2. To: (Receiving Organization) Distribution
3. From: (Originating Organization) Phutonium Finishing Plant Project
5. Proj./Prog./Dept./Div.: 15000
8. Originator Remarks: WinCal software documentation for use by BWHC and the IAEA.
   Release delayed while documents received add'l. approvals.

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18. Signature of EDT Originate Date

19. Authorized Representative Date for Receiving Organization

20. Design Authority Cognizant Manager

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Windows Calorimeter Control (WinCal) Program Computer Software Configuration Management Plan

G. A. Westsik, BWMC, Richland, WA 99352
Prepared for the Project Hanford Management Contractor for the U.S. Department of Energy under Contract DE-AC06-96RL13200

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Approved for Public Release

A-6400-073 (10/95) GEF321
Windows Calorimeter Control
(WinCal) Program Computer
Software Configuration
Management Plan

Date Published
March 1997

Prepared by
Babcock & Wilcox Hanford Company

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1.0 INTRODUCTION


1.1 PURPOSE

This system configuration management plan contains the requirements that control the WinCal system software, hardware, and documentation. This plan will govern all project activities during both development and operations.

1.2 SCOPE

This system configuration management plan applies to the management and control of the WinCal System, which consists of the following:

- The computer
- The IEEE-488 interface cards
- The WinCal software.

1.3 OVERVIEW

Calorimetric assay has been an important part of nondestructive assay for more than
40 years. In this analysis method, a radiometric isothermal calorimeter measures the heat flow produced by the decay of radioactive material in a sample.

WinCal software controls calorimeter operation and data collection, stores data, and performs calculations to determine the rate at which thermal power is produced in the sample being measured. In its current application, the WinCal-measured rate of power production and the relative abundance of the isotopes of plutonium and $^{241}$Am are used to calculate the quantity of plutonium in the container. This configuration management plan supports calorimetry analysis at the Plutonium Finishing Plant (PFP) and helps ensure that the software provided to the International Atomic Energy Agency (IAEA) is well documented and that software changes are identified, implemented, and controlled.

The WinCal software consists of source code developed at Hanford using a packaged applications development software (Visual BASIC) combined with external resources provided by third party vendors which have been incorporated to perform specific functions of the WinCal system.

The U.S. Department of Energy has agreed to the joint use of calorimeters at PFP. The IAEA requires exclusive use of the WinCal system when the calorimeters are under their control. The WinCal System for the IAEA will be compiled on their hard drive and stored at PFP under IAEA seal. The WinCal must be acceptable to both the IAEA and the U.S. Department of Energy. WinCal software documentation must comply with DOE quality assurance and IEEE requirements.

1.4 WINCAL CONFIGURATION MANAGEMENT STRATEGY

WinCal configuration management and control at the Hanford Site has two phases—development and operation. Babcock & Wilcox Hanford Company (BWHC) will control both phases. Because responsibility for the WinCal software was transferred to the PFP during development, a configuration management strategy needs to be followed during development as well as later on during normal operation to control the change process.

The configuration management strategy for WinCal is as follows.

- A WinCal software change control board (SCCB) was established to review and approve requested software changes. The SCCB will have representatives from the following: PFP; the Safeguards and Security organization; and the technical organization, Lockheed Martin Services, Inc. (LMSI), who will make any required changes to the WinCal software.
A baseline "BETA Version 2.00" was established before any software changes were made. This baseline consisted of an agreed-on set of hardware and software.

A new beta version number will be assigned to each release of the WinCal software during development.

When all software development is completed, a unique operational version number will be assigned to the WinCal system.

During the operational phase, System Change Requests (SCRs) will be collected and completed in phases.

Configuration management will continue for WinCal throughout the operational life of the system.

Configuration management will be applied both to the code developed at Hanford as well as external resources provided by third party vendors.

Software changes when approved, implemented, tested, and installed will be reflected throughout WinCal supporting documentation.

Updates to the documentation that are not the result of software configuration changes may be made when the need is identified. These types of changes may include, but are not limited to, correcting typographical errors, adding and updating information for better clarification, and correcting omissions.

