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ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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		10. System/Bldg./Facility: 241-AW Tank Farm
11. Receiver Remarks: THIS IS A BASELINE DOCUMENT		12. Major Assm. Dwg. No.:
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15. DATA TRANSMITTED

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1	WHC-SD-W457-CDR-001	All	0	Conceptual Design Report for Project W-457, AW Farm Tank Monitoring and Controls System	SQ	1	1	

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
1	1	Proj.Eng. D. T. Lott	D. T. Lott	6/27/96	R3-25						
1	1	Proj. Mgr. J. M. Light	J. M. Light	6-27-96	R3-25						
1	1	Farm Cog. K. A. White	K. A. White	6/26/96	S5-13						
1	1	QA H. W. Henrikson	H. W. Henrikson	6-27-96	R3-28						
1	1	Safety for M. N. Islam	M. N. Islam	6/27/96	R3-03						
1	1	~~Environ. R. G. Erlandson~~	~~Signature~~	~~6/27/96~~	~~H6-28~~						
1	1	C. C. Scaief	C. C. Scaief III	6/27/96	S2-01	★DESIGN AUTHORITY					

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
D. T. Lott R. Matteucci 10/29/96 Signature of EDT Originator Date	Authorized Representative for Receiving Organization Date	J. M. Light 6/24/96 Cognizant Manager Date	[] Approved [] Approved w/comments [] Disapproved w/comments

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BD-7400-172-1

Conceptual Design Report for Project W-457, AW Tank Farm Monitoring and Controls System

DT Lott
P.O. Box 1970, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

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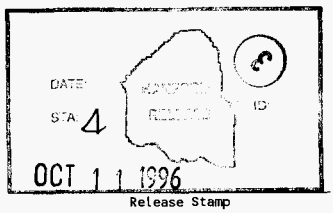
Abstract: The 241-AW Tank Farm, located in the 200 East Area of the Hanford Site, contains six 1.16 Mgal double-shell tanks. The tanks are used primarily for storage of waste from facilities such as PUREX and B Plant. Tanks 102-AW and 106-AW commonly are used for staging waste concentrated by the evaporator.



Release Approval — Date 10/10/96 — Release Stamp

Approved for Public Release

CONCEPTUAL DESIGN REPORT

AW TANK FARM MONITORING AND CONTROL SYSTEM INSTALLATION

PROJECT W-457

Prepared for

Westinghouse Hanford Company

June 1996

Subcontract WHC 380393

Prepared by

ICF Kaiser Hanford Company
Richland, Washington

W457CDR

CONCEPTUAL DESIGN REPORT

for

AW TANK FARM MONITORING AND CONTROL SYSTEM INSTALLATION PROJECT W-457

issued by

WESTINGHOUSE HANFORD COMPANY

for the

U.S. Department of Energy
Richland Operations Office
Richland, Washington

PREPARED BY: ICF Kaiser Hanford Company — June 14, 1996 (Date)

WESTINGHOUSE HANFORD COMPANY APPROVALS:

Responsible Manager, Projects	7/22/96 (Date)
Manager, User/Sponsor Organization	8/29/96 (Date)
for Manager, Safety Organization	7/23/96 (Date)
Manager, Quality Assurance Organization	7/22/96 (Date)

U.S. DEPARTMENT OF ENERGY APPROVAL:

N/A U.S. Department of Energy Richland Operations Office	(Date)

W457CDR

CONCEPTUAL DESIGN REPORT

FOR

AW TANK FARM MONITORING AND CONTROL SYSTEM INSTALLATION

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Westinghouse Hanford Company

[signature]	6/14/96	[signature]	6-13-96
Lead Engineer	Date	Technical Documents	Date
N/A		N/A	
Safety Engineering	Date	Environmental Engineering	Date
N/A		[signature]	6-14-96
Quality Engineering	Date	Project Manager	Date

Westinghouse Hanford Company

[signature]	6/14/96
Project Manager	Date

per telecon w/ R. W. Matt. Clark 10/9/96

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APPENDICES

ABBREVIATIONS

ALARA	As Low As Reasonably Achievable
CASS	Computer Aided Survielence System
CDR	Conceptual Design Report
Enraf	
FDC	Functional Design Criteria
FeCN	Fero Cyanide
FM	Fidelity Mutual
GCS	Gas Characterization System
MIT	Multi-functional Instrument Tree
NEC	National Electric Code
SHMS	Standard Hydrogen Monitoring Systems
TMACS	Tank Monitoring and Control System
UL	Underwriters Laboratories
USQ	Unreviewed Safety Question
WBS	Work Breakdown Structure

CONCEPTUAL DESIGN REPORT

AW TANK FARM MONITORING AND CONTROL SYSTEM INSTALLATION

PROJECT W-457

I. INTRODUCTION

The 241-AW Tank Farm, located in the 200-East Area of the Hanford Site, contains six 1.16 Mgal double-shell tanks. The tanks are used primarily for storage of waste from facilities such as PUREX and B Plant. Tanks 102-AW and 106-AW commonly are used for staging waste concentrated by the evaporator.

Evaporator personnel maintain and monitor all the 241-AW tanks on a daily basis. Two tanks within the farm recently have been identified as having potential flammable gas concerns. Tank 101-AW is currently on the Flammable Gas Watch List. Recently, Tank 104-AW was added to the Flammable Gas Watch List USQ. These classifications impose additional operating controls and monitoring of these tanks.

The process for concentrating the supernatant via the evaporator is termed an "evaporator campaign." The campaign usually lasts from one to three months depending on the waste type and level. During campaigns, supernatant is transferred through underground piping to the evaporator feed tank (Tank 241-AW-102) for concentration in the evaporator. After the evaporator treats the waste, the concentrated waste (slurry), is routed to Tank AW-106 for additional liquid removal. During evaporator campaigns and normal daily operations, many safety precautions are taken to ensure tank safety. These safety precautions are defined in tank farm operating procedures and safety documentation. The precautions predominantly involve frequent monitoring of the tank waste temperature, level, gas, and pressure using installed tank waste monitoring equipment.

The tank monitoring and control system (TMACS) was originally designed to monitor the temperature in the 24 ferrocyanide (FeCN) Watch List tanks (ref 2). TMACS provides continuous remote monitoring, alarming, and data storage of waste tank temperatures, levels and gas pressures. Since the original installation, the scope of the monitoring system has been expanded to encompass monitoring various tank farm parameters in all tank farms (200-East and 200-West Areas), including the 241-AW Tank Farm (ref 3).

The cost estimate summary and conceptual project schedule are in Appendices B and C, respectively.

II. SUMMARY

Project W-457, "AW Tank Farm Monitoring and Control System Installation," will provide systems to read and control in tank monitoring equipment remotely. Tank equipment that can be monitored by the tank monitoring and control system (TMACS) are thermocouple trees, multi-functional instrument trees (MITs), hydrogen monitoring equipment, pneumatic pressure gauges, ventilation flow, Enraf level gauges, and more. Project W-457 will install the signal conditioners and ancillary equipment required to convert the analog signal provided by the tank monitoring equipment to a digital signal suitable for interpretation by the central TMACS computer.

TMACS will provide alarm management, data storage, data trending, reporting, event logging, failure status, and graphical presentation using a hierarchy of displays that allow progression from the general to the specific. Installing TMACS will provide obvious benefits in safety and ALARA as well as reducing cost associated with manual monitoring of tank parameters.

This CDR includes information required for TMACS installation in the AW Tank Farm. The design of the AW Tank Farm installation is based on currently installed and proven designs in other tank farms.

The total estimated cost for this fiscal year 1996 General Plant Project is $910,000. Construction costs of the project are $740,000; other project costs are $170,000. This estimate includes a 23% contingency.

III. JUSTIFICATION

During evaporator campaigns and normal daily operations, many safety precautions are taken to ensure waste tank integrity. These precautions predominantly involve frequent monitoring of the tank waste temperature, level, vapor space constituents, and pressure. Monitoring is performed using installed tank waste monitoring equipment.

There are several types of tank monitoring equipment installed in AW Tank Farm: pneumatic pressure gauges, standard hydrogen monitoring systems (SHMS), multi-functional instrument tree (MIT), and thermocouple trees. Additional equipment installed includes a gas characterization system (GCS), standard-D hydrogen monitoring systems on the central exhauster, and Enraf level gages.

All of the listed equipment is read and recorded locally. This requires operators to make rounds to the six tanks within the AW Tank Farm, record readings, and survey out of the tank farm. During normal operations, operators are dispatched once every shift to make rounds and record readings. During evaporator campaigns, operators are dispatched every 2 hours to make rounds and record readings.

Per DOE Order 6430.1A and Code of Federal Regulation (CFR) 10 CFR 436, an economic analysis was performed (Appendix E). The economic analysis compared the do nothing option (continue performing manual readings) versus installing TMACS in AW Tank Farm. Based on present day dollars, this analysis shows that the expense for installing TMACS will be recovered by expense savings in less than 6 years. This is based on the estimated cost for installation, operation and maintenance costs, current billing rate for operators, and

continuation of current mode of operation within the AW Tank Farm and evaporator.

Installation of TMACS will provide real-time status of parameters associated with the AW Tank Farm tanks and also will provide a means of instantaneously identifying failed equipment. Installation of TMACS will reduce tank farm activity by remotely recording waste tank parameters, and will provide ALARA benefits by reducing potential for exposure or contamination.

IV. DESCRIPTION OF PROJECT SCOPE

A. IMPROVEMENTS TO LAND (460)

Excavation will be required for buried electrical power, control, and instrumentation conduit (triple conduit). The excavation will be performed within the AW Tank Farm fence to a maximum depth of approximately 610 mm (24 in.). This will be performed following the procedure WKS 17 in WHC-CM-1-10, "Safety Manual."

Excavation for triple conduit will be made throughout the farm as shown on drawing H-2-820792. All drawings are in Appendix G. The excavation between pull boxes PB-94-5-Δ, PB-94-6-Δ, and PB-94-10-Δ and subsequent triple conduit runs and pull box placement will be provided by project W-451, "Tank Farm Gas Characterics."

Excavation for electrical power and instrument conduit will be performed at each tank. The excavation will provide power and instrumentation conduit between the nearest pull box and the tank specific TMACS terminal box.

Further excavation for instrumentation conduit will be performed from the tank specific TMACS terminal box to the individual terminal boxes of tank instrumentation. This will be performed for three thermocouple junction

boxes, one Enraf liquid level gauge, and one tank vapor space pressure transducer cabinet [two pressure transmitters] at each tank.

Tank AW-101 will require additional excavation for power and instrumentation conduit required for MIT and hydrogen monitoring (see drawing H-2-820792).

B. **BUILDINGS (501)**

TMACS equipment will be provided in the existing control facility (241-AW-271) outside the AW Tank Farm north fence. The building will be provided with the electrical power and instrumentation service required for TMACS. Two electrical enclosures housing TMACS equipment will be installed in the building; the modem assembly (modems provided by others) and the communications interface unit (see drawings H-2-820793 and H-2-820801, respectively).

C. **OTHER STRUCTURES (550)**

The electrical enclosures in the tank farm will be supported by unistrut stands. The stands will be fabricated in the shop and then placed in the farm to maintain ALARA. Details of the support stands are shown in drawing H-2-815300.

D. **UTILITIES (600)**

Electrical power will be distributed to TMACS terminal boxes through underground wiring. The power wiring will be in a separate conduit than the control and instrumentation wiring.

Instrumentation wiring will be distributed to TMACS terminal boxes through underground wiring in a conduit separate from the power conduit. No control wiring will be provided by this effort. Control conduit is provided for future control expansion.

The electrical system design will conform to the National Electric Code (NEC). All electrical parts will be listed or approved by Underwriters Laboratories (UL), Fidelity Mutual (FM), or another nationally recognized testing laboratory.

Two designated telephone lines will be provided for communication between the AW Tank Farm TMACS and the master TMACS computer. The line will connect the modems located in 241-AW-271 to the TMACS central computer located in the 2750E Building. The telephone company will provide two excess modems.

E. SPECIAL EQUIPMENT AND PROCESS SYSTEMS (700)

The existing TMACS computer system will be programmed to recognize the AW Tank Farm.

The process of obtaining data from the in-tank instrumentation requires multiple electronic signal processors. The analog signal from an instrument is converted to a digital signal that is stored as a measurement in local memory. When a report is requested, the stored data is transmitted serially via an RS-485 signal that is converted to RS-232C which is suitable for transfer and interpretation by the TMACS master computer. The equipment required to do the data obtaining process will be installed at 18 thermocouple trees, 6 Enraf liquid level gauges, 12 tank vapor pressure transducers and 1 standard hydrogen monitor in the AW Tank Farm. The equipment consists of the TMACS enclosures and Acromag I/O processors installed locally at each tank.

F. STANDARD EQUIPMENT (710 THROUGH 799)

All equipment will be standard "off-the-shelf" items. Exceptions may arise with some of the instrumentation signal conversion equipment, but this is not anticipated.

G. IMPROVEMENTS FOR OTHERS (800)

Accommodations for future expansion of monitored points will be provided. These expansion points will provide standardized access for future monitoring equipment.

Conduit runs providing control capability will be at the pull boxes throughout the AW Tank Farm (see drawing H-2-820792). This will allow for future control of pumps, valves, etc. by the master TMACS computer.

Excess electrical capability also will be provided to AW Tank Farms. This will be provided in sufficient capacity to operate miscellaneous hand tools and future controls applications.

A computer terminal will be provided in the 242-A Evaporator Building to be used for in situ monitoring of tank parameters by tank farm personnel.

H. DEMOLITION (810)

The Doric Digitrend remote multiplexers in control facility 241-AW-271 that are tied to CASS will be removed. These units presently are not functional and there are no plans to repair them. However, buried CASS cables will remain.

I. OTHER PROJECT COSTS (900)

Other project costs include design finalization and project management during construction.

J. DESIGN COMPLIANCE

The design and construction of project W-457 will comply with the codes and regulations listed in the project FDC (ref 1).

V. METHODS OF PERFORMANCE

A. CONSTRUCTION WORK BY ONSITE CONTRACTOR (WBS 3.1)

Fabrication of TMACS equipment will be performed by site construction forces. Primarily, this will be fabrication of terminal boxes and stands.

Installation of the TMACS system will be performed by the onsite engineer/construction contractor. This will include excavation and backfill within the AW Tank Farm, installation of conduits and wiring, placement of terminal boxes and instruments, and termination of instrumentation and power.

The design of TMACS will utilize over the counter products to the extent practical. All items will be called out on drawings and procured using purchase requisitions by a purchasing agent. Parts that make up the design will be chosen by the responsible engineer based on its performance and physical attributes, and the requirements of the project.

B. WORK BY OPERATING CONTRACTOR (WBS 1.0 and 4.0)

The operating contractor will provide definitive design and engineering services during construction.

The operating contractor will provide overall project management support during design, procurement, and construction of this project.

The operating contractor will provide support for other project costs associated with TMACS installation.

VI. REQUIREMENTS AND ASSESSMENTS

A. SAFEGUARDS AND SECURITY

Existing safeguards and security measures will not be impacted by this project. No new measures beyond the current practices will be required.

Badging and escort requirements shall be administrated per WHC-CM-4-33, "Security Manual."

B. HEALTH AND SAFETY

Construction contractors will be required to take reasonable precautions for protection of the health and safety of their employees, subcontractors, operating contractor, and DOE personnel. This includes providing continuous access to construction areas by emergency vehicles and personnel, and ensuring that emergency evacuation routes are unobstructed.

The installation of TMACS equipment will take place in the AW Tank Farm. All installation activities will be performed in accordance with the HSRCM-1, "Hanford Site Radiological Control Manual," and WHC-SD-WM-HSP-002, "Tank Farm Health and Safety Plan."

Installation will require hand excavation, routing conduit, and electrical connection to existing instrumentation. The fabrication of electrical enclosures and other equipment will be performed in shop to the extent possible for ALARA.

An Unreviewed Safety Question (USQ) screening was performed for the AW Tank Farm TMACS installation. The USQ screening determined that there would be no changes to the facility equipment or facility procedures.

C. DECONTAMINATION AND DECOMMISSIONING

All decontamination and decommissioning shall be performed in accordance with the HSRCM-1.

D. MAINTENANCE AND OPERATION REQUIREMENTS

The TMACS system maintenance requirements are known from previous installations in other tank farms. The maintenance procedures and costs associated with AW Tank Farm are assumed to be the same as those for other tank farms with TMACS. The estimated maintenance costs for the AW Tank Farm TMACS installation are $8,000 per year.

No special tools are required for TMACS maintenance other than those regularly used by electrical maintenance personnel. The operation and maintenance costs for tank farms will decrease with the installation of TMACS due to the elimination of man-hour intensive readings required by tank farm personnel.

E. AUTOMATED DATA PROCESSING EQUIPMENT

Data processing and telecommunications equipment will be similar or identical to those used in previous TMACS installations (ref 9). The equipment has been selected carefully based on system requirements and has been successfully used in the field.

The system must be able to convert analog signals from existing in-tank instrumentation into a digital signal for computer processing. The instrumentation signals are read periodically and stored at the tank data signal converter. The data is then available, upon request, for bulk downloading to the TMACS master computer. When queued, the data stored at the tank data signal converter is transferred to a modem signal converter that formats the data for transfer to the TMACS master computer. This allows data to be organized in a historical presentation of tank parameters.

The instrumentation and processors also will provide warnings if loss of communication occurs with an instrument and will alarm if a critical tank criteria is out of established parameters. The TMACS computer system will pin-point the anomaly so corrective action can be initiated.

F. QUALITY ASSURANCE/SAFETY CLASSIFICATION

1. Quality Assurance Activities

Project activities for contractors involved in design, procurement, construction, and acceptance will be governed by 10 CFR 830.120, "Quality Assurance." Minimum project quality attributes are included in the project FDC and will be incorporated into the project specific Quality Assurance Program Plan (QAPP). The QAPP will indicate the project critical characteristics, corresponding safety classification assignments, and programmatic controlling documents. The specific technical and quality programmatic requirements, material certifications, qualification and certification of personnel, inspections, examinations and testing, and applicable quality assurance records will be established during definitive design and included in design documents. Specifications will require controls to exclude misrepresented products.

The project includes individual systems or components to an existing facility and the existing facility hazardous classification has not changed.

Independent design verification will be required. Safety significant and nonsafety significant items and services will be procured from commercially available sources unless specific exception is noted during definitive design.

2. **Safety Classification**

Safety classifications will be identified for those systems, components, and structures important to safety or environmental protection so that appropriate efforts will be placed on design, procurement, construction, testing, operation, maintenance, and modifications.

Safety classification criteria and methodology are defined in WHC Management Requirements and Procedures Manual, WHC-CM-4-46. Safety classifications will be determined through analysis and consequences of failure based on information contained in the project FDC and safety analysis documents. The resulting safety classifications form the basis for the Hanford design and quality assurance requirements applied to the project. Safety significant is the highest level anticipated for any element of the proposed facility.

G. ENVIRONMENTAL COMPLIANCE

All tank farm areas have been granted a cultural resource exemption based on the extensive disturbances that occurred during tank installation. This exemption includes all maintenance and new construction performed within, and extending 150 meters outside, the 18 fenced tank farm areas. All construction for the TMACS installation will be performed inside the AW Tank Farm.

All tank farm areas are covered by a blanket biological review (#95-200-073). This review determined that there would be no adverse impacts to species or habitats of concern due to projects within the 200-East and 200-West tank farm areas.

The AW Tank Farm TMACS installation is presumed to be under a categorical exclusion and NEPA documentation is not required. An

environmental checklist that shows environmental compliance has been completed (ref 11).

H. **PERMITS**

An excavation permit will be required for conduit runs throughout the AW Tank Farm. The permit will be obtained per procedure 503.1 in WHC-CM-8-7 (ref 12).

VII. IDENTIFICATION AND ANALYSIS OF UNCERTAINTIES

The installation of TMACS has been performed in several other tank farms in the 200-West Area. The design for installation of TMACS in the AW Tank Farm has been completed. The design and equipment used in this installation are similar, if not identical, to that used in other TMACS installations. Therefore, from a technical standpoint, no uncertainties can be identified.

VIII. REFERENCES

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2. U.S. Congress, "Safety Measures for Waste Tanks at Hanford Nuclear Reservation," Section 3137 of National Defense Authorization Act For Fiscal Year 1991, Public Law 101-510, 1990.

3. Supporting Document, "Tank Monitor and Control System Software Configuration Management Plan," prepared by Westinghouse Hanford Company, Document No. WHC-SD-WM-CSCM-019, Rev 0, 1993a.

4. U.S. Department of Energy Order 6430.1A, "General Design Criteria," 1989.

5. Code of Federal Regulations, 10 CFR 436, "Federal Energy Management and Planning Programs."

6. Manual, "Safety Manual," prepared by Westinghouse Hanford Company, Document No. WHC-CM-1-10, 1995.

7. Manual, "Hanford Site Radiological Control Manual," prepared by Westinghouse Hanford Company, Document No. HSRCM-1, Rev 2, 1994.

8. Supporting Document, "Tank Farm Health and Safety Plan," prepared by Westinghouse Hanford Company, Document No. WHC-SD-WM-HSP-002, Rev. 2E, 1996.

9. Supporting Document, "TMACS System Description," prepared by Westinghouse Hanford Company, Document No. WHC-SD-WM-TI-671, Rev. 0, 1995.

10. Manual, "Management Requirements and Procedures Manual," prepared by Westinghouse Hanford Company, Document No. WHC-CM-1-3, 1996.

11. Report, "Environmental Requirements Checklist for AW Farm TMACS Installation," Project W-457, prepared by Westinghouse Hanford Company, Document No. 96-POC-004, 1996.

12. Manual "Site Support Services," prepared by Westinghouse Hanford Company, Document No. WHC-CM-8-7, 1995.

13. National Fire Protection Agency NFPA 70, "National Electrical Code," 1993.

14. Manual, "Quality Assurance Manual," prepared by Westinghouse Hanford Company, Document No. WHC-CM-4-2, 1988.

15. Manual, "Standard Engineering Practices," prepared by Westinghouse Hanford Company, Document No. WHC-CM-6-1, 1993.

16. Manual, Environmental Compliance, prepared by Westinghouse Hanford Company, Document No. WHC-CM-7-5, 1993.

17. Design Criteria Source, "Preparation and Control of Engineering and Fabrication Drawings," ICF Kaiser Hanford Company Architect/Engineer Standard GG-DWG-01.

18. Design Criteria Source, "Design Loads for Facilities," ICF Kaiser Hanford Company Architect/Engineer Standard, GC-LOAD-01.

19. U.S. Department of Energy Order 4700.1, "Project Management System," March 6, 1987.

20. Waste Tank Safety Program EA (DOE/EA-0915).

21. Supporting Document, "Functional Requirements for Ferrocyanide Tank Temperature Monitoring," prepared by Westinghouse Hanford Company, Document No. WHC-SD-WM-RD-013, Rev 1, 1991a.

22. Supporting Document, "Engineering Work Plan for Ferrocyanide Tank Temperature Monitoring Phase 2 and Phase 3," prepared by Westinghouse Hanford Company, Document No. WHC-SD-WM-WP-116, Rev 0, 1991c.

23. Supporting Document, "Thermal Analysis of Hoffman Enclosure," prepared by Westinghouse Hanford Company, Document No. WHC-SD-WM-ER-111, Rev 0, 1991d.

24. Supporting Document, "TMACS Functional Requirements," prepared by Westinghouse Hanford Company, Document No. WHC-SD-WM-SFR-006, Rev 0, 1992a.

25. Supporting Document, "Tank Farm Instrumentation and Data Acquisition/Management Upgrade Plan," prepared by Westinghouse Hanford Company, Document No. WHC-SD-WM-WP-132, Rev 2, 1993c.

26. Supporting Document, "TMACS and Box Support Wind/Seismic Analysis," prepared by Westinghouse Hanford Company, Document No. WHC-SD-WM-DR-010, Rev 0, WHC, 1993d.

27. Code of Federal Regulations, 10 CFR 830.120, "Quality Assurance."

APPENDIX A

Work Breakdown Structure

WORK BREAKDOWN STRUCTURE

1.0 ENGINEERING

- 1.1 Definitive Design (Operating Contractor)
- 1.2 Engineering and Inspection (Operating Contractor)

3.0 CONSTRUCTION

- 3.1 Force Account Construction (Engineer/Constructor Contractor)

4.0 PROJECT INTEGRATION/MANAGEMENT (OPERATING CONTRACTOR)

APPENDIX B

Cost Estimate Summary

COST CODE	DESCRIPTION	ESCALATED TOTAL COST	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
000	ENGINEERING	76,000	15	11,000	87,000
050	CONSTRUCTION MANAGEMENT	149,000	21	32,000	181,000
706	ELECTRICAL	529,000	25	132,000	661,000
	(ADJUSTED TO MEET DOE 5100.4)	- 4,000		5,000	1,000
	PROJECT TOTAL	750,000	23	180,000	930,000

TYPE OF ESTIMATE	WORKING CONSTRUCTION JUNE 6, 1996	REMARKS: THE PREVIOUS ESTIMATE, FILE NO. W457CAA3, HAS BEEN REVISED TO INCORPORATE ESCALATION COSTS.
ARCHITECT ENGINEER	ICFKH	
OPERATING CONTRACTOR	WHC	

(ROUNDED/ADJUSTED TO THE NEAREST " 1,000 / 10,000 " - PERCENTAGES NOT RECALCULATED TO REFLECT ROUNDING)

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
110000	WHC DEFINITIVE DESIGN	49104	0	49104	0.45	221	49325	15	7399	56724
120000	WHC ENGINEERING/INSPECTION	26040	0	26040	0.67	174	26214	15	3932	30147
SUBTOTAL 12	ENGINEERING/INSPECTION	26040	0	26040	0.67	174	26214	15	3932	30147
SUBTOTAL 1	ENGINEERING	75144	0	75144	0.53	395	75539	15	11331	86871
310000	GENERAL & TECHNICAL CONDITIONS	28207	0	28207	2.15	606	28813	25	7203	36017
310001	ELECTRICAL INSTALLATION	489653	0	489653	2.15	10528	500181	25	125045	625226
317710	PROJECT MANAGEMENT	66498	0	66498	1.73	1150	67648	25	16912	84561
317720	CF SUPPORT	19539	0	19539	1.73	338	19877	25	4969	24846
317730	QUALITY SUPPORT	8087	0	8087	1.73	140	8227	25	2057	10284
SUBTOTAL 31	FA CONST-ONSITE E/C	611984	0	611984	2.09	12762	624746	25	156186	780934
SUBTOTAL 3	CONSTRUCTION	611984	0	611984	2.09	12762	624746	25	156186	780934
400000	WHC PROJECT INTEGRATION	53092	0	53092	1.12	595	53687	15	8053	61740
SUBTOTAL 4	PROJECT INTEGRATION	53092	0	53092	1.12	595	53687	15	8053	61740
PROJECT TOTAL		740,220	0	740,220	1.86	13,752	753,972	23	175,570	929,545

1. DOCUMENTS AND DRAWINGS

DOCUMENTS: LOI

DRAWINGS: SEE LOI LIST

2. MATERIAL PRICES

UNIT COSTS REPRESENT CURRENT PRICES FOR SPECIFIED MATERIAL.

3. LABOR RATES

A.) ICF-KH HOURLY RATES ARE BASED ON THE 1996 FISCAL YEAR BUDGET LIQUIDATION RATES AS ISSUED BY KEH FINANCE

4. GENERAL REQUIREMENTS/TECHNICAL SERVICES/OVERHEADS

A.) ONSITE CONSTRUCTION FORCES GENERAL REQUIREMENTS, TECHNICAL SERVICES AND CRAFT OVERHEAD COSTS ARE INCLUDED AS A COMPOSITE PERCENTAGE BASED ON THE ICF-KH ESTIMATING FACTOR,

5. ESCALATION

ESCALATION PERCENTAGES WERE CALCULATED FROM THE AUGUST 1994 UPDATE OF THE ECONOMIC ESCALATION PRICE CHANGE INDICES FOR DOE CONSTRUCTION PROJECTS AS PUBLISHED BY THE "OFFICE OF INFRASTRUCTURE AQUISITION" FM-50.

6. ROUNDING

U.S. DEPARTMENT OF ENERGY - DOE ORDER 5100.4 PAGE I-32 SUBPARAGRAPH (M), REQUIRES ROUNDING OF ALL GENERAL PLANT PROJECTS (GPP'S) AND LINE ITEM (LI) COST ESTIMATES. REFERENCE: DOE 5100.4, FIGURE I-11, DATED 10-31-84.

7. REMARKS/QUALIFICATIONS

A.) NO MASK WORK ASSUMED
B.) NO CONTAMINATED SOIL WILL BE ENCOUNTERED
C.) CONSTRUCTION PERFORMED BY ICFKH FORCES.
D.) THE ESTIMATE INCLUDES COST PROVIDED BY WHC FOR ENGINEERING, DESIGN, AND MANAGEMENT SUPPORT.

COST CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
000	ENGINEERING									
110000	WHC DEFINITIVE DESIGN	49104	0	49104	0.45	221	49325	15	7399	56724
120000	WHC ENGINEERING/INSPECTION	26040	0	26040	0.67	174	26214	15	3932	30147
TOTAL 000	ENGINEERING	75144	0	75144	0.53	395	75539	15	11331	86871
050	CONSTRUCTION MANAGEMENT									
317710	PROJECT MANAGEMENT	66498	0	66498	1.73	1150	67648	25	16912	84561
317720	CF SUPPORT	19539	0	19539	1.73	338	19877	25	4969	24846
317730	QUALITY SUPPORT	8087	0	8087	1.73	140	8227	25	2057	10284
400000	WHC PROJECT INTEGRATION	53092	0	53092	1.12	595	53687	15	8053	61740
TOTAL 050	CONSTRUCTION MANAGEMENT	147216	0	147216	1.51	2223	149439	21	31991	181431
706	ELECTRICAL									
310000	GENERAL & TECHNICAL CONDITIONS	28207	0	28207	2.15	606	28813	25	7203	36017
310001	ELECTRICAL INSTALLATION	489653	0	489653	2.15	10528	500181	25	125045	625226
TOTAL 706	ELECTRICAL	517860	0	517860	2.15	11134	528994	25	132248	661243
PROJECT TOTAL		740,220	0	740,220	1.86	13,752	753,972	23	175,570	929,545

CSI	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
ENGINEERING										
00	TECHNICAL SERVICES	75144	0	75144	0.53	395	75539	15	11331	86871
TOTAL ENGINEERING		75,144	0	75,144	0.53	395	75,539	15	11,331	86,871
CONSTRUCTION										
00	TECHNICAL SERVICES	53092	0	53092	1.12	595	53687	15	8053	61740
01	GENERAL REQUIRMENTS	122331	0	122331	1.83	2234	124565	25	31141	155708
16	ELECTRICAL	489653	0	489653	2.15	10528	500181	25	125045	625226
TOTAL CONSTRUCTION		665,076	0	665,076	2.01	13,357	678,433	24	164,239	842,674
PROJECT TOTAL		740,220	0	740,220	1.86	13,752	753,972	23	175,570	929,545

REFERENCE: ESTIMATE BASIS SHEET PAGE 3 OF 7
COST CODE ACCOUNT SUMMARY PAGE 4 OF 7

THE U.S. DEPARTMENT OF ENERGY - RICHLAND ORDER 5700.3 "COST ESTIMATING, ANALYSIS AND STANDARDIZATION" DATED 3-27-85, PROVIDES GUIDELINES FOR ESTIMATE CONTINGENCIES. THE GUIDELINE FOR A `WORKING CONSTRUCTION' ESTIMATE SHOULD HAVE AN OVERALL RANGE OF 5 TO 15 % .

CONTINGENCY IS EVALUATED AT THE THIRD COST CODE LEVEL AND SUMMARIZED AT THE PRIMARY AND SECONDARY COST CODE LEVEL OF THE DETAILED COST ESTIMATE.

ENGINEERING
000 110000/120000

FIFTEEN PERCENT IS USED BASED ON POSSIBLE
UNFORSEEN FIELD CONDITIONS

AVERAGE ENGINEERING CONTINGENCY 15 %

CONSTRUCTION
050 317710/317720/317730

TWENTY FIVE PERCENT IS USED BASED ON POSSIBLE
UNFORSEEN FIELD CONDITIONS

AVERAGE CONSTRUCTION CONTINGENCY 25 %

OTHER PROJECT COST
050 400000

FIFTEEN PERCENT IS USED BASED ON POSSIBLE
UNFORSEEN FIELD CONDITIONS

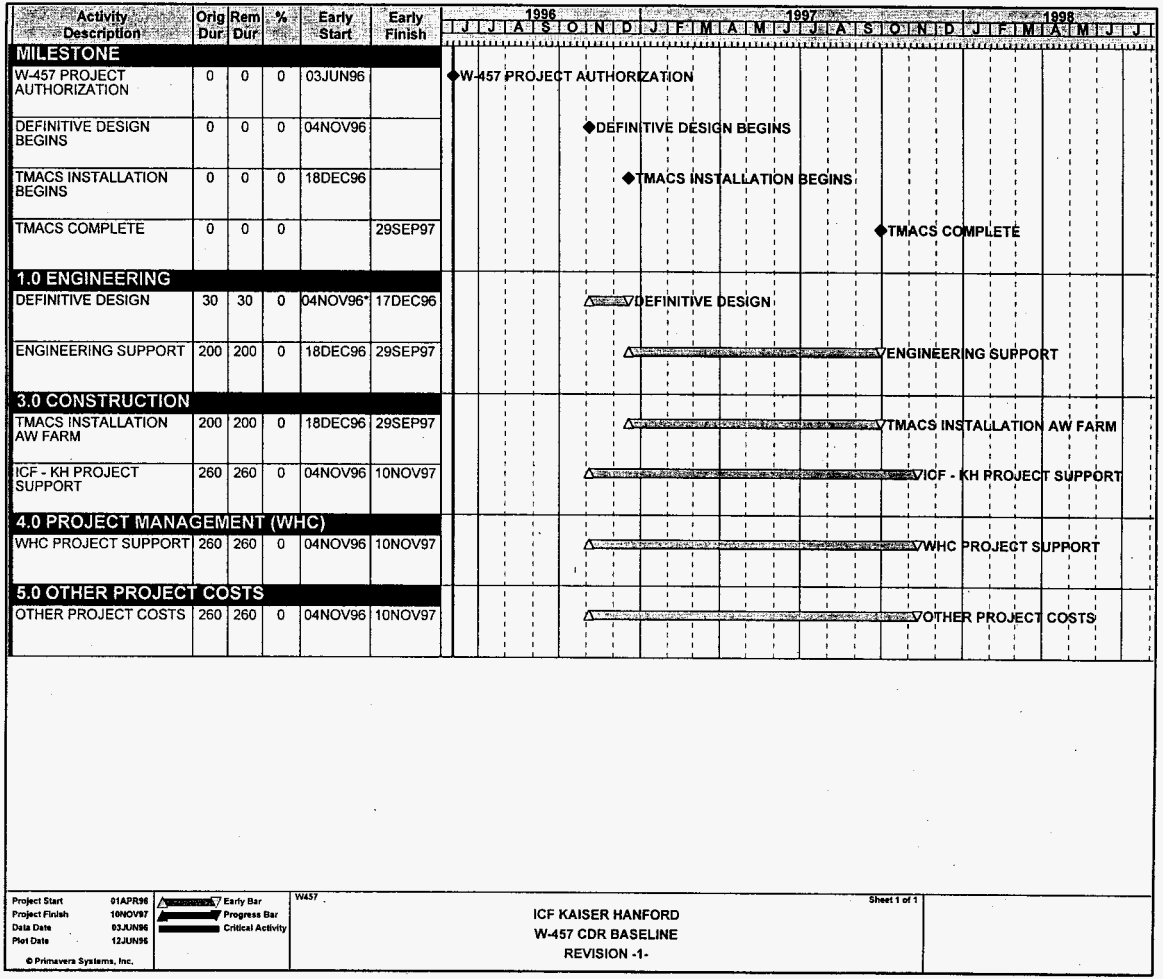
AVERAGE CONSTRUCTION CONTINGENCY 15 %

AVERAGE PROJECT CONTINGENCY 23 %

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONTRACT ADMINISTRATION %	CONTRACT ADMINISTRATION TOTAL	BID PACK PREP.	OTHER INDIRECTS	TOTAL INDIRECTS
110000	WHC DEFINITIVE DESIGN	49104	0.00	0	0	0	0
120000	WHC ENGINEERING/INSPECTION	26040	0.00	0	0	0	0
310000	GENERAL & TECHNICAL CONDITIONS	28207	0.00	0	0	0	0
310001	ELECTRICAL INSTALLATION	489653	0.00	0	0	0	0
317710	PROJECT MANAGEMENT	66498	0.00	0	0	0	0
317720	CF SUPPORT	19539	0.00	0	0	0	0
317730	QUALITY SUPPORT	8087	0.00	0	0	0	0
400000	WHC PROJECT INTEGRATION	53092	0.00	0	0	0	0
PROJECT TOTAL		740.220		0	0	0	0

APPENDIX C

Conceptual Project Schedule


Activity Description
Orig Dur
Rem Dur
%
Early Start
Early Finish
1996
1997
1998
J J A S O N D J F M A M J J A S O N D J F M A M J J
MILESTONE
W-457 PROJECT AUTHORIZATION 0 0 0 03JUN96
W-457 PROJECT AUTHORIZATION
DEFINITIVE DESIGN BEGINS 0 0 0 04NOV96
DEFINITIVE DESIGN BEGINS
TMACS INSTALLATION BEGINS 0 0 0 18DEC96
TMACS INSTALLATION BEGINS
TMACS COMPLETE 0 0 0 29SEP97
TMACS COMPLETE
1.0 ENGINEERING
DEFINITIVE DESIGN 30 30 0 04NOV96* 17DEC96
DEFINITIVE DESIGN
ENGINEERING SUPPORT 200 200 0 18DEC96 29SEP97
ENGINEERING SUPPORT
3.0 CONSTRUCTION
TMACS INSTALLATION AW FARM 200 200 0 18DEC96 29SEP97
TMACS INSTALLATION AW FARM
ICF - KH PROJECT SUPPORT 260 260 0 04NOV96 10NOV97
ICF - KH PROJECT SUPPORT
4.0 PROJECT MANAGEMENT (WHC)
WHC PROJECT SUPPORT 260 260 0 04NOV96 10NOV97
WHC PROJECT SUPPORT
5.0 OTHER PROJECT COSTS
OTHER PROJECT COSTS 260 260 0 04NOV96 10NOV97
OTHER PROJECT COSTS
Project Start 01APR96
Project Finish 10NOV97
Data Date 03JUN96
Plot Date 12JUN96
© Primavera Systems, Inc.
Early Bar
Progress Bar
Critical Activity
W457
Sheet 1 of 1
ICF KAISER HANFORD
W-457 CDR BASELINE
REVISION -1-

APPENDIX D

Energy Conservation Report and Analysis

An Energy Conservation Analysis was not performed for project W-457. The estimated power consumption for the TMACS installation in AW Tank Farm does not warrant such a report.

