2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	R. R. Wandling, 07E62, R1-01,372-0972	[X] Yes [] No TF-99-0235	3/15/99
	6. Project Title/No./Work Order No.	7. Bldg./Sys./Fac. No.	8. Approval Designator
	Tank Monitor and Control System (TMACS) Software Configuration Management Plan	N/A	ESQ
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-WM-CSCM-019, Rev. 0-C	10. Related ECN No(s).	11. Related PO No. N/A

12a. Modification Work	12b. Work Package No.	12c. Modification Work Complete	12d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 12b) [X] No (NA Blks. 12b, 12c, 12d)	N/A	N/A Design Authority/Cog. Engineer Signature & Date	N/A Design Authority/Cog. Engineer Signature & Date

13a. Description of Change   13b. Design Baseline Document? [] Yes [X] No

Complete revision of document.

14a. Justification (mark one)

Criteria Change	[X]	Design Improvement	[]	Environmental	[]	Facility Deactivation	[]
As-Found	[]	Facilitate Const	[]	Const. Error/Omission	[]	Design Error/Omission	[]

14b. Justification Details

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

See distribution Sheet

RELEASE STAMP

DATE   HANFORD
 STA: 4   RELEASE   ID:

58

APR 1 1999

16. Design Verification Required	17. Cost Impact						18. Schedule Impact (days)	
	ENGINEERING			CONSTRUCTION				
[ ] Yes	Additional	[ ]	$	Additional	[ ]	$	Improvement	[ ]
[X] No	Savings	[ ]	$	Savings	[ ]	$	Delay	[ ]

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	[X]
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
N/A		

21. Approvals

	Signature	Date		Signature	Date
Design Authority	C. C. Scaief, III - R1-56	3-26-99	Design Agent		
Cog. Eng. :	M. J. Holm - R2-11	3-24-99	PE		
Cog. Mgr. :	N. W. Kirch - R2-11	3-25-99	QA		
QA :	D. C. Board - S7-07	3-24-99	Safety		
Safety :	L. E. Thomas - R3-01	3/24/99	Design		
Environ. :	P. C. Miller - R1-51	3/2/99	Environ.		
Other			Other		
Operations:	R. P. Tucker - T4-07	3/25/99			
Shift Operations:	D. A. Selle - S5-03	3-24-99			

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

ADDITIONAL

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Process Control	Date 03/15/99
Project Title/Work Order		EDT No. N/A
HNF-SD-WM-CSCM-019, Rev. 1 Tank Monitor and Control System (TMACS) Software Configuration Management Plan		ECN No. 651198

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
D. A. Barnes	R2-11	X			
D. C. Board	S7-07	X			
S. C. Cantrell	R3-43	X			
R. G. Geiger	R1-01				X
J. A. Glasscock	R1-01	X			
M. J. Holm	R2-11	X			
N. W. Kirch	R2-11	X			
P. C. Miller	R1-51	X			
C. C. Scaief, III	R1-56	X			
D. A. Selle	S5-03	X			
P. L. Smith	R3-01	X			
M. J. Sutey	S5-07	X			
R. P. Tucker	T4-07	X			
R. R. Wandling	R1-01	X			

Tank Monitor and Control System (TMACS) Software Configuration Management Plan

J. A. Glasscock
Lockheed Martin Services, Inc., Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

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Key Words: Software Configuration Management Plan, SCMP, Tank Monitor and Control, TMACS

Abstract: This document describes the methodology used to develop and control software for the Tank Monitor and Control System (TMACS).

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Release Approval   3/31/99   Date   Release Stamp
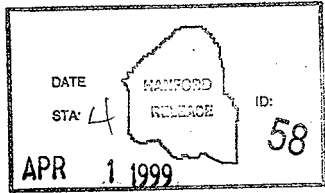
Approved for Public Release

RECORD OF REVISION		(1) Document Number	
		HNF-SD-WM-CSCM-019, Rev. 1	Page 1
(2) Title Tank Monitor and Control System (TMACS) Software Configuration Management Plan			

CHANGE CONTROL RECORD				
(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release		
		(5) Cog. Engr.	(6) Cog. Mgr.	Date
0	(7) HNF-SD-WM-CSCM-019 (EDT 140497)	N/A	N/A	
RS 1	Complete revision per ECN 651198.	M. J. Holm 3-26-99	N. W. Kirch 3-26-99	

TANK MONITOR AND CONTROL SYSTEM (TMACS) SOFTWARE CONFIGURATION MANAGEMENT PLAN

Prepared By
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Lockheed Martin Services Inc.

