UNCONTROLLED

NO.	Rev.	Date
EP-3-016	0	07/03/89

WEST VALLEY
NUCLEAR SERVICES COMPANY
INCORPORATED

ENGINEERING PROCEDURE

SUBJECT
Software Configuration Management

APPROVED
D. K. Ploetz
Plant Engineering Manager

1.0 PURPOSE

This procedure describes the processes by which software and its associated documentation are maintained as permanent records, changes are made to software and its associated documentation, and ongoing documentation of code management is maintained.

This procedure applies only when selected on the Software Requirements Form in accordance with EP-3-013, Determination of Software Requirements. It applies to engineering/scientific software and designated support software.

For engineering/scientific software being developed or modified at WVNS, this procedure shall apply after the base version of the software is established by the FIDR in accordance with EP-3-014, "Final Internal Development Review".

For acquired engineering/scientific software that needs no development or modification, this procedure shall apply after the software has been transferred in accordance with EP-3-015, "Transfer of Software, Data, and/or Documentation," if applicable.

For support software, this procedure shall apply if designated on the Software Requirements Form (see attachment C of EP-3-013, "Determination of Software Requirements"). Configuration management is required if support software is going to be used repeatedly or by multiple users.

This procedure does not apply to system maintained software. However, a stream of commands used to execute system maintained software and classed as support software shall adhere to the configuration management requirements of support software.

Configuration management of data base software that is not classed as system maintained software is covered by this procedure.

8910260213 891025
PDR PROJ
M-32 PDC

2.0 RESPONSIBILITIES

2.1 Cognizant System Process/Design Manager (CSPM/CSDM) - Approves/disapproves all Software Change Request Forms; approves all New Version Reports; approves revised versions of software and/or design documentation for release.

2.2 Code Custodian - Maintains software in such a way that its integrity is assured; initiates any required changes in software and/or documentation; distributes any necessary information to the users of the software.

2.3 User - Reports any problems with software usage to the code custodian for resolution.

2.4 Records Management - Assigns a document number to software upon request of the Code Custodian; receives the Permanent Software Documentation Package in accordance with EP-3-011, Review, Approval, and Engineering Release; assigns an ECN number upon request of Code Custodian; revises Software Documentation Package as required by Software Change Request Forms.

2.5 Quality Assurance - Approves initial release of Permanent Software Documentation Package and all subsequent revisions to the package by signature on appropriate forms.

3.0 DEFINITIONS

3.1 RECORD - As used in this procedure, a record is a magnetic media item or document associated with a computer code.

3.2 Benchmarked Version - The version of a code as it exists at completion of the development phase of the life cycle. This is the version that will undergo verification and validation testing and may not be altered except as prescribed in section 4.3.4 of this procedure.

3.3 All other terms used in this procedure are defined in EP-3-013, "Determination of Software Requirements," section 3.0.

4.0 GENERAL

4.1 Initiation of Configuration Management

Software is considered to be under configuration management when the following activities take place:

Software developed at WVNS: the code custodian receives the benchmarked version of the software and associated documentation following completion of the FIDR process in accordance with EP-3-014, "Final Internal Development Review of Software and Documentation".

Acquired software: the code custodian is the receiver of the software and associated documentation in accordance with EP-3-015, "Transfer of Software, Data, and/or Documentation".

Existing software: the software (in machine-readable form) and its associated documentation is physically transferred from its current location to the code custodian.

On receipt of software and documentation, the Code Custodian shall assign a unique version number to software and design documentation, and shall identify the software version and the associated document version on a Software Version Log, attachment A. The Code Custodian shall ensure that the unique software version number and the Internal ID Number from the Software Summary Sheet is identified in the software listing and is printed in the engineering/scientific software output.

Until software testing is completed in accordance with EP-3-017, "Conversion Testing, Verification, and/or Validation of Software," the Code Custodian shall ensure that the software listing and all output include the following disclaimer:

"Results are based on the use of unverified software. No assurance is expressed or implied as to the accuracy, completeness or usefulness of this information."