An Energy Conservation Report is required for new construction and retrofit projects of facilities larger than 10,000 ft^2, or where energy use is anticipated to be greater than 500 MBtu/yr. A conservative estimate of power consumption for the AW Tank Farm TMACS installation is 5,700 kWh/yr or less than 20 MBtu/yr. Therefore, an Energy Conservation Report is not required.

APPENDIX E

Preliminary Safety Evaluation

A USQ screening is the only preliminary safety evaluation required for project W-457. A USQ screening performed for the AW Tank Farm TMACS installation on June 28, 1994 determined that there would be no changes to the facility equipment or facility procedures.

APPENDIX F

Economic Analysis and Life Cycle Cost Analysis

SUMMARY

An economic analysis was performed to investigate the benefits of installing TMACS verses the current method of manual data gathering. The net result based on best available information was that the installation expense for TMACS would be recovered in less than 6 years.

The analysis takes into account the hourly rate for operations personnel, the time required to make readings (for normal operations and during evaporator campaigns), cost of installation of TMACS, annual operation and maintenance costs, additional electrical consumption, and a discount rate (interest and inflation) based on OMB circular A-94 guidelines. It is assumed that there is no resale value for equipment at the end of the study period.

The hourly rates for operations personnel and the time requirements were provided by WHC. This was equated into an end of year expense for manually monitoring AW Tank Farm. It was assumed that this expense disappears completely with the installation of TMACS. It was also assumed that this includes annual operation and maintenance expenses.

The TMACS installation cost is obtained from the ICF KH project cost estimate dated 2-22-96. This is the cost to complete design and installation of TMACS in the AW Tank Farm. This estimate has been updated subsequent to the release of this document. The total estimated cost did not change significantly, therefore, the economic analysis was not updated.

The TMACS maintenance cost estimates are provided by WHC. This is determined using the total TMACS budget divided by the number of tanks. It is assumed that maintenance costs will remain constant through the span of the study.

Electrical power costs are included for the additional power consumption with the TMACS equipment. The added power consumption is estimated to be a constant 650 Watts. This equates to an annual consumption of approximately 5,700 kWh. The cost of electrical power to facilities on the Hanford site is 4.6 cents per kWh.

The analysis was performed using NIST building life cycle cost software, version 4.3. This program prepares reports for comparison of alternatives using present value. The payoff time was calculated by hand using present value relations and the discount rate and present value determined by the NIST program.

The input data and results are listed on the following pages of this appendix.

AW TANK MONITORING AND CONTROL SYSTEM UPGRADE PAYBACK CALCULATION

CURRENT MANUAL RECORDING COST

NORMAL DAILY OPERATIONS (Twice each 12 hr shift.)

	DAILY MHS	RATE	TOTAL
OPERATOR	8	39	$312
HPT	1	42	$42
TOTAL DAILY COST	9		$354
ANNUAL TOTAL			$95,580

EVAPORATOR CAMPAIGN (Once every 2 hours.)

	DAILY MHS	RATE	TOTAL
OPERATOR	24	39	$936
HPT	2	42	$84
TOTAL DAILY COST	26		$1,020
ANNUAL TOTAL (3 MONTHS OF CAMPAIGN PER YEAR)			$91,800

TOTAL ANNUAL COST $187,380
Annual total based on 3 months of evaporator campaign and 9 months normal operation

PRESENT VALUE $2,675,679
Based on discount rate of 4.9%

TMACS COST

TMACS INSTALLATION COST

PROJECT W-457, DESIGN AND INSTALLATION	$840,140

TMACS MAINTENANCE COST

NUMBER OF TANKS	6
MAINTENANCE COST PER TANK	$1,213
ANNUAL OPERATION AND MAINTENANCE COST	$7,279

Maintenance cost per tank based on TMACS total operating budget and number of tanks

ELECTRICAL POWER COST $262
Based on 4.6 cents per kiloWatt-hour and continuous 650 Watt consumption

PRESENT VALUE $947,824
Based on discount rate of 4.9%

YEARS TO BREAK-EVEN 5.95

Based on discount rate of 4.9%

BLCC Summary for Project: AW TANK FARM TMACS INSTALLATION
Alternative: DO NOTHING

	PRESENT VALUE	ANNUAL VALUE
INITIAL COST (AS OF SERVICE DATE)	$0	$0
ANNUALLY RECURRING OM&R COSTS	$2,675,679	$187,380
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$2,675,679	$187,380

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* N I S T  B L C C:  D E T A I L E D  L C C  A N A L Y S I S (ver. 4.3-96 ) *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

PART I - INITIAL ASSUMPTIONS AND COST DATA

Project Name: AW TANK FARM TMACS INSTALLATION
Project Alternative: DO NOTHING
Run date: 02-07-1996 13:41:27
Run type: Federal Analysis--Projects Subject to OMB A-94
Comment:
Input data file: DONOTHIN.DAT, last modified: 02-06-1996/11:27:30
LCC output file: DONOTHIN.LCC, created: 02-06-1996/11:27:41
Base Date of Study: JAN 1996
Service Date: JAN 1996
Study period: 25.00 years (JAN 1996 through DEC 2020)
Discount rate: 4.9% Real (exclusive of general inflation)
End-of-year discounting convention

INITIAL CAPITAL ASSET COSTS (NOT DISCOUNTED)

	Total Cost
TOTAL INITIAL CAPITAL ASSET COSTS	$0

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

PART II - LIFE-CYCLE COST ANALYSIS
Discount Rate = 4.9% Real (exclusive of general inflation)

PROJECT ALTERNATIVE: DO NOTHING RUN DATE: 02-07-1996/13:41:27

	PRESENT VALUE (1996 DOLLARS)	ANNUAL VALUE (1996 DOLLARS)
CASH REQUIREMENTS AS OF SERVICE DATE	$0	$0
OPERATING, MAINTENANCE & REPAIR COSTS: ANNUALLY RECURRING COSTS (NON-ENERGY)	$2,675,679	$187,380
SUBTOTAL	$2,675,679	$187,380
RESALE VALUE OF ORIG CAPITAL COMPONENTS	$0	$0
RESALE VALUE OF CAPITAL REPLACEMENTS	$0	$0
TOTAL LIFE-CYCLE PROJECT COST	$2,675,679	$187,380

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

BLCC Summary for Project: AW TANK FARM TMACS INSTALLATION
Alternative: INSTAL TMACS

	PRESENT VALUE	ANNUAL VALUE
INITIAL COST (AS OF SERVICE DATE)	$840,140	$58,836
ANNUALLY RECURRING OM&R COSTS	$103,940	$7,279
ENERGY COSTS	$3,744	$262
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$947,824	$66,377

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* N I S T  B L C C:  D E T A I L E D  L C C  A N A L Y S I S (ver. 4.3-96 ) *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

PART I - INITIAL ASSUMPTIONS AND COST DATA

Project Name: AW TANK FARM TMACS INSTALLATION
Project Alternative: INSTAL TMACS
Run date: 02-07-1996 13:41:56
Run type: Federal Analysis--Projects Subject to OMB A-94
Comment:
Input data file: DOTMACS.DAT, last modified: 02-07-1996/09:06:54
LCC output file: DOTMACS.LCC, created: 02-07-1996/09:06:57
Base Date of Study: JAN 1996
Service Date: JAN 1996
Study period: 25.00 years (JAN 1996 through DEC 2020)
Discount rate: 4.9% Real (exclusive of general inflation)
End-of-year discounting convention

INITIAL CAPITAL ASSET COSTS (NOT DISCOUNTED)

	Total Cost
TOTAL INITIAL CAPITAL ASSET COSTS	$719,312

ENERGY-RELATED COSTS

Energy Type	Units	Units/ Year	Price+ ($/Unit)	Annual Cost: Energy	Annual Cost: Demand	Total P.V. Cost
Electricity	kWh	5,700	$0.046	$262	$0	$3,744

Price and annual cost are as of base date (not adjusted for price escalation).

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

PART II - LIFE-CYCLE COST ANALYSIS
Discount Rate = 4.9% Real (exclusive of general inflation)

PROJECT ALTERNATIVE: INSTAL TMACS RUN DATE: 02-07-1996/13:41:56

	PRESENT VALUE (1996 DOLLARS)	ANNUAL VALUE (1996 DOLLARS)
CASH REQUIREMENTS AS OF SERVICE DATE	$840,140	$58,836
OPERATING, MAINTENANCE & REPAIR COSTS:		
ANNUALLY RECURRING COSTS (NON-ENERGY)	$103,940	$7,279
SUBTOTAL	$103,940	$7,279
ENERGY COSTS	$3,744	$262
RESALE VALUE OF ORIG CAPITAL COMPONENTS	$0	$0
RESALE VALUE OF CAPITAL REPLACEMENTS	$0	$0
TOTAL LIFE-CYCLE PROJECT COST	$947,824	$66,377

* *
* *

PART III - EMISSIONS SUMMARY \a

Region: US Average Source Documentation: SRP

Energy Type	Annual Emissions	Life-cycle Emissions
Electricity:		
CO2 (Kg):	5,525.3	138,134
SO2 (Kg):	41.0	485
NOx (Kg):	16.6	416
Total:		
CO2 (Kg):	5,525.3	138,134
SO2 (Kg):	41.0	485
NOx (Kg):	16.6	416

\a Based on emission factors from file USAVG.EMI

* *

APPENDIX G

Drawings

H-2-820792, Sh 1	TMACS AW-Tank Farm Instm. Plan
H-2-820792, Sh 2	TMACS AW-Tank Farm Instm. Plan
H-2-820792, Sh 3	TMACS AW-Tank Farm Connection Schedule
H-2-820792, Sh 4	TMACS AW-Tank Farm Interconnection Diagram
H-2-820793, Sh 1	TMAC-TBX-201 Modem Assembly
H-2-820793, Sh 2	TMAC-TBX-201 Modem Wiring Diagram
H-2-820794, Sh 1	TMAC-TBX-202 TMACS Assembly
H-2-820794, Sh 2	TMAC-TBX-202 Wiring Diagram
H-2-820794, Sh 3	TMAC-TBX-202 Wiring Diagram
H-2-820795, Sh 1	TMAC-TBX-203 TMACS Assembly
H-2-820795, Sh 2	TMAC-TBX-203 Wiring Diagram
H-2-820795, Sh 3	TMAC-TBX-203 Wiring Diagram
H-2-820796, Sh 1	TMAC-TBX-204 TMACS Assembly
H-2-820796, Sh 2	TMAC-TBX-204 Wiring Diagram
H-2-820796, Sh 3	TMAC-TBX-204 Wiring Diagram
H-2-820797, Sh 1	TMAC-TBX-205 TMACS Assembly
H-2-820797, Sh 2	TMAC-TBX-205 Wiring Diagram
H-2-820797, Sh 3	TMAC-TBX-205 Wiring Diagram
H-2-820798, Sh 1	TMAC-TBX-206 TMACS Assembly
H-2-820798, Sh 2	TMAC-TBX-206 Wiring Diagram
H-2-820798, Sh 3	TMAC-TBX-206 Wiring Diagram
H-2-820799, Sh 1	TMAC-TBX-207 TMACS Assembly
H-2-820799, Sh 2	TMAC-TBX-207 Wiring Diagram
H-2-820799, Sh 3	TMAC-TBX-207 Wiring Diagram
H-2-820800, Sh 1	TMAC-TBX-208 TMACS Assembly
H-2-820800, Sh 2	TMAC-TBX-208 TMACS Wiring Diagram
H-2-820800, Sh 3	TMAC-TBX-208 TMACS Wiring Diagram
H-2-820801, Sh 1	Comm Interface Unit (CIU) Assembly
H-2-820801, Sh 2	Comm Interface Unit (CIU) Assembly
H-2-820820, Sh 1	TBX-TMACS-GEN Acromag Assemblies
H-3-830820, Sh 2	TBX-TMACS-GEN Wiring Diagram
H-2-824669, Sh 1	Multifunctional Instrument Tree Terminal Box Assy
H-2-824669, Sh 2	Multifunctional Instrument Tree Term Box Wiring Diag
H-2-815300	TBX-TMACS-GEN Support Installation

GENERAL NOTES (UNLESS OTHERWISE SPECIFIED)

1. MARK ALL WIRE RUNS WITH THEIR RESPECTIVE IDENTIFICATION NUMBERS. USE THE FULL NAME ON ALL FIELD IDENTIFICATION LABELS.
2. CONDUIT AND PULL BOX IDENTIFICATION LABELS SHALL HAVE A SUFFIX LETTER (P, C, I) DESIGNATING ITS INTENDED USAGE. SEE EXAMPLES AND TABLE BELOW.

   EXAMPLES:
   - P-94-18-P CONDUIT IDENTIFICATION LABEL FOR "POWER"
   - P-94-18-C CONDUIT IDENTIFICATION LABEL FOR "CONTROL"
   - P-94-18-I CONDUIT IDENTIFICATION LABEL FOR "INSTRUMENTATION"
   - PB-94-18-P PULL BOX (PB) IDENTIFICATION LABEL FOR "POWER"

   - I = USE DESIGNATOR SUFFIX (P, C, I)
   - 18 = SEQUENTIAL NUMBER OF CONDUIT OR PB
   - 94 = LAST TWO DIGITS OF CURRENT YEAR (1994)
   - PB = PREFIX DESIGNATOR FOR PULL BOX

DESIGNATOR (SUFFIX)	USE	EXAMPLES
P	POWER	THREE PHASE OR SINGLE PHASE UNDER 600 VAC USED TO SERVE MOTORS, HEATERS OR TO PROVIDE POWER TO INSTRUMENTATION ETC. OR
C	CONTROL	WIRING USED FOR CONTROL.
I	INSTRUMENTATION	NEC CLASS 2 AND 3 CIRCUITS. LOW VOLTAGE AND CURRENT SIGNAL WIRING. NOISE SENSITIVE WIRING, TRANSDUCERS, THERMOCOUPLES, RTD, ETC.

3. CONDUIT RUNS ARE SHOWN DIAGRAMMATICALLY, FIELD ROUTE AND SUPPORT AS REQUIRED PER NEC. BURY ALL CONDUIT A MINIMUM OF 24" EXCEPT A MINIMUM OF 6" IS PERMITTED IN AREAS INACCESSIBLE TO VEHICLE TRAFFIC.
4. INSTALLATION SHALL CONFORM TO THE 1993 EDITION OF THE NATIONAL ELECTRICAL CODE (NEC).
5. ALL ELECTRICAL PARTS SHALL BE LISTED OR APPROVED BY UL, FM, OR ANOTHER NATIONALLY RECOGNIZED TESTING LABORATORY.
6. LIQUID TIGHT FLEXIBLE METAL CONDUIT AND APPROVED FITTINGS MAY BE USED IN LENGTHS NOT EXCEEDING THREE FEET WHERE CONDITIONS OF INSTALLATION REQUIRE FLEXIBILITY OF THE CONDUIT RUN.
7. FOR I/N 12 PREPARE A NAMEPLATE LABEL PER HS-BS-0015 TYPE 6 USING I/N 16. ATTACH TO THE FRONT OF THE DOOR WITH SILICONE ADHESIVE. THE TEXT SHALL BE AS SHOWN.

   LINE 1 USING 1/2" CHARACTERS: "TMAC-TBX-209
   LINE 2 USING 1/4" CHARACTERS: "COMM. INTERFACE UNIT"
   LINE 3 USING 1/4" CHARACTERS: "H-2-820801, H-2-820792"
   LINE 4 USING 1/4" CHARACTERS: "CDS-DP-206 CKT 22"

8. MOUNT I/N 17 ON THE SOUTH FACING SIDE OF THE SUPPORT STAND USED TO MOUNT I/N 11 USING TWO UNISTRUT P1000 CHANNELS 27-1/4" LONG. FIELD LOCATE APPROXIMATELY CENTERED BEHIND I/N 11.
9. FOR I/N 17 PREPARE NAMEPLATE LABEL "A" PER HS-BS-0015 TYPE 6 USING I/N 16. ATTACH IN THE LOCATION SHOWN ON H-2-824669-010 WITH SILICONE ADHESIVE. THE TEXT SHALL BE AS SHOWN.

   LINE 1 USING 1/2" CHARACTERS: "MIT-TBX-202"
   LINE 2 USING 1/4" CHARACTERS: "MIT I/O TERMINATIONS"
   LINE 3 USING 1/4" CHARACTERS: "H-2-824669, H-2-820792"

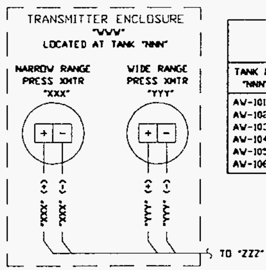
10. FOR I/N 17 PREPARE NAMEPLATE LABEL "B" PER HS-BS-0015 TYPE 6 USING I/N 16. ATTACH IN THE LOCATION SHOWN ON H-2-824669-010 WITH SILICONE ADHESIVE. THE TEXT SHALL BE AS SHOWN BELOW USING 5/32" HIGH CHARACTERS.

MIT PROBE AV-101 RIS-234			
SW POS	TC NO	SW POS	TC NO
	VST-TE-		VST-TE-
1	201A	12	212A
2	202A	13	213A
3	203A	14	214A
4	204A	15	215A
5	205A	16	216A
6	206A	17	217A
7	207A	18	218A
8	208A	19	219A
9	209A	20	220A
10	210A	21	221A
11	211A	22	222A

LEGEND	
TBX	TERMINAL BOX
TE	TEMPERATURE ELEMENT
PB	PULL BOX
TMACS	TANK MONITOR AND CONTROL SYSTEM
LIT	LEVEL INDICATING TRANSMITTER (TIC)
WST	WASTE STORAGE TANK
MIT	MULTIFUNCTIONAL INSTRUMENT TREE

CONNECTION OF STANDARD HYDROGEN MONITORING SYSTEM (SHMS)
H-2-817854 SH 2 FOR TANK 241-AV-101 VTP-PNL-205A

SHMS	PAIR NO. COLOR	SIGNAL NAME	SIGNAL FUNCTION	TMACS TERMINATION H-2-820800
TB2-1				
TB2-2	3-BLK	VTP-FIT-250A (+)	FLOW	UB-11 (+)
TB2-3	3-WHT	VTP-FIT-250A (-)	FLOW	UB-11 (-)
TB2-6	2-BLK	VTP-GIT-250A (+)	0-10% H2	UB-10 (+)
TB2-7	2-WHT	VTP-GIT-250A (-)	0-10% H2	UB-10 (-)
TB2-8				
TB2-9	1-BLK	VTP-GIT-251A (+)	0-1% H2	UB-9 (+)
TB2-10	1-WHT	VTP-GIT-251A (-)	0-1% H2	UB-9 (-)
TB2-20	SHIELD		CABLE SHIELD	NO CONNECTION
TB2-21	4-BLK	VTP-LY-251A	HIGH HYDROGEN (NO)	DI/O-UA TERM 4
TB2-22	4-WHT	VTP-LY-251A	HIGH HYDROGEN (C)	PS-1 (+)
TB2-23	5-BLK	VTP-UY-250A	TROUBLE (NO)	DI/O-UA TERM 6
TB2-24	5-WHT	VTP-UY-250A	TROUBLE (C)	PS-1 (+)
TB2-25				



DETAIL I

PARTIAL WIRING DIAG. FOR TRANSMITTER ENCLOSURES
SEE H-2-70352

FOR EACH TANK REPLACE THE FOLLOWING "NNN", "VVV", "XXX", "YYY" AND "ZZZ" WITH THE TEXT FROM THIS TABLE.

TANK NO "NNN"	XMITTER ENCLOSURE "VVV"	NARROW RANGE "XXX"	WIDE RANGE "YYY"	TO TMACS "ZZZ"
AV-101	VSTA-PNL-201	VST-PT-201A	VST-PT-202A	TMAC-TBX-202
AV-102	VSTA-PNL-202	VST-PT-203A	VST-PT-204A	TMAC-TBX-203
AV-103	VSTA-PNL-203	VST-PT-205A	VST-PT-206A	TMAC-TBX-204
AV-104	VSTA-PNL-204	VST-PT-207A	VST-PT-208A	TMAC-TBX-205
AV-105	VSTA-PNL-205	VST-PT-209A	VST-PT-210A	TMAC-TBX-206
AV-106	VSTA-PNL-206	VST-PT-211A	VST-PT-212A	TMAC-TBX-207

PARTS/MATERIAL LIST

QTY REQD	REF. DES.	PART/DASH NO.	NOMENCLATURE/DESCRIPTION			
X		-0'0	INSTALLATION		2	1
						2
1		H-2-820793-010	TMAC-TBX-201 MODEM ASSEMBLY			3
1		H-2-820794-010	TMAC-TBX-202 TMACS ASSEMBLY			4
1		H-2-820795-010	TMAC-TBX-203 TMACS ASSEMBLY			5
1		H-2-820796-010	TMAC-TBX-204 TMACS ASSEMBLY			6
1		H-2-820797-010	TMAC-TBX-205 TMACS ASSEMBLY			7
1		H-2-820798-010	TMAC-TBX-206 TMACS ASSEMBLY			8
1		H-2-820799-010	TMAC-TBX-207 TMACS ASSEMBLY			9
						10
1		H-2-820800-010	TMAC-TBX-208 TMACS ASSEMBLY			11
1		H-2-820801-010	COMM INTERFACE UNIT, ASSEMBLY (TMAC-TBX-209)	SEE NOTE 7		12
						13
						14
						15
3			NAMEPLATE, PLASTIC			16
1		H-2-824669-010	MIT TERMINAL BOX ASSEMBLY (MIT-TBX-202)	SEE NOTE 9, 10		17
1		H-2-824669-020	MIT CABLE ASSEMBLY			18
7		H-2-815300-010	INSTALLATION-SUPPORT, TMACS			19
						20

REF NUMBER	TITLE
H-2-70300	AV-FARM DRAWING INDEX
H-2-70333	ELEC WIRE RUN
H-2-81761	TMACS BLOCK DIAGRAM
H-2-81778	TMACS DRAWING INDEX

REFERENCES — NEXT USED ON — DRAWING TRACEABILITY LIST — REVISIONS

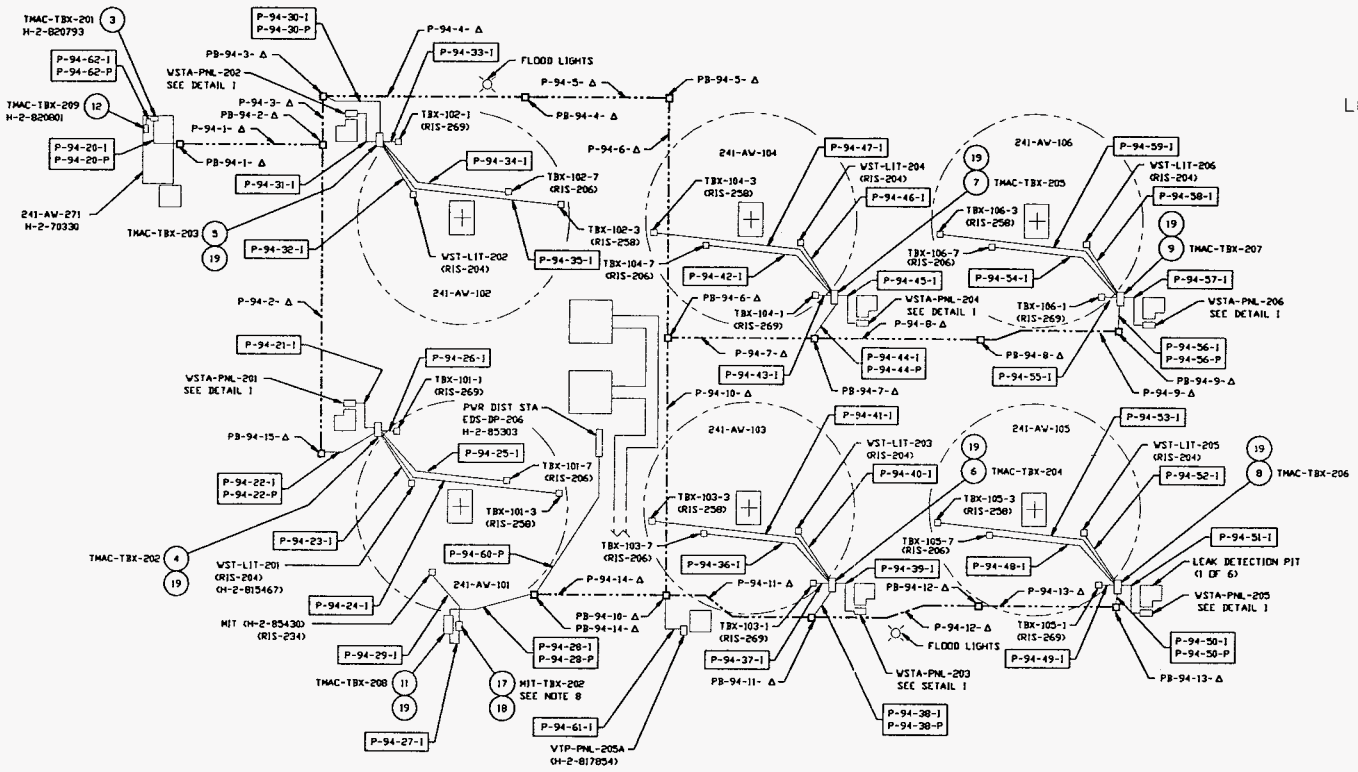
CADFILE B820792A — CADCODE DOS-6.0-ACD2-12.DSS

DRAWN B.L. MURRY 9-94
CHECKED FAIRCHILD 4-95
R. ROHNE 4-95
K.A. WHITE

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

TMACS AW-TANK FARM
INSTM. PLAN

F 241-AV 5901 H-2-820792 0
SCALE NONE CBI 161968



1 INSTALLATION

LOCAL NOTES:

A ON THIS SHEET THE FOLLOWING SYMBOLS REPRESENT: (H-2-70330)

---- THICK LINE REPRESENTS THREE SEPARATE PARALLEL CONDUITS

□ THICK LINE BOX REPRESENTS THREE SEPARATE PULL BOXES.

Δ TRIANGLE REPRESENTS THE SUFFIX LETTER FOR THREE SEPARATE LABELS FOR CONDUITS OR PULL BOXES. THE SUFFIX LETTERS ARE P, C, OR I.

EXAMPLE: P-94-18-Δ REPRESENTS THE FOLLOWING:
P-94-18-P CONDUIT IDENTIFICATION LABEL FOR "POWER"
P-94-18-C CONDUIT IDENTIFICATION LABEL FOR "CONTROL"
P-94-18-I CONDUIT IDENTIFICATION LABEL FOR "INSTRUMENTATION"

SEE GENERAL NOTE 1 FOR FURTHER EXPLANATION.

FOR GENERAL NOTES AND PARTS LIST SEE SH 1

DRAWN B.L. MURRY 9-94	U.S. DEPARTMENT OF ENERGY		
CHECKED FAIRCHILD 4-95	Richland Operations Office		
DES. AUTH R. ROMINE 4-95	Westinghouse Hanford Company		
DOE APPR. K.A. WHITE	TMACS AW-TANK FARM		
	INSTM. PLAN		
	SCALE NONE	DWG NO H-2-820792	REV 0
	CAD/CAM FILE 8207928	CAD/CAM CODE DOS6.0ACD81205S	SHEET 2 OF

DRAWING TRACEABILITY LIST — DWG NO | TITLE | REFERENCES | REF NUMBER | TITLE | NEXT USED ON

REVISIONS — REV NO | DESCRIPTION | ENGR DATE | DRFTG DATE | CHK'D DATE | APPROVALS ENGR | DRFTG | CHK'D

THERMOCOUPLE CONNECTION SCHEDULE
(H-2-70353)

TBX-101-1 (RIS 269) NEW WIRE NO.	OLD WIRE NO.
WST-TE-263A (+)	TE-101-3 (+)
WST-TE-263A (-)	TE-101-3 (-)
WST-TE-270A (+)	TE-101-10 (+)
WST-TE-270A (-)	TE-101-10 (-)
WST-TE-280A (+)	TE-101-20 (+)
WST-TE-280A (-)	TE-101-20 (-)
WSTA-TE-274A (+)	TE-101-74 (+)
WSTA-TE-274A (-)	TE-101-74 (-)
WSTA-TE-277A (+)	TE-101-77 (+)
WSTA-TE-277A (-)	TE-101-77 (-)
WSTA-TE-280A (+)	TE-101-80 (+)
WSTA-TE-280A (-)	TE-101-80 (-)
WSTA-TE-283A (+)	TE-101-83 (+)
WSTA-TE-283A (-)	TE-101-83 (-)

TBX-102-1 (RIS 269) NEW WIRE NO.	OLD WIRE NO.
WST-TE-263B (+)	TE-102-3 (+)
WST-TE-263B (-)	TE-102-3 (-)
WST-TE-270B (+)	TE-102-10 (+)
WST-TE-270B (-)	TE-102-10 (-)
WST-TE-280B (+)	TE-102-20 (+)
WST-TE-280B (-)	TE-102-20 (-)
WSTA-TE-274B (+)	TE-102-74 (+)
WSTA-TE-274B (-)	TE-102-74 (-)
WSTA-TE-277B (+)	TE-102-77 (+)
WSTA-TE-277B (-)	TE-102-77 (-)
WSTA-TE-280B (+)	TE-102-80 (+)
WSTA-TE-280B (-)	TE-102-80 (-)
WSTA-TE-283B (+)	TE-102-83 (+)
WSTA-TE-283B (-)	TE-102-83 (-)

TBX-103-1 (RIS 269) NEW WIRE NO.	OLD WIRE NO.
WST-TE-263C (+)	TE-103-3 (+)
WST-TE-263C (-)	TE-103-3 (-)
WST-TE-270C (+)	TE-103-10 (+)
WST-TE-270C (-)	TE-103-10 (-)
WST-TE-280C (+)	TE-103-20 (+)
WST-TE-280C (-)	TE-103-20 (-)
WSTA-TE-274C (+)	TE-103-74 (+)
WSTA-TE-274C (-)	TE-103-74 (-)
WSTA-TE-277C (+)	TE-103-77 (+)
WSTA-TE-277C (-)	TE-103-77 (-)
WSTA-TE-280C (+)	TE-103-80 (+)
WSTA-TE-280C (-)	TE-103-80 (-)
WSTA-TE-283C (+)	TE-103-83 (+)
WSTA-TE-283C (-)	TE-103-83 (-)

TBX-104-1 (RIS 269) NEW WIRE NO.	OLD WIRE NO.
WST-TE-263D (+)	TE-104-3 (+)
WST-TE-263D (-)	TE-104-3 (-)
WST-TE-270D (+)	TE-104-10 (+)
WST-TE-270D (-)	TE-104-10 (-)
WST-TE-280D (+)	TE-104-20 (+)
WST-TE-280D (-)	TE-104-20 (-)
WSTA-TE-274D (+)	TE-104-74 (+)
WSTA-TE-274D (-)	TE-104-74 (-)
WSTA-TE-277D (+)	TE-104-77 (+)
WSTA-TE-277D (-)	TE-104-77 (-)
WSTA-TE-280D (+)	TE-104-80 (+)
WSTA-TE-280D (-)	TE-104-80 (-)
WSTA-TE-283D (+)	TE-104-83 (+)
WSTA-TE-283D (-)	TE-104-83 (-)

TBX-105-1 (RIS 269) NEW WIRE NO.	OLD WIRE NO.
WST-TE-263E (+)	TE-105-3 (+)
WST-TE-263E (-)	TE-105-3 (-)
WST-TE-270E (+)	TE-105-10 (+)
WST-TE-270E (-)	TE-105-10 (-)
WST-TE-280E (+)	TE-105-20 (+)
WST-TE-280E (-)	TE-105-20 (-)
WSTA-TE-274E (+)	TE-105-74 (+)
WSTA-TE-274E (-)	TE-105-74 (-)
WSTA-TE-277E (+)	TE-105-77 (+)
WSTA-TE-277E (-)	TE-105-77 (-)
WSTA-TE-280E (+)	TE-105-80 (+)
WSTA-TE-280E (-)	TE-105-80 (-)
WSTA-TE-283E (+)	TE-105-83 (+)
WSTA-TE-283E (-)	TE-105-83 (-)

TBX-106-1 (RIS 269) NEW WIRE NO.	OLD WIRE NO.
WST-TE-263F (+)	TE-106-3 (+)
WST-TE-263F (-)	TE-106-3 (-)
WST-TE-270F (+)	TE-106-10 (+)
WST-TE-270F (-)	TE-106-10 (-)
WST-TE-290F (+)	TE-106-20 (+)
WST-TE-280F (-)	TE-106-20 (-)
WSTA-TE-274F (+)	TE-106-74 (+)
WSTA-TE-274F (-)	TE-106-74 (-)
WSTA-TE-277F (+)	TE-106-77 (+)
WSTA-TE-277F (+)	TE-106-77 (-)
WSTA-TE-280F (+)	TE-106-80 (+)
WSTA-TE-280F (+)	TE-106-80 (-)
WSTA-TE-283F (+)	TE-106-83 (+)
WSTA-TE-283F (+)	TE-106-83 (-)

TBX-101-3 (RIS 258) NEW WIRE NO.	OLD WIRE NO.
WSTA-TE-254A (+)	TE-101-54 (+)
WSTA-TE-254A (-)	TE-101-54 (-)
WSTA-TE-260A (+)	TE-101-60 (+)
WSTA-TE-260A (-)	TE-101-60 (-)

TBX-102-3 (RIS 258) NEW WIRE NO.	OLD WIRE NO.
WSTA-TE-254B (+)	TE-102-54 (+)
WSTA-TE-254B (-)	TE-102-54 (-)
WSTA-TE-260B (+)	TE-102-60 (+)
WSTA-TE-260B (-)	TE-102-60 (-)

TBX-103-3 (RIS 258) NEW WIRE NO.	OLD WIRE NO.
WSTA-TE-254C (+)	TE-103-54 (+)
WSTA-TE-254C (-)	TE-103-54 (-)
WSTA-TE-260C (+)	TE-103-60 (+)
WSTA-TE-260C (-)	TE-103-60 (-)

TBX-104-3 (RIS 258) NEW WIRE NO.	OLD WIRE NO.
WSTA-TE-254D (+)	TE-104-54 (+)
WSTA-TE-254D (-)	TE-104-54 (-)
WSTA-TE-260D (+)	TE-104-60 (+)
WSTA-TE-260D (-)	TE-104-60 (-)

TBX-105-3 (RIS 258) NEW WIRE NO.	OLD WIRE NO.
WSTA-TE-254E (+)	TE-105-54 (+)
WSTA-TE-254E (-)	TE-105-54 (-)
WSTA-TE-260E (+)	TE-105-60 (+)
WSTA-TE-260E (-)	TE-105-60 (-)