For

Lockheed Martin Hanford
For
US Department of Energy
Richland Operations Office
Richland, Washington

Table of Contents

1. INTRODUCTION

1.1 PURPOSE

This Software Configuration Management Plan (SCMP) describes the methodology for control of computer software developed and supported by the Systems Development & Integration (SD&I) organization of Lockheed Martin Services, Inc. (LMSI) for the Tank Monitor and Control System (TMACS).

1.2 SCOPE

This plan controls changes to the software and configuration files used by TMACS. The controlled software includes the Gensym software package, Gensym knowledge base files developed for TMACS, C-language programs used by TMACS, the operating system on the production machine, language compilers, and all Windows NT[1] commands and functions which affect the operating environment. The configuration files controlled include the files downloaded to the Acromag[2] and Westronics[3] field instruments.

This document does not cover the following:

- Process for controlling service requests.

- Process for controlling hardware configuration which includes the interfaces between the TMACS computers, the TMACS field equipment, the Surveillance Analysis Computer System (SACS), and the communications networks (phone and LAN)

These processes are documented in WHC-IP-0842, Volume IV Section 4.13 "Tank Farm Surveillance System Configuration Management Plan".

1.3 OVERVIEW

TMACS was established in 1991 as part of the Tank Farm Instrument Upgrade project. TMACS was designed to monitor temperatures and surface levels in the Hanford 200 area "watch list" tanks. The system consisted of a DOS based software system running on PC hardware located in Room B-105 of building 2750E. The system monitored field sensors via programmable input/output stations (Acromag™ 4000 Series) over dedicated telephone lines.

In January 1993, the TMACS monitoring computers were upgraded from PC hardware/ DOS-based software to engineering workstations running the UNIX[4]-based G2[5] "expert system"

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[1]Windows NT is a trademark of the Microsoft Corporation.
[2]Acromag is a trademark of Acromag Incorporated, Wixom, Michigan.
[3]Westronics if a registered trademark of Westronics, Inc.

and C-language software programs. The new computers continued to use the installed sensors and communication system. Additional types of I/O station interfaces were added. These I/O stations talk to Enraf[6] level gauges (ENRAF BV), Panalarm[7] (Panalarm) alarm displays, and remote alarm systems.

In 1999 the TMACS was converted to run on a Windows NT hardware platform. The purpose for the conversion was to lower maintenance operating cost. A Westronic[®] I/O interface was also added to communicate to temperature sensors.

1.4 ACRONYMS AND DEFINITIONS

1.4.1 Acronyms

COTS	Commercial-Off-The-Shelf
HLAN	Hanford Local Area Network
QA	Quality Assurance
SCCB	System Change Control Board
SCM	Software Configuration Management
SD&I	Systems Development & Integration
SR	Service Request
T&NE	Telecommunication and Network Engineering
VDD	Version Description Document

1.4.2 Definitions

Term	Definition
Acromag™ Station Configuration Files	The configuration data stored on each Acromag™ station. These data are controlled by this procedure, and maintained in a fireproof vault.
Application components	Locally developed or modified computer files used to support the system.
Backup	A recoverable copy of computer files.
Baseline	A set of uniquely identified Configuration Items, which constitute the current and controlled software product baseline. The software product baseline serves as the basis for further development of the software product.

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[4] UNIX is a trademark of X/Open Company, Ltd.
[5] G2 is a registered trademark of the Gensym Corporation.
[6] Enraf is a registered trademark of Enraf, B. V.
[7] Panalarm is a registered trademark of Ametek, Inc.

