DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	F.A.Graf, Jr.	Date Feb.15, 1995
Project Title/Work Order		EDT No. 601182
Computer Software Configuration Management Plan		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./Appendix Only	EDT/ECN Only
M.C. Arntzen	L4-93	1			
J.B. Benton	S6-71	1			
S.L. Carmichael	S6-71	1			
A.F. Crane	S6-71	1			
L.P. Diediker	T1-30	1			
F.A. Graf, Jr. (4)	S6-71	4			
P.G. Haigh	S6-77	1			
D.T. Heimberger	S6-77	1			
O.M. Jaka	R3-08	1			
E.A. Mcnamar	S6-71	1			
R.S. Pavlina	S6-77	1			
M.W. Peres	S6-71	1			
N.J. Sullivan	S6-71	1			
D.A. Vasques	S6-77	1			
R.B. Wurz	S6-71	1			
Central Files	L8-04 A3-80	2			
OSIT	L8-07	2			

^GMACPATH~GFE1000^G

MASTER

50

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

5

FEB 27 1995

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT

601182

2. To: (Receiving Organization) Distribution		3. From: (Originating Organization) Liquid Effluent Engineering		4. Related EDT No.: None	
5. Proj./Prog./Dept./Div.: C-018H/W-049H/W-291/W-252		6. Cog. Engr.: F.A.Graf, Jr.		7. Purchase Order No.: ICF-Kaiser 69913	
8. Originator Remarks: Issued for approval and release. Was issued for review as WHC-SD-C018H-CSCM-001. Now being issued as WHC-SD-LEF-CSCM-001.				9. Equip./Component No.: ETF/TEDF/PTECS Monitor and Control System	
				10. System/Bldg./Facility: 2025E	
11. Receiver Remarks:				12. Major Assm. Dwg. No.:	
				13. Permit/Permit Application No.:	
				14. Required Response Date:	
15. DATA TRANSMITTED					
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator
1	WHC-SD-LEF-CSCM-001		0	Computer Software Configuration Management Plan for 200East/West Liquid Effluent Facilities	SEQ
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	
(G)	(H)	17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)			
Reason	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	Cog.Eng. F.A.Graf, Jr.	<i>F.A.Graf, Jr.</i>	2-15-95	S6-75
1	1	Cog. Mgr. N.J.Sullivan	<i>N.J.Sullivan</i>	2-16-95	S6-75
1	1	QA M.C.Arntzen	<i>M.C.Arntzen</i>	2-16-95	L4-93
1	1	Safety O.M.Jaka	<i>O.M.Jaka</i>	2-16-95	R3-08
1	1	Env. L.P.Diediker	<i>L.P.Diediker</i>	2-21-95	T1-30
		See attached Distribution List			
18.		19.		20.	
F.A.Graf, Jr. <i>F.A.Graf, Jr.</i> Signature of EDT Originator Date 15 Feb 95		M.W.Peres <i>M.W.Peres</i> Authorized Representative for Receiving Organization Date 2/21/95		N.J.Sullivan <i>N.J.Sullivan</i> Cognizant Manager Date 2-16-95	
21. DOE APPROVAL (if required) Ctrl. No. [] Approved [] Approved w/comments [] Disapproved w/comments					

BD-7400-172-2 (04/94) GEF097^GMACPATH^GEF1000^G

BD-7400-172-1 (07/91)

RELEASE AUTHORIZATION

Document Number: WHC-SD-LEF-CSCM-001, REV 0

Document Title: Computer Software Configuration Management Plan for
200 East/West Liquid Effluent Facilities

Release Date: 2/27/95

**This document was reviewed following the
procedures described in WHC-CM-3-4 and is:**

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Kara M. Broz

February 27, 1995

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

This report has been reproduced from the best available copy. Available in paper copy and microfiche. Printed in the United States of America. Available to the U.S. Department of Energy and its contractors from:

U.S. Department of Energy
Office of Scientific and Technical Information (OSTI)
P.O. Box 62
Oak Ridge, TN 37831
Telephone: (615) 576-8401

Available to the public from:

U.S. Department of Commerce
National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Telephone: (703) 487-4650