TBX-106-3 (RIS 258) NEW WIRE NO.	OLD WIRE NO.
WSTA-TE-254F (+)	TE-106-54 (+)
WSTA-TE-254F (-)	TE-106-54 (-)
WSTA-TE-260F (+)	TE-106-60 (+)
WSTA-TE-260F (-)	TE-106-60 (-)

THERMOCOUPLE CONNECTION SCHEDULE
(H-2-34304)

TBX-101-7 (RIS 206) NEW WIRE NO.	OLD WIRE NO.
WST-TE-236A (+)	TE-101-36 (+)
WST-TE-236A (-)	TE-101-36 (-)
WST-TE-237A (+)	TE-101-37 (+)
WST-TE-237A (-)	TE-101-37 (-)
WST-TE-238A (+)	TE-101-38 (+)
WST-TE-238A (-)	TE-101-38 (-)
WST-TE-239A (+)	TE-101-39 (+)
WST-TE-239A (-)	TE-101-39 (-)
WST-TE-240A (+)	TE-101-40 (+)
WST-TE-240A (-)	TE-101-40 (-)
WST-TE-241A (+)	TE-101-41 (+)
WST-TE-241A (-)	TE-101-41 (-)
WST-TE-242A (+)	TE-101-42 (+)
WST-TE-242A (-)	TE-101-42 (-)
WST-TE-243A (+)	TE-101-43 (+)
WST-TE-243A (-)	TE-101-43 (-)
WST-TE-244A (+)	TE-101-44 (+)
WST-TE-244A (-)	TE-101-44 (-)
WST-TE-245A (+)	TE-101-45 (+)
WST-TE-245A (-)	TE-101-45 (-)
WST-TE-246A (+)	TE-101-46 (+)
WST-TE-246A (-)	TE-101-46 (-)
WST-TE-247A (+)	TE-101-47 (+)
WST-TE-247A (-)	TE-101-47 (-)
WST-TE-248A (+)	TE-101-48 (+)
WST-TE-248A (-)	TE-101-48 (-)
WST-TE-249A (+)	TE-101-49 (+)
WST-TE-249A (-)	TE-101-49 (-)
WST-TE-250A (+)	TE-101-50 (+)
WST-TE-250A (-)	TE-101-50 (-)
WST-TE-251A (+)	TE-101-51 (+)
WST-TE-251A (-)	TE-101-51 (-)
WST-TE-252A (+)	TE-101-52 (+)
WST-TE-252A (-)	TE-101-52 (-)
WST-TE-253A (+)	TE-101-53 (+)
WST-TE-253A (-)	TE-101-53 (-)

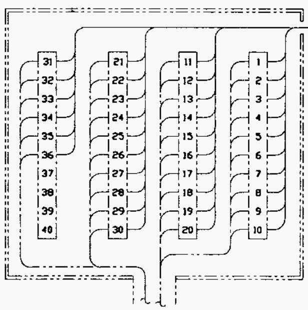
TBX-102-7 (RIS 206) NEW WIRE NO.	OLD WIRE NO.
WST-TE-236B (+)	TE-102-36 (+)
WST-TE-236B (-)	TE-102-36 (-)
WST-TE-237B (+)	TE-102-37 (+)
WST-TE-237B (-)	TE-102-37 (-)
WST-TE-238B (+)	TE-102-38 (+)
WST-TE-238B (-)	TE-102-38 (-)
WST-TE-239B (+)	TE-102-39 (+)
WST-TE-239B (-)	TE-102-39 (-)
WST-TE-240B (+)	TE-102-40 (+)
WST-TE-240B (-)	TE-102-40 (-)
WST-TE-241B (+)	TE-102-41 (+)
WST-TE-241B (-)	TE-102-41 (-)
WST-TE-242B (+)	TE-102-42 (+)
WST-TE-242B (-)	TE-102-42 (-)
WST-TE-243B (+)	TE-102-43 (+)
WST-TE-243B (-)	TE-102-43 (-)
WST-TE-244B (+)	TE-102-44 (+)
WST-TE-244B (-)	TE-102-44 (-)
WST-TE-245B (+)	TE-102-45 (+)
WST-TE-245B (-)	TE-102-45 (-)
WST-TE-246B (+)	TE-102-46 (+)
WST-TE-246B (-)	TE-102-46 (-)
WST-TE-247B (+)	TE-102-47 (+)
WST-TE-247B (-)	TE-102-47 (-)
WST-TE-248B (+)	TE-102-48 (+)
WST-TE-248B (-)	TE-102-48 (-)
WST-TE-249B (+)	TE-102-49 (+)
WST-TE-249B (-)	TE-102-49 (-)
WST-TE-250B (+)	TE-102-50 (+)
WST-TE-250B (-)	TE-102-50 (-)
WST-TE-251B (+)	TE-102-51 (+)
WST-TE-251B (-)	TE-102-51 (-)
WST-TE-252B (+)	TE-102-52 (+)
WST-TE-252B (-)	TE-102-52 (-)
WST-TE-253B (+)	TE-102-53 (+)
WST-TE-253B (-)	TE-102-53 (-)

TBX-103-7 (RIS 206) NEW WIRE NO.	OLD WIRE NO.
WST-TE-236C (+)	TE-103-36 (+)
WST-TE-236C (-)	TE-103-36 (-)
WST-TE-237C (+)	TE-103-37 (+)
WST-TE-237C (-)	TE-103-37 (-)
WST-TE-238C (+)	TE-103-38 (+)
WST-TE-238C (-)	TE-103-38 (-)
WST-TE-239C (+)	TE-103-39 (+)
WST-TE-239C (-)	TE-103-39 (-)
WST-TE-240C (+)	TE-103-40 (+)
WST-TE-240C (-)	TE-103-40 (-)
WST-TE-241C (+)	TE-103-41 (+)
WST-TE-241C (-)	TE-103-41 (-)
WST-TE-242C (+)	TE-103-42 (+)
WST-TE-242C (-)	TE-103-42 (-)
WST-TE-243C (+)	TE-103-43 (+)
WST-TE-243C (-)	TE-103-43 (-)
WST-TE-244C (+)	TE-103-44 (+)
WST-TE-244C (-)	TE-103-44 (-)
WST-TE-245C (+)	TE-103-45 (+)
WST-TE-245C (-)	TE-103-45 (-)
WST-TE-246C (+)	TE-103-46 (+)
WST-TE-246C (-)	TE-103-46 (-)
WST-TE-247C (+)	TE-103-47 (+)
WST-TE-247C (-)	TE-103-47 (-)
WST-TE-248C (+)	TE-103-48 (+)
WST-TE-248C (-)	TE-103-48 (-)
WST-TE-249C (+)	TE-103-49 (+)
WST-TE-249C (-)	TE-103-49 (-)
WST-TE-250C (+)	TE-103-50 (+)
WST-TE-250C (-)	TE-103-50 (-)
WST-TE-251C (+)	TE-103-51 (+)
WST-TE-251C (-)	TE-103-51 (-)
WST-TE-252C (+)	TE-103-52 (+)
WST-TE-252C (-)	TE-103-52 (-)
WST-TE-253C (+)	TE-103-53 (+)
WST-TE-253C (-)	TE-103-53 (-)

TBX-104-7 (RIS 206) NEW WIRE NO.	OLD WIRE NO.
WST-TE-236D (+)	TE-104-36 (+)
WST-TE-236D (-)	TE-104-36 (-)
WST-TE-237D (+)	TE-104-37 (+)
WST-TE-237D (-)	TE-104-37 (-)
WST-TE-238D (+)	TE-104-38 (+)
WST-TE-238D (-)	TE-104-38 (-)
WST-TE-239D (+)	TE-104-39 (+)
WST-TE-239D (-)	TE-104-39 (-)
WST-TE-240D (+)	TE-104-40 (+)
WST-TE-240D (-)	TE-104-40 (-)
WST-TE-241D (+)	TE-104-41 (+)
WST-TE-241D (-)	TE-104-41 (-)
WST-TE-242D (+)	TE-104-42 (+)
WST-TE-242D (-)	TE-104-42 (-)
WST-TE-243D (+)	TE-104-43 (+)
WST-TE-243D (-)	TE-104-43 (-)
WST-TE-244D (+)	TE-104-44 (+)
WST-TE-244D (-)	TE-104-44 (-)
WST-TE-245D (+)	TE-104-45 (+)
WST-TE-245D (-)	TE-104-45 (-)
WST-TE-246D (+)	TE-104-46 (+)
WST-TE-246D (-)	TE-104-46 (-)
WST-TE-247D (+)	TE-104-47 (+)
WST-TE-247D (-)	TE-104-47 (-)
WST-TE-248D (+)	TE-104-48 (+)
WST-TE-248D (-)	TE-104-48 (-)
WST-TE-249D (+)	TE-104-49 (+)
WST-TE-249D (-)	TE-104-49 (-)
WST-TE-250D (+)	TE-104-50 (+)
WST-TE-250D (-)	TE-104-50 (-)
WST-TE-251D (+)	TE-104-51 (+)
WST-TE-251D (-)	TE-104-51 (-)
WST-TE-252D (+)	TE-104-52 (+)
WST-TE-252D (-)	TE-104-52 (-)
WST-TE-253D (+)	TE-104-53 (+)
WST-TE-253D (-)	TE-104-53 (-)

TBX-105-7 (RIS 206) NEW WIRE NO.	OLD WIRE NO.
WST-TE-236E (+)	TE-105-36 (+)
WST-TE-236E (-)	TE-105-36 (-)
WST-TE-237E (+)	TE-105-37 (+)
WST-TE-237E (-)	TE-105-37 (-)
WST-TE-238E (+)	TE-105-38 (+)
WST-TE-238E (-)	TE-105-38 (-)
WST-TE-239E (+)	TE-105-39 (+)
WST-TE-239E (-)	TE-105-39 (-)
WST-TE-240E (+)	TE-105-40 (+)
WST-TE-240E (-)	TE-105-40 (-)
WST-TE-241E (+)	TE-105-41 (+)
WST-TE-241E (-)	TE-105-41 (-)
WST-TE-242E (+)	TE-105-42 (+)
WST-TE-242E (-)	TE-105-42 (-)
WST-TE-243E (+)	TE-105-43 (+)
WST-TE-243E (-)	TE-105-43 (-)
WST-TE-244E (+)	TE-105-44 (+)
WST-TE-244E (-)	TE-105-44 (-)
WST-TE-245E (+)	TE-105-45 (+)
WST-TE-245E (-)	TE-105-45 (-)
WST-TE-246E (+)	TE-105-46 (+)
WST-TE-246E (-)	TE-105-46 (-)
WST-TE-247E (+)	TE-105-47 (+)
WST-TE-247E (-)	TE-105-47 (-)
WST-TE-248E (+)	TE-105-48 (+)
WST-TE-248E (-)	TE-105-48 (-)
WST-TE-249E (+)	TE-105-49 (+)
WST-TE-249E (-)	TE-105-49 (-)
WST-TE-250E (+)	TE-105-50 (+)
WST-TE-250E (-)	TE-105-50 (-)
WST-TE-251E (+)	TE-105-51 (+)
WST-TE-251E (-)	TE-105-51 (-)
WST-TE-252E (+)	TE-105-52 (+)
WST-TE-252E (-)	TE-105-52 (-)
WST-TE-253E (+)	TE-105-53 (+)
WST-TE-253E (-)	TE-105-53 (-)

TBX-106-7 (RIS 206) NEW WIRE NO.	OLD WIRE NO.
WST-TE-236F (+)	TE-106-36 (+)
WST-TE-236F (-)	TE-106-36 (-)
WST-TE-237F (+)	TE-106-37 (+)
WST-TE-237F (-)	TE-106-37 (-)
WST-TE-238F (+)	TE-106-38 (+)
WST-TE-238F (-)	TE-106-38 (-)
WST-TE-239F (+)	TE-106-39 (+)
WST-TE-239F (-)	TE-106-39 (-)
WST-TE-240F (+)	TE-106-40 (+)
WST-TE-240F (-)	TE-106-40 (-)
WST-TE-241F (+)	TE-106-41 (+)
WST-TE-241F (-)	TE-106-41 (-)
WST-TE-242F (+)	TE-106-42 (+)
WST-TE-242F (-)	TE-106-42 (-)
WST-TE-243F (+)	TE-106-43 (+)
WST-TE-243F (-)	TE-106-43 (-)
WST-TE-244F (+)	TE-106-44 (+)
WST-TE-244F (-)	TE-106-44 (-)
WST-TE-245F (+)	TE-106-45 (+)
WST-TE-245F (-)	TE-106-45 (-)
WST-TE-246F (+)	TE-106-46 (+)
WST-TE-246F (-)	TE-106-46 (-)
WST-TE-247F (+)	TE-106-47 (+)
WST-TE-247F (-)	TE-106-47 (-)
WST-TE-248F (+)	TE-106-48 (+)
WST-TE-248F (-)	TE-106-48 (-)
WST-TE-249F (+)	TE-106-49 (+)
WST-TE-249F (-)	TE-106-49 (-)
WST-TE-250F (+)	TE-106-50 (+)
WST-TE-250F (-)	TE-106-50 (-)
WST-TE-251F (+)	TE-106-51 (+)
WST-TE-251F (-)	TE-106-51 (-)
WST-TE-252F (+)	TE-106-52 (+)
WST-TE-252F (-)	TE-106-52 (-)
WST-TE-253F (+)	TE-106-53 (+)
WST-TE-253F (-)	TE-106-53 (-)



SELECTED THERMOCOUPLES TO TMACS. SEE DWG'S
TANK AV101 H-2-820794
TANK AV102 H-2-820795
TANK AV103 H-2-820796
TANK AV104 H-2-820797
TANK AV105 H-2-820798
TANK AV106 H-2-820999

EXISTING THERMOCOUPLE TREE
TERMINAL BOX (H-2-34304)
SEE THERMOCOUPLE CONNECTION SCHEDULE

FOR GENERAL NOTES AND PARTS LIST SEE SH 1

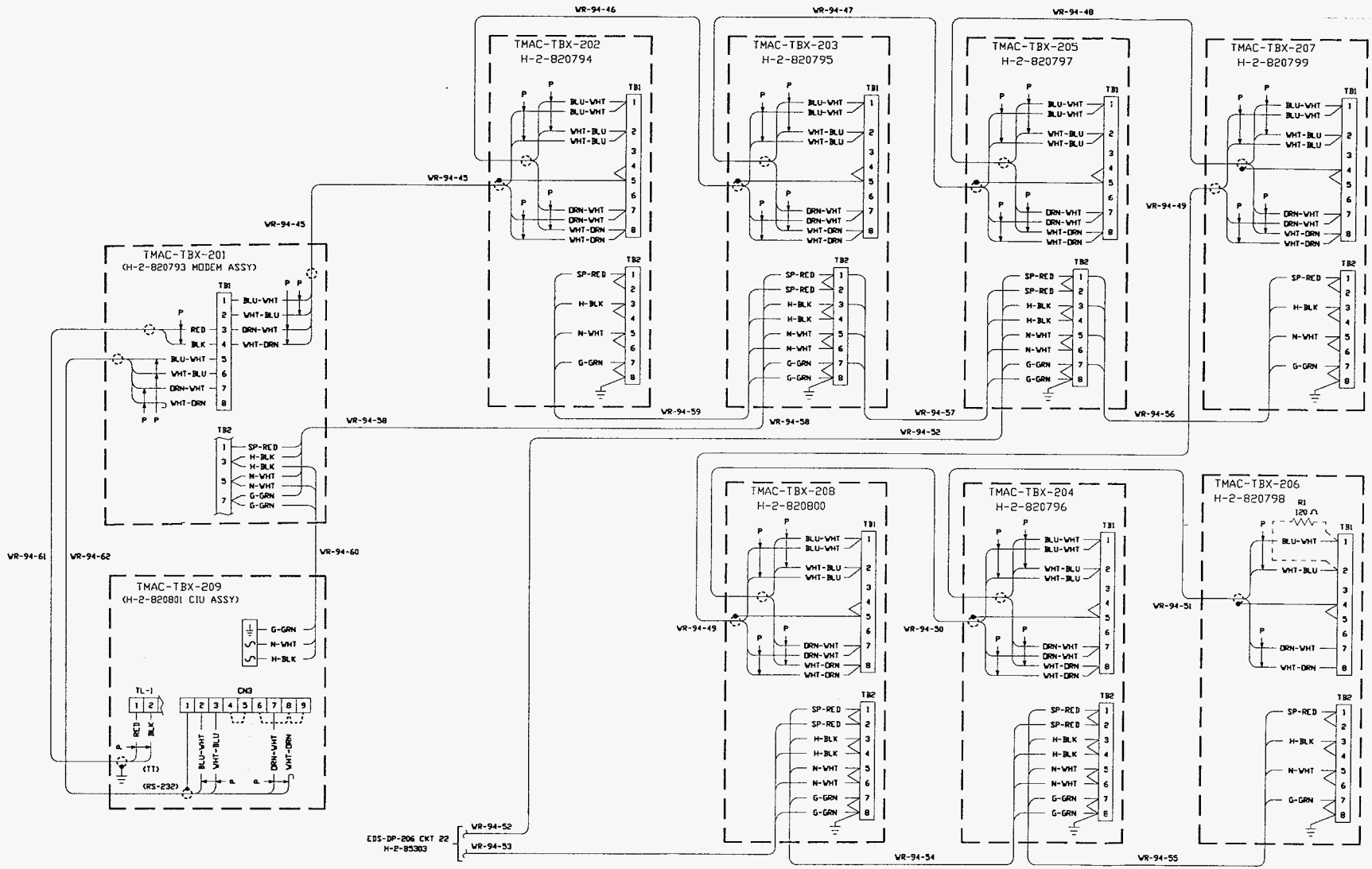
DRAWN B.L. MURRY 10-94
CHECKED FAIRCHILD 4-95
R. ROMINE 4-95
K.A. WHITE

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

TMACS AW-TANK FARM
CONNECTION SCHEDULE

F 241-AV 5901 H-2-820792 0
SCALE NONE CBT 161968 SHEET 3

CADFILE B820792C CADCODE DOS6.0ACAD12.0SS



NOTE:

1. COMMUNICATIONS CABLE

BLU-WHT = D
WHT-BLU = D — ACROMAC RS-485

DRN-WHT = T
WHT-DRN = T — ENRAF COMMUNICATION

FOR GENERAL NOTES AND PARTS LIST SEE SH 1

DRAWN	B.L. MURRY	10-94
CHECKED	T AIRCHILD	4-95
DES APPR	R. ROMINE	4-95
CM ENGR	K.A. WHITE	

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

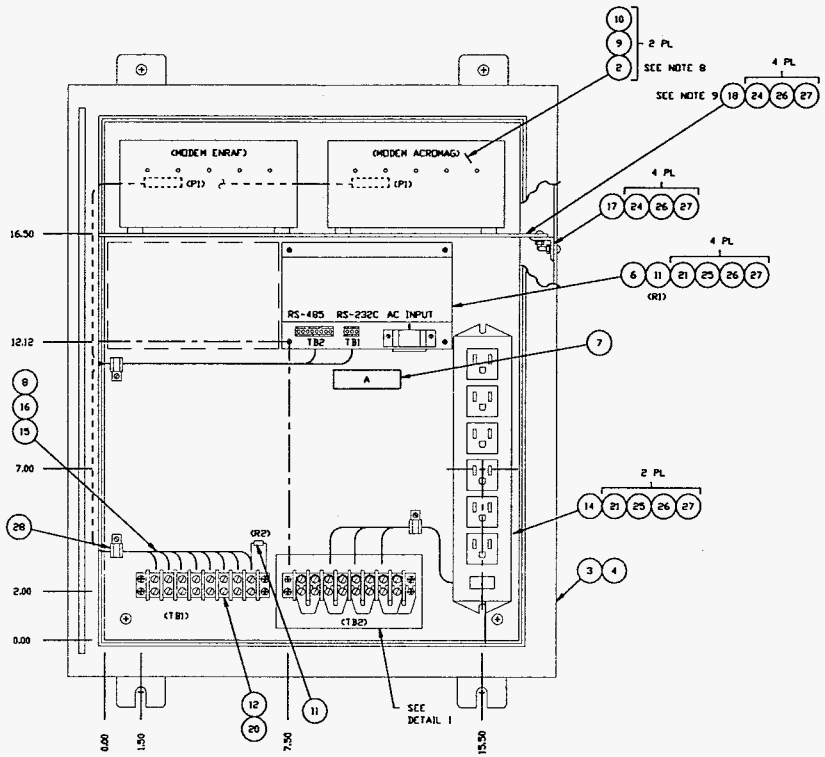
TMACS AW-TANK FARM
INTERCONNECTION DIAGRAM

SIZE	BLDG NO	WORK NO	DWG NO	REV
F	241-AW	5901	H-2-820792	0

SCALE: NONE | EDT 161968 | SHEET 4 OF

DRAWING TRACEABILITY LIST | REFERENCES | REVISIONS

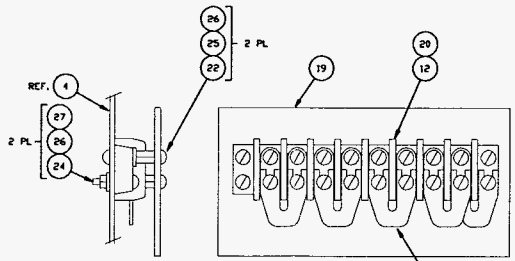
CADFILE 8820792D | CADCODE DOS-6.0-ACD-12.05S



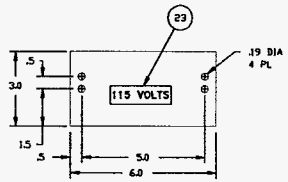
1 ASSEMBLY
HINGED COVER REMOVED

LABEL A
TMAC-CONV-201A
RS232C TO RS485
AV FARM

7 NAMEPLATE SCHED
SEE NOTE 1 AND 7



DETAIL I
SCALE: 1=1



19 COVER

PARTS/MATERIAL LIST

QTY MODS -020	-010	REF. DES.	PART/DASH NO.	NOMENCLATURE/DESCRIPTION	MATERIAL/REF.	SHT	ITEM NO.
	X		-010	ASSEMBLY			1
	2		LDS-140	MODEM	GANDALF		2
	1		A-242016LP	ENCLOSURE, 24"X20"X16"	HOFFMAN		3
	1		A-24P20AL	PANEL, 21"X17"	HOFFMAN		4
							5
	1		4SCC-TTM-1	SIG. CONV. - (RS232C TO RS485)	ACROMAG		6
	2			NAMEPLATE, PLASTIC	HS-BS-0015		7
	AR			WIRE, 16 AWG, GRN, STRANDED	TFFN COPPER		8
	2	P1	DB-19604-432	CONNECTOR, MALE "D" 25 PIN	CINCH		9
	2		DB-51226-1A	BACKSHELL, (FOR I/N 9)	CINCH		10
	2	R1, R2	RC20GF121J	RESISTOR, 120 OHM, 1/2W, 5%	MIL-R-11		11
	2	TB1,TB2	B-142	TERMINAL BLOCK, 8 TERM.	CINCH		12
	5		142J-2	JUMPER (FOR I/N 12)	CINCH		13
	1			POWER STRIP, 6 OUTLETS, 120V AC, 15A, WITH MASTER SW. AND CIRCUIT BREAKER			14
	AR		9842	CABLE, 18 AWG, 1 PAIR, TWISTED SHLD PAIR, STRANDED	BELDEN COPPER		15
	AR		(88760)	CABLE, 24 AWG, 2 PAIR, TWISTED SHLD PAIR, STRANDED (RED, BLK)	(BELDEN) COPPER		16
	2			ANGLE, 1"X1"X14"	6061-T6 AL		17
	1			PLATE, 14"X19-1/2"X1/8"	6061-T6 AL		18
	1			COVER, 3"X6"X1/8"	PLEXIGLASS		19
	2		MS-8-142	MARKER, STRIP (FOR I/N 12)	TRW		20
	6		7220	SPACER, 1/4" HEX MALE/FEMALE 8-32 UNF THREAD, 3/8" LONG	KEYSTONE		21
	2		1474 B	SPACER, 1/4" HEX FEMALE 8-32 UNF THREAD, 3/8" LONG	KEYSTONE		22
	1		WAT-5011	MARKER, VINYL, 1/2" X 2 1/4"	T & B		23
	10			SCREW, 8-32, 5/8" LONG	CS		24
	8			SCREW, 8-32, 3/8" LONG	CS		25
	18			WASHER, LOCK, NO. 8	CS		26
	18			NUT, HEX, 8-32 UNF	CS		27
	AR			CLAMP, CABLE			28
							29
							30

GENERAL NOTES (UNLESS OTHERWISE NOTED)

1. LABEL ITEM NO. 1 PER HS-BS-0015 TYPE 6, USING (1/N 7). TEXT SHALL CONSIST OF THE FOLLOWING
   LINE 1 USING 1/2" CHARACTERS: FIRST LINE OF DVG TITLE
   LINE 2 USING 1/4" CHARACTERS: "TMACS MODEM 241-AV-271"
   LINE 3 USING 1/4" CHARACTERS: DRAWING NO. PART/DASH NO.
   LINE 4 USING 1/4" CHARACTERS: "EDS-DP-206 CKT 22"
   ATTACH TO FRONT OF THE DOOR USING SILICONE ADHESIVE.
2. ELECTRICAL INSTALLATION SHALL CONFORM TO THE 1993 EDITION OF THE NATIONAL ELECTRICAL CODE.
3. ALL ELECTRICAL PARTS SHALL BE LISTED BY UL, FM, OR ANOTHER NATIONALLY RECOGNIZED TESTING LABORATORY.
4. FOR ITEM 6 SEE VENDOR INFORMATION (VI), NUMBER 22138.
5. CABLE SHIELDS ARE GROUNDED AT ONE END ONLY.
6. FIELD TO TEMPLATE MOUNTING HOLES FROM COMPONENTS AND DRILL AS REQ'D.
7. LABEL PER HS-BS-0015 TYPE 6 WITH INFORMATION AS SHOWN USING 5/32" HIGH CHARACTERS, ATTACH USING SILICONE ADHESIVE.
8. MODEM (1/N 2) SUPPLIED BY TELEPHONE COMPANY.
9. MOUNT SHELF (1/N 18) LEAVING ROOM FOR CABLES AT REAR. POWER CORDS TO POWER STRIP (1/N 14) NOT SHOWN.
10. DIMENSIONS ARE IN INCHES
    TOLERANCES: .X = ±0.1
    .XX = ±0.03

DRAWING TRACEABILITY LIST		REFERENCES		REVISIONS
DWG NO	TITLE	REF NUMBER	TITLE	
		H-2-70330	ELEC INSTN PLANS	
		H-2-81761	TMACS BLOCK DIAGRAM	
		H-2-81778	TMACS DRAWING INDEX	
		NEXT USED ON	H-2-820792	CADFILE 8820793A CADCODE DDS-6.0ACDP12DSS

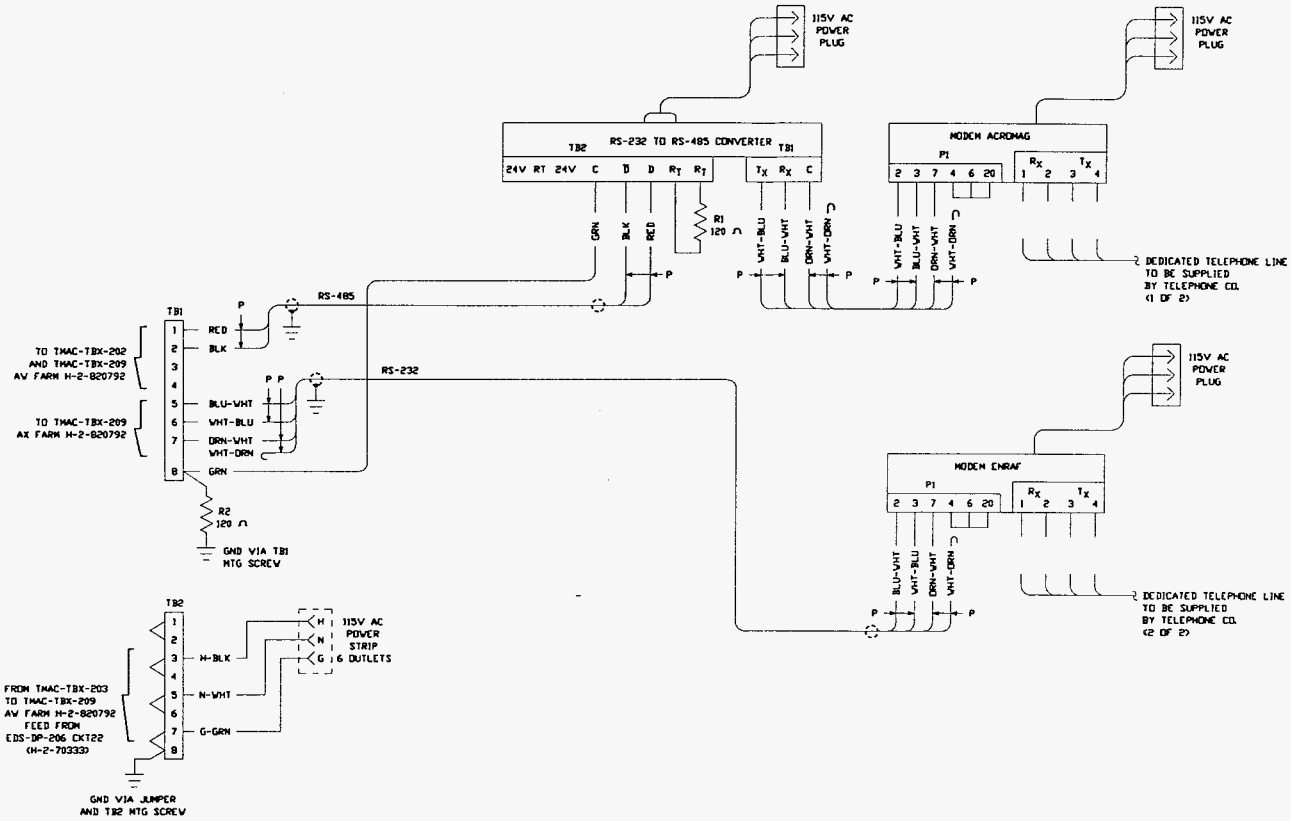
DRAWN	BL MURRY	1-95
CHECKED	FAIRCHILD	4-95
STD APPR	R. ROMINE	4-95
FUNC APPR	K.A. WHITE	

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

TMAC-TBX-201
MODEM ASSEMBLY

SIZE	BLDG NO	DRAWING NO	REV
F	241-AV	H-2-820793	0

SCALE 1/2 | SHEET 1 OF 2

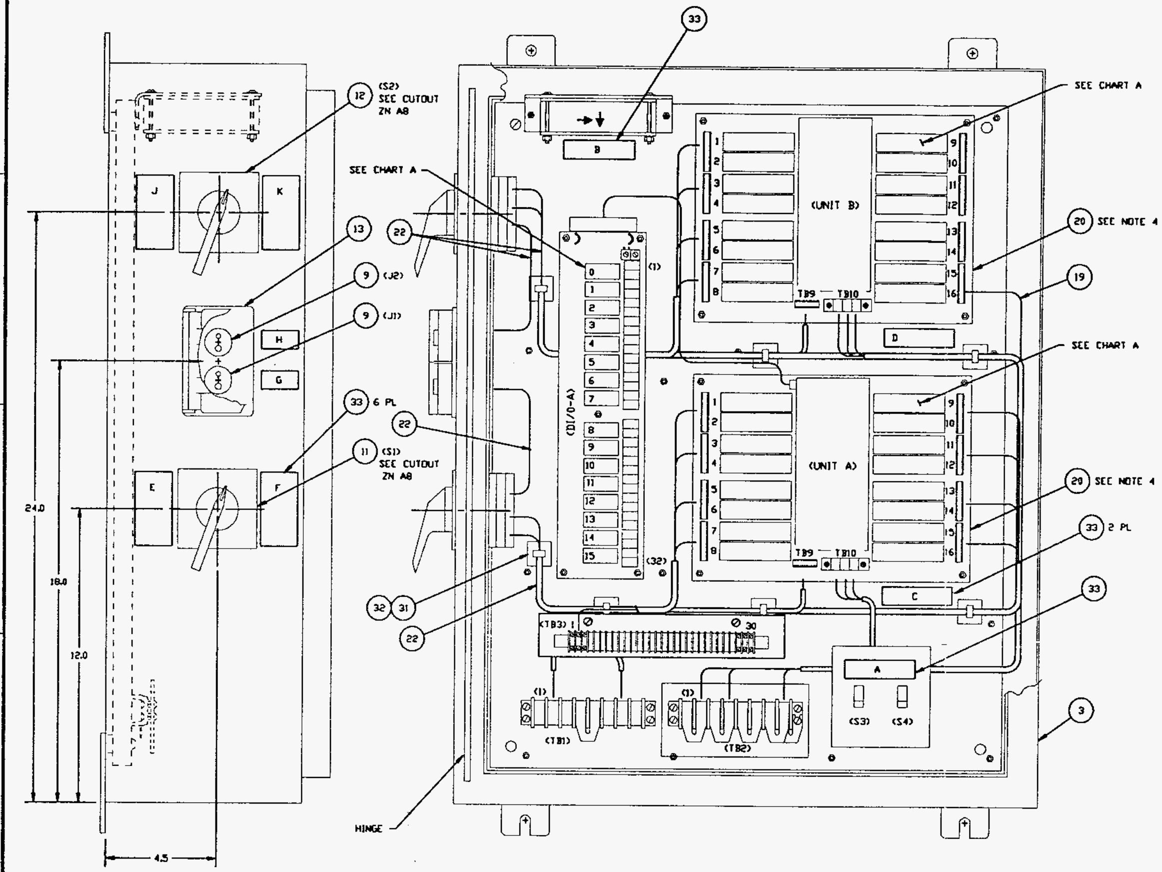


FOR PARTS LIST AND GENERAL NOTES SEE SHT 1

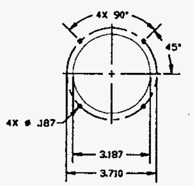
DRAWN BL. MURRY	1-95	U.S. DEPARTMENT OF ENERGY Richland Operations Office Westinghouse Hanford Company
CHECKED FAIRCHILD	4-95	
APVD and R. ROMINE	4-95	TMAC-TBX-201 MODEM WIRING DIAGRAM
QUALITY ASSURANCE K.A. WHITE		SIZE F · DRAWING NO H-2-820793 · REV 0 · SCALE NONE · SHEET 2

DRAWING TRACEABILITY LIS | REF NUMBER / TITLE / NEXT USED ON | REFERENCES | REVISIONS | CADFILE B820793B | CADCODE DOS6.DAC12\2.DSS

54-6000-027(5/89)



1 ASSEMBLY
HINGED COVER REMOVED



ENCLOSURE CUTOUT
S1 AND S2

CHART A

MODULE LOCATOR			
SLOT NO.	UNIT A I/N	UNIT B I/N	DI/O-A I/N
0	N/A	N/A	26
1	6	6	-
2	6	6	-
3	6	6	-
4	6	6	-
5	6	6	-
6	6	6	-
7	6	6	-
8	6	6	-
9	6	6	-
10	6	6	-
11	6	6	-
12	6	7	-
13	6	7	-
14	6	-	-
15	6	-	-
16	6	7	N/A

PARTS/MATERIAL LIST

QTY REQD -020	QTY REQD -010	REF. DES.	PART/DASH NO.	NOMENCLATURE/DESCRIPTION	MATERIAL/REF.	SHT	NO.
	X		-010	ASSEMBLY			1
							2
	1		H-2-820820-020	ASSEMBLY, (2 ACROMAG)			3
							4
							5
	27		4M00-210	MODULE, TC INPUT	ACROMAG		6
	3		4M00-240	MODULE, DC CURRENT INPUT	ACROMAG		7
							8
	2	J1, J2	RSJ-E-R	JACK, PANEL, TC TYPE E	OMEGA		9
							10
	1	S1	OSV3-20-PG	SWITCH, SELECTOR, 20 POS.	OMEGA		11
	1	S2	OSV3-16-PG	SWITCH, SELECTOR, 16 POS.	OMEGA		12
	1		WLRD-1	DUPLEX COVER, W/SPRING DOOR	CROUSE-HINDS		13
							14
							15
							16
							17
							18
	AR		(88760)	CABLE, 18 AWG, 1 TWISTED SHLD PAIR, STRANDED (RED AND BLK)	(BELDEN) COPPER		19
	AR			WIRE, 20 AWG, SOLID, BARE	COPPER		20
							21
	AR		(5710/2001)	WIRE, TC TYPE EX	(ALPHA)		22
							23
							24
							25
	1		OAC5	AC OUTPUT MODULE	(POTTER & BRUMFIELD) (OPTO 22)(ACROMAG)		26
							27
							28
							29
							30
	AR		(ABM2S-A-C)	CABLE TIE MOUNT	(PANDUIT)		31
	AR		(PLT1.5I-C)	TIE, CABLE	(PANDUIT)		32
	11			NAMEPLATE, PLASTIC	HS-BS-0015		33
							34
							35