Term	Definition
Bridge Code	G2®'s terminology for a software device driver.
Configuration Item	The basic unit of software configuration management. This could be any life cycle document, source code module(s), various libraries, utilities etc., which comprise the system baseline.
Controlled software	The software configuration controlled according to this plan to which access must be limited. In particular the software source and configured G2® knowledge base.
Development Environment	A development environment in an area dedicated for project personnel to effect system changes. The development environment is maintained and controlled by the project developers.
Driver	See Software Driver.
Field Instrument Station	An intelligent hardware device in the field that communicates between TMACS and the field instruments. The field instrument stations can be configured to different types of instruments.
Formal Test	A test procedure performed under controlled conditions with a customer or qualified third party as a witness. A Formal Test is usually released as a supporting document.
G2®	The underlying software product used in the TMACS project. Gensym Corp., Cambridge, MA, produces G2®. G2® is an interpreted language and does not use object files. It runs using knowledge bases.
Knowledge Base (KB)	A G2® file containing the configuration classes, instances, rules, relations, procedures and displays for the software application (i.e., TMACS).
Major Release	Software release that usually contains several distinct revisions to the software, and warrants a comprehensive retest of the system.
Minor Release	A software release that consists of one or more distinct revisions to the software that warrants testing of the system components believed to be affected by the revisions.
Object Module (or Object file)	The computer file resulting from the compilation of a source file, i.e., the output of a language compiler.
Operating System Software	The operating system used by the computer where TMACS is run. The vendor provides the operating system versions. For example, Windows NT™ Server 4.0 for the HP NetServer Pro LX."
Patches	See Software Patches.

Term	Definition
Project Lead	The Software Engineer from the SD&I organization assigned to handle the system support.
Revision History Record (RHR)	G2® record of revisions. This record is contained within the knowledge base.
SACS	Surveillance Analysis Computer System: A management information computer system that serves as a repository for data collected through the TMACS, and other systems. SACS also has the capability to do statistical analysis and trending of tank farm data.
Software Configuration Control	The systematic evaluation, control, documentation and tracking of changes to computer software.
Software Driver	Software developed to communicate between a host computer and an external device. In the case of TMACS, there are drivers for the Field Instrument Stations and the printers. In the G2® software environment, software driver code is also referred to as "Bridge Code".
Software Patches	Minor modifications to the TMACS software or operating environment. Changes that have less impact than a Minor Release, usually to correct small defects in the code.
Service Request (SR)	A document that describes specific changes required to resolve a system problem, modify functionality, or improve performance. SRs are the initial identification of proposed changes to systems. (Note: A Service Request (SR) is synonymous with a Change Request or Problem Report).
Service Request Log	A list of the SRs that are open against the system; a list of SRs closed or cancelled.
Software Configuration Management	A set of management disciplines that applies technical and administrative direction and surveillance to software development. It identifies and documents the functional and physical characteristics of a product, controls changes to those characteristics, and records and reports on the change processing and implementation.
System Administrator (SA)	The key user from the Customer Organization assigned to oversee the system administration. Typically, security, access, and data issues are reviewed and resolved by the SA. Unresolved issues or system functionality problems are forwarded via Service Request (SR) to the development staff.
Software Revision	A modification to a component of the TMACS Software done under Software Configuration control.

Term	Definition
Source file (or Source module)	A computer file containing the source language (C, etc.) statements for a computer program or part of a computer program, but not including a G2® knowledge base file. Source files are used primarily on TMACS as software "drivers", to interface with Field Instrument Stations.
Production	The status of a system once it has entered the operation and maintenance phase. Production status is granted after customer acceptance and implementation is complete.
Production Environment	The production environment is the set of operating system, programs, and hardware that are used for a system in the O&M phase.
System Change Control Board (SCCB)	The controlling and approving authority for changes to software product baselines. The system's SCCB will review System Change Requests (SRs) and determine the criticality, benefit, and risks of the SR(s) as defined by WHC-IP-0842, Volume IV Section 4.13 "Tank Farm Surveillance System Configuration Management Plan".
Test Environment	The environment, including hardware, operating system, and programs, where software is formally tested.
Tank Farm Surveillance System (TFSS)	An umbrella organization in Tank Farms composed of CASS, TMACS, SACS, and the instrument maintenance organization. Members of this organization participate in the TFSS Configuration Control Board, whose Configuration Management Plan is specified in WHC-IP-0842, Volume IV Section 4.13 "Tank Farm Surveillance System Configuration Management Plan".
TMACS Software Configuration Change Log	A log, maintained by the TMACS Software Project Manager that tracks all TMACS service requests that apply to TMACS software.
TFSS	Tank Farm Surveillance System.
TMACS Test Case	Identifies a TMACS function and the customer acceptance criteria for that function. A test case usually specifies the input data and actions and the expected results for a function.
TMACS Test Procedure	A set of test cases used to verify operation of a functional area within TMACS.

