S

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.		4. USQ Required?	5. Date
Supplemental ☐	J.W. Green, Facilities Eng., X4-01, 372-1597		☐ Yes ☒ No	10/4/2000
Direct Revision ☒				
Change ECN ☐	6. Project Title/No./Work Order No.	7. Bldg./Sys./Fac. No. 142K/93-1/CVD		8. Approval Designator
Temporary ☐				
Standby ☐	Cold Vacuum Drying Facility			Q
Supersedure ☐	9. Document Numbers Changed by this ECN (includes sheet no. and rev.)	10. Related ECN No(s).		11. Related PO No.
Cancel/Void ☐	SNF-6949, Rev. 0	NA		NA

12a. Modification Work	12b. Work Package No.	12c. Modification Work Completed	12d. Restored to Original Condition (Temp. or Standby ECNs only)
☐ Yes (fill out Blk. 12b)		NA	NA
☒ No (NA Blks. 12b, 12c, 12d)	NA	Design Authority/Cog. Engineer Signature & Date	Design Authority/Cog. Engineer Signature & Date

13a. Description of Change   13b. Design Baseline Document? ☒ Yes ☐ No

The SCMIP document for the CVDF MCS (SNF-6949)was changed to clarify the procedure for processing software changes and documenting those changes. In addition, a concurrence signature block was added for the Operations Manager to ensure communication of software changes to Operations.
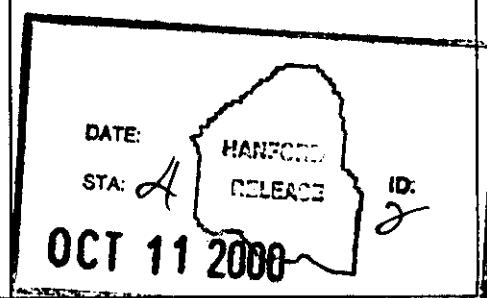
No USQ screening is required because this is a document change to clarify the software change process, therefore is a categorical exclusion according to Appendix C, Section B.1 of AP-NS-4-001.

14a. Justification (mark one)	14b. Justification Details
Criteria Change ☐	Rev. 0 of the SCMIP document was not sufficiently clear on the software
Design Improvement ☐	change process. A Software Change Config. Flow Diagram was added (Fig
Environmental ☐	1)to help clarify the process.
Facility Deactivation ☐	
As-Found ☐	
Facilitate Const. ☐	
Const. Error/Omission ☐	
Design Error/Omission ☒	

15. Distribution (include name, MSIN, and no. of copies)

JR Gregory	X3-78	(1)	AN Artzer		X3-78	(1)
FD Choyeski	X3-71	(1)	SNF Project Files		X3-11	(1)
CS Haller	X3-78	(1)				
JR Brehm	X3-79	(1)				
R Whitehurst	X3-78	(1)				
RD Dunlap	X4-01	(1)				
DA King	S1-53	(1)				
HM Chafin	X3-78	(1)				
JW Green	X4-01	(1)				

RELEASE STAMP

DATE: HANFORD

STA: RELEASE   ID:

OCT 11 2000

A-7900-013-2 (10/97)

16. Design Verification Required	17. Cost Impact					18. Schedule Impact (days)	
	ENGINEERING			CONSTRUCTION			
☐ Yes	Additional ☐	$ NA	Additional ☐	$ NA		Improvement ☐	NA
☒ No	Savings ☐	$ NA	Savings ☐	$ NA		Delay ☐	NA

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	☐	Seismic/Stress Analysis	☐	Tank Calibration Manual	☐
Functional Design Criteria	☐	Stress/Design Report	☐	Health Physics Procedure	☐
Operating Specification	☐	Interface Control Drawing	☐	Spares Multiple Unit Listing	☐
Criticality Specification	☐	Calibration Procedure	☐	Test Procedures/Specification	☐
Conceptual Design Report	☐	Installation Procedure	☐	Component Index	☐
Equipment Spec.	☐	Maintenance Procedure	☐	ASME Coded Item	☐
Const. Spec.	☐	Engineering Procedure	☐	Human Factor Consideration	☐
Procurement Spec.	☐	Operating Instruction	☐	Computer Software	☐
Vendor Information	☐	Operating Procedure	☐	Electric Circuit Schedule	☐
OM Manual	☐	Operational Safety Requirement	☐	ICRS Procedure	☐
FSAR/SAR	☐	IEFD Drawing	☐	Process Control Manual/Plan	☐
Safety Equipment List	☐	Cell Arrangement Drawing	☐	Process Flow Chart	☐
Radiation Work Permit	☐	Essential Material Specification	☐	Purchase Requisition	☐
Environmental Impact Statement	☐	Fac. Proc. Samp. Schedule	☐	Tickler File	☐
Environmental Report	☐	Inspection Plan	☐		☐
Environmental Permit	☐	Inventory Adjustment Request	☐		☐

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number/Revision
NA	NA	NA

21. Approvals

	Signature	Date		Signature	Date
Design Authority	R Whitehurst	10/6/00	Design Agent	NA	
Cog. Eng.	John D Pearts for		PE		
Cog. Mgr.	CS Haller C.S. Haller	10/6/00	QA		
QA	HM Chafin Hank M. Chafin	10/6/00	Safety		
Safety			Design		
Environ.			Environ.		
Other			Other		

