From: Oleg Povetko
Sent: Friday, May 25, 2007 1:15 PM
To: James Winterle
Subject: RE: PCSA Phase II

Jim,

This is part of PCSA-II exercise. During our examination of DOE documents last year we determined that misloads may potentially initiate Category 1 or 2 event sequences. The treatment of misloads is complicated since the TAD loading, sealing etc is expected to take place outside GROA, at the power plants. Yet, the loading sets the waste form parameters that drive the safety analysis; in particular, the neutron mulitiplicaiton analysis. The misloads are not part of DOE PCSA, how will they be accounted for, is not clear. In its criticality safety analysis, DOE relies on neutron absorbers in pre- and postclosure, the neutron absorbers will be ITWI, may be ITS also. Our concerns on misloads were reiterated by the similar comment made by the similar comment made by the DOE Criticality Safety Support Group in course of their internal review of repository criticality safety. They let us look at this non-public information for a couple of hours during March Appendix 7 meeting. Currently the difference between pre- and postclosure is the fresh fuel assumption for preclosure. It might change though.

Either assemblies or absorber plates or both can be misloaded. During PCSA-II exercise the question rose whether even single missing from WP (due to misloads) neutron absorbing plates may constitute a concern as potential initiating events for categorized events. To answer that one needs first to assess reactivity effect of missing absorber plates in WP GROA configuration and NRC tried to use HOLTEC MPC-24E configurations since TAD-WP configurations are not available. In our postclosure criticality work we've already developed TAD-WP criticality models based on the best available design information, so we used them in this work. Razvan started working on it but then NRC decided to conduct consequences analysis in PCSA-II exercise, so he was transferred completely to PCSA-II consequences analysis. After we complete the dose analysis Razvan will continue working on criticality by validating SCALE 5.1 and placing it under QA control. We'll definitely share these results with nuclear engineers after NRC double check on the assumptions, models and results. The conclusions on safety implications based on our results might be quite different from theirs.

Oleg.

-----Original Message-----
From: James Winterle [mailto:jwinterle@cnwra.swri.edu]
Sent: Friday, May 25, 2007 7:53 AM
To: 'Oleg Povetko'
Subject: RE: PCSA Phase II

Oleg,

Thanks. Looks interesting. I have a couple of questions. Can you remind me how this work will be used by NRC? Is it this a preclosure activity? Also, is Razvan helping with this work, or is that a different modeling effort? It would be good to share these results with your fellow nuclear engineers in PA group; I am thinking all of our nuclear engineers should be aware of what the others are working on.

--Jim

==========

-----Original Message-----
From: Oleg Povetko [mailto:opovetko@cnwra.swri.edu]
Sent: Thursday, May 24, 2007 7:36 PM
To: 'Sheena Whaley'
Cc: Asadul Chowdhury; James Winterle; Albert Wong
Subject: RE: PCSA Phase II

Sheena,

We conducted requested calculations checks to assess the reactivity effect of missing neutron absorber plates in the waste package. The effects for MPC-24E are within statistical errors. Since MPC-24E and TAD-WP configurations and material compositions are quite different, we've conducted series of independent calculations, first, for 21-PWR pre-TAD WP and then, for 21-PWR TAD-WP configurations. Preliminary results are compiled on shared drive in \Oleg Povetko\Criticality\BoralPlateMisloads\ReactivityEffectOfMissingAbsorberPlates052207.doc file. The file contains hyperlinks to all the input/output files located in the same folder. Please note that the results are preliminary and have not been reviewed according to the Center QA program. You can just check the Summary Figure 1 and Summary Table 1 at the end of the file where I compiled only 21-PWR TAD-WP results. The example configuration considered for 6 missing plates (most reactive configuration) and the Summary Table 1 follow. Missing plates here surround the center cell and replaced by water (blue in color).

Oleg.

>
>
> I put the TN-32 model in your folder - it's called BWsimple.inp
>
> >>> Oleg Povetko <opovetko@cnwra.swri.edu> 4/30/2007 12:09 PM >>>
> I see three input/output files there.
> Can you put GBC-32 cask file with no flux traps there also?
>
> Oleg.
>
> >
> >
> > I put the files in your folder. The normal is the case with
> > all boral plates present. For case acc31 I removed the boral
> > plate from the bottom of the cell (unit 31) and because it is
> > modeled with mirror, it results in the plate missing from 2
> > cells. For acc3140, I removed one boral plate from units 31
> > and 40 (4 cells).
> >
> > Sheena
> >
> > >>> Oleg Povetko <opovetko@cnwra.swri.edu> 4/27/2007 5:39 PM >>>
> > Sheena,
> >
> > We may check the calculations and also check reactivity
> > effect of missing plates for 21-PWR WP without flux traps. I
> > don't think there will be flux traps in TAD WP.
> >
> > Oleg.
> >
> > > -----Original Message-----
> > > From: Sheena Whaley [mailto:SAW2@nrc.gov]
> > > Sent: Friday, April 27, 2007 9:57 AM
> > > To: Fernando Ferrante; George Adams; Oleg Povetko; Albert
> > > Wong; Christopher Ryder; David Dancer; Rosemary Reeves;

> > > Robert Johnson; Tina Ghosh
> > > Cc: Asadul Chowdhury
> > > Subject: PCSA Phase II
> > >
> > >
> > > Even though we don't normally assume a cask in
> mis-manufactured for
> > > criticality safety, I ran some quick calcs to see if totally
> > > removing a few boral plates from the cask would make much of a
> > > difference. I didn't just reduce the boron because there are
> > > already studies done on that (I gave Albert a graph that
> showed that
> > > a significant amount would have to be missing uniformly
> throughout
> > > the cask before there was an issue).
> > >
> > > My work will have to be checked but the results show that 4 boral
> > > plates could be missing and the cask would still be subcritical.
> > > The model is a PWR cask (24 assemblies) with flux traps. This is
> > > similar to the TAD, but holds 3 more assemblies. Fuel -
> fresh (4.2
> > > wt%) 15x15 westinghouse assembly For simplicity, I replaced the
> > > bottom boral plate on 2 center locations with water. I
> also repeated
> > > this for 2 more locations.
> > >
> > > keff
> > > normal case (all boral plates present) - .9441 + .0016 missing 2
> > > boral plates - .9439 + .0018 missing 4 boral plates -
> .9458 + .0015
> > >
> > > Again, this needs to be checked to make sure I did the
> right cells
> > > but it appears that this is not an issue.
> > >
> >
>

Hearing Identifier: HLW_YuccaMountain_Hold_EX
Email Number: 445

Mail Envelope Properties (004e01c79ef0$4b0a14c0$7bc8a281)

Subject: RE: PCSA Phase II
Sent Date: 5/25/2007 1:15:29 PM
Received Date: 5/25/2007 1:15:29 PM
From: Oleg Povetko

Created By: opovetko@cnwra.swri.edu

Recipients:
"James Winterle" <jwinterle@cnwra.swri.edu>
Tracking Status: None

Post Office: cnwra.swri.edu

Files	**Size**	**Date & Time**
MESSAGE	6896	5/25/2007 1:15:29 PM

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received: