

OCT. 9 1998
Sta. 4 58

ENGINEERING DATA TRANSMITTAL

Page 1 of 1
1. EDT 622481

2. To: (Receiving Organization) Distribution		3. From: (Originating Organization) Data Management/Technical Basis and Planning		4. Related EDT No.: N/A	
5. Proj./Prog./Dept./Div.: Field Equipment Renovation Report/Waste Management/TBP/Process Engineering		6. Design Authority/ Design Agent/Cog. Engr.: M. R. Adams		7. Purchase Order No.: N/A	
8. Originator Remarks: This document is being released into the supporting document system for retrievability purposes.					
9. Equip./Component No.: N/A					
10. System/Bldg./Facility: N/A					
11. Receiver Remarks: 11A. Design Baseline Document? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No For release.					
12. Major Assm. Dwg. No.: N/A					
13. Permit/Permit Application No.: N/A					
14. Required Response Date: 10/08/98					

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	HNF-3356	N/A	0	Field Equipment Renovation Report for TWRS Mission Critical Systems	N/A	2	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	4. Review	5. Post-Review	1. Approved	4. Reviewed no/comment
		2. Release	6. Dist. (Receipt Acknow. Required)	3. Information	2. Approved w/comment	5. Reviewed w/comment
		3. Information			3. Disapproved 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	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
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2	/	Cog. Eng. M.R. Adams	<i>M.R. Adams</i>	10/3/98							
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18. A.E. Young <i>A.E. Young</i> 10/8/98 Signature of EDT Date Originator		19. N/A Authorized Representative Date for Receiving Organization		20. J.W. Hunt <i>J.W. Hunt</i> 10/8/98 Design Authority Date Cognizant Manager		21. DOE APPROVAL (if required) Ctrl. No. <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments	
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Field Equipment Renovation Report for TWRS Mission Critical Systems

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Lockheed Martin Hanford Corp., Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

EDT/ECN: EDT-622481 UC: 2070
Org Code: 74B10 Charge Code: CACN 106597/COA BC20
B&R Code: EW 3120074 Total Pages:

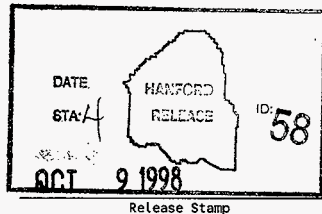
Key Words: Field Equipment Renovation, Field Equipment, TWRS, Mission Critical Systems, Mission Critical, Systems

Abstract: N/A

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Release Approval Date 10/9/98



Approved for Public Release

HNF-3356 Rev 0

**Field Equipment Renovation Report for TWRS Mission Critical
Systems**

September 1998

***Issued by:
Lockheed Martin Hanford Corporation***

***for the
United States Department of Energy, Richland Operations Office
Richland, WA***

Prepared by E. Ivar Husa and Linda Fergestrom .

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Field Equipment Renovation Report for TWRS Mission Critical Systems

1 Introduction

Lockheed Martin Hanford Company Tank Waste Remediation System (TWRS) has 28 systems identified as mission critical by Flour Daniel Northwest. These are on a fast track for Y2K compliance certification. This report identifies which of these systems have field equipment, what field equipment has been identified (by make and model) for Y2K review, and a disposition of any potentially noncompliant items. This report completes the renovation phase for the TWRS Mission Critical Field Equipment Y2K project.

A list of TWRS equipment was submitted to the DOE in 1997, and these items have also been dispositioned herein, thus meeting DOE reporting requirements.

2 Definitions

Compliant- Systems are judged to be compliant if their operation is not adversely affected by dates that refer to the next millennium.

Crosswalk- A mapping from one table to another. Row numbers indicate matching records (mapping).

FDNW- Flour Daniel Northwest

Field Equipment - Equipment that is not associated with a fixed installation and is typically distributed across the tank farms.

LMHC- Lockheed Martin Hanford Corporation

PC- personal computer

TWRS- Tank Waste Remediation System

Y2K- Year 2000

3 Disposition of Mission Critical Field Equipment

Table 3-1 lists the 28 TWRS Mission Critical Y2K projects and indicates whether each system (project) contains field equipment. Table 3-1 was derived from information contained in the Y2K project plans for these systems. Each of the systems containing field equipment was given further review. The system owner provided a list of the field equipment in each system to be addressed for Y2K concerns. This information from system owners provided the basis for the Top-Down Equipment List in Table 3-2.

3.1 Top Down List

Field equipment consists of a variety of items such as sensors, data collection devices, and even air conditioning systems. The Y2K team has a separate category called 'file servers' which includes general-purpose computers, even if deployed for a dedicated application. In other words, "PCs" are treated as servers and not field equipment.

TWRS Y2K project plans were reviewed to determine which of these plans likely had field equipment. The authors (system owners) of these plans were contacted and asked to provide a list of field equipment they thought might have Y2K problems (or not). The accumulation of their responses resulted in Table 3-2, the Top-Down List.

The TWRS Y2K team reviewed the information provided by the authors and augmented it as necessary. Each item was disposed of in one of these ways:

- determined Y2K compliant or removed from service (deactivated),
- replaced with new equipment,
- a contingency plan is committed to be completed by the milestone 3/15/99,
- order information from a third-party vendor concerning its Y2K compliance.
- determined that item is Y2K tolerant and that at least one option has been developed.

Options for disposition of the equipment are provided to the extent possible at this time.

Table 3-1 Mission Critical Project List

Y2K Compliance Project Name	Field Equipment Used?
Gas Characterization System	Yes
Tank Farm Spare Pump Database	No
Administrative Procedure Information System	No
Computer Automated Surveillance System	No
Cross-Site Transfer Monitoring System (W-058)	Yes
Dry Well Van Control Program	Yes
Master Equipment List Phase I	No
Micon Control System (MCS)	Yes
Procedure Information System	No
Surveillance Analysis Computer System	No
Tank Monitor and Control System	Yes
Temporary Labeling System	No
Data Acquisition and Control System (Tank 101-SY)	Yes
Gas Monitoring System - 2	Yes
Job Control System - Automated Data Processing	No
Liquid Observation Well Van Program	Yes
Tank Waste Network Information System	No

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Standard Hydrogen Monitoring System	Yes
Tank Characterization Database	No
Tank Vapor Database	No
Environmental Requirements Management Interface	No
ASPEN Flowsheet Modeling	No
Hanford Tank Waste Operations Simulator	No
TWRS Lessons Learned Information System	No
Saltwell HMI Intouch HMI SCADA Wonderware	Yes
Saltwell Wonderware DDE Server	No
Operator Interface AB DTAM	No
PLC Programming Software - Rockwell AB APS	No

Table 3-2 Top-Down Equipment List

Project	Manufacturer	Model	Indicated Compliant Y/N	Description	Source of Data	Disposition
W-030	Simplex Time Recording Co.	4100-8001	Yes	Fire Protection System	http://www.simplexnet.com/products/index2.html	When the date advances beyond December 31, 2003, the History log and printing reverts to 1988. Recommend upgrading panel software to Version 6.05, 7.05, 8.03 if desired. These versions will be available October 1998.
W-030	DA Data Aire Inc	DTAU-0332	Yes	Chiller	Wayne Winkleman	Will also be tested and certified as part of W-030 system compliance plan.
W-030	Durham Bush	ACDR-45-B	Yes	Chiller	FAX	Reports year 2000 as two-digit "00", but device will continue to operate across millennium. Devices getting data from this sensor must recognize the two-digit year field.
W-030	Caterpillar	3304b	Yes	Diesel Generator	Wayne Winkleman	No use of date was found, per Wayne Winkleman.
W-030	Eberline	AMS-4 V3.0	Yes	Air Monitor	http://www.eberlineinst.com/yr2000/year2000.htm	Vendor certification in hand.
W-030	Cutler Hammer	AF95	Yes	Variable Frequency Drive (VFD).	http://www.ch.cutler-hammer.com/y2k/index.htm	Cutler Hammer claims this device to be completely Y2K compliant. W-030 project will be testing anyway. TAVA reports this as compliant.
W-030	International Power Machines	IBP+10	Yes	Power protection device	http://www.exide.com/year2000.htm	Compliant per information provided in vendor's web pages.
W-030	Micon/Sun	Sparc -2 (Sparc 5)	Yes	Unix computer	http://www.usec.sun.com/	Unix computer has no problem with Y2K, per Wayne Winkleman.
W-030	Micon/Sun	U-32, RCM	N/A	Software	http://apsq102.rl.gov/y2k/index.html	Will be tested and certified as part of W-030 system compliance plan.
W-030	Micon	Ver 3.0.54	N/A	Control system software	http://apsq102.rl.gov/y2k/index.html	Will be tested and certified as part of W-030 system compliance plan.

GCS	Bio-Rad	FTS-175 FTIR	Yes	Spectrometer	Y2K Work Plan	No date/time function or computational capability is present in this instrument.
GCS	MTI Gas Chromatograph	M200	Yes	Gas Chromatograph	Y2K Work Plan	No date/time function or computational capability is present in this instrument.
W-058	Allen Bradley	PLC-5	Yes	Programmable Logic Controller	Y2K Work Plan and have letter from manufacturer.	Vendor has provided documentation that the PLCs are in compliance.
W-058	Panametrics	DF868	Yes	Flow Controller	Y2K Work Plan	Panametrics DF868 Flow Controller does process dates. Vendor documentation indicates that it is in compliance.
W-058	Permalert	PAL-AT	Yes	Leak Detection System	Y2K Work Plan	Permalert PAL-AT Leak Detection System does process dates. Vendor documentation indicates that it is in compliance (TAVA).
TMAC S	Acromag	4000 Series	Yes	I/O Processor	Letter from manufacturer	Vendor documentation indicates that this item is in compliance.
TMAC S	ENRAF	854	Yes	Computer Interface Unit	Letter from mfg.	Vendor documentation indicates that this item is in compliance.
TMAC S	Westronics	SM100	No-Tolerant	Smart Multiplexors	http://westronics.com/Y2KWEB/Y2K.htm	These instruments maintain the year in a two-digit format. Equipment will continue to function. The century is not displayed, printed, or used internally for any purpose. Datasheet from TAVA.
DACS	AEG Modicon	E984	Yes	PLC	http://www.modicon.com	Compliant per TAVA documentation.
GMS-2	Bio-Rad	FTS-25	No-Tolerant	Fourier Transform Infrared Spectrometer	Tava	Product requires a manual reset, and will continue to function.
GMS-2	Bruel & Kjaer	1302	No-Tolerant	Photoacoustic Infrared Spectrometer	Daron Tate	Daron Tate's data shows that this item is non-compliant, but that it can be used provided that a manual reset is performed.
GMS-2	HP	RGA-3	N/A	Gas Chromatograph	N/A	Equipment to be dispositioned by the GMS-2 Compliance Project
GMS-2	HP	RGA-5	N/A	Gas Chromatograph	N/A	Equipment to be dispositioned by the GMS-2 Compliance Project
GMS-2	Allen-Bradley	SLC 5/01	Yes	PLC	Y2K Work Plan and have letter from manufacturer.	The vendor CVI data shows that no date field is used by this PLC.

GMS-2	Bio-Rad	SPC3200	No-Tolerant	Computer for the FTIR	Daron Tate	Daron Tate's data shows that this item is non-compliant, but that it can be used provided that a manual reset is performed.
GMS-2	AST	486/33 Premmia	No	Computer	Daron Tate	Replaced
GMS-2	AST	Premium 486/66 - SE Tower	No	Computer	Daron Tate	Replaced
GMS-2	Spectra-Physics	SP4400	No-Tolerant	Computer	TAVA	Year is presented as two digits, thus is not compliant. Equipment still functions and work around was developed as part of GMS system compliance project.
GMS-2	IBM	IBM notebook 386	No	Computer (BlackBox)	Daron Tate	Replacement ordered and received.
LOWV P	IBM or compatible	486DX	No	Computer	Dave Barnes	Reassigned to file server project
LOWV P	Multiple possible sources	80C196KC	No-Tolerant	Microcontroller	Y2K Work Plan	The microprocessor does not access the PC system clock, and dates are not used at the microprocessor level.
SWP	Allen-Bradley	SLC-500	Yes	PLC	Y2K Work Plan and	Accept as-is, per letter from manufacturer.
SWP	Allen-Bradley	1747-DTAM-E	Yes	Data Table Access Model, operator interface	Jack Lamphere	Replaced with compliant version. Dispositioned by Saltwell Pumping Project.
SWP	Allen-Bradley	DCS-File Server - Wonderware 7000 software	Yes	Software	Jack Lamphere	Software was upgraded to a Y2K compliant version. This was dispositioned by the SWP Compliance Project
SWP	UtiliNet	Unknown	Yes	Radio Transmitter - computer data	Jack Lamphere	No date functions that are associated with this, per telcon with vendor (J. Lamphere)