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

ADDITIONAL

A-7900-013-3 (10/97)

System Configuration Management Implementation Procedure for the Cold Vacuum Drying Facility Monitoring and Control System
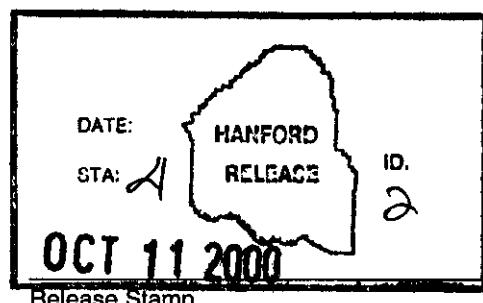
Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

Fluor Hanford

P.O. Box 1000
Richland, Washington

System Configuration Management Implementation Procedure for the Cold Vacuum Drying Facility Monitoring and Control System

Division: SNF

M. O. Anglesey
Fluor Hanford

Date Published
August ,2000

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Fluor Hanford

Release Approval   _10/11/00_ Date   Release Stamp

DATE:
STA:
OCT 11 2000
HANFORD
RELEASE
ID.
2

TRADEMARK DISCLAIMER

Total Pages: _____28__

RECORD OF REVISION		(1) Document Number	
		SNF-6949	
			Page 1

<table>
<tr><td colspan="6">(2) Title
System Configuration Management Implementation Procedure for the Cold Vacuum Facility
Monitoring and Control System</td></tr>
<tr><td colspan="6" align="center">Change Control Record</td></tr>
</table>

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
		(5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) Initial Release, EDT 630229	RD Dunlap	CSHaller 9/13/00
1 **RS**	Clarify the software change process, added a software change configuration flow diagram *ECN-663340*	R Whitehurst *LE7ov* *R. Whitehurst* *per telecon* *10-11-00*	CS Haller *Haller* 10/6/00 *10/9/00*

A-7320-005 (10/97)

SYSTEM CONFIGURATION MANAGEMENT IMPLEMENTATION PROCEDURE FOR THE COLD VACUUM DRYING FACILITY MONITORING AND CONTROL SYSTEM SOFTWARE

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LIST OF TRADEMARKS

Windows NT™ is a registered trademark of Microsoft Corporation, Redmond, Washington.

FIX32™ is a registered trademark of Intellution, Inc., Norwood, Massachusetts.

Modicon™ is a registered trademark of Schneider Automation Inc., North Andover, Maine

Key Words: CVDF, Cold Vacuum Drying Facility, Monitor and Control System, MCS, Software, Configuration Control

Abstract: This document implements the procedure for providing configuration control of the monitoring and control systems associated with operation of the Cold Vacuum Drying Facility (CVDF). It identifies and defines the configuration items in the monitoring and control systems, provides configuration control of these items throughout the system life cycle, provides configuration status accounting, physical protection and control, and verifies the completeness and correctness of the items. It is written to comply with: HNF-SD-SNF-CM-001, *Spent Nuclear Fuel Configuration Management Plan* (Forehand 1998) AP-CM-6-013-01, *SNF Software Configuration Management* HNF-PRO-309, *Computer Software Quality Assurance Requirements* and Applicable sections of administrative procedure AP-CM-6-037-00, *SNF Project Process Automation Software and Equipment Configuration Management.*

SYSTEM CONFIGURATION MANAGEMENT IMPLEMENTATION PROCEDURE FOR THE COLD VACUUM DRYING FACILITY MONITORING AND CONTROL SYSTEM SOFTWARE

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to establish the System Configuration Management Implementation Procedure (SCMIP) for the Cold Vacuum Drying Facility (CVDF) Monitoring and Control System (MCS). This procedure provides configuration management for the process control system. The process control system consists of equipment hardware and software that controls and monitors the instrumentation and equipment associated with the CVDF processes. Refer to SNF-3090, *Cold Vacuum Drying Facility Monitoring and Control System Design Description*, HNF-3553, *Annex B, Safety Analysis Report for the Cold Vacuum Drying Facility*, and AP-CM-6-037-00, *SNF Project Process Automation Software and Equipment Configuration*. This SCMIP identifies and defines the system configuration items in the control system, provides configuration control throughout the system life cycle, provides configuration status accounting, physical protection and control, and verifies the completeness and correctness of these items.

1.2 SCOPE

This procedure applies to the Modicon™ Quantum Programmable Logic Controller (PLC) units (hot standby), five remote I/O cabinets, and the Human Machine Interface (HMI) consisting of four workstations, each of which include a desktop personal computer running Windows NT™ operating system and Intellution's FIX32™ software as the graphics interface. The HMI is a graphical interface that provides on-screen "mimics" of the status of process equipment. Three are located in the control room and one is located in the shift manager's office.

This procedure provides configuration control for the process control system after the MCS is turned over for production operations. During periods of system modifications or software development, configuration control will be under the direction of CH2M Hill internal procedures.

