



FLUOR DANIEL, INC.

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

Date: May 26, 1993

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

Transmittal No.: WDOE-445

Dear Mr. Grantham:

TRANSMITTAL

We enclose * copy of the items listed below. These are issued per US-DOE request.
 * 2 FULLSIZE, 1 REDUCED, 2 SPECIFICATION

Response due to Fluor: N/A
 Responds to: A170 PACKAGE

NUMBER	REV	DATE	TITLE
SEE TRANSMITTAL ATTACHMENT	-----	-----	A170 PACKAGE CONSTRUCTION POWER

Distribution:

Reference: FRP-965, FUP-480
 R. L. Long: DOE-RL, w/O
 TWP/AME Corresp Cntrl Cntr, MSIN A5-10
 (A170 PACKAGE), w/O
 P. Felise, WHC-RL (MSIN G6-06), w/1F & 1 SPEC
 Environmental Data Management Center
 (MSIN H6-08), w/1F & 1 SPEC
 D. Duncan, US EPA, Region X, w/O

Very truly yours,

R. S. Poulter for
 R. S. Poulter
 Project Director



MHF
 RSP:MHF:ts

TRANSMITTAL ATTACHMENT FOR PACKAGE SPECIFICATIONS

<u>SPEC NUMBER</u>	<u>PKG SIGN</u> <u>DATE</u>	<u>PKG</u> <u>REV</u>	<u>SECT</u> <u>REV</u>	<u>SECTION</u>	<u>SECTION TITLE</u>
B-595-C-A170	A170	3		CONSTRUCTION POWER	
	05/24/93		3	16110	ELECTRICAL MATERIALS AND DEVICES

TRANSMITTAL ATTACHMENT FOR PACKAGE DRAWINGS

PACKAGE NUMBER: A170

<u>DRAWING NUMBER</u>	<u>SHT NO.</u>	<u>REV</u>	<u>DATE</u>	<u>DRAWING TITLE</u>	<u>SOFTWARE</u>
H-2-122105	1	3	05/24/93	CONSTRUCTION POWER TITLE SHEET	A
H-2-122106	1	3	05/24/93	CONSTRUCTION POWER DRAWING INDEX	A
H-2-122107	1	3	05/24/93	ELECTRICAL GENERAL NOTES AND SYMBOLS	A
H-2-122108	1	3	05/24/93	ELECTRICAL STANDARD ASSEMBLIES AND DETAILS	A
H-2-122109	1	3	05/24/93	ELECTRICAL CONSTRUCTION POWER ONE-LINE DIAGRAM	A
H-2-122126	1	3	05/24/93	ELECTRICAL CONSTRUCTION UTILITIES OVERALL DISTRIBUTION PLAN	A
H-2-122126	2	1	05/24/93	ELECTRICAL CONSTRUCTION UTILITIES OVERALL DISTRIBUTION PLAN	A
H-2-122134	1	3	05/24/93	ELECTRICAL CONSTRUCTION UTILITIES DETAILS	A
H-2-122134	2	3	05/24/93	ELECTRICAL CONSTRUCTION UTILITIES DETAILS	A
H-2-122134	3	3	05/24/93	ELECTRICAL CONSTRUCTION UTILITIES DETAILS	A

SPECIFICATIONS

CONSTRUCTION POWER

B-595-C-A170

HANFORD WASTE VITRIFICATION PLANT

**U.S. DEPARTMENT OF ENERGY
RICHLAND OPERATIONS OFFICE**



**FLUOR DANIEL
ADVANCED TECHNOLOGY DIVISION
CONTRACT 8457**

**DOE CONTRACT NO.
DE-AC06-86RL10838**

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

MAY 25 1993

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

CONSTRUCTION POWER
SPECIFICATION B-595-C-A170

APPROVED FOR CONSTRUCTION

REVISION 3
PER CR-0690, CR-0881
AND FRR-0301A
ISSUE DATE 5/24/93

SAFETY CLASS 4 (REF)

APPROVED BY:

<u>M. H. Featherston</u>		<u>5/17/93</u>
M. H. Featherston	Procurement Package Engineer	Date
<u>Edward Jacobs</u>		<u>5-17-93</u>
E. R. Jacobs	Area Project Manager	Date
<u>Paul Spedid</u>		<u>5/13/93</u>
P. J. Spedid	Engineering Project Manager	Date
<u>David H. Abraham for J. L. Smets</u>		<u>5/17/93</u>
J. L. Smets	Systems Manager	Date
<u>M. K. Yee for A. K. Yee</u>		<u>5/13/93</u>
A. K. Yee	Independent Safety Manager	Date
<u>John Kelly for J. G. Kelly</u>		<u>5/18/93</u>
J. G. Kelly	Quality Assurance Manager	Date
<u>R. S. Poulter</u>		<u>17 MAY 93</u>
R. S. Poulter	Project Director	Date

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CONSTRUCTION POWER
B-595-C-A170

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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

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SECTION 16110
ELECTRICAL MATERIALS AND DEVICES
B-595-C-A170-16110

APPROVED FOR CONSTRUCTION

REVISION 3 PER CR-0690, CR-0881
& FRR-0301A
ISSUE DATE 5/24/93

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

ORIGINATOR:

CHECKER:

K. K. Srivastava 5/21/93
Kumar Srivastava, Electrical Eng. Date

Mona Morrow 5/21/93
Mona Morrow, Electrical Engineer Date

APPROVED BY:

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

5-21-93
Date

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SECTION 16110
ELECTRICAL MATERIALS AND DEVICES
B-595-C-A170-16110

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<u>ATTACHMENT</u>	<u>TITLE</u>
A	DATA SHEET - ELECTRICAL MATERIALS AND DEVICES
B	DETAIL 1 THROUGH 7

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SECTION 16110
ELECTRICAL MATERIALS AND DEVICES

PART 1 GENERAL

1.1 SUMMARY

This specification section covers the technical requirements for furnishing and delivery of electrical materials and devices for construction power distribution, and temporary and permanent parking lot and street lighting.

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 ASSOCIATION OF STATE HIGHWAY AND
TRANSPORTATION OFFICIALS (AASHTO)

- | | |
|--------------|--|
| AASHTO LTS2 | 1985 Structural Supports for Highway Signs, Luminaires and Traffic Signals |
| AASHTO HB-14 | 1989 Standard Specification for Highway Bridges |

AMERICAN CONCRETE INSTITUTE (ACI)

- | | |
|---------|--|
| ACI 318 | 1989 Building Code Requirements for Reinforced Concrete and Commentary |
|---------|--|

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- | | |
|--------------|---|
| ANSI 05.1 | 1987 Wood Poles - Specifications and Dimensions |
| ANSI 05.3 | 1989 Solid Sawn-Wood Crossarms and Braces - Specifications and Dimensions |
| ANSI B1.1 | 1989 Unified Inch Screw Threads |
| ANSI B18.2.1 | 1981 Square and Hex Bolts and Screws Inch Series |
| ANSI B18.2.2 | 1987 Square and Hex Nuts (Inch Series) |
| ANSI B18.6.3 | 1972 Machine Screws and Machine Screw Nuts |

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ANSI B18.22.1	1975 Plain Washers
ANSI C29.2	1983 Insulators - Wet-Process Porcelain and Toughened Glass - Suspension Type
ANSI C29.5	1984 Wet-Process Porcelain Insulators - Low and Medium Voltage Types
ANSI/IEEE C37.20.2	1987 Metal-Clad and Station-Type Cubicle Switchgear, Standard for
ANSI/IEEE C62.11	1987 Metal-Oxide Surge Arresters for AC Power Circuits, Standard for
ANSI C78.41	1987 Electric Lamps - Low Pressure Sodium Lamps
ANSI C82.9	1988 High Intensity Discharge and Low Pressure Sodium Lamps, Ballasts, and Transformers - Definitions
ANSI C119.1	1986 Electric Connectors - Sealed Insulated Underground Connector Systems Rated 600 Volts

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A36	1989 Standard Specification for Structural Steel
ASTM A153	1982 (R 1987) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A307	1990 Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
ASTM A475	1989 Standard Specification for Zinc Coated Steel Wire Strand
ASTM A500	1989 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A615	1990 Standard Specification for Performed and Plain Billet-Steel Bars for Concrete Reinforcement

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ASTM 706	1990 Standard Specification for Low Alloy Steel Deformed Bars for Concrete Reinforcement
ASTM B3	1990 Standard Specification for Soft or Annealed Copper Wire
ASTM B8	1986 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM B230	1989 Standard Specification for Aluminum 1350-H19 Wire for Electrical Purposes
ASTM B232	1986 Standard Specification for Concentric-Lay-Stranded Aluminum Conductors, Coated-Steel Reinforced (ACSR)
ASTM B498	1988 Standard Specification for Zinc-Coated (Galvanized) Steel Core Wire for aluminum Conductors, Steel Reinforced (ACSR)
ASTM C33	1990 Standard Specification for Concrete Aggregates
ASTM C150	1989 Standard Specification for Portland Cement
ASTM F1135	1988 Standard Specification for Cadmium or Zinc Chromate Organic Corrosion Protective Coating for Fasteners

AMERICAN WOOD-PRESERVERS ASSOCIATION (AWPA)

AWPA C7	1990 Incised (Red, White and Yellow Cedar) Pole Butts, Thermal Treatment
---------	--

ASSOCIATION OF EDISON ILLUMINATING COMPANIES (AEIC)

AEIC CS6	1987 Specification for Ethylene Propylene Rubber Insulated Shielded Power Cables Rated 5 through 69 kV
----------	--

FEDERAL SPECIFICATIONS (FS)

FS TT-P-645B	1990 Primer, Paint, Zinc-Molybdate, Alkyd Type
--------------	--

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FEDERAL STANDARDS (FS)

FS-595B 1989 Colors Used in Government
Procurement

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC. (IEEE)

IEEE 48 1990 Standard for High Voltage AC Cable
Terminations Test Procedures and
Requirements

IEEE 404 1986 Standard for Cable Joints for use
with Extruded Dielectric Cable Rated
5000V through 46,000V and Cable Joints
for use with Laminated Dielectric Cable
Rated 2500V through 500,000V

NATIONAL ELECTRIC MANUFACTURERS ASSOCIATION (NEMA)

NEMA LA1 1986 Surge Arresters

NEMA PB2 1989 Dead-Front Distribution Switchboards

NEMA RN1 1986 Polyvinyl-Chloride (PVC) Externally
Coated Galvanized Rigid Steel Conduit and
Intermediate Metal Conduit

NEMA WC7 1988 Cross-Linked-Thermosetting-
Polyethylene-Insulated Wire and Cable for
the Transmission and Distribution of
Electrical Energy

NEMA WC8 1988 Ethylene-Propylene-Rubber-Insulated
Wire and Cable for the Transmission and
Distribution of Electrical Energy

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 1990 National Electrical Code (NEC)

UNDERWRITERS LABORATORIES (UL)

UL 44 1983 Rubber Insulated Wires and Cables,
Twelfth Edition

UL 198G 1988 Standard for Fuses for Supplementary
Overcurrent Protection

UL 467 1984 Grounding and Bonding Equipment

UL 510 1986 Insulating Tape, Sixth Edition

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UL 651	1989 Schedule 40 and 80 Rigid PVC Conduit, Fifth Edition
UL 891	1984 Dead-Front Switchboards
UL 1072	1986 Medium Voltage Power Cables
UL 1277	1989 List of Acceptable Sunlight-Resistant PVC Compounds for use as Insulating and/or Jacketing Material on Listed Outdoor Flexible Cords and Christmas-Tree Wire and Cords, Medium-Voltage Cable, Power and Control Tray Cable, and Metal Clad Cable
UL 1449	1985 Transient Voltage Surge Suppressors
UL 1581	1983 Reference Standard for Electrical Wires, Cables and Flexible Cords

1.3 RELATED REQUIREMENTS

Specification Section 01730	Operation and Maintenance Data
Specification Section 16100	Electrical Installation
Specification Section 16905	Electrical Testing

1.4 SUBMITTALS

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

1.4.1 Manufacturer's Catalog Data including the following:

- A. Splice Kit
- B. PVC Conduit
- C. Sealant
- D. Fused Interrupter Switches
- E. Insulating Tape
- F. Marking Tape
- G. Ground Conductors
- H. Ground Rods

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- I. Grounding Assembly
- J. Ground Connectors
- K. Anti-Oxidizing Compound
- L. Exothermic Welds
- M. Surge Arresters
- N. Cable Termination Kits
- O. Cable to Bus Connection Kits
- P. Wood Poles
- Q. 5 kV Crossarm Pin Insulator Assembly
- R. 5 kV Dead-End Assembly
- S. 15 kV Dead-End Insulator Assembly
- T. Double Crossarm Assembly for Dead-End Loading
- U. Down Guy Assembly
- V. Horizontal Guy Assembly
- W. Miscellaneous Pole Line Devices
- X. Exterior Lighting Assembly
- Y. 600 Volt Power Cable
- Z. Medium Voltage Cable
- AA. Concrete Boxes
- AB. Concrete Box Covers
- AC. Concrete Cone Anchors
- AD. Underground Cable Markers
- AE. Hardware
- AF. Guy Wire
- AG. Manholes

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- 1.4.2 Shop Drawings
 - 1.4.2.1 Switchboard
 - 1.4.2.1.1 Submit switchboard detailed shop drawings indicating outline dimensions, enclosure construction, shipping splits, lifting and supporting points, single line diagrams, elementary and detailed connection diagrams and equipment electrical ratings.
 - 1.4.2.1.2 Also provide the approximate positions of the overall vertical and horizontal centers of gravity of the switchboards, size and locations of anchor bolts, hold down and/or base frame details and the shipping and operating weights.
 - 1.4.2.2 Exterior Lighting Assembly
 - 1.4.2.2.1 Luminaires

Include dimensions, effective projected area (EPA), accessories, and installation and construction details. Photometric data, including zonal lumen data, and candlepower distribution data.
 - 1.4.2.2.2 Poles

Include dimensions, wind load withstand capability and maximum pole deflection under maximum loading conditions in accordance with AASHTO LTS2.
 - 1.4.2.2.3 Anchor base and anchor bolt pattern details and criteria.
 - 1.4.2.3 Power Cables

Submit detailed shop drawings indicating dimensions and assembly of the 5 kV and 15 kV power cables and the ACSR conductors.

 - 1.4.2.3.1 Sag and Tension Data

Submit manufacturer's data for stringing sags and tensions. Span range shall be 100 to 350 feet at 50 foot intervals. Temperature range shall be -20°F to 110°F at 10° intervals.
- 1.4.3 Manufacturer's Installation Instructions for the following:
 - 1.4.3.1 Switchboards
 - 1.4.3.2 Fused Interrupter Switches
 - 1.4.3.3 Surge Arresters

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1.4.4 Test Procedures

Test procedures for Buyer's approval, to include factory tests described under Factory Acceptance Test paragraph of this section.

1.4.5 Test Reports

1.4.5.1 Power Cable

Submit Certified Factory Test Reports on 5 kV and 15 kV power cables and ACSR conductors.

1.4.6 Operation and maintenance data in accordance with Specification Section 01730, Operation and Maintenance Data.

1.5 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

1.5.1 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

1.5.2 Operating Environment

A. Normal Temperature -20° to 110°F

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

2.1.1 Splice Kit

Splice kits for low and medium voltage cables shall be waterproof and shall be in accordance with ANSI C119.1 and IEEE 404 respectively. Raychem RVS and HVS respectively or equal.

2.1.2 PVC Conduit

PVC conduit shall be Schedule 80, as shown on the Contract Drawings, in accordance with UL 651.

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2.1.3 Sealant

Sealant for preventing moisture from entering conduits shall be a non-oxidizing and noncorrosive compound, Dow Corning 738 or equal.

2.1.4 Pole Mounted Fused Interrupter Switches

2.1.4.1 Fused interrupter switches shall be distribution class, 3 pole for outdoor operation. A disconnect stick shall be provided for switch operation.

2.1.4.2 Fused interrupter switches shall be outdoor type, rated 5 and 15 kV, 60 and 95 kV BIL respectively, 600 amp continuous, 20 kA interrupting rating, silver plated contacts with power fuse sizes as shown on the Contract Drawings. Fuses shall be in accordance with UL 198G. S&C switches with SM-5 fuses or approved equal.

2.1.5 Switchboard

2.1.5.1 Switchboard assembly shall be of the outdoor dead-front distribution type, containing main circuit breaker, branch circuit breakers with the necessary accessory components, all completely factory assembled and operationally checked in accordance with NEMA PB2 and UL 891. For details see Contract Drawings.

2.1.5.2 Furnish the power bus, the ground bus and a 50% neutral bus in all sections of the switchboards. Buses shall be copper.

2.1.5.3 Incoming supply is 3 phase, 4 wire, plus ground, busduct (bus throat) from the transformers. Busducts and transformers are by others.

Furnish all buses and hardware to connect the incoming busducts to the switchboards. Buses shall be copper.

Switchboard seller shall be completely responsible for matching the busduct throat to the switchboard.

2.1.5.4 Outgoing conduits shall be at the bottom.

2.1.5.5 Main circuit breakers shall be adjustable, thermal magnetic trip type with built-in ground fault protection. The sensors shall enclose the neutral. Main circuit breakers shall be provided with double lugs at the line side of the circuit breakers where shown on the Contract Drawings.

2.1.5.6 Branch circuit breakers shall be totally front accessible, thermal magnetic trip type with breaker ratings as shown on the Contract Drawings.

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- 2.1.5.7 Switchboard enclosure sizes shall be large enough to accommodate all the branch circuit wiring.
- 2.1.5.8 A vapor-tight lighting fixture with globe, guard and an incandescent lamp and a switch shall be provided for exterior lighting. The fixture shall be rated 120 Vac. The power to the lighting fixture shall be derived from the switchboard by using a 480-120 Vac control power transformer with two primary fuses and one secondary fuse for one leg and the other leg grounded.
- 2.1.5.9 Each switchboard and all breakers, including the main breaker, "spares" and "spaces," shall have a nameplate as follows:
- 2.1.5.9.1 Nameplates shall be of laminated black and white plastic arranged to show black engraving on white background.
- 2.1.5.9.2 Nameplate descriptions shall be as shown on the Contract Drawings. Sample nameplates for the switchboard and breakers are shown on Attachment A.
- 2.1.5.9.3 Nameplates shall be mounted using stainless steel screws. Glued or "Press-On" type of fastening is not acceptable.
- 2.1.5.9.4 The switchboard nameplate shall be mounted in the center of the panel where the main circuit breaker is located and shall be spaced 1-1/2 inch from the top of the panel. The feeder breaker nameplates shall be mounted near the breakers.
- 2.1.6 Tapes
- 2.1.6.1 Insulating Tape
- Insulating tape shall be vinyl insulating type with a continuous temperature rating of 105°C, in accordance with UL 510. 3M Super 88 Series or equal.
- 2.1.6.2 Marking Tape
- Plastic marking tape for identifying underground electrical cable shall be six inches wide, yellow color, without printing. Reef Industries Terra Tape or equal.
- 2.1.7 Ground Conductors
- Ground loop shall be #500 kcmil, and bonded connections sized as indicated on the Contract Drawings. They shall be bare copper wire in accordance with ASTM B3. Wire shall be Class B concentric stranded in accordance with ASTM B8.

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2.1.8 Ground Rods

Ground rods shall be copper clad steel or copper bonded, 5/8 inch diameter by 8 feet or 10 feet long, threaded, as shown on Contract Drawings. Joslyn Number J9158 and J9160 or equal. Ground rods for power poles shall be 5/8 inch diameter by 8 feet long and in accordance with UL 467. Carolina Catalog Number P588 or equal.

2.1.9 Grounding Assembly

Distribution grounding assembly shall be in accordance with Detail 6, Attachment B.

2.1.10 Ground Connectors

Grounding connectors, screws, bolts or clamps used shall be bronze or Everdur, unless specifically indicated otherwise on the Contract Drawings, and shall be in accordance with UL 467.

2.1.11 Anti-Oxidizing Compound

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

2.1.12 Exothermic Welds

All below grade ground connections shall be Exothermic type, CADWELD or equal.

2.1.13 Surge Arresters

Surge arresters shall be 5 and 15 kV systems, 60 and 95 kV BIL respectively, distribution class in accordance with ANSI/IEEE C62.11, NEMA LA-1, UL-1449 and with NEMA type "A" bracket for crossarm mounting. Joslyn Catalog numbers J9221-QS and J9251-QS respectively or equal.

2.1.14 Cable Termination Kits

2.1.14.1 Cable termination kit for termination of 15 kV shielded copper conductor cables shall include stress relief cones and shall be in accordance with IEEE 48 and IEEE 404. The size and number of conductors of 15 kV shielded power cables shall be as shown on the Contract Drawings. Raychem HVT or equal.

2.1.14.2 Cable termination kit for termination of 5 kV non-shielded cables shall include insulating tubes and sealant and shall be suitable for outdoor installation. The termination kit shall be in accordance with IEEE 48. Raychem HVT-50 or equal.

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2.1.15 Cable to Bus Connection Kits

Cable to bus connection kits shall be made in accordance with ANSI/IEEE C37.20.2. The size of cable shall be as shown on the Contract Drawings. Raychem HVBC or equal.

2.1.16 Wood Poles for Power Distribution

Wood pole shall include shaft and crossarm and shall be designed for the installation of fused interrupter switches and surge arresters.

2.1.16.1 Shaft

2.1.16.1.1 Shaft shall be 45 feet long ANSI Class 2 and shall consist of one piece Western Red Cedar cut round straight wood in accordance with ANSI 05.1. Shaft shall be butt treated and branded or marked in accordance with AWWA C7 and ANSI 05.1 respectively.

2.1.16.1.2 The pole roof and gain shall be factory coated with preservative solution. The top of each pole shall have a one-way roof cut sloping 30 degrees (120 degrees with pole axis) and the cut surface shall face at right angles to the pole face.

2.1.16.2 Wood Crossarms

Wood crossarms shall be as shown on the Contract Drawings, Attachment B and ANSI 05.3.

