

NUSCO GENERATION ENGINEERING DEPARTMENT PROCEDURE

GED 3.09

COMPUTER PROGRAM DOCUMENTATION AND QUALIFICATION

1.0 PURPOSE

The purpose of this procedure is to establish the requirements and procedural method for the documentation and qualification of all Quality Assurance Category I computer programs.

2.0 APPLICABILITY

This procedure applies to all computer programs affecting the design of Category I equipment and/or design licensing analyses.

3.0 REFERENCES

3.1 Generation Engineering Department Procedure GED 3.08.

4.0 DEFINITIONS

4.1 QA Category I Computer Program

A QA Category I computer program is defined as one whose output is used in the design of a Category I structure, system, or component, or is used to qualify this design, or in support and verification of technical specifications, or in the analysis of the operation of safety related items.

If the output of a computer program is used to design more than one structure, system, or component, which have different QA categories, the computer program shall be QA Category I.

4.2 Version

The version designation of a program will be incremental at each revision to the source language software.

4.3 Level

The level of a program will be incremental at every significant change to the job stream (i.e., JCL changes affecting file or library allocation).

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4.4 Public Domain Program

A program that is generally available to anyone in the industry through a service bureau or other organization. A public domain program may be copyrighted, has been extensively tested, has wide industry acceptance, and may not be modified by individual users without identifying it as a modified program and qualifying it in accordance with this procedure.

4.5 Program Summary

A brief description of a computer program, usually one page or less.

4.6 Program Author

The Northeast Utilities employee who wrote or is currently responsible for software maintenance or, for non-in-house programs, the respective non-Northeast Utilities person performing a similar program support function.

4.7 Program Sponsor

The Northeast Utilities employee assigned to be responsible for a computer program. The sponsor may or may not be the author.

5.0 RESPONSIBILITY

5.1 The program sponsor with or without the author's assistance, shall qualify that the computer program produces accurate results for the selected options and range of applicability consistent with the mathematical models used during its development by one of the following methods.

5.1.1 Manual Qualification

Perform one or more manual or computerized calculations using test data for the computer program being qualified. Compare these results against the results obtained by using the test data in the program. The program's test results must be proven to be substantially similar.

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5.1.2 Comparison Qualification

Compare the test results of the program being qualified and the results obtained using a previously qualified method of obtaining the same results, or the results of a presently used Public Domain Program, to verify that both sets of results are substantially similar.

The input data for both methods shall be either the test data developed for the program or other test data substantially similar to the test data.

5.1.3 Qualification of Public Domain Codes

Upon acquisition of a public domain computer program, the program sponsor will qualify the program by running test case(s) provided by the specific service bureau or other organization from where the code was obtained, and verifying test results to be substantially similar to results provided by said organization. The program sponsor will also verify that the issuing organization, program developers, or other organizations within the industry, have performed acceptable qualification of the program in accordance with paragraphs 5.1.1, or 5.1.2. This may be performed by reviewing available documentation (User's Manuals, Code Descriptions, Program Applications, etc.) to assess the extent and acceptability of the qualification performed. All documents reviewed by the sponsor shall be referenced and maintained in the responsible department.

5.1.4 The range of applicability of qualification shall be clearly defined.

5.2 When the Manual Qualification technique is used, documentation for the qualification shall include:

5.2.1 The title, version, and level number of the computer program being qualified.

5.2.2 The documentation of all qualification calculations shall be in accordance with NUSCO Generation Engineering Department Procedure GED 3.08.

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- 5.2.3 A tabulated comparison of the results obtained by a qualification calculations and the program test results.
- 5.2.4 The range of applicability of qualification shall be clearly defined.
- 5.3 When the Comparison Qualification technique is used, documentation for qualification shall include:
 - 5.3.1 The title, version, and level number of the computer program being qualified.
 - 5.3.2 Clear identification of the previously qualified method or Public Domain program used.
 - 5.3.3 Reference to the documentation for the previously qualified method of obtaining the same results.
 - 5.3.4 A tabulated comparison of the test date and test results for the program being qualified to the input and results of the previously qualified method.
 - 5.3.5 The range of applicability of qualification shall be clearly defined.
- 5.4 When the qualification is performed for a Public Domain program, documentation for qualification shall include:
 - 5.4.1 The title, version, and level number of the computer program being qualified.
 - 5.4.2 Listing of sample case(s) provided by the issuing organization and a tabulated comparison of sample or test case results will be shown.
 - 5.4.3 Reference to extent and acceptability of qualification performed by the issuing organization or other industry organization.
 - 5.4.4 Reference to the qualification of the QA/QC Programs of the issuing organization, if applicable.
 - 5.4.5 The range of applicability of qualification shall be clearly defined.

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5.5 Documentation Review and Approval

- 5.5.1 A copy of all documentation required by Paragraphs 5.2 and 5.3 shall be reviewed by a qualified individual and/or group
- 5.5.2 When reviewing Computer Programs other than Public Domain, the reviewer shall as a minimum:
- 5.5.2.1 Verify the validity of the analytical approach taken and the formulae applied.
 - 5.5.2.2 Verify all assumptions made by the author for accuracy and determine if they are reasonable.
 - 5.5.2.3 Verify that the limitations and range of applicability of the program are sufficiently defined.
 - 5.5.2.4 Verify the basic logic the author has applied to write the program (e.g., are the mathematical formulae properly coded into computer language).
 - 5.5.2.5 Complete Sections I and II of the "Review and Approval of Documentation For QA Category I Program" form (Attachment 3.09-A) to identify the computer program, the version of the program, the date of publication, and all documentation being reviewed.
 - 5.5.2.6 Prepare or update the "Computer Program Documentation Log and Historical Development Chart For QA Category I Programs" form (Attachment 3.09-B).
 - 5.5.2.7 When qualification is performed on a Public Domain program, the requirements of section 5.5.2.1, 5.5.2.2 and 5.5.2.4 shall be accomplished by review of referenced available documentation of such efforts performed by the service bureau or issuing organization. The review of the efforts of said organization and documentation of that review shall constitute compliance to paragraphs 5.5.2.1, 5.5.2.2 and 5.5.2.4.

