

**Key Words:**  
**Performance Assessment**  
**Software Quality Assurance**

**Retention:**  
**Permanent**

**Software Testing and Verification of PORFLOW Versions 6.30.1 and  
6.30.2**

**Author: Tad Whiteside**

**July, 2010**

Savannah River National Laboratory  
Savannah River Nuclear Solutions  
Savannah River Site  
Aiken, SC 29808

---

**Prepared for the U.S. Department of Energy Under  
Contract Number DE-AC09-08SR22470**



## DISCLAIMER

**This work was prepared under an agreement with and funded by the U.S. Government. Neither the U. S. Government or its employees, nor any of its contractors, subcontractors or their employees, makes any express or implied:**

- 1. warranty or assumes any legal liability for the accuracy, completeness, or for the use or results of such use of any information, product, or process disclosed; or**
- 2. representation that such use or results of such use would not infringe privately owned rights; or**
- 3. endorsement or recommendation of any specifically identified commercial product, process, or service.**

**Any views and opinions of authors expressed in this work do not necessarily state or reflect those of the United States Government, or its contractors, or subcontractors.**

**Printed in the United States of America**

**Prepared for  
U.S. Department of Energy**

**Key Words:**  
**Performance Assessment**  
**Software Quality Assurance**

**Retention:**  
**Permanent**

**Software Testing and Verification of PORFLOW Versions 6.30.1 and  
6.30.2**

**Author: Tad Whiteside**

**July, 2010**

Savannah River National Laboratory  
Savannah River Nuclear Solutions  
Savannah River Site  
Aiken, SC 29808

---

**Prepared for the U.S. Department of Energy Under  
Contract Number DE-AC09-08SR22470**



## REVIEWS AND APPROVALS



7/14/2010

---

Tad S. Whiteside, Author  
Environmental Science and Bio Technology, SRNL

Date

TABLE OF CONTENTS

List of Acronyms ..... iv

1.0 Summary..... 1

2.0 Objective ..... 2

3.0 Method ..... 2

4.0 Scope of Test Problems..... 2

5.0 References ..... 3

## LIST OF ACRONYMS

### ACRONYMS

DOE	U.S. Department of Energy
PA	Performance Assessment
QA	Quality Assurance
SRNL	Savannah River National Laboratory
SRNS	Savannah River Nuclear Solutions
SRS	Savannah River Site

## **1.0 SUMMARY**

This report is the latest in the series of PORFLOW QA documents that identify differences between versions of PORFLOW and differences between PORFLOW and analytical results. This series is composed of the following documents, in chronological order from oldest to newest: WSRC-STI-2007-00150, Rev. 0; G-TR-G-00002; SRNS-TR-2008-00003, Rev. 0; SRNL-TR-2010-00023, Rev. 0; SRNL-TR-2010-00195, Rev. 0.

This document compares 64-bit PORFLOW version 6.30.1 to 64-bit PORFLOW version 6.30.2 on the Linux operating system: Red Hat Enterprise Linux Client release 5.5 (Tikanga).

There have been no new tests added to the test suite described in G-TR-G-00002. The input files are the same as described in that document and in SRNL-TR-2010-00195.

None of the results differ between PORFLOW version 6.30.1 and PORFLOW version 6.30.2.

The QA tests confirm that the 64-bit PORFLOW version 6.30.2 on the Linux platform meets the needs of the tank and vault closure applications.

## 2.0 OBJECTIVE

This document compares 64-bit PORFLOW version 6.30.1 to 64-bit PORFLOW version 6.30.2 on the Linux operating system: Red Hat Enterprise Linux Client release 5.5 (Tikanga) using the problems described in WSRC-STI-2007-00150 Rev 0 and G-TR-G-00002.

## 3.0 METHOD

The method used to perform this QA is identical to that described in SRNS-TR-2008-00003, Rev. 0.

The input and output files are located on the High Performance Computing File System at the Savannah River National Lab, under the directory “/hpc/project/projwork22/porflow\_qa/”.

## 4.0 SCOPE OF TEST PROBLEMS

The test problems were selected based on analytical solutions (or code-to-code comparisons) that definitively establish the code accuracy and the resulting impact of mesh and control parameter settings on the accuracy of results. Four groups of test problems are used to verify the capability of the software to represent the physical phenomena characteristic of groundwater flow and transport applications at the Savannah River Site.

They are:

- Group 1:** Saturated and variably saturated groundwater flow in one and two dimensions (steady-state and transient conditions).
- Group 2:** Contaminant transport in one, two and three dimensions (transient).
- Group 3:** Numerical dispersion.
- Group 4:** Keyword Commands (e.g. STATistics).

None of the results differ between 64-bit PORFLOW version 6.30.1 and 64-bit PORFLOW version 6.30.2. The same problems that were present in 6.30.1 are still present in 6.30.2.



## **5.0 REFERENCES**

Aleman, S. E., 2007, PORFLOW Testing and Verification Document, WSRC-STI-2007-00150, Rev. 0.

Whiteside, T., 2007, Software Testing and Verification for PORFLOW Version 6.10.3, G-TR-G-00002, Rev. 0.

Whiteside, T., 2008, Software Testing and Verification for PORFLOW, SRNS-TR-2008-00003, Rev. 0.

Whiteside, T., 2010, Software Testing and Verification of PORFLOW 6.21.0, SRNL-TR-2010-00023, Rev. 0.

Whiteside, T., 2010, Software Testing and Verification of PORFLOW Versions 6.30.0 and 6.30.1, SRNL-TR-2010-00195, Rev. 0.

**Distribution**

G. P. Flach	773-42A, Rm. 211
T. S. Whiteside	773-42A, Rm. 250