2.1.17 5 kV Crossarm Pin Insulator Assembly

5 kV crossarm pin insulator assembly shall consist of a pin type distribution insulator in accordance with ANSI C29.5, Class 55-2 and 5/8" x 6-1/2" long shank forged steel insulator pin, 8 inches high.

2.1.18 5 kV Dead-End Assembly

5 kV dead-end assembly shall consist of a suspension insulator, thimble clevis, eye nut and connector as shown on Detail 1, Attachment B.

2.1.19 15 kV Crossarm Pin Insulator Assembly

15 kV crossarm pin insulator assembly shall consist of a pin type insulator in accordance with ANSI C29.5, Class 55-5 and a 5/8" x 6-1/2" long shank forged steel insulator pin, 8 inches high.

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2.1.20 15 kV Dead-End Insulator Assembly

15 kV dead-end insulator assembly shall consist of suspension insulators, strain clamp and eye nut as shown on Detail 2, Attachment B.

2.1.21 Double Crossarm Assembly for Dead-End Loading

Double crossarm assembly for dead-end loading shall consist of crossarms, crossarm braces, machine bolt, washers, carriage bolts, lag screws and double arming bolts as shown on Detail 4, Attachment B.

2.1.22 Down Guy Assembly

Down guy assembly shall consist of 7 guy strands, guy clamps, serving sleeves, strain insulator, pole band, single guy attachment, guy roller, plastic guy guard, anchor rod and concrete cone anchor as shown on Detail 7, Attachment B.

2.1.23 Horizontal Guy Assembly

7/16 inch utilities horizontal guy assembly shall consist of 7 guy strands, strain insulators, pole bands and single guy attachment as shown on Detail 7, Attachment B.

2.1.24 Miscellaneous Pole Line Devices

The following materials for the above assemblies shall be as specified below or equal:

Eye-Nuts	Chance Series 6500
Serving Sleeves	Chance Series 6450
Plastic Guy Guard	Joslyn #J1492Y
Threaded Forged-Eye Anchor Rods	Joslyn #J7540
Guy Roller	Hughes Bros #28082/3
Connecting Link	Hughes #3153
Pole Band	Hughes #3105
Guy Grip	Preformed #GDE-1108, BG-2115/6
Guy Clamps	Joslyn #J931
Double Arming Bolts	Joslyn Series #J8800
Machine Bolts	Joslyn Series #J8800, J8700, J8900

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Carriage Bolts	Joslyn Series #J8600
Flat Steel Crossarm Braces	Joslyn #J7028
Wood Crossarm Brace	Joslyn #J5188, J5172
Thimble Clevises	Joslyn #J0555
Lag Screws	Joslyn #J8755
Galvanized Staple	Joslyn #J128
Copper-Coated Staple	Joslyn #J6493
Split Bolt Connector, Tinned	Burndy Type KSU
Ground Rod Clamps Galvanized	Joslyn #J8225
Plastic Ground Wire Molding	Joslyn #PM128
Galvanized Ground Rod	Joslyn #J5328
Copperbonded Ground Rod	Joslyn #P588
Ground Rod Clamps Copper	Burndy GRC58

2.1.25 Exterior Lighting Assembly

The pole, luminaire, lamp and bracket arm shall be an integral assembly of exterior lighting designed in accordance with the standards specified in this section and as shown on the Contract Drawings.

2.1.26 Luminaire

2.1.26.1 Luminaire shall be 95 percent or higher power factor, low pressure sodium, one lamp, 180 watt, 480V, single phase, pole mounted type with two inch slipfitter and clear flat lens, dual in-line fuses and individual photocell control.

Housing shall be constructed of formed and welded aluminum sheet with integral high power factor ballast in accordance with ANSI C82.9, rated for -20°F starting, enclosed and gasketed suitable for outdoor use. Each housing shall be finished with a zinc-molybdate primer coat, alkyd type, conforming to FS-TT-P-645B, and painted with a medium gray paint, Color No. 16492, pigmented alkyd gloss enamel in accordance with FS-595B, Quality Lighting/MWC #SE-180 LPS, or approved equal.

2.1.26.2 Lamps

Low-pressure sodium (LPS) lamps shall meet ANSI C78.41 for 180 watt lamp type L74. Venture lighting Pro-Arc #76415 or equal.

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2.1.26.3 Poles

2.1.26.3.1 Steel Poles

- A. The pole assembly complete with luminaire in place shall be capable of withstanding a sustained wind velocity of 70 mph with gust wind velocity of 1.3 times the sustained wind velocity in accordance with AASHTO LTS2.
- B. Steel poles shall be 30 feet long, and shall include shaft, anchor base, handhole with cover and grounding terminal, base cover, anchor bolts, leveling shims, and tenon for mounting two foot side arm with two inch slipfitter. Shaft shall consist of one piece straight square steel tubing in accordance with ASTM A500, Grade B. Spaulding 30 foot, square, straight steel pole with finish to match luminaire.
- C. Anchor base shall be circumferentially welded to the pole shaft. The tensile capacity of the weld attaching the shaft to the base shall exceed the tensile capacity of the shaft. The base shall be fabricated from carbon steel in accordance with ASTM A36.
- D. Bracket arm shall be two foot side arm with two inch slip-fitter to match pole top tenon. An opening in the tenon mounting plate shall be part of the continuous wireway from the pole base to the luminaire. Bracket arm primer and paint shall match pole shaft and luminaire finishes. Bracket arm shall be furnished with hardware required for mounting luminaire with two inch slipfitter.
- E. Anchor bolts shall be in accordance with ASTM A307, Grade C ASTM A36 and as shown on the Contract Drawing. Anchor bolt and hex nuts shall be galvanized in accordance with ASTM A153.

2.1.26.3.2 Wood Poles for Lighting

Wood pole shall include shaft and bracket arm and shall be designed for installation of two inch slipfitter type luminaire.

A. Shaft

- 1) Shaft shall be 40 or 50 feet long as shown on the Contract Drawings, ANSI Class 4 and shall consist of one piece Western Red Cedar cut round straight wood in accordance with ANSI 05.1. Shaft shall be butt treated and branded or marked in accordance with AWWA C7 and ANSI 05.1 respectively.

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- 2) The pole roof and gain shall be factory coated with preservative solution. The top of each pole shall have a one-way roof cut sloping 30 degrees (120 degrees with pole axis) and the cut surface shall face at right angles to the pole face.

B. Bracket Arm

Bracket arm shall be a standard steel luminaire support for wood poles. The steel luminaire support shall be hot dip galvanized in accordance with ASTM A153 for lasting protection from the elements and shall have a 2-1/2 foot horizontal length and 8 inch rise. Bracket arm shall be furnished with ground lug assembly and hardware required for mounting luminaire with a two inch slipfitter. Joslyn Catalog Number J728003 or equal.

2.1.26.3.3 Stub Poles

- A. Stub poles shall include shaft and shall be designed for pole support by using horizontal and down guys.
- B. Shaft shall be 40 feet long ANSI Class 4 and shall consist of one piece Western Red Cedar cut round straight wood in accordance with ANSI 05.1. Shaft shall be butt treated and branded or marked in accordance with AWPA C7 and ANSI 05.1 respectively.
- C. The pole roof and gain shall be factory coated with preservative solution. The top of each pole shall have a one-way roof cut sloping 30 degrees (120 degrees with pole axis) and the cut surface shall face at right angles to the pole face.

2.1.27 600 Volt Power Cable

2.1.27.1 General Requirements

- 2.1.27.1.1 Cable supplied shall be new, and shall be the product of an established manufacturer normally engaged in the production of cable, with a minimum of 5 years documented experience in the manufacture of cable.
- 2.1.27.1.2 Cable on each reel shall be continuous. Factory splices or factory repairs are not acceptable in individual conductors. Cable shall be free of abrasions and/or abnormalities.

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2.1.27.1.3 Conductor Identification

Conductors shall be color coded as indicated below:

- | | |
|------------------------|----------|
| A. Grounded neutral | - Gray |
| B. Grounding conductor | - Green |
| C. Phase "A" conductor | - Brown |
| D. Phase "B" conductor | - Orange |
| E. Phase "C" conductor | - Yellow |

2.1.27.2 Single Conductor Cable

2.1.27.2.1 Design Requirements

Cables shall be single conductor, stranded copper, 600 volts, Type XHHW in accordance with the National Electrical Code.

2.1.27.3 Multiconductor Direct Burial Cable

2.1.27.3.1 General Requirements

Cables shall have a 600 volt rating. They shall be Type TC multiconductor cable suitable for direct burial in accordance with NFPA 70 (NEC) Articles 340 and 310, UL 1277 and UL 1581. All cables shall include an insulated ground wire. Okonite X-0lene-Okoseal Type TC cable or equal.

2.1.27.3.2 Conductor

Conductors shall be annealed, bare copper wire in accordance with ASTM B3 and shall be Class B, concentric stranded in accordance with Part 2 of NEMA WC7 and ASTM B8.

2.1.27.3.3 Conductor Insulation

The conductor insulation shall be flame-retardant, cross-linked-polyethylene compound, type XHHW in accordance with NEMA WC7 and UL 44.

2.1.27.3.4 Jacket

Overall jacket shall be polyvinyl chloride complying with UL 1277 and UL 1581 and shall be sunlight resistant and suitable for direct burial.

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2.1.27.4 Multiconductor Lighting Fixture Cords

Cable shall be 3/C #12, stranded copper, 600 volt, type S0 cord.

2.1.28 Medium Voltage Cable

2.1.28.1 Underground Cable

2.1.28.1.1 15 kV Cable

A. General

The cable shall be shielded, copper, three conductor, rated 90°C for operation at a nominal 15 kV. The cable shall be suitable for direct burial, and shall be suitable for intermittent or continuous submersion in water, Okonite type CLX, or approved equal.

B. Conductors

The cables shall have copper conductors with concentric lay Class B round stranding in accordance with the requirements of ASTM B8 and NEMA WC8. The conductor sizes shall be as indicated on the Contract Drawings.

C. Conductor Screen

The stress control layer shall be an extruded semiconducting ethylene-propylene rubber material meeting the requirements of NEMA WC8, AEIC CS6 and UL 1072.

D. Insulation

The primary insulation shall be 15 kV voltage class, ethylene-propylene rubber (133 percent insulation level). It shall meet the requirements of NEMA WC8, UL 1072 and AEIC CS6. The minimum average thickness of insulations shall be 220 mils. The minimum thickness at any point shall not be less than 90 percent of the minimum average.

E. Insulation Screen

The nonmetallic insulation screen shall be an extruded semi-conducting ethylene-propylene rubber material extruded directly over the insulation, and meeting the requirements of NEMA WC8, UL 1072 and AEIC CS6.

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F. Metallic Shield

The extruded semi-conducting screen shall be covered with an uncoated copper shielding tape. It shall be applied helically with a 12-1/2 percent minimum overlap.

G. Cable Assembly

The three shielded conductors shall be cabled together with non-hydroscopic moisture resistant fillers and a bare copper grounding conductor in contact with the metal shielded tape between conductors. The cabled assembly shall have a left hand lay and shall provide a round substantially filled core covered by a binder tape overall.

H. Sheath

The three shielded conductors shall have a tight fitting, continuously welded, impervious, corrugated aluminum sheath applied over the cable core in accordance with UL 1072.

I. Grounding Conductor

The three shielded conductors shall have an equipment grounding conductor of uninsulated copper, Class B stranded per ASTM B8 inserted into cable assembly and in contact with metal shielding tape. The size of the equipment grounding conductor shall be equivalent to that shown on the Contract Drawings.

J. Overall Jacket

A continuous extruded jacket of moisture, heat, oil, and abrasion resistant black polyvinylchloride (PVC) meeting the requirements of NEMA WC8 and UL-1072 shall be applied over the metallic shield. The minimum thickness at any point shall not be less than 80 percent of the minimum average value in accordance with NEMA WC8.

K. Conductor Identification

A colored mylar strip, black/red/blue, shall be placed longitudinally under the copper shield tape for phase identification.

2.1.28.1.2 5 kV Cable

A. General

The cable shall be copper, single conductor, nonshielded and rated 90°C. The cable shall meet the requirements of the

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NEC, Article 310-6, Okonite type Okoguard-Okoseal, or approved equal.

B. Conductors

Conductors shall be concentric lay Class B round stranded in accordance with the requirements of ASTM B8 and NEMA WC8. The conductor sizes shall be as indicated on the Contract Drawings.

C. Conductor Screen

The stress control layer shall be an extruded semiconducting ethylene-propylene rubber material meeting the requirements of NEMA WC8, AEIC CS6 and UL 1072.

D. Insulation

The primary insulation shall be 5 kV voltage class, ethylene-propylene rubber (133 percent insulation level). It shall meet the requirements of NEMA WC8 and UL 1072. The minimum average thickness of insulations shall be 125 mils. The minimum thickness at any point shall not be less than 90 percent of the minimum average.

E. Overall Jacket

A continuous extruded jacket of moisture, heat, oil, and abrasion resistant polyvinylchloride (PVC) meeting the requirements of NEMA WC8 and UL-1072 shall be applied over the insulation. The minimum jacket thickness at any point shall not be less than 80 percent of the minimum average value in accordance with NEMA WC8.

2.1.28.2 Aerial Cable

2.1.28.2.1 General

The cable shall be suitable for overhead installation.

2.1.28.2.2 Conductors

The overhead cable shall be bare aluminum conductor steel reinforced (ACSR) with concentric lay stranded in accordance with ASTM B230, B232 and B498. The conductor type and class shall be as follows:

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CONDUCTOR SIZE (AWG/Kcmil)	ACSR STRANDING	CLASS	CODE NAME	RATED BREAKING STRENGTH (POUNDS)
#2	7/1	AA-A	SPARATE	3640
#4	6/1	AA-A	SWAN	1800
336.4	30/7	AA	ORIOLE	17,300

2.1.29 Concrete Boxes

Concrete boxes shall be 12 inch diameter reinforced concrete. Brooks Products "PB" or equal.

2.1.30 Concrete Box Covers

Concrete box covers shall be bolt-down type marked with "GROUND" reinforced concrete for concrete ground box Brooks Products or equal.

2.1.31 Concrete Cone Anchors

Concrete cone anchors shall be rated for 3000 pounds per square inch compressive strength at 28 days. Cones shall have the following dimensions in inches:

Diameter of top	3±1/2
Diameter of bottom	24±1
Diameter of hole through axis	1-3/16±1/16
Height	16±1/2

Concrete cone anchors shall be Reese Concrete Product Manufacturing Co. anchor or equal.

2.1.32 Underground Cable Markers

Route markers shall be galvanized steel with a 3 inch steel helix welded to a 7/16 inch diameter rod. Attached to the rod shall be a 2 inch by 3/4 inch by 30 inch 10 gauge steel stake with a 4 inch by 7 inch steel identification plate mounted near the top. The designation "Cable" with a directional arrow shall be marked on face plate. AB Chance Catalog No. C554-0183.

2.1.33 Hardware

Hardware shall be cadmium plated steel in accordance with ASTM F1135 and the following:

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Machine screws	ANSI B1.1, B18.6.3
Machine hex head nuts and bolts	ANSI B1.1, B18.2.1, B18.2.2, ASTM A307
Plain washers	ANSI B18.22.1

2.1.34 Guy Wire

Guy wire shall be galvanized steel strand in accordance with ASTM A475.

2.1.35 Precast Manholes

2.1.35.1 Precast manholes shall be manufactured from reinforced concrete and be produced in a plant specifically designed for that purpose. All work shall be performed under strict plant controlled procedures and supervision.

2.1.35.2 Manhole sizes and knockout details shall be as shown on the Contract Drawings.

2.1.35.3 Precast concrete shall meet the provision of ACI 318, Chapter 16.

2.1.35.4 Manholes shall be designed to resist the following loads in accordance with ACI 318:

A. Dead loads due to self weight and any soil overburden loads. The weight of the compacted soil shall be taken to be 110 pcf.

B. Live loads due to an HS20-44 truck load as defined in AASHTO HB-14 acting directly over or adjacent to each manhole.

C. Lateral earth pressure based on an at-rest lateral earth pressure coefficient of 0.43. To account for increased lateral pressure due to residual compaction effects the lateral earth pressure shall not be taken to be less than 500 psf at any location less than 11 feet beneath the finished surface. The applied lateral earth pressure shall be increased by the application of an additional surcharge to take into account the effect of traffic loads.

D. Impact loads due to traffic loads.

E. Erection and transportation loads.

2.1.35.5 Precast manholes shall be manufactured from normal weight concrete in accordance with the following:

A. Cement conforming to ASTM C150 Type I or II.

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- B. Aggregates conforming to ASTM C33. Gradation as determined by the manufacturer to meet design requirements.
 - C. Admixtures as determined by the manufacturer to meet design requirements.
 - D. Reinforcing steel conforming to ASTM A615 Grade 60 or ASTM A706 Grade 60.
 - E. Concrete mix as determined by the manufacturer to meet the design requirements but shall not have a 28 day compression strength less than 4000 psi.
- 2.1.35.6 Each compartment of a precast manhole shall be provided a unique identifier (mark number), in accordance with Paragraph 16.5 of ACI 318.
- 2.1.35.7 Manhole covers shall be round cast iron heavy-traffic type not less than 30 inches in diameter. Covers shall be identified by cast-in lettering "ELECTRICAL."
- 2.1.35.8 Plastic joint sealing compound shall be provided to seal joint between manhole sections.
- 2.1.35.9 Manholes shall be provided with 12-inch diameter drain sump, pulling irons and cast in slotted channels for cable supports as shown on the Contract Drawings.
- 2.1.35.10 Two knockouts for ground rods shall be provided at opposing ends of the manhole.
- 2.1.35.11 Manholes shall be provided with an adequate size ladder.
- 2.1.35.12 Manholes shall be Utility Vault Company Type "LA" or equal.

2.2 FABRICATION AND MANUFACTURE

2.2.1 Factory Acceptance Test

2.2.1.1 Medium Voltage Cable

2.2.1.1.1 All cables shall be subjected to factory tests.

2.2.1.1.2 A certified copy of the actual production test values for the insulated power cables and the ACSR conductors shall be provided in accordance with AEIC CS6 and ASTM B498 respectively.

2.2.1.2 Switchboards

2.2.1.2.1 All switchboards shall be factory tested.

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- 2.2.1.2.2 A certified copy of the actual production test values for the switchboards shall be provided in accordance with NEMA PB2.

PART 3 EXECUTION

3.1 INSTALLATION, APPLICATION AND ERECTION

Electrical materials and devices shall be installed in accordance with Specification Section 16100, Electrical Installation.

3.2 FIELD QUALITY CONTROL

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

END OF SECTION

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ATTACHMENT A

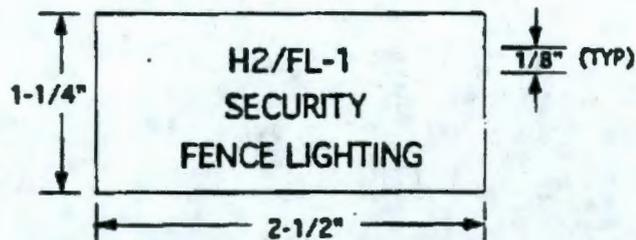
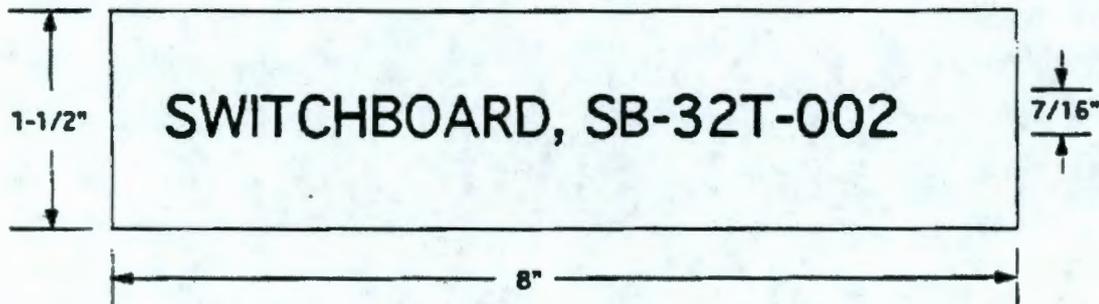
DATA SHEET

ELECTRICAL MATERIALS AND DEVICES

Specification No.: B-595-C-A170-16110

EQUIPMENT NO.: SB-32T
SERVICE: Switchboard
CONTRACT NO.: 845734
PROJECT: HWVP
BY: R. A. HUR DATE: 03/18/91
REV.: 2 DATE: _____
CUSTOMER: DOE

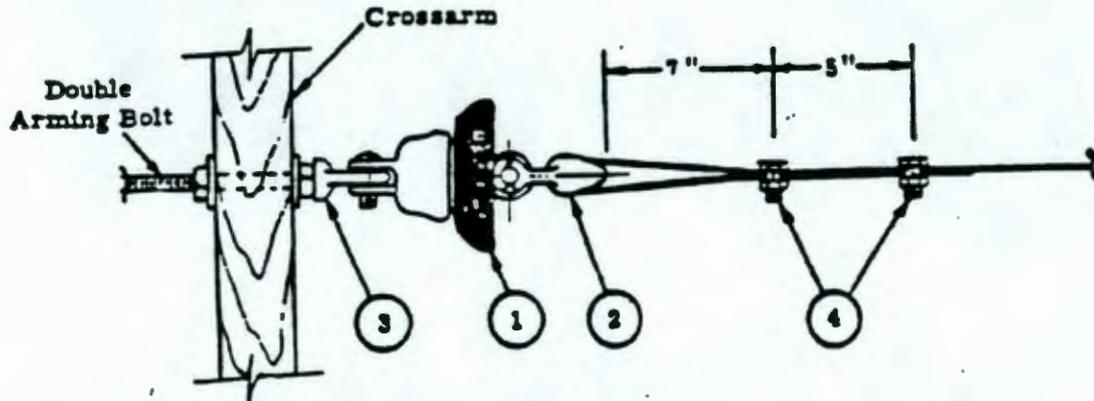
SAMPLE NAMEPLATES
NOT TO SCALE



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ATTACHMENT B



BILL OF MATERIAL		
ITEM NO.	QTY	DESCRIPTION
1	1	Insulator - Suspension, ANSI C29.2, Class 52-1
2	1	Thimble Clevis, Galvanized Forged Steel
3	1	Eye Nut - 5/8" § *
4	2	Connector - Split Bolt, Tinned

