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# Protocol for Disposition of Tank Farm Equipment Lists and Tank Farm Drawings for Year 2000 Compliance

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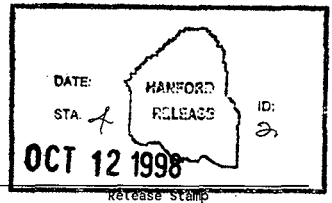
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PROTOCOL FOR DISPOSITION OF TANK FARM EQUIPMENT LISTS AND TANK FARM DRAWINGS  
FOR YEAR 2000 COMPLIANCE

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HNF-3424 REVISION 0

M.R. ADAMS  
J.A. JOHNSTON

OCTOBER 1998

LOCKHEED MARTIN HANFORD COMPANY

HNF-3424 REV 0  
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## 1.0 INTRODUCTION

A program has been initiated to assess, renovate, document and certify tank farm field equipment for year 2000 compliance. The program is necessary to assure no adverse effects occur in tank farm operations as a result of equipment malfunction due to what is widely known as the "millennium bug". This document elaborates the protocols for reviewing field equipment lists and tank farm drawings for the purpose of identifying and resolving year 2000 compliance problems in tank farm equipment.

## 2.0 OVERVIEW OF YEAR 2000 TWRS FIELD EQUIPMENT REVIEW PROCESS

Due to limitations in the documentation and configuration control of field equipment within tank farms, a multifaceted approach was adopted to identify and resolve potential year 2000 compliance problems within tank farm equipment. This approach assures that tank farm equipment compliance issues are identified and corrected with a very high degree of confidence despite the limitations inherent in any single approach. The multifaceted approach includes four major parallel efforts:

- 1- review of maintenance procedures to identify equipment that may have time or date dependent functions, programmable clocks or imbedded processors that process time or date dependent data
- 2- review of tank farm equipment lists to identify make and model of potentially non-compliant equipment
- 3- review of tank farm essential drawings to identify make and model of potentially non-compliant equipment
- 4- tank farm walkdowns to verify information collected from list and drawing reviews and to identify potentially non-compliant equipment not on equipment lists or drawings.

Following completion of the above four steps, equipment is evaluated for year 2000 compliance by one or more of the following methods:

- > expert review to determine if equipment has date dependent functions or processing capabilities
- > collection of vendor information by make and model number using the internet or a subcontractor (TAVA)
- > interviews with cognizant engineers and/or operators familiar with the design and operation of the equipment.

Following the evaluation, the equipment is separated into two lists: the Index of Compliant Items (IOCI) or the Potential Non-Compliant Sublist (PNCS). Items on the PNCS are subjected to further evaluation in an attempt to resolve their status. If the equipment is still determined to be non-compliant, a contingency plan is prepared for the make and model of non-compliant equipment.

The contingency plan may require one or more of the following actions:

- > replace hardware and/or software with certified items
- > test clock forward (if fail, select another option)
- > deactivate equipment
- > transfer function to compliant equipment
- > set clock back to run equipment, tolerate date output errors
- > equipment will run, tolerate date output errors
- > reboot equipment on or after 01/01/2000
- > provide administrative procedure to compensate for failure of equipment
- > recode and test software
- > provide ongoing manual override to compensate for equipment problem.

### 3.0 REVIEW OF MAINTENANCE PROCEDURES

As the first step in review of equipment, the TWRS Maintenance Procedure Index was utilized as a basis for reviewing the procedures. A key word search was made of the index using words such as clock, PLC, PCU-1, programmable logic, processor, timer, controller, etc. If a key word was discovered in a procedure, the procedure was reviewed to determine the equipment involved. Information concerning the equipment was then obtained from the Certified Vendor Index (CVI) file or the Job Control System (JCS). Potentially non-compliant equipment discovered by this method was placed on the PNCS list for further evaluation using vendor information, expert review or year 2000 subcontractor expert review (TAVA).

The methods and results of the maintenance procedure review effort are documented in HNF-3410, "Year 2000 TWRS Maintenance Procedure Review Report", Revision 0, 09/21/98.

### 4.0 REVIEW OF EQUIPMENT LISTS

#### 4.1 PURPOSE

The purpose of the equipment list review protocol is to provide a clear description of how the equipment lists are being used to identify and resolve potential year 2000 problems.

