LSNReviews

From:	Osvaldo Pensado [opensado@cnwra.swri.edu]
Sent:	Tuesday, April 26, 2005 7:01 PM
То:	Randall Fedors; Goodluck I Ofoegbu; Douglas Gute; Oleg Povetko; George Adams; Ronald Janetzke
Cc:	Sitakanta Mohanty
Subject:	WP temperature under drift degradation scenario
Attachments:	burnup.dat; ThermalResults.wpd

Approach: adjusted burnup.dat to match 1.45 kW/m at 25 yr (DOE design basis) WPSpacingAlongEmplacementDrift[m] = 5.265 WPLength[m]=5.165 Varied ThermalConductivityOfBackfillModelOne[W/(m-C)] from 0.12 to 1.0

Results: WP temperatures as high as 700 C for the low values of the thermal conductivity.

I increased the active ventilation time to 100 yr, resulting in temperatures as high as 350 C for the lowest values of the thermal conductivity.

Therefore, the scenario of active ventilation for 50 yr followed by passive ventilation for 50 yr will produce WP temperatures between 350 and 700 C.

Based on discussions with Randy, there are date supporting low values of the thermal conductivity. Thus, there is rationale to back up the selected range in thermal conductivity.

Oleg, I need you to help us to insert the glass heat source in the burnup.dat to define a better average. Probably the average load is below the 1.45 kW/m design basis.

Also, the WPs are so close to each other (10 cm apart), that only 6 subareas of the repository are populated with WPs. The 7th subarea is empty. Therefore, there is room to spread the WPs and lower the thermal output. There appears to exist some design freedom to manage lower temperatures. As of today, it appears that DOE will screen out the drift degradation scenario from the PA.

Ron, the temporary burnup.dat file is slightly different than another previously sent. Before, I did not account that TPA does logarithmic interpolation.

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Properties Page

Return-path: <opensado@cnwra.swri.edu> Received: from DAKATH ([129.162.200.212]) by rogain.cnwra.swri.edu (Sun ONE Messaging Server 6.0 (built Oct 29 2003)) with ESMTP id <0IFK004L7TBFA120@rogain.cnwra.swri.edu>; Tue, 26 Apr 2005 18:02:04 -0500 (CDT) Date: Tue, 26 Apr 2005 18:01:28 -0500 From: Osvaldo Pensado <opensado@cnwra.swri.edu> Subject: WP temperature under drift degradation scenario To: Randall Fedors <rfedors@cnwra.swri.edu>, Goodluck I Ofoegbu <goodluck.ofoegbu@swri.org>, Douglas Gute <dgute@cnwra.swri.edu>, Oleg Povetko <opovetko@cnwra.swri.edu>, George Adams <gadams@cnwra.swri.edu>, Ronald Janetzke <rjanetzke@cnwra.swri.edu> Cc: Sitakanta Mohanty <smohanty@cnwra.swri.edu> Reply-to: opensado@cnwra.swri.edu Message-id: <000d01c54ab3\$e0e76670\$d4c8a281@DAKATH> **Organization: CNWRA** MIME-version: 1.0 X-MIMEOLE: Produced By Microsoft MimeOLE V6.00.2800.1478 X-Mailer: Microsoft Outlook, Build 10.0.6626 Content-type: multipart/mixed; boundary="----= NextPart 000 000E 01C54A89.F8115E70" Importance: Normal X-Priority: 3 (Normal)

X-MSMail-priority: Normal

TITLE: Data for TPA 5.0.1 based on SCALE5/ORIGEN-ARP calculations, O. Povetko 02-04-05 ** ** time is years passed after discharge out of reactor. ** bwr is thermal output for boiling water reactor SNF. ** pwr is thermal output for pressurised reactor SNF. ** ** Input data for calculations from BWR Source Term Generation and ** Evaluation, BBAC00000-01717-0210-0010REV 01 1999 Table 33 and p. XV-1; ** and from PWR Source Term Generation and Evaluation, BBAC00000-01717-0210-0010 ** REV 01 1999 Table 11 and p. X-1. ** OPR: Multiplied by 0.8208 to get 1.45 kW/m at 25 yr, assuming WastePackagePayload[MTU]=7.89, WPLength[m] = 5.165, WP spacing = 0.1 m 2008. ! Calendar year corresponding to time 0 in the table 0.35 ! bwr blend ! pwr blend 0.65 pwr (W/MTHM) Time (yr) bwr (W/MTHM) 1 6316.022254 11665.96807 2 3639.407755 6358.703626 3 2515.738559 4126.139554 5 1647.336798 2427.913428 10 1161.425795 1548.020529 15 1012.040993 1309.169005 20 912.7247234 1163.888181 25 825.5060095 1044.081376 30 760.4671369 955.4060953 50 550.3434595 681.3424396 100 297.4563307 361.3142295 200 164.1591229 195.7597541 300 126.6487633 150.0414383 500 91.51871102 107.6883846 1000 52.40779999 60.49263679 2000 27.42278148 30.55001277 5000 17.38445112 18.97679461 10000 12.4268456 13.63341516 20000 7.149129803 7.924781658 50000 2.545287201 2.870322264 100000 1.007116219 1.156501021 200000 0.636526999 0.747498566 500000 0.524488398 0.618305336 1000000 0.375513994 0.441341802

Different colors represent 6 subareas



TimeOfRepositoryClosure[yr] = 50.0 **ThermalConductivityOfBackfillModelOne[W/(m-C)] = 0.27** WPSpacingAlongEmplacementDrift[m] = 5.265 WPLength[m]=5.165



TimeOfRepositoryClosure[yr] = 50.0 **ThermalConductivityOfBackfillModelOne[W/(m-C)] = 1.0** WPSpacingAlongEmplacementDrift[m] = 5.265 WPLength[m]=5.165



TimeOfRepositoryClosure[yr] = 100.0

ThermalConductivityOfBackfillModelOne[W/(m-C)] = 0.12 WPSpacingAlongEmplacementDrift[m] = 5.265 WPLength[m]=5.165