4 Disposition of FDNW-LMHC Y2K Equipment Inventory

The TWRS Field Equipment Y2K Compliance Project was launched in 1997 by the creation and submission to DOE of a list of field equipment. The list was adopted by FDNW in the form listed in Appendix A. FDNW expanded the list of items with a quantity (number of such items in TWRS) into a list that had one record (or row) per instance. Thus 45-item list became a 2000 line list.

Appendix A includes a field called " **Crosswalk to Summary List** " which shows the mapping, or crosswalk, to the Summary List of FDNW-LMHC Y2K Equipment Inventory, Table 4-1. The summary lists every unique equipment type, with duplicate types removed. This is an appropriate step because the Y2K Field Equipment Project does not disposition these device types on a per-installation basis. The TWRS Y2K effort also goes beyond the 28 mission critical systems.

Table 4-1 includes some items of equipment not found in the 28 mission critical compliance projects. As a consequence, these items are not subject to the same Y2K schedules for renovation.

The first step in creating the summary list was to create a "crosswalk" between the FDNW-LMHC Y2K Equipment Inventory and the summary list (Table 4-1). To do this, the FDNW-LMHC Y2K Equipment Inventory file was sorted by Component Name and then by Component ID Number. All items with the same Component Name, Owner, Component Description, and Comments were designated as one item in the summary table. The crosswalk is given in Appendix A under the column titled "Crosswalk to Summary List".

Table 4-1, the summary list, is an alphabetical list of all the unique components from the FDNW-LMHC Y2K Equipment Inventory list. There are 45 items on the summary list. They are dispositioned as either compliant or potentially non-compliant using reasons consistent with dispositioning of equipment found in electronic databases, drawings, and procedures. All items determined to be non-compliant will be subject to further scrutiny. Some or all will be submitted to a contractor for further investigation. Some items on the list, such as the Light Duty Utility Arm, have compliance projects associated with them and have been indicated N/A (not applicable) in Table 4-1.

Table 4-1 Summary of FDNW-LMHC Y2K Equipment Inventory

Item Number	Item Name	Model	Compliant	Non Compliant	Reason/Disposition/Correction Strategy
1	4250G	CHESELL MODEL 4250G DATA LOGGER ON PORTABLE EXHAUSTERS B&C	X		E-mail 8/24/98 from Jeff Akers to Linda Fergstrom states Chessel data loggers are Y2K compliant.
2	ACROMAG SIGNAL CONDITIONER	ACROMAG SIGNAL CONDITIONER	X		E-mail 8/25/98 from Chuck Scaief to Linda Fergstrom states these do not have a calendar clock.
3	AMMONIA MONITORS	SHMS B&K AMMONIA MONITORS	N/A	N/A	See SHMS notebook for test plan, project plan, etc.; scheduled for compliance assurance by 7/31/99.
4	AMS-4	BETA PARTICLE CONTINUOUS AIR MONITOR (CAM), EBERLINE AMS-4, ON EXHAUSTERS B & C.	X		Utilizing engineering knowledge and experience, this item is Y2K compliant.
5	AMS-4 SOFTWARE	EBERLINE AMS-4 BETA CAM SOFTWARE	N/A	N/A	See Beta CAM notebook for test plan, project plan, etc.; scheduled for compliance assurance by 7/31/99.
6	ANALOG PRESSURE XMTRS	ELECTRONIC ANALOG PRESSURE XMTRS	X		Instrument technicians in 200 East Area shift office confirm that these have no dates.
7	CENTRAL SUBSTATION	CASS CENTRAL SUBSTATION	N/A	N/A	CASS scheduled for compliance assurance by 5/30/99 per project plan.
8	CHESELL/TAYLOR RECORDERS	CHESELL/TAYLOR RECORDERS		X	ABB & Eurotherm Chessel have (or have by inference) some recorders that are POTENTIALLY NON-COMPLIANT; product numbers would need to be given to specify items as COMPLIANT or POTENTIALLY NON-COMPLIANT; reference letter from Joanne Sleight to Bill Clarkson, August 27, 1998 and letter from Jeff Castleman to Bill Clarkson, August 27, 1998, respectively. Compliance projects with these recorders must check model numbers against