#### 4.2 ORIGIN AND NATURE OF THE PM/S LIST

The Preventative Maintenance System (PM/S) list is the primary list being used to identify field equipment that is potentially non-compliant. This list is currently the most up-to-date and comprehensive with regard to equipment that is related to the safe operation of tank farms. The PM/S list is a division of the Job Control System (JCS). The JCS is the system by which work packages are generated while the PM/S list is the database of components that have been identified as requiring preventative maintenance activities. The predecessor to the JCS was the Component Based Recall System (CBRS). The CBRS was used in December 1994 as the "seed" database for the current JCS.

Components are added to the PM/S list through a process in which the cognizant engineer identifies the component, the maintenance procedure(s), the maintenance intervals, etc. The results are documented by use of the PM/S Activity Form. The process also includes the completion of a Component Index Form on which the manufacturer, model, location, name, drawing numbers and other information are placed.

It is known that the PM/S list has limitations since it contains outdated, incomplete and erroneous information (e.g. wrong manufacturer). However, the database is the best available. Because of the limitations in the PM/S, the year 2000 effort has three additional and parallel efforts underway as described in section 2.0 above.

#### 4.3 RATIONALE FOR REVIEW PROTOCOL

The PM/S list (14,000 + items) is the primary list used for evaluation of components for year 2000 compliance. Despite its limitations, it is the best list available. The primary problem with the list is the fact that some components listed have no information as to manufacturer or model number. Both manufacturer and model number are necessary when performing internet searches to obtain manufacturer information regarding year 2000 compliance or in the use of specialty year 2000 information vendors (TAVA). Of the 14,000 + items in PM/S, about 1,600 have been relegated to a "no clue" list because only a component number (e.g. FT-301) is available. A vigorous effort has been made to cross-reference the component number with other lists such as the Master Equipment list and to cross-check with other compartments of the JCS. At the point where diminishing returns are realized with regard to identification of "no clue" items, further list review efforts will be discontinued. Discontinuance will not degrade the quality of the year 2000 review effort overall because procedure review, drawing review and tank farm walkdown efforts are expected to compliment, supplement and overlap the list review efforts.

#### 4.4 PROTOCOL FOR REVIEW AND IMPLEMENTATION

In light of the discussion in section 4.3 above, one or more of the following methods may be used to resolve components with incomplete information:

- > no make or model is available from any known source, however, if a portion of the information available is recognizable in another analogous item, the unknown item type may be inferred and the item may be dispositioned as IOCI.
- > in cases of truncated component identification numbers, extraordinary efforts sometimes yield more data from the JCS. Such efforts will continue to the point of diminishing returns.

One or more of the following situations may result in discontinuing further efforts to review and resolve equipment lists:

- > an item may be on the PM/S list, but not on any component list or vice versa resulting in incomplete information

> model numbers may not reflect the original equipment or source identification (e.g. a re-seller catalog number) making further tracking of the item difficult or impossible

> PM/S listings are outdated because they contain old tank farm nomenclature that was not carried over to more recent drawing revisions.

## 5.0 REVIEW OF TANK FARM DRAWINGS

### 5.1 PURPOSE

The purpose of this protocol is to describe which tank farm drawings will be reviewed and utilized for identification of tank farm equipment that may not be year 2000 compliant.

### 5.2 PROTOCOL FOR DRAWING REVIEW AND TANK FARM WALKDOWNS

Using HNF-SD-WM-PC-002, Rev. 11, "Tank Farm Essential Drawing Plan", all Essential Drawings and Support Drawings will be retrieved with the following names:

- > process and instrument diagram
- > engineering flow diagram
- > instrument flow diagram
- > other combinations or titles that appear to contain instrument information.

The retrieved drawings will be reviewed and used to implement the tank walkdown process. The tank farm walkdown process will be used to:

- > verify equipment shown on drawings that may have year 2000 problems
- > obtain additional information about suspect equipment that has not been obtainable by other methods such as make or model number
- > identify potential non-compliant equipment not shown on drawings.

In addition, all H-14 drawings or H-14 draft drawings with titles such as those above will be selected for review based upon input from design engineers familiar with tank farm systems.

### 5.3 RATIONALE FOR PROTOCOL

Essential drawings and support drawings are those selected by the DST facility staff per criteria listed in HNF-WM-PC-002, Revision 11. HNF-002 reflects the knowledge of the cognizant engineers and their expertise. By TWRS procedure, these drawings are given priority for update and currency.

The drawings listed in HNF-002 reflect two important criteria of interest to year 2000 compliance:

- > drawings that are essential to the safe operation and understanding of facility process and support systems
- > drawings that depict and identify instrumentation required by the Authorization Basis.



#### 5.4 PROTOCOL IMPLEMENTATION

To implement this protocol, drawings selected shall be reviewed for the presence of equipment suspected to be year 2000 non-compliant as listed on the attached table (table 1).

**H-14 DRAWING EQUIPMENT LIST RANKED BY SUSPECT PRIORITY**  
**9/24/98**

DESIGNATION	EQUIPMENT	SUSPICION
ACC	ACCUMULATOR	HIGH
DG	DIESEL GENERATOR	HIGH
GC	GAS CHROMATOGRAPH	HIGH
MUX	MULTIPLEXER	HIGH
R	RECORDER	HIGH
TV	VIDEO CAMERA	HIGH
UPS	UNINTERRUPTIBLE POWER SUPPLY	HIGH
AC	AIR CONDITION UNIT, ANALYSIS CONTROLLER	MEDIUM
AIC	ANALYSIS INDICATING CONTROLLER	MEDIUM
AIT	ANALYSIS INDICATING TRANSMITTER	MEDIUM
ARM	AREA RADIATION MONITOR	MEDIUM
AT	ANALYSIS TRANSMITTER	MEDIUM
ATS	AUTO TRANSFER SWITCH	MEDIUM
AY	ANALYSIS EQUIPMENT*	MEDIUM
CAM	CONTINUOUS AIR MONITOR	MEDIUM
CIT	CONDUCTIVITY INDICATING TRANSMITTER	MEDIUM
CONV	CONVERTER	MEDIUM
CRM	COUNT RATE MONITOR	MEDIUM
CRT	CONDUCTIVITY RECORDING TRANSMITTER	MEDIUM
CSS	CENTRAL SWITCHING STATION	MEDIUM
CT	CONDUCTIVITY TRANSMITTER, CURRENT TRANSFORMER	MEDIUM
DC	DENSITY CONTROLLER	MEDIUM
DIT	DENSITY INDICATING TRANSMITTER	MEDIUM
DR	DENSITY RECORDER	MEDIUM
DT	DENSITY TRANSMITTER	MEDIUM
DY	DENSITY EQUIPMENT*	MEDIUM
ET	VOLTAGE TRANSMITTER	MEDIUM
EY	VOLTAGE EQUIPMENT*	MEDIUM
FC	FLOW CONTROLLER	MEDIUM
FIC	FLOW INDICATING CONTROLLER	MEDIUM
FIRC	FLOW INDICATING RECORDING CONTROLLER	MEDIUM
FIT	FLOW INDICATING TRANSMITTER	MEDIUM
FIY	FLOW INDICATING EQUIPMENT*	MEDIUM
FQIT	FLOW TOTALIZER INDICATING EQUIPMENT	MEDIUM
FQT	FLOW TOTALIZER TRANSMITTER	MEDIUM
FR	FLOW RECORDER	MEDIUM
FT	FLOW TRANSMITTER	MEDIUM
FY	FLOW EQUIPMENT*	MEDIUM
HM	HOUR METER	MEDIUM
IR	CURRENT RECORDER	MEDIUM
IT	CURRENT TRANSMITTER	MEDIUM
IY	CURRENT EQUIPMENT*	MEDIUM
JC	POWER CONTROLLER	MEDIUM
JIT	POWER INDICATING TRANSMITTER	MEDIUM
JRC	POWER RECORDING CONTROLLER	MEDIUM
JT	POWER TRANSMITTER	MEDIUM
JY	POWER EQUIPMENT*	MEDIUM
KQI	TIME INDICATOR	MEDIUM
LCS	LOCAL CONTROL STATION	MEDIUM
LIC	LEVEL INDICATING CONTROLLER	MEDIUM

# H-14 DRAWING EQUIPMENT LIST RANKED BY SUSPECT PRIORITY

9/24/98

LIT	LEVEL INDICATING TRANSMITTER	MEDIUM
LT	LEVEL TRANSMITTER	MEDIUM
LY	LEVEL EQUIPMENT*	MEDIUM
MC	MOISTURE CONTROLLER	MEDIUM
MIT	MOISTURE INDICATING TRANSMITTER	MEDIUM
MON	MONITOR	MEDIUM
NIT	GAS INDICATING TRANSMITTER	MEDIUM
NR	GAS RECORDER	MEDIUM
NT	GAS CONCENTRATION TRANSMITTER	MEDIUM
NY	GAS EQUIPMENT*	MEDIUM
OT	TURBIDITY TRANSMITTER	MEDIUM
OY	TURBIDITY EQUIPMENT*	MEDIUM
PC	PRESSURE CONTROLLER, PERSONAL COMPUTER	MEDIUM
PDIC	PRESSURE DIFFERENTIAL INDICATING CONTROLLER	MEDIUM
PDIT	PRESSURE DIFFERENTIAL INDICATING TRANSMITTER	MEDIUM
PDR	PRESSURE DIFFERENTIAL RECORDER	MEDIUM
PDT	PRESSURE DIFFERENTIAL TRANSMITTER	MEDIUM
PDY	PRESSURE DIFFERENTIAL EQUIPMENT*	MEDIUM
PIC	PRESSURE INDICATING CONTROLLER	MEDIUM
PIT	PRESSURE INDICATING TRANSMITTER, PIT	MEDIUM
PR	PRESSURE RECORDER	MEDIUM
PRM	PROCESS RADIATION MONITOR	MEDIUM
PT	PRESSURE TRANSMITTER	MEDIUM
PY	PRESSURE EQUIPMENT*	MEDIUM
QY	MULTISIGNAL INTEGRATOR	MEDIUM
RIT	RADIATION INDICATING TRANSMITTER	MEDIUM
RR	RADIATION RECORDER	MEDIUM
RY	RADIATION EQUIPMENT*	MEDIUM
SE	SPEED/VELOCITY ELEMENT	MEDIUM
SGT	SPECIFIC GRAVITY TRANSMITTER	MEDIUM
SIC	SPEED/VELOCITY INDICATING CONTROLLER	MEDIUM
SIT	SPEED/VELOCITY INDICATING TRANSMITTER	MEDIUM
SR	SPEED/FREQUENCY RECORDER	MEDIUM
ST	STEAM TRAP, SPEED/VELOCITY FREQUENCY TRANSMITTER	MEDIUM
SY	SPEED/VELOCITY EQUIPMENT*	MEDIUM
TC	TEMPERATURE CONTROLLER	MEDIUM
TDC	TEMPERATURE DIFFERENTIAL CONTROLLER	MEDIUM
TDIC	TEMPERATURE DIFFERENTIAL INDICATING CONTROLLER	MEDIUM
TDR	TEMPERATURE DIFFERENTIAL RECORDER, TIME DELAY RELAY	MEDIUM
TIC	TEMPERATURE INDICATING CONTROLLER	MEDIUM
TIT	TEMPERATURE INDICATING TRANSMITTER	MEDIUM
TR	TEST RISER, TEMPERATURE RECORDER	MEDIUM
TT	TEMPERATURE TRANSMITTER	MEDIUM
TY	TEMPERATURE EQUIPMENT*	MEDIUM
UE	MULTIVARIABLE ELEMENT	MEDIUM
UI	MULTIVARIABLE INDICATOR	MEDIUM
UT	MULTIVARIABLE TRANSMITTER	MEDIUM
UY	MULTIVARIABLE EQUIPMENT*	MEDIUM
VIT	VIBRATION INDICATING TRANSMITTER	MEDIUM
VT	VENT TRAP, VIBRATION TRANSMITTER	MEDIUM
WFT	WEIGHT FACTOR TRANSMITTER	MEDIUM

**H-14 DRAWING EQUIPMENT LIST RANKED BY SUSPECT PRIORITY**  
**9/24/98**

WIT	WEIGHT/FORCE INDICATING TRANSMITTER	MEDIUM
WT	WEIGHT/FORCE TRANSMITTER	MEDIUM
WY	WEIGHT/FORCE EQUIPMENT*	MEDIUM
XT	FAILURE TRANSMITTER	MEDIUM
YY	EVENT CONVERTER	MEDIUM
YYC	PROGRAM CONTROLLER	MEDIUM
ZIT	POSITION INDICATING TRANSMITTER	MEDIUM
ZT	POSITION INDICATOR	MEDIUM
ZY	POSITION EQUIPMENT*	MEDIUM
EQUIPMENT* = SOLENOIDS, RELAYS, COMPUTING DEVICES		

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