9 (flag at item 22)

GENERAL NOTES (UNLESS OTHERWISE NOTED)

1. LABEL ITEM NO. 1 PER HS-BS-0015 TYPE 6, USING (I/N 33). TEXT SHALL CONSIST OF THE FOLLOWING:
   LINE 1 USING 1/2" CHARACTERS: FIRST LINE OF DWG TITLE
   LINE 2 USING 1/4" CHARACTERS: "TMACS I/O TERMINATION"
   LINE 3 USING 1/4" CHARACTERS: DRAWING NO. PART/DASH NO.
   LINE 4 USING 1/4" CHARACTERS: "EDS-DP-206 CKT 22"
   ATTACH TO FRONT OF THE DOOR USING SILICONE ADHESIVE.
2. WIRING IS DIAGRAMMATICALLY SHOWN, ROUTE AND SUPPORT AS REQUIRED.
3. ALL ELECTRICAL PARTS SHALL BE LISTED BY UL, FM, OR ANOTHER NATIONALLY RECOGNIZED TESTING LABORATORY.
4. USE ITEM NO. 20 FOR JUMPER.
5. FOR ACROMAG PARTS SEE VENDOR INFORMATION (VI), NUMBER 22138.
6. CABLE SHIELDS ARE GROUNDED AT ONE END ONLY.
7. FIELD TO TEMPLATE MOUNTING HOLES FROM ITEMS TO BE MOUNTED AS REQ'D.
8. LABEL PER HS-BS-0015 TYPE 6 WITH INFORMATION AS SHOWN USING 5/32" HIGH CHARACTERS, ATTACH USING SILICONE ADHESIVE.
9. CABLE, THERMOCOUPLE EXTENSION, SINGLE PAIR, 20 AWG SOLID CONDUCTOR PER ANSI MC 96.1-1975, 300 VOLT, 90 DEGREE C, ANSI COLOR CODED PVC INSULATION AND JACKET.
10. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
11. DIMENSIONS ARE INCHES.
    TOLERANCES: .X = ±0.1
    .XXX = ±0.010
    DEGREES: ±1°

LABEL E

AW-101 RIS-206	
SW POS	TC NO
	WST-TE-
1	236A
2	237A
3	238A
4	239A
5	240A
6	241A
7	242A
8	243A
9	244A
10	245A

1.5 MAX
LABEL E THRU K ONLY

LABEL F

AW-101 RIS-206	
SW POS	TC NO
	WST-TE-
11	246A
12	247A
13	248A
14	249A
15	250A
16	251A
17	252A
18	253A
19	-
20	-

LABEL G

TC TYPE E

LABEL H

TC TYPE E

LABEL J

AW-101 RIS-258	
SW POS	TC NO
	WST-TE-
1	254A
2	260A

LABEL K

AW-101 RIS-269	
SW POS	TC NO
	WST-TE-
3	263A
4	270A
5	280A
	WSTA-TE-
6	274A
7	277A
8	280A
9	283A
10	-

LABEL A

UNIT A UNIT B

LABEL B

TMAC-F-202

LABEL C

TMAC-RTU-202A
REMOTE TERMINAL UNIT A
AW TANK FARM

LABEL D

TMAC-RTU-202B
REMOTE TERMINAL UNIT B
AW TANK FARM

33 NAMEPLATE SCHED
SEE NOTE 1 AND 8

DWG NO	TITLE	REF NUMBER	TITLE
		H-2-81778	TMACS DRAWING INDEX
		H-2-81761	BLOCK DIAGRAM
DRAWING TRACEABILITY LIST		REFERENCES	
		NEXT USED ON	H-2-820792

REVISIONS
CADFILE B820794A
CADCODE DOS6.0ACD2I12DSS

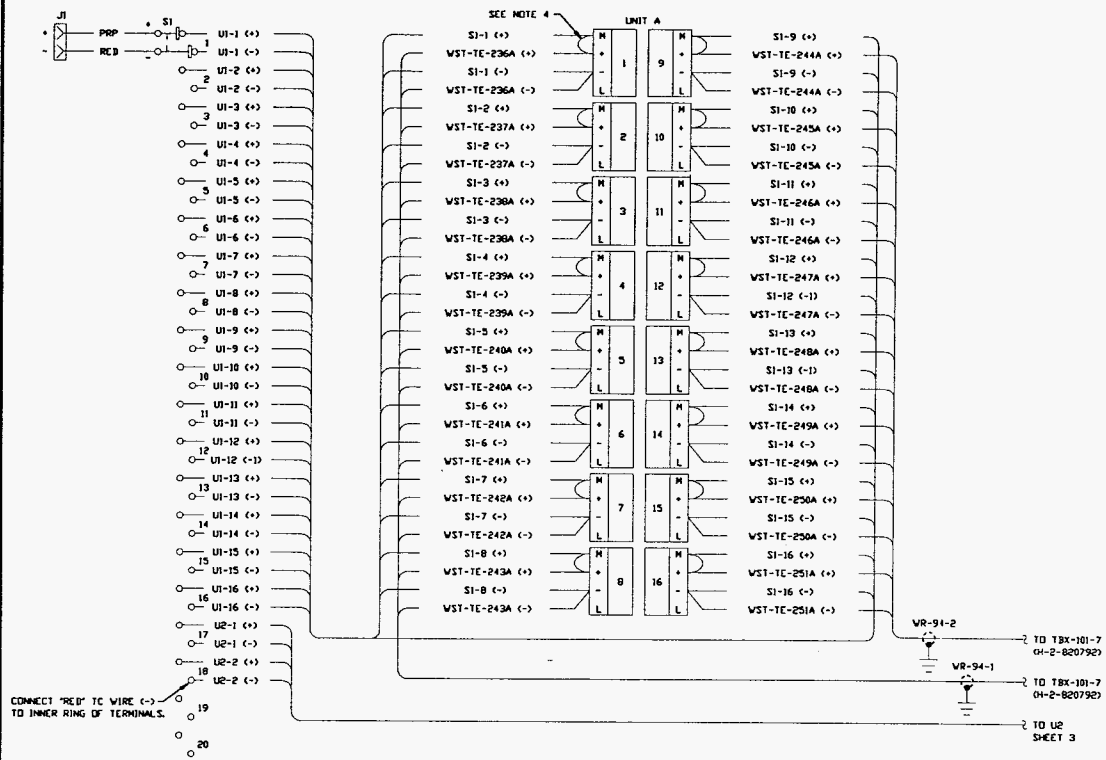
DRAWN	BL MURRY	7-94
CHECKED	FAIRCHILD	4-95
DFTG APVD	R. ROMINE	4-95
COG ENGR	K. WHITE	

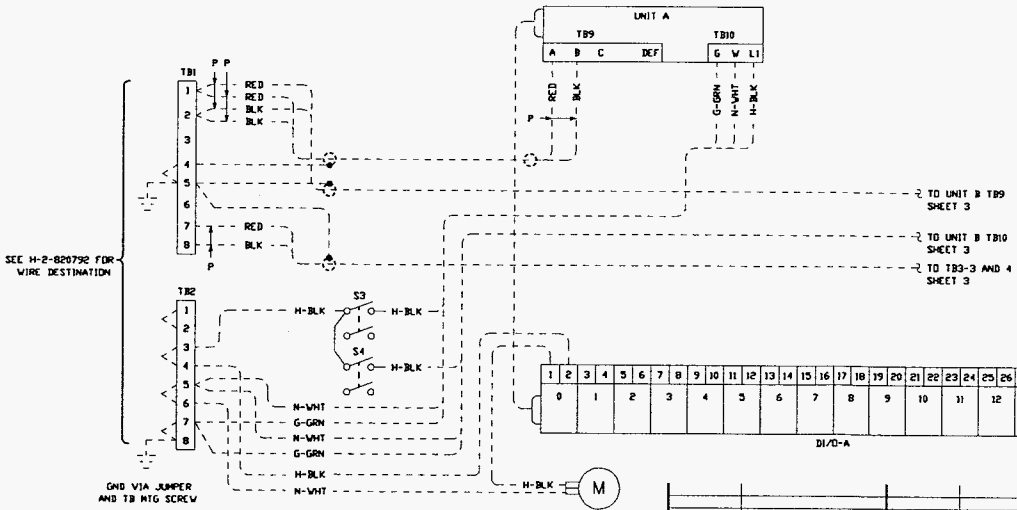
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

TMAC-TBX-202
TMACS ASSEMBLY

SIZE	BLDG NO	INDEX NO	DWG NO	REV
F	241-AW	5901	H-2-820794	0

SCALE 1/2 | CRT 161968 | SHEET 1 OF 3

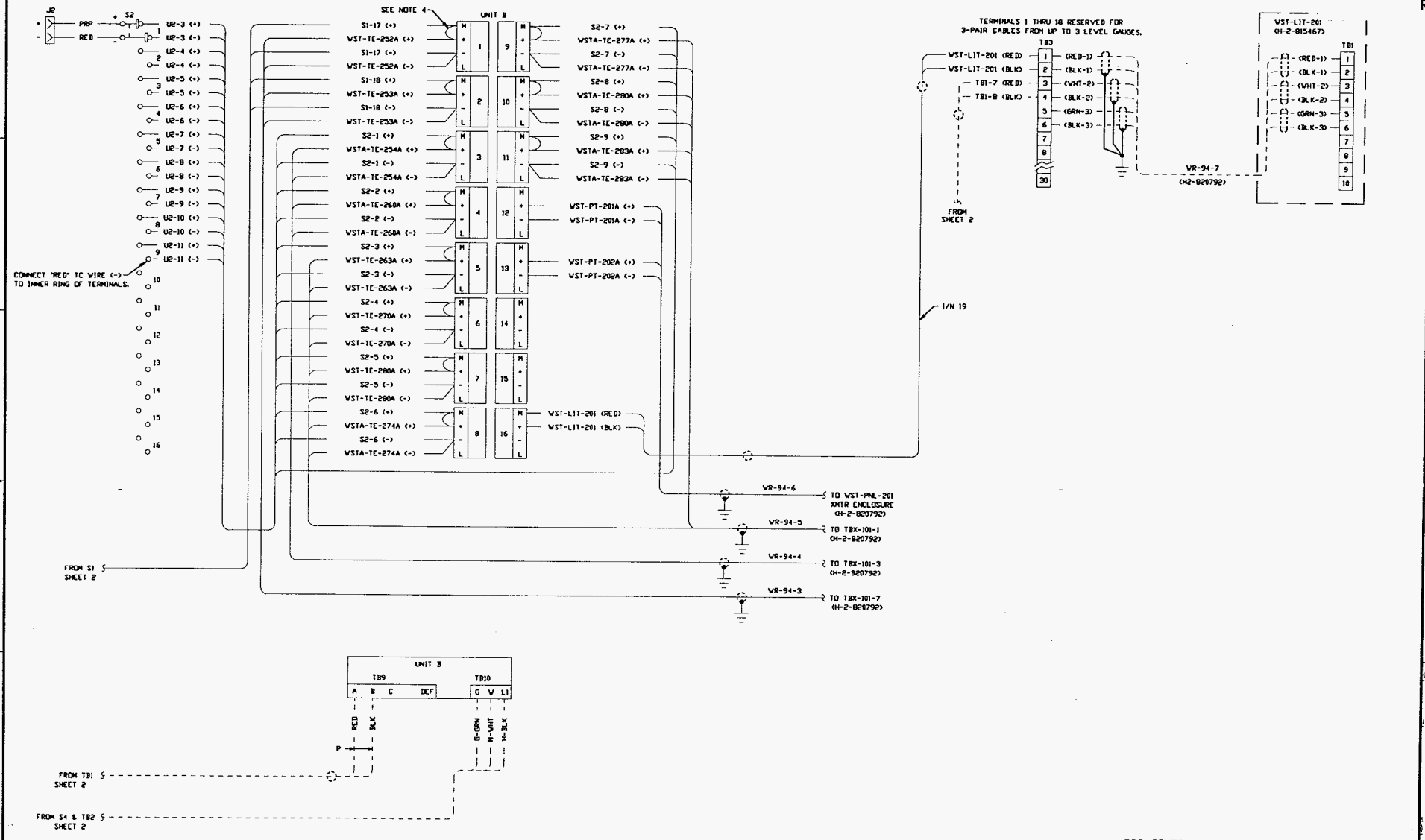




FOR GENERAL NOTES AND PARTS LIST SEE SHT 1

DRAWING TRACEABILITY LIST		REFERENCES		REVISIONS
DWG NO	TITLE	REF NUMBER	TITLE	NEXT USED ON
				CADFILE 8820794B / CADCODE DOS-6.0ACD12.0SS

Drawn BL MURRY	7-94	U.S. DEPARTMENT OF ENERGY Richland Operations Office Westinghouse Hanford Company
Design FAIRCHILD	4-95	
Drafting R. ROMINE	4-95	TMAC-TBX-202 WIRING DIAGRAM
Checked K. WHITE		
		SIZE F / 241-AV / 5903 / H-2-820794 / REV 0
		SCALE NONE / EDT 161968 / SHEET 2 OF



FOR GENERAL NOTES AND PARTS LIST SEE SHT 1

DRAWN BL MURRY	7-94	U.S. DEPARTMENT OF ENERGY Richland Operations Office Westinghouse Hanford Company	
CHECKED FAIRCHILD	4-95		
APPROVED R. ROMINE	4-95		
ENG MGR KA WHITE		TMAC-TBX-202 WIRING DIAGRAM	
F	241-AV	5903	H-2-820794 0
SCALE NONE		REF 161968	SHEET 3

DWG NO | TITLE | REF NUMBER | TITLE
DRAWING TRACEABILITY LIST | REFERENCES | NEXT USED ON

REVISIONS
CADFILE B820794C | CADCODE DOS-6.0ACDS12DSS

54-6000-027(5/89)

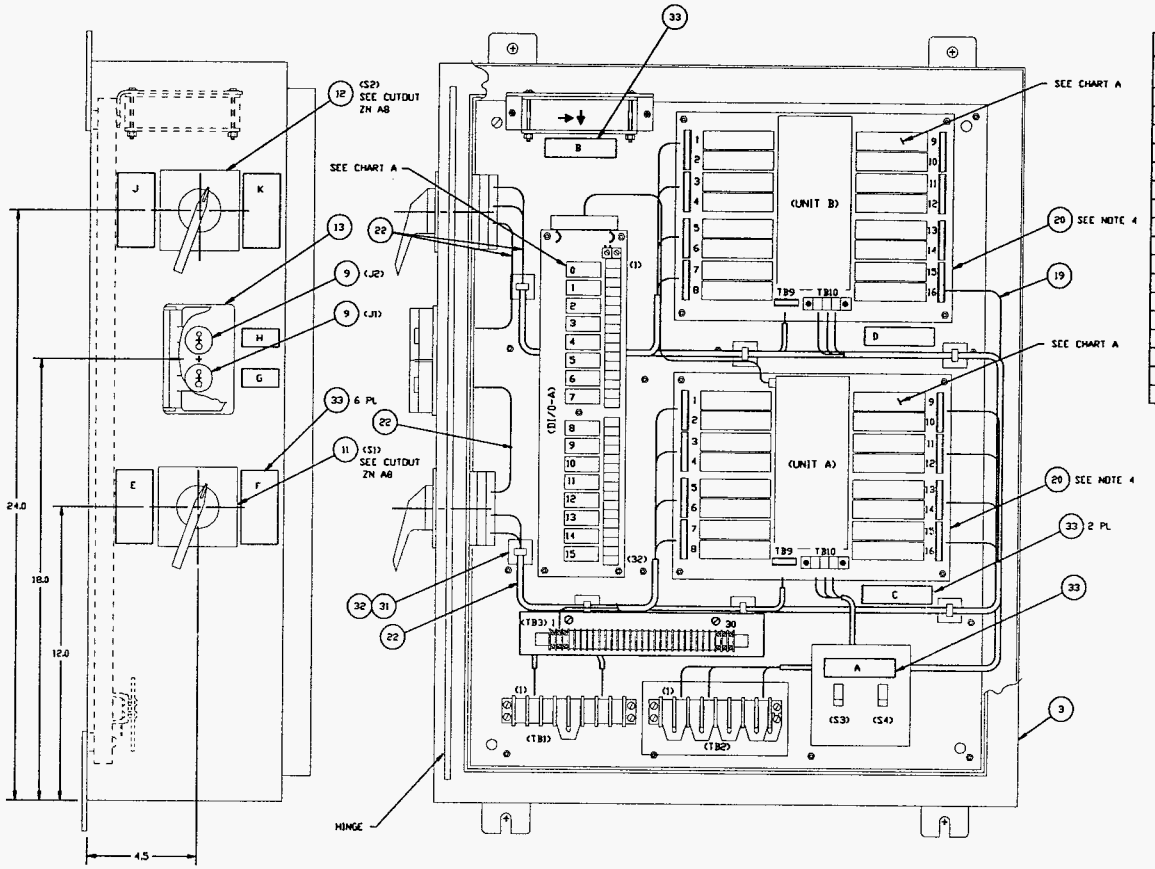


CHART A

MODULE LOCATOR

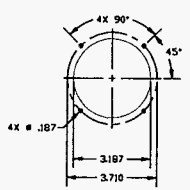
SLOT NO.	UNIT A I/N	UNIT B I/N	DI/O-A I/N
0	N/A	N/A	26
1	6	6	-
2	6	6	-
3	6	6	-
4	6	6	-
5	6	6	-
6	6	6	-
7	6	6	-
8	6	6	-
9	6	6	-
10	6	6	-
11	6	6	-
12	6	7	-
13	6	7	-
14	6	-	-
15	6	-	-
16	6	-	N/A

PARTS/MATERIAL LIST

QTY REQD -020	QTY REQD -010	REF. DES.	PART/DASH NO.	NOMENCLATURE/DESCRIPTION	MFR/MATERIAL REF.	SHT NO.
	X		-010	ASSEMBLY		1
						2
	1		H-2-820820-020	ASSEMBLY, (2 ACROMAG)		3
						4
						5
	27		4M00-210	MODULE, TC INPUT	ACROMAG	6
	2		4M06-240	MODULE, DC CURRENT INPUT	ACROMAG	7
						8
	2	J1, J2	RSJ-E-R	JACK, PANEL, TC TYPE E	OMEGA	9
						10
	1	S1	DSW3-20-PG	SWITCH, SELECTOR, 20 POS.	OMEGA	11
	1	S2	DSW3-16-PG	SWITCH, SELECTOR, 16 POS.	OMEGA	12
	1		WLRD-1	DUPLEX COVER, W/SPRING DOOR	CROUSE-HINDS	13
						14
						15
						16
						17
						18
	AR		(86760)	CABLE, 18 AWG, 1 TWISTED SHLD PAIR, STRANDED (RED AND BLK)	(BELDEN) COPPER	19
	AR			WIRE, 20 AWG, SOLID, BARE	COPPER	20
						21
9	AR		(5710/2001)	WIRE, TC TYPE EX	(ALPHA)	22
						23
						24
						25
	1		OACS	AC OUTPUT MODULE	(POTTER & BRUMFIELD) (OPTO 22)(ACROMAG)	26
						27
						28
						29
						30
	AR		(ABMES-A-C)	CABLE TIE MOUNT	(PANDUIT)	31
	AR		(PLT1.5I-C)	TIE, CABLE	(PANDUIT)	32
	11			NAMEPLATE, PLASTIC	HS-BS-0015	33
						34
						35

GENERAL NOTES (UNLESS OTHERWISE NOTED)

1. LABEL ITEM NO. 1 PER HS-BS-0015 TYPE 6, USING (1/4 33). TEXT SHALL CONSIST OF THE FOLLOWING
   LINE 1 USING 1/2" CHARACTERS: FIRST LINE OF DWG TITLE
   LINE 2 USING 1/4" CHARACTERS: "TMACS I/O TERMINATION"
   LINE 3 USING 1/4" CHARACTERS: DRAWING NO. PART/DASH NO.
   LINE 4 USING 1/4" CHARACTERS: "EDS-DP-206 CKT 22"
   ATTACH TO FRONT OF THE DOOR USING SILICONE ADHESIVE.
2. WIRING IS DIAGRAMMATICALLY SHOWN, ROUTE AND SUPPORT AS REQUIRED.
3. ALL ELECTRICAL PARTS SHALL BE LISTED BY UL, FM, OR ANOTHER NATIONALLY RECOGNIZED TESTING LABORATORY.
4. USE ITEM NO. 20 FOR JUMPER.
5. FOR ACROMAG PARTS SEE VENDOR INFORMATION (VI), NUMBER 22138.
6. CABLE SHIELDS ARE GROUNDED AT ONE END ONLY.
7. FIELD TO TEMPLATE MOUNTING HOLES FROM ITEMS TO BE MOUNTED AS REQ'D.
8. LABEL PER HS-BS-0015 TYPE 6 WITH INFORMATION AS SHOWN USING 5/32" HIGH CHARACTERS, ATTACH USING SILICONE ADHESIVE.
9. CABLE, THERMOCOUPLE EXTENSION, SINGLE PAIR, 20 AWG SOLID CONDUCTOR PER ANSI MC 96.1-1975, 300 VOLT, 90 DEGREE C, ANSI COLOR CODED PVC INSULATION AND JACKET.
10. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
11. DIMENSIONS ARE INCHES.
    TOLERANCES: .X = ±0.1
    .XXX = ±0.010
    DEGREES: ±1°



ENCLOSURE CUTOUT
S1 AND S2

(1) ASSEMBLY
HINGED COVER REMOVED

LABEL E

AW-102 RIS-206 SW POS	TC NO
	WST-TE-
1	236B
2	237B
3	238B
4	239B
5	240B
6	241B
7	242B
8	243B
9	244B
10	245B

1.5 MAX
LABEL E THRU K ONLY

LABEL F

AW-102 RIS-206 SW POS	TC NO
	WST-TE-
11	246B
12	247B
13	248B
14	249B
15	250B
16	251B
17	252B
18	253B
19	-
20	-

LABEL G: TC TYPE E

LABEL H: TC TYPE E

LABEL J

AW-102 RIS-258 SW POS	TC NO
	WST-TE-
1	254B
2	260B

LABEL K

AW-102 RIS-269 SW POS	TC NO
	WST-TE-
3	263B
4	270B
5	280B
	WSTA-TE-
6	274B
7	277B
8	290B
9	293B
10	-

LABEL A: UNIT A UNIT B

LABEL B: TMAC-F-203

LABEL C: TMAC-RTU-203A REMOTE TERMINAL UNIT A AV TANK FARM

LABEL D: TMAC-RTU-203B REMOTE TERMINAL UNIT B AV TANK FARM

(33) NAMEPLATE SCHED
SEE NOTE 1 AND 8

DWG NO	TITLE	REFERENCES
DRAWING TRACEABILITY LIST		H-2-81778 TMACS DRAWING INDEX
		H-2-81761 BLOCK DIAGRAM
		REF NUMBER TITLE
		NEXT USED ON H-2-820792

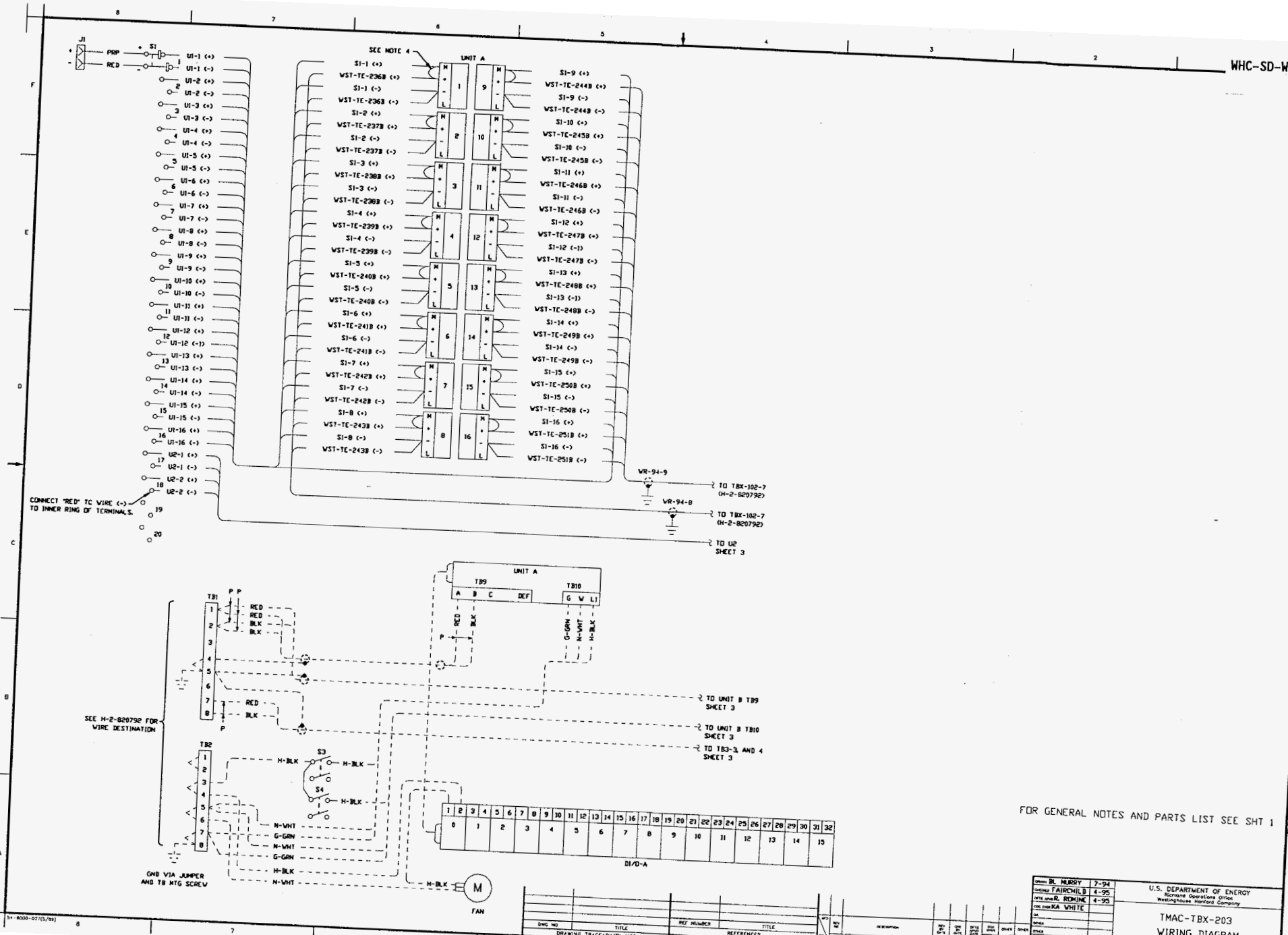
REVISIONS
CADFILE B820795A (CADCODE DOS-6 DACD2.12 DSS)

Drawn BL MURRY 7-94
Checked FAIRCHILD 4-95
Eng Appr R. ROHNE 4-95
Cog Engr KA WHITE

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

TMAC-TBX-203
TMACS ASSEMBLY

F 241-AV 5901 H-2-820795 0
SCALE 1/2 LAS 161968 SHEET 1 of 3



FOR GENERAL NOTES AND PARTS LIST SEE SHT 1

DRAWN BL MURRY	7-94	U.S. DEPARTMENT OF ENERGY
CHECKED FAIRCHILD	4-95	Richland Operations Office
DATE APPR R. ROMINE	4-95	Westinghouse Hanford Company
CAD/CAE KA WHITE		TMAC-TBX-203
		WIRING DIAGRAM

BLDG NO	DRAWING NO	REV NO	DWG NO
F 241-AV	5903	H-2-820795	0

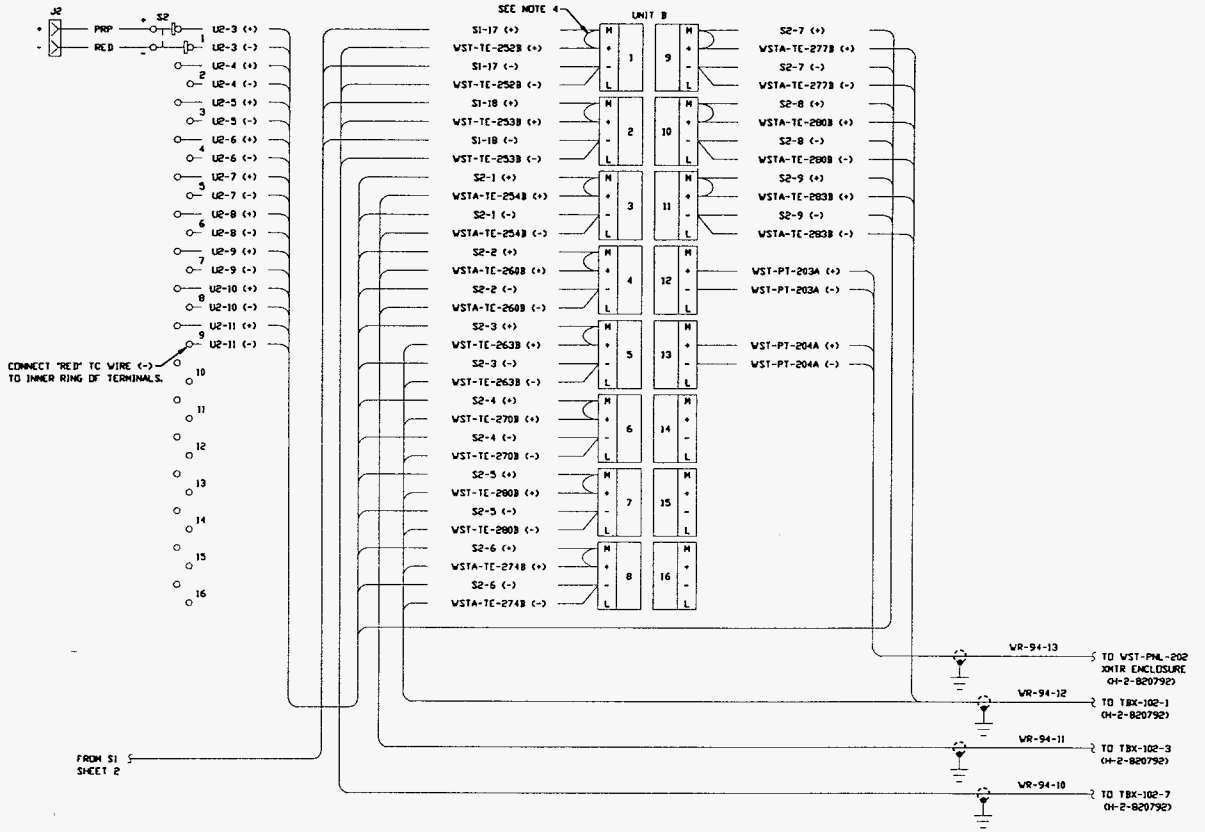
BOAC NONE EQUIP 161960 SHEET 2 OF

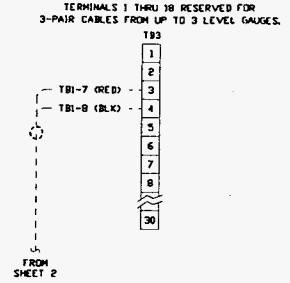
DRAWING TRACEABILITY LIST

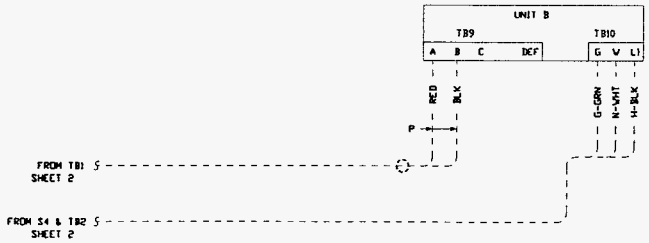
DWG NO	TITLE	REF NUMBER	TITLE	REFERENCES
		NEXT USED ON		

REVISIONS

CADFILE 8820795B CADCODE DOS&LMACRO12855







FOR GENERAL NOTES AND PARTS LIST SEE SHT 1

DRAWN BL MURRY	7-94	U.S. DEPARTMENT OF ENERGY Richland Operations Office Westinghouse Hanford Company	
DESIGN FAIRCHILD	4-95		
DATA ANAL R. ROMINE	4-95	TMAC-TBX-203 WIRING DIAGRAM	
QUALITY ASSUR KA WHITE			
CADFILE B820795C	CADCODE DOS 6.0 AC D12 DSS	F 241-AV / 5903 / H-2-820795 / 0	
		SCALE NONE / CRT 161960 / SHEET 3	

DWG NO	TITLE	REF NUMBER	TITLE	REV NO	DESCRIPTION	REV BY DATE	CW BY DATE	DESIGN DATE	QUAL ENGR	OTHER	OTHER
DRAWING TRACEABILITY LIST		REFERENCES			REVISIONS						
		NEXT USED ON									

54-6010-027(5/89)

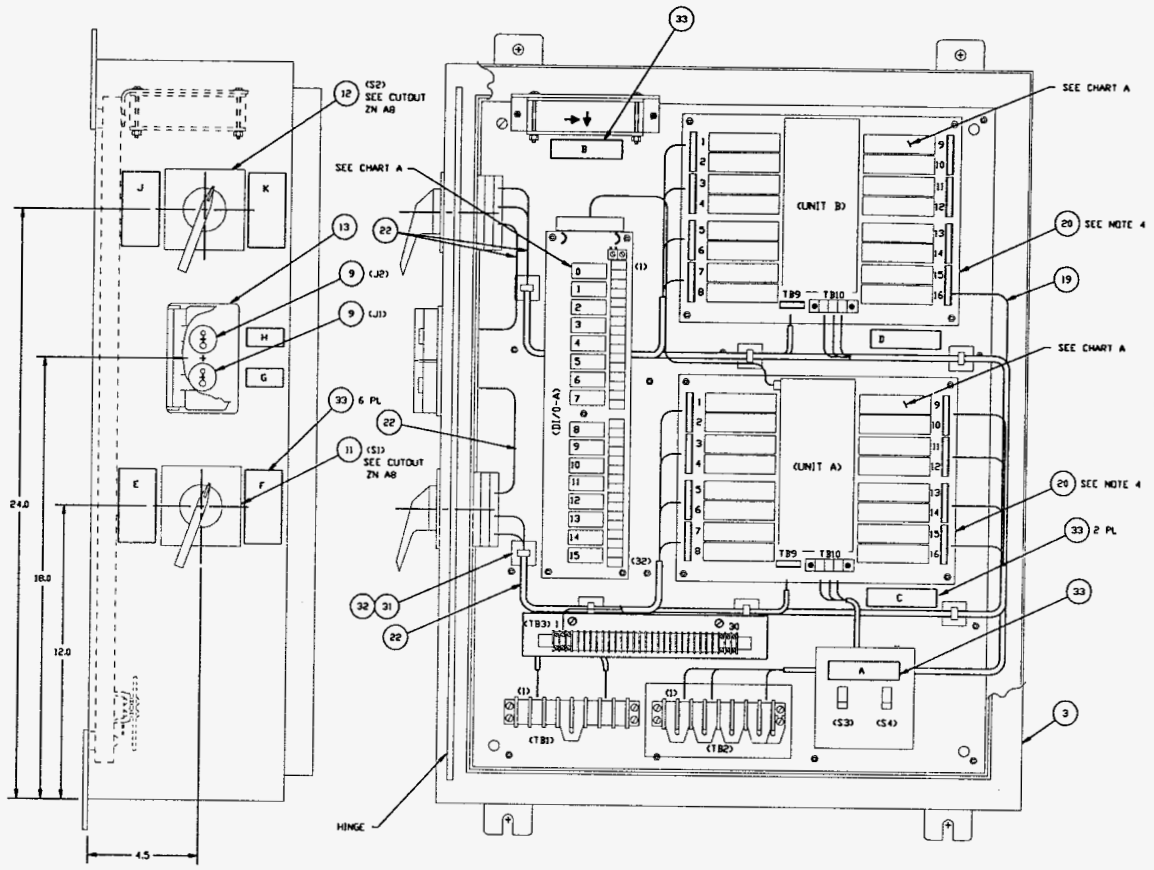


CHART A

MODULE LOCATOR

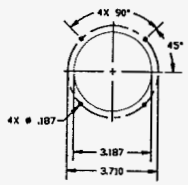
SLOT NO.	UNIT A I/N	UNIT B I/N	B1/D-A I/N
0	N/A	N/A	26
1	6	6	-
2	6	6	-
3	6	6	-
4	6	6	-
5	6	6	-
6	6	6	-
7	6	6	-
8	6	6	-
9	6	6	-
10	6	6	-
11	6	6	-
12	6	7	-
13	6	7	-
14	6	-	-
15	6	-	-
16	6	-	N/A