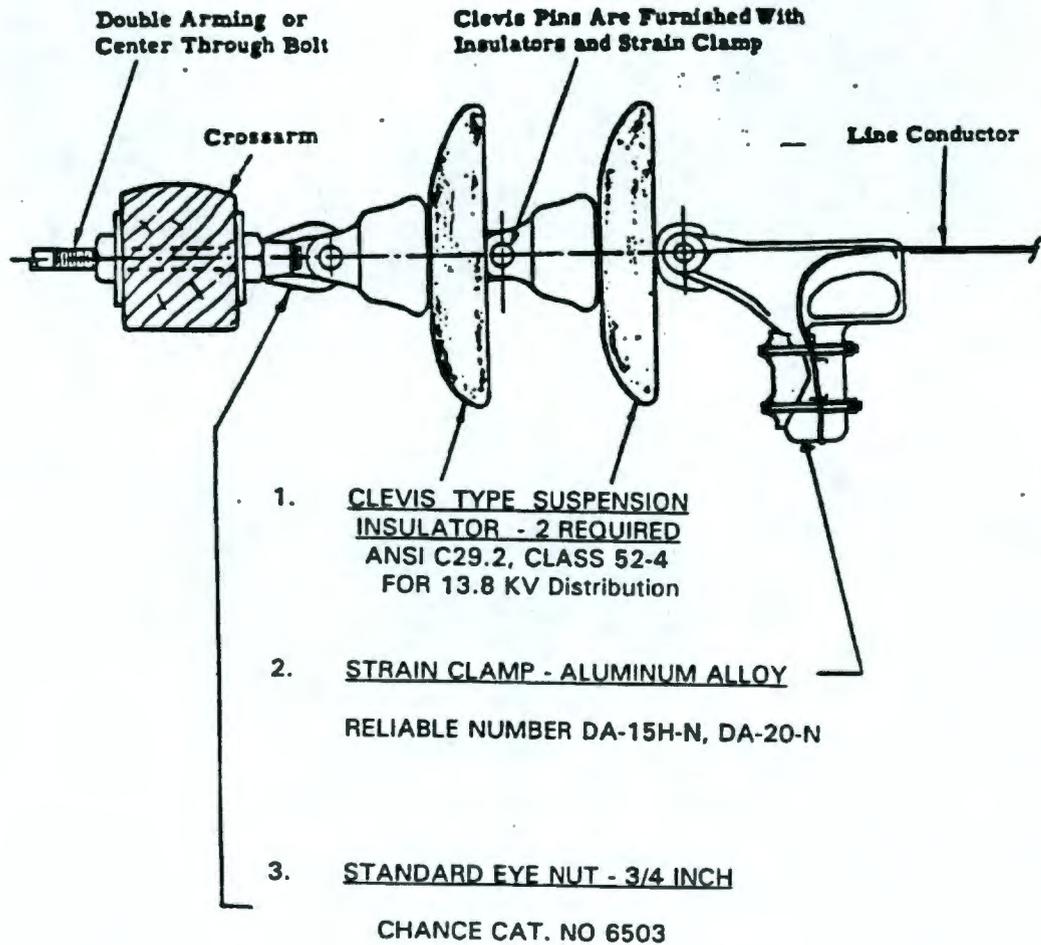
* Hardware shall conform to American National Standard Institute.

§ Use 5/8" eye nut (item 3) with conductors No. 1/0 Awg and smaller. For heavier construction, use 3/4" eye nut, or 3/4" double arming eye bolts.

PRIMARY DEAD-END ASSEMBLY, 5 kV
DETAIL 1

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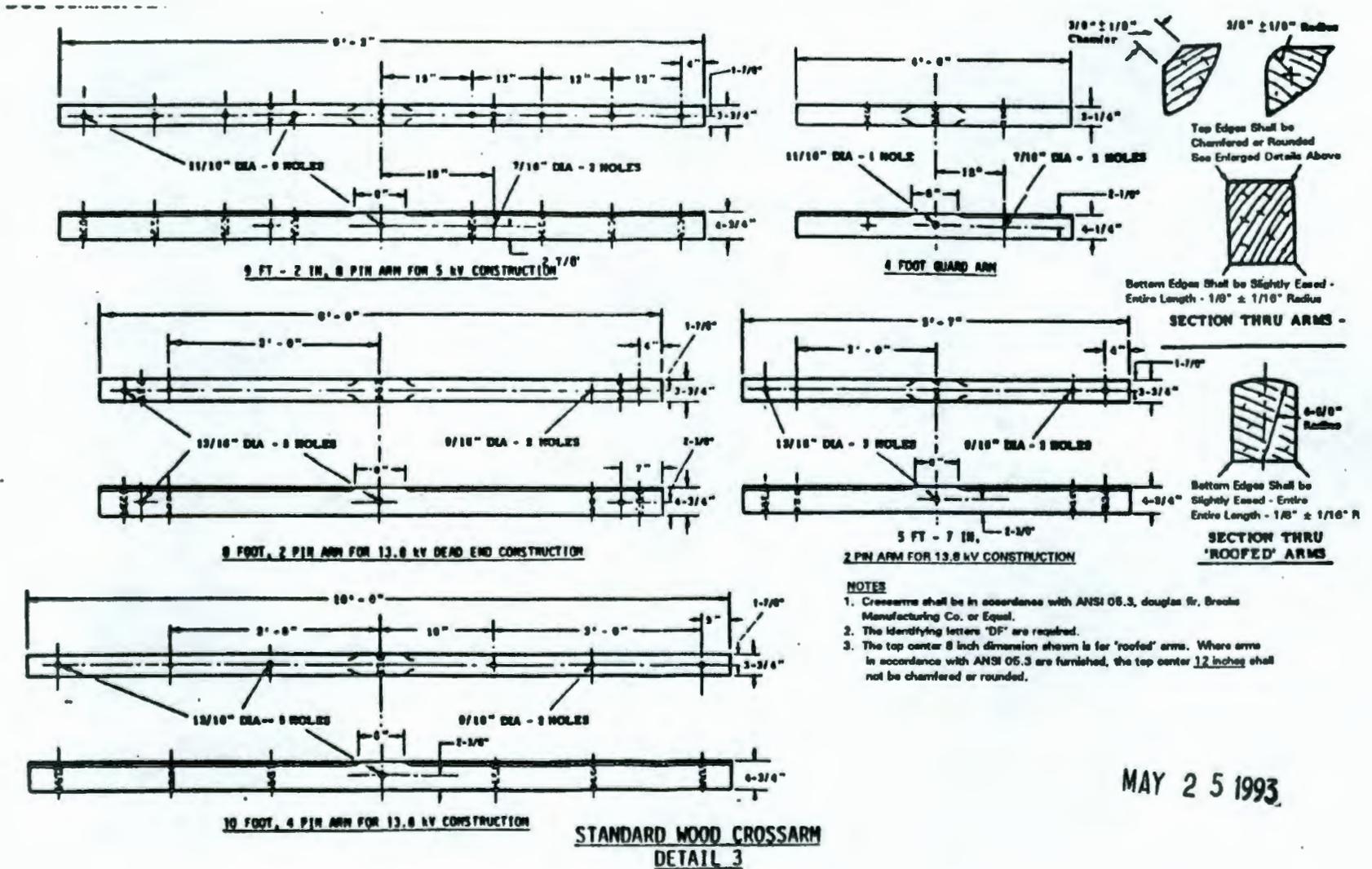
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EACH ITEM SHALL BE AS SPECIFIED OR EQUAL.

DEAD-END INSULATOR ASSEMBLY, 13.8 kV
DETAIL 2

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MATERIAL LIST		
ITEM NO.	QTY	DESCRIPTION
LIGHT CONSTRUCTION - DETAIL A		
1	2c	Crossarm - 9'-2", See Detail 3
2	4	Crossarm Brace - Flat 7/32" x 1-7/32" x 28"
4	1	Machine Bolt - 5/8" Dia x Length Required *
5	104	Washer - 2-1/4" Sq x 3/16" - 11/16" Hole *
6	4	Carriage Bolt - 3/8" x 5" *
7	2	Lag Screw - 1/2" x 6"
8	2w	Double Arming Bolt - 5/8" Dia x Length Req *
HEAVY CONSTRUCTION - DETAIL B		
1	2c	Crossarm - 9'-2", See Detail 3
3	2	Crossarm Brace - 72" Span - See Note 5
4	1	Machine Bolt - 5/8" Dia x Length Required *
9	1	Machine Bolt - 3/4" Dia x Length Required *
10	104	Washer - 3" Sq x 1/4" - 13/16" Hole *
11	4	Machine Bolt - 1/2" Dia x 6" *
12	4	Washer - 1-3/8" Rd x 12 Ga - 9/16" Hole *
13	2w	Double Arming Bolt - 3/4" Dia x Length Req *

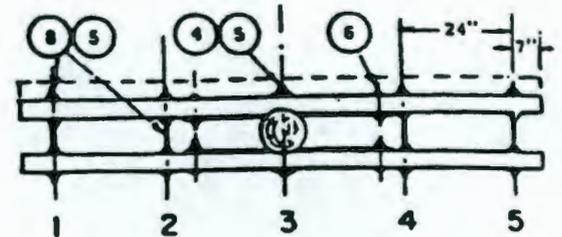
- * Hardware shall conform to American National Standard Institute.
- c See Note 4 for use of triple arms for dead-ending.
- w Use additional double arming bolts where conductors are dead-ended at positions 2 or 4.
- 4 Add four washers for each additional double arming bolt.

NOTES

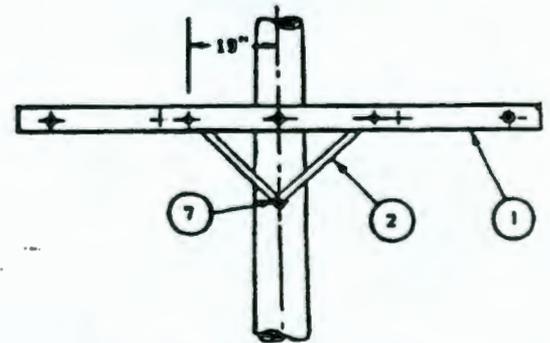
1. These double crossarm assemblies are for vertical and dead end support of conductors. See other Hanford Elect Bids or the construction drawings for cross arm positions on poles.
2. Use light construction for a single power circuit (three conductors) of No. 1/0 Awg or smaller wire having a span length of not over 150 feet. Incidental street or fence lighting wires, dead ended or on pins, may be included.
3. Use heavy construction (1) for two power circuits (six conductors) on the same arm, (2) for one circuit of conductors larger than No. 1/0 Awg, or (3) where the span length exceeds 150 feet.
4. Use dead end positions as shown below with either light or heavy construction for three-conductor circuits having a span length not exceeding 150 feet on crossarms without arm guys.

DOUBLE ARM		TRIPLE ARM	
Wire Size	Dead End Position	Wire Size	Dead End Position
2 and smaller	1-2-5 1-4-5	1 and smaller	1-2-5 1-4-5
1	1-3-5	1/0 and 2/0	1-3-5
1/0 to 3/0	2-3-4	4/0 to 250 MCM	2-3-4

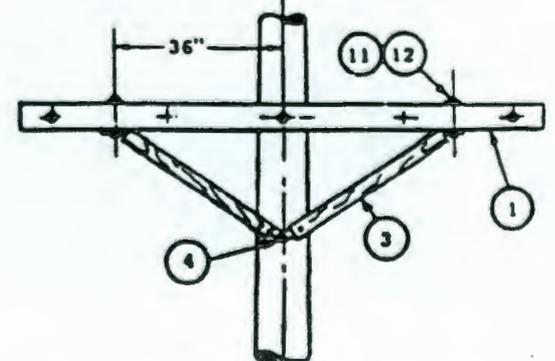
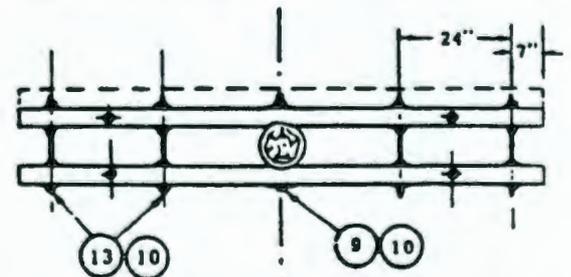
5. Item 3. Crossarm Braces shall be Douglas Fir treated with a factory applied preservative and have galvanized steel end fittings of a type that use a vertical mounting bolt through the crossarm.



DEAD ENDING POSITIONS
See Note 4

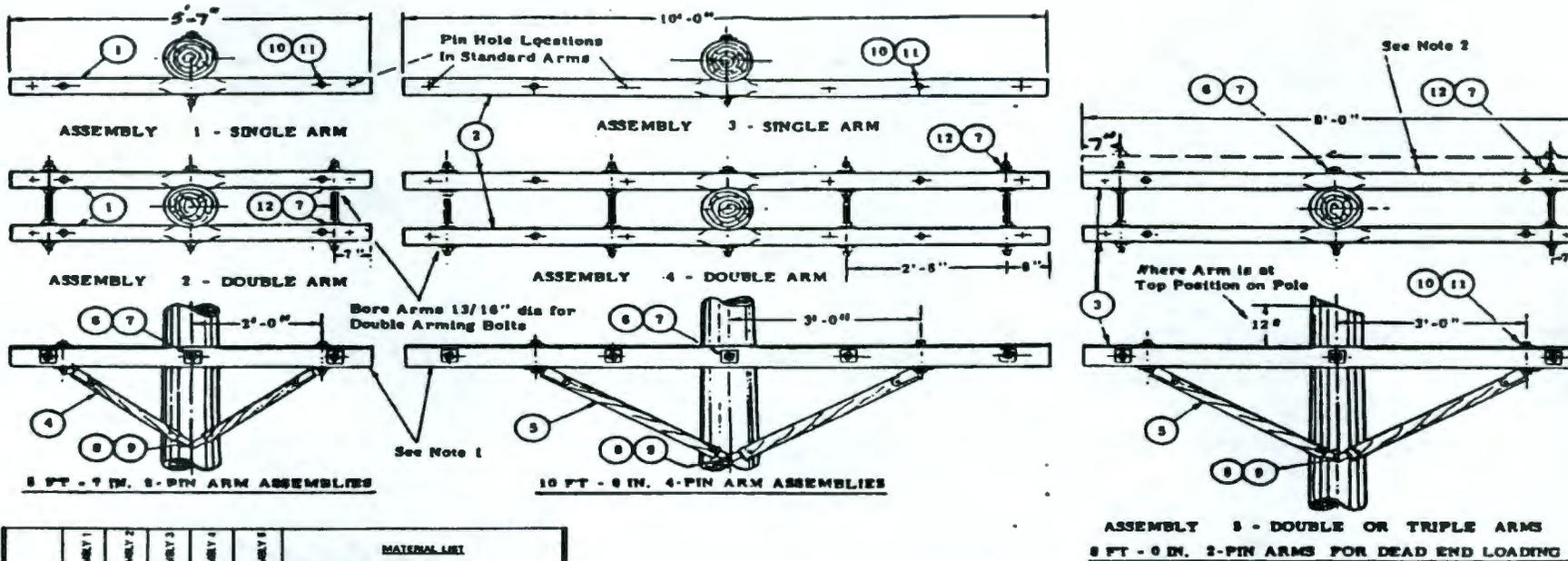


LIGHT CONSTRUCTION - DETAIL A



HEAVY CONSTRUCTION - DETAIL B

DOUBLE CROSSARM ASSEMBLY FOR VERTICAL AND DEAD-END LOADING
DETAIL 4



ITEM NO.	ASSEMBLY					DESCRIPTION
	1	2	3	4	5	
1	1	-	-	-	-	Crossarm - 8'-7", See Detail 3
2	-	-	1	2	-	Crossarm - 10'-0", See Detail 3
3	-	-	-	-	2 or 3	Crossarm - 8'-0", See Detail 3
4	1	2	-	-	-	*Crossarm Brace - 48" Span - See Note 3
5	-	-	1	2	2	*Crossarm Brace - 72" Span - See Note 3
6	1	1	1	1	1	*Machine Bolt - 3/4" x Length Required
7	2	10	2	10	10	*Washer - 3" Square x 1/4" x 13/16" Hole
8	1	1	1	1	1	*Machine Bolt - 5/8" x Length Required
9	-	-	1	-	-	*Washer - 2-1/4" Square x 13/16" x 11/16" Hole
10	2	4	2	4	4	*Machine Bolt - 1/2" x 6"
11	2	4	2	4	4	*Washer - 1-3/8" Round x 1/2" Gaps x 8/16" Hole
12	-	2	-	4	2	*Double Arming Bolt - 3/4" x Length Required

- NOTES**
- Unless otherwise shown on other Standards or the construction drawings, single crossarm assemblies may be used for conductors No. 4/0 Awg and smaller on pin insulators. Double arms shall be used for conductors larger than 4/0 Awg.
 - Use double arms (Assembly 5) for dead ending conductors No. 1 Awg and smaller at arming bolt and center positions. Use triple arms for conductors No. 1/0 Awg and larger.
 - Item 4 and 5, Crossarm Brace shall be Douglas fir treated with a factory applied preservative and shall have galvanized steel end fittings of a type that use a vertical mounting bolt through the crossarm.

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WOOD CROSSARM ASSEMBLIES FOR 13.8 kV CONSTRUCTION
 DETAIL 5

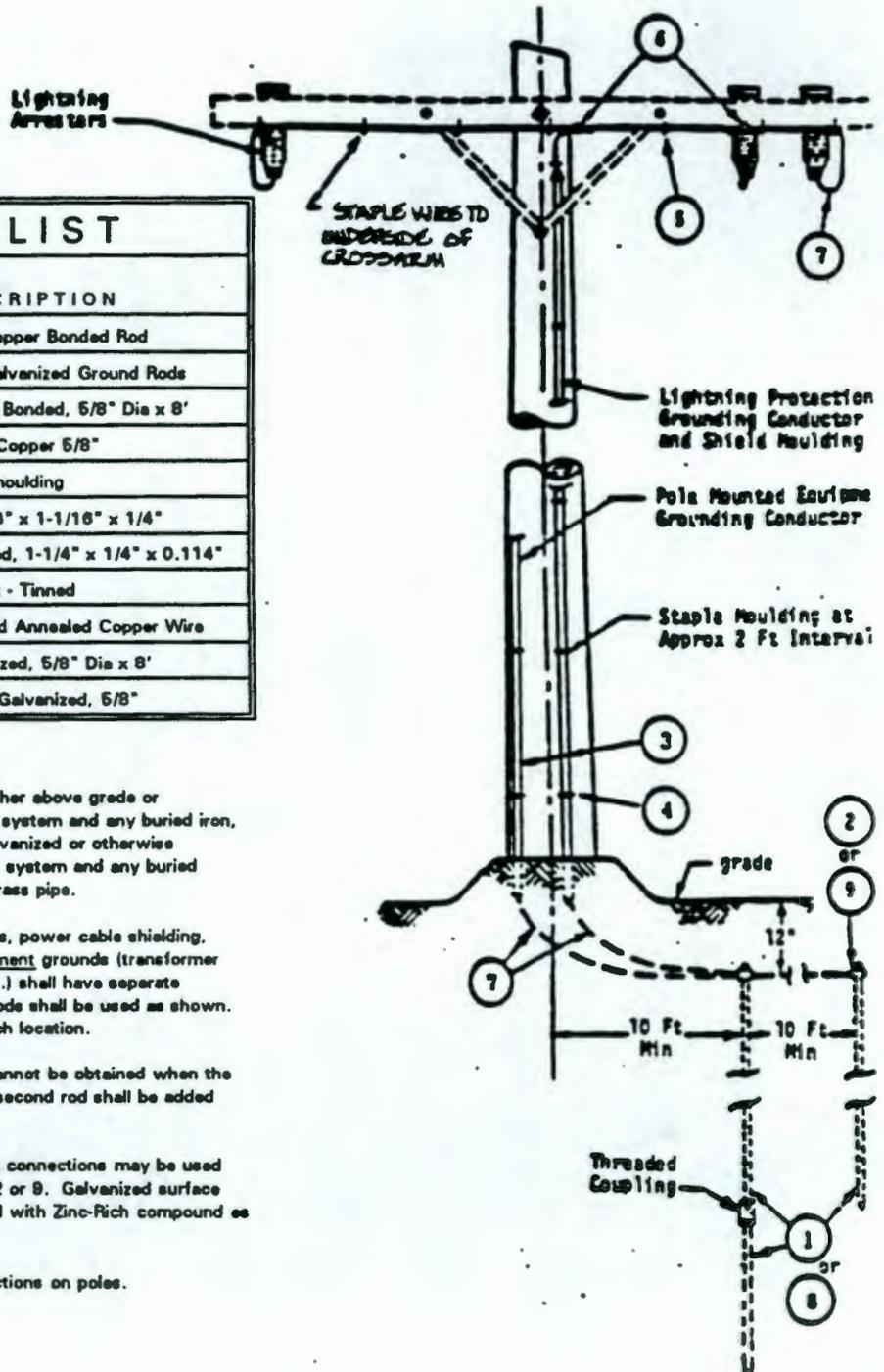
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MATERIAL LIST			
ITEM NO.	QUANTITY	DESCRIPTION	
		Grounding Assy w/Copper Bonded Rod	
		Grounding Assy w/Galvanized Ground Rods	
1	2	Ground Rod - Copper Bonded, 5/8" Dia x 8'	
2	2	Ground Rod Clamp - Copper 5/8"	
3	Reqd	Plastic Ground wire moulding	
4	Reqd	Staple - Galvanized, 3" x 1-1/16" x 1/4"	
5	Reqd	Staple - Copper coated, 1-1/4" x 1/4" x 0.114"	
6	Reqd	Connector - Split Bolt - Tinned	
7	Reqd	No. 4 AWG Bare Solid Annealed Copper Wire	
8	--	2	Ground Rod - Galvanized, 5/8" Dia x 8'
9	--	2	Ground Rod Clamp - Galvanized, 5/8"

NOTES

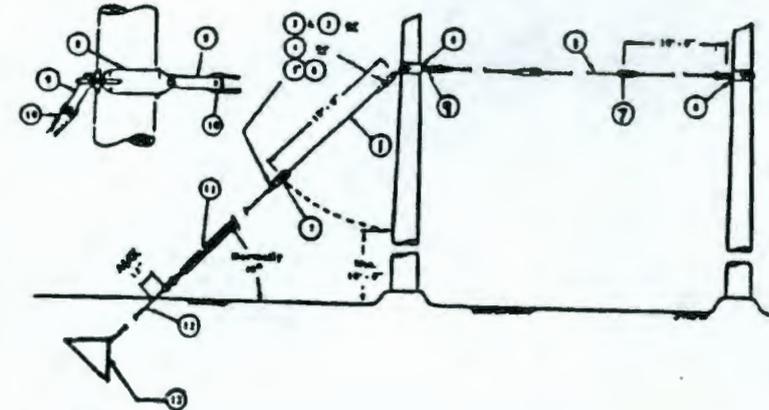
- There shall be no metallic connection, either above grade or underground, between copper grounding system and any buried iron, steel or stainless steel, whether bare, galvanized or otherwise coated, or between galvanized grounding system and any buried copper grounding grids, copper pipe or brass pipe.
- Grounds for lightning protection (arresters, power cable shielding, telephone cable sheaths, etc.) and equipment grounds (transformer tanks, equipment housings, conduits, etc.) shall have separate conductors on poles. Common ground rods shall be used as shown. At least two rods shall be installed at each location.
- If a 25 ohms or less drop in resistance cannot be obtained when the first length of grounding rod is driven, a second rod shall be added to reach damp earth.
- Erico Products, Inc., 'Cedweld', or equal, connections may be used in place of the ground rod clamps, item 2 or 9. Galvanized surface damaged during Cedweld shall be treated with Zinc-Rich compound as manufactured by Erico Products.
- See contract drawings for ground connections on poles.



