



**CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES
QUALITY ASSURANCE
SURVEILLANCE REPORT**

PROJECT NO: 20.06002.01.031

REPORT NO: 2005-17

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SURVEILLANCE SCOPE: Development and control of scientific and engineering software

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

STARTING DATE: August 3, 2005

ENDING DATE: September 8, 2005

QA REPRESENTATIVE: R. Folck *R. Folck*

PERSONS CONDUCTING TEST/EXAM/ACTIVITY: E. Percy, J. McMurry, R. Pabalan, B. Dasgupta, N. Franklin, R. Janetzke, G. Adams, S. Painter, B. Winfrey, S. Gonzalez, G. Wittmeyer, J. Stamatakos, D. Hooper, V. Jain, A. Chowdhury, T. Wilt, S. Painter, P. Shukla, L. Ibarra, F. Ferrante, J. Winterle, J. Durham, A. Lozano, M. Padilla

SATISFACTORY FINDINGS:

- Reviewed software development files for MULTIFLO™, Version 2.0.1, 3DStress™, Versions 3.0 and 3.1, TPA, Version 5.0.1, and PCSA Tools, Version 3.0 and 3.0.1, Beta C. Verified, to varying degrees, implementation of the following TOP-018 requirements:
 - Development and review of Software Requirements Descriptions – 5.2.
 - Development and use of Software Development Plans – 5.3.
 - Internal code documentation – 5.4.4, 5.4.5.
 - Installation testing – 5.6.1.
 - Acceptance testing – 5.6.2.
 - Quality Assurance verification – 5.7.2.
 - Use of Software Change Reports – 5.9.
- Reviewed software validation files for acquired software MCNP, Version 5.0, ArcGIS, Version 9.0 and ProShake, Version 1.11. Verified implementation of TOP-018, 4.3, use of the NRC endorsement option for MCNP, validation testing for ArcGIS and benchmarking for ProShake.
- Verified training to Revision 10 of TOP-018 in process.

UNSATISFACTORY FINDINGS: None

NONCONFORMANCE REPORT NO: None

ATTACHMENTS: None

RECOMMENDATIONS/ACTIONS:

See page 2.

APPROVED: *R. Folck*
CENTER DIRECTOR OF QUALITY ASSURANCE

DATE: 9/9/2005

DISTRIBUTION:

ORIGINAL - CENTER QA DIRECTOR/ QA RECORDS
ORIGINATOR - R. Folck
PRICIPAL INVESTIGATORS
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TECHNICAL & ADMINISTRATIVE DIRECTORS
M. Ehnstrom

Recommendations:

1. Templates are provided on the network for the Software Requirements Description, Software Development Plan, and Software Validation Test Plan. Consider development of a template for the Software Validation Test Report and consider posting samples of each document.
2. TOP-018 states in part, "validation testing is performed to gain confidence that the software successfully implements specified requirements." In some cases it is difficult to determine if validation test cases fully address the requirements described in the Software Requirements Description. For developed software, consider updating the Software Validation Test Plan template with a requirements traceability matrix. Traceability should be to the Software Requirements Description and/or User's Guide.
3. The software development processes for MULTIFLO™, 3DStress™, TPA and PCSA Tools have matured and with on-going maintenance these development efforts have transitioned from a "project" focus to a "product" focus. Consider development of maintenance procedures (e.g. TOP's) for each of these codes to address software and customer specific requirements, procedures for enhancements and fixing bugs, testing, reproduction and distribution, etc. Product-specific procedures would replace current Software Development Plans.
4. Software Requirements Description documents are initially written at a relatively high level. As software development progresses or maintenance is performed on the software, the requirements described in a Software Requirements Description typically do not change but evolve. As a result, an initial software version may not implement all requirements specified in the Software Requirements Description or multiple releases of software may be supported the same revision of a Software Requirements Description. To enhance traceability and communication consider the following:
 - Provide with each major release (e.g. 1.0, 2.0) or at validation, an updated Software Requirements Description and/or Use's Guide that reflects the "as delivered" version of the software.
 - Develop a Version Description Document for each release of developed software. The Version Description Document would describe for the users the changes since the previous release. A Version Description Document may also be referred to as release notes.
 - Since software development projects use Software Change Reports to control the software development activity, consider documenting changes to Software Requirements Description requirements in the Software Change Reports. The Software Change Reports may then be used as a basis for a revision to the Software Requirements Description, User's Guide and/or release notes.
5. The software version number is used as the index for software QA records. One or more documents (e.g. SDP, SRD, User's Guide) may apply to multiple software versions making retrievability and review of software records difficult and time consuming. Consider developing an index system that includes physical segregation of records for each release and appropriate cross-referencing.
6. Internet software such as EZ-Frisk cannot be copied or downloaded to establish a configuration baseline of the software. Since the configuration of the software is maintained by the developing organization, software changes may be introduced without knowledge of the user. For validated software consider running and documenting a test suite derived from validation test cases prior to each use of the software to ensure continued suitability.