PARTS/MATERIAL LIST

QTY REQD -001	QTY REQD -010	REF. DES.	PART/DASH NO.	NOMENCLATURE/DESCRIPTION	MATERIAL/REF.	ITEM NO.
	X		-010	ASSEMBLY		1
	1		H-2-820820-020	ASSEMBLY, (2 ACROMAG)		2
	27		4M00-210	MODULE, TC INPUT	ACROMAG	6
	2		4M00-240	MODULE, DC CURRENT INPUT	ACROMAG	7
	2	J1, J2	RSJ-E-R	JACK, PANEL, TC TYPE E	OMEGA	9
	1	S1	DSW3-20-PG	SWITCH, SELECTOR, 20 POS.	OMEGA	11
	1	S2	DSW3-16-PG	SWITCH, SELECTOR, 16 POS.	OMEGA	12
	1		WLRD-1	DUPLEX COVER, W/SPRING DOOR	CROUSE-HINDS	13
	AR		(80760)	CABLE, 18 AWG, 1 TWISTED SHLD PAIR, STRANDED (RED AND BLK)	(BELDEN) COPPER	19
	AR			WIRE, 20 AWG, SOLID, BARE	COPPER	20
9	AR		(5710/2001)	WIRE, TC TYPE EX	(ALPHA)	22
	1		DAC5	AC OUTPUT MODULE	(POTTER & BRUNFIELD (OPTO 22)(ACROMAG)	26
	AR		(ABM2S-A-C)	CABLE TIE MOUNT	(PANDUIT)	31
	AR		(PLT1.5I-C)	TIE, CABLE	(PANDUIT)	32
	11			NAMEPLATE, PLASTIC	HS-BS-0015	33

GENERAL NOTES (UNLESS OTHERWISE NOTED)

1. LABEL ITEM NO. 1 PER HS-BS-0015 TYPE 6, USING (1)/N 33). TEXT SHALL CONSIST OF THE FOLLOWING:
   LINE 1 USING 1/2" CHARACTERS: FIRST LINE OF DWG TITLE
   LINE 2 USING 1/4" CHARACTERS: "TMACS I/O TERMINATION"
   LINE 3 USING 1/4" CHARACTERS: DRAWING NO. PART/DASH NO.
   LINE 4 USING 1/4" CHARACTERS: "EDS-DP-206 CKT 22"
   ATTACH TO FRONT OF THE DOOR USING SILICONE ADHESIVE.
2. WIRING IS DIAGRAMMATICALLY SHOWN, ROUTE AND SUPPORT AS REQUIRED.
3. ALL ELECTRICAL PARTS SHALL BE LISTED BY UL, FM OR ANOTHER NATIONALLY RECOGNIZED TESTING LABORATORY.
4. USE ITEM NO. 20 FOR JUMPER.
5. FOR ACROMAG PARTS SEE VENDOR INFORMATION (VI), NUMBER 22138.
6. CABLE SHIELDS ARE GROUNDED AT ONE END ONLY.
7. FIELD TO TEMPLATE MOUNTING HOLES FROM ITEMS TO BE MOUNTED AS REQ'D.
8. LABEL PER HS-BS-0015 TYPE 6 WITH INFORMATION AS SHOWN USING 5/32" HIGH CHARACTERS, ATTACH USING SILICONE ADHESIVE.
9. CABLE, THERMOCOUPLE EXTENSION, SINGLE PAIR, 20 AWG SOLID CONDUCTOR PER ANSI MC 96.1-1975, 300 VOLT, 90 DEGREE C, ANSI COLOR CODED PVC INSULATION AND JACKET.
10. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
11. DIMENSIONS ARE INCHES.
    TOLERANCES: .X ± 0.1
    .XXX ± 0.010
    DEGREES: ±1°



ENCLOSURE CUTOUT
S1 AND S2

(1) ASSEMBLY
HINGED COVER REMOVED

LABEL E

AV-103 RIS-206 SV	TC
POS	NO
	VST-TE-
1	236C
2	237C
3	238C
4	239C
5	240C
6	241C
7	242C
8	243C
9	244C
10	245C

1.5 MAX
LABEL E THRU K ONLY

LABEL F

AV-103 RIS-206 SV	TC
POS	NO
	VST-TE-
11	246C
12	247C
13	248C
14	249C
15	250C
16	251C
17	252C
18	253C
19	-
20	-

LABEL G: TC TYPE E

LABEL H: TC TYPE C

LABEL J

AV-103 RIS-258 SV	TC
POS	NO
	VST-TE-
1	254C
2	260C

LABEL K

AV-103 RIS-269 SV	TC
POS	NO
	VST-TE-
3	263C
4	270C
5	280C
	VSTA-TE-
6	274C
7	277C
8	286C
9	283C
10	-

LABEL A: UNIT A UNIT B

LABEL B: TMAC-F-204

LABEL C: TMAC-RTU-204A REMOTE TERMINAL UNIT A AV TANK FARM

LABEL D: TMAC-RTU-204B REMOTE TERMINAL UNIT B AV TANK FARM

(33) NAMEPLATE SCHED
SEE NOTE 1 AND 8

DRAWING TRACEABILITY LIST		REFERENCES	
DWG NO	TITLE	REF NUMBER	TITLE
		H-2-81778	TMACS DRAWING INDEX
		H-2-81761	BLOCK DIAGRAM
		NEXT USED ON	H-2-820792

REVISIONS

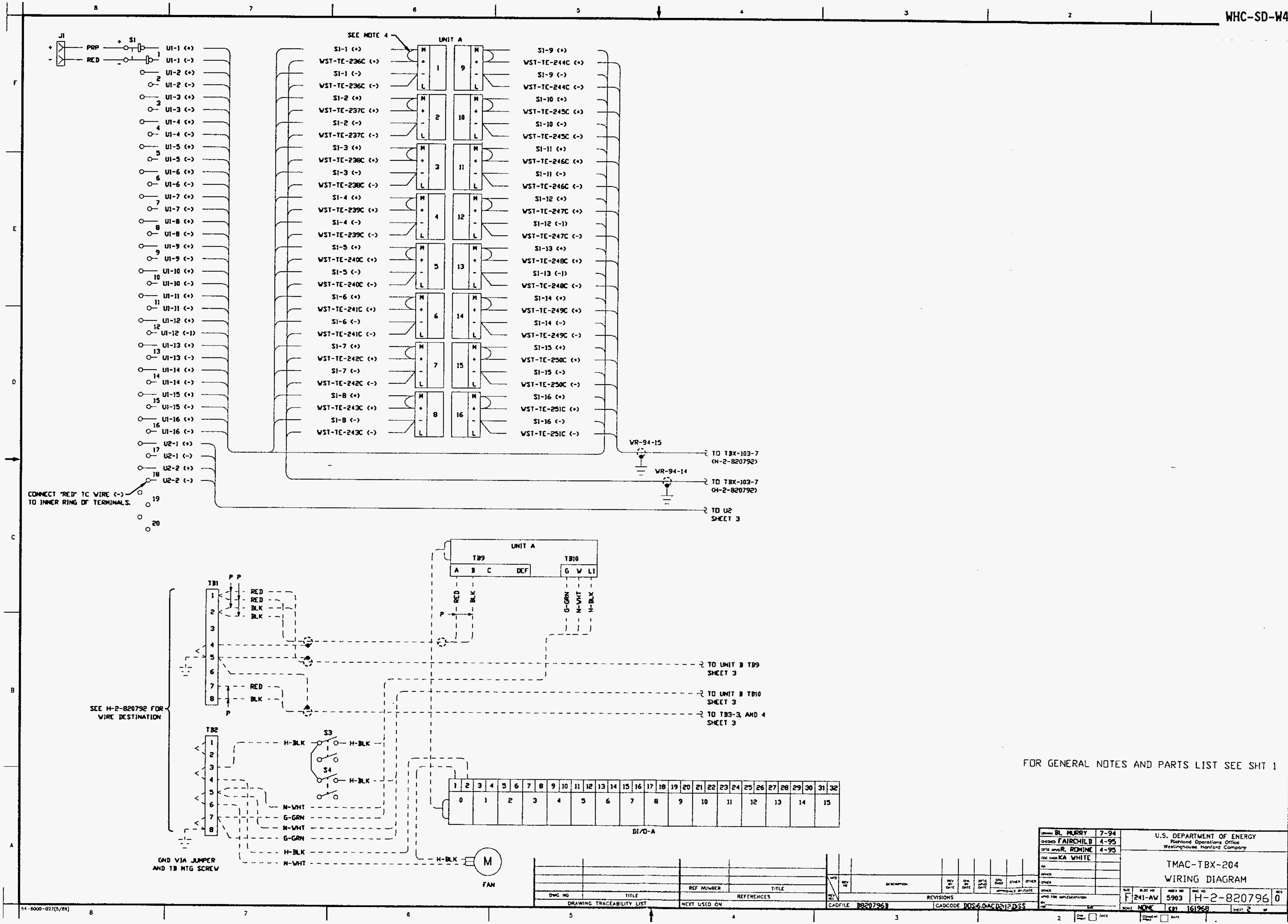
CADFILE B820796A CADCODE DOS6.0ACD512.0SS

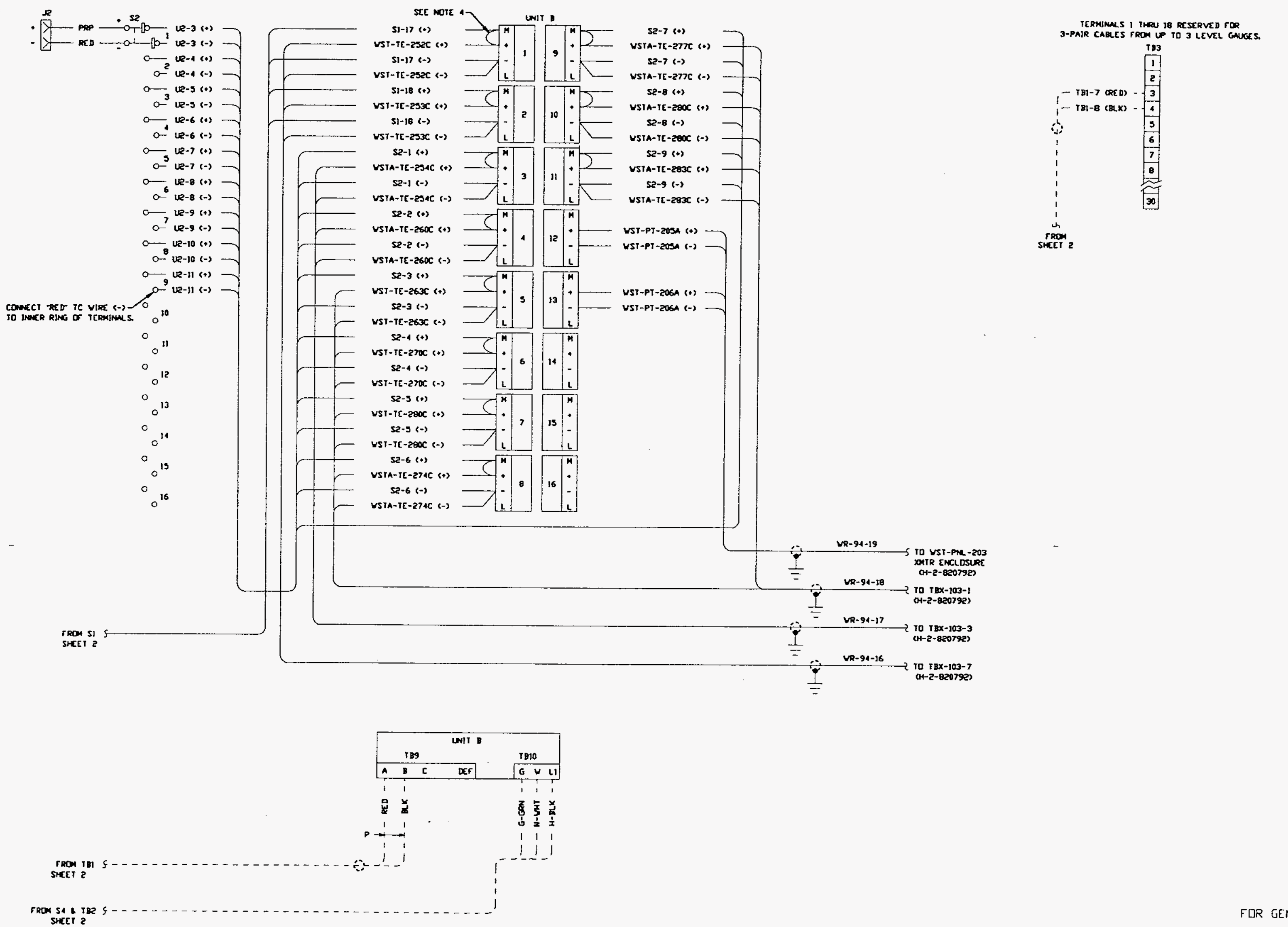
DRAWN	BL MURRY	7-94
DESIGNED	FAIRCHILD	4-95
STR ANLR	R. ROMINE	4-95
CHK ENGR	KA WHITE	
QA		
OTHER		
OTHER		
APVD FOR IMPLEMENTATION		

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

TMAC-TBX-204
TMACS ASSEMBLY

SIZE F | FSCM NO 241-AV | DWG NO 5901 | H-2-820796 | REV 0
SCALE 1/2 | EDT 161968 | SHEET 1 of 3


UNIT A
SEE NOTE 4
J1
S1
PRP
RED
VR-94-15
TO TBX-103-7 (H-2-820792)
VR-94-14
TO TBX-103-7 (H-2-820792)
TO U2 SHEET 3
CONNECT "RED" TO WIRE (-) TO INNER RING OF TERMINALS.
TB9
TB10
TB1
TB2
TO UNIT B TB9 SHEET 3
TO UNIT B TB10 SHEET 3
TO TB3-3, AND 4 SHEET 3
SEE H-2-820792 FOR WIRE DESTINATION
GND VIA JUMPER AND TB MTG SCREW
S3
S4
H-BLK
N-WHT
G-GRN
DI/O-A
FAN
FOR GENERAL NOTES AND PARTS LIST SEE SHT 1
DRAWING TRACEABILITY LIST
REFERENCES
REVISIONS
BL MURRY 7-94
FAIRCHILD 4-95
R. ROMINE 4-95
KA WHITE
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company
TMAC-TBX-204
WIRING DIAGRAM
F 241-AW 5903 H-2-820796 0
SHEET 2

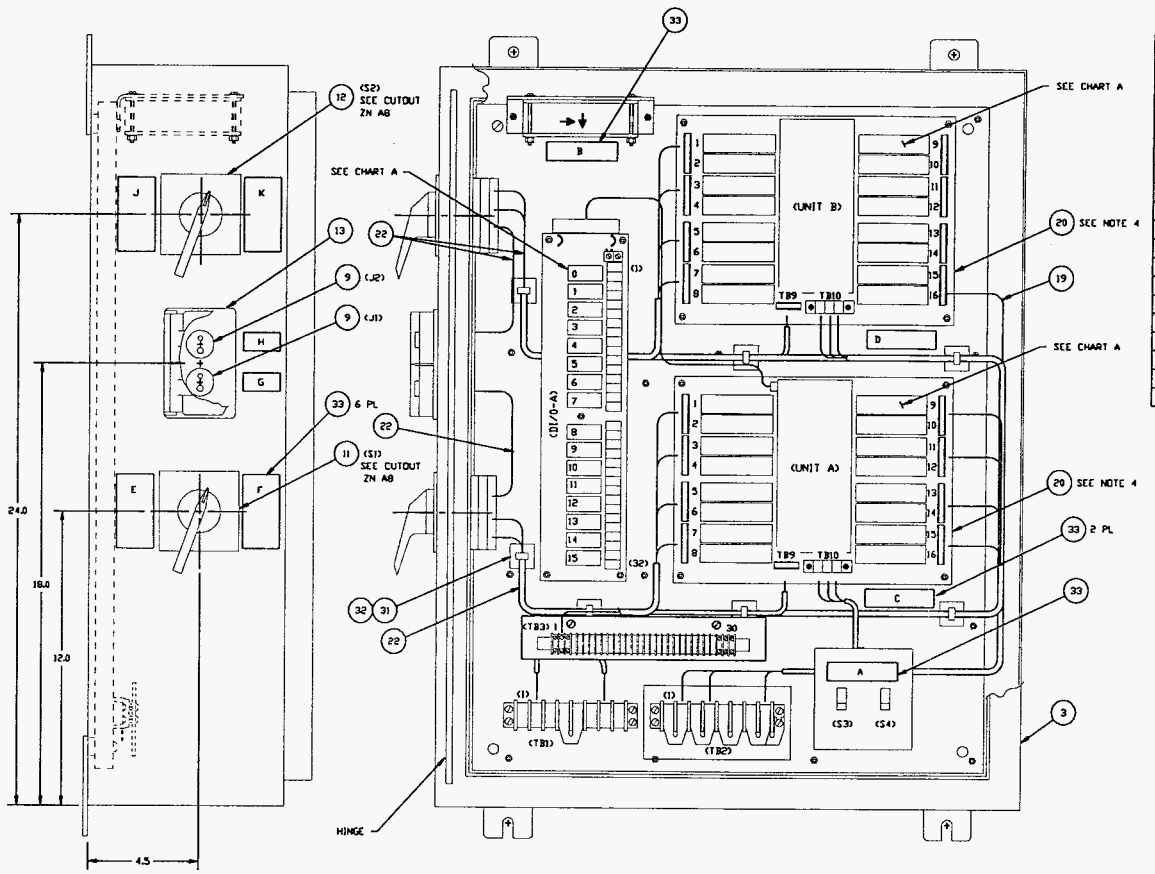


FOR GENERAL NOTES AND PARTS LIST SEE SHT 1

DRAWN BL MURRY	7-94	U.S. DEPARTMENT OF ENERGY Richland Operations Office Westinghouse Hanford Company
CHECKED FAIRCHILD	4-95	
DFTG APVD R. ROMINE	4-95	TMAC-TBX-204
DOC CHCK KA WHITE		WIRING DIAGRAM
SIZE F	BLDG NO 241-AV	INDEX NO 5903 / DWG NO H-2-820796 / REV 0
SCALE NONE	EXT 161968	SHEET 3

DWG NO | TITLE — DRAWING TRACEABILITY LIST
REF NUMBER | TITLE — REFERENCES — NEXT USED ON
REVISIONS
CADFILE B820796C
CADCODE DOS6.0ACAD12DSS

54-6000-027(5/89)



1 ASSEMBLY
HINGED COVER REMOVED

CHART A

MODULE LOCATOR

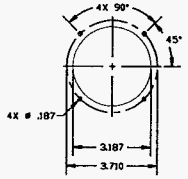
SLOT NO.	UNIT A I/N	UNIT B I/N	DI/O-A I/N
0	N/A	N/A	26
1	6	6	-
2	6	6	-
3	6	6	-
4	6	6	-
5	6	6	-
6	6	6	-
7	6	6	-
8	6	6	-
9	6	6	-
10	6	6	-
11	6	6	-
12	6	7	-
13	6	7	-
14	6	-	-
15	6	-	-
16	6	-	N/A

PARTS/MATERIAL LIST

QTY REQD UNIT	QTY REQD ASSY	REF. DES.	PART/DASH NO.	NOMENCLATURE/DESCRIPTION	MATERIAL/REF.	SHT	ITEM NO.
	X		-010	ASSEMBLY			1
	1		H-2-820820-020	ASSEMBLY, (2 ACROMAG)			2
							3
							4
							5
	27		4M00-210	MODULE, TC INPUT	ACROMAG		6
	2		4M00-240	MODULE, DC CURRENT INPUT	ACROMAG		7
							8
	2	J1, J2	RSJ-E-R	JACK, PANEL TC TYPE E	OMEGA		9
							10
	1	S1	DSW3-20-PG	SWITCH, SELECTOR, 20 POS.	OMEGA		11
	1	S2	DSV3-16-PG	SWITCH, SELECTOR, 16 POS.	OMEGA		12
	1		WLRD-1	DUPLEX COVER, W/SPRING DOOR	CROUSE-HINDS		13
							14
							15
							16
							17
							18
	AR		(88760)	CABLE, 18 AWG, 1 TWISTED SHLD PAIR, STRANDED (RED AND BLK)	(BELDEN) COPPER		19
	AR			WIRE, 20 AWG, SOLID, BARE	COPPER		20
							21
9	AR		(5710/2001)	WIRE, TC TYPE EX	(ALPHA)		22
							23
							24
							25
	1		DAC5	AC OUTPUT MODULE	(OPTO 22)(ACROMAG)		26
							27
							28
							29
							30
	AR		(ABM2S-A-C)	CABLE TIE MOUNT	(PANDUIT)		31
	AR		(PLT1.5I-C)	TIE, CABLE	(PANDUIT)		32
	11			NAMEPLATE, PLASTIC	HS-BS-0015		33
							34
							35

GENERAL NOTES (UNLESS OTHERWISE NOTED)

1. LABEL ITEM NO. 1 PER HS-BS-0015 TYPE 6, USING (1/N 33). TEXT SHALL CONSIST OF THE FOLLOWING:
   LINE 1 USING 1/2" CHARACTERS: FIRST LINE OF DWG TITLE
   LINE 2 USING 1/4" CHARACTERS: "TMACS I/O TERMINATION"
   LINE 3 USING 1/4" CHARACTERS: DRAWING NO. PART/DASH NO.
   LINE 4 USING 1/4" CHARACTERS: "EDS-DP-206 CKT 22"
   ATTACH TO FRONT OF THE DOOR USING SILICONE ADHESIVE.
2. WIRING IS DIAGRAMMATICALLY SHOWN, ROUTE AND SUPPORT AS REQUIRED.
3. ALL ELECTRICAL PARTS SHALL BE LISTED BY UL, FM OR ANOTHER NATIONALLY RECOGNIZED TESTING LABORATORY.
4. USE ITEM NO. 20 FOR JUMPER.
5. FOR ACROMAG PARTS SEE VENDOR INFORMATION (VI), NUMBER 22138.
6. CABLE SHIELDS ARE GROUNDED AT ONE END ONLY.
7. FIELD TO TEMPLATE MOUNTING HOLES FROM ITEMS TO BE MOUNTED AS REQ'D.
8. LABEL PER HS-BS-0015 TYPE 6 WITH INFORMATION AS SHOWN USING 5/32" HIGH CHARACTERS. ATTACH USING SILICONE ADHESIVE.
9. CABLE, THERMOCOUPLE EXTENSION, SINGLE PAIR, 20 AWG SOLID CONDUCTOR PER ANSI MC 96.1-1975, 300 VOLT, 90 DEGREE C, ANSI COLOR CODED PVC INSULATION AND JACKET.
10. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
11. DIMENSIONS ARE INCHES.
    TOLERANCES: .X = ±0.1
    .XXX = ±0.010
    DEGREES: ±1°



ENCLOSURE CUTOUT
S1 AND S2

LABEL E

AV-104 RIS-206 SV POS	TC NO
	-VST-TE-
1	236D
2	237D
3	238D
4	239D
5	240D
6	241D
7	242D
8	243D
9	244D
10	245D

LABEL F

AV-104 RIS-206 SV POS	TC NO
	-VST-TE-
11	246D
12	247D
13	248D
14	249D
15	250D
16	251D
17	252D
18	253D
19	-
20	-

1.5 MAX
LABEL E THRU K ONLY

LABEL G: TC TYPE E

LABEL H: TC TYPE E

LABEL J

AV-104 RIS-258 SV POS	TC NO
	-VST-TE-
1	254D
2	260D

LABEL K

AV-104 RIS-269 SV POS	TC NO
	-VST-TE-
3	263D
4	270D
5	280D
	-VSTA-TE-
6	274D
7	277D
8	280D
9	283D
10	-

LABEL A: UNIT A UNIT B

LABEL B: TMAC-F-205

LABEL C: TMAC-RTU-205A REMOTE TERMINAL UNIT A AV TANK FARM

LABEL D: TMAC-RTU-205B REMOTE TERMINAL UNIT B AV TANK FARM

33 NAMEPLATE SCHED
SEE NOTE 1 AND 8

H-2-81778	TMACS DRAWING INDEX	
H-2-81761	BLOCK DIAGRAM	
REF NUMBER	TITLE	
DWG NO	REFERENCES	
DRAWING TRACEABILITY LIST	NEXT USED ON: H-2-820792	

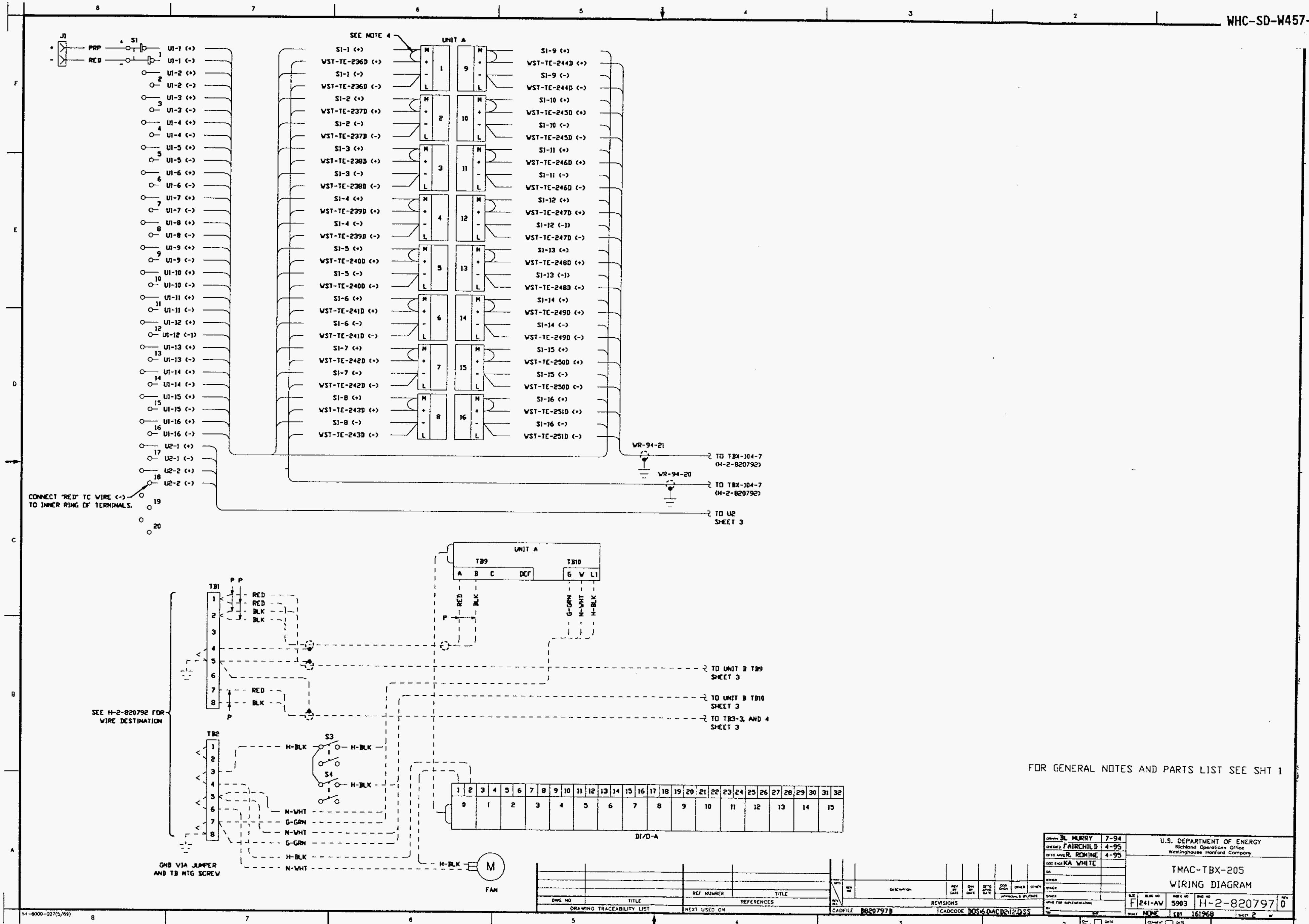
REVISIONS
CADFILE B820797A | CADCODE BDS6-DACD2-12-DSS

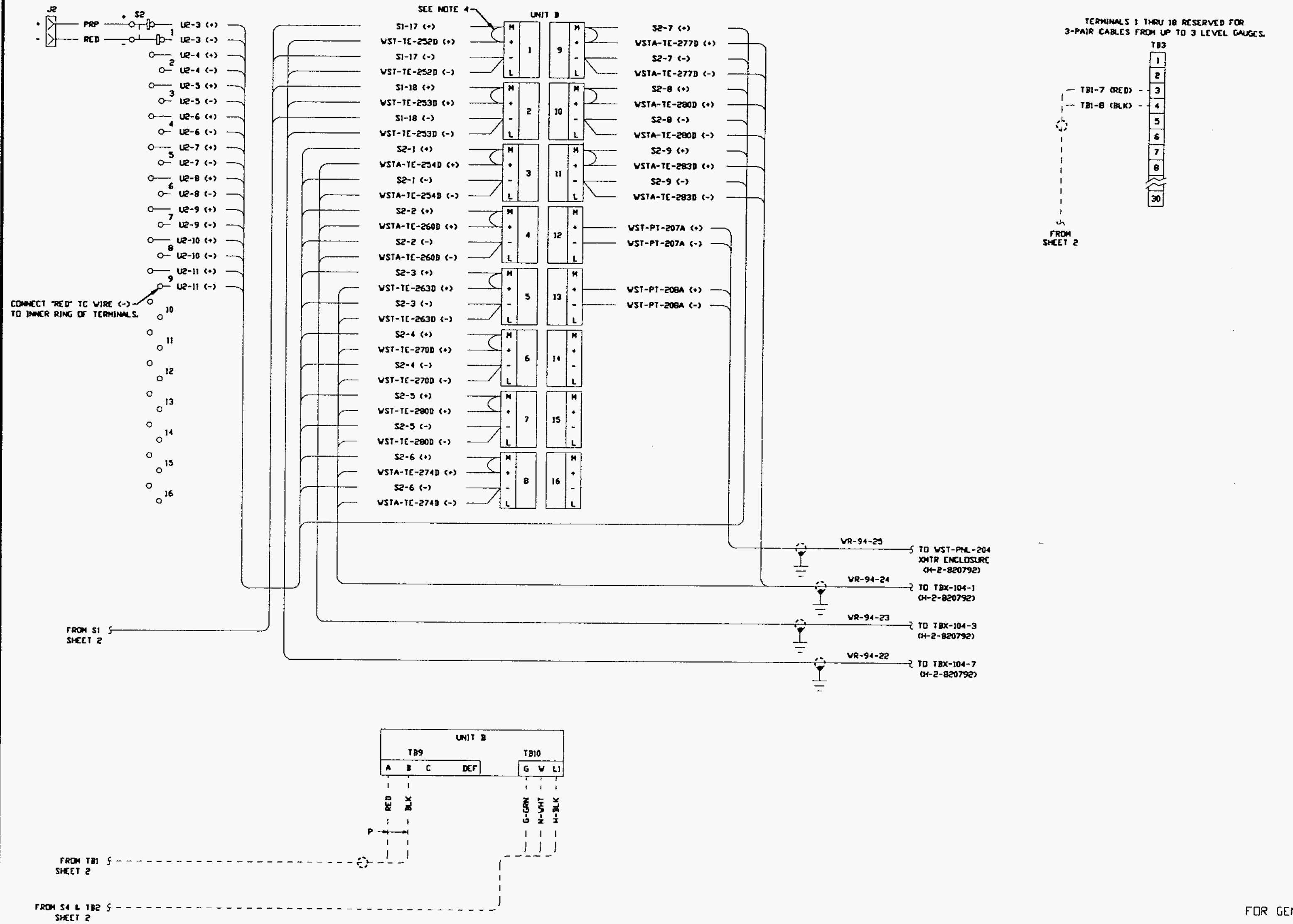
Drawn	BL MURRY	7-94
Checked	FAIRCHILD	4-95
Date Man.	R. ROMINE	4-95
QAC Chkr	KA WHITE	
Sa		
Other		
Other		
Other		
Other		
Approved for Implementation		
By		
Date		

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

TMAC-TBX-205
TMACS ASSEMBLY

SIZE F | 241-AV | 5901 | H-2-820797 | REV 0
SCALE 1/2 | EDT 161968 | SHEET 1 OF 3


J1
PRP
RED
S1
U1-1 (+)
U1-1 (-)
U1-2 (+)
U1-2 (-)
U1-3 (+)
U1-3 (-)
U1-4 (+)
U1-4 (-)
U1-5 (+)
U1-5 (-)
U1-6 (+)
U1-6 (-)
U1-7 (+)
U1-7 (-)
U1-8 (+)
U1-8 (-)
U1-9 (+)
U1-9 (-)
U1-10 (+)
U1-10 (-)
U1-11 (+)
U1-11 (-)
U1-12 (+)
U1-12 (-)
U1-13 (+)
U1-13 (-)
U1-14 (+)
U1-14 (-)
U1-15 (+)
U1-15 (-)
U1-16 (+)
U1-16 (-)
U2-1 (+)
U2-1 (-)
U2-2 (+)
U2-2 (-)
CONNECT "RED" TC WIRE (-) TO INNER RING OF TERMINALS.
SEE NOTE 4
UNIT A
S1-1 (+)
WST-TE-236D (+)
S1-1 (-)
WST-TE-236D (-)
S1-2 (+)
WST-TE-237D (+)
S1-2 (-)
WST-TE-237D (-)
S1-3 (+)
WST-TE-238D (+)
S1-3 (-)
WST-TE-238D (-)
S1-4 (+)
WST-TE-239D (+)
S1-4 (-)
WST-TE-239D (-)
S1-5 (+)
WST-TE-240D (+)
S1-5 (-)
WST-TE-240D (-)
S1-6 (+)
WST-TE-241D (+)
S1-6 (-)
WST-TE-241D (-)
S1-7 (+)
WST-TE-242D (+)
S1-7 (-)
WST-TE-242D (-)
S1-8 (+)
WST-TE-243D (+)
S1-8 (-)
WST-TE-243D (-)
S1-9 (+)
WST-TE-244D (+)
S1-9 (-)
WST-TE-244D (-)
S1-10 (+)
WST-TE-245D (+)
S1-10 (-)
WST-TE-245D (-)
S1-11 (+)
WST-TE-246D (+)
S1-11 (-)
WST-TE-246D (-)
S1-12 (+)
WST-TE-247D (+)
S1-12 (-)
WST-TE-247D (-)
S1-13 (+)
WST-TE-248D (+)
S1-13 (-)
WST-TE-248D (-)
S1-14 (+)
WST-TE-249D (+)
S1-14 (-)
WST-TE-249D (-)
S1-15 (+)
WST-TE-250D (+)
S1-15 (-)
WST-TE-250D (-)
S1-16 (+)
WST-TE-251D (+)
S1-16 (-)
WST-TE-251D (-)
WR-94-21
TO TBX-104-7 (H-2-820792)
WR-94-20
TO TBX-104-7 (H-2-820792)
TO U2 SHEET 3
UNIT A
TB9
TB10
DEF
RED
BLK
G-GRN
N-WHT
H-BLK
TB1
TB2
SEE H-2-820792 FOR WIRE DESTINATION
TO UNIT B TB9 SHEET 3
TO UNIT B TB10 SHEET 3
TO TB3-3, AND 4 SHEET 3
S3
S4
GND VIA JUMPER AND TB MTG SCREW
DI/O-A
FAN
FOR GENERAL NOTES AND PARTS LIST SEE SHT 1
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company
TMAC-TBX-205
WIRING DIAGRAM
BL MURRY 7-94
FAIRCHILD 4-95
R. ROMINE 4-95
KA WHITE
F 241-AV 5903 H-2-820797 0
NONE
161968
SHEET 2
DRAWING TRACEABILITY LIST
REFERENCES
REVISIONS
B820797B
DOS6AACD212DSS
54-6000-027(5/89)