DISTRIBUTION GROUNDING ASSEMBLY WITH APPROVED GROUND RODS
 DETAIL 6

MATERIAL LIST																			
45 DEGREE DOWN GUYS 20,500 LBS. ULTIMATE STRENGTH					HORIZONTAL GUYS 14,500 LBS ULTIMATE STRENGTH (See Loading Table)														
ITEM NO	QUANTITY		DESCRIPTION	Alternate Grades of Guy Strand					QUANTITY		Alternate Grades of Guy Strand								
	Insulated Guys	Grounded Guys		Grade H. S. 7/16" - 7	High Strength 8/16" - 7	Unilium 1/2" - 7	Grade H. S. 1/2" - 7	Starnon-Martin 3/16" - 10	Insulated Guys	Grounded Guys	High Strength 7/16" - 7	Grade H. S. 3/8" - 7	Starnon-Martin 8/16" - 7 or 10	Unilium 7/16" - 7	Starnon-Martin 1/2" - 10				
1	Length as Required		GUY STRAND Grade, Size and Number of Strands						Length as Required										
2	4	2	* Guy Clamp-Heavy Type, 3-5/8" Bolo, 6" Long						0	2									
3	4	2	Serving Sleeve - To Suit Guy Strand Used						0	2									
4	4	2	△ Guy Grip-Perforated Line Products Co., Catalog No.	GDE	BG	BG	BG		0	2	GDE	GDE	BG	GDE	NM				
				1100	2110	2110	2110					1100	1107	2110	1100				
5	0	2	Strand-View Reliable	Short Ball	5203	NM	5204	5204	2	2	5203	5102	NM	5203	NM				
6	0	2	Deerle Co. Catalog No.	Long Ball	5253	NM	5254	5254	4	2	5253	5152	NM	5253	NM				
7	1	NU	Strain Insulator - ANSI C29.4 Class 54-1						2	NU									
45 DEGREE DOWN GUYS										HORIZONTAL GUYS									
ITEM NO	Quantity	DESCRIPTION								ITEM NO	Quantity	DESCRIPTION							
8	1	Pole Band - 3/8" x 4" Steel 7-1/2" to 12" Pole Dia Hugner Bros. No. 3106								8	1	Pole Band Hugner Bros. No. 3106							
9	1	Single Guy Attachment Hugner Bros. No. 3153								9	2	Single Guy Attachment Hugner Bros. No. 3153							
10	1	Guy Roller								10	1	Guy Roller							
11	1	Plastic Guy Guard - Yellow								EACH ITEM SHALL BE AS SPECIFIED OR AN APPROVED EQUAL.									
12	1	Anchor Rod - Double Thread Eye - 1" x 9'-0"																	
13	1	24" Concrete Cone Anchors (Single or Twin)																	

- △ Alternate A - These items shall conform to American National Standard Institute.
- Alternate B - NM Not manufactured for the size of guy strand shown.
- NU Not used for the construction indicated.



NOTES

- The Loading Table shows the maximum horizontal line loads for which this Standard may be used. Safety factors are for Grade B construction. Allowance has been made in the Bill of Material for the increased tension in the strand and hardware for 45 degree down guys.
- High strength grade of guy strand shall be used for telephone and 230 kV line guying, and Starnon-Martin grade shall be used for all other electrical distribution guys unless otherwise specified or the use of a substitute grade is specifically approved.
- Where horizontal guys are installed with down guys, the horizontal guy may be the same as the down guy as that required for the down guy.
- The use of 3-bolt clamp, strand-rib, or guy grip hardware is optional at any position in the guy assembly.
- This Standard assembly is designed for telephone and electrical distribution pole guying and should not be applied indiscriminately to other structures.

ALTERNATE A - Item 4
Perforated Guy Grip

ALTERNATE B - Item 5 & 9
Strand-View -
Short Ball for Thread Eye Hardware
Long Ball for Insulators

ALTERNATE GUY HARDWARE

EXTRA-HEAVY DUTY GUYS - ULTIMATE HORIZONTAL LOAD OF 14,500 LBS MAXIMUM

LOADING TABLE		
Type of Guy	Safety Factor	Maximum Horizontal Line Load - Pounds
Dead Ends	1.5	9700
Longitudinal - General	1.0	14500
Transverse	2.00	5400

EXTRA HEAVY DUTY HORIZONTAL AND DOWN GUY ASSEMBLIES
DETAIL 7

MAY 25 1993

PROJECT TITLE:

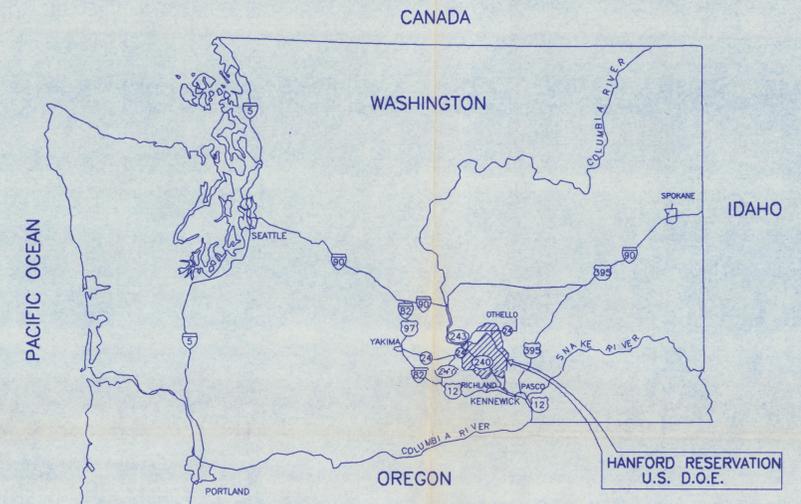
B-595 HWVP-HANFORD WASTE VITRIFICATION PLANT

FOR:

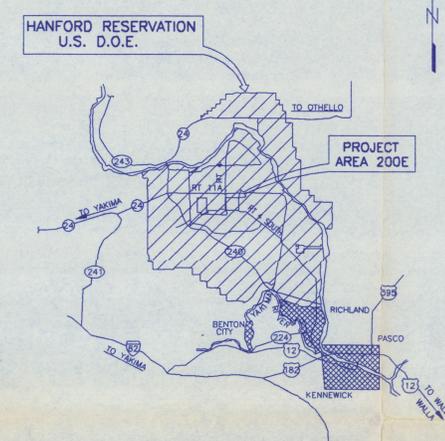
U.S. DEPARTMENT OF ENERGY RICHLAND OPERATIONS OFFICE

BY: **FLUOR DANIEL, INC**

CONSTRUCTION POWER CWBS A170



REGIONAL MAP
GRAPHIC SCALE
1"=40 MILES



VICINITY MAP
GRAPHIC SCALE
1"=10 MILES

LEGEND

- DENOTES HANFORD RESERVATION U.S. D.O.E.
- DENOTES CITY LIMITS

MAY 25 1993

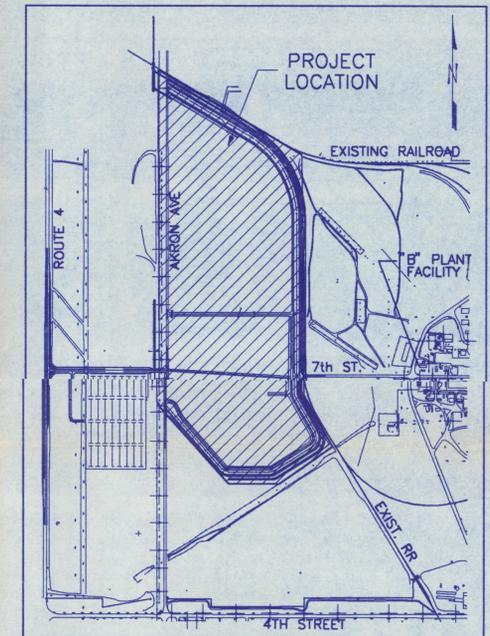
REV. NO.	DATE	REVISION DESCRIPTION	APPROVAL INITIALS
3	5/14/93	REVISION PER CR-HWVP-0690 & OBB1	JLD SC JLD GNK EJ AKY JGK RNG
2		NOT USED	
1	5/13/92	REVISED TITLE BLOCK AND MAPS PER CR#0724	JLD SC JLD GNK EJ AKY JGK RNG
0	12/7/91	APPROVED FOR CONSTRUCTION	SC BR WF KAO GNK CCB AKY JGK RNG

CHPTLE B122105A ENGINEERING RELEASE REV. DATE ERO.		CHPTCODE 2B:BM:ACD2:12.C2:SS U.S. DEPARTMENT OF ENERGY Richland Operations Office DE - AC06-BER110838	
SIGNATURE DATE PROJ. ENG. R.N. GIBBONS 12-19-91 D.A. ENGR. J.C. KELLY 12-12-91 INDEPENDENT SAFETY A. KYEE 12-12-91 PROJECT ENG. ENGINEER C.C. BUSCHMANN 12-12-91 ENGINEERING MGR. G.N. KIMURA 12-12-91 SUPERVISOR W.FRENCH K.A. OWREY 12-11-91		PROJECT TITLE HANFORD WASTE VITRIFICATION PLANT PROJECT B-595 FLUOR CONTRACT NO. 8457 SCALE NONE BLDG. NO. A170 DRAWING H.MELGARES CLASSIFICATION NONE NOT REQ'D H-2-122105	
DWG. NO. DRAWING TITLE REFERENCE DRAWINGS		SHEET OF REV. 1 1 3	

NEXT USED ON	

DRAWING INDEX

DRAWING NO.	CODE NO.	TITLE	REV
GENERAL			
H-2-122105	T1	CONSTRUCTION POWER TITLE SHEET	3
H-2-122106	T2	CONSTRUCTION POWER DRAWING INDEX	3
ELECTRICAL			
H-2-122107	E1	ELECTRICAL GENERAL NOTES AND SYMBOLS	3
H-2-122108	E2	ELECTRICAL STANDARD ASSEMBLIES AND DETAILS	3
H-2-122109	E3	ELECTRICAL CONSTRUCTION POWER ONE-LINE DIAGRAM	3
H-2-122110	E4	ELECTRICAL SITE DEMOLITION PLAN	2
H-2-122111	E5	ELECTRICAL POLE LINE RELOCATION PLAN	2
H-2-122112 SHT 1	E6	ELECTRICAL POLE LINE DETAILS	2
H-2-122112 SHT 2	E7	ELECTRICAL POLE LINE DETAILS	2
H-2-122112 SHT 3	E8	ELECTRICAL POLE LINE DETAILS	0
H-2-122126 SHT 1	E9	ELECTRICAL CONSTRUCTION UTILITIES OVERALL DISTRIBUTION PLAN	3
H-2-122126 SHT 2	E10	ELECTRICAL CONSTRUCTION UTILITIES OVERALL DISTRIBUTION PLAN	1
H-2-122134 SHT 1	E11	ELECTRICAL CONSTRUCTION UTILITIES DETAILS	3
H-2-122134 SHT 2	E12	ELECTRICAL CONSTRUCTION UTILITIES DETAILS	3
H-2-122134 SHT 3	E13	ELECTRICAL CONSTRUCTION UTILITIES DETAILS	3
H-2-122135 SHT 1	E14	ELECTRICAL POLE LINE PROFILE	0
H-2-122135 SHT 2	E15	ELECTRICAL POLE LINE PROFILE	0
STRUCTURAL			
H-2-118060	S1	STRUCTURAL NOTES AND TYPICAL DETAILS	1
H-2-118061	S2	STRUCTURAL SG-32T-001 SWITCHGEAR FOUNDATION DETAILS	1
H-2-118062	S3	STRUCTURAL ELECTRICAL EQUIPMENT FOUNDATION DETAILS	2
H-2-118063	S4	STRUCTURAL LIGHT POLE FOUNDATION DETAIL	2

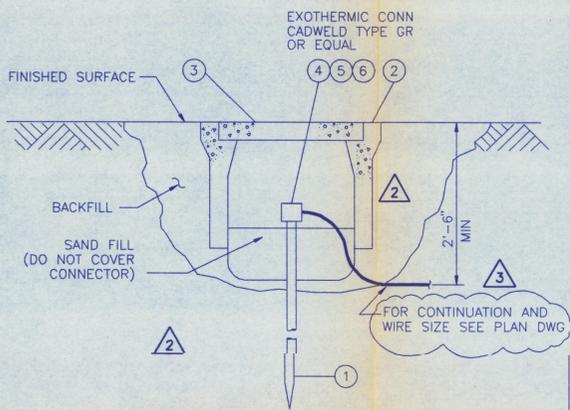


PROJECT AREA MAP

MAY 25 1993

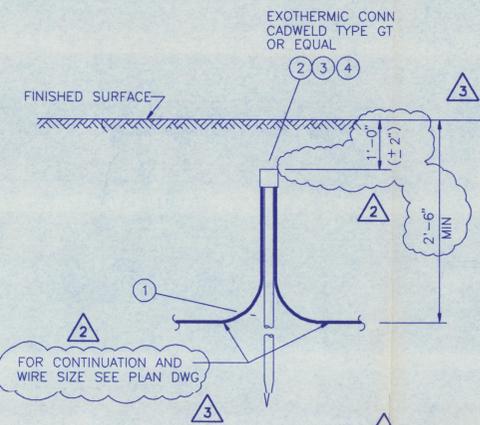
REV. NO.	DATE	REVISION DESCRIPTION	APPROVAL INITIALS
3	5/14/93	REVISION PER CR-HWVP-0690 & 0881	JLD EJ
2	8/24/92	REVISED DRAWING INDEX PER CR-HWVP-0739	JLD EJ
1	5/13/92	REVISED TITLE BLOCK, DRAWING INDEX & MAP PER CR#0724	JLD EJ
0	12/19/91	APPROVED FOR CONSTRUCTION	SC CCB

DRAWING NO. B122106A		CADD CODE 2B:IBM.ACD2:12.C2:SS	
U.S. DEPARTMENT OF ENERGY Richard Operations Office <small>DE AC06-86RL10839</small>			
PROJ. DIR.	DATE	FLUOR DANIEL, INC. ADVANCED TECHNOLOGY DIVISION CONSTRUCTION POWER DRAWING INDEX	
R.N. GIBBONS	12-19-91		
COA. ENGR.	DATE		
J.G. KELLY	12-12-91		
INDEPENDENT SAFETY	DATE		
A.K. YEE	12-12-91	PROJECT TITLE HANFORD WASTE VITRIFICATION PLANT PROJECT NO. B-595 FLOOR CONTRACT NO. 8457 CRIS NO. A170 SCALE NONE BLDG. NO. INDEX NO. DRAWN BY H.MELGARES CLASSIFICATION NONE NOT REQ'D DRAWING NUMBER H-2-122106 SHEET 1 OF 3	
PROJECT ENG. INCHARGE	DATE		
C.C. BUSCHMANN	12-12-91		
ENGINEERING MGR.	DATE		
G.N. KIMURA	12-12-91		
SUPERVISOR	DATE	PROJECT TITLE HANFORD WASTE VITRIFICATION PLANT PROJECT NO. B-595 FLOOR CONTRACT NO. 8457 CRIS NO. A170 SCALE NONE BLDG. NO. INDEX NO. DRAWN BY H.MELGARES CLASSIFICATION NONE NOT REQ'D DRAWING NUMBER H-2-122106 SHEET 1 OF 3	
DESIGN ENGINEER	DATE		
B. RETTIG	12-11-91		
CHECKED	DATE		
S. CLARK	12-11-91		



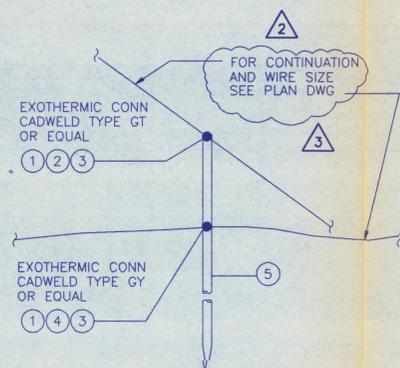
ITEM	DESCRIPTION
1	GROUND ROD, 5/8" X 10'-0" COPPER CLAD
2	CONCRETE GROUND WELL BOX
3	BOX COVER (CONCRETE)
4	CARTRIDGE (IGNITER)
5	MOLD
6	HANDLE

ASSEMBLY G01
GROUND TEST WELL—ONE CONNECTION



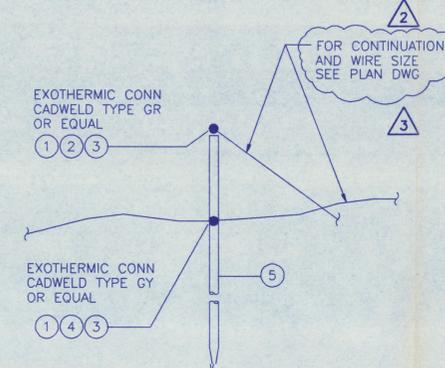
ITEM	DESCRIPTION
1	GROUND ROD, 5/8" X 8'-0" COPPER CLAD
2	CARTRIDGE (IGNITER)
3	MOLD
4	HANDLE

ASSEMBLY G02
GROUND ROD



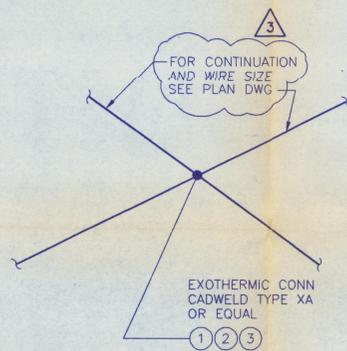
ITEM	DESCRIPTION
1	CARTRIDGE (IGNITER)
2	MOLD: TYPE GT
3	HANDLE
4	MOLD: TYPE GY
5	GROUND ROD, 5/8" X 8'-0" COPPER CLAD

ASSEMBLY G38
GROUND ROD TO CABLE CONNECTIONS FOR COPPER GROUND CONDUCTOR



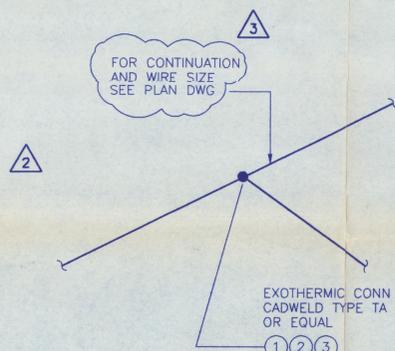
ITEM	DESCRIPTION
1	CARTRIDGE (IGNITER)
2	MOLD: TYPE GR
3	HANDLE
4	MOLD: TYPE GY
5	GROUND ROD, 5/8" X 8'-0" COPPER CLAD

ASSEMBLY G39
GROUND ROD TO CABLE CONNECTIONS FOR COPPER GROUND CONDUCTOR



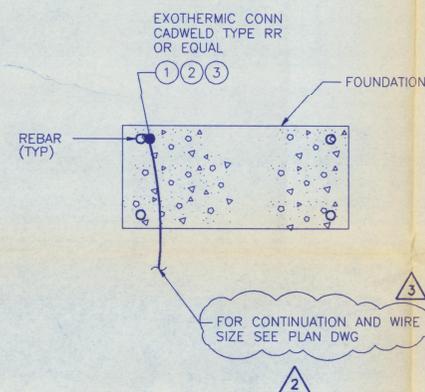
ITEM	DESCRIPTION
1	CARTRIDGE (IGNITER)
2	MOLD
3	HANDLE

ASSEMBLY G40
CROSS CONNECTION FOR COPPER GROUND CONDUCTOR



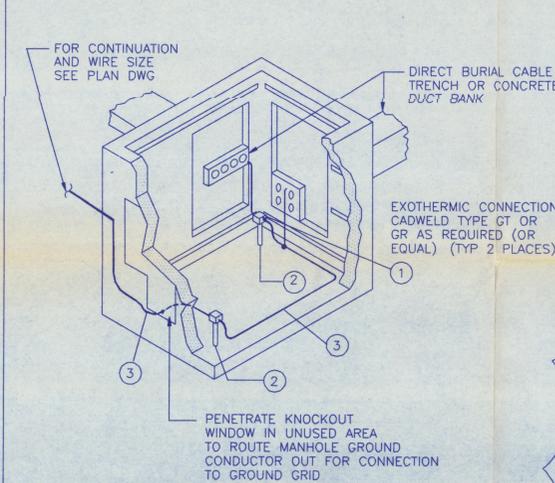
ITEM	DESCRIPTION
1	CARTRIDGE (IGNITER)
2	MOLD
3	HANDLE

ASSEMBLY G41
TEE CONNECTION FOR COPPER GROUND CONDUCTOR



ITEM	DESCRIPTION
1	CARTRIDGE (IGNITER)
2	MOLD
3	HANDLE

ASSEMBLY G12
REBAR TO CABLE CONNECTIONS FOR COPPER GROUND CONDUCTOR



ITEM	DESCRIPTION
1	CARTRIDGE WELD METAL, STANDARD POWDER (NOTE 1)
2	GROUND ROD, 5/8" X 8'-0", COPPER CLAD STEEL
3	CONDUCTOR, BARE COPPER, STRANDED

ASSEMBLY G11
MANHOLE GROUNDING

NOTE:
1. A REUSEABLE MOLD (CABLE TO GROUND ROD). HANDLE AND IGNITER IS REQUIRED TO PERFORM THE EXOTHERMIC CONNECTION.