4.2 Software Documentation

4.2.1 Permanent Software Documentation Package

Upon initiation of configuration management, the Code Custodian ensures that software documentation consists of the following at a minimum:

Developed or modified engineering/scientific software -

- Software Summary Form (SSF)
- Software Requirements Form (SRF)
- Documentation resulting from review of SRF, if performed FIDR Package
- FIDR Comment/Resolution Form(s)
- FIDR Summary

Developed or modified support software -

- Software Summary Form (SSF)
- Software Requirements Form (SRF)
- User's manual

Acquired engineering/scientific and support software -

- Request for Transfer (RFT)
- Software Summary Form (SSF)
- Software Requirements Form (SRF)
- All documentation transferred with the software (e.g., user's manual, verification reports, technical reference manual)

Existing engineering/scientific and support software -

- Software Summary Form (SSF)
- Software Requirements Form (SRF)
- All documentation currently associated with the software (e.g., user's manual, verification reports, technical reference manual)

Following initiation of Configuration Management, documentation shall include testing documentation in accordance with EP-3-017, "Conversion Testing, Verification, and/or Validation of Software".

If not included as part of the software documentation, the CSPM/CSDM shall ensure that one or more benchmark test cases are developed to demonstrate correct model operation and provide for future comparison of software versions. Benchmark test cases are optional for support software.

The collection of documentation described above is the Permanent Software Documentation Package which will be transmitted to Records Management in accordance with EP-3-011, Review, Approval, and Engineering Release. The package, as transmitted, will contain a record copy of the software, either on magnetic media or as a hard copy.

4.2.2 Software Documentation Package

The entire collection of software documentation associated with a particular code is the Software Documentation Package. This package contains, in addition to those documents included in the Permanent Software Document

Package, all documentation required by this procedure (e.g., Software Version Log, Software User List, Software Change Request Form), and all future documentation relating to the code. The Software Documentation Package is maintained by the Code Custodian, updated as required to include all current documentation, and provides the major source of information for a particular piece of software.

4.3 Instructions for Completion of Forms Required by this Procedure

4.3.1 Software Version Log (attachment A)

This form is to be filled out by the Code Custodian upon receipt of software as described in section 4.1. It is the means by which a unique version number is assigned to software and design documentation and updated as appropriate. This form is retained by the Code Custodian as part of the Software Documentation Package.

4.3.2 Magnetic Media Log (attachment B)

This form is to be filled out by the Code Custodian following creation of backup copies of the software on magnetic media. It identifies and records the location of magnetic media items received or created by the custodian for the purposes of configuration management as follows:

A. Magnetic media items maintained onsite under physical control of the Code Custodian shall be logged with a unique log number and externally labelled with software name, version, creation date, and log number.

B. Magnetic media items not under physical control of the Code Custodian (e.g., those maintained by Records Management) shall be logged with the identifiers necessary to facilitate retrieval.

A list of contents (e.g., file directory) of each magnetic media item identified in the log shall be filed with the log until the item is erased.

When a magnetic media item is moved or erased, the action shall be recorded on the next numbered column under location/disposition and date.

This form shall be retained by the Code Custodian as part of the Software Documentation Package.

4.3.3 Software User List (attachment C)

The Code Custodian shall complete the Software User List in the following manner:

A. Initial access to a software version shall be indicated in column 1 under software version/date of release.

B. As a user receives a new software version, the version identifier shall be noted on the next numbered column under software version/date of release.

C. When user access is terminated, the date of termination shall be noted under the appropriate column of software version/date of release.

D. This form shall be retained by the Code Custodian as part of the Software Documentation Package.

4.3.4 Software Change Request Form, WV-1870 (attachment D)

This form has two functions: 1) it is the means by which the Permanent Software Documentation Package is revised and 2) it is the means by which changes to configuration managed software are initiated and documented.

If used for function 1:

The form is completed by the Code Custodian to revise the Permanent Software Documentation Package. ECN is checked at the top of the form and the ECN number, as assigned by Records Management, is entered in the appropriate space.