FOR GENERAL NOTES AND PARTS LIST SEE SHT 1

DRAWN BL MURRY	7-94
CHECKED FAIRCHILD	4-95
OPTG APVD R. ROMINE	4-95
COG ENGR KA WHITE	

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

TMAC-TBX-205
WIRING DIAGRAM

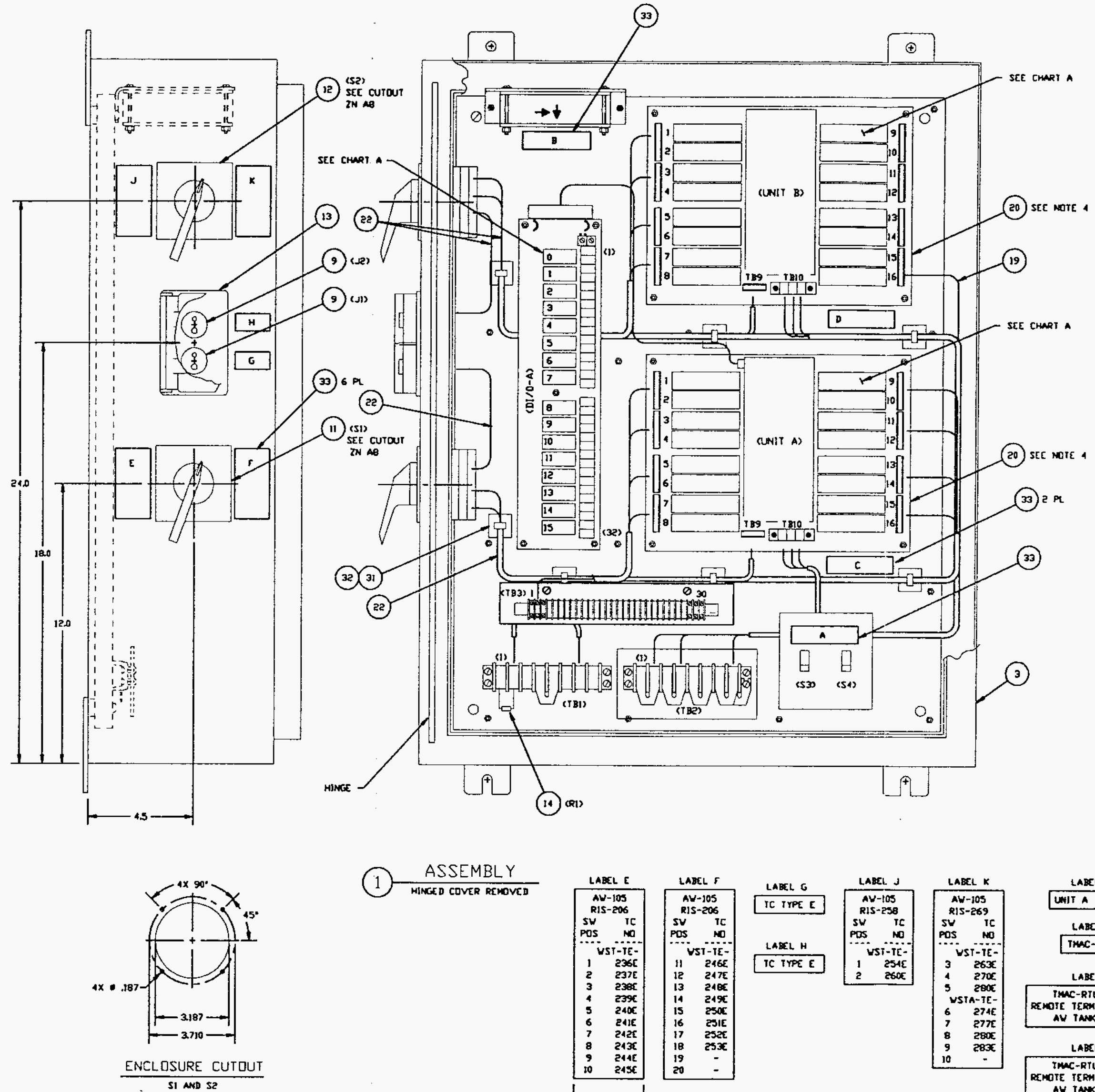
F 241-AV 5903 H-2-820797 0

SCALE NONE   161968   SHEET 3

CADFILE B820797C   CADCODE DOS6.0ACD212DSS

DWG NO / TITLE — DRAWING TRACEABILITY LIST; REF NUMBER / TITLE — REFERENCES; NEXT USED ON; REVISIONS

54-6000-027(5/89)



LABEL E		LABEL F	
AW-105 RIS-206		AW-105 RIS-206	
SW POS	TC NO	SW POS	TC NO
WST-TE-		WST-TE-	
1	236E	11	246E
2	237E	12	247E
3	238E	13	248E
4	239E	14	249E
5	240E	15	250E
6	241E	16	251E
7	242E	17	252E
8	243E	18	253E
9	244E	19	-
10	245E	20	-

1.5 MAX
LABEL E THRU K ONLY

LABEL G: TC TYPE E

LABEL H: TC TYPE E

LABEL J	
AW-105 RIS-258	
SW POS	TC NO
WST-TE-	
1	254E
2	260E

LABEL K	
AW-105 RIS-269	
SW POS	TC NO
WST-TE-	
3	263E
4	270E
5	280E
WSTA-TE-	
6	274E
7	277E
8	280E
9	283E
10	-

LABEL A: UNIT A UNIT B

LABEL B: TMAC-F-206

LABEL C: TMAC-RTU-206A REMOTE TERMINAL UNIT A AW TANK FARM

LABEL D: TMAC-RTU-206B REMOTE TERMINAL UNIT B AW TANK FARM

(33) NAMEPLATE SCHED
SEE NOTE 1 AND 8

CHART A

MODULE LOCATOR			
SLOT NO.	UNIT A I/N	UNIT B I/N	DI/O-A I/N
0	N/A	N/A	26
1	6	6	-
2	6	6	-
3	6	6	-
4	6	6	-
5	6	6	-
6	6	6	-
7	6	6	-
8	6	6	-
9	6	6	-
10	6	6	-
11	6	6	-
12	6	7	-
13	6	7	-
14	6	-	-
15	6	-	-
16	6	-	N/A

PARTS/MATERIAL LIST

QTY REQD -020	-010	REF. DES.	PART/DASH NO.	NOMENCLATURE/DESCRIPTION	MA	
	X		-010	ASSEMBLY		1
						2
	1		H-2-820820-020	ASSEMBLY, (2 ACROMAG)		3
						4
						5
	27		4M00-210	MODULE, TC INPUT	ACROMAG	6
	2		4M00-240	MODULE, DC CURRENT INPUT	ACROMAG	7
						8
	2	J1, J2	RSJ-E-R	JACK, PANEL, TC TYPE E	OMEGA	9
						10
	1	S1	OSW3-20-PG	SWITCH, SELECTOR, 20 POS.	OMEGA	11
	1	S2	OSW3-16-PG	SWITCH, SELECTOR, 16 POS.	OMEGA	12
	1		WLRD-1	DUPLEX COVER, W/SPRING DOOR	CROUSE-HINDS	13
	1	R1	RC20GF121J	RESISTOR, 120 OHM, 1/2W, 5%	MIL-R-11	14
						15
						16
						17
						18
	AR		(88760)	CABLE, 18 AWG, 1 TWISTED SHLD PAIR, STRANDED (RED AND BLK)	(BELDEN) COPPER	19
	AR			WIRE, 20 AWG, SOLID, BARE	COPPER	20
						21
9	AR		(5710/2001)	WIRE, TC TYPE EX	(ALPHA)	22
						23
						24
						25
	1		OAC5	AC OUTPUT MODULE	(POTTER & BRUMFIELD) (OPTO 22)(ACROMAG)	26
						27
						28
						29
						30
	AR		(AIMZS-A-C)	CABLE TIE MOUNT	(PANDUIT)	31
	AR		(PLT1.5I-C)	TIE, CABLE	(PANDUIT)	32
	11			NAMEPLATE, PLASTIC	HS-BS-0015	33
						34
						35

GENERAL NOTES (UNLESS OTHERWISE NOTED)

1. LABEL ITEM NO. 1 PER HS-BS-0015 TYPE 6, USING (I/N 33). TEXT SHALL CONSIST OF THE FOLLOWING:
   LINE 1 USING 1/2" CHARACTERS: FIRST LINE OF DWG TITLE
   LINE 2 USING 1/4" CHARACTERS: "TMACS I/O TERMINATION"
   LINE 3 USING 1/4" CHARACTERS: DRAWING NO. PART/DASH NO.
   LINE 4 USING 1/4" CHARACTERS: "EDS-DP-206 CKT 22"
   ATTACH TO FRONT OF THE DOOR USING SILICONE ADHESIVE.
2. WIRING IS DIAGRAMMATICALLY SHOWN, ROUTE AND SUPPORT AS REQUIRED.
3. ALL ELECTRICAL PARTS SHALL BE LISTED BY UL, FM, OR ANOTHER NATIONALLY RECOGNIZED TESTING LABORATORY.
4. USE ITEM NO. 20 FOR JUMPER.
5. FOR ACROMAG PARTS SEE VENDOR INFORMATION (VI), NUMBER 22138.
6. CABLE SHIELDS ARE GROUNDED AT ONE END ONLY.
7. FIELD TO TEMPLATE MOUNTING HOLES FROM ITEMS TO BE MOUNTED AS REQ'D.
8. LABEL PER HS-BS-0015 TYPE 6 WITH INFORMATION AS SHOWN USING 5/32" HIGH CHARACTERS. ATTACH USING SILICONE ADHESIVE.
9. CABLE, THERMOCOUPLE EXTENSION, SINGLE PAIR, 20 AWG SOLID CONDUCTOR PER ANSI MC 96.1-1975, 300 VOLT, 90 DEGREE C, ANSI COLOR CODED PVC INSULATION AND JACKET.
10. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
11. DIMENSIONS ARE INCHES.
    TOLERANCES: .X = ±0.1
    .XXX = ±0.010
    DEGREES: ±1°

DWG NO	TITLE
H-2-81778	TMACS DRAWING INDEX
H-2-81761	BLOCK DIAGRAM
REF NUMBER	TITLE

REFERENCES — NEXT USED ON H-2-820792

DRAWING TRACEABILITY LIST

REVISIONS

CADFILE B820798A — CADCODE DOS6.0ACD2\32DSS

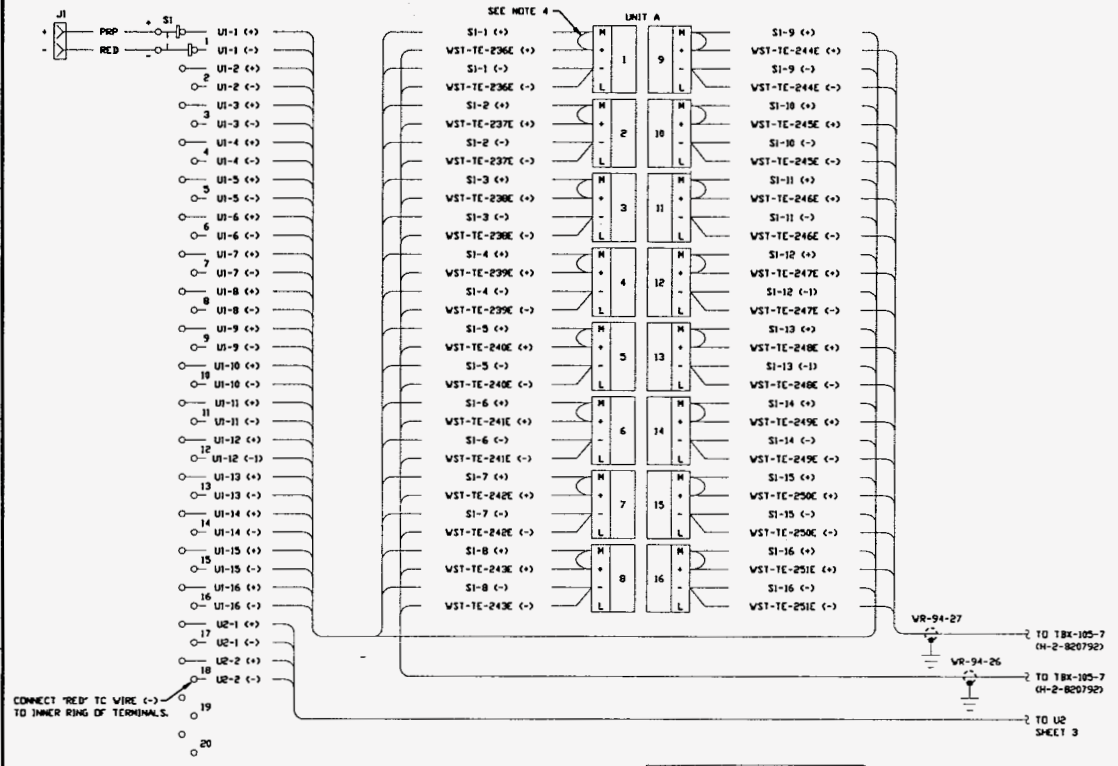
DRAWN BL MURRY 7-94
CHECKED FAIRCHILD 4-95
ENG APPR R. ROMINE 4-95
QA KA WHITE

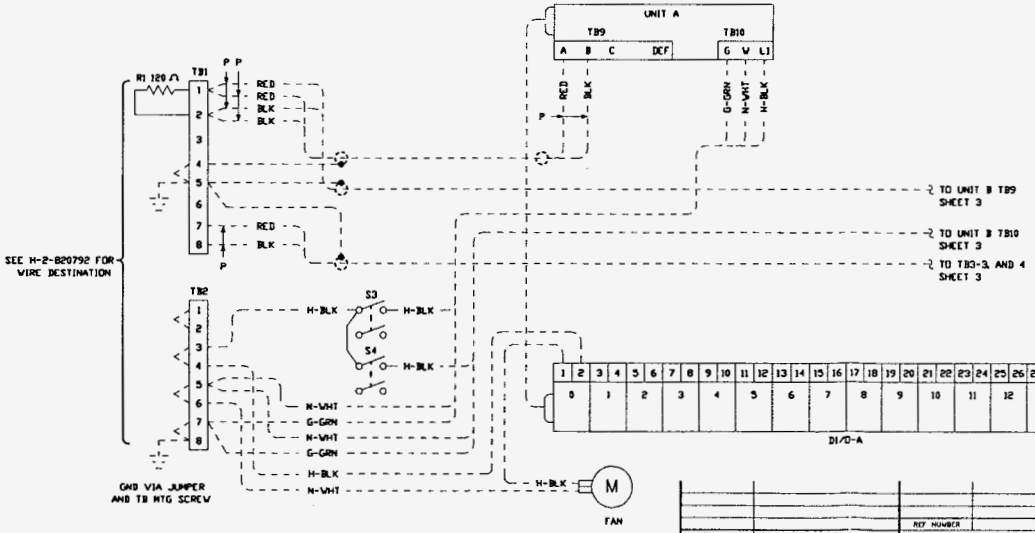
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

TMAC-TBX-206
TMACS ASSEMBLY

SIZE F | BLDG NO 241-AW | INDEX NO 5901 | DWG NO H-2-820798 | REV 0
SCALE 1/2 | CPI 161968 | SHEET 1 OF 3

54-6000-027(5/89)





FOR GENERAL NOTES AND PARTS LIST SEE SHT 1

DRAWING TRACEABILITY LIST			
DWG NO	TITLE	REF NUMBER	TITLE
		NEXT USED ON	

REVISIONS									
REV NO	DESCRIPTION	REV DATE	ECN NO	DATE ENTERED	CODE	OTHER	OTHER

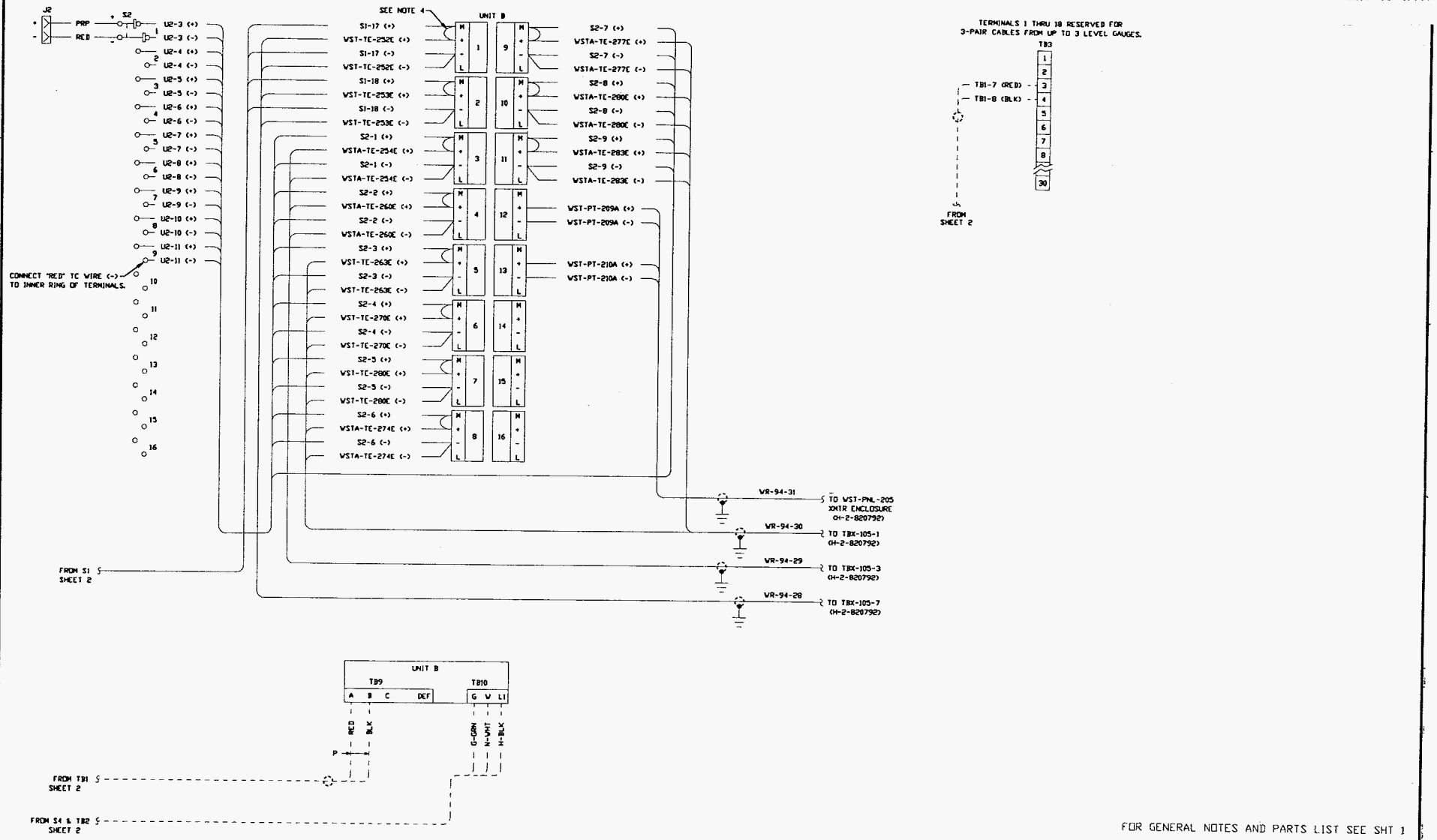
CADFILE B820798B CADCODE DDS-6.0ACDR12.0SS

DRAWN BL MURRY	7-94	U.S. DEPARTMENT OF ENERGY Richland Operations Office Westinghouse Hanford Company
DESIGN FAIRCHILD	4-95	
QUALITY R. ROMINE	4-95	TMAC-TBX-206 WIRING DIAGRAM
ENGINEER KA WHITE		

SCALE	DWG NO	REV
NONE	H-2-820798	0

SYSTEM	UNIT	LOT	SHEET
241-AW	5903	161968	2 of

51-6000-027(5/89)



FOR GENERAL NOTES AND PARTS LIST SEE SHT 1

DRAWN BL MURRY	7-94	U.S. DEPARTMENT OF ENERGY Richland Operations Office Westinghouse Hanford Company
DESIGN FAIRCHILD	4-95	
CHK BY R. ROMINE	4-95	TMAC-TBX-206 WIRING DIAGRAM
CDC from KA WHITE		
QA		
OTHER		
OTHER		
APPR FOR IMPLEMENTATION		
APPR		

SIZE F | BLK NO 241-AV | DWG NO 5903 | H-2-820798 | REV 0
SCALE NONE | EDT 161968 | SHEET 3 of

DRAWING TRACEABILITY LIST

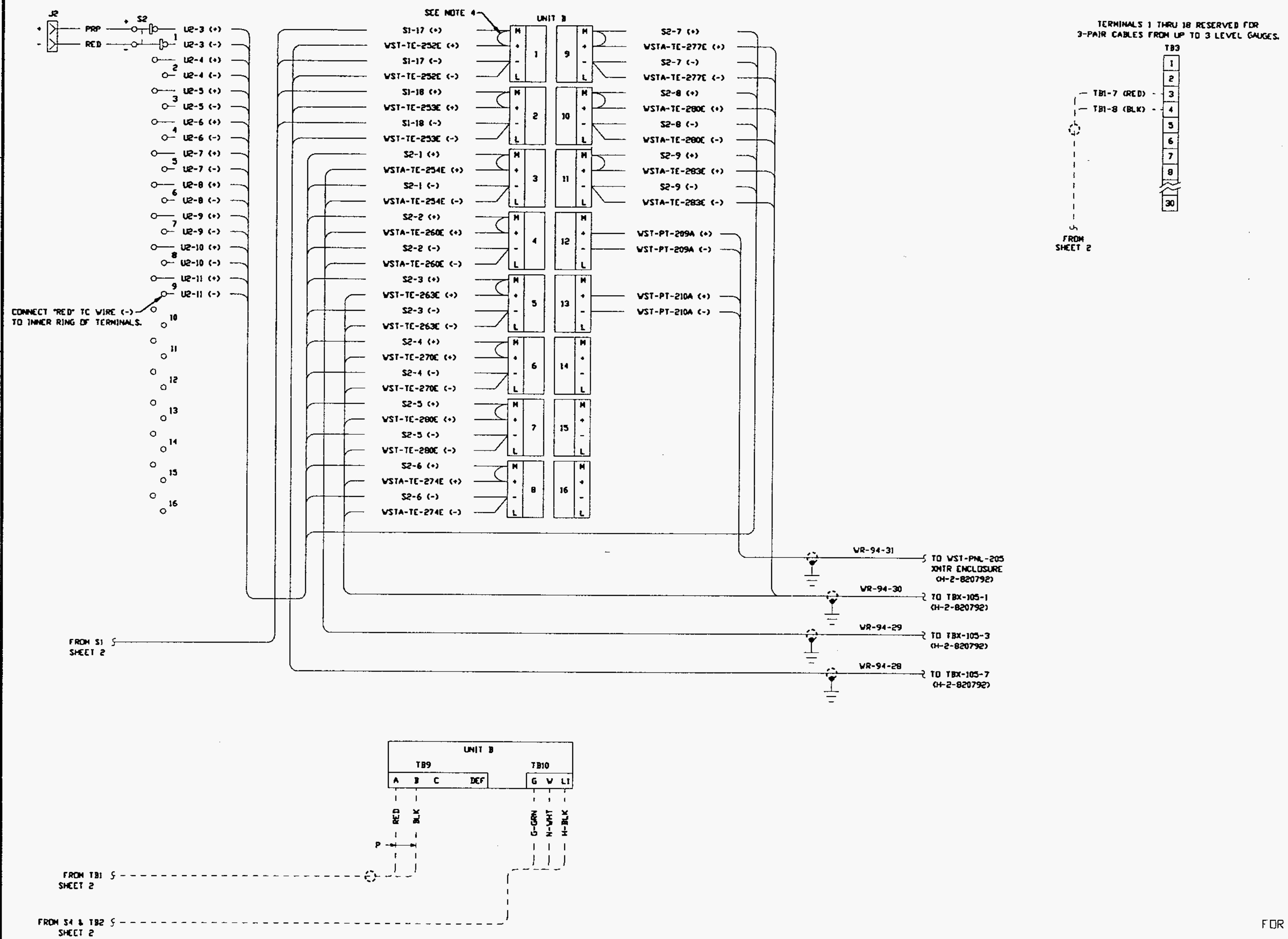
DWG NO	TITLE	REF NUMBER	TITLE
		NEXT USED ON	

REFERENCES

REVISIONS

REV	DESCRIPTION	REV DATE	CHK DATE	APP DATE	DWG RELEASE	OTHER	OTHER

CADFILE B820798C | CADCODE DOS6.0ACD2I2DSS



FOR GENERAL NOTES AND PARTS LIST SEE SHT 1

DRAWN BL MURRY	7-94	U.S. DEPARTMENT OF ENERGY Richland Operations Office Westinghouse Hanford Company
CHECKED FAIRCHILD	4-95	
DSGN R. ROMINE	4-95	TMAC-TBX-206 WIRING DIAGRAM
COG ENGR KA WHITE		

F | 241-AV | 5903 | H-2-820798 | 0
SCALE NONE | 161968 | SHEET 3

DRAWING TRACEABILITY LIST | NEXT USED ON | REFERENCES | REVISIONS
CADFILE B820798C | CADCODE DOS6.0ACD12.DSS

54-6000-027(5/89)

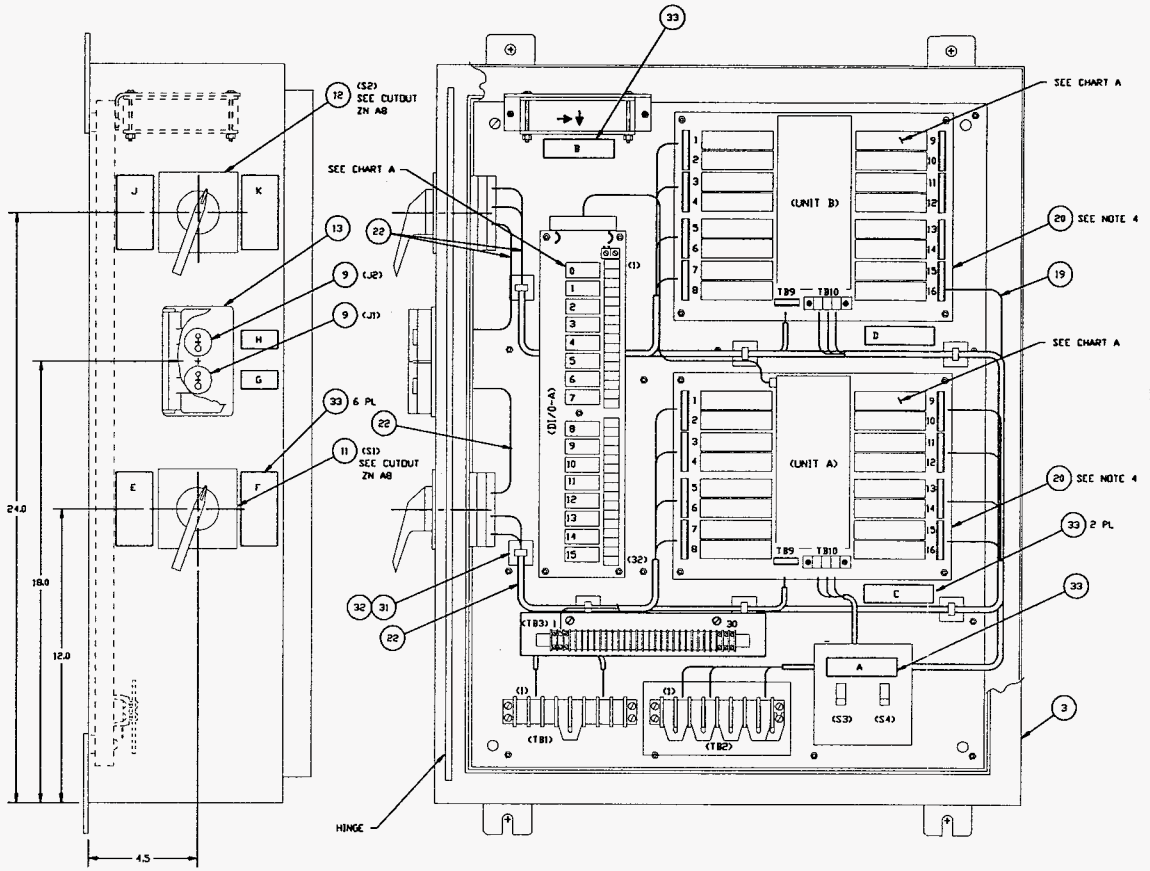


CHART A

MODULE LOCATOR

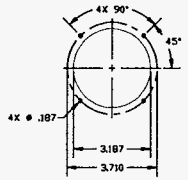
SLOT NO.	UNIT A I/N	UNIT B I/N	DI/O-A I/N
0	N/A	N/A	26
1	6	6	-
2	6	6	-
3	6	6	-
4	6	6	-
5	6	6	-
6	6	6	-
7	6	6	-
8	6	6	-
9	6	6	-
10	6	6	-
11	6	6	-
12	6	7	-
13	6	7	-
14	6	-	-
15	6	-	-
16	6	-	N/A

PARTS/MATERIAL LIST

QTY REQD -020	QTY REQD -010	REF. DES	PART/DASH NO.	NOMENCLATURE/DESCRIPTION	MATERIAL/REF.	SHT	ITEM NO.
	X		-010	ASSEMBLY			1
							2
	1		H-2-820820-020	ASSEMBLY, (2 ACROMAG)			3
							4
							5
	27		4M00-210	MODULE, TC INPUT	ACROMAG		6
	2		4M00-240	MODULE, DC CURRENT INPUT	ACROMAG		7
							8
	2	J1, J2	RSJ-E-R	JACK, PANEL, TC TYPE E	OMEGA		9
							10
	1	S1	DSW3-20-PG	SWITCH, SELECTOR, 20 POS.	OMEGA		11
	1	S2	DSW3-16-PG	SWITCH, SELECTOR, 16 POS.	OMEGA		12
	1		WLRD-1	DUPLEX COVER, W/SPRING DOOR	CROUSE-HINDS		13
							14
							15
							16
							17
							18
	AR		(88760)	CABLE, 18 AVG, 1 TWISTED SHLD PAIR, STRANDED (RED AND BLK)	(BELDEN) COPPER		19
	AR			WIRE, 20 AVG, SOLID, BARE	COPPER		20
							21
9	AR		(5710/2001)	WIRE, TC TYPE EX	(ALPHA)		22
							23
							24
							25
	1		OAC5	AC OUTPUT MODULE	(POTTER & BRUMFIELD (OPTO 22)(ACROMAG)		26
							27
							28
							29
							30
	AR		(ABM2S-A-C)	CABLE TIE MOUNT	(PANDUIT)		31
	AR		(PLT1.5I-C)	TIE, CABLE	(PANDUIT)		32
	11			NAMEPLATE, PLASTIC	MS-BS-0015		33
							34
							35

GENERAL NOTES (UNLESS OTHERWISE NOTED)

1. LABEL ITEM NO. 1 PER MS-BS-0015 TYPE 6, USING (1/W 33). TEXT SHALL CONSIST OF THE FOLLOWING
   LINE 1 USING 1/2" CHARACTERS: FIRST LINE OF DWG TITLE
   LINE 2 USING 1/4" CHARACTERS: "TMACS I/O TERMINATION"
   LINE 3 USING 1/4" CHARACTERS: DRAWING NO. PART/DASH NO.
   LINE 4 USING 1/4" CHARACTERS: "EDS-DP-206 CKT 22"
   ATTACH TO FRONT OF THE DOOR USING SILICONE ADHESIVE.
2. WIRING IS DIAGRAMMATICALLY SHOWN, ROUTE AND SUPPORT AS REQUIRED.
3. ALL ELECTRICAL PARTS SHALL BE LISTED BY UL, FM, OR ANOTHER NATIONALLY RECOGNIZED TESTING LABORATORY.
4. USE ITEM NO. 20 FOR JUMPER.
5. FOR ACROMAG PARTS SEE VENDOR INFORMATION (VI), NUMBER 22138.
6. CABLE SHIELDS ARE GROUNDED AT ONE END ONLY.
7. FIELD TO TEMPLATE MOUNTING HOLES FROM ITEMS TO BE MOUNTED AS REQ'D.
8. LABEL PER MS-BS-0015 TYPE 6 WITH INFORMATION AS SHOWN USING 5/32" HIGH CHARACTERS, ATTACH USING SILICONE ADHESIVE.
9. CABLE, THERMOCOUPLE EXTENSION, SINGLE PAIR, 20 AWG SOLID CONDUCTOR PER ANSI MC 96.1-1975, 300 VOLT, 90 DEGREE C, ANSI COLOR CODED PVC INSULATION AND JACKET.
10. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
11. DIMENSIONS ARE INCHES.
    TOLERANCES: .X = ±0.1
    .XXX = ±0.010
    DEGREES: ±1°



ENCLOSURE CUTOUT
S1 AND S2

1 ASSEMBLY
HINGED COVER REMOVED

LABEL E

AV-106 RIS-206 SW POS	TC NO
	VST-TE-
1	236F
2	237F
3	238F
4	239F
5	240F
6	241F
7	242F
8	243F
9	244F
10	245F

1.5 MAX
LABEL E THRU K ONLY

LABEL F

AV-106 RIS-206 SW POS	TC NO
	VST-TE-
11	246F
12	247F
13	248F
14	249F
15	250F
16	251F
17	252F
18	253F
19	-
20	-

LABEL G
TC TYPE E

LABEL H
TC TYPE E

LABEL J

AV-106 RIS-258 SW POS	TC NO
	VST-TE-
1	254F
2	260F

LABEL K

AV-106 RIS-269 SW POS	TC NO
	VST-TE-
3	263F
4	270F
5	280F
	WSTA-TE-
6	274F
7	277F
8	290F
9	283F
10	-

LABEL A
UNIT A UNIT B

LABEL B
TMAC-F-207

LABEL C
TMAC-RTU-207A
REMOTE TERMINAL UNIT A
AV TANK FARM

LABEL D
TMAC-RTU-207B
REMOTE TERMINAL UNIT B
AV TANK FARM

33 NAMEPLATE SCHED
SEE NOTE 1 AND 8

DRAWN	BL MURRY	7-94
CHECKED	FAIRCHILD	4-95
APPD. and/or STD.	R. ROMINE	4-95
ISSUED BY	KA WHITE	

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

TMAC-TBX-207
TMACS ASSEMBLY

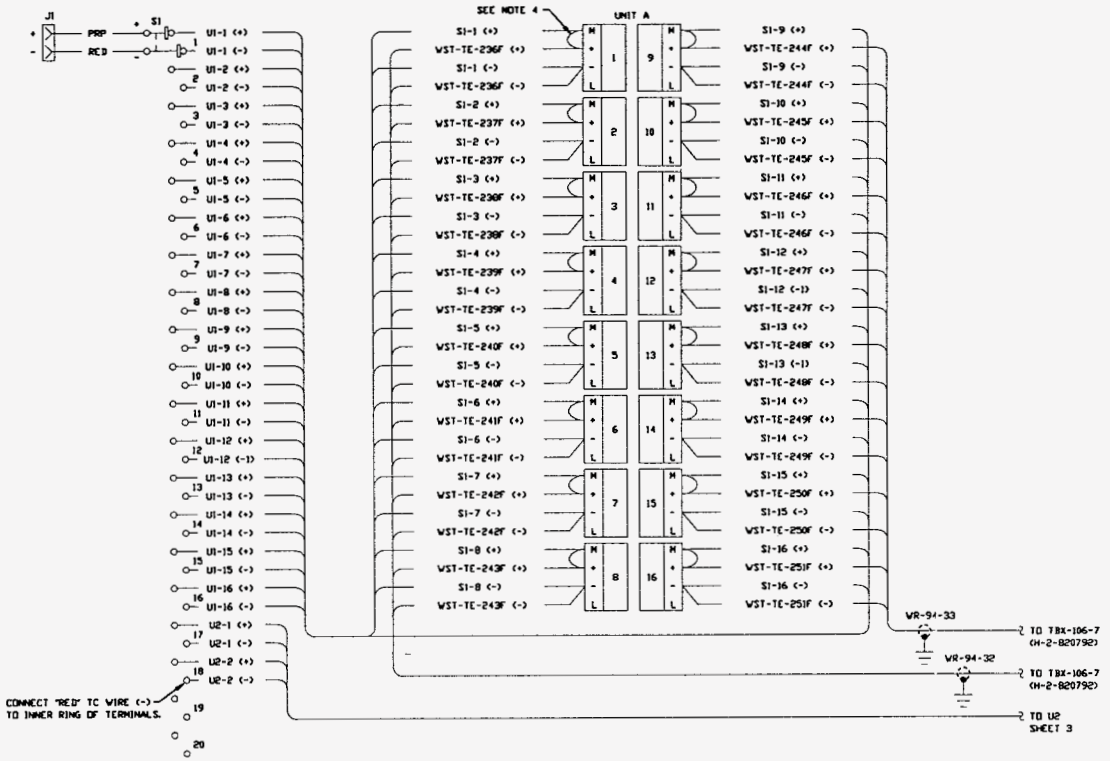
SIZE F | FSCM NO 241-AV | DWG NO 5901 H-2-820799 | REV 0
SCALE 1/2 | CAT 161960 | SHEET 1 OF 3