1.3 DEFINITIONS

Configuration Item: Components of a software system requiring configuration control including software, documentation, hardware and operating environment. Note: The hardware referred to here includes those portions of the operating environment necessary to assure continued operation of the software.

Configuration Management (CM): An integrated management process that applies technical and administrative direction and surveillance to identify and document the functional and

physical characteristics of a facility/configuration item such that design requirements, documentation, systems and components match throughout the life of a facility/configuration item. Configuration management controls changes to these items, and records and reports change processing and implementation.

Production: Pertaining to the status of a given control system following acceptance by the customer, i.e. the production phase (refer to HNF-PRO-2778, *IRM Application Software System Life Cycle Standards*).

Software Configuration Management (SCM): Configuration management applied to SNF Project computer software and documentation to provide for the identification, change control, corrective actions, and configuration status of software for activities including design calculations, operational control and/or laboratory analysis.

Software Change Request and Problem Report (SCR/PR): A document used to identify proposed changes to or suspected problems with the software. An SCR/PR may identify a new function, modify an existing function, or report suspected problems of the software. One or more SCR/PR's may be grouped into a planned release.

Testing – Pertaining to the status of a given control system prior to acceptance by the customer, i.e. the implementation phase.

2.0 MANAGEMENT

2.1 ORGANIZATION

<u>Design Authority</u> - responsible for the CVDF MCS. Ensures monitoring and control system changes meet design basis.

<u>System Cognizant Engineer</u> – approves software changes, provides functional requirements and support for the system.

<u>Software Configuration Administrator</u> – maintains media, maintains security and change status in accordance with AP-CM-6-037 and this SCMIP.

2.2 RESPONSIBILITIES

Individuals assigned the following roles will be designated by the SNFP Facility Engineering Manager and approved by the Chief Engineer. Current designations will be listed in the change status log maintained by the System Cognizant Engineer, or delegate.

<u>Design Authority</u> – review software changes. Ensures that configuration management controls are implemented, determines the need for and extent of software/system development, ensures appropriate review and approval of changes, ensures configuration is compliant with design baseline and safety basis.

<u>System Cognizant Engineer</u> – approves all software change requests, tests changes prior to installation, and implements software changes. Maintains updates of system documentation. Maintains system data directory and stores copies of backup media.

<u>Software Configuration Administrator</u> - provides configuration control and security of the system utilizing Mortice Kern Systems, Inc. (MKS) Source Integrity system and this SCMIP; implements and tracks configuration change status; and maintains software directory and backup media.

2.3 INTERFACE CONTROL

The MCS is the primary monitoring and control system for CVD Facility processes and interfaces with all facility subsystems that require instruments, monitoring or control, except for fire protection and HVAC.

The boundary of the MCS includes all components starting at the workstations and ending at the wiring terminations at the process bay skids or facility utility systems. The actual sensors, effectors, and other process equipment are outside the MCS boundary.

The MCS is an independent system with respect to the Safety Class Instrumentation and Control (SCIC) system, though the MCS receives signals from the SCIC system and under normal circumstances, is allowed to control process isolation valves. The MCS, however,

cannot prevent the safety system from performing its safety functions. During SCIC operation, specific valves are interlocked by the SCIC system. The SCIC system does not require the support or operability of the MCS to perform its required functions.

A small portion of the MCS software configuration interfaces with four loops associated with the Office of Civilian Radioactive Waste Management (OCRWM). These loops, temperature and pressure loops, could be affected by changes in scaling factors in the loop parameter configuration section of the program. No unauthorized changes may be made to the configuration of these loops (OCRWM Loops) which include: TIT-3*05, TIT-3*12, PT-1*08 and PT-1*10. Changes in parameters of other loops (non-OCRWM loops) do not affect the OCRWM Loops. [Note: the asterisk (*) referenced in the loop numbers above denotes the CVDF Bay number, e.g., PT- 1*08 is PT-1408 and PT-1508, pressure (vacuum) loops in Bays 4 and 5, respectively]. Any change to the software and hardware of these OCRWM Loops is controlled via Work Control (JCS) procedures. In addition, the hardware portion of these OCRWM Loops that are affected include I/O cards 5, 6, and 21 in Bay 4 and 5; and I/O cabinets CP 401 and CP-501. Only these I/O cards affect OCRWM Loops.

2.4 IMPLEMENTATION

This SCMIP becomes effective when the MCS is turned over for production operations. Version change control is the method of providing configuration management of the MCS software.

This plan does not apply to the startup testing/software development phase. During that phase configuration control will be managed by the development organization's (in this case CH2M Hill) internal configuration control procedures.

3.0 SYSTEM CONFIGURATION MANAGEMENT ACTIVITIES

Configuration Management will be applied to the Monitoring and Control System as described in this section.

3.1 CONFIGURATION IDENTIFICATION

The primary documents that define and control the software configuration, are the P&ID's, Wiring Diagrams, Logic Diagrams, and Computer Software Design Description. These are the design basis documents, which define the functional operation of the software.

