June 12, 1997 **ENGINEERING DATA TRANSMITTAL**

Page 1 of 1

1. EDT 619594

Sta 22 (27)
per BMW 6/18/97

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Engineering Administration	FFTF ASEE 18240	
5. Proj./Prog./Dept./Div.:	6. Design Authority/ Design Agent/Cog. Engr.:	7. Purchase Order No.:
F-031	Derek Jones	N/A
8. Originator Remarks: Ladder Logic Diagrams for the Sodium Storage Facility PLC's		9. Equip./Component No.: C-3005
		10. System/Bldg./Facility: S93B/402/SSF
11. Receiver Remarks: 11A. Design Baseline Document? [X] Yes [] No		12. Major Assm. Dwg. No.: H-4-302426
		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	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	HNF-SD-FF-SDD-002		0	SSF Trace Heat Sys. Design Description	NA	2	1	
2	HNF-SD-FF-CSCM-~~8~~9		0	SSF Software Configuration Control Plan	Q	2	1	1
3	HNF-SD-FF-CSWD-~~8~~60		0	SSF Trace Heat Cross Reference	NA	2	1	
4	HNF-SD-FF-CSWD-~~8~~61		0	SSF Ladder Logic Diagrams	NA	2	1	

16. KEY

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

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

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	Design Authority	Derek Jones	5/23/97	N2-05	1	1	D.A. Granite (ASD)	DC Smith	6/4/97	N2-13
		Design Agent									
1	1	Cog.Eng.	Derek Jones	5/23/97	N2-05						
1	1	Cog. Mgr.	[illegible]	5/30/97	N2-05						
1	1	QA	[illegible]	6/30/97	H2-11						
		Safety									
		Env.									

18.	19.	20.	21. DOE APPROVAL (if required)
Derek Jones 5/23/97		SEE BLOCK 17 FOR MANAGER SIGNATURE Derek Jones 5/30/97	Ctrl. No. [] Approved [] Approved w/comments [] Disapproved w/comments
Signature of EDT Originator / Date	Authorized Representative for Receiving Organization / Date	Design Authority/ Cognizant Manager / Date	

BD-7400-172-2 (05/96) GEF097

BD-7400-172-1

Sodium Storage Facility Software Configuration Control Plan

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U.S. Department of Energy Contract DE-AC06-96RL13200

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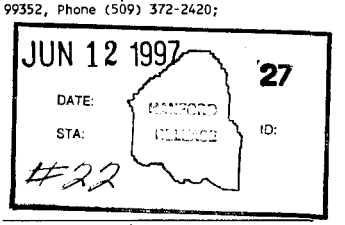
Key Words: Sodium, SSF, Trace Heat, PLC, Computer

Abstract: This document describes the plan for ensuring that the SSF Trace Heat Software will be available for use whenever that facility is opened for the use of draining sodium from FFTF.



Release Approval Date

Release Stamp

Approved for Public Release

1.0 INTRODUCTION

1.1 Purpose

This document describes how the software that was developed for the Sodium Storage Facility (Project F-031) [SSF] will be managed. This software management plan will describe how the software for the Sodium Storage Facility (SSF) Trace Heat control system will be maintained until it is needed. Due to a change in mission status, draining of the FFTF sodium is being delayed. Supporting Document HNF-SD-FF-SDD-002, the SSF Trace Heat System Design Description, documents the "As Built" programs and their features. This plan will not address, but may reference, other Fast Flux Test Facility (FFTF) and Hanford Site procedures that will be utilized to control the configuration of this software.

1.2 Scope

This document is limited to the software designed and procured for project F-031. This software is the Ladder Logic Diagrams, Spreadsheet, and Drawing or Object files created by the Rockwell APS, Microsoft EXCEL, and Intellution software packages that are loaded on the as built system.

This plan and the associated SDD will address recovery from a failed computer hard disk, and briefly what we were taught by the vendor concerning how the software was developed. This information is provided so that this software could be recreated if required. Since this is not a quality affecting software package I will not attempt to detail what the vendor did to obtain test and create the entire package.

1.3 Overview

The SSF was built as a long term location for storing the sodium coolant that would be drained from the FFTF as part of facility deactivation. The Trace Heat system is to be used to keep the sodium liquid during transfer operations. Because of the number of electric Trace Heaters that are required in this facility, the most cost effective and easiest control system that was available at this time is a Programmable Logic Controller (PLC). A PLC when connected to an IBM compatible PC allows the system to be programmed and operated from a single control station.