1.5 REFERENCES

HNF-PRO-233, "Review and Approval of Documents"

HNF_PRO-309, "Computer Software Quality Assurance Requirements"

HNF-PRO-317, "Engineering Release and Approval Requirements"

HNF-PRO-432, "Software Practices – Testing"

HNF-PRO-555, "Software Practices – System Configuration Management Plan"

WHC-SD-WM-SDP-004, "Tank Monitor And Control System (TMACS) Upgrade Project Management Plan."

WHC-IP-0842, Waste Tank Project Administration Manual, Volume IV Section 4.13, "Tank Farm Surveillance System (TFSS) Configuration Control".

2. MANAGEMENT

2.1 ORGANIZATION

The Tank Monitor and Control System is an integrated multi-company effort. It is composed of people from LMHC, LMSI and Numatec. LMHC provides the funding the funding and overall project direction. LMSI provides the TMACS project technical lead and integration for software development and interfaces. Numatec provides engineering and development support.

2.2 RESPONSIBILITIES

Manager, Tank Farm Process Engineering

- Chair the TFSS Change Control Board per instructions given in WHC-IP-0842, Volume IV Section 4.13 "Tank Farm Surveillance System Configuration Management Plan".

- Manager, Tank Farms Surveillance & Data Acquisition.

- Appoint the TMACS Cognizant Engineer.

- Assure that configuration management controls identified in this plan are documented and used.

- Assure that appropriate approvals and reviews are obtained in accordance with HNF-PRO-233 and HNF-PRO-445.

TMACS Design Authority

- Establish the approvals and reviews of the TMACS software documentation.

- Identifies the safety class of the TMACS equipment.

TMACS Cognizant Engineer

- Establish the approvals and reviews of the TMACS software documentation, and the safety class of the TMACS equipment.

- Assure that the configuration management requirements as in this plan are followed.

- Assure that proper procedures are used for the documentation of the TMACS software.

- Identify the functional requirements of TMACS software and modifications to the TMACS software.

- Establish and update tank temperature alarm levels.

- Review tank temperature data.

TFSS Change Control Board

- Review and approve System Change Requests, per WHC-IP-0842, Volume IV Section 4.13 "Tank Farm Surveillance System Configuration Management Plan".

Quality Assurance

- Review and approve software documentation in accordance with HNF-PRO-233 "Review and Approval of Documents".

- Perform the responsibilities as designated in HNF_PRO-309, "Computer Software Quality Assurance Requirements"

TMACS Software Project Manager

- Assign software engineers to implement approved changes to the TMACS software.

- Maintain the TMACS SR report, which describes all known faults and failures of each version release.

- Maintain the TMACS Software Configuration Change Log, which tracks all TMACS change requests that apply to TMACS software.

- Assign TMACS software release numbers.

- Maintain TMACS Project File and current documentation.

- Report project status to LMHC and LMSI management.

TMACS Software Engineers

- Perform or establish the necessary actions required for TMACS software control, configuration management, software verification and validation, and software documentation.

TMACS System Administrator

- Act as the TMACS Software Custodian.

- Assure that the TMACS computer hardware configuration is maintained for proper execution of the TMACS software.

- Assure that the station configuration stored in the G2® knowledge base agrees with the actual station configuration.

- Install all version releases of the G2® software, TMACS software configuration, and applicable software drivers.