The required software functions are entered into the Intellution & Modicon software, where the resulting information is internally stored in numerous data files. Most of the data files are unreadable or otherwise not suited for generating readable hard copies. Consequently, the data files will be controlled by version identification, rather than by actual content of the file. A software release document will define the version of each file that is applicable to that release. The System Cognizant Engineer is responsible for assuring (by test, inspection, etc) that the release meets the functions of the controlled design basis. Backup procedures will be employed to assure recoverability of each file version, and to ensure that the proper version is currently installed.

The following types of software related items need to be identified for the purposes of controlling revisions and installation:

- Design Basis Documents which define the functional requirements:
  P&ID
  Wiring Diagrams
  Logic Diagrams   H-1-82300 series drawings
  Computer Software Design Description (CSDD)

- Commercial software which provides the application base:
  Windows NT™ 4.0
  Intellution FIX32™ Ver. 6.1.5
  Modicon Modsoft™ Ver. 2.6.1

- On-line configuration data files:
  FIX32™ Database File
  Graphics picture files
  Tag Group files

3.1.1 Application Software

Documentation which sets the foundation for the configuration of the CVDF Monitoring and Control System, is found in the system description; SNF-3090, *Cold Vacuum Drying Facility Monitoring and Control System Design Description*; HNF-3553, *Annex B, Safety Analysis Report for the Cold Vacuum Drying Facility*; HNF-2058, *Cold Vacuum Drying (CVD)*

Project Monitoring & Control System Computer Software Requirements Specification (CSRS); SNF-6957, *CVDF Monitoring and Control System Computer Software User Document (CSUD);* and AP-CM-6-37-00, *Process Automation and Equipment Configuration Management procedure.*

The CVDF Monitoring and Control software code is developed using Modsoft™ Ver. 2.6.1 software residing on a personal computer (PC), or laptop computer, and is in the form of ladder logic with related configuration database files. Once developed the software code is downloaded to the Modicon Quantum™ PLC's via a Modbus Plus communications port.

The Human Machine Interface (HMI - graphics interface) is configured with Intellution FIX32™ Ver. 6.1.5 software that runs on a Pentium class personal computer with Windows NT™ 4.0, Service Pack 4 as the operating system. Intellution FIX32™ software is used to develop display windows that are connected to I/O. The file types used by the HMI software are described in the FIX32™ Users Guide (Vendor Information).

Each version (new or revised) of a production software release shall be a grouping of the software code (logic) and executables, documentation and any modifications to vendor software (e.g., configurations, etc.). The release is assigned a unique release number by the developer, CH2M Hill. In the case of new versions, the version number and modifications thereto will be noted.

3.1.2 Verification and Validation

Software verification and validation was performed during the development/testing phase in conjunction with the software developer, CH2M/Hill as described below.

Verification of the CVDF Bay 4 and Bay 5 software was accomplished with a review of the MCS Logic Test by the Joint Test Group (JTG) to ensure the test document results conformed to the requirements detailed in the Test Specification (SNF-W441-TS-093-1). In addition, an integrated Control System Logic Test (SNF-W441-PAT-093-1A) verified that the CVDF Bay 5 software conformed to the requirements of the MCS Computer Software Requirements Specification (HNF-2058) and the CVD Facility Operations Manual (SNF-2356).

During the initial stages of design, a bench test simulation for the CVDF Bay 4 software was performed to provide validation by ensuring that the software conformed to the requirements outlined in the CVD Operations Manual (SNF-2356) and the Computer Software Requirements Specification (HNF-2058). The CVDF Bay 4 and Bay 5 MCS software was validated by performance of the Integrated Preoperational Test (PAT) Procedure (SNF-W441-PAT-007-7).

Once the MCS control system is turned over for production operations, any changes to the software will require preparation of Verification and Validation Test Procedure as part of the required retest. The procedure will indicate how changes will be verified and validated, and how the tests will be documented. Measures will be outlined to demonstrate that the revised software satisfactorily performs its intended function. The measures may include component

testing, acceptance testing, integration testing, regression testing, and if possible simulation of field instrumentation inputs/outputs to and from the system PLC.

3.1.3 Software Products

Each software product (e.g., the application software development packages, the operating system software, etc.) is assigned a unique product name and release version number by the appropriate vendor and will be used as identification as much as practical on the software release documentation.

Windows NT™, Modsoft™ and FIX32™ are commercial off-the-shelf software and are not subject to this configuration management procedure, except as necessary to support rebuilding or rebooting the workstation should the entire system crash. Only the user created configuration programs and files are subject to the configuration control covered by this document.

3.1.4 Computer Hardware

Microprocessor controlled hardware, such as installed field components, modules, power supplies, etc., is controlled by normal Hanford administrative procedures (H-1 drawing system via Engineering Data Transmittals (EDT) and Engineering Change Notices (ECN)). Configuration control is required by this SCMIP, only for the case of:

Identification of the minimum equipment necessary for operation, and

Evaluation of impacts caused by field hardware changes that are part of the design basis documentation set – via an SCR/PR.

3.1.5 Documentation

When a new or revised version of the MCS software is released, the System Cognizant Engineer will: 1) establish a file with a copy of the information related to that release, and 2) prepare an SNF document (ECN) to formally document the release. These documents are controlled by normal SNF administrative procedures (via ECN's or Release/Revision Record's). The new or revised release document incorporates SCR/PR's associated with the previous software version to provide backward traceability. Completed SCR/PR forms and the release document shall be returned to the System Cognizant Engineer, and a copy kept in the local Document Control (DC) project files in log form by the System Cognizant Engineer.