If used for function 2:

Internal code revision is checked at the top of the form and the Software Change Request No. is entered by the Code Custodian (see Subsection B.) The form is completed by the Code Custodian upon receipt of a request from a user to change software and/or design documentation in order to correct errors, to add new features, or to modify existing features. The process used to effect and document such changes is as follows:

A. Upon receipt of a request, the Code Custodian shall document it on the Software Change Request Form, WV-1870 (attachment D, Part 1) if it is not already in that format.

B. If a software problem is being reported, attachment D, Part 1 shall include a description of the problem and a listing of input for a test case that demonstrates the error (or sufficient information to allow a test case to be developed).

If the information submitted is incomplete (e.g., lacks test case input) or illegible, the Code Custodian shall request clarification or reject the change request and return the Software Change Request Form to the originator without action.

When the change request is accepted for action, the Code Custodian shall assign it a change request number and shall enter the number on the Software Change Request Form and on the Software Change Request Log, attachment E.

C. If a software problem is being reported, the Code Custodian shall ensure that software is run using input supplied with or described in Part 1 of the Software Change Request Form, and that the appropriate action below is accomplished:

1. If the error cannot be duplicated with the input provided or if it is found that the supplied input is in error, the Code Custodian shall note this information on Part 2 of the Software Change Request Form, and under "Disposition" on the Software Change Request Log, attachment E; and shall send a copy of the Software Change Request Form to the user identified in Part 1 of the form and retain the original form as part of the Software Documentation Package. No further action shall be required for the change request.

2. If the error occurs as described in Part 1 of the Software Change Request Form, or if any other errors occur in the run, the Code Custodian shall complete Part 2, sign and date the form, and forward the form, the input, and the output to the CSPM/CSDM.

D. The CSPM/CSDM shall review the Software Change Request Form to assess the impact of the software problem, to determine disposition of the request, and to determine if users shall be notified. The CSPM/CSDM shall indicate disposition of the request on Part 3, sign and date the form, and return the completed form to the Code Custodian.

E. The Code Custodian shall enter the appropriate information from Part 3 of the Software Change Request Form on the Software Change Request Log, attachment E, and shall take the following actions as appropriate on the disposition as specified by the project manager:

1. If the change request is approved, the Code Custodian shall ensure changes to the software and/or design documentation are developed in accordance with sections 4.3.6, A and B respectively.

2. If the requested change is disapproved, the Code Custodian shall send a copy of the completed Software Change Request Form to the originator. The original form is retained as part of the Software Documentation Package.

3. If users are to be notified of an error, the Code Custodian shall ensure that a copy of the Software Change Request Form is sent to each person on the Software User List, attachment C.

F. The Code Custodian may notify users of and provide user access to interim corrections for software errors that have been processed in accordance with the above process before formal release of a new version of the software.

The Code Custodian shall include a transmittal letter or memo stating that Users assume all risks and responsibilities for use of software containing such interim corrections and that Users shall modify the version identifier to reflect the changes installed by adding the change request number(s) to the version number for the interim period. User shall also include the verification disclaimer specified in section 4.1.

The Code Custodian shall update the Software Version Log to reflect the interim change in the version number.

4.3.5 Software Change Request Log (attachment E)

This form is completed by the Code Custodian and provides the means of documenting changes made to software and/or design documentation. It is retained by the Code Custodian as part of the Software Documentation Package.

4.3.6 New Version Report, WV-1871 (attachment F)

A. Creation of a New Version of Software

The New Version Report, WV-1871 (attachment F) is completed by the Code Custodian to identify the base version of the software to be revised, assign a new version number, specify changes to be installed in the designated version, and select test cases to be used:

1. Only those changes reported and logged in accordance with section 4.3.4 may be installed.

2. At a minimum, the test cases designated shall be comprised of the benchmark test cases (see section 4.2) and input provided with the designated Software Change Request Form.

3. Additional test cases may be developed, as appropriate.

Upon completion of Part 1, the New Version Report is delivered to the CSPM/CSDM for approval. It is then returned to the Code Custodian who performs the following tasks:

1. Provides access to the version of the software to be revised for the person(s) who will create the new version. This individual(s) will be designated by the CSPM/CSDM.