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

MASTER

SUPPORTING DOCUMENT		1. Total Pages ^{2/02/95} 2422
2. Title Computer Software Configuration Management Plan for 200 East/West Liquid Effluent Facilities	3. Number WHC-SD-LEF-CSCM-001-	4. Rev No. 0
5. Key Words Process control and monitoring Liquid effluent Water treatment	6. Author Name: Frank A. Graf, Jr. <i>Frank A. Graf, Jr.</i> Signature Organization/Charge Code 86230/A2170	
7. Abstract <p>This Computer Software Management Configuration Plan covers the control of the software for the monitor and control system that operates the Effluent Treatment Facility and its associated truck load in station and some key aspects of the Liquid Effluent Retention Facility that stores condensate to be processed. Also controlled is the Treated Effluent Disposal System's pumping stations and monitors waste generator flows in this system as well as the Phase Two Effluent Collection System.</p>		
8. RELEASE STAMP <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"><div style="display: flex; justify-content: space-between;"><div>OFFICIAL RELEASE BY WHC DATE FEB 27 1995</div><div style="border: 1px solid black; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">5</div></div><p style="text-align: right; margin-top: 5px;"><i>Atto. 4</i></p></div>		

COMPUTER SOFTWARE CONFIGURATION MANAGEMENT PLAN
FOR
200 EAST/WEST LIQUID EFFLUENT FACILITIES

Revision 0

TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 OVERVIEW	1
1.2 PURPOSE	1
1.3 SCOPE	2
1.4 DEFINITIONS	2
1.5 SECURITY	5
1.6 HARDWARE/SOFTWARE DESCRIPTION	5
1.6.1 Hardware Descriptions	5
1.6.2 Software Descriptions	7
2.0 MANAGEMENT	8
2.1 ORGANIZATION	8
2.1.1 System Administrator	8
2.1.2 MCS Cognizant Engineers	8
2.1.3 Process Engineer	8
2.1.4 Instrumentation Technicians	9
2.1.5 Operator Group	9
2.2 RESPONSIBILITIES	9
2.2.1 Cognizant Manager	9
2.2.2 System Administrator	9
2.2.3 MCS Cognizant Engineers	9
2.2.4 Configuration Management	10
2.2.5 Information Resource Management	10
2.3 INTERFACE CONTROLS	10
2.4 IMPLEMENTATION	10
2.5 POLICIES, DIRECTIVES, AND PROCEDURES	10
3.0 ACTIVITIES	11
3.1 CONFIGURATION IDENTIFICATION	11
3.1.1 Software Documentation	11
3.1.2 System Software Identification	11
3.2 PROBLEMS, FAULTS and FAILURES	13
3.3 CONFIGURATION CONTROLS	13
3.3.1 Software Changes	13
3.3.2 Configuration Software Work Package Processing	14
3.3.3 Access Levels	14
3.3.4 Backup and Recovery Operations	15
3.3.5 Historical Data File	15
3.3.6 Graphic Display Files	15
4.0 TOOLS, TECHNIQUES, AND METHODOLOGIES	16

5.0 SUPPLIER CONTROL	16
6.0 RECORD COLLECTION AND RETENTION	17
7.0 REFERENCES	17

LIST OF FIGURES

1	LEF MCS Block Diagram	6
---	-----------------------------	---

LIST OF TERMS

ATP	Acceptance Test Procedure
CSCMP	Computer Software Configuration Management Plan
ECN	Engineering Change Notice
ETF	Effluent Treatment Facility
GPLI	General Purpose LAN Interface
I/O	Input/Output
LAN	Local Area Network
LEF	Liquid Effluent Facilities
LERF	Liquid Effluent Retention Facility
LCU	Local Control Unit
MCS	Monitor and Control System
OCS	Operator Control Station
OTP	Operational Test Plan
PTECS	Phase Two Effluent Collection System
P&ID	Piping and Instrument Diagram
RCM	Remote Control Module
RISC	Reduced Instruction Set Computer
RTD	Resistance Temperature Device
SPARC	Sun Microsystems Scalable Process Architecture
SALDS	State-Approved Land Disposal Site
TEDF	Treated Effluent Disposal Facility
VAC	Volts, Alternating Current
VDC	Volts, Direct Current
WHC	Westinghouse Hanford Company

COMPUTER SOFTWARE CONFIGURATION MANAGEMENT PLAN FOR 200 EAST/WEST LIQUID EFFLUENT FACILITIES

1.0 INTRODUCTION

1.1 OVERVIEW

This Computer Software Management Configuration Plan (CSMCP) addresses control of the software for the Effluent Treatment Facility (ETF), the associated Treated Effluent Disposal Facility (TEDF) Monitor and Control System (MCS), and the add-on Phase Two Effluent Collection System (PTECS). Collectively, these facilities are known as the Liquid Effluent Facilities (LEF) for the Hanford Site 200 East/West areas.

The ETF processes waste condensate to remove traces of radioactive particulates and organic contaminants, after which it is released to the soil column at an approved location. The TEDF and PTECS collect various acceptable-for-release streams around the 200 East and 200 West areas and transports the water to a State-Approved Liquid Disposal Site (SALDS).