3.1.6 Removable Media

The Software Configuration Administrator will maintain custody of the master copy of removable media and verifies that it is correctly labeled, maintains backup copies, and maintains tracking documentation. Removable media will have the following information on the label:

- Media identifier (i.e., disc number)
- Software identification
- Software revision identification ("R.r", "R" = major and "r" = minor software changes, e.g., 1.0)
- Software or data name or description
- Responsible organization and System Cognizant Engineer's name
- Recording date and time

3.1.7 Directory Nomenclature

Original or backup source and executable software placed on media containing multiple versions/revisions shall be segregated using the available directory/subdirectory structure.

The System Cognizant Engineer shall verify that the correct software component and version is installed on each computer or PLC. On the production systems, only the most current version will be maintained in a single project directory. For the PLC, the configuration is stored in the PLC memory. For the HMI the configuration will be in FIX32™ directory.

A separate project directory will be maintained for each major release of FIX32™ System software. The vendor software is currently controlled by factory issued compact disk media. For minor releases, changes (edits) will be made directly to the most current major release files.

3.2 CONFIGURATION CONTROL

Configuration control of the MCS software shall be managed by the System Cognizant Engineer and this SCMIP. The Software Configuration Administrator will track configuration change status, maintain a software directory and provide software media backups.

Change control will be managed via SNF document change requirements (ECN's, SCR/PR forms, Release/Revision Record's, EDT's, etc.) as noted in, 3.1.5 above.

SCR/PR approvals are recorded and submitted using the SCR/PR form. See Appendix A for an example of the form.

E-mail approvals for processing SCR/PR's may be substituted for handwritten approvals. When e-mail approvals are used a copy of the e-mail approval must be attached to the SCR/PR.

Telephone approvals for processing SCR/PR's may be used, but subsequently must be documented on the SCR/PR form.

3.2.1 Software Changes

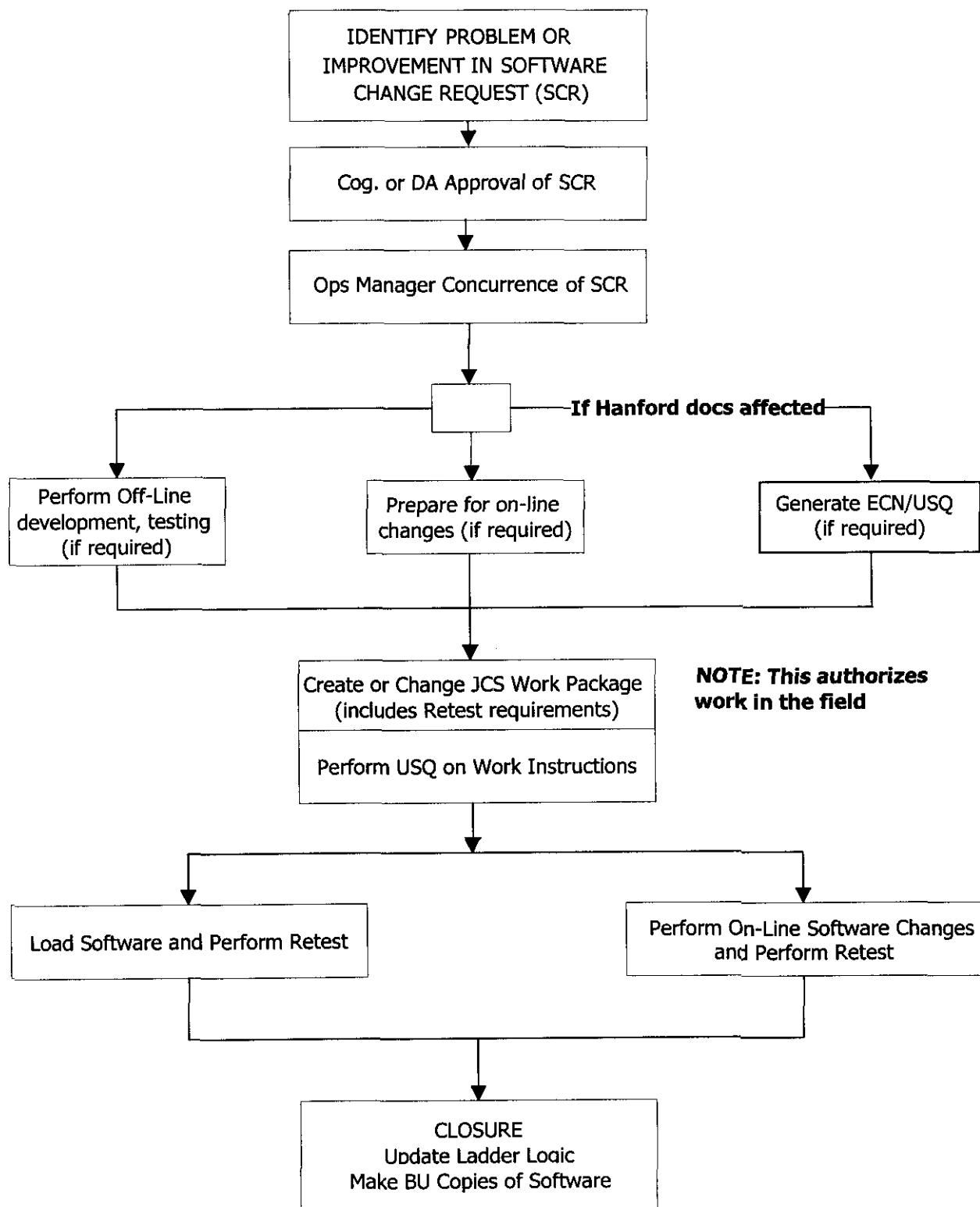Changes to the MCS control system software will be processed as described in this section, and as shown in Figure 1.