Item Number	Item Name	Model	Compliant	Non Compliant	Reason/Disposition/Correction Strategy
					available data to determine compliance status. If the collected information is not adequate, then a request to TAVA can be sent in. These recorders are also likely candidates for replacement, as well. A contingency plan may also allow these recorders to continue in-service. Note: Contingency plans are due 3/15/99
9	COMM INTERFACE UNITS	ENRAF COMMUNICATION INTERFACE UNIT.	X		E-mail 8/20/98, from Robert Arias @ ENRAF to Linda Fergestrom states these are Y2K compliant.
10	CONTROL SYSTEM	MICON CONTROL SYSTEM	N/A	N/A	MICON Control System scheduled for compliance assurance by 10/23/98 per W-030 test/project plan
11	DATA RECORDERS	SHMS WESTRONIC DATA RECORDER	N/A	N/A	See SHMS notebook for test plan, project plan, etc.; scheduled for compliance assurance by 7/31/99.
12	DIGITAL DISPLAY	DIGITAL DISPLAYS MADE BY DCI INC. & DAYTRONICS INC. ON CST 1,2,3 & 4	X		E-mail 8/24/98 from Jeff Akers to Linda Fergestrom states this equipment is not time of day or date aware.
13	DRYWELL COMPUTERS	DRYWELL VAN COMPUTERS	N/A	N/A	Dry Well Van scheduled for compliance assurance by 5/30/99 per project plan.
14	ENGRAVER	ENGRAVER IN MAINTENANCE AREA	X		No Y2K issues with engraver according to 2E instrument technicians.
15	FAX MACHINE	FAX MACHINE TOOL CRIB	X		Brother™ Intel Fax 1550 MC in 2W Tool Crib, //www.brother.com/y2k/index.html#status states Brother fax machines are Y2K compliant; no fax machine in 200 East Area tool crib.
16	GXTM-5133	GXTM-5133	X		A model of Dell Computer™ which uses a Pentium processor and does not pose a Y2K

Item Number	Item Name	Model	Compliant	Non Compliant	Reason/Disposition/Correction Strategy
					problem.
17	IN-SITU MOISTURE MONITORING SYSTEM	IN-SITU MOISTURE MONITORING SYSTEM	N/A	N/A	There are none in the field, per telcon with Fred Reich 9/14/98.
18	LEVEL GAUGES	ENRAF LEVEL GAUGES.	X		Utilizing engineering knowledge and experience, this item is Y2K compliant.
19	LIGHT DUTY UTILITY ARM	LIGHT DUTY UTILITY ARM	N/A	N/A	LDUA notebook will have test plan/project plan when completed.
20	MAGNETIC FLOWMETERS	MAGNETIC FLOWMETERS	X		Utilizing engineering knowledge and experience, this item is Y2K compliant.
21	MASSTRON	FLOW INDICATING TRANSMITTERS (FIT) AIR MONITOR CORP. (AMC) MASSTRON MODEL, ON EXHAUSTERS B & C.	X		E-mail 8/25/98 from Chuck Scaief to Linda Fergestrom states these do not have a calendar clock.
22	MC5500	GRAPHTEC MODEL MC5500 STRIP CHART RECORDER ON CORE SAMPLE TRUCK (CST) #2	N/A	N/A	E-mail 8/24/98 from Jeff Akers to Linda Fergestrom states this truck will no longer be used and was therefore not checked.
23	MODICON MODULES	DACS/MODICON MODULES	N/A	N/A	See DACS notebook for test plan, project plan, etc.; scheduled for compliance assurance by 7/31/99.
24	PCM-1B	PCM1B-PERSONAL CONTAMINATION MONITOR.		X	Documentation has been obtained from the vendor that this item is not Y2K compliant. This equipment could be replaced, but a more practical solution may be to develop and implement a contingency plan. The solution selected will be up to the equipment owners. Note: Contingency plans are due 3/15/99
25	PCM-1B SOFTWARE	PCM-1B SOFTWARE		X	E-mail 8/26/98 from Jerry Wilk to Linda Fergestrom states this is POTENTIALLY