Two additional facilities outside the ETF Building are monitored and controlled from the ETF Control Room: the Liquid Effluent Retention Facility (LERF) and the Truck Load-in Facility.

The Liquid Effluent Facilities include the ETF, the TEDF MCS, and PTECS. TEDF/PTECS is monitored and controlled from the ETF Control Room with a monitor and control system (MCS) similar to the ETF MCS. The ETF section of the MCS has three consoles and the TEDF/PTECS has three consoles. An engineering console is also located in the control room. The software for each use is separate, but an intertie will be established between each set of consoles that will allow exchange of information.

1.2 PURPOSE

The purpose of this document is to establish a Computer Software Configuration Management Plan (CSCMP) as required by WHC-CM-4-2, Quality Assurance Manual, Section QR 19.0, and WHC-CM-3-10, Software Practices Manual. This CSCMP manages the MCS software used to control and monitor the ETF processes and the TEDF pump stations and to monitor the various users' streams and various auxiliary areas outside the ETF Building.

This CSCMP identifies and defines the configuration items in a system, controls the release and change of these items throughout the system life cycle, records and reports the status of configuration items and change requests, and verifies the completeness and correctness of the items.

1.3 SCOPE

This CSCMP applies to ETF Process Engineering managers and MCS engineers responsible for the software/hardware and administration of the MCS system. It also applies to any other organization within the ETF that is currently active on the system, including operators and process engineers.

The MCS software monitors and controls the related instrumentation and control equipment inside and outside the ETF, as well as the 2 TEDF pump stations. It also monitors the characteristics of the flows received from generators of TEDF/PTECS effluent.

1.4 DEFINITIONS

Acceptance Test Procedure: A procedure that outlines the acceptance plan for testing the MCS system interfaces to the plant hardware. All input/output (I/O) is checked to verify that the correct field hardware is connected to the software-assigned points for the wire terminations.

Commercial Software: Licensed or copyrighted off-the-shelf software not subject to Westinghouse Hanford Company (WHC) design or specification requirements unique to WHC and typically used in applications other than WHC facilities. This software is typically ordered from the manufacturer or supplier on the basis of requirements set forth in the manufacturer's published product description (such as catalogs). Commercial software includes operating systems, language processors, spreadsheets, etc.

Configuration Management: A discipline applying technical and administrative direction and surveillance to identify, document and control software in order to prevent unauthorized changes and to protect the software's integrity.

Data Files: Electronic files developed using MICON function blocks [subroutines]) that define input and output variables (analog and digital) and provide specific attributes to these variables that direct the remote control modules (RCMs) in the processing of these variables. (See "RCM-32" and "Tag").

FIRMWARE: Programmed computer chips that contain the operating instructions for the system. These instructions cannot be altered by the computer user.

GPLI: General-purpose LAN interface used as a bridge for U-32 and RCM-32 remote controllers to communicate to the data highway.

Graphic Displays: Usually a flowsheet display showing equipment, valves and piping with interactive points inserted into the displays to show process data as well as alarms. Graphic displays can be built on the screen using predefined valves, pumps and other process

equipment; interconnecting lines are used to depict piping, valves and pumps. The graphic displays can also consist of video backgrounds into which pumps, valves and other process equipment are inserted and made dynamic. Liquid levels can also be made dynamic in the display background to show true liquid levels in the pump stations, disposal ponds and process vessels.

Graphic displays are also used to depict the logic employed; blocks or symbols are dynamically indicated for each logic step, showing its active/inactive status.

Group: A level of access defined by the system administrator for each user and plant component related to the MCS system.

Group Text File: A file that defines groups of parameters for display.

LAN: Local Area Network. The LAN is the data highway between the consoles and the GPLIs which then allows the local control units (LCUs) to communicate with the consoles.

MCS: The monitor and control system that operates the ETF, TEDF and PTECS. It is a commercially available distributed digital control system that employs controllers distributed throughout the ETF Plant and at each waste generator, as well as at the two pump stations, the load-in station and the collection system. It is manufactured by MICON and is known as the A/S Open System.

TMMICON A/S: Brand name of a distributed control system supplied by MICON Company (Powell Process Systems) of Houston, Texas.

MICON View: Operation and configuration software provided by MICON Company for the MICON A/S distributed control system.

MCS Cognizant Engineer: The engineer(s) responsible for distributed control system manufactured by Micon and is known as the A/S Open maintaining the software.