2.0 MANAGEMENT

2.1 SOFTWARE CHANGE CONTROL BOARD

ORGANIZATION

A joint SCCB has been formed. The SCCB consists of representatives from BWHC, Babcock & Wilcox Protec, Inc. (BWP), and LMSI. Other designated customer representatives and software programmer subcontract personnel will sit on the board as required. Members may be added if the use and deployment of the WinCal system reveal the need. The SCCB will review and approve recommendations for changes to the WinCal software during the development and operational phases. The board will discuss SCRs as necessary to obtain agreement on changes and improvements and take action accordingly.
2.1.1 Babcock & Wilcox Hanford Company

BWHC is responsible to safely characterize and store nuclear materials in several different forms. As part of this responsibility, BWHC personnel routinely perform radiochemical and nondestructive analyses of nuclear materials. PFP is responsible for developing or acquiring calorimeters and for operating and maintaining the calorimeters and integral computers on a continuing basis. PFP is responsible for coordinating current WinCal software development and maintenance efforts and associated funding and project management support.

2.1.2 Babcock & Wilcox Protec, Inc.

BWP is responsible for safeguarding of the nuclear material stored at the Hanford Site. BWP’s Safeguards and Security organization is responsible for communicating with the PFP operations and laboratory organizations and the IAEA on safeguard issues. BWP also is responsible for providing the requirements that must be met to ensure that WinCal software meets PFP and IAEA needs.

2.1.3 Lockheed Martin Services, Inc.

LMSI is responsible for maintaining the application software and technical documentation for the current phase of WinCal software development. LMSI personnel will implement all changes requested via software problem reports. Systems Development and Integration will test the software to affirm its integrity and that it meets the criteria defined in the Test Plan and the applicable SCRs. After Systems Development and Integration testing is successfully completed, the new application software will be released to the system administrator or customer for acceptance testing. The system revision number will be maintained by the system administrator.

2.2 SOFTWARE CONFIGURATION MANAGEMENT PLAN IMPLEMENTATION

This software configuration management plan becomes effective when it is approved and applies to the development and operational phases. Processes for administering SCRs and relating SCRs to the application software and supporting system documentation must also be in place when this plan is approved.
2.3 APPLICABLE POLICIES, DIRECTIVES, AND PROCEDURES

Configuration management and control of changes to the application software and the supporting documentation will be in accordance with WHC-CM-3-10, Sections SP-6.2 and SP-6.3, and the corresponding IEEE standards on which these software practices are based.

The governing safety document requires that a safety review of all hardware and software be conducted. The WinCal system was reviewed by PFP Safety and was determined not to have safety significance.

3.0 SYSTEM CONFIGURATION MANAGEMENT ACTIVITIES

System configuration management activities center around the control of changes to the application software, hardware, and documentation.

3.1 CONFIGURATION IDENTIFICATION

Hanford Site supporting document (SD) and implementing procedure (IP) document control numbers and associated change procedures are used to identify supporting documents. These numbers and procedures are described in WHC-CM-3-10, Section SP-6.1, and corresponding IEEE software engineering standards. Software, hardware, and documentation are identified in accordance with the revision number process described in WHC-CM-3-10, Section SP-6.2, and corresponding IEEE software engineering standards. Correlation between document and software revisions are accommodated through the use of document record of revision sheets in each document and the system change request described in WHC-CM-3-10, Section SP-6.3 procedures, and corresponding IEEE software engineering standards.

An automated software tool called “Visual Source Safe” is used to identify and control WinCal software modules during the development and maintenance phases. The version number of WinCal is displayed on the startup screen, on the title bar of the MDI form, and on the HELP/ABOUT screen. As software changes are made and new version numbers are identified, the current version numbers displayed on the WinCal screens will be updated. Encoded module headings and file version identification labels also will be updated.

Any files, graphs, tables, etc. that are part of the WinCal software will be controlled by Visual Source Safe. Files generated when the WinCal hardware and software are used to perform an analysis will be saved with a header that includes the date, time, filename, and current software release identifier.
3.2 CONFIGURATION CONTROL

During the configuration control process, the system administrator and software engineers perform activities necessary to ensure that planned changes are implemented correctly, documentation is complete and up to date, and no unacceptable changes have been introduced into the software performance. The configuration control process is as follows.

- Requested changes are brought before the SCCB for discussion and priority assessment.
- Requests are documented on a SCR.
- Software changes and testing take place in a development environment.
- Changes to the software are tested by the system administrator.
- All SCRs will follow the approved SCCB procedures.
- At least one earlier version of the software will be maintained by the system administrator. This version is to be saved and stored before releasing the new version for production.
- After the new version has been released for production, a backup copy of the new version will be made to be used in the event of loss or failure.
- When a portion of software development is subcontracted to another organization, the software development organization will retain responsibility for software configuration management.

3.3 CONFIGURATION STATUS ACCOUNTING

Configuration status at any given point is reflected by a record of revision in each document, the SCRs, and the HELP/ABOUT menu in the WinCal software.

During the development phase, three versions of software, BETA Version 2.01, BETA Version 2.02, and BETA Version 2.03, are released. The initial operational WinCal System software will be set at WinCal Version 1.0. Each subsequent software release will have version numbers incremented as approved by the SCCB.
### 3.4 AUDITS AND REVIEWS

For changes requiring major software modifications or enhancements, a formal project plan will be implemented. The formal plan will identify appropriate technical, verification and validation, and quality assurance reviews that are consistent with WHC-CM-3-10, Section 3.0, and corresponding IEEE software engineering standards and are commensurate with the complexity of the change. The SCCB will decide when a release is significant enough to warrant a formal project plan.

### 3.5 ACCESS CONTROL

The WinCal system provides access and control to the application.

### 3.6 BACKUP AND RECOVERY

The WinCal software will be backed up as identified in Section 3.2. The WinCal initialization (.INI) files (WCIEEE.INI, WC CONFIG.INI and WINCAL.INI) will be backed up on a weekly basis. The Measurement Control Log (MCL) file will be backed up on a monthly basis. In the event of a failure, the backup files will be used to restore the WinCal software, initialization files and MCL log to the most current version.

### 4.0 SUPPLIER CONTROL

If a WinCal user or software engineer requests a new version of vendor software, the SCCB will review and either approve or reject the request. If the request is approved, the software engineers will test the installation of new releases of vendor software before upgrading new software releases. They will test the vendor software before routine installation and use of the WinCal software and related software packages to ensure acceptable performance.

The WinCal system administrator is authorized to implement new releases. It is suggested the system administrator perform some or all of the test plan to verify that no conditions arise that adversely affect the operational version of the application software.

### 5.0 RECORDS COLLECTION AND RETENTION
Records inventory disposal schedules are required for the WinCal software, program code, and data files. The WinCal system administrator is responsible for developing and maintaining the disposal schedules in accordance with applicable company procedures.

WinCal supporting documents and related changes generated during both system development and operation will be maintained as quality-affecting records.

6.0 REFERENCES


QR-19.0, “Software Quality Assurance Requirements”
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APPENDIX A

SYSTEM CHANGE REQUEST

The following is a sample of the System Change Request (SCR) format. The actual format used may differ slightly.

WINDOWS CALORIMETER (WINCAL) CONTROL PROGRAM

SCM NUMBER: ___________________________ DATE: ________________ TPCN, W/O: ____________________________

1. SUBMITTED BY: ___________________________ DATE: ________________

2. DOCUMENTS AFFECTED:
   [ ] None
   [ ] WHC-SD-CP-CSRS-014 WinCal System Requirement Specifications
   [ ] WHC-SD-CP-TP-093 WinCal System Test Plan
   [ ] WHC-SD-CP-SDD-019 WinCal System Design Description
   [ ] WHC-SD-CP-CSCM-010 WinCal System Configuration Management Plan
   [ ] Other ____________________________

3. DETAILED DESCRIPTION OF THE CHANGE:

4. REQUESTED COMPLETION DATE:

5. REQUESTED PRIORITY: [ ] Critical [ ] Non-Critical [ ] General Enhancement

6. SCCB DECISION: [ ] Accept [ ] Reject [ ] Defer to Date: ___________

  SCCB COMMENTS:

7. SCCB APPROVAL:

8. ASSIGNED TO:

9. SOLUTION IMPACTS: COST ESTIMATE: $__________ SCHEDULE: __________

10. DESCRIPTION OF HARDWARE/SOFTWARE AFFECTED:
     Note: Modifications to software should also be noted in the code itself for reference.

__________________________________________________________________________

__________________________________________________________________________

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Project Title/Work Order: Revision 0, Windows Calorimeter Control (WinCal) Program

Computer Software Documentation

EDT No. 620733

ECN No.