Item Number	Item Name	Model	Compliant	Non Compliant	Reason/Disposition/Correction Strategy
					NON-COMPLIANT. This software could be replaced, but a more practical solution may be to develop and implement a contingency plan. The solution selected will be up to the equipment owners.
26	PRE AMS-4	CONTINUOUS AIR MONITOR: PRE AMS-4	X		According to instrument technicians at 2E shift office, there are no Y2K issues with the monitors.
27	PERFECTROL 6200	FLOW CONTROLLERS, AIR MONITOR CORP. PERFECTROL 6200 ON EXHAUSTERS B & C	X		E-mail 8/24/98 from Jeff Akers to Linda Fergstrom states this equipment is not time of day or date aware.
28	PROGRAMMABLE RECORDER	YEW PROGRAMMABLE RECORDERS	X		According to 2E instrument technicians, these are not being used; MR100/180/250 prior to 1988 are potentially non-compliant, after 1988 are compliant.
29	RECORDERS	CHESELL/TAYLOR RECORDERS		X	ABB & Eurotherm Chessell have (or have by inference) some recorders that are POTENTIALLY NON-COMPLIANT; product numbers would need to be given to specify items as COMPLIANT or POTENTIALLY NON-COMPLIANT; reference letter from Joanne Sleight to Bill Clarkson, August 27, 1998 and letter from Jeff Castleman to Bill Clarkson, August 27, 1998, respectively. Compliance projects with these recorders must check model numbers against available data to determine compliance status. If the collected information is not adequate, then a request to TAVA can be sent in. These recorders are also likely candidates for replacement, as well. A contingency plan may also allow these recorders to continue in-service. Note:

Item Number	Item Name	Model	Compliant	Non Compliant	Reason/Disposition/Correction Strategy
					Contingency plans are due 3/15/99.
30	RETAINED GAS SAMPLER	RETAINED GAS SAMPLER	X		No clock, this is a piece of sampling equipment.
31	SERIES 305	TEXAS INSTRUMENTS/SIEMENS SERIES 305 PROGRAMMABLE LOGIC CONTROLLER	X		No date or time function per Siemens Automation & Drives, Year 2000 - Product Overview, Status 03.03.98, Page 9/62.
32	SERIES 90	PANALARM SERIES 90 ANNUNCIATORS	X		Telecon 8/17/98 Chuck Fordham to Ervine Whitfield of AMETEK (PANALARM), Ervine stated that these items correctly process data.
33	SIGN DRAFTING MACHINE	SIGN DRAFTING MACHINE	X		Telecon 8/25/98 Linda Fergestrom to Ken Peiffer 372-0984 and Eric Blouin states sign drafting machines have no clock and no date function; therefore compliant.
34	SLC-500	ALLEN BRADLEY PLC'S (SLC-500) USED FOR SALTWELL SKIDS AND PORTABLE EXHAUSTERS	X		Letter attachment 8/17/98 from Joseph P. Owen, Jr. (Allen Bradley) to Jack Lamphere states these have no clock function.
35	SLC-500	ALLEN BRADLEY PLC'S ON SALTWELL SKIDS	X		Letter attachment 8/17/98 from Joseph P. Owen, Jr. (Allen Bradley) to Jack Lamphere states these have no clock function.
36	"SMART" PRESSURE TRANSMITTERS	"SMART" PRESSURE TRANSMITTERS	X		Instrument technicians in 200 East Area shift office confirm that these have no clock.
37	STRIP CHART RECORDER	PANEL MOUNTED STRIP CHART RECORDERS.	X		Instrument technicians in 200 East Area shift office confirm that these have no clock if not SHMS; SHMS instrumentation is covered under the SHMS project plan.