Operational Test Procedure (OTP): A procedure that documents a live test of the equipment with simulated feed and all equipment operating. The test is conducted per WHC-CM-6-1, Standard Engineering Practices, Section 4.1, "Design Verification Requirements."

PID Controller: A process controller (flow, level, pressure, etc.) that uses the proportional-integral-derivative algorithm.

Pipe and Instrument Diagram (P&ID): A piping and instrument schematic of a processing facility that shows the major equipment (tanks, pumps, valves, etc.), the connecting piping and services, and the associated instrumentation. These drawings are traditionally used as the design guide for process control, and document the field instruments and their interfacing to the control system.

TMMICON is a registered trademark of Powell Process Systems, Inc.

RCM-32: A multi-loop programmable controller with I/O signal processing capabilities. RCM-32s can be used either for signal I/O processing only or for signal processing and control logic.

Release: Release is an activity covered by WHC-CM-3-10, Software Practices, Section SP-6.1, "Document Control." A WHC release stamp certifies that a document is a controlled version, is approved for the intended use, is entered into a database, and is retrievable.

Software: Computer programs, procedures, and possible associated documentation and data pertaining to the operation of a computer system. Software includes: user-provided instructions and data that implement function blocks (preprogrammed algorithms) in control systems; computer codes and data that will reside in firmware; and, where specified by the cognizant manager, user-provided instructions and data used by commercial software such as spreadsheet and database packages.

Software Information: Unclassified software, software-generated reports and listings, manuals, documentation, data libraries or machine-readable media.

Solaris Software: Software containing the Unix operating system and the OpenWindows software. This software is provided by Sun Microsystems.

SPARCstation: A trademark registered to Sun Microsystems, Inc. for a Unix-based computer system that incorporates RISC (reduced instruction set computer) architecture.

System Administrator: The MCS cognizant engineer responsible for Liquid Effluent Facilities software. The system administrator is assigned top access to the MCS system and administers all access control for the MCS system through passwords and levels of access for all users.

System Configuration: The completed database that allows the distributed control system to set up a specific control and display strategy for the plant system and process.

Tag: A generic term for variables (analog or digital) defined by the MCS software and used by the controllers. Tags are programmable to process input and output data as specified by the executable logic files. Tags can be real (input or output) or virtual (assignable within the software to calculated variable or at various places within the software where identification and viewing of that place within the software is useful).

User: The person or persons who operate or interact directly with the system. The user(s) are generally the process operators.

U-32: A multi-loop programmable controller with dual network communications capability. The U-32 acts as a distributor of data between the remote control modules (RCM-32) and the data highway via the GPLI.

1.5 SECURITY

Security for the MCS system is provided by limiting access to the system through the use of passwords to various security levels. The system administrator controls access through a log-in procedure that consists of Login name and a password consisting of 6 to 16 characters. The access control program is pre-existing and is found in Unix operating system and MICON View. This program allows the system administrator to define the level of access and the breadth of allowed operations for each level.

1.6 HARDWARE/SOFTWARE DESCRIPTION

1.6.1 Hardware Descriptions

The MICON A/S distributed control system (see Figure 1) consists of 7 consoles or workstations (6 operator and 1 engineering), a data highway, and numerous Local Control Units (LCUs).

Each console is based on a Sun Microsystems Scalable Process Architecture (SPARC) 10, Model 30, workstation. Each workstation contains 64 megabytes of memory, 1 gigabyte hard drive, 1 3-1/2-inch floppy drive, a 150-megabyte tape backup, an ASCII keyboard, a universal operator keyboard for operator use, and a trackball.

There are also 644-Mbyte internal SunCD Packs for downloading Solaris and A/S system software. In addition, each SPARC 10 is capable of supporting 2 video outputs, 2 RS-232 serial ports, and 2 ethernet ports (a thick-net and a thin-net). The video ports are connected to a high-resolution color monitor. The RS-232 ports are connected to 2 Emerald model FPXT single-board IBM XT-compatible computers with touchscreen used as an Intelligent Operator Keyboard (IOK) and annunciator. The Emerald FPXTs are preprogrammed by MICON Company and cannot be changed by the user. One of the two ethernet ports, the thin-net, is connected to the data highway via a general purpose local area network (LAN) interface (GPLI). The thick-net provides a LAN between the consoles.

The data highway is the main data link between the consoles and the process control cabinets in the ETF building. Outside the ETF, telephone modems are used to communicate with the remote LCUs.

The data highway consists of 2 redundant coax cables that run between all 7 consoles and ETF LCUs. The data highway is a LAN using a high-speed token ring passing protocol.

Figure 1
Block Diagram of the Monitor Control Systems for
ETF & TEDF/PTECS

29412027.1
revised 12/12/94

The data highway is also redundant. This means that if one of the cables fails, communication is automatically passed to the other.