2. Following completion of the revision, obtains a computer-generated listing of software modifications that compares the revised version with the designated base version (e.g., using VAX/VMS DIFFERENCES, CDC's UPDATE, or BNW's WITNESS).

3. Ensures that application runs are performed to test the revised version of the software on the designated computer system using the specified test cases.

4. Develop revisions to design documentation as required by the designated change requests in accordance with section 4.3.6, B.

5. The Code Custodian shall ensure that all additional software and design documentation errors discovered during software revision or testing are handled as new change requests in accordance with section 4.3.4, and that revisions to correct them are included in the revised software and design documentation.

When the above process is concluded, the Code Custodian shall complete Part 2 of the New Version Report, and shall deliver the listing of the revised version of software, listing of modifications, testing documentation, and design documentation revisions to the CSPM/CSDM for review.

B. Creation of a New Version of Design Documentation

New versions of the design documentation corresponding to new versions of the software are created if the change requests designated in Part 1 of the New Version Report require documentation changes. In this case, the following actions are performed concurrently with those in section 4.3.6, A. Design documentation may also be revised independently of software if significant changes are requested in section 4.3.4.

To initiate creation of a new version of documentation, the Code Custodian shall complete Part 1 of the New Version Report to identify the base version of design documentation, assign the new version number, and identify the revisions to be implemented. Only those changes reported and logged in sections 4.3.4 and 4.3.5, and typographical and minor editorial changes that clarify but do not change the meaning of the text, may be implemented and reviewed in this process. The Code Custodian proceeds as follows:

Ensures that a copy of the designated base version of design documentation to be revised is made available to the person(s) performing the revision. This individual(s) is assigned by the CSPM/CSDM.

At the completion of the revision, receives a revised version of design documentation in the form of a new document or a set of replacement pages, with replacement instructions, for the designated base version.

Ensures that each page in the new design documentation or each replacement page is marked with the new version identifier to differentiate it from the designated base version.

The Code Custodian shall ensure that all additional errors (except typographical and minor editorial changes) in the design documentation discovered during the revision process are handled as new change requests in accordance with section 4.3.4, and that these errors are corrected in the revised design documentation.

When the above process is concluded, the Code Custodian shall complete Part 2 of the New Version Report and deliver the draft revised design documentation or draft replacement pages and instructions to the CSPM/CSDM for review.

C. Review of New Versions of Software and/or Design Documentation

The GSPM/CSDM shall ensure that an Independent Technical Review (see EP-3-013, section 3.19) of the new version of software and/or design documentation is conducted. If possible, appointed reviewers should come from the WVNS Technical Specialist List. The CSPM/CSDM shall designate items for review and include at a minimum the following:

1. New Version Report, with Parts 1 and 2 completed.

2. Copies of all Software Change Request Forms, attachment D, for changes included in the new version. Documents developed in section 4.3.6, A, including listings of revised software, listings of software modifications, testing documentation, and results of application runs used for testing.

3. Revised design documentation or replacement pages with instructions developed in section 4.3.6, B.

Criteria for approval of items designated in section 4.3.6, C, shall be the following, at a minimum:

1. Satisfactory implementation of the designated requested changes.

2. Conformance of revised software to design input specified on the Software Requirements Form, EP-3-013, "Determination of Software Requirements."

3. Conformance of revised design documentation to the requirements specified on the Software Requirments Form, EP-3-013, "Determination of Software Requirements."

4. Adequacy and correctness of testing of the revised software version, including input, input assumptions and results.

5. Adherence of the software to the requirements for version identification and for the disclaimer statement in section 4.1.

Following completion of the Internal Technical Review, the new version of software and/or design documentation is approved for release by the CSPM/CSDM by completion of Part 3 of the New Version Report. The completed New Version Report, the Independent Technical Review Report, the new version of software, and/or the new version of design documentation are delivered to the Code Custodian for retention in the Software Documentation Package and for inclusion in the Permanent Software Documentation Package via a Software Change Form (see Section 4.3.4, Function 1).