Item Number	Item Name	Model	Compliant	Non Compliant	Reason/Disposition/Correction Strategy
38	STRIP CHART RECORDER	SHMS YOKAGAWA STRIP CHART RECORDERS	N/A	N/A	See SHMS notebook for test plan, project plan, etc.; scheduled for compliance assurance by 7/31/99.
39	SURFACE MOISTURE MONITOR	SURFACE MOISTURE MONITORING SYSTEM	N/A	N/A	There are none in the field, per telcon with Fred Reich 9/14/98.
40	SWITCHES	PRESSURE SWITCHES, TEMPERATURE SWITCHES, FLOW SWITCHES, LEVEL SWITCHES	X		Instrument technicians in 200 East Area shift office confirm that these have no clock.
41	TEMP. DATA LOGGERS	AP TEMPERATURE DATA LOGGERS	X		Telecon 8/31/98 Linda Fergstrom to Doug Broz states AP temperature data loggers are Westronics Model 3200/MB; documentation from the manufacturer/vendor states these data loggers are Y2K compliant."
42	TEMPERATURE CONTROLLERS	TEMPERATURE CONTROLLERS	X		According to instrument technicians in 200 East Area shift office, temperature controllers (generally by Watlows) have no clock.
43	TEMPERATURE TRANSMITTERS	TEMPERATURE TRANSMITTERS	X		All temperature transmitters are compliant, through utilizing engineering knowledge and experience or obtaining documentation from the manufacturer/vendor.
44	VGR	ANGUS ELECTRONICS, MODEL VIDEOGRAPHIC RECORDER (VGR) 16, DATA LOGGER ON CST #3 \$ 4.	X		See VGRNET notebook for test plan, project plan, etc.; scheduled for compliance assurance by 7/31/99; E-mail 8/24/98 from Jeff Akers to Linda Fergstrom states Angus Electronics data loggers are Y2K compliant.
45	VOID FRACTION INSTRUMENT	VOID FRACTION INSTRUMENT	N/A	N/A	See VFI notebook for test plan, project plan, etc.; scheduled for compliance assurance by 7/31/99.

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4.1 Preventative Maintenance Equipment List

The Top-Down List is not a convincingly large list for all TWRS field equipment compliance, despite its pedigree. System owners tended to only include items suspected to be non-compliant. The owners typically left off many items project leads knew confidently to pose no Y2K concerns. In addition, the Y2K mission critical projects focus on tank monitoring equipment and not on the overall tank farm operating equipment. This lack of volume or thoroughness prompted the Y2K team to undertake additional efforts.

The Y2K team, using a list of all TWRS equipment in the Preventative Maintenance (PM) Database, has undertaken a comprehensive effort to identify all equipment that could have Y2K problems, whether within the scope of the 28 mission critical systems or not. The team has engaged the services of several instrumentation engineers with tank farm experience. The effort is proceeding on a three-stage approach:

- Review and disposition of the Preventative Maintenance List
- Review and disposition of TWRS maintenance procedures
- Review and disposition of tank farm drawings followed by cognizant engineer and/or tank farm entry, as necessary.

(Krishna Pandey extracted the Preventative Maintenance List from the JCS database. Equipment lists from both 200 East and West Areas were combined into a list of over 14,000 items.)

The overall effort to disposition all the TWRS field equipment will continue on schedule to meet the milestone for implementation due 3/31/1999. This report covers only the relatively small number of items that are part of mission critical systems. A later report will encompass all TWRS field equipment.

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Note: Because of its voluminous nature, appendix A is not contained in this released document. The appendix is on file in the year 2000 document file, section 7.1, located in 2750E/C-116.

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