Communication with the LCUs outside the ETF Building is by non-redundant telephone modems connected in a star configuration to the data highway via GPLIs. The LCUs consist of 2 redundant main controllers (U-32s) and several process controllers (RCM-32s). The U-32s and RCM-32s communicate via a small LAN called a field bus. The U-32 is a MICON-built controller based on the Motorola 68020 processor. Although it can be used to directly control instruments and devices in the field, its primary purpose is to pass information between the consoles and the RCM-32s. Each U-32 has a redundant backup. The RCM-32s are also built by MICON and based on a Motorola 68030 processor. These controllers provide input and output directly to field instruments and other devices. The RCMs can also have a one-for-one backup, and do in some critical locations, such as the TEDF pump stations.

Six types of cards are used in this system: A, B, C, D, Dr, and F. The A cards are used primarily for analog signals, and have 26 analog input capacity and 4 analog outputs. The A modules provide hardware for any standard analog instrument input (4 to 20 milliamp) and provide a standard (4 to 20 milliamp) output signal. They provide 2 28-volt DC discrete (on/off) channels that may be used for input, output, or both. The B cards are mixed analog and discrete on/off, and have 8 analog inputs, 4 analog outputs, and 20 either discrete input analog out and 2 discrete (on/off), 28-VDC channels. The C cards have 18 analog in, 12 analog out and 2 discrete (on/off), 28-VDC channels. The D cards have 32 on/off, 110-VAC with transistor configuration. The Dr card provides 32 on/off channels that can be used as inputs, outputs, or both and are used with relays for switching higher than 2 Amps at 110 VAC. The F card provides 26 RTD inputs, 4 analog outputs and 2 discrete (on/off) channels.

1.6.2 Software Descriptions

Software for the SPARC 10 workstations is in 4 layers. The first layer is the Unix operating system, and the second is the OpenWindows user interface. Both the Unix operating system and OpenWindows are provided by Sun Microsystems under the trade name Solaris. The third layer is the MICON View control system software provided by MICON Company. The last layer is the user configuration or applications database. This is a database of all process information that can be displayed and/or recorded by the system.

The U-32 and RCM-32 software is in 3 layers. The first layer is the RTS-C-based operating system supplied by MICON Company. The next layer is the MICON program compiler, also supplied by MICON Company. The third layer is the user program created by the MICON View software in the SPARC workstations based on user input. The user program is downloaded to the U-32s and RCM-32s over the data highway.

Unix, OpenWindows, MICON View, RTS-C, the MICON program compiler, and the Emerald FPXT computer (electroluminescent touch screen key pad or local operator

interface) programming are off-the-shelf software and are not subject to this configuration management plan. However, updates involving any of these software packages will come in as a new version of the A/S Open software and will require some reverification prior to startup.

Verification that the system will boot up shall be made, followed by verification that all controllers are on line followed by a check that a control function in each LCU functions as expected.

2.0 MANAGEMENT

2.1 ORGANIZATION

There are four groups of system users; these groups define the level of access to the data files and other programmable files within the MICON A/S. These access levels permit certain operations and exclude others. The breadth of these operations may also be limited depending upon the user group. The groups are defined below in terms that not only relate them to ETF organizational elements but also to operations that are permitted (restricted) under the MICON A/S access control system.

2.1.1 System Administrator

The system administrator has the highest access level and is permitted any and all software operations, including access to security data file (password assignments), changes to access levels and breadth of operations, etc. One alternate system administrator shall be designated by the ETF Process Engineering Manager.

2.1.2 MCS Cognizant Engineers

The MCS cognizant engineers' access level is immediately below that of the system administrator. The cognizant engineer cannot access the security file and password information. There shall be two cognizant MCS engineers for the Effluent Treatment Facility and one for the TEDF/PTECS. One of the ETF MCS cognizant engineers shall be responsible for the main treatment train and the other for the secondary treatment train control. Access for the two ETF MCS cognizant engineers shall be set up so that one cannot get into the other's area of assignment. The TEDF/PTECS MCS cognizant engineer shall be on a separate SPARCstation system and shall have sole responsibility for its software.

2.1.3 Process Engineer

The process engineers do not have authority to make software changes except to build group displays; they have "look see" authority only. Process engineers that are designated as shift engineers may have the authority to reboot a SPARCstation on the night shifts. An

Engineering Work Station and SPARCstations linked to the MCS shall be provided for the process engineers' use in viewing the process.