On this PC's hard disk are licensed copies of MS DOS™ version 6.22 for the PC's operating system. Microsoft Windows® provides a graphical user interface. Intellution, Inc., provides its FIX™ Man Machine Interface (MMI)which is a bundled process control software that provides the system operator with a very user friendly interface for controlling groups of electric trace heaters in the SSF. Rockwell International provides software for controlling the Allen-Bradley PLC and interfacing that device with the PC and the Intellution™ software.

The SSF Trace Heater Control System is based on two Allen-Bradley SLC 500 series Programmable Logic Controller (PLC)CPUs and a PC Based Intellution® System Control And Data Acquisition (SCADA) system.

Basically the Allen Bradley PLC is controlled by its own Ladder Logic Program. This Ladder Logic was created using the Rockwell Advanced Programming Software (APS™) Release 6.0. This software contains an Application Programing Interface (API) called "INTERCHANGE." INTERCHANGE allows APS™ software to use the Allen Bradley KT Data Highway Plus (DH+) card installed in an ISA card slot in the PC to enable communications with the PLC. This communication link is a serial link that operates at a baud rate of approximately 50 K baud.

The Intellution® software provides the graphical operator view screens. This software is a completely Visual or Object oriented software package. This package includes a DATABASE BUILDER Program, a Drawing program, and Historical Trending applications. The Intellution® software and the APS™ software share a common memory array called a Driver Image Table. This Driver Image Table was originally created as Microsoft (MS) EXCEL spread sheets. These files were compiled with MS EXCEL macro routines into a single workbook. Then the Intellution® DATABASE BUILDER application is opened and communication with the Supervisory Control And Data Acquisition (SCADA) nodes is established. Objects in the shared memory locations are identified by their unique Tag Names. The Tag Name ties the Object on the drawing, to the Data Base, and to the PLC Ladder Rung.

1.4 Definitions

Hard Disk: A computer disk with an aluminum disk coated with ferro-magnetic material that is used to store digital computer information. This device is usually installed as a permanent part of a PC.

MMI: A software package that visually displays how industrial process is functioning in an easy to understand format for the process operator.

Personal Computer: A digital computer which has its central processor located all on one integrated circuit chip. Often called a Microprocessor or Micro Computer. For our purposes here that definition needs to be narrowed to an IBM compatible computer using an Intel compatible 4X86 or higher microprocessor.

PLC: A device that uses microprocessor technology to replace relay logic in industrial control systems.

SCADA: A microprocessor based system that can perform both Data Collection and control output devices.

2.0 MANAGEMENT

2.1 Organizations and Responsibilities

FFTF Auxiliary Systems Electrical Engineering (ASEE) provides electrical engineering support to the FFTF plant and associated facilities. ASEE will have the primary responsibility for maintaining this software. ASEE will also maintain personal accountability of the original vendor software disks and a non-compressed copy of the SSF object files.

The FFTF operations organization (OPS) has the primary responsibility for operating the SSF Trace Heat Control system. OPS will keep one set of back-up disks and the FFTF Engineering Organization will keep a second set.

FFTF Quality Assurance (QA) provides an overview of the quality affecting components in the FFTF plant. The QA organization will authorize this plan before it goes into effect.

The FFTF Quality Control (QC) organization will verify that back up files of this software are maintained per the requirements of FFTF Administrative Procedure A-23.

Some assistance may be required from the FFTF Fuel Handling I & C Engineering (FHI&C) organization who has more programming expertise than ASEE. Also per A-23, the Manager of FHI&C will authorize for the back up disks to be entered into the FFTF Controlled Media Cabinets.

2.2 Interface Control

N/A

2.3 Implementation

This plan will become effective on the date that it is approved and released into the Hanford Site Document Control system.

2.4 Policies and Procedures

A-23 requires that in addition to the files used for system operation, there will be multiple back-up files available to restore the system to operation in the event of a primary storage device (Hard Disk) failure.

3.0 SOFTWARE CONFIGURATION MANAGEMENT ACTIVITIES

3.1 Configuration Identification

The back up disks will be identified as required by FFTF Administrative Procedure A-23.

3.2 Configuration Control

Will be maintained per the Hanford Site Engineering Change Notice (ECN) process.

3.3 Configuration Status Accounting and Access Control

Per FFTF Administrative Procedure A-23, the back up disks must be formally checked out from the controlled media cabinets for use per and approved FFTF operating procedure. Also, the back up disks can not be permanently removed until they are deleted by an approved ECN.