D. Release of New Versions of Software and/or Design Documentation

On receipt of the new version of software and/or design documentation from the CSPM/CSDM, the Code Custodian shall:

1. Indicate completion of each installed software change in the Software Change Request Log, attachment E.

2. Identify the new version of software and/or design documentation and incorporated changes (by change request log numbers) in the Software Version Log, attachment A.

3. Create backup copies and identify new magnetic media items in the Magnetic Media Log, attachment B.

4. Notify users identified on the Software Users List, attachment C, of the availability of the new version of software and/or design documentation.

If the user requests the new version of software and/or design documentation, the Code Custodian shall update the next numbered column under software version/date of release in the Software User List.

4.4 Records

4.4.1 Copies of all pertinent documentation associated with a computer code shall be maintained by the Code Custodian in the Software Documentation Package in a manner that will guarantee the safety and integrity of those documents. Appropriate considerations would be limited personnel access (e.g.,locked cabinet, locked room) and protection from physical hazards (e.g., fire, excessive moisture, excessive temperature deviation).

4.4.2 Copies of all records that are essential to code operations (e.g., backup copies of codes on magnetic media), that result from compliance with procedures number EP-3-013 through EP-3-018 (with the exception of logs and user lists), and/or that provide information necessary for the effective use of the code shall be transmitted to Records Management in accordance with EP-3-011, Review, Approval, and Engineering Release. Required signatures on Form #WV-1840, Document/Design Review Transmittal Form are:

Cognizant System Program/Design Manager (A)

Quality Assurance Manager (A)

Project Records and Publication Manager (A)

4.4.3 Copies of documentation that is necessary for daily code operation (e.g., user manuals) shall be made available to personnel who require them. The Code Custodian shall ensure that all such documentation is the current version and that all such documentation is updated in accordance with section 4.3.6, B.

5.0 PROCESSING

5.1 General Configuration Management

RESPONSIBILITY	ACTION
5.1.1 Code Custodian	A. Receives software and initiates configuration management in accordance with section 4.1.
	B. Reviews documentation received for adequacy in accordance with section 4.2.
	C. Makes copies of all records received (magnetic media items and documents) for transmittal to Records Management per section 4.4.2.
	D. Fills out a Software Version Log, Magnetic Media Log, and a Software User List (sections 4.3.1, 4.3.2, and 4.3.3).
	E. Files Software Documentation Package in accordance with section 4.4.1.
	F. Transmits Permanent Software Documentation Package to Records Management per section 4.4.2.
	G. Provides designated users with copies of necessary documentation.

5.2 SOFTWARE CHANGE CONTROL

5.2.1 User	A. Submits a request for a software change to the Code Custodian.

RESPONSIBILITY		ACTION
5.2.2	Code Custodian	A. Processes the Software Change Request Form per sections 4.3.4., A, B, and C. and delivers the form to the CSPM/CSDM.
5.2.3	Cognizant System Form Program/Design Manager (CSPM/CSDM)	A. Reviews Software Change Request and indicates disposition per section 4.3.4, D; returns form to Code Custodian.
5.2.4	Code Custodian	A. Implements required action per section 4.3.4, E. B. If a change is approved, delivers revised version and associated documentation to CSPM/CSDM for review.
5.2.5	CSPM/CSDM	A. Reviews new version of software and/or design documentation and indicates approval for release on New Version Report; returns package to Code Custodian.
5.2.6	Code Custodian	A. Releases new version of software and/or design documentation per section 4.3.6, D.