2.1.4 Instrument Technician

The instrument technicians are assigned access levels that permit testing and maintenance of the system to include "troubleshooting" hardware. Software configuration changes and adjustments to input and output parameters are not permitted. Breadth may be limited to specific LCUs, buildings, or systems, because some of the LCUs will be maintained by the waste generators that feed to the TEDF/PTECS pipeline disposal system.

2.1.5 Operator Group

The operator group consists of the process operators. The group can change equipment settings within the prescribed operating ranges, alter equipment lineup, select approved data displays, set up trends, build group displays, review historical and operational data, and, in general, control and monitor facility systems and processes. Breadth of control may be limited to specific systems and processes.

2.2 RESPONSIBILITIES

2.2.1 Cognizant Manager

The cognizant manager is responsible for ensuring the configuration management controls identified by this document are implemented and that all documents are assigned an appropriate designator level per WHC-CM-3-5, Document Control and Records Management Manual.

2.2.2 System Administrator

The system administrator is responsible for: identifying the functional requirement of the computer software; establishing the designator level of the computer software documentation; ensuring that configuration management requirements are followed; overseeing and ensuring the configuration and security of the system, including maintaining the password list; approving, implementing and tracking engineering change notices (ECNs); approving revised existing software; implementing new engineering data transmittals; ensuring that the control and monitoring features are as required; maintaining the system data directory; maintaining and storing the backup tapes; and archiving the required historical data.

2.2.3 MCS Cognizant Engineers

The MCS cognizant engineers are responsible for approving ECNs for new revisions to software and for identifying the functional requirements within the ECN. The TEDF/PTECS cognizant and one of the ETF cognizant engineers are responsible for maintaining each

database. The ETF database is one entire database and cannot practicably be divided between primary and secondary systems.

2.2.4 Configuration Management

Configuration Management is responsible for assigning a supporting document number to and releasing the computer software documents.

2.2.5 Information Resource Management

Information Resource Management (IRM) is responsible for providing appropriate vault storage for record copies of software documentation and for providing appropriate records management requirements.

2.3 INTERFACE CONTROLS

The process P&ID drawings, the logic diagrams and the tag list function as the mechanism that controls and defines the system interfaces. In general, the interface between the MCS consoles and the process that the MCS controls is at the digital/analog input/output terminals or the terminal strips. The P&ID drawings, logic diagrams and tag lists shall be controlled and all changes to these documents shall be via an ECN per WHC-CM-6-1, Standard Engineering Practices, Section EP-2.2.

2.4 IMPLEMENTATION

This software management configuration plan, when issued, is the controlling document for the MCS system at LEF. It shall be in force after the operations testing procedure (OTP) has been completed and shall be strictly adhered to by all parties concerned. Changes to the P&IDs, the logic diagrams and the tag list shall be by ECN as described in WHC-CM-6-1, Section EP-2.2, "Engineering Document Change Control Requirements." The MCS shall be validated by performing the system acceptance test using the acceptance test procedure (ATP) and OTP.

2.5 POLICIES, DIRECTIVES, AND PROCEDURES

Software shall be designed and developed in compliance with WHC-CM-3-10 Software Practices Manual. Computer software shall be design verified in accordance with WHC-CM-6-1, EP-4.1, "Design Verification Requirements," and validated in accordance with EP-4.2, "Testing Practices." Computer software documents shall be approved and released in accordance with EP-1.6, "Engineering Data Transmittal," EP-1.7, "Engineering Document Approval and Release Requirements," and revised in accordance with EP-2.2, "Engineering Document Change Controls".

3.0 ACTIVITIES

3.1 CONFIGURATION IDENTIFICATION

3.1.1 Software Documentation

Three magnetic tape copies (150 Mbyte) shall be made of all software associated with the MCS. One tape shall reside in the ETF Control Room, one with the system administrator, and one with the cognizant engineering manager. Each tape shall include software identification per Section 3.1.2.

3.1.2 System Software Identification

WHC-CM-3-10, Software Practices, requires that the 150-Mbyte tapes are to be labeled as follows:

1. Tape identifier (number).
2. Software identifier
3. Software revision identification
4. Software name
5. Responsible organization and system administrator's name
6. Recording date and time.

3.1.2.1 Solaris Software. The Solaris software is contained on a CD ROM disk and shall only be used for recovery purposes.

