



SRNL-L3200-2012-00023

Date: August 14, 2012

To: Kent Rosenberger

From: Greg Flach *GF*
Thong Hang *TH*
Frank Smith *FS*

Copy: Heather Burns
Jeff Jordan
Maria Westbrook

Subject: **SRNL Design Checking for H-Tank Farm PA Rev. 1 PORFLOW Modeling**

PORFLOW modeling in support of the H-Tank Farm (HTF) Performance Assessment (PA) Rev. 1 has been design checked per Procedure Manual E7, 2.60 *Technical Reviews* following guidance provided by WSRC-IM-2002-00011, Rev. 2, *Technical Report Design Check Guidelines*. The purpose of this memorandum is to summarize technical findings and resolutions originating from multiple SRNL design checkers. Additional quality assurance checks have been performed by Savannah River Remediation LLC but are not documented here.

The base model for the PORFLOW modeling was the same as that used for Rev. 0 of the PA. Where applicable, credit was taken for the design check on the prior model (SRNL-L6200-2010-00027, Rev. 1). As an example, the tank geometry was not modified from the prior work and was not re-checked as part of this work. Comparing to the prior model was a commonly used design checking method.

Frank Smith

Frank Smith check extraction of flow rates and average properties from PORFLOW vadose zone flow simulations intended for GoldSim use. The regions of interest were defined by SRR. No technical findings resulted from this review (Appendix A).

Thong Hang

Thong Hang checked that the aquifer CaseA and CaseA_100k runs as well as the flow sensitivity runs – CaseA.1-24, CaseC.1-24, CaseE.1-24 were correctly implemented. For the aquifer results, this included ensuring the appropriate dispersion factors were included and the flux information was correctly transferred from the vadose results to the aquifer runs. The flow runs, as described in the PORFLOW modeling report (SRNL-STI-2012-000465, Rev. 0), employed different cementitious degradation, different infiltration, and different liner failure times. Confirming the appropriate differences from the

base case was the method of design checking for this section. No technical findings resulted from this review (Appendix B).

Greg Flach

Greg Flach checked that Jeff Jordan and Maria Westbrook correctly implemented modeling scenarios, cases and inputs defined by Savannah River Remediation LLC in PORFLOW vadose zone flow and transport simulations. These cases are defined in the PA as well as the PORFLOW modeling report. Appendix C enumerates a few technical findings, all of which has been satisfactorily resolved.


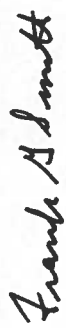
References

Jordan, J, G. Flach and D. Schep, 2010, *SRNL Design Checking for H-Tank Farm PORFLOW Modeling*, SRNL-L6200-2010-00027.

Procedure Manual E7, 2.60, *Technical Reviews*.

Savannah River National Laboratory, 2004, *Technical Report Design Check Guidelines*, WSRC-IM-2002-00011, Rev. 2.

Appendix A - Design checking performed by Frank Smith

Design Check: Vadose zone flow field extraction for GoldSim		Date: 8/14/2012		
Design check scope, instructions, and/or general comments: Check extraction of flow rates and average properties extracted from PORFLOW and transition time calculations for GoldSim modeling.				
No.	Comment	Proposed Resolution	Analyst Response	Checker Concur? Y,N
If checker has no comments, check here. <input checked="" type="checkbox"/>				
Analyst Name (print): Greg Flach		Add additional rows above, as needed. E-Signature (or sign/date/scan hardcopy): (Not required if no comments)  8/14/2012		
Checker Name (print): Frank Smith		E-Signature (or sign/date/scan hardcopy):  8/14/2012		

Appendix B - Design checking performed by Thong Hang

Design Check: Aquifer and Vadose Setup		Date: 8/14/2012		
Design check scope, instructions, and/or general comments: Aquifer CaseA and CaseA_100k runs as well as the flow sensitivity runs – CaseA.1-24, CaseC.1-24, CaseE.1-24				
No.	Comment	Proposed Resolution	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here.

Analyst Name (print):
Greg Flach

Checker Name (print):
Thong Hang

E-Signature (or sign/date/scan hardcopy): (Not required if no comments)
f M Flach 8/14/2012

E-Signature (or sign/date/scan hardcopy):
Thong Hang 8/14/12

Appendix C - Design checking performed by Greg Flach

Design Check: PORFLOW analyses for HTF PA		Date: 8/14/2012		
Design check scope, instructions, and/or general comments: PORFLOW setup of vadose zone flow and transport, barrier analysis, and aquifer transport				
No.	Comment	Proposed Resolution	Analyst Response	Checker Concur? Y,N
1	<u>Vadose zone flow</u> : The VadoseTypeI_noliner transition times are not properly calculated for CaseA and CaseA_100k	Recompute the transition times and rerun.	The transition times were recomputed and rerun.	Y
2	<u>Vadose zone flow</u> : The VadoseTypeIIIA transition times are not properly calculated for CaseB, CaseC, and CaseD	Recompute the transition times and rerun.	The transition times were recomputed and rerun.	Y
3	<u>Vadose zone flow</u> : The VadoseTypeIIIA liner failure times occurred earlier than intended for CaseA.3, CaseA.7, CaseA.11, CaseA.15, CaseA.19, and CaseA.21	These runs are sensitivity runs for liner failure. The liner failure time was earlier than intended, but still provides insight into the sensitivity of the results on the liner failure times. No change at this point.	No change was made.	Y
4	<u>Aquifer zone transport</u> : The dispersion factors were not changed to reflect the new Aquifer grid	Correct the dispersion factors and rerun	The dispersion factors were corrected and rerun.	Y
5	<u>Flow parametric study</u> : Type I liner failure times for CaseA series should be 2100, 11397, and 15000 rather than 500, 3638, 8000.	Correct liner failure times	Corrected	Y
6	<u>Vadose zone transport</u> : For the source zone definition for Type I annulus inventory, the lower-left indices are off by one.	Correct indices in PORFLOW sub-region definition	Corrected	Y
7	<u>Vadose zone transport</u> : Tank 16 simulations do not have an inventory assignment for the secondary sand zone	Assign designated inventory to this region	Corrected	Y
If checker has no comments, check here. <input type="checkbox"/>			Add additional rows above, as needed.	
Analyst Name (print): Jeffrey Jordan		E-Signature (or sign/date/scan hardcopy): (Not required if no comments) <i>Jeffrey A. Jordan</i> 8/14/2012		
Checker Name (print): Greg Flach		E-Signature (or sign/date/scan hardcopy): <i>GM Flach</i> 8/14/2012		