NOTE:
1. FOR GENERAL NOTES AND SYMBOLS, SEE DWG H-2-122107.

QUALITY LEVEL II SAFETY CLASS 4 (REF) MAY 25 1993

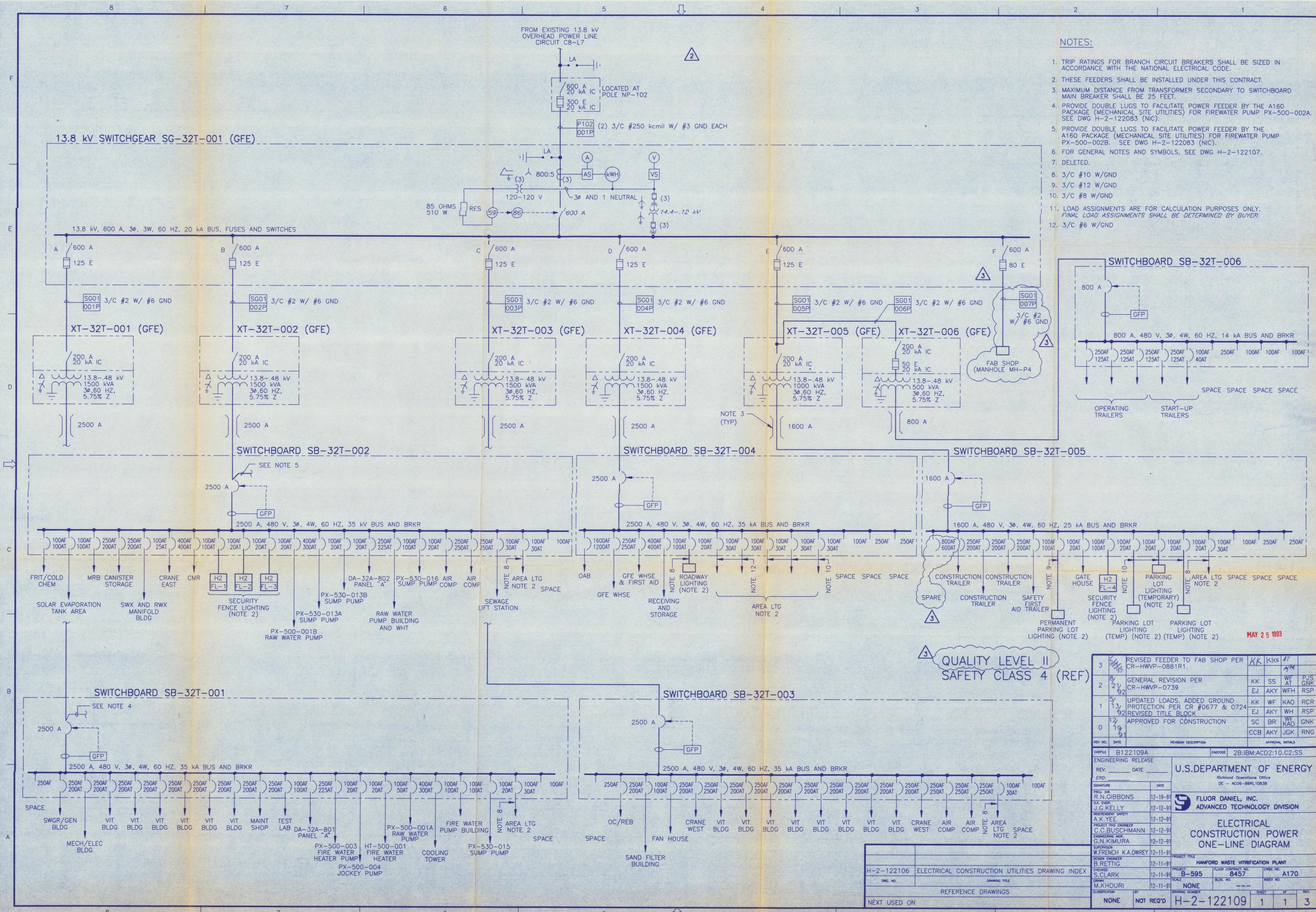
REV. NO.	DATE	REVISION DESCRIPTION	APPROVAL INITIALS
3	5/21/93	REVISED ASSEMBLIES PER CR-HWVP-0690, FRR-00301A & CR-HWVP-0881R1	KK WKS APM
2	8/21/92	REVISED PER CR-HWVP-0739	KK SS WF AT PJS GNR
1	5/3/92	REVISED TITLE BLOCK PER CR-HWVP-0724	EJ AKY JGK RSP
0	12/9/91	APPROVED FOR CONSTRUCTION	SC BR WF KAO GNK

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
2E - ACDF-368R10838

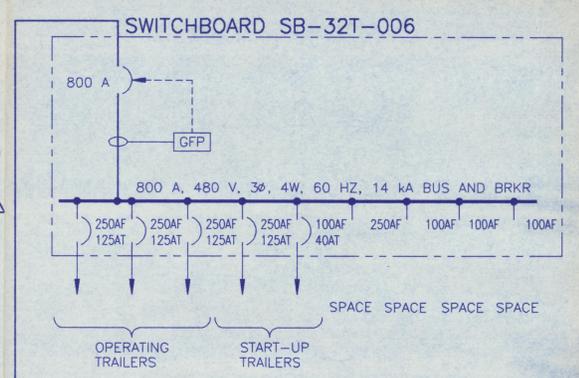
FLUOR DANIEL, INC.
ADVANCED TECHNOLOGY DIVISION
ELECTRICAL STANDARD ASSEMBLIES AND DETAILS

DESIGN ENGINEER	PROJECT TITLE	PROJECT NO.	FLUOR CONTRACT NO.	CHWS NO.
B. RETTIG	HANFORD WASTE VITRIFICATION PLANT	B-595	8457	A170
CHECKED	SCALE	BLOC. NO.	INDEX NO.	
S. CLARK	NONE	---		
DESIGNED BY	DRAWING NUMBER	SHEET	OF	REV.
M. KHOURI	H-2-122108	1	1	3

DWG. NO.	DRAWING TITLE
H-2-122106	ELECTRICAL CONSTRUCTION UTILITIES DRAWING INDEX
REFERENCE DRAWINGS	
NONE	NOT REQ'D
NEXT USED ON	



- NOTES:**
- TRIP RATINGS FOR BRANCH CIRCUIT BREAKERS SHALL BE SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
 - THESE FEEDERS SHALL BE INSTALLED UNDER THIS CONTRACT.
 - MAXIMUM DISTANCE FROM TRANSFORMER SECONDARY TO SWITCHBOARD MAIN BREAKER SHALL BE 25 FEET.
 - PROVIDE DOUBLE LUGS TO FACILITATE POWER FEEDER BY THE A160 PACKAGE (MECHANICAL SITE UTILITIES) FOR FIREWATER PUMP PX-500-002A. SEE DWG H-2-122083 (NIC).
 - PROVIDE DOUBLE LUGS TO FACILITATE POWER FEEDER BY THE A160 PACKAGE (MECHANICAL SITE UTILITIES) FOR FIREWATER PUMP PX-500-002B. SEE DWG H-2-122083 (NIC).
 - FOR GENERAL NOTES AND SYMBOLS, SEE DWG H-2-122107.
 - DELETED.
 - 3/C #10 W/GND
 - 3/C #12 W/GND
 - 3/C #8 W/GND
 - LOAD ASSIGNMENTS ARE FOR CALCULATION PURPOSES ONLY. FINAL LOAD ASSIGNMENTS SHALL BE DETERMINED BY OWNER.
 - 3/C #6 W/GND



**QUALITY LEVEL II
SAFETY CLASS 4 (REF)**

REV. NO.	DATE	REVISION DESCRIPTION	APPROVAL INITIALS
3	5/14/93	REVISED FEEDER TO FAB SHOP PER CR-HWVP-0881R1.	KK Kks AT
2	8/21/92	GENERAL REVISION PER CR-HWVP-0739	KK SS WF PJS EJ AKY WFH RSP
1	5/13/92	UPDATED LOADS, ADDED GROUND PROTECTION PER CR #0677 & 0724	KK WF KAO RCR EJ AKY WH RSP
0	12/19/91	APPROVED FOR CONSTRUCTION	SC BR WF CCB AKY JGK RRG

U.S. DEPARTMENT OF ENERGY
Richardson Operations Office
DE - AC06-BER110838

FLUOR DANIEL, INC.
ADVANCED TECHNOLOGY DIVISION

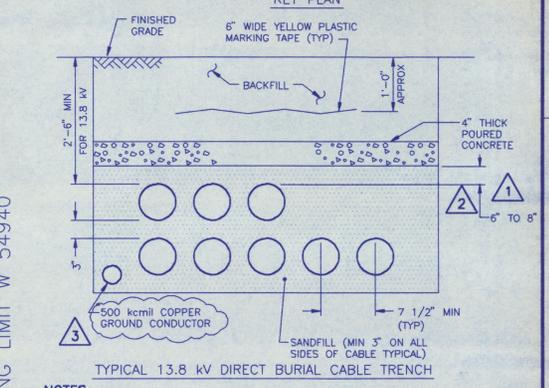
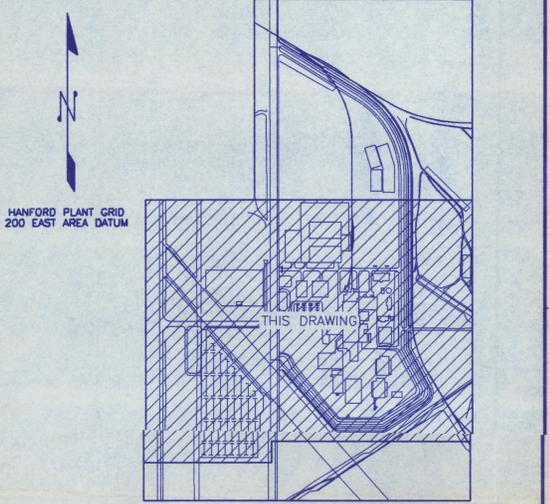
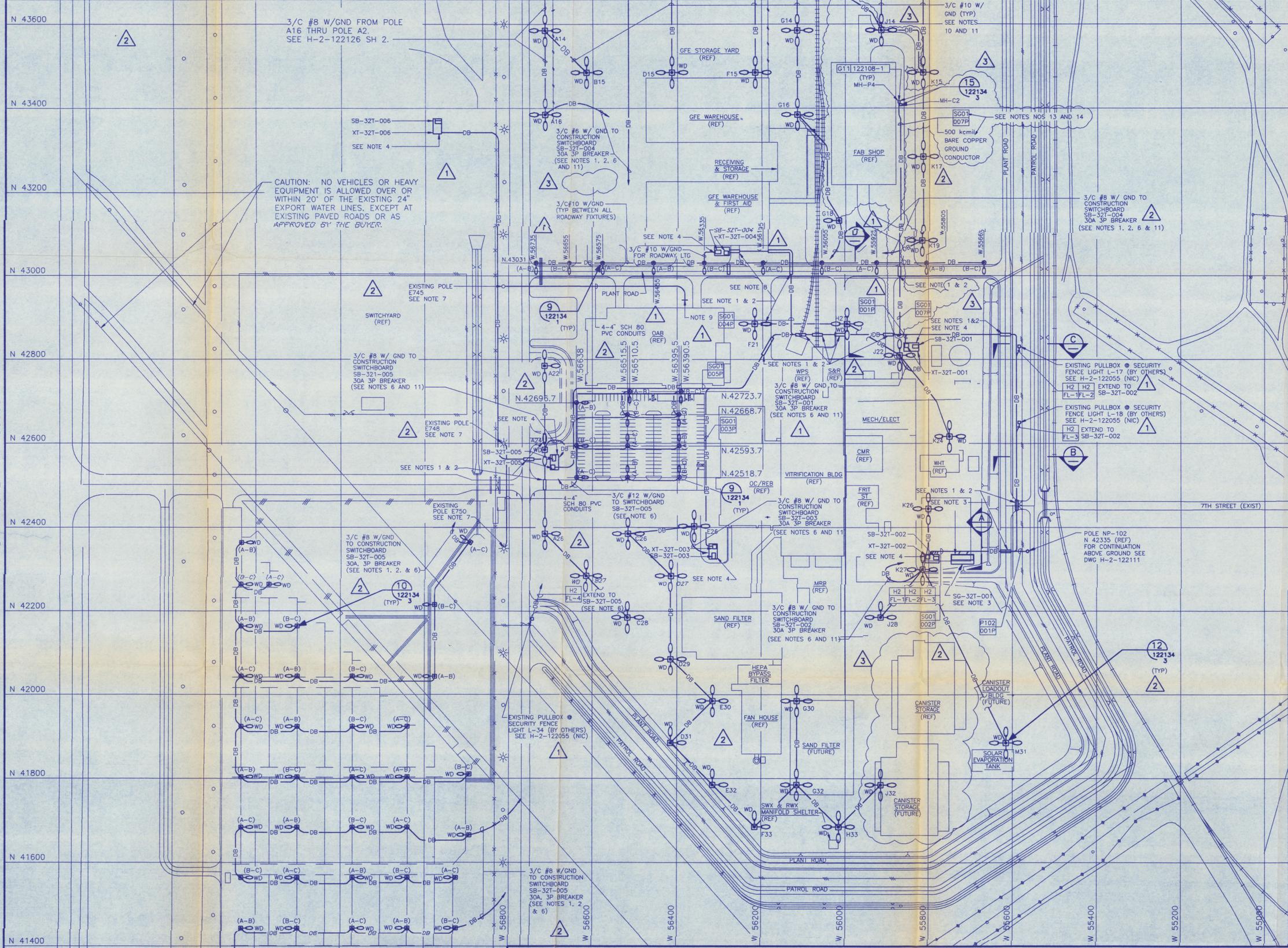
ELECTRICAL CONSTRUCTION POWER ONE-LINE DIAGRAM

PROJECT TITLE	HANFORD WASTE VITRIFICATION PLANT
PROJECT	B-595
FLUOR CONTRACT NO.	8457
DRWS. NO.	A170
SCALE	NONE
INDEX NO.	
CLASSIFICATION	NONE
BY	NOT REQ'D
DRAWING NUMBER	H-2-122109
SHEET	1
OF	1
REV.	3

H-2-122106	ELECTRICAL CONSTRUCTION UTILITIES DRAWING INDEX
DWG. NO.	DRAWING TITLE
REFERENCE DRAWINGS	
NEXT USED ON	

DRAWING LIMIT N 43660

MATCH LINE N 43660 DWG H-2-122126 SH 2



- NOTES:**
- EXACT LOCATION OF CONSTRUCTION FOR DIRECT BURIAL CABLE TRENCH TO BE DETERMINED BY SELLER AND APPROVED BY THE BUYER.
 - CONCRETE ENCASE MINIMUM 3" ALL AROUND DIRECT BURIED CABLE IN 5" SCHEDULE 80 PVC CONDUIT BENEATH ROAD AND EXTEND 5' BEYOND SHOULDER. PROVIDE 2 SPARE CONCRETE ENCASED 5" CONDUITS. THIS LOCATION SEE DETAIL #11 DWG H-2-122126 SH 2.
 - SEE DWG H-2-122134 SH 1 FOR ENLARGED PLAN.
 - SEE DWG H-2-122134 SH 2 FOR ENLARGED PLAN.
 - FOR GENERAL NOTES & SYMBOLS, SEE DWG. H-2-122107.
 - SELLER TO FIELD ROUTE TO CONSTRUCTION SWITCHBOARD.

QUALITY LEVEL II **SAFETY CLASS 4 (REF)** MAY 25 1993

REV. NO.	DATE	REVISION DESCRIPTION	APPROVAL INITIALS
5	5/24/93	REVISED FAB SHOP LOCATION PER CR B81R1. DELETED SWGR/GEN PER CR-HWVP-0854 & LIGHT POLES & FIXTURES PER CR-HWVP-081R. REVISED GROUNDING PER CR-HWVP-0690 & FRR-00301A.	KK KKS AT
3	8/2/92	ADDED COORDINATES TO POLES & CONC TO 13.8 KV DB CABLES PER CR #0877. REV WATER LINES CAUTION NOTE, TITLE BLOCK & DRAWING NOTES PER CR #0659 & 0724.	KK SS WF PJS EJ AKY WFH RSP
2	5/13/92	APPROVED FOR CONSTRUCTION	KK WF KAO GNK EJ AKY JGK RSP
1	12/19/91	APPROVED FOR CONSTRUCTION	SC BR WF KAO GNK CCB AKY JGK RSP

PROJECT: B122126A
 ENGINEERING RELEASE
 U.S. DEPARTMENT OF ENERGY
 Richland Operations Office
 DE - AC06-B8RL10838

DESIGNER	CHECKED	DATE
R.N. GIBBONS	S. CLARK	12-19-91
J.G. KELLY	M. KHOURI	12-12-91
A.K. YEE		12-12-91
C.C. BUSCHMANN		12-12-91
G.N. KIMURA		12-12-91
W.FRENCH K.A. OWREY		12-11-91

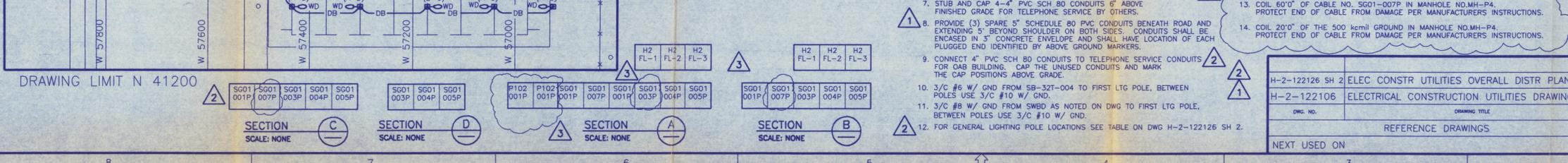
ELECTRICAL CONSTRUCTION UTILITIES OVERALL DISTRIBUTION PLAN

PROJECT TITLE: HANFORD WASTE VITRIFICATION PLANT
 PROJECT NO.: B-595
 SCALE: 1" = 100'-0"
 SHEET: 1 OF 3

DRAWING LIMIT N 41200

DRAWING LIMIT N 41400

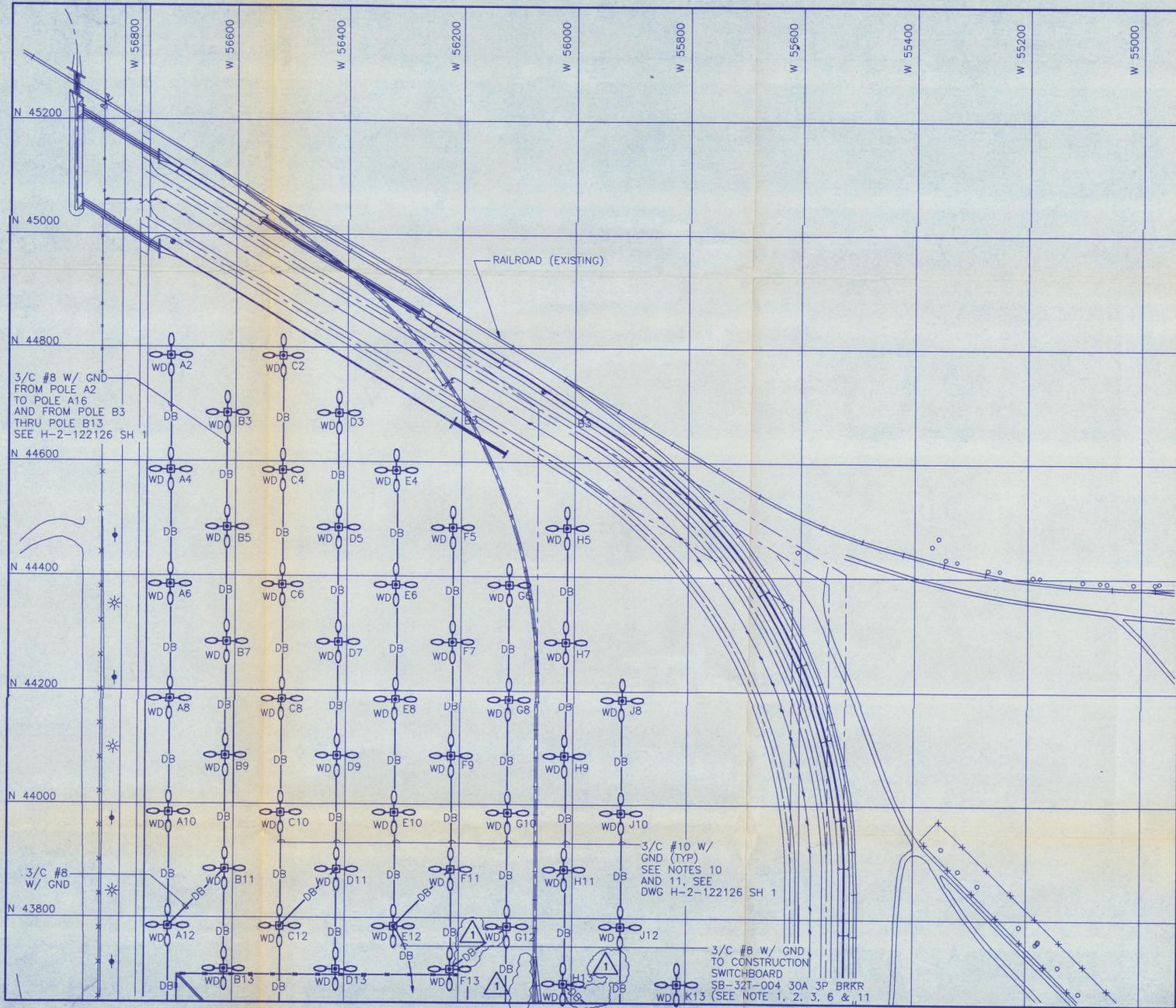
NOTES: (CONTINUED)



