OFFICE OF NUCLEAR REGULATORY RESEARCH

RES OFFICE INSTRUCTION

Office Instruction No.	PRM-012	**Approved by: Brian W. Sheron** **Date: 03/05/2012**
Office Instruction Title	Software Quality Assurance for RES-sponsored Codes	
Effective Date Review Date	**03/05/2012** **09/30/2017**	
Primary Contact	**Kenneth Armstrong**	
Responsible Division	**RES/PMDA**	
ADAMS Accession No.	ML12132A176	
Training	Yes. Presentation at the Division Level	
SUMMARY OF CHANGES:		

1 PURPOSE

This Office Instruction (OI) provides guidance on ensuring that computer codes developed or sponsored by or for the Office of Nuclear Regulatory Research (RES) have the appropriate level of software quality assurance (SQA). This OI applies to all active and proposed RES computer codes, whether developed in-house, by Department of Energy laboratories, or by commercial entities. This OI applies to codes that are developed in common with other entities, for instance where RES contributes funding and project direction along with other Federal entities. This OI does not apply to codes used by RES that have been developed by others, for instance commercial off the shelf codes (e.g., FLUENT).

2 BACKGROUND

Management Directive (MD) 11.7, ANRC Procedures for Placement and Monitoring of Work with the U.S. Department of Energy (DOE),@ provides that AAll software development, modification, or maintenance tasks shall follow general guidance provided in NUREG/BR-0167, >Software Quality Assurance Program and Guidelines.=@ NUREG/BR-0167 is available in ADAMS: ML012750471. Although the MD applies only to codes developed for RES by DOE laboratories, the principles discussed and the elements of SQA described in the referenced NUREG/BR apply equally well to RES codes developed in-house and by commercial entities. In addition, the provisions of MD 2.8, AProject Management Methodology,@ apply.

The Department of Energy has issued an order governing Quality Assurance that covers all of its contractors (DOE O 414.1C). This order establishes requirements for quality assurance programs that all DOE elements must follow when performing their work. DOE O 414.1C is available on the DOE web site: http://www.hss.energy.gov/csa/csp/sqa/dir.htm.

3 DEFINITIONS

3.1 **Computer code** also called **computer program** or **software** - A combination of computer instructions and data definitions that enable computer hardware to perform computational or control functions.

3.2 **Level of software** - The level assigned to a code, based on the application and use. See Section 1.2 of NUREG/BR-0167.

3.3 **Project file** - The collection of documents covering a code=s entire life cycle. A project file may be maintained as paper copies (for existing documents) or as documents in ADAMS (for new documents), in the latter case the documents shall be organized in code-specific subfolders to the folder on RES-sponsored codes.

3.4 **Software quality assurance** - A planned and systematic pattern of all actions necessary to provide adequate confidence that a code conforms to established technical requirements.

4 RESPONSIBILITIES

4.1 Project Manager

Completes SQA training (when it becomes available).

Proposes the level of software and audit frequency to be assigned to an RES-sponsored code.

If software is developed under contract, incorporates requirements for SQA in Statements of Work for all computer codes. Approves SQA plan developed by the contractor.

If software is developed in-house, prepares and implements an SQA plan.

Audits contractor implementation of SQA as necessary, with the assigned frequency and to a depth dependent on the level of software assigned to the code.

4.2 RES Branch Chief

Approves the assignment of level of software and audit frequency proposed by Project Managers reporting to him/her.

If software is developed by Branch staff in-house, approves SQA plan developed by staff.

If software is developed by Branch staff in-house, assigns an independent staff member to perform an audit of the SQA plan implementation.

4.3 RES Deputy Division Director

Approves the assignment of level of software and audit frequency proposed by Project Managers reporting to him/her.

If software is developed by Division staff in-house, approves SQA plan developed by staff.

If software is developed by Division staff in-house, assigns an independent staff member to perform an audit of the SQA plan implementation.

5 INSTRUCTION

5.1 The Project Manager shall propose a level of software to be assigned to a code, considering whether it is or is not a technical application and whether or not the results obtained from the code may be expected to be used in making safety decisions.

5.2 Levels of software shall to be assigned to new codes and to existing codes. For new codes, all the requirements shall be applied at the start of development and during all phases of the code=s life cycle. For existing codes, the depth and breadth of requirements invoked by that assignment shall be applied only to subsequent activities of code development, modification, and maintenance (that is, requirements will not be backfitted).

5.3 Following approval of the level of software by the Branch Chief or Deputy Division Director, as appropriate, the Project Manager shall document the assigned level and audit frequency in the project file using the appropriate form from Appendix A. For codes developed under contract, the Project Manager shall incorporate the requirements of that level into all Statements of Work associated with the code. The requirements may be incorporated by reference. For codes developed in-house, an SQA plan shall be prepared and implemented. All the elements discussed in NUREG/BR-0167 are necessary for adequate SQA; the degree of applicability will depend on the level assigned to the software. The assigned level of software and the SQA requirements shall become a part of the official project file.

5.4 The Project Manager shall assign the frequency and depth of SQA audit necessary and the assignment shall be a part of the official project file. The documentation of all audits conducted shall become a part of the official project file. The Project Manager or independent auditor shall use the appropriate form from Appendix A for the documentation.

6 PERFORMANCE MEASURES

None.

7 REFERENCES

NUREG/BR-0167, ASoftware Quality Assurance Program and Guidelines,@ February 1993. ML012750471

DOE O 414.1C. AQuality Assurance,@ Approved 6-17-05. http://www.hss.energy.gov/csa/csp/sqa/dir.htm

Management Directive 2.8, AProject Management Methodology (Draft) INTERIM GUIDANCE.@

Management Directive 11.7, ANRC Procedures for Placement and Monitoring of Work With the U.S. Department of Energy (DOE).@

APPENDIX A

SOFTWARE QUALITY ASSURANCE FORMS

SOFTWARE QUALITY ASSURANCE

ASSIGNMENT OF LEVEL OF SOFTWARE AND AUDIT FREQUENCY

Code Name:

Proposed Level of Software:

Audit Frequency:

Approved by:

Audit Due:

Project Manager:

Date:

SOFTWARE QUALITY ASSURANCE

AUDIT REPORT

Code Name:

Audit Date:

Audit Scope:

Audit Observations:

Software Quality Assurance meets requirements of NUREG/BR-0167

___yes _____no (If no, discuss shortcomings under findings)

Other observations:

Audit Findings:

Resolution of Audit Findings:

Audit Conducted by:

Next Audit Due:

APPENDIX B
CHANGE HISTORY
RES OFFICE INSTRUCTION NO. PRM-012

Effective Date	Revision No.	Description of Changes
6/8/2007	1	Revised to include the changes in Background and References sections