Responsible Personnel	Description of Actions
Anyone in owner/operator organization	Prepare a SCR/PR to identify a problem with or request a change to the software. Forward the SCR/PR to the System Cognizant Engineer. Include recommendations on how to implement changes where appropriate.
Design Authority (or delegate)	Ensures the change is compliant with the design baseline and Safety Basis, and approves design baseline documents.
Design Authority (or delegate) and Operations Manager (or delegate)	Determine which SCR/PR's are appropriate and forward to the Design Contractor/Cognizant Engineer for analysis and hours estimate. Operations Manager (or delegate) approves implementation of the selected software changes with concurrence on the SCR/PR form. Determine whether the change is an emergency or routine SCR/PR.
System Cognizant Engineer (or delegate)	Ensures that an evaluation is performed to determine if software changes would result in potential changes to the design basis documentation (via an SCR/PR and attached ECN with USQ review). Assign an SCR/PR Number and enter in the SCR/PR Log (Appendix C). Maintain the SCR/PR Log sheets in the project file. Analyze SCR/PR and estimate hours and impact to complete and implement. Evaluate SCR/PR and decide to accept, modify, reject or defer. Determine if SCR/PR requires a major or minor revision. Prioritize accepted SCR/PR's. Group one or more SCR/PR's into a planned release. Plan how, and to what extent changes to the software will be tested and documented. Forward appropriate problem reports (SCR/PR's) to vendor. Conduct tests. Ensure that changes that cannot be tested in a test environment are conducted in a manner that will not have adverse affect on the software production environment.

	Evaluate the results of the tests with Independent Reviewers to determine if the changes (individually and as a whole) are acceptable for a production release.
	Document test results and include with change request, or indicate supporting document number if applicable. Obtain independent review.
	Provide change documentation to Software Configuration Administrator.
	Schedule implementation with users of the system.
	Place source code and executable files for the release on removable media, labeled per Section 3.1.6.
	Provide a download of the Production Copy on removable media to the Software Configuration Administrator.
	Prepare and issue release documentation as an ECN, or as Release/Revision Record.
	Update system documentation as required and place copies in the system project file.
Software Configuration Administrator	Verifies removable media are properly labeled.
	Enters the software release into the status log.
	Verify that SCR/PR closeout is distributed to the initiator and others as appropriate.
	Maintains a configuration status log.
Facilities Engineering Manager	Approve or disapprove placing a release in the test/production environment.

Figure 1

SOFTWARE CHANGE CONFIGURATION FLOW PATH

```
┌─────────────────────────────┐
│     IDENTIFY PROBLEM OR      │
│   IMPROVEMENT IN SOFTWARE    │
│   CHANGE REQUEST (SCR)       │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│   Cog. or DA Approval of SCR │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Ops Manager Concurrence of SCR │
└─────────────────────────────┘
```

If Hanford docs affected

| Perform Off-Line development, testing (if required) | Prepare for on-line changes (if required) | Generate ECN/USQ (if required) |

| Create or Change JCS Work Package (includes Retest requirements) | **NOTE: This authorizes work in the field** |
| Perform USQ on Work Instructions | |

| Load Software and Perform Retest | Perform On-Line Software Changes and Perform Retest |

```
┌─────────────────────────────┐
│          CLOSURE            │
│      Update Ladder Logic     │
│   Make BU Copies of Software │
└─────────────────────────────┘
```

3.2.2 Software Copies

Software will be controlled in four locations as follows:

- **Production Copy** – latest release stored and operating on the production equipment.

- **Working Copy** – removable media or the copy residing on the laptop computer, used to transfer latest changes to the Production Copy – used by the System Cognizant Engineer.

- **Master Copy** – controlled copy archived and accessed on the MKS System, each major and minor release, labeled by System Cognizant Engineer. Working copies made from this copy for updating/changing/restoring the production copy.

- **Backup Copy** – duplicate of each master copy stored on the backup server in directories named to correspond to the removable media release numbers.

3.3 CONFIGURATION STATUS ACCOUNTING

The configuration status of all controlled items is shown on the Release Cover Sheet (example, Appendix B). In addition, the status of all SCR/PR's and associated releases will be tracked and maintained, and be available on the backup directory as a log file.