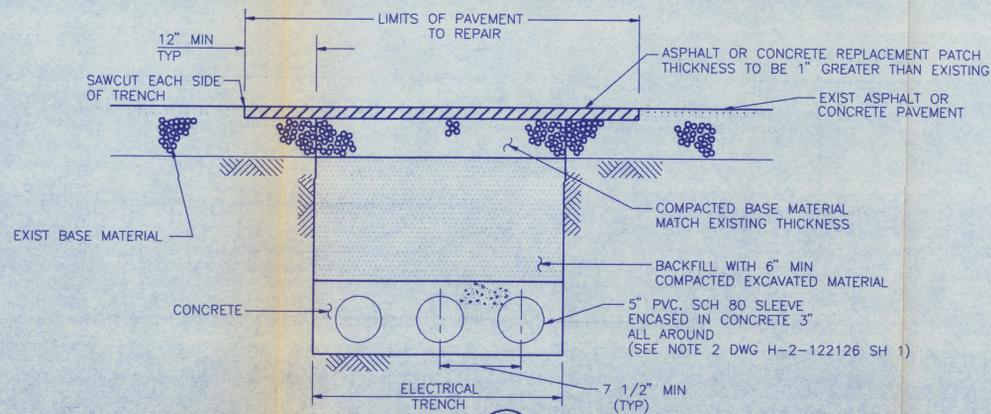
SECTION	SCALE
SECTION C	SCALE: NONE
SECTION D	SCALE: NONE
SECTION A	SCALE: NONE
SECTION B	SCALE: NONE

DWG. NO.	DRAWING TITLE
H-2-122126 SH 2	ELEC CONSTR UTILITIES OVERALL DISTR PLAN
H-2-122106	ELECTRICAL CONSTRUCTION UTILITIES DRAWING INDEX

DRAWING LIMIT N 45400



MATCH LINE N 43660 DWG H-2-122126 SH 1

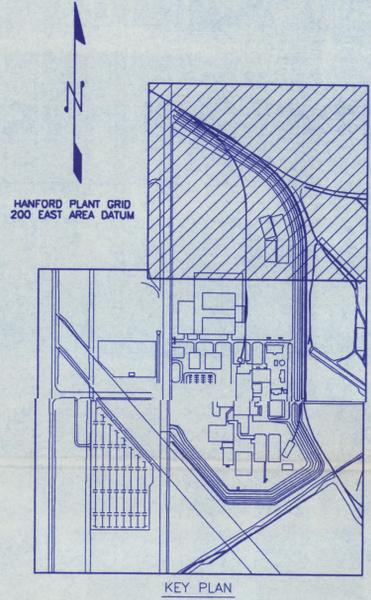


DETAIL 11 SCALE: NONE 122126

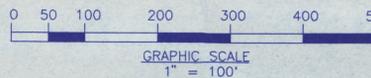
* GENERAL LIGHTING POLE LOCATION TABLE

LTG POLE NO.	LIGHTING POLE LOCATION		FIXTURES PER POLE	FIXTURE CIRCUIT			
	NORTH COORD	WEST COORD		1	2	3	4
A2	44785	56715	4	A-B	B-C	C-A	A-B
A4	44585	56715	4	B-C	C-A	A-B	B-C
A6	44385	56715	4	C-A	A-B	B-C	C-A
A8	44185	56715	4	A-B	B-C	C-A	A-B
A10	43985	56715	4	B-C	C-A	A-B	B-C
A12	43785	56715	4	C-A	A-B	B-C	C-A
A14	43585	56715	4	A-B	B-C	C-A	A-B
A16	43385	56715	4	B-C	C-A	A-B	B-C
A22	42785	56715	3	A-B	B-C	C-A	---
A24	42585	56715	2	A-B	B-C	---	---
A26	42385	56715	3	---	B-C	C-A	A-B
B3	44685	56615	4	C-A	A-B	B-C	C-A
B5	44485	56615	4	A-B	B-C	C-A	A-B
B7	44285	56615	4	B-C	C-A	A-B	B-C
B9	44085	56615	4	C-A	A-B	B-C	C-A
B11	43885	56615	4	A-B	B-C	C-A	A-B
B13	43710	56615	4	B-C	C-A	A-B	B-C
B15	43485	56615	4	C-A	A-B	B-C	C-A
B27	42285	56615	4	B-C	C-A	A-B	B-C
C2	44785	56515	4	A-B	B-C	C-A	A-B
C4	44585	56515	4	B-C	C-A	A-B	B-C
C6	44385	56515	4	C-A	A-B	B-C	C-A
C8	44185	56515	4	A-B	B-C	C-A	A-B
C10	43985	56515	4	B-C	C-A	A-B	B-C
C12	43785	56515	4	C-A	A-B	B-C	C-A
C26	42385	56515	4	B-C	C-A	A-B	B-C
C28	42185	56515	4	C-A	A-B	B-C	C-A
D3	44685	56415	4	B-C	C-A	A-B	B-C
D5	44485	56415	4	C-A	A-B	B-C	C-A
D7	44285	56415	4	A-B	B-C	C-A	A-B
D9	44085	56415	4	B-C	C-A	A-B	B-C
D11	44885	56415	4	C-A	A-B	B-C	C-A
D13	43710	56415	4	A-B	B-C	C-A	A-B
D15	44485	56415	4	B-C	C-A	A-B	B-C
D27	42285	56415	4	C-A	A-B	B-C	C-A
D29	42085	56415	4	A-B	B-C	C-A	A-B
D31	41885	56415	2	---	C-A	A-B	---
E4	44585	56315	4	A-B	B-C	C-A	A-B
E6	44385	56315	4	B-C	C-A	A-B	B-C
E8	44185	56315	4	C-A	A-B	B-C	C-A
E10	43985	56315	4	A-B	B-C	C-A	A-B
E12	43785	56315	4	B-C	C-A	A-B	B-C
E26	42403	56360	4	A-B	B-C	C-A	A-B
E30	41985	56315	4	B-C	C-A	A-B	B-C
E32	41785	56315	2	---	B-C	C-A	---
F5	44485	56215	4	B-C	C-A	A-B	B-C
F7	44285	56215	4	B-C	C-A	A-B	B-C
F9	44085	56215	4	C-A	A-B	B-C	C-A
F11	43885	56215	4	A-B	B-C	C-A	A-B
F13	43710	56215	4	B-C	C-A	A-B	B-C
F15	43485	56215	4	C-A	A-B	B-C	C-A
F21	42885	56215	4	A-B	B-C	C-A	A-B
F33	41685	56215	2	---	A-B	B-C	---
G6	44385	56115	4	A-B	B-C	C-A	A-B
G8	44185	56115	4	B-C	C-A	A-B	B-C
G10	43985	56115	4	C-A	A-B	B-C	C-A
G12	43785	56115	4	A-B	B-C	C-A	A-B
G14	43585	56115	4	B-C	C-A	A-B	B-C
G16	43385	56115	4	C-A	A-B	B-C	C-A
G18	43150	56020	1	---	---	---	B-C
G32	41785	56115	4	C-A	A-B	B-C	C-A
G30	41985	56115	4	A-B	B-C	C-A	A-B
H5	44485	56015	4	B-C	C-A	A-B	B-C
H7	44285	56015	4	C-A	A-B	B-C	C-A
H9	44085	56015	4	A-B	B-C	C-A	A-B
H11	43885	56015	4	B-C	C-A	A-B	B-C
H13	43685	56015	4	C-A	A-B	B-C	C-A

DRAWING LIMIT W 54940



NOTE:
1. FOR NOTES SEE DWG H-2-122126 SH 1.



H21	42885	55995	4	B-C	C-A	A-B	B-C
H33	41685	56015	4	B-C	C-A	A-B	B-C
J8	44185	55915	4	A-B	B-C	C-A	A-B
J10	43985	55915	4	C-A	A-B	B-C	C-A
J12	43785	55915	4	B-C	C-A	A-B	B-C
J14	43585	55915	4	A-B	B-C	C-A	A-B
J22	42810	55870	4	C-A	A-B	B-C	C-A
J28	42185	55915	3	B-C	C-A	A-B	---
J32	41785	55915	4	C-A	A-B	B-C	C-A
K13	43685	55815	4	A-B	B-C	C-A	A-B
K15	43485	55815	4	C-A	A-B	B-C	C-A
K17	43285	55815	4	B-C	C-A	A-B	B-C
K19	43085	55815	4	A-B	B-C	C-A	A-B
K24	42620	55770	4	A-B	B-C	C-A	A-B
K26	42470	55800	4	C-A	A-B	B-C	C-A
K27	42300	55815	4	A-B	B-C	C-A	A-B
M31	41885	55615	4	B-C	C-A	A-B	B-C

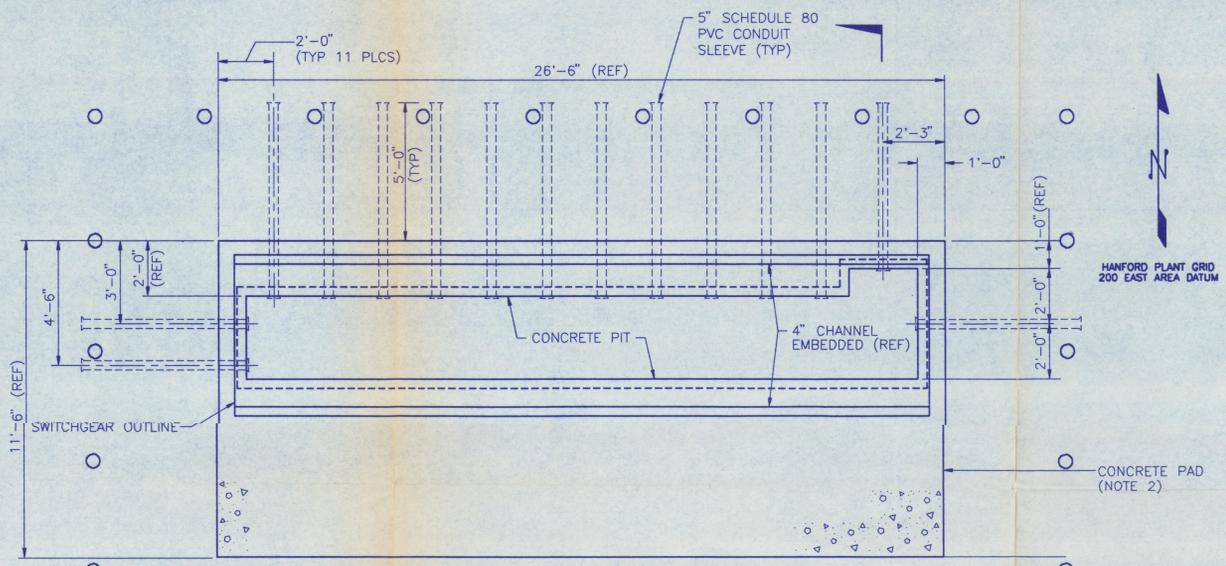
* - INDICATES APPROXIMATE LOCATION OF FIXTURE. LOCATION TO BE FIELD VERIFIED.

QUALITY LEVEL II
SAFETY CLASS 4 (REF) MAY 25 1993

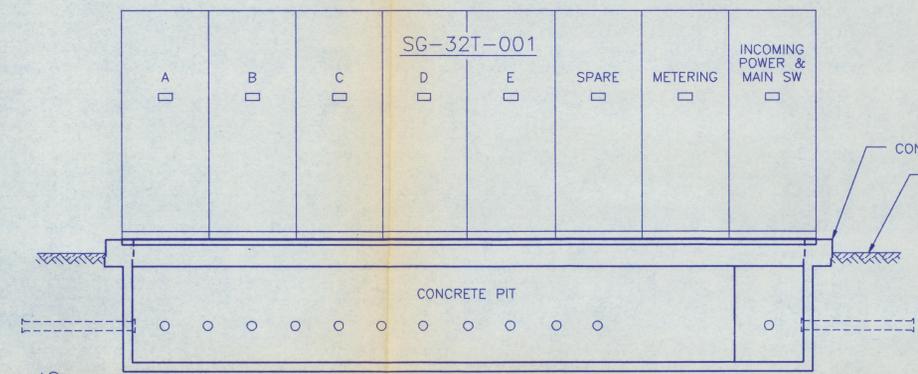
REV NO.	DATE	REVISION DESCRIPTION	APPROVAL INITIALS
1	5/24/93	REVISED LTG & LTG POLE LOCATION TABLE PER CR-HWVP-0881R1	KK KKS
0	8/21/92	ADDED AREA LTG PER CR-HWVP-0739 APPROVED FOR CONSTRUCTION	KK SS WF AT PJS GJK RSP

PROJECT NO. B122126B
 U.S. DEPARTMENT OF ENERGY
 FLUOR DANIEL, INC.
 ELECTRICAL CONSTRUCTION UTILITIES OVERALL DISTRIBUTION PLAN

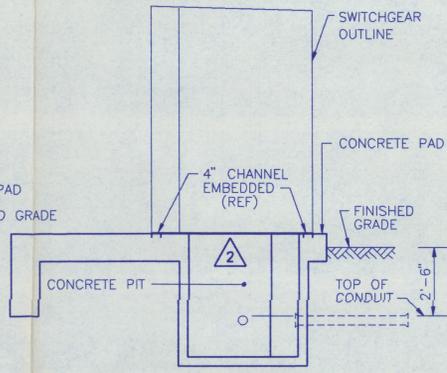
DWG NO.	DRAWING TITLE
H-2-122106	ELECTRICAL CONSTRUCTION UTILITIES DRAWING INDEX
REFERENCE DRAWINGS	
NEXT USED ON	



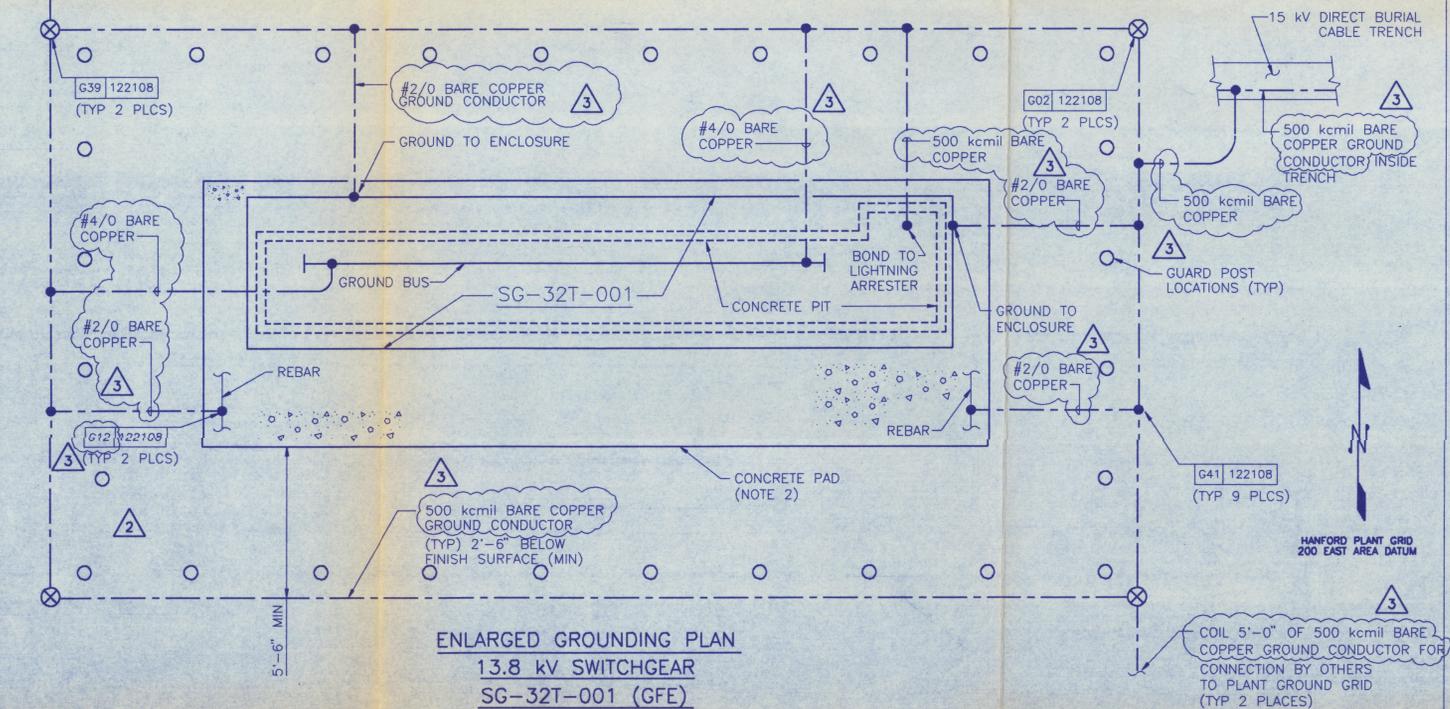
ENLARGED PLAN
13.8 kV SWITCHGEAR
SG-32T-001 (GFE)



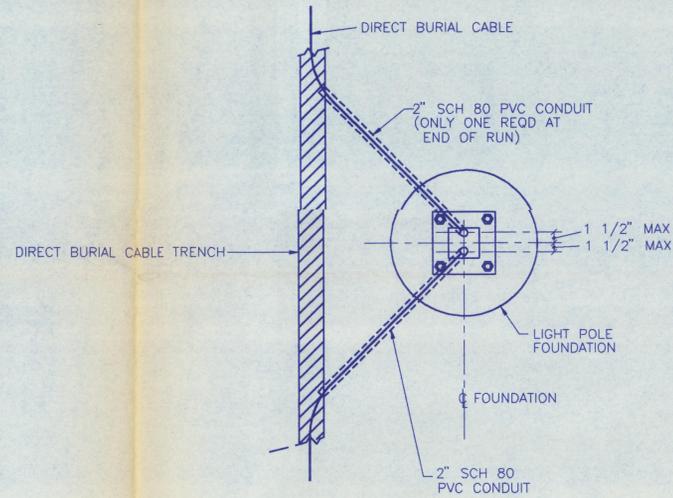
FRONT ELEVATION



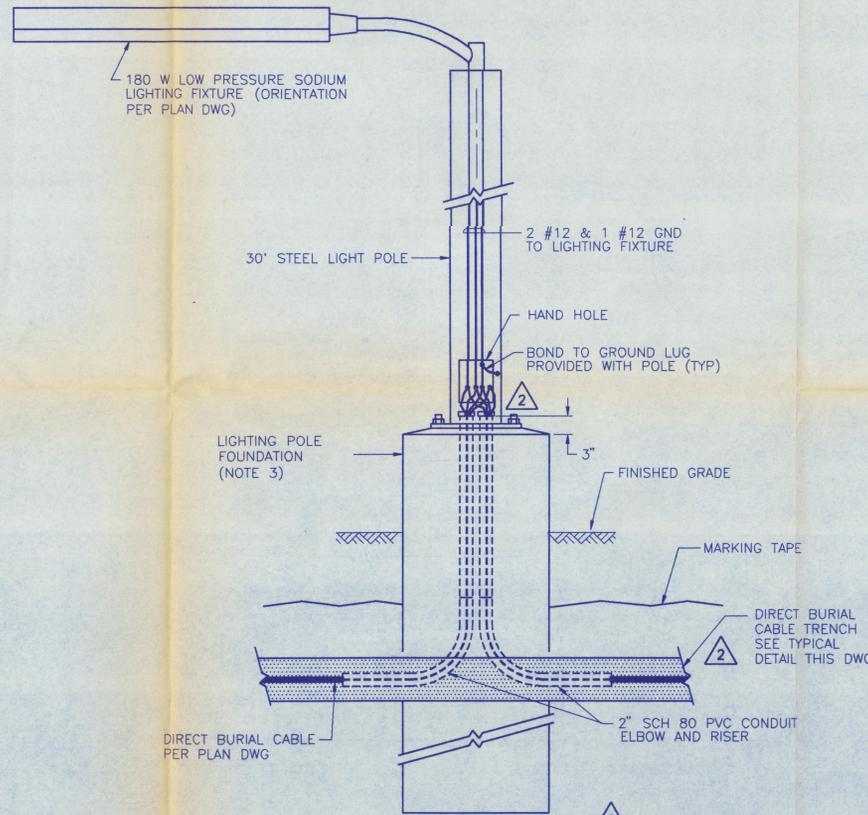
SECTION G
SCALE: NONE



ENLARGED GROUNDING PLAN
13.8 kV SWITCHGEAR
SG-32T-001 (GFE)

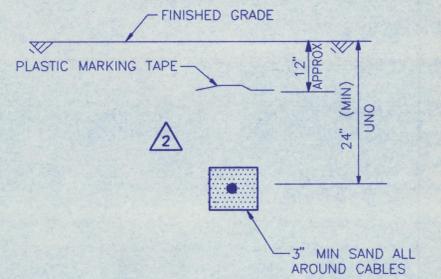


PLAN



DETAIL (TYP) 9
SCALE: NONE

STEEL LIGHT POLE



TYPICAL 600 V DIRECT BURIAL CABLE TRENCH

NOTES:

- FOR GENERAL NOTES & SYMBOLS SEE DWG H-2-122107.
- FOR EXACT LOCATION AND STRUCTURAL DETAILS SEE STRUCTURAL DWG H-2-118061.
- FOR STRUCTURAL DETAILS SEE STRUCTURAL DWG H-2-118063.