3.4 Audits and Reviews

Per FFTF Administrative Procedure A-23, the back up disks in controlled media cabinets are audited on a periodic basis.

4.0 TOOLS, TECHNIQUES, AND METHODOLOGIES

An IOMEGA®/EPSON® Zip Drive™ and two of their proprietary 100 Megabyte discs were used to back up the contents of the SSF Trace Heat Computer Hard Drive.

The standard Microsoft® Backup routine, as modified by installation of Zip Tools™ that comes with Windows® ver. 3.11/DOS ver 6.22, was used to perform the backup.

The recovery procedure detailed below assumes that a recovery can be performed in MS DOS™ as it is advertised in MS DOS™ Users Guide. This manual says that the versions of backup used in both Windows® 3.11 and DOS 6.22 are fully compatible. If this is true, running the back up from DOS will also restore Windows®, Zip Tools™, the Rockwell™ and the Intellution™ software in the same working configuration that was present on the day that those backup disks were made. If a problem develops, install Windows® and Zip Tools™ and then perform the procedure provided below starting from step 4.1.6.

4.1 Recovery

4.1.1 Replace the failed hard disk assembly with a new one.

4.1.2 Format, partition, and install MS DOS™ version 6.22 on the new hard drive then turn the computer back off.

4.1.3 Connect a ZIP Drive™ to the computers parallel port with the Intellution hardware key still installed in the parallel port. If required, the printer can be reconnected to the parallel connection on the Zip Drive™ .

4.1.4 Start up the computer and at the DOS prompt run GUEST.EXE from the IOMEGA® installation floppy disk. Make a note of which disk drive letter the Zip Drive is installed as.

4.1.5 From the DOS Directory start BACKUP.

4.1.6 Choose "Restore" from the Menu or Dialog Box.

4.1.7 In the restore dialog box select the Zip Drive backup file. This should be the only file on the disk besides the IOMEGA READ.ME file. Verify "Restore To" drive is "C:\."

4.1.8 Choose "Start Restore."

4.1.9 Be patient, it may take up to 6 hours for the restore to be completed.

4.1.0 When restoration is complete, restart the computer. It should now start in Windows® and the FFTF Normal Operating procedure can be used to start up the SSF Trace Heat Monitoring system.

5.0 SUPPLIER CONTROL

This software is basically an off the shelf software package for a non-quality affecting system, so no formal supplier controls are required.

6.0 RECORDS COLLECTION AND RETENTION

The following documents are all available through the Hanford Site Document Management System:

6.1 HNF-SD-FF-SDD-002, SODIUM STORAGE FACILITY TRACE HEAT CONTROL SYSTEM DESIGN DESCRIPTION

6.2 HNF-SD-FF-CSCM-009, SSF SOFTWARE CONFIGURATION CONTROL PLAN

6.3 HNF-SD-FF-CSWD-060, SSF TRACE HEAT CROSS REFERENCE

6.4 HNF-SD-FF-CSWD-061, SSF LADDER LOGIC DIAGRAMS

6.5 The Vendor Information file number: 22710, Supp. 10.

This file contains the majority of the vendor provided information on the system hardware.

The Equipment Title is: Sodium Storage Temperature Control System & Electric Heater Power Control Cabinet.

The Vendor/Manufacturer Name on the VI file is: Equipment Technology & Design

The Project No./Work Order number is: F-031/C2/109, 115, & 120

The following documents are available from their associated vendors:

6.6 Intellution® software manuals for version 5.5 - ©1988-1995, Intellution® Inc., All Rights Reserved; manuals included in the set are:

a. Display Development

b. System Setup

c. Advanced Tools

d. System Development

e. Allen-Bradley KT/KT2 (ABK) I/O Driver Manual

f. Message Handler Manual

g. Dynamos

h. Upgrade Guide

6.7 Rockwell Software Inc. Manuals

a. Advanced Programming Software Version 6.0 User Manual - Document ID 9399-APSUM-11.15.95, copyright ©1995, no author credited.

b. Advanced Programming Software Version 6.0 Import/Export Utility User Manual - Document ID 9399-APSIE-11.15.95, copyright ©1995, no author credited.

6.8 Allen-Bradley SLC 500™ Instruction Set Reference Manual, author not credited, published January 1996 Part Number 956500-01 Publication # 1747-6.15

These documents are all that would be required to recreate this software from scratch if necessary.