3.4 ACCESS CONTROL

Limiting access control through the use of restricted entry and passwords provides security for the MCS software. The System Cognizant Engineer, or delegate provides an authorized user list and associated privilege levels. Authorized users are required to provide a user name and password.

3.5 BACKUP AND RECOVERY

Backup of the source code and executable files that constitutes the production release of the software will be maintained in the MKS system by the Software Configuration Administrator. The Software Configuration Administrator is responsible for verifying that the backup is in place and the appropriate files exist.

Recovery shall be accomplished by rewriting the appropriate files from the master media onto the production system. This shall be accomplished by the System Cognizant Engineer as needed.

4.0 TOOLS, TECHNIQUES, AND METHODOLOGIES

4.1 DEVELOPMENT TOOLS

4.1.1 Intellution FIX32™ Software

Working copies of Intellution FIX32™ are loaded on the laptop computer and production copies are loaded onto the four desktop computers. Refer to vendor information on operation and use of this product.

4.1.2 Modicon Modsoft™ Software

Working copies of ModSoft™ 2.1.6 software are loaded onto a laptop computer. Modsoft™ software does not have a simulation feature. However, the PLC ladder logic can be viewed, edited, and saved on the laptop and downloaded onto the PLC. The logic is loaded via a Modbus Plus communications port. The laptop computer (with Modsoft™) may be connected to the PLC's to permit live viewing, editing, and forcing of logic states; and can also be used for software development testing, debugging, troubleshooting, and administration. Caution should be used when operating Modsoft™ in the run mode since the PLC is in actual control of field devices. The laptop computer is not required for normal automatic operation.

4.2 Test Environment

All MCS software modifications and enhancements will be completed and certified in a test environment where possible. These changes will be implemented into the production environment only after the System Cognizant Engineer has reviewed and approved the test results and the Responsible Manager has approved the implementation. Modifications and enhancements will be grouped logically into production releases.

5.0 SUPPLIER CONTROL

The System Cognizant Engineer, or delegate will ensure that new releases of vendor application and system software are tested prior to being placed in production. The System Cognizant Engineer, or delegate will also ensure that new releases are consistent with original testing and is satisfied that the software will perform all the required functions. Changes in vendor application and/or system software will be processed as a Software Change Request or Problem Report (SCR/PR) with the same approval requirements as a locally generated change.

The System Cognizant Engineer, or delegate will maintain a software project file or binder of all software-related project documentation, correspondence, and project-produced documents. Vendor provided materials and manuals will be maintained by the System Cognizant Engineer. This software project file or binder will maintain the most current version of all documents.

6.0 RECORDS COLLECTION AND RETENTION

The MCS System Cognizant Engineer will process software development and maintenance records in accordance with HNF-PRO-2778, *IRM Application Software System Life Cycle Standards* (Appendix A, Sections 8 and 9) and AP-CM-6-037-00, *Process Automation Software and Equipment Configuration Management.* System documentation update records will be sent to the Software Configuration Administrator for inclusion in the MKS system. These records include, at a minimum the SCR/PR log and SCR/PR form entries, copies of which will be kept by the System Cognizant Engineer, or delegate in local project files.

7.0 REFERENCES

AP-CM-6-013-01, Rev. 1, *SNF Project Software Configuration Management*, Fluor Hanford, Inc., Richland, Washington.

AP-CM-6-037-00, Rev. 0, *SNF Project Process Automation Software and Equipment Configuration Management*, Fluor Hanford, Inc., Richland, Washington.

HNF-SD-SNF-CM-001, Rev. 3, *SNF Configuration Management Plan*, Forehand, G. D., 1998, Duke Engineering Services Hanford, Richland, Washington.

HNF-3553, *Annex B, Safety Analysis Report for the Cold Vacuum Drying Facility*, Fluor Hanford, Inc., Richland, Washington.

HNF-PRO-309, Rev. 1, *Computer Software Quality Assurance Requirements*, Fluor Hanford, Inc., Richland, Washington.

HNF-PRO-2778, Rev. 0, *IRM Application Software System Life Cycle Standards*, Fluor Hanford, Inc., Richland, Washington.

SNF-2356, Rev. 4, *Spent Nuclear Fuel Project Cold Vacuum Drying Facility Operations Manual*, Fluor Hanford, Inc., Richland, Washington.

HNF-2058, *Cold Vacuum Drying (CVD) Project Monitoring & Control System Computer Software Requirements Specification*, DE&S Hanford, Inc., Richland, Washington.

SNF-W441-PAT-007-7, *Cold Vacuum Drying Facility Monitoring & Control System Preoperational Test (PAT) Procedure*, Fluor Hanford, Inc., Richland, Washington.

SNF-6957, *CVDF Monitoring and Control System Computer Software User Document (CSUD)*, prepared by CH2M/Hill for Fluor Hanford, Inc., Richland, Washington.