6.0 REFERENCES

6.1 EP-3-011, "Review, Approval, and Engineering Release.

6.2 EP-3-013, "Determination of Software Requirements"

6.3 EP-3-014, "Final Internal Development Review of Software and Documentation"

6.4 EP-3-015, "Transfer of Software, Data, and/or Documentation"

6.5 EP-3-017, "Conversion Testing, Verification, and/or Validation of Software"

7.0 ATTACHMENTS

7.1 Attachment A - Software Version Log

7.2 Attachment B - Magnetic Media Log

7.3 Attachment C - Software User List

7.4 Attachment D - Software Change Request Form, WV-1870 (latest revision)

7.5 Attachment E - Software Change Request Log

7.6 Attachment F - New Version Report, WV-1871 (latest revision)

7.7 Attachment G - Configuration Management Process Flow Chart

ATTACHMENT A

SOFTWARE VERSION LOG

Software name: _____

Design documentation title: _____

SOFTWARE VERSION	DESIGN DOCUMENTATION VERSION(S)	RELEASE DATE	DESCRIPTION (e.g., Change requests incorporated)

Page completion certified by:

_____

Code Custodian Date

ATTACHMENT B

MAGNETIC MEDIA LOG

Software name: _____

MEDIA TYPE AND LOG NO.	DESCRIPTION OF CONTENTS (e.g., Software Version No.)	LOCATION/DISPOSITION AND DATE 1	2	3	4

Page completion certified by:

Code Custodian _____ Date

Form No. EP-1001

ATTACHMENT C

SOFTWARE USER LIST

Software name: _____

NAME AND ADDRESS OF USER	SOFTWARE VERSION/DATE OF RELEASE				
	1	2	3	4	5

Page completion certified by:

Code Custodian _____ Date

ATTACHMENT D

Document/Internal ID No.: _____
ECN: _____
Internal Code Revision: _____

SOFTWARE CHANGE REQUEST FORM

_____ Enter ECN No. if request is for revision of Software Documentation Package.

_____ Enter Change Request No. if request is for internal revision or a code or its documentation.

Software Name and Version: _____
Documentation Title and Version: _____

PART I - Person reporting problem, requesting internal code or documentation change, or documentation package revision.

Submitted by Name: _____ Date submitted: _____
Address: _____ Telephone: _____
_____

Problems reported, code/documentation changes or documentation package revision requested (if a software problem is being reported, include a description of input data that can be used to duplicate the error):

PART II - To be completed by the code custodian

____ Probable software error. ____ Probable documentation error.
____ No errors found. ____ Documentation Package Revision

Description/recommendation:

PART III - To be completed by the CSPM/CSDM

1) Does this change affect previously reported information?
____ Yes
____ No

2) Should user (As identified on Software User List, Att. C) be notified?
____ Yes
____ No, for the following reasons:

3) Disposition of Change Request Documentation Package revision.
____ Approved
____ Disapproved

Comments/instructions:

Reviewed and approved by: _____
CSPM/CSDM Date

Reviewed and Approved by: _____
QA Representative (at ECN level only) Date

ATTACHMENT E

SOFTWARE CHANGE REQUEST LOG

Software name: _____

CHANGE REQUEST NO. (FROM ATT. 3)	DATE REC'D.	REQUIRES DOCUMENTATION REVISION? (Y/N)	DISPOSITION			REVISED SOFTWARE/DESIGN DOCUMENTATION VERSION IDENTIFIER
			Accept	Reject	Date Users Notified	

Page completion certified by:

_____

Code Custodian Date

Form No. EV-1001

ATTACHMENT F

NEW VERSION REPORT

PART 1 - To be completed by the Code Custodian

Base Software Name and Version _____

Computer Type and Operating System _____

NEW SOFTWARE VERSION _____

Base Design Documentation Title and Version _____

NEW DOCUMENT VERSION _____

List change request numbers to be installed:

List the test case(s) to be used:

Reviewed and approved by:

_____

Cognizant System Project/Design Manager Date

PART 2 - To be completed by the Code Custodian

Are additional software and/or design documentation changes required? If so, complete Part 1 of the Change Request Form, attachment C, and note associated change request number(s) below:

ATTACHMENT F

NEW VERSION REPORT (CONTINUED)

PART 2 (Continued) - To be completed by the Code Custodian

Identify items submitted for Independent Technical Review:

Reviewed and approved by:

Code Custodian Date

PART 3 - To be completed by the CSPM/CSDM

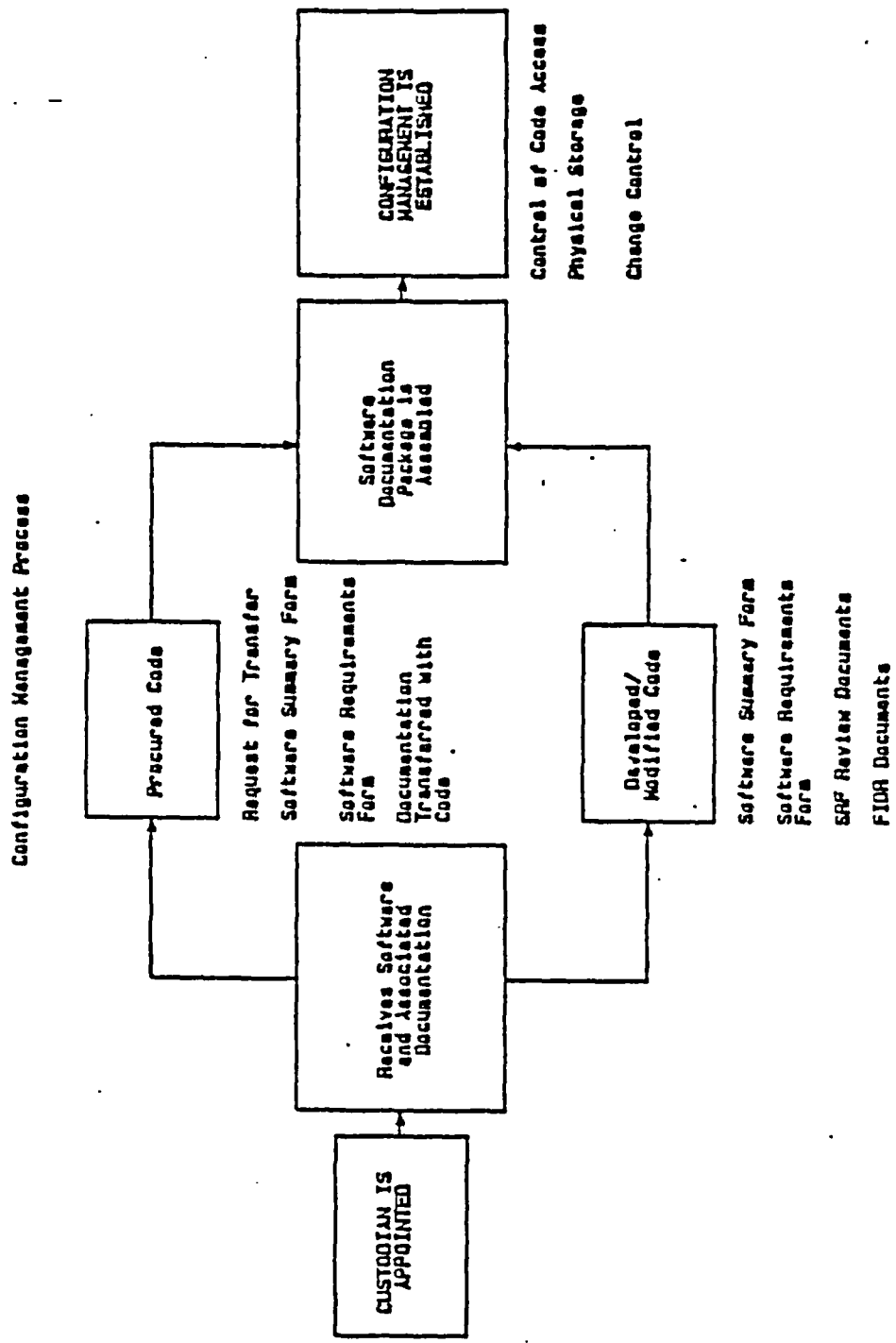
The revised version of the software is approved for use.

Release date: _____

Reviewed and approved by:

Cognizant System Program/Design Manager Date

ATTACHMENT G



Form No. AV-1C01