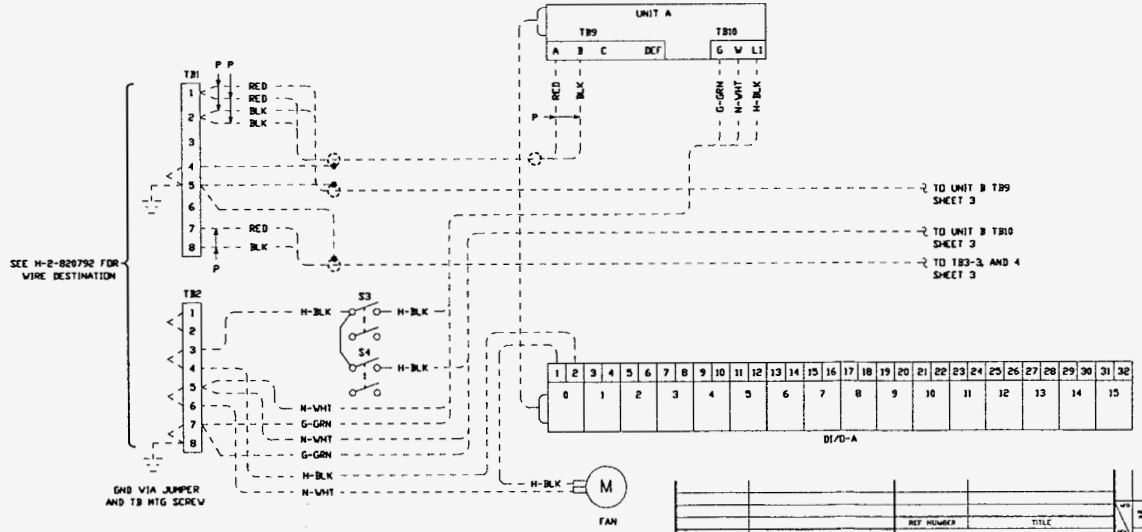
DWG NO	TITLE	REFERENCES
H-2-81778	TMACS DRAWING INDEX	
H-2-81761	BLOCK DIAGRAM	

DRAWING TRACEABILITY LIST
NEXT USED ON H-2-820792
CADFILE B820799A
CADCODE DDS-6-DACD2-12-DSS

REVISIONS

54-8000-027(5/89)





FOR GENERAL NOTES AND PARTS LIST SEE SHT 1

DRAWN BL MURRY	7-94	U.S. DEPARTMENT OF ENERGY Richland Operations Office Westinghouse Hanford Company
DESIGN FAIRCHILD	4-95	
ENG APPR R. ROMINE	4-95	TMAC-TBX-207 WIRING DIAGRAM
QA CHK KA WHITE		
CM		
OTHER		
OTHER		
APPR FOR IMPLEMENTATION		

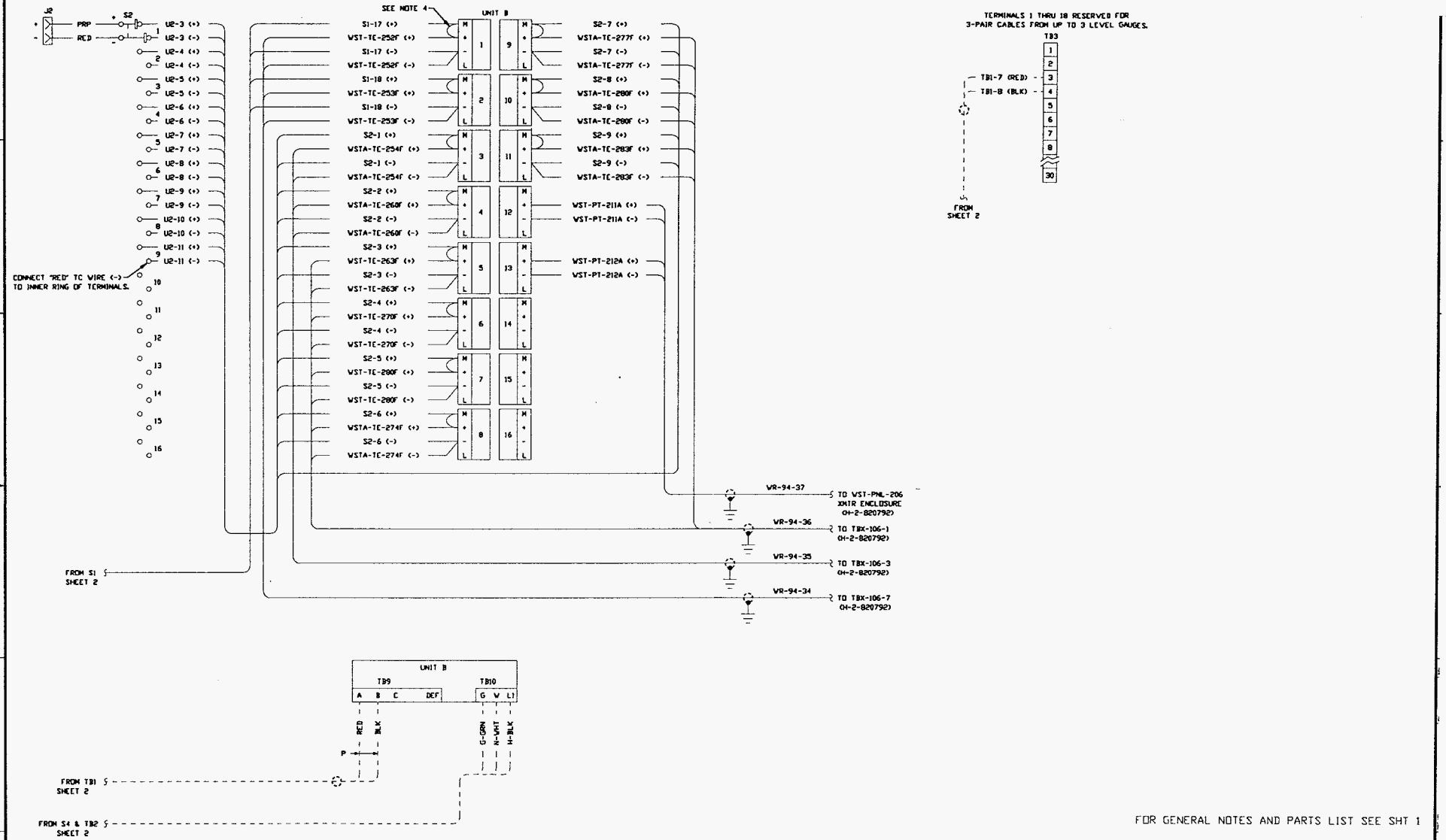
SIZE	BLDG NO	WBS NO	DWG NO	REV
F	241-AV	5903	H-2-820799	0

SCALE NONE | EAI 161960 | SHEET 2 OF

DRAWING TRACEABILITY LIST: DWG NO | TITLE | REF NUMBER | TITLE | NEXT USED ON | REFERENCES

REVISIONS: NO | DESCRIPTION | ECN NO | DATE | BY | CHK | ENG | QA | OTHER | OTHER

CADFILE H820799B | CADCODE DOS6.0ACDR12.0SS



FOR GENERAL NOTES AND PARTS LIST SEE SHT 1

DRAWN BL MURRY	7-94	U.S. DEPARTMENT OF ENERGY Richland Operations Office Westinghouse Hanford Company
DESIGN FAIRCHILD	4-95	
DFTR APPR R. ROHME	4-95	TMAC-TBX-207 WIRING DIAGRAM
CC ENGR KA WHITE		

SIZE	BLDG NO	DRWG NO	REV
F	241-AV	5903 H-2-820799	0

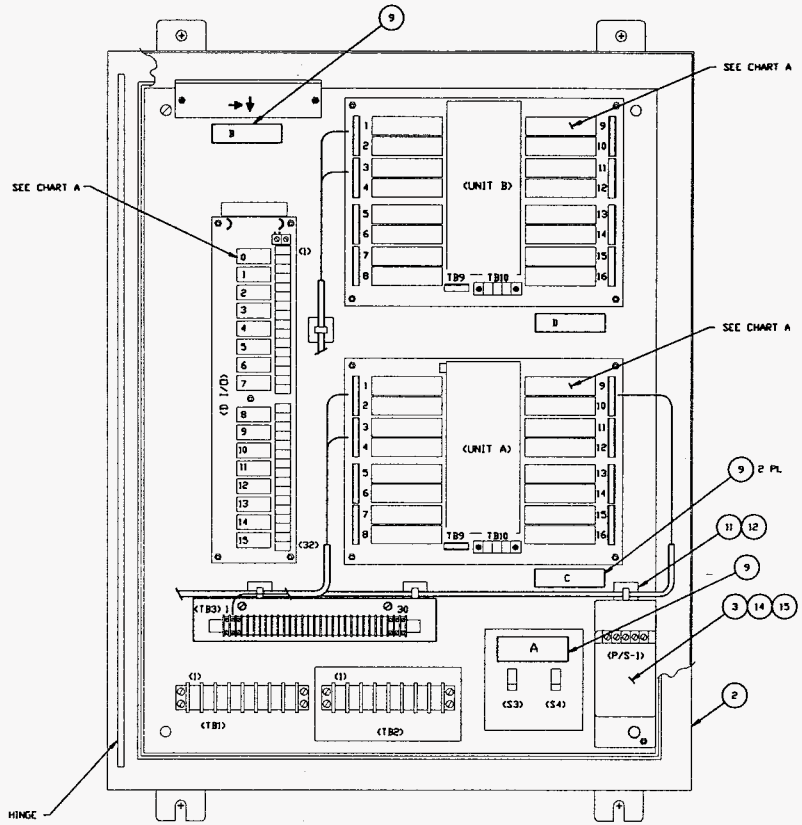
SCALE NONE | CAT 161968 | SHEET 3

CADFILE B820799C | CADCODE DOS6-DACD12/DSS

DWG NO | TITLE | REF NUMBER | TITLE | REFERENCES | NEXT USED ON

DRAWING TRACEABILITY LIST

REVISIONS



1 ASSEMBLY
HINGED COVER REMOVED

CHART A

MODULE LOCATOR

SLOT NO.	UNIT A I/N	UNIT B I/N	DI/DA I/N
0	N/A	N/A	8
1	6	6	5
2	6	6	3
3	6	6	-
4	6	6	-
5	6	6	-
6	6	6	-
7	6	-	-
8	6	-	-
9	6	7	-
10	6	7	-
11	6	7	-
12	6	-	-
13	6	-	-
14	6	-	-
15	6	-	-
16	6	-	N/A

PARTS/MATERIAL LIST

QTY REQD -020	QTY REQD -010	REF. DES.	PART/DASH NO.	NOMENCLATURE/DESCRIPTION	MATERIAL/REF.	SAFI	ITEM NO.
	X		-010	ASSEMBLY			1
	1		H-2-820820-020	ASSEMBLY, (2 ACROMAG)			2
	1	P/S-1	H-2-81764-030	ASSEMBLY, P/S			3
							4
	2		IDC5	MODULE, 10-32V DC INPUT	POTTER & BRUMFIELD		5
	22		4MOD-210	MODULE, TC INPUT	ACROMAG		6
	3		4MOD-240	MODULE, DC CURRENT INPUT	ACROMAG		7
	1		DAC5	MODULE, AC OUTPUT	POTTER & BRUMFIELD		8
	5			NAMEPLATE, PLASTIC	HS-BS-0015		9
							10
	AR		(ABM2S-A-C)	CABLE TIE MOUNT	(PANDUIT)		11
	AR		(PLT1.5I-C)	TIE, CABLE	(PANDUIT)		12
	AR			WIRE, 20 AWG, SOLID, BARE	COPPER		13
	AR		(88760)	CABLE, 18 AWG, 1 TWISTED SHLD PAIR, STRANDED (RED AND BLK)	(BELDEN) COPPER		14
	AR			WIRE, 16 AWG, BLK, STRANDED	TFFN COPPER		15
	AR			WIRE, 16 AWG, WHT, STRANDED	TFFN COPPER		16
							17
							18
							19
							20

LABEL A
UNIT A UNIT B

LABEL B
TMAC-F-208

LABEL C
TMAC-RTU-208A
REMOTE TERMINAL UNIT A
AW TANK FARM

LABEL D
TMAC-RTU-208B
REMOTE TERMINAL UNIT B
AW TANK FARM

9 NAMEPLATE SCHED
SEE NOTE 1 AND 6

GENERAL NOTES (UNLESS OTHERWISE NOTED)

1. LABEL ITEM NO. 1 PER HS-BS-0015 TYPE 6, USING (1/N 9). TEXT SHALL CONSIST OF THE FOLLOWING:
   LINE 1 USING 1/2" CHARACTERS: FIRST LINE OF DWG TITLE
   LINE 2 USING 1/4" CHARACTERS: "TMACS I/O TERMINATION"
   LINE 3 USING 1/4" CHARACTERS: DRAWING NO. PART/DASH NO.
   LINE 4 USING 1/4" CHARACTERS: "EDS-DP-206 CKT 22"
   ATTACH TO FRONT OF THE DOOR USING SILICONE ADHESIVE.
2. WIRING IS DIAGRAMMATICALLY SHOWN, FIELD ROUTE AND SUPPORT AS REQUIRED.
3. ALL ELECTRICAL PARTS SHALL BE LISTED BY UL, FM OR ANOTHER NATIONALLY RECOGNIZED TESTING LABORATORY.
4. FOR ACROMAG PARTS SEE VENDOR INFORMATION (V1), NUMBER 22138.
5. CABLE SHIELDS ARE GROUNDED AT ONE END ONLY.
6. LABEL PER HS-BS-0015 TYPE 6 WITH INFORMATION AS SHOWN USING 5/32" HIGH CHARACTERS, ATTACH USING SILICONE ADHESIVE.
7. USE ITEM NO. 13 FOR JUMPER.

DWG NO	TITLE
H-2-81778	TMACS DRAWING INDEX
H-2-81761	BLOCK DIAGRAM

REF NUMBER | TITLE

DRAWING TRACEABILITY LIST — REFERENCES
NEXT USED ON H-2-820778

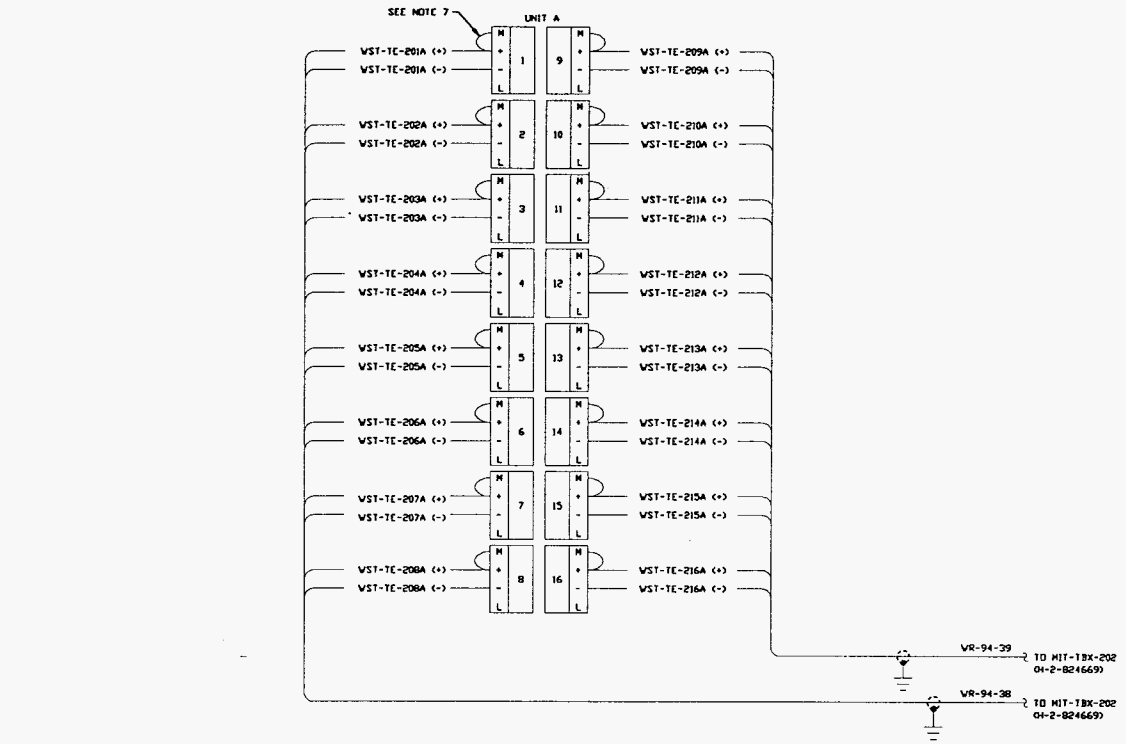
REVISIONS
CAD FILE B820800A | CADCODE DOS6.0ACD2.12.0SS

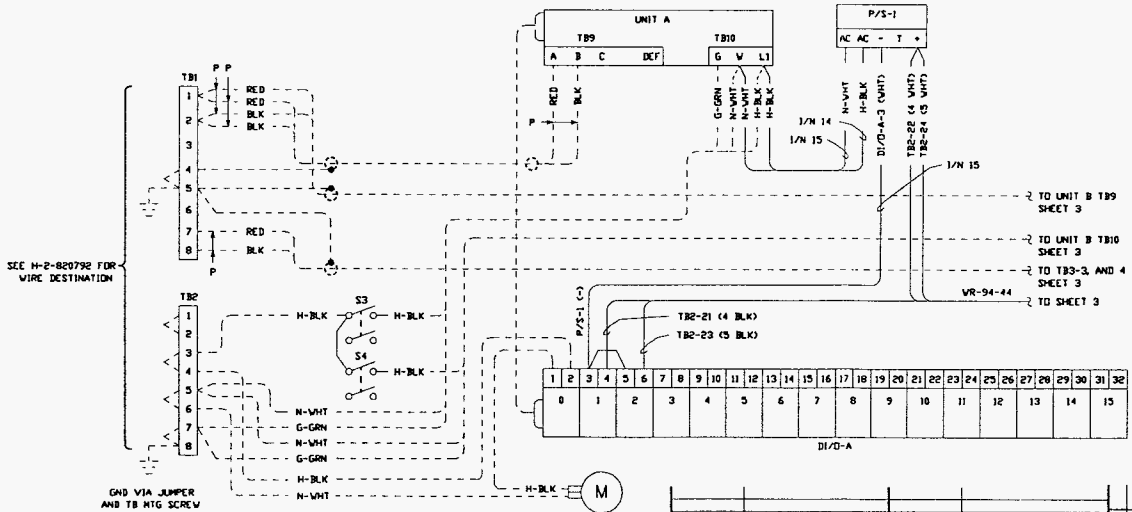
Drawn	BL MURRY	9-94
Checked	FAIRCHILD	4-95
Date Issued	R. ROMINE	4-95
Doc Check	KA WHITE	

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

TMAC-TBX-208
TMACS ASSEMBLY

SIZE F | BLDG NO 241-AV | WORK NO 5901 | DRAWING NO H-2-820800 | REV 0
SCALE 1/2 | EDT 161968 | SHEET 1 OF 3





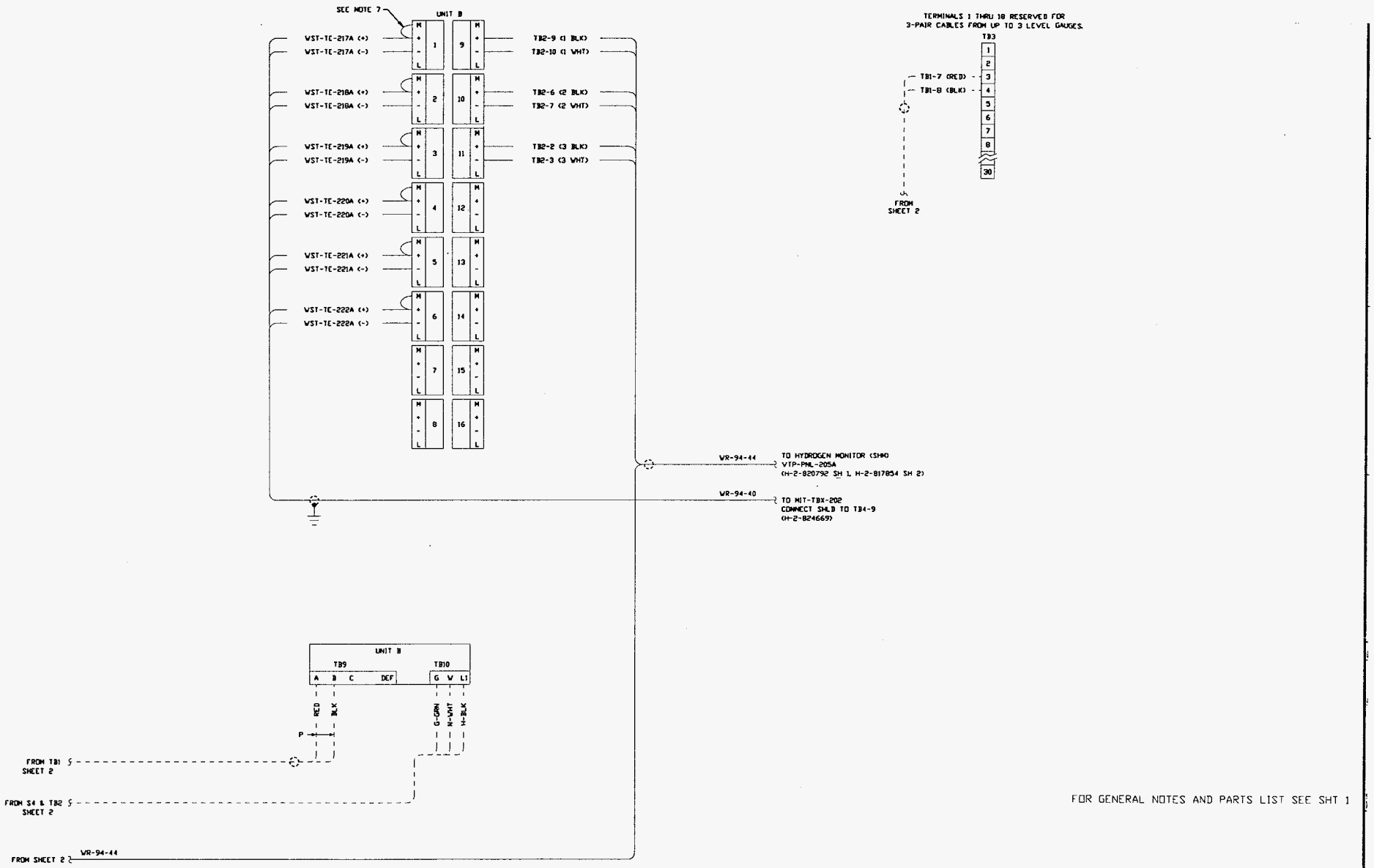
FOR GENERAL NOTES AND PARTS LIST SEE SHT 1

DRAWN BL HURRY	9-94	U.S. DEPARTMENT OF ENERGY	
CHECKED FAIRCHILD	4-95	Richland Operations Office	
DES ENGR R. ROMINE	4-95	Westinghouse Hanford Company	
QUE ENGR KA WHITE		TMAC-TBX-208	
		TMACS WIRING DIAGRAM	
SIZE F	FSCM NO 24-AV	DWG NO H-2-820800	REV 0
SCALE NONE	CAD NO 161968	SHEET 2 OF	

DRAWING TRACEABILITY LIST — DWG NO / TITLE / REFERENCES / REF NUMBER / TITLE / NEXT USED ON

REVISIONS — REV / DESCRIPTION / DRAWN DATE / ENGR DATE / DESIGN AUTH / QUAL ENGR / OTHER / APPROVALS BY/DATE

CADFILE B820800D CADCODE BDS-6.0ACD2.12/0-SS



FOR GENERAL NOTES AND PARTS LIST SEE SHT 1

DRAWN BL MURRY	9-94	U.S. DEPARTMENT OF ENERGY
CHECKED FAIRCHILD	4-95	Richland Operations Office
ENG APPR R. ROMINE	4-95	Westinghouse Hanford Company
PROJ ENGR KA WHITE		

TMAC-TBX-208

TMACS WIRING DIAGRAM

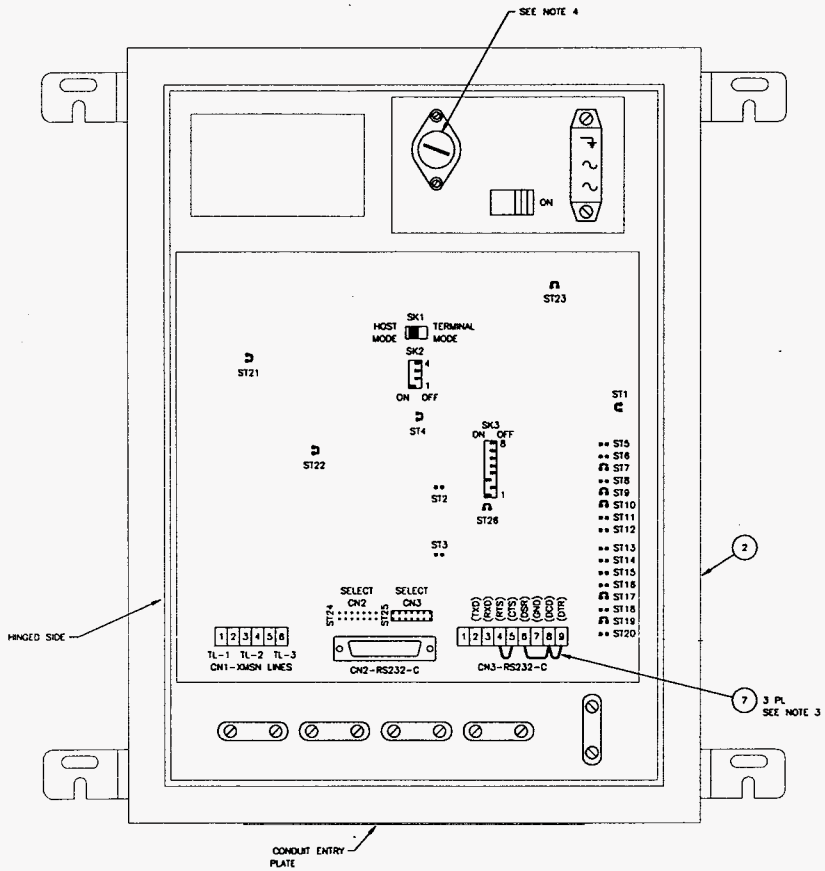
SYS	BLDG NO	WORK NO	DWG NO	REV
F	241-AV	5903	H-2-820800	0

NONE | EDT 161960 | SHT 3 of

DRAWING TRACEABILITY LIST | REFERENCES | REVISIONS

CADFILE 8820800C | CADCODE DOS6.0ACD12.0SS

54-6000-027(5/89)



1 ASSEMBLY – CIU
HINGED COVER REMOVED

SWITCH SETTINGS (SETUP)		
SWITCH	POSITION	FUNCTION
SK1	HOST	HOST MODE
SK3-1	ON	ENABLE SK3
SK3-2	OFF	BAUD RATE 2400 (RS-232-C)
SK3-3	ON	BAUD RATE 2400 (RS-232-C)
SK3-4	OFF	ODD PARITY
SK3-5	OFF	TURN AROUND DELAY (4 MS)
SK3-6	OFF	TURN AROUND DELAY (4 MS)
SK3-7	OFF	NOT SPECIFIED
SK3-8	OFF	NOT SPECIFIED

ADDRESS SWITCH SETTINGS						
LOCATION	NAME	ADDRESS	SK2-4	SK2-3	SK2-2	SK2-1
241-AN-271	TMAC-TBX-108	0	OFF	OFF	OFF	OFF
241-AW-271	TMAC-TBX-209	1	OFF	OFF	OFF	ON
242-TC	TMAC-TBX-3642	2	OFF	OFF	ON	OFF
		3	OFF	OFF	ON	ON
		4	OFF	ON	OFF	OFF
		5	OFF	ON	OFF	ON
		6	OFF	ON	ON	OFF
		7	OFF	ON	ON	ON
		8	ON	OFF	OFF	OFF
		9	ON	OFF	OFF	ON

STRAP SETTINGS				
FACTORY SETTINGS NOT TO BE CHANGED		USER SELECTED		FUNCTION
OPEN	CLOSED	OPEN	CLOSED	
	ST1			
ST2				
		ST3		WITHOUT "DCD"
			ST4	2400 FIELD BAUD RATE (TT)
ST5				
ST6				
	ST7			
ST8				
	ST9			
	ST10			
ST11				
ST12				
ST13				
ST14				
ST15				
ST16				
	ST17			
ST18				
	ST19			
ST20				
			ST21	FIELD LINES GAIN SET AT 10
			ST22	
	ST23			
		ST24		OPEN TO DESELECT CN2 (NO MULTI-JUMPER)
			ST25	MULTI-JUMPER INSTALLED ENABLING CONNECTOR CN3
			ST26	ENABLE SK3

PARTS/MATERIAL LIST

QTY REQD -020	QTY REQD -010	REF. DES.	PART/DASH NO.	NOMENCLATURE/DESCRIPTION	MATERIAL/REF.	SHT	NO.
	X		-010	ASSEMBLY – CIU			1
1	1		UN858U/CNC-US	COMMUNICATIONS INTERFACE UNIT	ENRAF B.V.		2
X			-020	ASSEMBLY – CIU (WITH MODEM)		2	3
							4
							5
1				POWER CORD, 16 AWG NEMA 5-15	(BELDEN 17461)		6
AR	AR			WIRE, 20 AWG, SOLID	COPPER		7
AR				WIRE, 20 AWG, STRANDED	COPPER		8
AR				CABLE, 2 TWISTED PAIR WITH OVERALL SHLD, 24 AWG STRD	(BELDEN 9842) COPPER		9
							10
1				CONNECTOR, 25 PIN PLUG, D-SUB	(CINCH DBC-25P)		11
1				CONNECTOR HOOD (FOR I/N 11)	(CINCH DPH-B-001)		12
1				HUB, CONDUIT, 1/2"	(MYERS STA-1)		13
2				BRACKET, 3/4"X 9 1/2"X .062	AL 8061-T6		14
4			7220	SPACER, 1/4" HEX MALE/FEMALE 8-32 UNC THREAD, 3/8" LONG	KEYSTONE		15
4				SCREW, 8-32 UNC-A, 1" LONG	ANY GRADE		15
12				WASHER, FLAT NO. 8	ANY GRADE		17
8				WASHER, LOCK NO. 8	ANY GRADE		18
4				NUT, HEX, 8-32 UNC-B	ANY GRADE		19
							20

GENERAL NOTES (UNLESS OTHERWISE NOTED)

1. BOX IDENTIFICATION LABEL SHALL BE SPECIFIED BY THE DRAWING THAT INSTALLS THIS ASSEMBLY.
2. SEE VENDOR INFORMATION (W) NUMBER 31560 FOR ITEM NO. 2.
3. USE ITEM NO. 7 FOR JUMPERS.
4. VERIFY OR SET THE VOLTAGE SELECTOR SWITCH TO THE NOMINAL SUPPLY VOLTAGE. (GENERALLY THIS SETTING SHOULD BE "110" AS SUPPLIED BY THE FACTORY)
5. POSITION SWITCHES AS SHOWN IN TABLES.
6. VERIFY ALL FACTORY STRAP (ST) SETTINGS PER TABLE.
7. CONFIGURE THE USER SELECTED STRAP (ST) SETTINGS PER TABLE.
8. MODEM TO BE SUPPLIED BY TELEPHONE COMPANY.
9. ADDITIONAL FLAT WASHERS (I/N 17) OR GASKET MATERIAL MAYBE USED ON BACK SIDE OF (I/N 14) TO PREVENT SCREWS (I/N 16) FROM BOTTOMING OUT.