QUALITY LEVEL II
SAFETY CLASS 4 (REF)

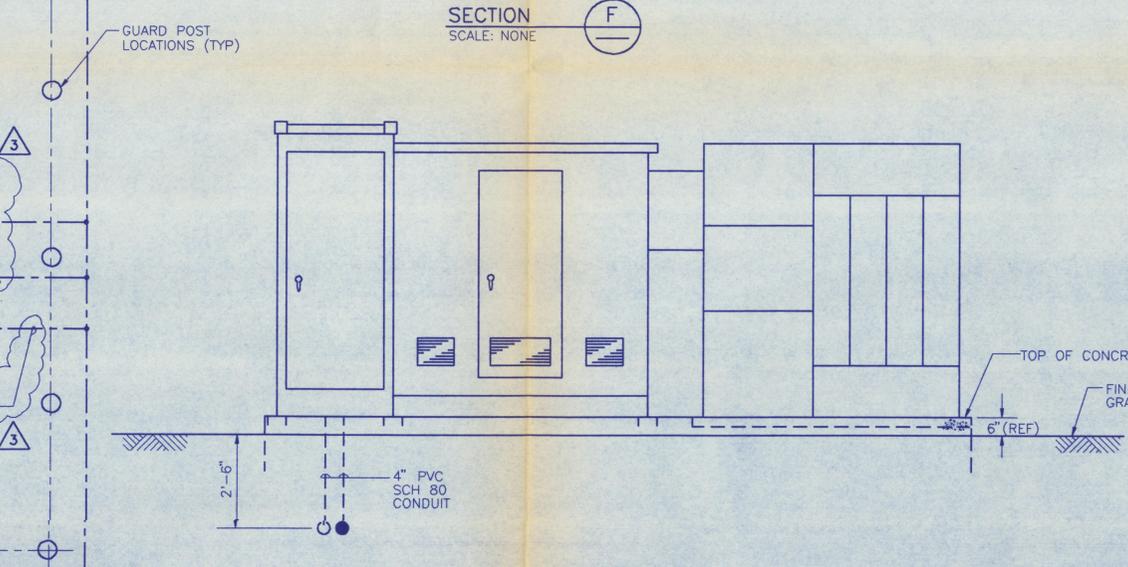
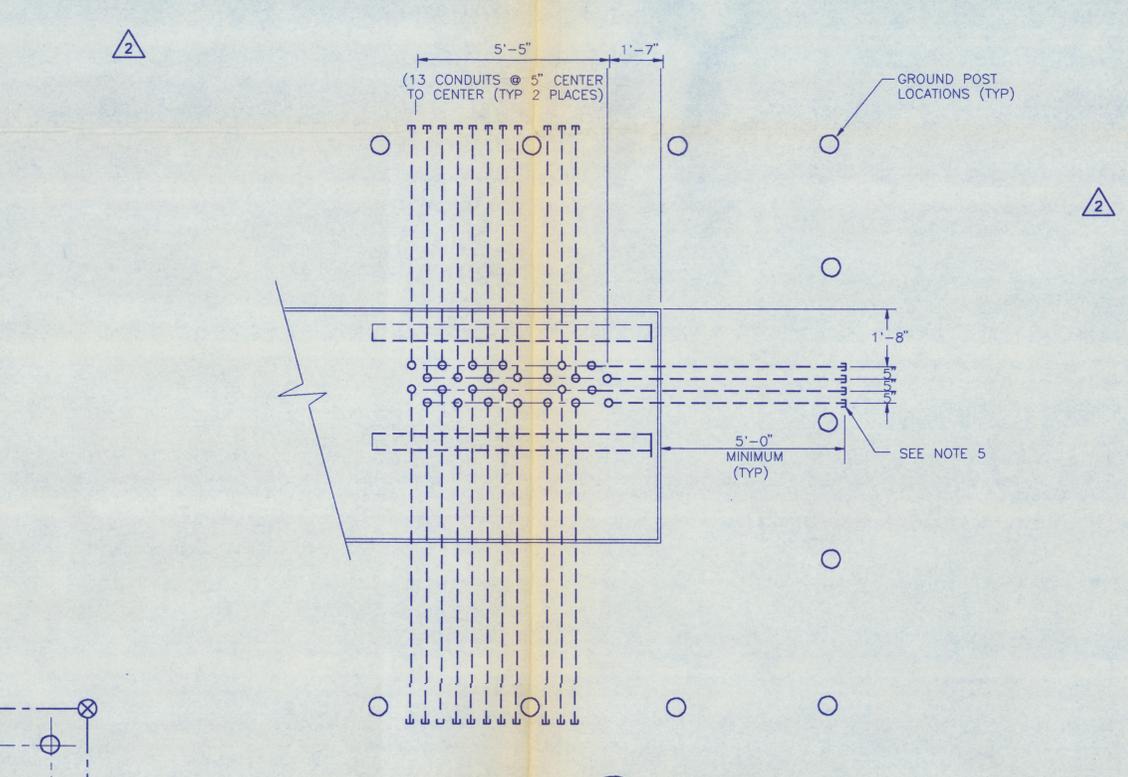
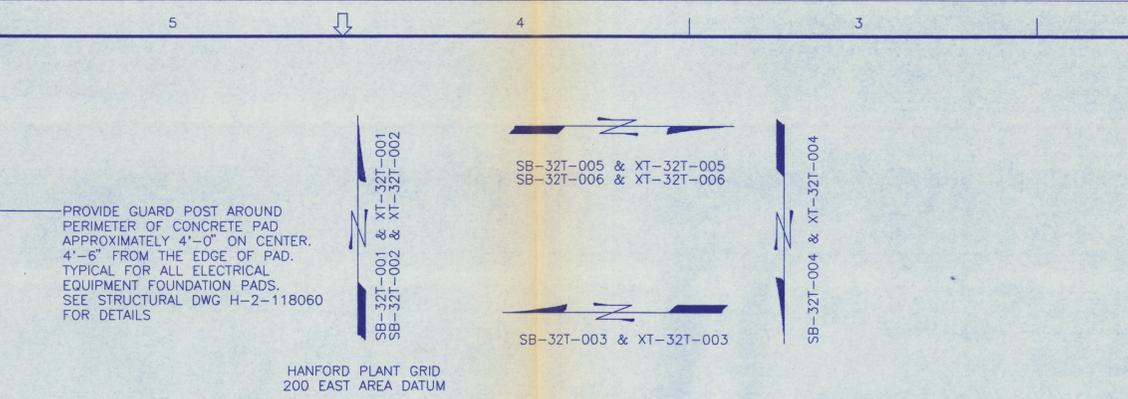
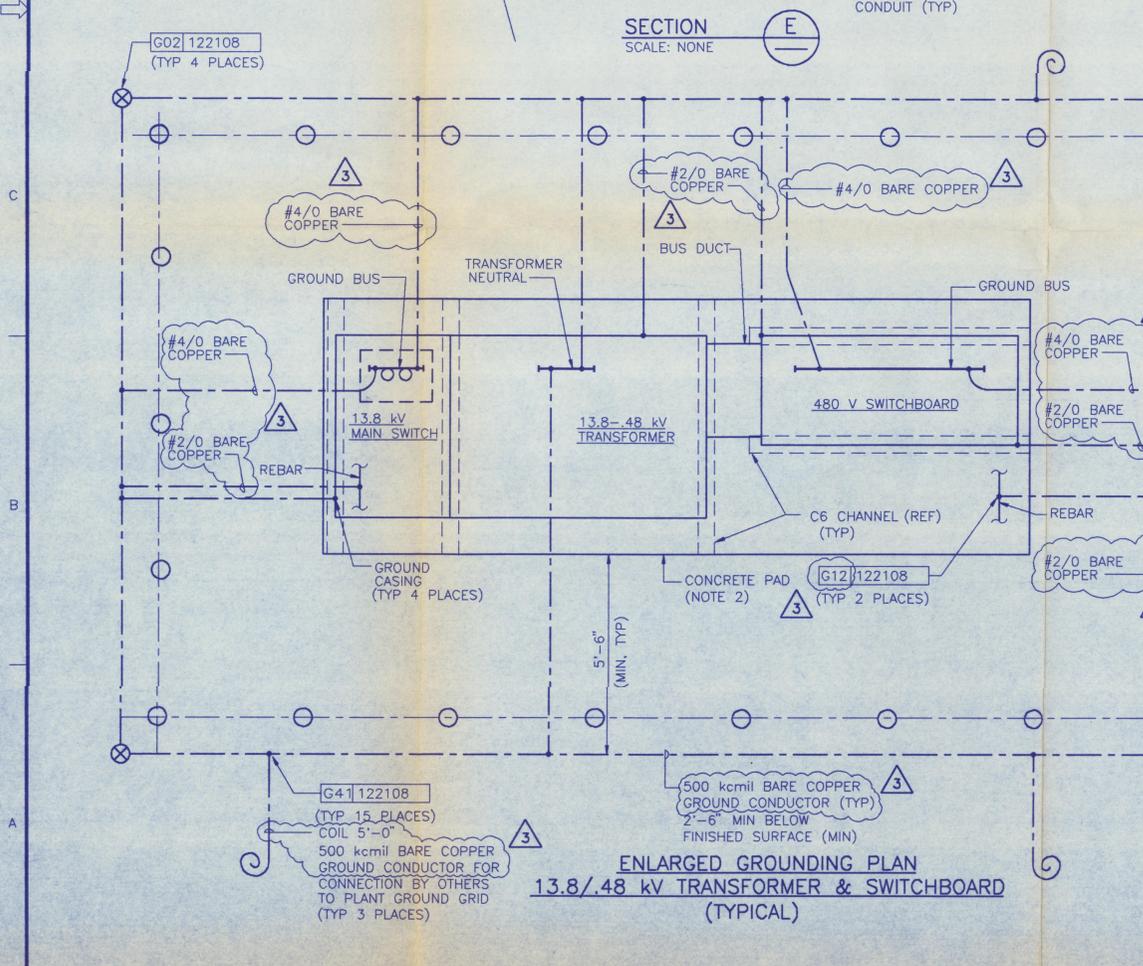
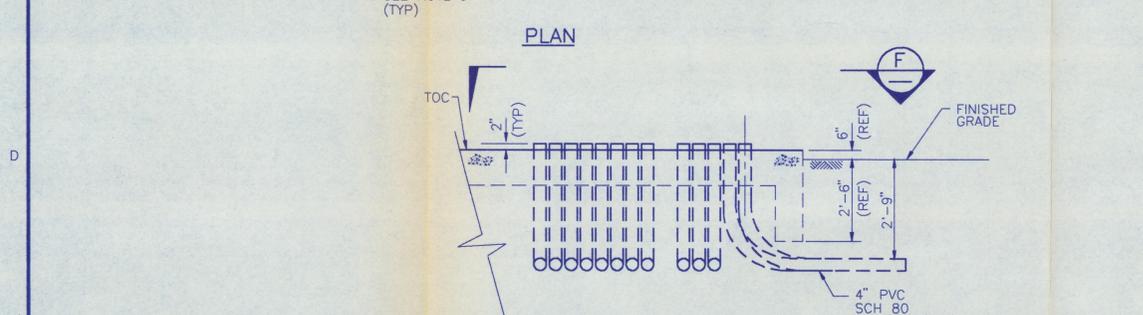
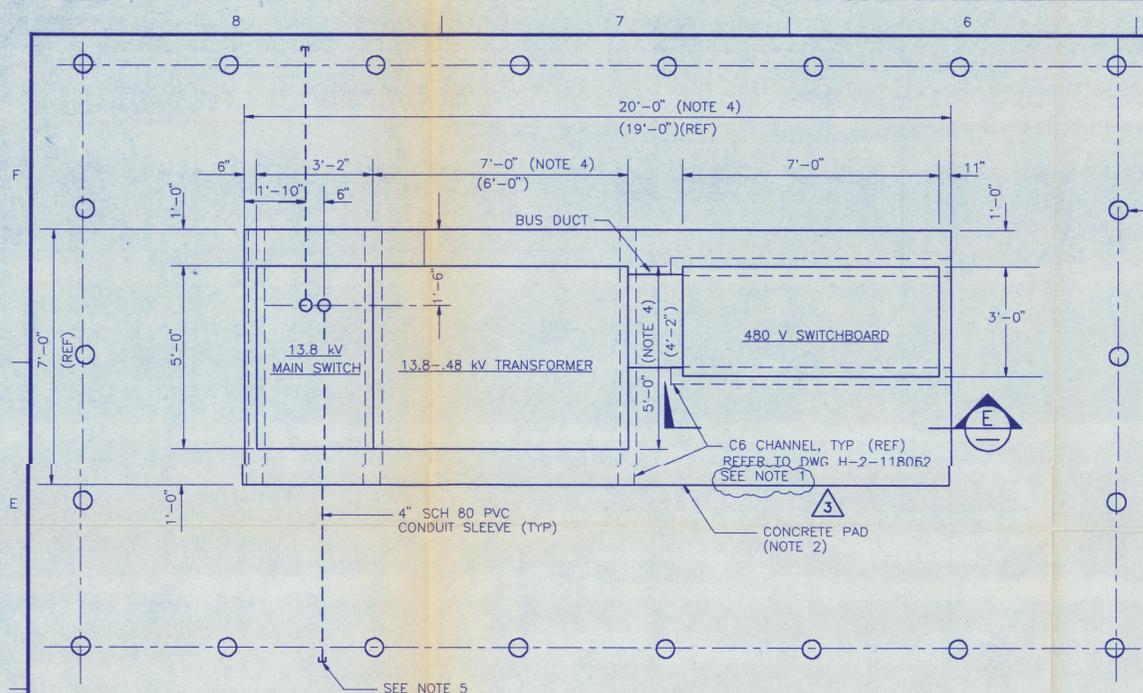
MAY 25 1993

REV. NO.	DATE	REVISION DESCRIPTION	APPROVAL INITIALS
3	5/19/93	REVISED GROUNDING PER CR-HWVP-0690 & FRR-00301A.	KK KKS
2	8/21/92	REVISED DB CABLE TRENCH AND PVC SCH. PER CR-HWVP-0739.	KK SS WF PJS EJ AKY WFH RSP
1	5/13/92	REVISED TITLE BLOCK PER CR #0724	KK WF KAO GNK EJ AKY JGK RSP
0	12/19/91	APPROVED FOR CONSTRUCTION	SC BR WF KAO GNK CCB AKY JGK RNG

PROJECT: B122134A
ENGINEERING RELEASE
REV. DATE
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
DE - AC06-B6R1.00356

FLUOR DANIEL, INC.
ADVANCED TECHNOLOGY DIVISION
ELECTRICAL CONSTRUCTION UTILITIES DETAILS

PROJECT TITLE: HANFORD WASTE VITRIFICATION PLANT
DESIGN ENGINEER: B. RETTIG
PROJECT: B-595
FLUOR CONTRACT NO.: 8457
CHRS NO.: A170
SCALE: NONE
BLDG. NO.: ---
INDEX NO.: ---
DRAWING NUMBER: H-2-122134
SHEET: 1 OF 3
REV. 3

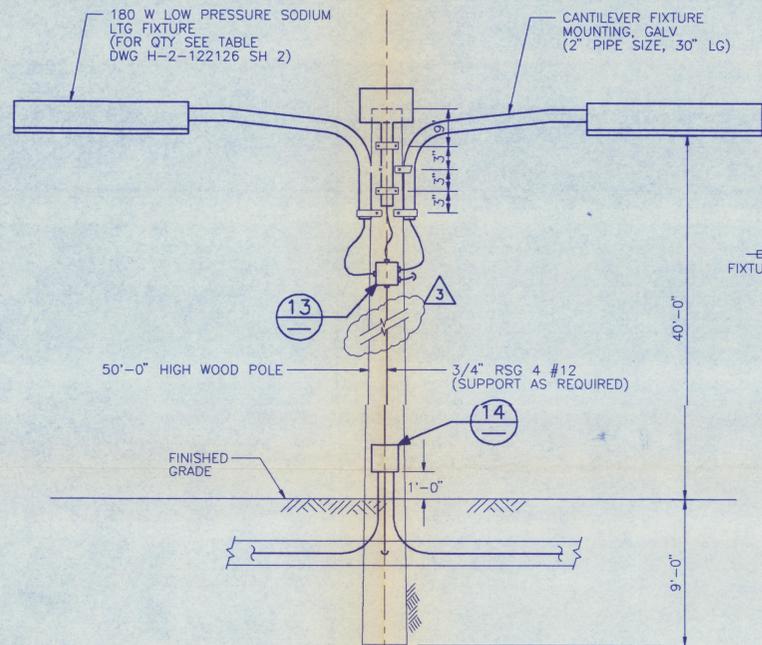


- NOTES:**
- THE LOCATION & LENGTH OF EMBEDDED LEVELING CHANNELS ARE PRELIMINARY AND SHALL NOT BE CONSTRUCTED UNTIL THEY ARE CONFIRMED BY THE BUYER TO BE IN ACCORDANCE WITH APPROVED EQUIPMENT DRAWINGS.
 - FOR EXACT LOCATION AND STRUCTURAL DETAILS SEE STRUCTURAL DWG H-2-118062.
 - FOR GENERAL NOTES & SYMBOLS SEE DWG H-2-122107.
 - DIMENSIONS SHOWN ARE FOR THE 1500 kVA & 1000 kVA TRANSFORMERS & SWITCHBOARDS (XT-32T-001 & SB-32-001 THRU XT-32T-005 & SB-32-005), FOR THE 500 kVA TRANSFORMER & SWITCHBOARD (XT-32-006 & SB-32-006) USE THE DIMENSIONS IN PARENTHESIS.
 - CAP ALL UNUSED UG CONDUITS WHEN NOT IN USE 5'-0" BEYOND EDGE OF CONCRETE PAD.

QUALITY LEVEL II
SAFETY CLASS 4 (REF)
MAY 25 1993

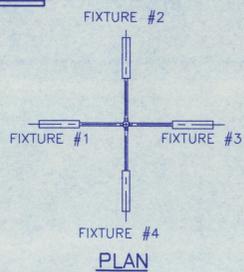
REV. NO.	DATE	REVISION DESCRIPTION	APPROVAL INITIALS
3	5/13/93	REVISED GROUNDING PER CR-HWVP-0690 & FRR-00301A.	KK KKS
2	2/21/92	REVISED SWBD & XFMR CONCRETE PADS PER CR-HWVP-0739	KK SS WF PJS EJ AKY WFH RSP
1	5/13/92	REVISED TITLE BLOCK PER CR-HWVP-0724	KK WF KAO GNK EJ AKY JGK RSP
0	2/19/91	APPROVED FOR CONSTRUCTION	SC BR WF KAO GNK CCB AKY JGK RNG

CHARTEL: B122134B
ENGINEERING RELEASE
REV. DATE
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
DE - AC06-86RL10836
FLUOR DANIEL, INC.
ADVANCED TECHNOLOGY DIVISION
ELECTRICAL CONSTRUCTION UTILITIES DETAILS
PROJECT TITLE: HANFORD WASTE VITRIFICATION PLANT
PROJECT: B-595
FLOOR CONSOLE NO.: 8457
CRIS NO.: A170
DRAWN: M.KHOURI
SCALE: NONE
CLASSIFICATION: NONE
NOT REO'D
DRAWING NUMBER: H-2-122134
SHEET: 2 OF 3
REV. 3