- Maintain controlled software source files and knowledge bases in controlled directories.

- Assign G2® user passwords and system access privileges to TMACS users and software development and maintenance personnel.

Windows NT™ System Administrator

- Install revisions to Windows NT™ operating system

- Assure that the TMACS software is backed up and logged and that proper recovery procedures and contingency backup plans are in place.

- Assure that the TMACS daily reports, which serve as the TMACS data backup, are sent to SACS, and that these SACS records are backed up.

- Assign passwords and access privileges to TMACS software development and maintenance personnel.

2.3 INTERFACE CONTROL

Current TMACS interfaces include the field instrument stations (Acromag™, etc.), network (HLAN, phone lines), and the SACS computer system. These interfaces must be controlled as part of the TMACS configuration. Any additional interfaces with the TMACS software must have the approval of the TFSS Configuration Control Board.

2.3.1 Field Instrument Station Interface Control

The TMACS System Administrator shall assure that the remote station configuration stored in the G2® knowledge base agrees with the actual station configuration.

2.3.2 TMACS System Users Interface

The users of the TMACS computer system are Tank Farm Operations and Engineering personnel. Password control and physical access control protect direct access to the TMACS. This interface prevents access of all users to the controlled software.

2.3.3 SACS Computer System Interface

The SACS computer system is connected to the TMACS central computers through the HLAN. This access allows the transfer of data from the TMACS to the SACS. The TMACS System Administrator or Windows NT System Administrator shall assign the appropriate access controls to assure that the TMACS software configuration is protected. Any change in the type or level of access to TMACS by SACS shall be managed by the TFSS Configuration Control Board, per WHC-IP-0842, Volume IV Section 4.13 "Tank Farm Surveillance System Configuration Management Plan".

2.4 IMPLEMENTATION

The baseline version of TMACS as of Revision 10.6.1 has been documented in a Version Description Document (HNF-3538 Rev. 0).

A new VDD will be released for each release of the TMACS software.

Commercial-Off-The-Shelf (COTS) software and development tools are stored on CDs in a vault.

Other software files are stored in the Source Code Control System (known as SourceSafe[8]) on the server \\UDO. All references to software and files refer to this repository.

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[8]SourceSafe is a trademark of the Microsoft Corporation.

2.5 POLICIES AND PROCEDURES

The following documents provide requirements implemented by this plan:

WHC-IP-0842, <u>Tank Farm Surveillance & Operations Administration</u>, Volume IV Section 4.13, "Tank Farm Surveillance System (TFSS) Configuration Control".

HNF-PRO-233, "Review and Approval of Documents"

HNF_PRO-309, "Computer Software Quality Assurance Requirements"

HNF-PRO-432, "Software Practices – Testing"

HNF-PRO-555, "Software Practices – System Configuration Management Plan"

HNF-PRO-317, "Engineering Release and Approval Requirements"

3. SOFTWARE CONFIGURATION MANAGEMENT ACTIVITIES

3.1 CONFIGURATION IDENTIFICATION

3.1.1 G2® Software and Operating Environment Identification

New releases of this G2® software and the operating environment are controlled under the TFSS Configuration Management Plan and this plan. The G2® software consists of the proprietary runtime executable(s) files (including the Telewindows[9] remote multi-user interface software) and libraries distributed by Gensym Incorporated. The operating environment includes the Windows NT™ operating system and any Windows NT™ utilities such as batch files.

3.1.2 TMACS Knowledge Base Identification

The approved versions of the TMACS G2® knowledge bases are controlled in the Source Code Control System (known as SourceSafe™) directory \TMACS\KnowedgeBases.

3.1.3 Software I/O Driver Identification

The source code for the I/O Drivers is controlled in the Source Code Control System (known as SourceSafe™) directory \TMACS\Drivers with the code for each driver in a subdirectory. The

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[9]Telewindows is a registered trademark of the Gensym Corporation.

executable code for the drivers is in \TMACS\Release Files\X.Y.Z, where X is the major release number, Y is the minor release number, and Z is the patch number.