H-2-81778	TMACS DRAWING INDEX	
H-2-81761	TMACS BLOCK DIAGRAM	
REF NUMBER	TITLE	
REFERENCES		
NEXT USED ON	AS ALLOCATED	

REV	DESCRIPTION	BLM 7/95	MHF 9/95	HLH 9/95	RSN 9/95	WFW 9/95
1	REV PER ECN 623291					

DRAWN	BL MURRY	1-95
CHECKED	FAIRCHILD	4-95
DES APPD	R. ROMINE	4-95
DOC MGR	KA WHITE	

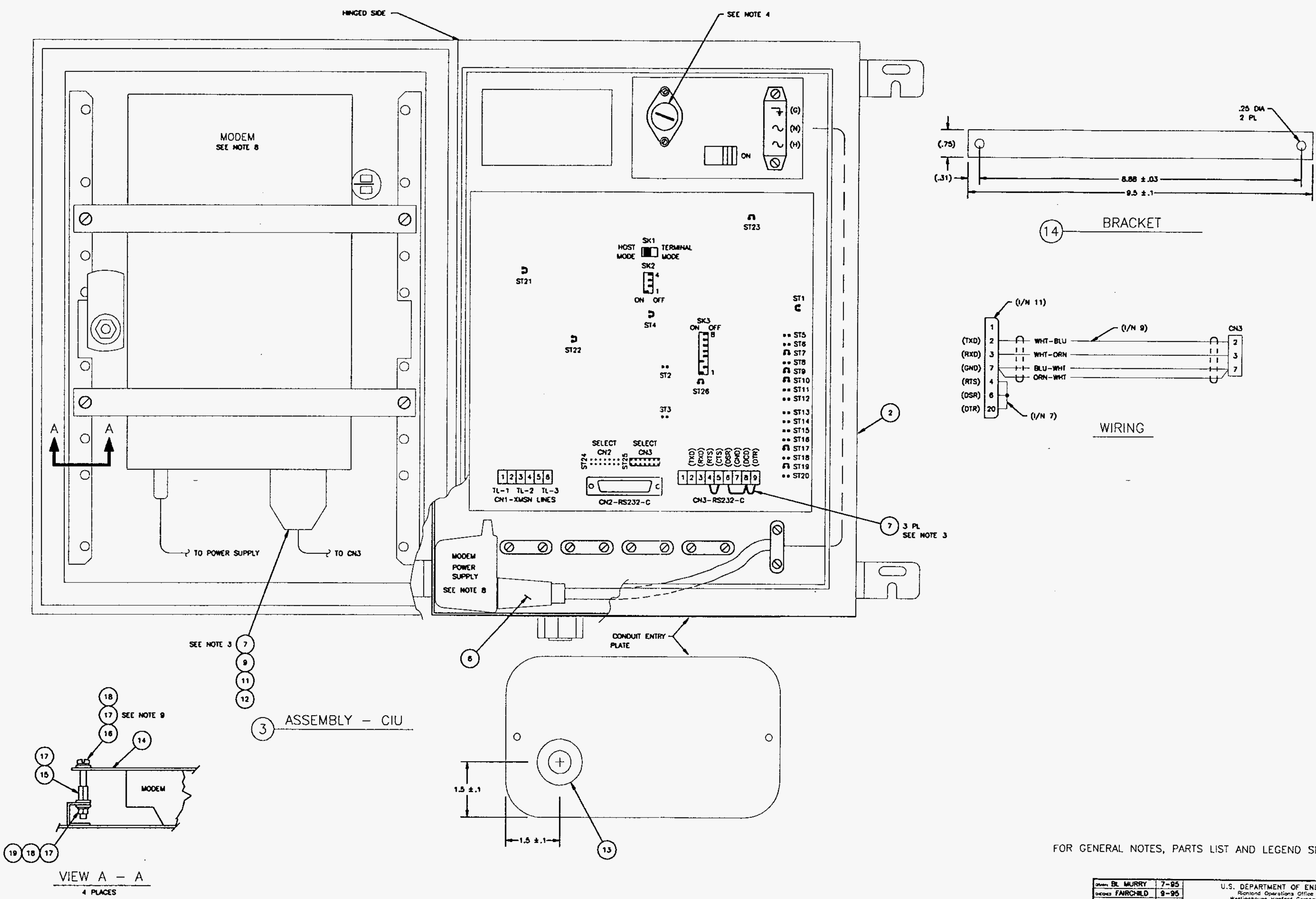
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

COMM INTERFACE UNIT
(CIU) ASSEMBLY

SIZE	BLDG NO	DRAWING NO	REV NO
F	241-C	5901 H-2-820801	1

SCALE NONE | LOT 181968 | SHEET 1 OF 2

CADFILE B820801A | CADCODE DOS:6.0:ACD2:12.0:SS



FOR GENERAL NOTES, PARTS LIST AND LEGEND SEE SH 1

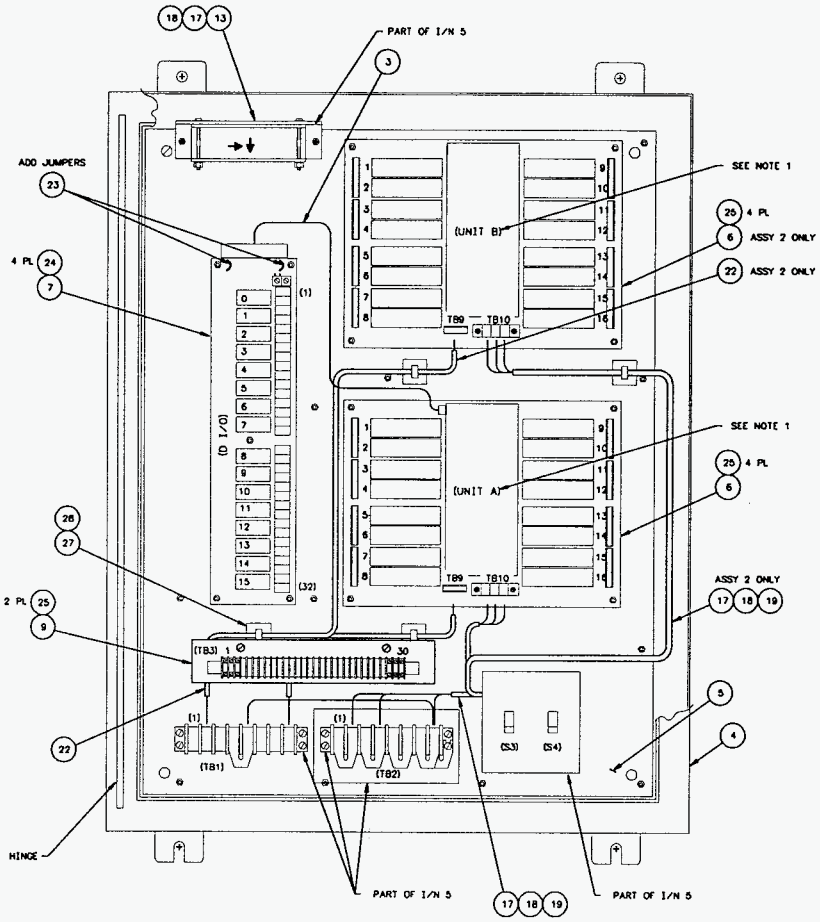
DRAWN BL MURRY	7-95	U.S. DEPARTMENT OF ENERGY Richland Operations Office Westinghouse Hanford Company
CHECKED FAIRCHILD	9-95	
HUMPHREYS	9-95	COMM INTERFACE UNIT (CIU) ASSEMBLY
NICHOLSON	9-95	
W.F. WHITE	9-95	

SIZE	BLDG NO	INDEX NO	DWG NO	REV
F	241-C	5901	H-2-820801	0

SCALE NONE | ECN 623291 | SHEET 2

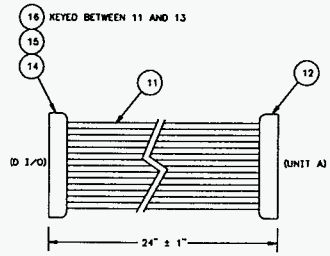
CADFILE B820801B | CADCODE DOS:6.0:AC02:12.0:SS

DRAWING TRACEABILITY LIST | NEXT USED ON | REFERENCES | REVISIONS



1 ASSEMBLY
HINGED COVER REMOVED

2 ASSEMBLY
HINGED COVER REMOVED



3 ASSEMBLY, CABLE
WIRED PIN TO PIN

PARTS/MATERIAL LIST

-030	-020	-010	REF. DES.	PART/DASH NO.	NOMENCLATURE/DESCRIPTION	MATERIAL/REF.	SPLY	NO.
		X		-010	ASSEMBLY (1 ACROMAG)			1
	X			-020	ASSEMBLY (2 ACROMAG)			2
X	1	1		-030	ASSEMBLY, CABLE			3
	1	1		A-30H2408ALLP	ENCLOSURE, 30"X24"X8"	HOFFMAN AL		4
	1	1		H-2-81764-020	PANEL, ASSEMBLY, (115V)			5
	2	1		4366-16-1	I/O SIGNAL CONT. UNIT	ACROMAG		6
	1	1		210-16	I/O MOUNTING BOARD	POTTER & BRUMFIELD		7
								8
	1	1		H-2-81764-040	ASSEMBLY, TERMAL BLOCK			9
								10
AR				3580/50	CABLE, 50 CONDUCTOR	ALPHA		11
1				3425-6600	CONNECTOR, 50 CONTACTS	3M		12
	1	1		5505	PLUG, WITH CORD	PAMOTOR		13
1				3415-0001	CONNECTOR, 50 CONTACTS	3M		14
1				3448-58	STRAIN RELIEF	3M		15
1				3439-2	POLARIZATION KEY	3M		16
	AR	AR			WIRE, 16 AWG, BLK, STRANDED	TFFN COPPER		17
	AR	AR			WIRE, 16 AWG, WHT, STRANDED	TFFN COPPER		18
	AR	AR			WIRE, 16 AWG, GRN, STRANDED	TFFN COPPER		19
								20
								21
	AR	AR		(86760)	CABLE, 18 AWG, 1 PAIR, TWISTED SHLD PAIR, STRANDED (RED, BLK)	(BELDEN) COPPER		22
	AR	AR			WIRE, 20 AWG, SOLID, BARE	COPPER		23
	4	4			SCREW, PAN 6-32 UNC-2A, 3/8" L	ANY GRADE CS		24
	10	6			SCREW, PAN 8-32 UNC-2A 3/8" L	ANY GRADE CS		25
								26
	AR	AR		ABM2S-A-C	CABLE TIE MOUNT	PANDUIT		27
	AR	AR		PLT1.51-C	TIE, CABLE	PANDUIT		28
								29
								30

GENERAL NOTES (UNLESS OTHERWISE NOTED)

1. LABELS "UNIT A AND UNIT B" IDENTIFICATION SHALL BE SHOWN ON DRAWINGS THAT REFERENCE THIS DRAWING.
2. WIRING IS DIAGRAMMATICALLY SHOWN, ROUTE AND SUPPORT AS REQUIRED.
3. ALL ELECTRICAL PARTS SHALL BE LISTED BY UL, FM, OR ANOTHER NATIONALLY RECOGNIZED TESTING LABORATORY.
4. FOR I/N 6 SEE VENDOR INFORMATION (VI), NUMBER 22138.
5. CABLE SHIELDS ARE GROUNDED AT ONE END ONLY.
6. CONNECT THE GROUNDING SCREW ON S3 AND S4 TO THE ELECTRICAL BOX/EQUITPMENT CHASSIS USING NO. 12 AWG COPPER WIRE.

DWG NO	TITLE	REF NUMBER	TITLE
DRAWING TRACEABILITY LIST:		H-2-81778	TMACS DRAWING INDEX
		H-2-81761	TMACS BLOCK DIAGRAM
		REFERENCES	
		NEXT USED ON	AS ALLOCATED

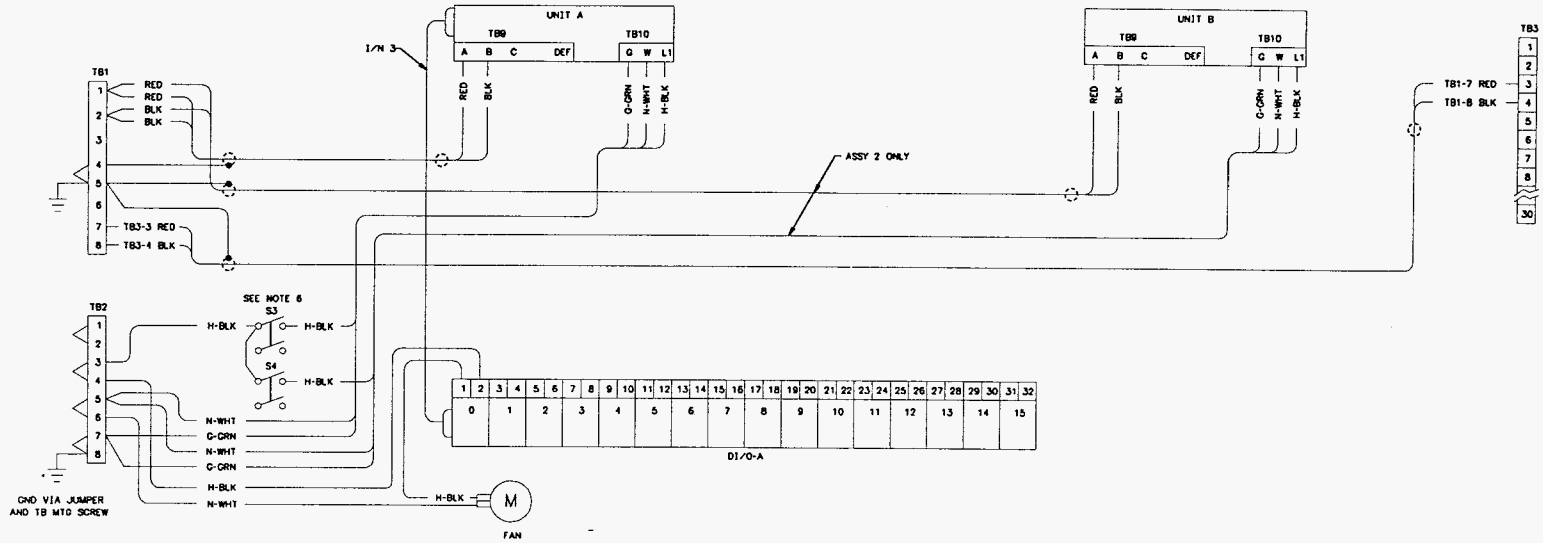
REVISIONS
CADFILE B820820A
CADCODE DOS;6.0:ACD2;12.0:SS

Drawn	BL MURRY 10-94
CHECKED	FAIRCHILD 4-95
DATE APVD	R. ROWINE 4-95
QUALITY ASSURANCE	KA WHITE
SAFETY	
OPERATIONS	
ENGINEERING	
APVD FOR IMPLEMENTATION	

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

TBX-TMACS-GEN
ACROMAG ASSEMBLIES

SIZE	FSCM NO	DWG NO	REV
F	241-C	H-2-820820	0
SCALE 1/2	EDT 161966	SHEET 1 of 2	



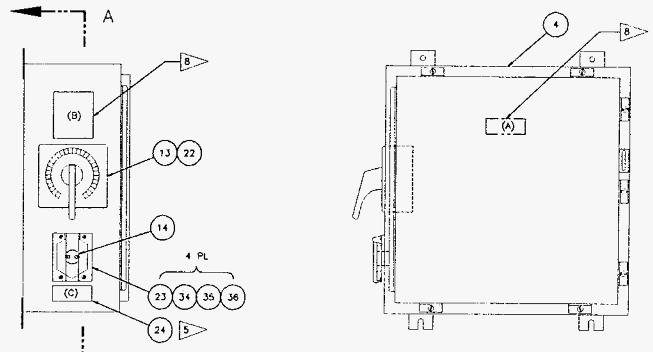
FOR GENERAL NOTES AND PARTS LIST SEE SHT 1

DRAWN BL MURRY	10-94	U.S. DEPARTMENT OF ENERGY	
CHECKED FAIRCHILD	4-95	Richland Operations Office	
APPD and R. ROMINE	4-95	Westinghouse Hanford Company	
ENG Appd KA WHITE		TBX-TMACS-GEN	
QA		WIRING DIAGRAM	
OTHER		SIZE F	BLDG NO 241-G
OTHER		MDCN NO 5903	DWG NO H-2-820820
OTHER		REV 0	
APPD FOR IMPLEMENTATION		SCALE NONE	EDT 151965
BY		SHEET 2 OF	
DATE			

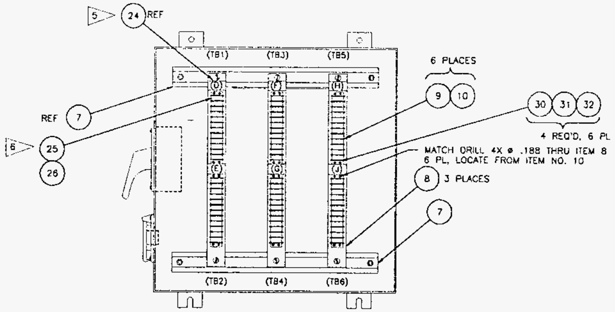
DWG NO	TITLE	REF NUMBER	TITLE
DRAWING TRACEABILITY LIST		REFERENCES	
		NEXT USED ON	

REVISIONS

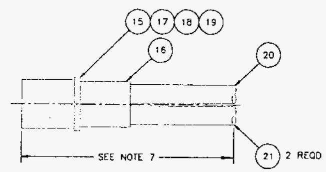
CADFILE B8206208 | CADCODE DOS:6.0:ACD2:12.0:SS



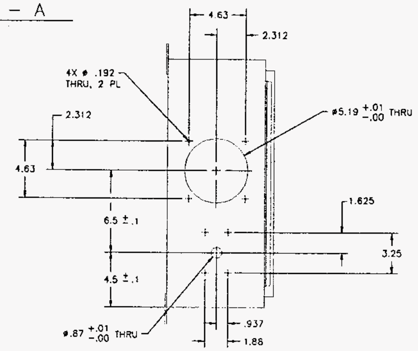
1 ASSEMBLY, GENERIC TBX
SCALE: 1/4



SECTION A – A
SCALE: 1/4



2 ASSEMBLY, CABLE
SCALE: NONE
FOR WIRING, SEE SHEET 2



4 ENCLOSURE, ALTERED
SCALE: 1/4

PARTS/MATERIAL LIST

QTY REQD -020	QTY REQD -010	REFERENCE/DESCRIPTION	PARTS/DASH NUMBER	NOMENCLATURE/DESCRIPTION	MATERIAL/REFERENCE	SHEET	ITEM NO.
	X		-010	ASSEMBLY, GENERIC TBX		1	1
X			-020	ASSEMBLY, CABLE		1	2
							3
	1		-001	ENCLOSURE, NEMA 4, 14 Ga, 20 X 20 X 8 ALTERED FROM	HOFFMAN ENGINEERING A-20H20BLP		4
							5
							6
	1		A-20NTMA2	BRACKET ASSEMBLY (2 BRACKETS)	HOFFMAN ENGINEERING		7
	3		A-20T	TERMINAL STRAP	HOFFMAN ENGINEERING		8
	6		MS-12-141	MARKER STRIP	CINCH		9
	6		12-141	TERMINAL BLOCK, 600V, 12 PT 141 SERIES	CINCH		10
							11
							12
	1	S1	OSW5-30-PG	ROTARY SELECTOR SWITCH, 2 POLE 30 POSITION, PISTOL GRIP	OMEGA ENGINEERING		13
	1	J2	RSJ-K-R	PANEL JACK, ROUND HOLE, STANDARD 1 1/8 DIA BEZEL, YELLOW	OMEGA ENGINEERING		14
1		(P1)	MTC-53-MC	CONNECTOR, THERMOCOUPLE	OMEGA ENGINEERING		15
1			MTC-55-SHL	BACKSHELL, CABLE CLAMP	OMEGA ENGINEERING		16
22			MTC-CH-P	PINS, MALE CHROMEL (+)	OMEGA ENGINEERING		17
22			MTC-AL-P	PINS, MALE ALUMEL (-)	OMEGA ENGINEERING		18
11			MTC-AU-P	PINS, MALE GOLD PLATED	OMEGA ENGINEERING		19
AR			24KX20PP	CABLE, 24 PAIR, 20 AWG TYPE KX, POLYVINYL INSULATION	OMEGA ENGINEERING		20
AR			5153C	CABLE, TRIAD, 3 CONDUCTOR, 20 AWG STRANDED COPPER, SHIELDED, PVC INSULATED	ALPHA		21
	AR			WIRE, TYPE KX	WHC STORES (0016-8000-460)		22
	1		WLRS-1	COVER, SPRING DOOR, SINGLE W/GASKET	CROUSE-HINDS		23
	AR		HPS-1-2-7	NAMEPLATE, (SEE LEGEND)			24
	22		TLCH-20	TERMINAL LUG, CHROMEL	OMEGA ENGINEERING		25
	22		TLAL-20	TERMINAL LUG, ALUMEL	OMEGA ENGINEERING		26
							27
							28
							29
	24			SCR, FAN HEAD 6-32UNC-2A X 5/8" L	ANY GRADE, CS		30
	24			LOCKWASHER #6	ANY GRADE, CS		31
	24			HEX NUT, 6-32UNC-2B	ANY GRADE, CS		32
							33
	4			SCR, RHD MACH 8-32UNC-2A X 1/2" L	ANY GRADE, CS		34
	4			LOCKWASHER #8	ANY GRADE, CS		35
	4			HEX NUT, 8-32UNC-2B	ANY GRADE, CS		36

(Flag note 9 marks item 22; flag note 5 marks item 24.)

GENERAL NOTES: (UNLESS OTHERWISE SPECIFIED)

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-82. DIMENSIONS ARE IN INCHES TOLERANCES: .XX ±.03; .XXX ±.010.
2. BREAK ALL SHARP EDGES, REMOVE ALL BURRS.
3. INSTALLATION SHALL CONFORM WITH THE NATIONAL ELECTRICAL CODE, 1993 EDITION.
4. PRIOR TO TERMINATING WIRE ENDS, INSTALL HEAT SHRINKABLE MARKER SLEEVING ON ENDS OF WIRES USING BLACK STAMP MARKER WITH WIRE IDENTIFICATION PER WIRING DIAGRAM (SHEET 2).
5. NAMEPLATES SHALL BE BONDED IN LOCATION SHOWN USING CLEAR SILICONE ADHESIVE.
6. ODD-NUMBERED TERMINALS ON TB1 THROUGH TB4 SHALL HAVE ITEM 25 INSTALLED ON TERMINAL BOARD. EVEN-NUMBERED TERMINALS ON TB1 THROUGH TB4 SHALL HAVE ITEM 26 INSTALLED ON TERMINAL BOARD.
7. FIELD TO DETERMINE LENGTH PRIOR TO FABRICATION.
8. LABELING SHALL BE SPECIFIED BY THE DRAWING THAT INSTALLS THIS ASSEMBLY.
9. CABLE, THERMOCOUPLE EXTENSION, 1 PAIR DUPLEX PARALLEL 20 AWG SOLID CONDUCTOR PER ANSI MC 96.1, 300 VOLT, 90 DEGREE C, ANSI COLOR CODED PVC INSULATION.

NAMEPLATE LEGEND (HPS-1-2-7)

NAMEPLATE	SIZE	LETTER SIZE	LEGEND
A			
B			
C	1/2" X 1 1/2"	5/32	TYPE K
D	1/2" X 1 1/2"	5/32	TB 1
E	1/2" X 1 1/2"	5/32	TB 2
F	1/2" X 1 1/2"	5/32	TB 3
G	1/2" X 1 1/2"	5/32	TB 4
H	1/2" X 1 1/2"	5/32	TB 5
J	1/2" X 1 1/2"	5/32	TB 6

(Flag note 8 marks nameplates A and B.)

DL OLSON 11/15/94

U.S. DEPARTMENT OF ENERGY
DOE Field Office, Richland
Westinghouse Hanford Company

MULTIFUNCTIONAL INSTRUMENT TREE TERMINAL BOX ASSY

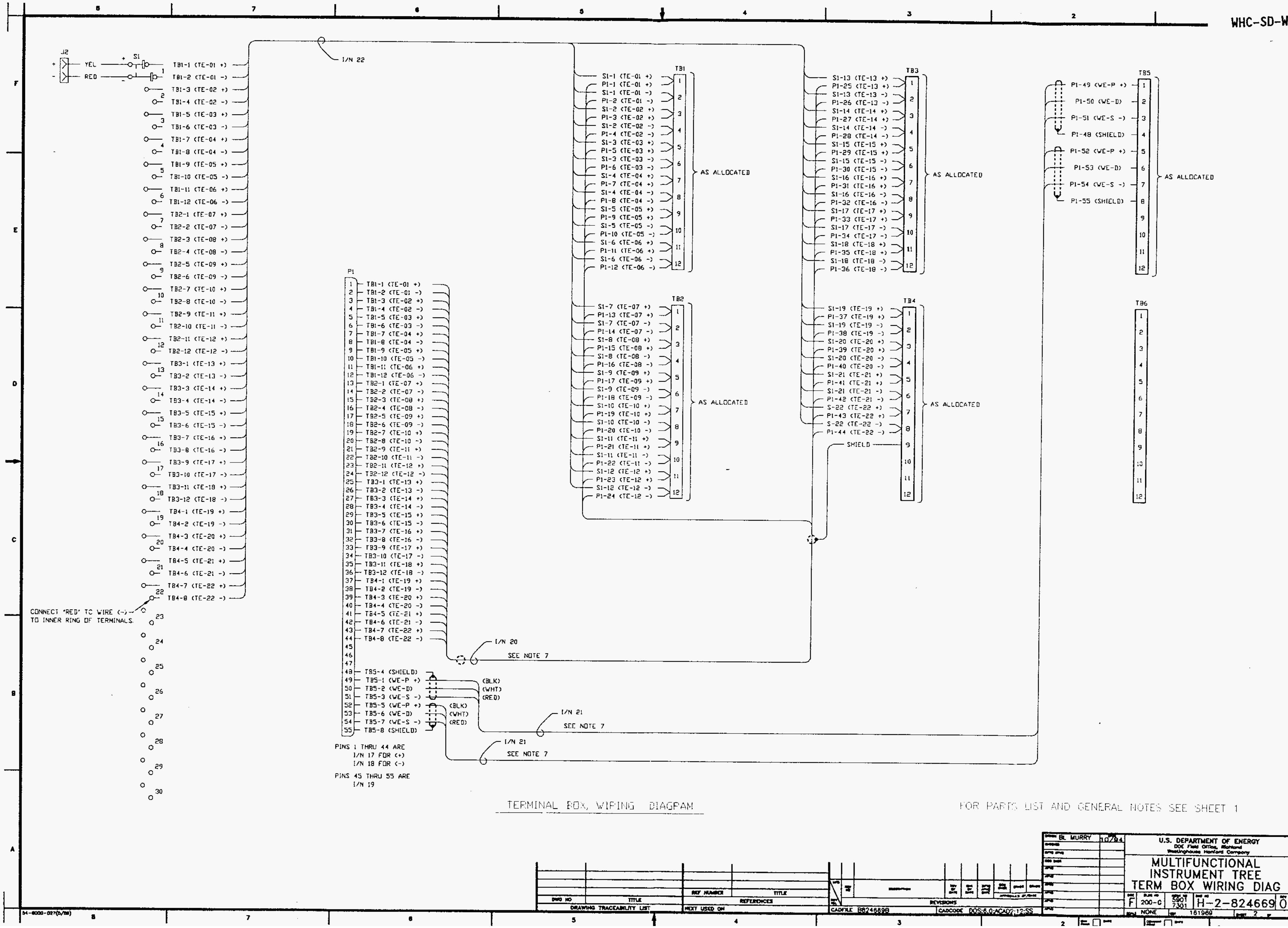
F 200G 5901 7301 H-2-824669 0

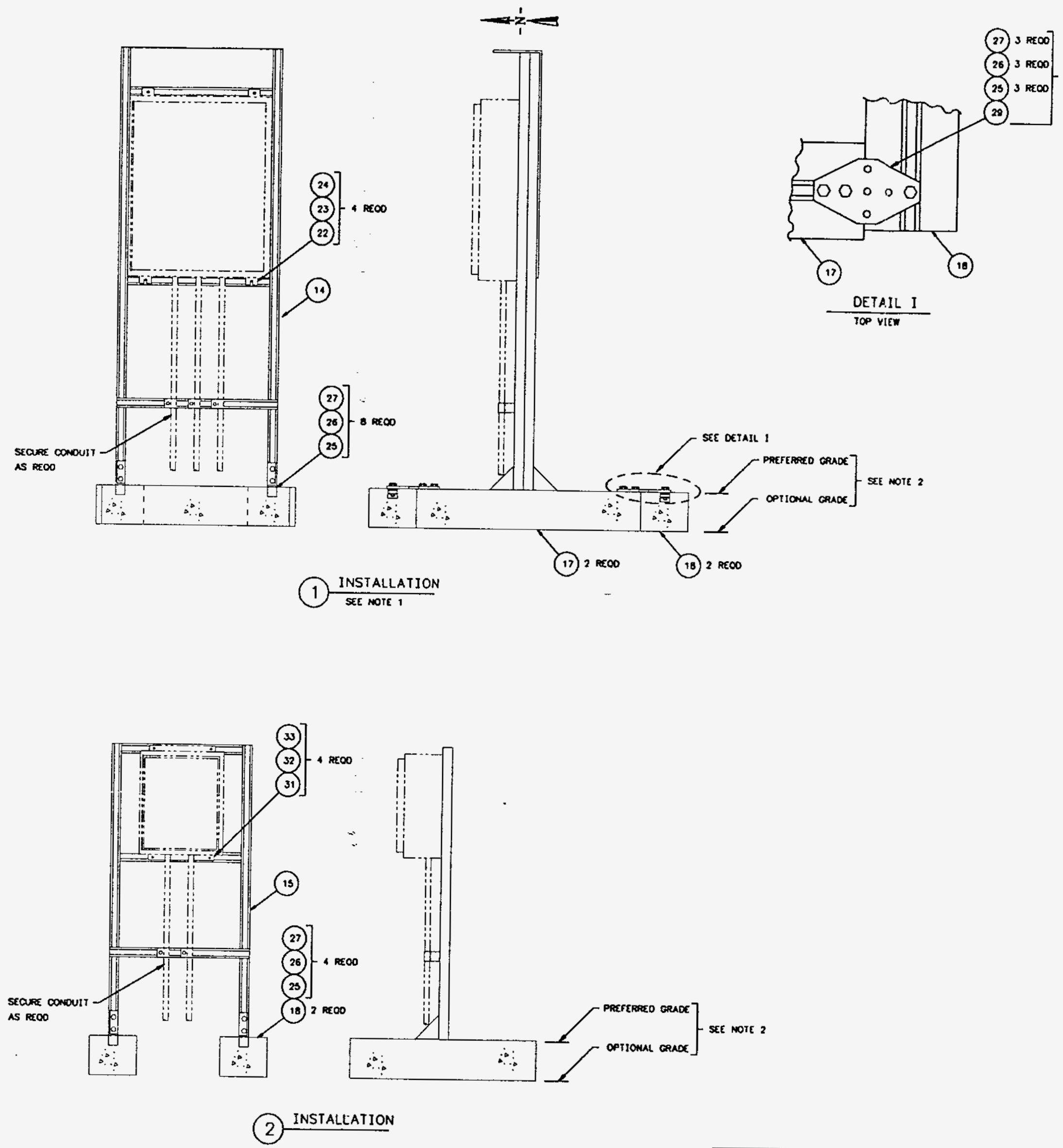
SCALE SHOWN 161969 SHEET 1 OF 2

DRAWING TRACEABILITY LIST — NEXT USED ON AS ALLOCATED — REFERENCES — REVISIONS

CADFILE B824669A CADCODE DOS:6.0;ACAD2:12.SS

54-6000-027(5/88)


J2
YEL
RED
S1
TB1-1 (TE-01 +)
TB1-2 (TE-01 -)
TB1-3 (TE-02 +)
TB1-4 (TE-02 -)
TB1-5 (TE-03 +)
TB1-6 (TE-03 -)
TB1-7 (TE-04 +)
TB1-8 (TE-04 -)
TB1-9 (TE-05 +)
TB1-10 (TE-05 -)
TB1-11 (TE-06 +)
TB1-12 (TE-06 -)
TB2-1 (TE-07 +)
TB2-2 (TE-07 -)
TB2-3 (TE-08 +)
TB2-4 (TE-08 -)
TB2-5 (TE-09 +)
TB2-6 (TE-09 -)
TB2-7 (TE-10 +)
TB2-8 (TE-10 -)
TB2-9 (TE-11 +)
TB2-10 (TE-11 -)
TB2-11 (TE-12 +)
TB2-12 (TE-12 -)
TB3-1 (TE-13 +)
TB3-2 (TE-13 -)
TB3-3 (TE-14 +)
TB3-4 (TE-14 -)
TB3-5 (TE-15 +)
TB3-6 (TE-15 -)
TB3-7 (TE-16 +)
TB3-8 (TE-16 -)
TB3-9 (TE-17 +)
TB3-10 (TE-17 -)
TB3-11 (TE-18 +)
TB3-12 (TE-18 -)
TB4-1 (TE-19 +)
TB4-2 (TE-19 -)
TB4-3 (TE-20 +)
TB4-4 (TE-20 -)
TB4-5 (TE-21 +)
TB4-6 (TE-21 -)
TB4-7 (TE-22 +)
TB4-8 (TE-22 -)
CONNECT 'RED' TO WIRE (-)
TO INNER RING OF TERMINALS.
I/N 22
P1
TB5-4 (SHIELD)
TB5-1 (WE-P +)
TB5-2 (WE-D)
TB5-3 (WE-S -)
TB5-5 (WE-P +)
TB5-6 (WE-D)
TB5-7 (WE-S -)
TB5-8 (SHIELD)
(BLK)
(WHT)
(RED)
PINS 1 THRU 44 ARE
I/N 17 FOR (+)
I/N 18 FOR (-)
PINS 45 THRU 55 ARE
I/N 19
I/N 20
SEE NOTE 7
I/N 21
SEE NOTE 7
TB1
S1-1 (TE-01 +)
P1-1 (TE-01 +)
S1-1 (TE-01 -)
P1-2 (TE-01 -)
S1-2 (TE-02 +)
P1-3 (TE-02 +)
S1-2 (TE-02 -)
P1-4 (TE-02 -)
S1-3 (TE-03 +)
P1-5 (TE-03 +)
S1-3 (TE-03 -)
P1-6 (TE-03 -)
S1-4 (TE-04 +)
P1-7 (TE-04 +)
S1-4 (TE-04 -)
P1-8 (TE-04 -)
S1-5 (TE-05 +)
P1-9 (TE-05 +)
S1-5 (TE-05 -)
P1-10 (TE-05 -)
S1-6 (TE-06 +)
P1-11 (TE-06 +)
S1-6 (TE-06 -)
P1-12 (TE-06 -)
AS ALLOCATED
TB2
S1-7 (TE-07 +)
P1-13 (TE-07 +)
S1-7 (TE-07 -)
P1-14 (TE-07 -)
S1-8 (TE-08 +)
P1-15 (TE-08 +)
S1-8 (TE-08 -)
P1-16 (TE-08 -)
S1-9 (TE-09 +)
P1-17 (TE-09 +)
S1-9 (TE-09 -)
P1-18 (TE-09 -)
S1-10 (TE-10 +)
P1-19 (TE-10 +)
S1-10 (TE-10 -)
P1-20 (TE-10 -)
S1-11 (TE-11 +)
P1-21 (TE-11 +)
S1-11 (TE-11 -)
P1-22 (TE-11 -)
S1-12 (TE-12 +)
P1-23 (TE-12 +)
S1-12 (TE-12 -)
P1-24 (TE-12 -)
AS ALLOCATED
TB3
S1-13 (TE-13 +)
P1-25 (TE-13 +)
S1-13 (TE-13 -)
P1-26 (TE-13 -)
S1-14 (TE-14 +)
P1-27 (TE-14 +)
S1-14 (TE-14 -)
P1-28 (TE-14 -)
S1-15 (TE-15 +)
P1-29 (TE-15 +)
S1-15 (TE-15 -)
P1-30 (TE-15 -)
S1-16 (TE-16 +)
P1-31 (TE-16 +)
S1-16 (TE-16 -)
P1-32 (TE-16 -)
S1-17 (TE-17 +)
P1-33 (TE-17 +)
S1-17 (TE-17 -)
P1-34 (TE-17 -)
S1-18 (TE-18 +)
P1-35 (TE-18 +)
S1-18 (TE-18 -)
P1-36 (TE-18 -)
AS ALLOCATED
TB4
S1-19 (TE-19 +)
P1-37 (TE-19 +)
S1-19 (TE-19 -)
P1-38 (TE-19 -)
S1-20 (TE-20 +)
P1-39 (TE-20 +)
S1-20 (TE-20 -)
P1-40 (TE-20 -)
S1-21 (TE-21 +)
P1-41 (TE-21 +)
S1-21 (TE-21 -)
P1-42 (TE-21 -)
S-22 (TE-22 +)
P1-43 (TE-22 +)
S-22 (TE-22 -)
P1-44 (TE-22 -)
SHIELD
AS ALLOCATED
TB5
P1-49 (WE-P +)
P1-50 (WE-D)
P1-51 (WE-S -)
P1-48 (SHIELD)
P1-52 (WE-P +)
P1-53 (WE-D)
P1-54 (WE-S -)
P1-55 (SHIELD)
AS ALLOCATED
TB6
TERMINAL BOX, WIRING DIAGRAM
FOR PARTS LIST AND GENERAL NOTES SEE SHEET 1
BL MURRY 10/94
U.S. DEPARTMENT OF ENERGY
DOE Field Office, Richland
Westinghouse Hanford Company
MULTIFUNCTIONAL
INSTRUMENT TREE
TERM BOX WIRING DIAG
F 200-C 5901 7301 H-2-824669 0
NONE 161969
DWG NO
TITLE
DRAWING TRACEABILITY LIST
REF NUMBER
REFERENCES
NEXT USED ON
REVISIONS
CADFILE B8246698
CADCODE DOS:6.0/ACAD7:12:SS



PARTS/MATERIAL LIST

QTY REQD -020	QTY REQD -010	PART/DASH NO.	NOMENCLATURE/DESCRIPTION	MATERIAL/REF.	SHT	NO.
X	X	-010	INSTALLATION - SUPPORT TMACS	SEE NOTE 5		1
X		-020	INSTALLATION - SUPPORT BOX	SEE NOTE 5		2
						3
						4
						5
						6
						7
						8
						9
						10
						11
						12
						13
	1	H-2-81769-010	SUPPORT, TMACS			14
1		H-2-81769-030	SUPPORT, BOX			15
						16
	2	H-2-815302-010	FOOTING, CONCRETE (48")			17
2	2	H-2-815302-020	FOOTING, CONCRETE (32")			18
						19
						20
						21
	4	HHCS037150EG	BOLT, 3/8-16 UNC-2A, 1 1/2 LG	UNISTRUT		22
	4	P 1008	NUT, 3/8-16 UNC-2B W/SPRING	UNISTRUT		23
	4	HLKW037EG	LOCK WASHER, 3/8	UNISTRUT		24
4	20	HHCS050150EG	BOLT, 1/2-13 UNC-2A, 1 1/2 LG	UNISTRUT		25
4	20	P 1010	NUT, 1/2-13 UNC-2B W/SPRING	UNISTRUT		26
4	20	HLKW050EG	LOCK WASHER, 1/2	UNISTRUT		27
						28
	4	P 1950	PLATE, FLAT 9 1/8" LG	UNISTRUT		29
						30
4		HHCS025150EG	BOLT, 1/4-20 UNC-2A, 1 1/2 LG	UNISTRUT		31
4		P 1006-1420	NUT, 1/4-20 UNC-2B W/SPRING	UNISTRUT		32
4		HLKW025EG	LOCK WASHER, 1/4	UNISTRUT		33
						34
						35

GENERAL NOTES (UNLESS OTHERWISE SPECIFIED)

1. ENSURE THAT THE ENCLOSURE FRONT FACES NORTH FOR THE SUN SHIELD TO HAVE MAXIMUM EFFECT.
2. PREFERABLY THE TOP OF THE CONCRETE FOOTING (I/N 17) WILL BE FLUSH WITH EXISTING GRADE OR BURIED SLIGHTLY. OPTIONALLY, AS DETERMINED IN THE FIELD, THE FOOTING CAN BE PLACED ON GRADE.
3. DIMENSION ARE IN INCHES.
4. SUPPORT STAND (I/N 1, ASSY -010) WITH SUN SHIELD IS DESIGNED FOR THE INSTALLATION OF AN ENCLOSURE BOX 30"X24"X8" WITH MOUNTING EARS (EXAMPLE: HOFFMAN P/N A-30H2408ALLP).
5. SEISMIC AND WIND LOADING ANALYSIS IS DOCUMENTED IN SUPPORTING DOCUMENT WHC-SD-WM-DR-010. ALSO ANALYZED WAS AN OPTIONAL ENCLOSURE BOX MIRROR IMAGED TO THE BACK OF STAND.

REF NUMBER	TITLE
H-2-81769	TBX-TMACS-SUPPORT ASSY
H-2-81781	FOOTING, CONCRETE
H-2-81778	TMACS DRAWING INDEX
H-2-81761	BLOCK DIAGRAM

REFERENCES — NEXT USED ON: AS ALLOCATED

DRAWING TRACEABILITY LIST (DWG NO / TITLE)

REV	DESCRIPTION	BY/DATE
2	INCORP. ECN 190938	BLM 9/93
1	INCORP. ECN 190931	BLM 7/93

REVISIONS

CADFILE B815300A — CADCODE 1B:19M:ACD2:11.0:SS

DRAWN	BL MURRY	3/93
CHECKED	J. MATEO	4/93
	R. SKORGE	4/93
	D. BORN	

ECN 161959

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

TBX-TMACS-GEN
SUPPORT INSTALLATION

SIZE F — BLDG NO 241-G — INDEX NO 5901 — DWG NO H-2-815300 — REV 2

SCALE NONE — SHEET 1 of 1

54-6000-027(5/89)