APPENDIX A

SOFTWARE CHANGE REQUEST AND PROBLEM REPORT FORM

CONSISTING OF 3 PAGES
INCLUDING COVERSHEET

SOFTWARE CHANGE REQUEST OR PROBLEM REPORT		
NOTE: Submitter Fills In Parts 1-8 (NON-GRAY)		DESIGN AUTHORITY USE
1. SCR Type: [ ] Problem [ ] Enhancement		SCR Number:
2. Submitted By:		Date:
3. Project Name:		TPCN, W/O, Task
4a. Software Program	4b. Program Name:	4c. Current Ver/Rev.:
5. Submitter's Priority [ ] 1= Critical 2= Very Important 3= Important 4= Inconvenient 5= Interesting		6. Requested Completion Date:
7. Task/Change/Problem Title (One Sentence Description):		8. ECN Required: [ ] Yes [ ] No
9. Detailed Description/Justification (Attach Additional Sheet If Necessary):		
10. Concurrence by Operations Mgr, or Delegate:		

DESIGN AUTHORITY USE ONLY:	Software Change Request Or Problem Report Resolution Information
Decision By:	[ ] Accept [ ] Modify [ ] Reject [ ] Defer
Assigned To:	Target Release Date:
Solution Comments/Impact:	
Software Programs, Modules or Files Affected:	

Task Completed By:	Date:
Verified By:	Date:
Actual Release Version:	Date:
Closed By:	Date:

Instructions for the Software Change Request or Problem Report

These instructions are for preparing the Change Request or Problem Report. If more space is needed, use blank pages and attach them to the SCR/PR form. This will be the record of the change request or problem report.

Anyone may submit a Change Request or Problem Report:

1.   Indicate if this is a problem report or request for enhancement.

2.   Record the name of the person submitting the form and the date.

3.   Enter CVDF for project.

4.   Enter MCS for software program name.

5.   Record submitter's evaluated priority as shown.

6.   Provide a requested completion date, or leave blank if unknown.

7.   Provide a single sentence title or problem or enhancement.

8.   Provide a description of the changes requested or the problems being reported. Provide justification if this is a change request. Attach additional sheets if necessary.

9.   Indicate if an ECN is required.

10.   Obtain Concurrence of Change by Operations Manager.

System Cognizant Engineer or Design Authority:

a.   On receipt, enter the SCR/PR into the MCS Log. Enter the SCR/PR number from the log on the SCR/PR form.

b.   Enter the date received.

c.   Enter the charge number if known, otherwise, leave blank.

d.   Enter current Version/Revision of the product.

e.   Review change request or problem with manager. Note that SCR/PR may require attached cost estimate and planning if extensive changes or testing are anticipated. Mark accept, modify, reject or defer as appropriate.

f.   System Cognizant Engineer or Design Authority signs "decision by" block.

g.   If accepted, contacts the vendor for contract arrangements and provides a Target Release Date as appropriate.

h.   Vendor documents the changes. Vendor also documents/performs testing as required and attaches test results or additional verification documentation.

i.   System Cognizant Engineer signs "Task Completed by" block and passes to independent reviewers.

j.   Independent reviewer(s), at a minimum including the System Cognizant Engineer or Design Authority, signs "Verified By" block.

k.   When included in a release, place release version in "Actual Release Version" block.

l.   System Cognizant Engineer or Design Authority signs "Closed By" block when complete or rejected..

APPENDIX B

RELEASE COVER SHEET & REVISION RECORD
FORM AND INSTRUCTIONS

CONSISTING OF 3 PAGES
INCLUDING COVERSHEET

RELEASE COVER SHEET & REVISION RECORD

1. Software ID (Name):		Rev.:
2. Release Type: [ ] Initial Release [ ] Change		[ ] App Des [ ] Sfty Class

3. Abstract

4. Software Files (or attach directory listing)

5. Software files record storage media and location

6. Documentation	Title	Number	Rev
Requirements			
Design			
Design Verif.			
Validation			
User			
Config. Cntl.			

7. Environment	Description	Rev	IL/Safety Class
Hardware			
Oper. Software(s)			
Language(s)			
Comm. Networks			

8. Released for:
   [ ] Integration [ ] Operational Test [ ] Operation

9. Approvals
Software Engineer: _____   Date: _____
Design Authority: _____   Date: _____
Software Custodian: _____   Date: _____

Instructions for the Release Cover Sheet & Revision Record

Fill out as indicated:

1. Provide Software Name and new revision number.

2. Check release type. Indicate Approval Designator and Safety Class (SC, SS, GS).

3. Provide an abstract describing the product being released. Indicate if only a portion of the software is being modified.

4. List all source and executable files that are being released and where they reside. Attaching a directory listing is acceptable, if it includes the full names of the file, creation date and time (combination is version identification). Date on all files may be set to release date, time may be set to indicate the release version number (e.g. 2.07a).

5. Indicate source and executable file master type (floppy disk, optical, magnetic tape), media serial number and storage location. This media will be held by the software custodian.

6. List the documentation components for the release.

7. List the operational environment for the release.

8. Check the reason/limits for the release.

9. Provide approval signatures as required by SCMIP.

APPENDIX C

SCR/PR LOG FORM

SOFTWARE CHANGE REQUEST AND PROBLEM REPORT LOG

The System Cognizant Engineer should enter the next sequential number on the Log Form, enter the Task/Change/Problem Title from the SCR/PR form, and enter the SCR/PR number on the SCR/PR form.

SCR/PR Number	Description (from block 7 of SCR/PR form)