

Description of STOMP QA/QC Program

The STOMP simulator is custom developed software at the Pacific Northwest National Laboratory (PNNL) that meets NQA-1-2000 software requirements, as well as the requirements specified under DOE Order 414.1C for Safety Software. Specifically, STOMP management follows the PNNL SBMS Safety Software Subject Area that is written to meet those requirements. To this end, STOMP development is managed under a Configuration Management Plan (CMP) in conjunction with a Software Test Plan (STP), that detail the procedures used to test, document and archive modifications to the source code. Formal procedures for software problem reporting and corrective actions for software errors and updates are maintained and rigorously implemented. Documentation of all verification and validation testing is publicly available.

Management of STOMP software includes maintaining both an internal and external STOMP user list. PNNL STOMP users are trained in the design, use and evaluation of the software. Internal users are also trained to the problem reporting and corrective action procedures that are outlined in the CMP.

STOMP software is also supported by a Software Requirement Specification (SRS) and Software Design Document (SDD), which are essential for developing quality software and life cycle maintenance. In addition to the documentation used to manage and document software development, STOMP is supported by user and theory guides. The User Guide (White and Oostrom 2006) is frequently updated to document input requirements for new capabilities. Updates to the theory guide (White and Oostrom 2000) are supported by addendums (e.g., Ward et al. 2005; White and McGrail 2006).

STOMP software can be used in a variety of different applications, including the analysis of nuclear facilities. Hence, under DOE Order 414.1C, STOMP software has been generically graded as Class C Safety and Hazard Analysis and Design Software. This classification was selected because results from STOMP-based analyses may impact regulatory permitting requirements for nuclear facilities. The classification of the software, however, will be application dependent, and the classification is evaluated on a project basis.

Modes Compliant with NQA-1-2000 Software Requirements & DOE Order 414.1c:

STOMP-W
STOMP-WA
STOMP-WAE
STOMP-WAE-B
STOMP-WOA
STOMP-WO
STOMP-W-R
STOMP-W-Sc

Supporting Documents for Configuration Control

Freedman, V.L. and M.D. White. 2007. STOMP Software Test Plan. PNNL-SA-54022. Pacific Northwest National Laboratory, Richland, WA.

Nichols, W.E. and M.D. White. 2007. Software Design Description For Subsurface Transport Over Multiple Phases (STOMP) Software. PNNL-SA-54078. Pacific Northwest National Laboratory, Richland, WA.

Nichols, W.E. and M.D. White. 2007. Project Management Plan For Subsurface Transport Over Multiple Phases (STOMP) Software Maintenance and Development. PNNL-SA-54024. Pacific Northwest National Laboratory, Richland, WA.

White, M.D. and V.L. Freedman. 2007. STOMP Software Configuration Management Plan. PNNL-SA-54023. Pacific Northwest National Laboratory, Richland, WA.

Z.F. Zhang, V.L. Freedman and M.D. White. Requirements for STOMP Subsurface Transport Over Multiple Phases. 2007. PNNL-SA-54079. Pacific Northwest National Laboratory, Richland, WA.

STOMP Guides

Nichols WE, NJ Aimo, M Oostrom, and MD White. 1997. STOMP Subsurface Transport Over Multiple Phases Application Guide. PNNL-11216 UC-2010, Pacific Northwest National Laboratory, Richland, Washington.

Oostrom M, DH Meck, and MD White. 2003. STOMP. Subsurface Transport Over Multiple Phases. An Introductory Short Course. PNNL-14440, Pacific Northwest National Laboratory, Richland, WA.

White MD and M Oostrom. 2003. STOMP Subsurface Transport Over Multiple Phases Version 3.0 User's Guide. PNNL-14286, Pacific Northwest National Laboratory, Richland, Washington.

Ward AL, MD White, EJ Freeman, and ZF Zhang. 2005. STOMP Subsurface Transport Over Multiple Phases Version 1.0 Addendum: Sparse Vegetation Evapotranspiration Model for the Water-Air-Energy Operational Mode. PNNL-15465, Pacific Northwest National Laboratory, Richland, Washington.

White MD and BP McGrail. 2005. STOMP Subsurface Transport Over Multiple Phases Version 1.0 Addendum: ECKEChem Equilibrium-Conservation-Kinetic Equation Chemistry and Reactive Transport. PNNL-15482, Pacific Northwest National Laboratory, Richland, Washington.

White MD and M Oostrom. 2006. STOMP Subsurface Transport Over Multiple Phases Version 4.0 User's Guide. PNNL-15782, Pacific Northwest National Laboratory, Richland, Washington.

White MD and M Oostrom. 2000. STOMP Subsurface Transport Over Multiple Phases Version 2.0 Theory Guide. PNNL-12030 UC-2010, Pacific Northwest National Laboratory, Richland, Washington.