3.1.4 Field Instrument Station Configuration Data

The configuration files for the field instruments are stored in the Source Code Control System (known as SourceSafe™) subdirectories under "\TMACS\Field Device Configuration" where each type of device has it own directory.

3.1.5 Identification Requirements

3.1.5.1 Version Release

Each TMACS Version Release shall be identified by a two-part decimal number of the form, "M.m", where "M" is the major revision number, and "m" is the minor revision number. For example, the number 5.0 indicate the initial release of major revision 5, and the number 5.2 identify the second minor revision to major revision 5. Release numbers shall start with 0.0 and be assigned sequentially to each software release thereafter. The TMACS Software Project Manager assigns release numbers.

3.1.5.2 Software Patches

The TMACS System Administrator may make emergency patches after a software release has been installed, to correct anomalies. An approval process as determined by the TMACS Cognizant Engineer and the TMACS Design Authority shall approve installation of these patches.

3.1.5.3 Service Request

The TMACS Service Request is a document used specify changes required to resolve a system problem, modify functionality, or improve performance. This information is taken by the TMACS Software Engineers, recorded, analyzed, and resolved. See Appendix A for an example of a Service Request.

3.2 CONFIGURATION CONTROL

3.2.1 Change Approval Authority

All TMACS service requests are reviewed and approved or disapproved by the TMACS Configuration Control Board Chairman and, if required, by the TMACS Configuration Control Board. The procedure for this activity is included in WHC-IP-0842, Volume IV Section 4.13 "Tank Farm Surveillance System Configuration Management Plan".

3.2.2 Request Processing

All requests for changes to the TMACS Software configuration shall be initiated from a Service Request form. The processing of these requests is included in WHC-IP-0842, Volume IV Section 4.13 "Tank Farm Surveillance System Configuration Management Plan".

Software Changes must be traced to a TMACS Service Request. Any changes to the functional requirements shall be incorporated in WHC-SD-WM-SFR-006, TMACS System Functional Requirements.

3.2.3 Release Processing

A Version Description Document (VDD) describes the current software. An Engineering Change Notification (ECN) will be prepared against the VDD when software system changes are required.

Installation of software will be coordinated with Tank Farm Operations.

The software engineer and the design authority will determine appropriate testing of software system changes.

3.2.4 Interface Configuration Control

Configuration control of interfaces with parts of the TMACS system and with other projects/organizations shall be controlled by WHC-IP-0842, Volume IV Section 4.13 "Tank Farm Surveillance System Configuration Management Plan".

3.3 CONFIGURATION STATUS ACCOUNTING

The status of all system change requests, including those for TMACS, shall be tracked by the Chairman of the TMACS Configuration Control Board or his/her designee, per requirements of WHC-IP-0842, Volume IV Section 4.13 "Tank Farm Surveillance System Configuration Management Plan".

The TMACS Software Project Manager shall keep a Software Configuration Change Log. This log keeps status information on those TMACS change requests that affect software, and tracks the assignment of the changes to the various version releases.

3.4 AUDITS AND REVIEWS

An audit of the software configuration can occur anytime. It shall be the responsibility of the Project Lead through a known baseline and status accounting to be prepared for such an audit. When the audit takes place the Project Lead shall participate as required.

3.5 ACCESS CONTROL

Both physical access and computer logon control measures are used to prevent unauthorized access to the TMACS. The TMACS central computer is located in the CASS Room (2750E/B-105/200E), which is operated 24 hours a day, and locked with a Cypher lock whenever operators are out of the room.

The TMACS operator is only granted access to read data values and acknowledge alarm messages on the computer screens. Access to modify data values or alter the software is restricted by user name, password, and login mode.

The Shift Office computers display TMACS data located on the central computer using Telewindows® software. The login security at the shift office only allows the users to view data, not modify values or underlying files.
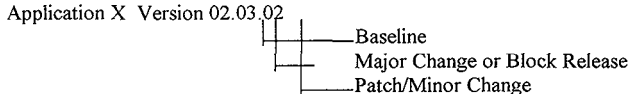
3.6 BACKUP AND RECOVERY

Complete backups are kept for the TMACS software and data. These are stored in the fireproof safe located just outside the CASS room, and are updated after each software release, and once a week for the data.

