



# CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES QUALITY ASSURANCE SURVEILLANCE REPORT

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SURVEILLANCE SCOPE: TPA 3.2 Post Processor, TPA 3.2 Personal Computer, TPA 3.2 Parallel Processor

REFERENCE DOCUMENTS: TOP-018, Development and Control of Scientific and Engineering Software, Revision 6

STARTING DATE: November 11, 1998      ENDING DATE: December 11, 1998

QA REPRESENTATIVE: Randolph Folck *Randy Folck*

PERSONS CONDUCTING TEST/EXAM/ACTIVITY: H. Millwater (06), S. Mohanty (20), H. Thomas (10), and M. Muller (15)

**SATISFACTORY FINDINGS:**  
Each project developed a Software Requirements Description (SRD) and Software Development Plan (SDP). Developer generated notes and data are to be consolidated into electronic scientific notebook number 170 at the quarterly submission. During development, configuration control was maintained manually as a series of backups. Coding standards were applied for each development. Acceptance testing was performed to demonstrate implementation of SRD requirements and that the functionality of the code was not changed. The Software Custodian documented design verification activities as required.

**UNSATISFACTORY FINDINGS:** SRDs and SDPs approved after the fact as identified by the Software Custodian.

**NONCONFORMANCE REPORT NO:** None, addressed in respective design review reports.

**ATTACHMENTS:** None

**RECOMMENDATIONS/ACTIONS:**  
Define a streamlined set of procedures to provide benefit and control to "small projects" without the additional burden of techniques designed for larger projects. While software projects of any size can benefit from a defined software process, small projects have lower communication and technical risks and can benefit from a streamlined process tailored to their needs.  
Require white box testing be performed to verify that every statement in the code is successfully executed at least once, and that the most probable paths through a code are identified and tested. Black box testing checks that for a given set of inputs, the code produces the correct set of outputs. White box testing checks that the correct paths through the code are executed under given circumstances. While much emphasis is placed on the code producing correct results, it is important to carry out both black box and white box testing on each code.  
Identify when and what software will be used in regulatory reviews and develop a software validation (see TOP-018, 5.10) schedule. Acceptance testing is performed before release to the user; documented in a scientific notebook or other document, i.e. user's manual, and demonstrates that the software complies with the requirements specified in the SRD in the target environment. Software validation is "formally documented" in a plan and report and "includes benchmarking or comparisons with alternative analysis techniques that show software stability and consistency in applications of a practical nature." Validation testing is required before the use of the software in regulatory reviews.

APPROVED: *[Signature]*  
CENTER DIRECTOR OF QUALITY ASSURANCE  
DATE: 12/11/98

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