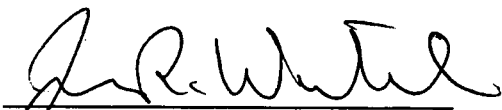# SOFTWARE DEVELOPMENT PLAN FOR CHANGES TO THE TOTAL-SYSTEM PERFORMANCE ASSESSMENT VERSION 5.0 CODE

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5 - 10-05

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This software development plan describes the approach to be followed in implementing the code modifications to be made to the Total-system Performance Assessment (TPA) Version 5.0 code.

1.0 SCOPE

The scope of the software development effort is described in detail in the Software Requirements Description for the Total-System Performance Assessment Version 5.0 Code (December 7, 2001) and applicable Software Change Reports.

2.0 BASELINE ITEMS

The products to be delivered to the U.S. Nuclear Regulatory Commission (NRC) from this software development project include: (i) multiple versions of the TPA Version 5.0 source code (identified as Version 5.0.x), (ii) an updated version of the input file *tpa.inp*, (iii) *make* files that create the TPA and process model executable files, (iv) auxiliary data files for the *data/* subdirectory, and (v) source code for the process models in the *codes/* subdirectory.

3.0 PROJECT MANAGEMENT

The software development tasks are discussed in the Software Requirements Description and Software Change Reports. The TPA Version 5.0 code will be used as the baseline code from which all modifications will proceed.

3.1 Work Breakdown Structure

The development tasks are tracked through various tables developed by the Principal Investigator for TPA code development. Key Center for Nuclear Waste Regulatory Analyses (CNWRA) and NRC technical staff members from appropriate key technical issues are identified in various tables.

3.2 Schedules

The task assignments are presented on the tables identified above.

3.3 Staffing

For most tasks, key CNWRA and NRC technical staff members from appropriate Integrated Subissues (ISI) teams will be required to produce the algorithms and data needed for modifications of the process models. These ISI staff members will also participate in the final code testing.

3.4 Risk Management

The primary risk associated with this project is failure to meet the committed delivery dates. If the required tasks are not complete as scheduled then modifications not implemented will be deferred until a later version in order that thorough testing for the delivery task may be completed on schedule. This risk is rated as medium.

4.0   Development Procedures

This section describes plans for developing the TPA Version 5.0 code.

4.1   Hardware and Software Resources

All code development will be done on a Sun SPARC 20 workstation running SOLARIS 5.8, the Sun Ultra-4 server running SOLARIS 5.8, and a personal computer running Microsoft Windows NT. The Sun FORTRAN 77 Version 5.0 will be used on the UNIX platform and Lahey Fortran 90 (LF90) Version 7.1 will be used on the PC platform.

4.2   Software Development Life Cycle

Software development will be documented in Software Change Reports.

4.3   Coding

All coding will be done in FORTRAN 77 with extensions to permit the use of long variable names. Coding style will be in accordance with that which has been historically used at the CNWRA and NRC for development of TPA codes.

4.4   Acceptance Testing and Analysis

The results of any testing will be appropriately recorded in scientific notebooks or Software Change Reports.

5.0   CONFIGURATION MANAGEMENT PLAN

The official version of the working code will be placed under control of the Software Configuration Control System package available on the Sun workstation to ensure that coding conflicts do not arise during development. A copy of the final TPA Version 5.0.x code will be provided to quality assurance for configuration control.

5.1   Tools

In addition to the software configuration control system tool mentioned above, Unix utilities *diff*, *filemerge* and *make* will be used to perform the code manipulations required to maintain the official version of the working code on the SUN platform.

5.2   Configuration Identification

The configuration identification will be assigned by the software custodian of the quality assurance staff.

5.3   Configuration Procedures

All check-in or check-out activities on *scratchy1* will be performed by Ron Janetzke. The latest version of the files will be available in */export/home/janetzke/tpa/dev*. The standard software change report form will be used for all significant changes to the controlled source code.

6.0   REFERENCES

None.

7.0   APPENDICES

None.