3.7 VERSION CONTROL

3.7.1 Format of a Version Number

The System Version Number will have three components. The first two digits will represent the baseline versions. The next two digits represent major changes or block releases. The final digits represent smaller changes or patches to the application. For example, let us assume application X is on its second baseline, third quarter block release, and has applied two patches since the block release. The Version number would appear as follows:

Application X Version 02.03.02

                               Baseline
                           Major Change or Block Release
                           Patch/Minor Change

3.8 DOCUMENT REVISION CONTROL

3.8.1 Revision Requirements

Major modifications to a system will trigger SCM to notify the SCCB that a new baseline (02.01.01) should be considered. The SCCB will examine the changes and direct the SD&I

Project Lead accordingly. Block releases or significant changes to an application will trigger recommendation of a block release update (02.**01**.01). Minor changes will be termed patches and the version number should be updated accordingly (02.01.**01**).

3.8.2 SCM Revision Control

Every system update will trigger a change to the system version number. Each change will be stored in a manner that will enable SCM to identify which modules were changed for Block and Patch releases. Baseline changes will be a recreation of the complete system repository.

4. TOOLS, TECHNIQUES, AND METHODOLOGIES

4.1 TOOLS

All TMACS-related files are stored in SourceSafe™ on the server identified as \\UDO. SourceSafe™ is a source-code control system from Microsoft.

4.2 TECHNIQUES

Source code is checked out of SourceSafe™. Modifications are made. System is tested in development. Files are checked into SourceSafe™. Files are retrieved for formal testing and installation.

4.2.1 Baseline/Library Management

Management of the different software baselines and libraries is described below:

  a. Development. The development baseline is controlled and managed by SD&I project personnel. The development environments are used by software engineers to develop and unit test code.

  b. Test. The test baseline will be established using the product baseline, if one exists. If none exists, as would be the case in a new development project, the test environment will be built using specific elements from the development environment. Test baselines and environments are managed and controlled by project personnel.

  c. Configuration. The server \\UDO will house the controlled configuration baseline for TMACS. As described in Section 3.1.1, Baseline Configuration, All application components should be stored in SourceSafe™. The vendor-supplied software (like G2®) is on CD and may be in SourceSafe™ as you stated in Section 2.3. Access to this server, as well as all production servers, will be restricted authorized personnel.

d. Production. Authorized personnel will only accomplish updates to the production. Depending on the environment, this authority may reside within the T&NE, O&S, and/or SD&I organization. The product baselines shall be a replication of the configuration-managed baseline except as modified by an emergency change.

4.3   METHODOLOGIES

The software lift cycle in effect for the TMACS system will be Operation and Maintenance.

5.   SUPPLIER CONTROL

Vendor supplied software on the TMACS central computer includes the Windows NT™ operating system software and the G2® software produced by Gensym, Inc. These vendors provide periodic revisions, as well as documentation, that detail changes from the last release. Notification to users of known faults and failures and any suggested work arounds are also supplied on a regular basis.

5.1   VENDOR-SUPPLIED SOFTWARE CONTROL

Vendor-supplied software and operating systems are available on CD. Copies of these CDs are kept in a vault.

5.2   SD&I SUPPORT AND SUBCONTRACTOR SUPPORT

Responsibility for installation of software revisions/releases shall be divided between the TMACS System Administrator, who shall be responsible for installing releases of the G2® software, and the NT System Administrator, who shall be responsible for installing releases of Windows NT™. These installations shall be made on the basis of an approved Service Request. The installation shall be made in such a manner that the last previously installed version can be restored to service easily should problems be encountered after installation.

6.   RECORDS COLLECTION AND RETENTION

Major software release documentation consists of the following:

- Version Description Document
- Acceptance Test Procedure
- Acceptance Test Report

The documents listed above are released as supporting documents, and shall be processed in

accordance with HNF-PRO-317 "Engineering Release and Approval Requirements".

- TMACS Service Request forms.
- The TMACS Service Request Log.

The TMACS Software Project Manager shall maintain the documents listed above.