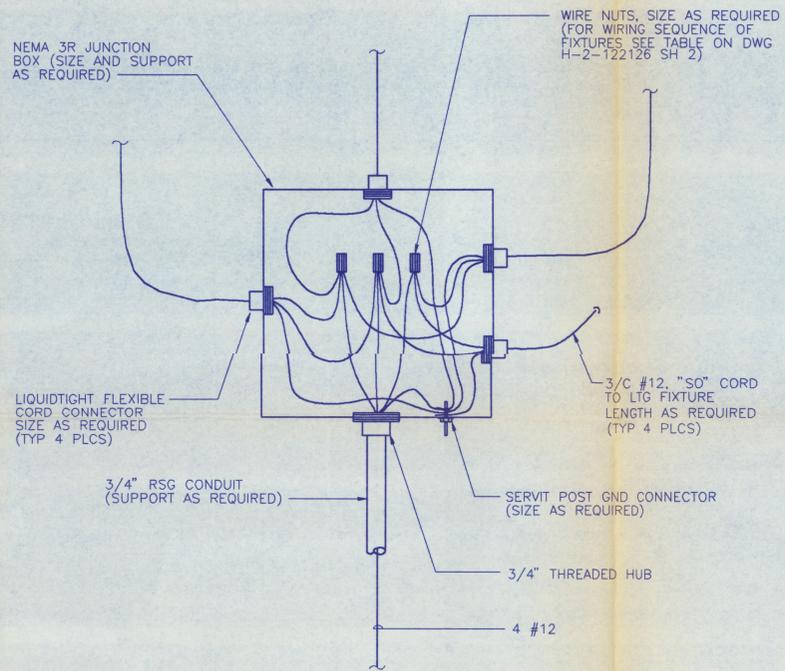


WOOD LIGHT POLE—MULTIPLE FIXTURES

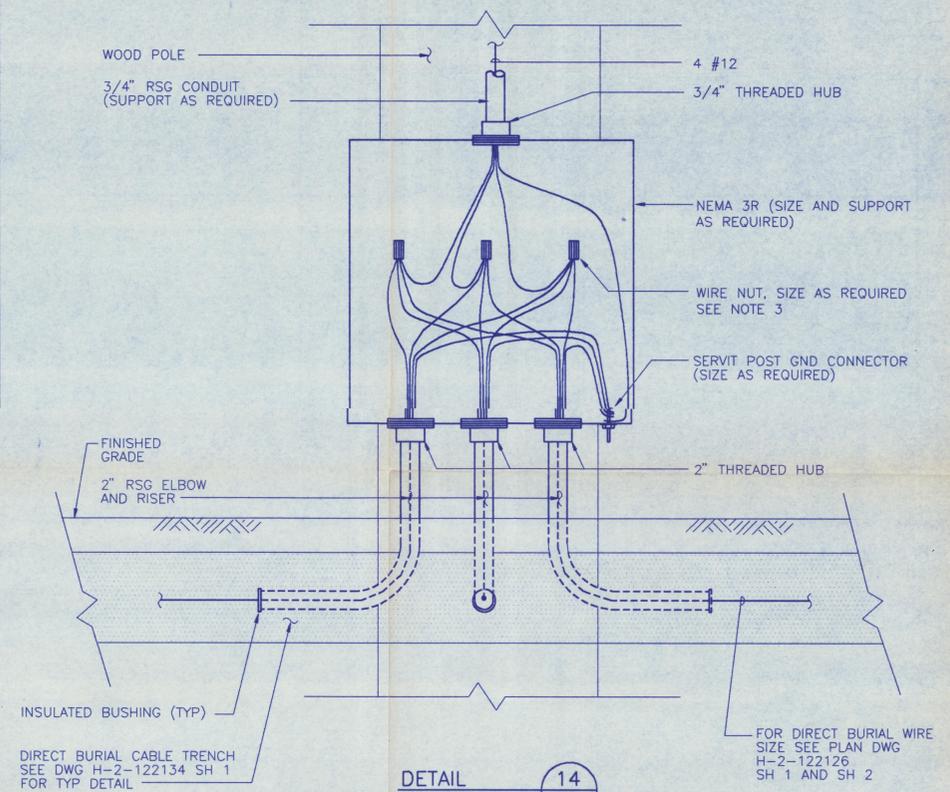
DETAIL 12
SCALE: NONE
122126
1,2



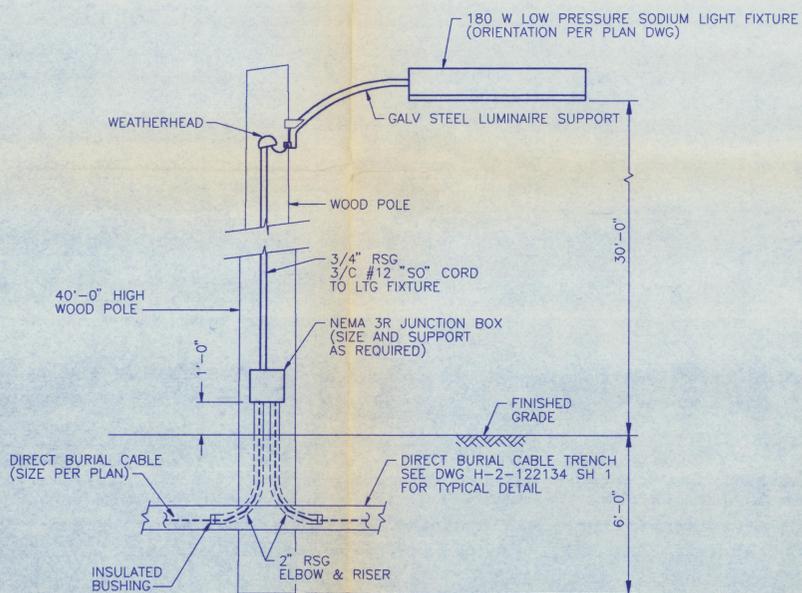
HANFORD PLANT GRID
200 EAST AREA DATUM



DETAIL 13
SCALE: NONE

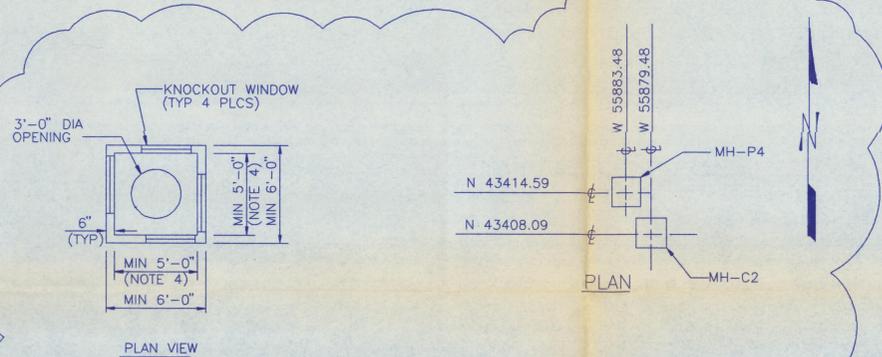


DETAIL 14
SCALE: NONE

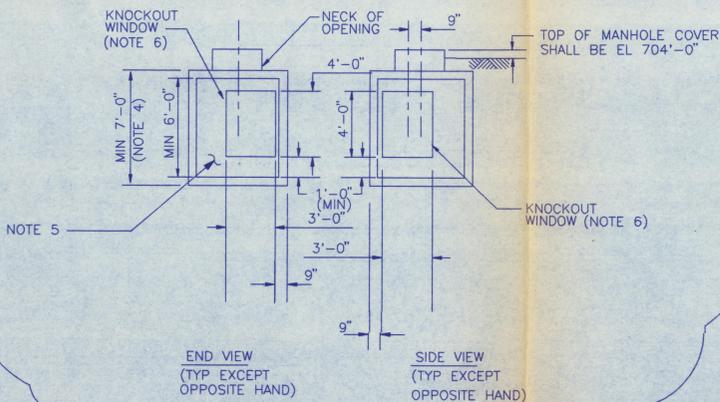


WOOD LIGHT POLE—SINGLE FIXTURE

DETAIL 10
SCALE: NONE
122126
1,2



PLAN VIEW



END VIEW (TYP EXCEPT OPPOSITE HAND)
SIDE VIEW (TYP EXCEPT OPPOSITE HAND)

MANHOLES
MH-P4 & MH-C2

DETAIL 15
SCALE: NONE
122126
1

NOTES:

- CONDUIT SHALL BE SCHEDULE 80 PVC, MINIMUM SIZE 2" UNLESS OTHERWISE NOTED, AND MINIMUM 2'-6" BELOW FINISHED SURFACE.
- FOR GENERAL NOTES AND SYMBOLS, SEE DWG H-2-122107.
- USE SPLIT BOLT CONNECTOR FOR #8 AND LARGER SIZE WIRE.
- MANHOLE DIMENSIONS ARE APPROXIMATE EXCEPT WHERE NOTED AS "MINIMUM" FOR INTERIOR SIZE. KNOCKOUT WINDOW DIMENSIONS ARE EXACT AND SHALL BE ADHERED TO. MINIMUM INTERIOR DIMENSIONS SHALL BE 5'-0" x 5'-0" x 6'-0" HIGH.
- ALL MANHOLES SHALL BE FURNISHED COMPLETE WITH LADDER, CABLE SUPPORTS, PULLING RINGS OR IRONS AND SUMP. MANHOLES SHALL ALSO HAVE GROUND ROD KNOCKOUTS LOCATED AT TWO OPPOSITE CORNERS OF INTERIOR.
- MANHOLE KNOCKOUT WINDOWS SHALL BE EQUIPPED WITH BEND-AWAY REBAR FOR TIE IN WITH FUTURE CONCRETE DUCT BANKS. UNLESS NOTED OTHERWISE, ALL KNOCKOUT WINDOWS SHALL BE SEGMENTED.

QUALITY LEVEL II
SAFETY CLASS 4 (REF) MAY 25 1993

REV. NO.	DATE	REVISION DESCRIPTION	APPROVAL INITIALS
3	5/21/93	REVISED PER CR-HWVP-0881R1	KK KKS
2	8/21/92	DELETE TEL CABINET AND ADD GEN LTG DET PER CR-HWVP-0739	KK SS WF AT PJS GNR
1	5/13/92	REVISED TITLE BLOCK PER CR #0724	EJ AKY WFK RSP
0	12/19/91	APPROVED FOR CONSTRUCTION	SC BR WF KAO GNR
			CCB AKY JGK RNG

CDRFILE: B122134C	CADCODE: 2B:BM:ACD2:10.C2:SS
ENGINEERING RELEASE	
REV. DATE	U.S. DEPARTMENT OF ENERGY
Richland Operations Office DE - AC06-B6RL10838	
SIGNATURE DATE	
PRJ. DIR. R.N. GIBBONS 12-19-91	FLUOR DANIEL, INC. ADVANCED TECHNOLOGY DIVISION
CHK ENGR. J.G. KELLY 12-12-91	
INDEPENDENT SAFETY A.K. YEE 12-12-91	ELECTRICAL CONSTRUCTION UTILITIES DETAILS
PROJECT ENG. C.C. BUSCHMANN 12-12-91	
ENGINEERING MGR. G.N. KIMURA 12-12-91	PROJECT TITLE: HANFORD WASTE VITRIFICATION PLANT
SUPERVISOR W. FRENCH K.A. OWREY 12-11-91	PROJECT NO. B-595
DESIGN ENGINEER B. RETTIG 12-11-91	FLOOR CONTROL NO. 8457
CHECKED S. CLARK 12-11-91	SCALE: NONE
DRAWN M. KHOURI	BLDG. NO. ---
CLASSIFICATION: NONE	INDEX NO. ---
NOT REQ'D	PROJECT SHEET: H-2-122134
	3 OF 3

H-2-122106	ELECTRICAL CONSTRUCTION UTILITIES DRAWING INDEX
DWG. NO.	DRAWING TITLE
REFERENCE DRAWINGS	
NEXT USED ON	

CONDUIT-CABLE	
SYMBOL FOR PLAN OR ELEVATION	DESCRIPTION
XXXXXX	EXISTING INSTALLATION TO BE REMOVED
---	UNDERGROUND CONDUIT AND CABLE, MINIMUM 2'-0" BELOW GRADE
C	NEW OVERHEAD POWER LINE, 13.8 kV (SIZED AS SHOWN ON PLAN DRAWING)
C	EXISTING OVERHEAD POWER LINE
DB	UNDERGROUND HOME RUN, DIRECT BURIAL CABLE OR CONDUIT AND CABLE
O E701	EXISTING POWER POLE E701
NP101	NEW POWER POLE NP101
DB	DIRECT BURIAL CABLE
MANHOLE	MANHOLE
LIGHTING	
SYMBOL FOR PLAN OR ELEVATION	DESCRIPTION
SL	EXISTING OVERHEAD SERIES LIGHTING CIRCUIT 2.4 kV STREET LIGHTING (SIZED AS SHOWN ON PLAN DRAWING).
SL	NEW OVERHEAD SERIES LIGHTING CIRCUIT 2.4 kV STREET LIGHTING (SIZED AS SHOWN ON PLAN DRAWING).
*	EXISTING 2400 V STREET LIGHTING
△	EXISTING LIGHTING TRANSFORMER
(A-B)	NEW LIGHTING FIXTURE 180 W LOW PRESSURE SODIUM 480 V WITH INTEGRAL PHOTO-ELECTRIC CELL MOUNTED ON 30'-0" STEEL POLE PHASE-TO-PHASE CIRCUITING
WD (A-B)	NEW LIGHTING FIXTURE SAME AS ABOVE EXCEPT MOUNTED ON 40'-0" WOOD POLE PHASE-TO-PHASE CIRCUITING INDICATES WOOD POLE (TEMPORARY)
WD A3	NEW AREA LIGHTING FIXTURE 180 W LOW PRESSURE SODIUM, 480 V WITH INTEGRAL PHOTO-ELECTRIC CELL MOUNTED ON 50'-0" WOOD POLE. PILE NO. INDICATES WOOD POLE (TEMPORARY)
GROUNDING	
SYMBOL FOR PLAN OR ELEVATION	DESCRIPTION
---	GROUNDING CONDUCTOR
⊗	GROUND WELL
⊗	GROUND ROD
---	MAIN GROUND CONDUCTOR (SIZE AS SHOWN ON DRAWING)
---	EXOTHERMIC WELD
---	TAP GROUND CONDUCTOR (SIZE AS SHOWN ON DRAWING)

ONE LINE	
SYMBOL FOR PLAN OR ELEVATION	DESCRIPTION
600 A 125 E	FUSED SWITCH RATING AS NOTED
40 E	POWER FUSE, TYPE 40 E
VS	SELECTOR SWITCH VS-VOLTMETER, AS-AMMETER
V	METER, V-VOLTMETER, A-AMMETER KWH-KILOWATT-HOUR METER
600 A	AIR INTERRUPTER SWITCH, 600 A
800 AF 800 AT	AIR CIRCUIT BREAKER, 800 A AF = AMPERE FRAME AT = AMPERE TRIP
800:5 E	CURRENT TRANSFORMER, 800:5 RATIO
1	POTENTIAL TRANSFORMER RATIO AS INDICATED
13.8/48 kV 1000 kVA	POWER TRANSFORMER, 13.8/48 kV WYE, 1000 kVA
LA	LIGHTNING ARRESTER
H2 P5	CABLE CALLOUT AREA DESIGNATION, LOCATION OR POWER SOURCE POWER CABLE NUMBER
GFP	GROUND FAULT PROTECTOR
SW	GROUND SWITCH
OAB	INDICATES CONSTRUCTION POWER FEEDER AND LOADS INSTALLED UNDER SEPARATE CONTRACT.
ROADWAY LIGHTING	INDICATES CONSTRUCTION POWER FEEDER AND LOADS INSTALLED UNDER THIS CONTRACT.
59	GROUND FAULT DETECTION RELAY G.E. TYPE 121FV51ADIA OR EQUAL
86	120 V AC LOCKOUT RELAY, ELECTRO-SWITCH TYPE WL-2 OR EQUAL, WITH PISTOL GRIP HANDLE.
RES	RESISTOR
---	DISCONNECTING DEVICE
2500 A	BUS DUCT RATING AS INDICATED

MISCELLANEOUS	
SYMBOL FOR PLAN OR ELEVATION	DESCRIPTION
SECTION CALLOUT	INDICATES SECTION A
SECTION	SECTION IDENTIFICATION LETTER
SCALE:	DENOTES DRAWING NUMBER ON WHICH SECTION IS SHOWN SHEET NUMBER (IF MORE THAN 1)
DETAIL CALLOUT	DETAIL NUMBER DRAWING NUMBER ON WHICH DETAIL IS SHOWN SHEET NUMBER (IF MORE THAN 1)
DETAIL	DETAIL NUMBER DRAWING NUMBER ON WHICH DETAIL IS CALLED OUT SHEET NUMBER (IF MORE THAN 1)
ASSEMBLY CALLOUT	SHEET NUMBER (IF MORE THAN 1) DRAWING NUMBER ON WHICH ASSEMBLY IS SHOWN ASSEMBLY NUMBER
EXISTING POST AND SIGN	
EXISTING FENCE	
NEW FENCE	

THE SELLER SHALL VERIFY CONDITIONS AT THE JOB SITE PRIOR TO STARTING CONSTRUCTION AND THE ENGINEER SHALL BE NOTIFIED, IN WRITING, OF ANY DISCREPANCIES OR INCONSISTENCIES.

HORIZONTAL AND VERTICAL CONTROL IS BASED ON THE EXISTING HANFORD PLANT 200 E AREA SYSTEM. THE PROJECT BENCHMARKS TO BE USED IN THE CONSTRUCTION OF THE HANFORD WASTE VITRIFICATION PLANT ARE LISTED IN THE TABLE BELOW.

BENCHMARK NAME	DESCRIPTION	HANFORD 200E AREA DATUM	
		COORDINATES	ELEVATION
2E-50	BRASS CAP SET IN CONCRETE	N 42499.94 W 55599.84	706.09
2E-51	BRASS CAP SET IN CONCRETE	N 43897.51 W 56725.52	698.61
2E-52	BRASS CAP SET IN CONCRETE	N 40950.18 W 56725.10	713.50

THE COORDINATES AND ELEVATIONS SHOWN FOR THESE BENCHMARKS ARE BASED ON THE SURVEY DATA REPORT PREPARED BY KAISER ENGINEERS, TITLED "HANFORD WASTE VITRIFICATION PLANT", DATED 9-15-89 (FILE NUMBER 2ESW-039)

ABBREVIATIONS	
A	AMPERES
AC	ALTERNATING CURRENT
ACSR	ALUMINUM CABLE STEEL REINFORCED
APPR	APPROXIMATE
ASSY	ASSEMBLY
AUX	AUXILIARY
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
BRKR	BREAKER
C	CENTIGRADE
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CHEM	CHEMICAL
COMP	COMPRESSOR
CONN	CONNECTION(S)
CMR	CONTACT MAINTENANCE ROOM
CONSTR	CONSTRUCTION
COORD	COORDINATE
DB	DIRECT BURIAL
DBE	DESIGN BASIS EARTHQUAKE
DC	DIRECT CURRENT
DET	DETAIL
DIA	DIAMETER
DISTR	DISTRIBUTION
DWG	DRAWING
E	EAST
EA	EACH
ELEC	ELECTRICAL
EL OR ELEV	ELEVATION
EOT	EDGE OF TRENCH
EX	EXAMPLE
FAB	FABRICATION
FIN	FINISH
FLR	FLOOR
FT	FOOT OR FEET
GALV	GALVANIZED
GEN	GENERATOR
GFE	GOVERNMENT FURNISHED EQUIPMENT (SUPPLIED BY BUYER)
GFP	GROUND FAULT PROTECTOR
GND	GROUND
GNDG	GROUNDING
HP	HORSEPOWER
HZ	CYCLES PER SECOND
IC	INTERRUPTING CURRENT
INSTR	INSTRUMENTATION
JB	JUNCTION BOX
kA	KILOAMPERES
kcmil	THOUSAND CIRCULAR MILS
KO	KNOCKOUT
kW	KILOWATT
kV	KILOVOLT
kVA	KILOVOLT-AMPERE
LAB	LABORATORY
LTG	LIGHTING
MAINT	MAINTENANCE
MECH	MECHANICAL
MRB	MANIPULATOR REPAIR BUILDING
MAX	MAXIMUM
MIN	MINIMUM
MH	MANHOLE
MTG	MOUNTING
mVA	MEGAVOLT-AMPERES
N	NORTH
NEC	NATIONAL ELECTRICAL CODE
NIC	NOT IN CONTRACT
NO.	NUMBER
OAB	OPERATIONS ANNEX BUILDING
OC/REB	OPERATIONS CONTROL/REGULATED ENTRANCE BUILDING
o	PHASE
PB	PULL BOX
PLCS	PLACES
PNL	PANEL
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
PWR	POWER
REF	REFERENCE
REQD	REQUIRED
RES	RESISTOR
RSG	RIGID STEEL GALVANIZED
RWX	RAW WATER
S&R	SHIPPING AND RECEIVING
SC	SAFETY CLASS
SCH	SCHEDULE
SH	SHEET
SP	SPARE
SPEC	SPECIFICATION
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
SWX	SANITARY WATER MANIFOLD
TBD	TO BE DETERMINED
TOC	TOP OF CONCRETE
TYP	TYPICAL
UG	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
V	VOLTS
VIT	VITRIFICATION
W	WEST
WD	WOOD
WHSE	WAREHOUSE
WHT	WASTE HOLDING TANK
WPS	WASTE PROCESSING STATION
XFMR	TRANSFORMER
%Z	PERCENT IMPEDANCE

- GENERAL NOTES:**
- MINIMUM COVER REQUIREMENTS FOR DIRECT BURIAL CABLE SHALL BE AS FOLLOWS:
600 V OR LESS=2'-0"
OVER 600 V=2'-6"
 - AT RAILROAD CROSSINGS, THE TOP OF CONDUIT SHALL BE A MINIMUM OF 47 INCHES BELOW BOTTOM OF RAILS.
 - WHERE THE EXISTING WORK AREA IS OVERLAIN WITH 4 INCHES OF CRUSHED ROCK SURFACING, REMOVE AS REQUIRED FOR BELOW GRADE WORK AND REPLACE UPON COMPLETION OF INSTALLATION.
 - EXCAVATION AND BACKFILL REQUIRED FOR THE INSTALLATION OF THE DIRECT BURIED CABLE SHALL BE PERFORMED IN ACCORDANCE WITH SPECIFICATION SECTION 02220. FOR CONCRETE CONSTRUCTION SEE SPECIFICATION SECTION 03300.
 - THE EXISTING UTILITIES AND ITEMS LOCATED IN THE PLANS ARE SHOWN IN AN APPROXIMATE MANNER ONLY. THE LOCATIONS OF EXISTING UTILITY LINES SHOWN HAVE BEEN PROVIDED BY THE OWNER BASED ON EXISTING AS-BUILT DRAWINGS. THE SELLER SHALL TAKE NECESSARY MEASURES TO PREVENT DAMAGING THE EXISTING UTILITY LINES, ASSOCIATED APPURTENANCES AND ALL OTHER ITEMS NOT TO BE DEMOLISHED.
 - FOR ELECTRICAL INSTALLATION, SEE SPECIFICATION SECTION 16100. FOR ELECTRICAL MATERIAL AND DEVICES, SEE SPECIFICATION SECTION 16110. FOR ELECTRICAL TESTING, SEE SPECIFICATION SECTION 16905.

REV. NO.	DATE	REVISION DESCRIPTION	APPROVAL INITIALS
3	5/13/92	REVISED ABBREVIATIONS & SYMBOLS PER CR-HWP-0690 & FRR-00301A	KK KKS jlc
2	8/21/92	ADDED SYMBOL FOR AREA LIGHTING & ABBREVIATIONS PER CR-HWP-0739	KK SS WF PJS EJ AKY WFH RSP
1	5/13/92	REVISED SYMBOL, ABBREVIATIONS, AND TITLE BLOCK PER CR #0724	KK WF KAO GNK EJ AKY JGK RSP
0	12/19/91	APPROVED FOR CONSTRUCTION	SC BR WF KAO GNK CCB AKY JGK RNG

MAY 25 1993

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
DE - AC06-B6R10838

FLUOR DANIEL, INC.
ADVANCED TECHNOLOGY DIVISION

ELECTRICAL GENERAL NOTES AND SYMBOLS

PROJECT TITLE	HANFORD WASTE VITRIFICATION PLANT		
DESIGN ENGINEER	B. RETTIG	PROJECT NO.	B-595
DRAWN BY	S. CLARK	FLUOR CONTRACT NO.	8457
CHECKED BY	M. KHOURI	CFRS NO.	A170
SCALE	NONE	BLDG. NO.	---
DRAWING NUMBER	H-2-122107	INDEX NO.	---
BY	---	SHEET	1
NOT REQ'D	---	OF	1
---	---	REV.	3