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6.0 INSTRUCTIONS

6.1 General

- 6.1.1 All computer programs within the scope of this procedure shall be documented and qualified individually. This shall be accomplished by the preparation, collection, and retention of documents for each computer program relating to its use, function, historical development, and method used to qualify the accuracy of the results. All qualification documentation shall be kept in the department which performs the actual qualification work.
- 6.1.2 The qualification and review of Category I computer programs shall be accomplished by individuals competent in the associated discipline.
- 6.1.3 Copies of Attachments 3.09-A and 3.09-B shall be kept in a departmental file to keep track of all qualified QA Category I Computer Programs in use in the department.

6.2 Programs Developed By Northeast Utilities

- 6.2.1 All QA Category I computer programs developed by Northeast Utilities shall be completely documented in accordance with this procedure. The program sponsor(s) shall develop or otherwise obtain the following documentation:
- A program summary.
 - A Users' Manual.
 - A list of the source program.
 - Test data and test results.
 - Qualification in accordance with Paragraph 5.0.

6.3 Acquired Computer Programs

- 6.3.1 Acquired programs (e.g., purchased, leased, obtained at no cost, etc.) and the associated documentation shall be accepted as published by the originating organization if complete. If incomplete, the documentation furnished shall be supplemented to the fullest extent possible without violating any existing

contractual agreements. The program sponsor(s) shall be responsible for ensuring all requirements of this paragraph are met. The minimum documentation for the computer program shall be:

A program summary.

A Users' Manual

A list of the source program.

Test data and test results.

Qualification in accordance with Paragraph 5.0.

6.4 Computer Programs Not Run on the Northeast Computer

6.4.1 The documentation for computer programs not run on the Northeast computer shall be accepted as published by the originating organization if complete. If incomplete, the documentation shall be supplemented to the fullest extent possible without violating any existing contractual agreements. The program sponsor(s) is responsible for ensuring all provisions of this paragraph are met. The minimum documentation for the computer program shall be:

A program summary.

A Users' Manual.

Test data and results as applicable.

Qualification in accordance with Paragraph 5.0.

Written verification from the originating organization stating the subject code is in conformance with the organization's QA requirements shall satisfy the above criteria if that organization's QA criteria is in conformance with this procedure.

6.5 Production Code Modifications

6.5.1 When a production code undergoes a revision (new version) the program sponsor(s) shall ensure that the following steps are taken:

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- 6.5.1.1 Modifications shall be made to a copy of the production mode program in order that the existing version is not destroyed.
- 6.5.1.2 Sample problems shall be used to demonstrate that all changes work as intended.
- 6.5.1.3 The new version shall be given a unique identification.
- 6.5.1.4 An update to the program documentation shall be prepared.
- 6.5.1.5 When all modifications have been completed, review and approval requirements shall be the same as for initial installation.

6.6 Changes in Program Documentation

- 6.6.1 Any changes incorporated into the program documentation resulting from the adaptation or improvement of the program for Northeast use shall be accomplished by attaching supplemental pages to the existing documents and recording the change, date, reason and initiator's signature on a table for that purpose in the subject document.

7.0 FIGURES

N/A

8.0 ATTACHMENTS

<u>Attachment No.</u>	<u>Attachment Title</u>
3.09-A	Review and approval of Documentation for QA Category I Program
3.09-B	Computer Program Documentation Log and Historical Development Chart for QA Category I Program

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REVIEW AND APPROVAL OF DOCUMENTATION FOR
QA CATEGORY I COMPUTER PROGRAM

1. COMPUTER PROGRAM IDENTIFICATION

TITLE: _____ / Developed by NUSCO
 _____ / Purchased
 VERSION NO. _____ / Leased
 LEVEL NO. _____ / Time Shared
 AUTHOR(S) - NUSCO Sponsor: / Other (Identify Below)

II. REVIEW

A. Documentation Reviewed: Revision No./Draft No.
 Program Summary _____ / _____
 Users' Manual _____ / _____
 Programmers' Manual _____ / _____
 Program Verification _____ / _____

B. Reviewer Approval(s) _____ Date _____
 _____ Date _____

C. Sponsor Approval(s): _____ Date _____
 _____ Date _____

COMPUTER PROGRAM DOCUMENTATION LOG AND HISTORICAL DEVELOPMENT CHART
FOR QA CATEGORY I PROGRAM

PROGRAM TITLE _____ REFERENCE NO. _____

SPONSOR'S INITIALS:									
PROGRAM SOURCE:	VERSION #	VERSION #	VERSION #	VERSION #	VERSION #	VERSION #	VERSION #	VERSION #	VERSION #
	LEVEL #	LEVEL #	LEVEL #	LEVEL #	LEVEL #	LEVEL #	LEVEL #	LEVEL #	LEVEL #
EFFECTIVE DATE:									
EXISTING DOCUMENTATION:	ORIGINAL ISSUE DATE	REVISION NUMBER							
		ENTER DATE EACH REVISION. IF NO REVISION IS NECESSARY, ENTER 'N/A'.							
PROGRAM SUMMARY									
USERS' MANUAL									
PROGRAMMERS' MANUAL									
TEST DATA DECK:	#1								
	#2								
	#3								
	#4								
VERIFICATION:	#1								
	#2								
	#3								
	#4								

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ATTACHMENT 3.09-B

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