3.1.2.2 MCS Software. The MCS software and several other files shall only be used for recovery purposes. The backup for these file shall be done on 150 Mbyte magnetic tape. Any new release received will be labeled A/S VIEW followed by the date and revision. For example:

MICON A/S VIEW
RELEASE XXXX
DECEMBER 10, 1994
P/N ASSW/SPARC:A1B0C0D1

Westinghouse Hanford Company shall add the responsible organization, the system administrator's name and the MCS system (either ETF or TEDF/PTECS) to the label. This tape shall also be used to back up the following directories:

- /HOME2/RUN
- /HOME2/DATA
- /HOME/DISPLAY BUILDER
- /HOME2/DATAVIEWS

3.1.2.3 Configuration Files. Configuration files are named in two parts. The first part identifies the MICON tag by relating it to the LCU, rack and slot where the RCM-32 is located; e.g., RCMA103 would indicate LCU1, slot3 and board type A. Three files per controller are generated when using the configuration utility: RCMA103.mcf103, RCMA103_mcf103 and mcf103. The first file is the text file that is displayed in the base window of the configurator. The second file is the link list that helps generate the controller files, and the third file is a "C"-based file that is downloaded and compiled in the RCM-32 controller at run time.

3.1.1.4 Group Text File: The group text file contains the information for controlling the console group display, such as: switches, controllers, alarms and indicators. Input to this file can be made by the cognizant engineer, system administrator or process operator through the access level assigned to them. The group text file shall be identified by the size of the file, month, date and time; for example: gconfig.dat 202031 OCT19 12:41.

Once the change has been implemented and compiled, the file shall be exported from the machine code to ASCII, replacing the existing file (after a backup of the old program has been completed [see section 3.1.2.7]). This action shall cause the identifier to change its values. This text file shall be updated on the backup tapes and stored as outlined in Section 3.1.2.

3.1.1.5 Data Directory Backup Tape. Any time a change is made to any files other than the group text file, a backup shall be made. The data directory backup file shall contain the access level security files. The backup shall be made on mag tape and labeled with the following information: system name, tape identifier, and date. For example:

MCS SYSTEM EFFLUENT TREATMENT FACILITIES 200E/200W Data.dir backup Date: 1/24/94
--

This label shall be placed on the outer housing of the tape.

3.1.1.6 Miscellaneous Directories Backup. The following files shall be backed up on an additional tape and shall contain the following directories:

- /USR/LIB/SHINKO
- /USR/LIB/PF
- /USR/LIB/TCPCON
- /USR/LIB/SOFTPC/DOS2UNIX
- /USR/LIB/SOFTPC/UNIX2DOS

A label shall be placed on the tape cover as described in Section 3.1.2.2. The first line of the label shall read "Miscellaneous Directories," followed by the date and revisions.

3.2 PROBLEMS, FAULTS AND FAILURES

Problems, faults and failures shall be reported, controlled, processed, corrected, retested, and closed out.

3.3 CONFIGURATION CONTROLS

3.3.1 Software Documentation Changes

The approval process for ECNs is defined in WHC-CM-6-1, Standard Engineering Practices, Section EP-2.2. The system administrator must sign all ECNs. The cognizant process system engineer must sign the ECN if basic documentation (P&IDs, the tag list or logic diagrams) is affected by the change.

Redlined copies of the P&IDs, logic diagrams and tag list shall be used until the end of OTP testing. At that time, the logic diagrams and P&IDs shall be finalized and the tag list, which is not normally released until the end of the project, will be issued. The tag list shall be issued as Supporting Document WHC-SD-WO49H-SWD-001.

Initial development of system configuration software or modification of existing configuration software shall be documented on a J-1 Form and processed in accordance with WHC-CM-8-8, Job Control System.

The format for configuration software work packages shall include a J-1 (Work Request) form for problem identification and a J-4 (Resolution/Retest) form for resolution of the identified problem.

An EDT shall be used for initial approval and release of critical system software in accordance with WHC-CM-6-1, Section EP-1.6. All software development before initial release is considered developmental.

An ECN shall be used for revising approved and released configuration software in accordance with WHC-CM-6-1, EP-2.2. For changes to existing databases, an approved ECN must be issued before the database is actually changed.

A J-7 form(s) shall become part of the configuration software work package when revising or correcting logic and/or graphic changes during acceptance testing of critical system software.

Approval requirements for either initial release or revision of configuration software are determined by the system administrator. Determination of the software approval designator shall be made by use of WHC-CM-3-5, Section 12.7.

3.3.2 Configuration Software Work Package Processing

The configuration software work package shall be processed and reviewed by the cognizant engineer for the affected system.

The cognizant engineer shall ensure that the functional requirements are defined to resolve the identified problem. Resolution requirements shall be stated in the resolution block of the J-4 form or attached as a separate document. The functional requirements shall be stated in such a way as to give clear and specific guidance to the MCS cognizant engineer for designing and developing the new configuration software.

The cognizant engineer shall ensure that the final test conditions and acceptance test criteria are defined in the resolution requirements or that a target date be established for the development of the final acceptance test conditions.

Acknowledgement that all requirements have been met and that the specifications meet conditions for configuration software development and system testing shall be indicated by the cognizant engineer's and cognizant engineer manager's signatures in the respective signature blocks of the J-4 form.

3.3.3 Access Levels

The MCS security system is configured completely by the system administrator, who defines the security system layout, passwords, user capabilities and restrictions.

The system administrator assigns each user to a user group. Each group of users is assigned certain capabilities to perform operations (read, write, download, etc.), along with certain restrictions. If a user is assigned the capability with restrictions, then a password is required to perform the operation. Each operation type is assigned an "access" level to perform an operation, restricted or not.

Each data point can be assigned a point access level. A user must possess a sufficient access level to perform an operation on a protected point. An optional point password also may be required.

The system administrator maintains the list of passwords to the MCS system.

3.3.4 Backup and Recovery Operations

Media control is exercised to ensure that the MCS software and LEF-developed software is backed up after each modification. These backup tapes allow reloading the computer files. Three backup tapes are maintained. One copy shall be stored in a locked system file cabinet(s) in the Control Room. Another copy shall be stored by the Process Engineering Manager, and the third copy by the system administrator.

The prior backup shall remain so that if the entire system is dumped or lost during the modification process, the last operating computer software can be used to regenerate the operating files and achieve recovery.

3.3.5 Historical Data File

Selective historical data files are transferred to 150-megabyte magnetic tapes. These tapes shall be transferred to the Engineering Work Station, where the data will be downloaded to a 644-Mbyte WORM (write many times, read only once) drive for permanent storage. A label containing the following information shall be placed on the tape covers: identification, historical data, volume number and date. For example:

Liquid Effluent
Treatment
Facilities
Historical Data
Volume 1
Starting Date
XX/XX/XXXX
Ending Date
XX/XX/XXXX

A similar label shall be attached to the WORM disk.

3.3.6 Graphic Display Files

The graphic displays are built using a licensed package called A/S DRAW. The final graphic displays printed cannot indicate which tags are built into the software; the software files are not readable. Therefore, the graphic display structure (outline and piping details) can be documented by making a hard copy of the display. Documenting the software that created the display is not practical. The tags imbedded into the graphic display, however, can be scrolled up when the graphic display is called online, and printed. Thus, the structure outline, the tags imbedded into the graphic display, and the file creation date shall constitute control of the graphic display.

4.0 TOOLS, TECHNIQUES, AND METHODOLOGIES

No additional tools, techniques, or methodologies are used in maintaining configuration control other than those supplied as part of the commercially available MICON and Solaris software.

5.0 SUPPLIER CONTROL

1. The ETF Process Engineering Manager ensures that a specification for the product is provided and that the requirements for testing are included.
2. The ETF Process Engineering Manager ensures the product acceptance criteria are specified.
3. The ETF Process Engineering Manager ensures the deliverable software to be provided by the supplier are specified.
4. The ETF Process Engineering Manager ensures the minimum documentation required for the contract-developed, quality-affecting software is specified in or included with the:
 - Inter-contractor work authorization, or
 - Application/implementation plan (see WHC-CM-1-3, MRP 3.13).
 - Purchase order.
5. The minimum set of deliverables (see WHC-CM-4-2, QR 19.0) required for contract-developed, quality-affecting software is software source code on machine-readable media and the following documentation:
 - Annotated logic diagrams
 - Annotated P&IDs
 - User documentation
 - Factory acceptance test report
 - An annotated printout of all configuration software.

6.0 RECORD COLLECTION AND RETENTION

- Historical Data Files will be permanently stored on WORM drive disks.

7.0 REFERENCES

WHC-CM-1-3, Management Requirements and Procedures, Sections MRP 5.43, "Impact Levels," and MRP 5.46, "Safety Classification of Systems, Components and Structures," Westinghouse Hanford Company, Richland, Washington.

WHC-CM-3-5, Document Control and Records Management Manual, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-3-10, Software Practices, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-2, Quality Assurance Manual, Section QR 19.0, "Software Quality Assurance Requirements," Westinghouse Hanford Company, Richland, Washington.

WHC-CM-6-1, Standard Engineering Practices, Sections EP-1.6, "Engineering Data Transmittal," EP-1.7, "Engineering Document Approval and Release Requirements," EP 2.2, "Engineering Document Change Control," EP-4.1, "Design Verification Requirements," and EP-4.2, "Testing Practices," Westinghouse Hanford Company, Richland, Washington.