November 07, 1990

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Subject: Comments on Report NUREG/CR-5604 (Draft) - Oct/01/90

Dear Sammy,

Based on a preliminary review of the above subject, the following are my comments:

1. MEKE-UP (MURP) ISLOCA

1.a Based on the fault tree (FT) presented in page E-27, the evaluation of the event tree (ET) top event HD2 is not correct. Instead of the 2.6E-03, the probability for "failure to detect ISLOCA" should be equal to 5.1E-02. Note that this modification will make the MU&P ISLOCA the dominant contributor to ISLOCA core damage frequency, assuming everything else remains the same.

I do not have any way to check if the indications included in the FT in page E-27 are the only ones the control room crew will have. I think that it should also be checked if there are any flood or radiation alarms in the area where the most probable breaks can occur.

1.b It is stated in page 24 that "a bounding calculation was performed to estimate the time to core uncovery for a DHR/LPI and an MPI sequence. The MPI calculation produced a minimum time to uncovery, given a rupture in the MPI system, of about 4 hours. This time is utilized in the MRA analysis for post-rupturs recovery events." In the Attachment 1 it is explicitly stated that it is assumed that 2 LPI trains are used (together with 1 MPI and 2 charging pumps) to refill the primary system and that the steam generators were depressurized to enhance primary to secondary heat transfer. It is also stated in Attachment 1 that the assumptions were made to minimize the time to empty the RWST.

It is my opinion that those assumptions are very conservative (as a matter of fact the use of two LPI pumps is not correct because the initiaton also disables one of the two LPI trains) and do not reflect the real progression of the accident. I do think that, as also stated in Attachment 1, a simulation of more realistic accident progression will substantially increase the time available for detection, diagnose and isolation of the modeled ISLOCA.

1.c It was not possible to review the evaluation of the probabilities of failure to diagnose and to isolate the ISLOCA

9109250194 910419 PDR FOIA WILLIAM90-512 PDR since the value used is taken directly from a table in a EGG report which I do not have at this moment. Nowever, even without having the report I will give a gualitative comment. Given the fact that the operators have <u>detected</u> and <u>correctly diagnosed</u> the ISLOCA, and in order to do that the used the indications from the "high Temp. alarm in the MP pump 1-2" and the opening of the relief valve 1511, i.e. the operators know that the break is in the MU&P system, and given the long time available for break isolation, I do think that the probability of failure used for the failure to isolate the ISLOCA seems to be high.

2. HPI ISLOCA

The comment 1.c given above is also valid for the HPI ISLOCA.

3. DAR Letdown ISLOCA - Shutdown

3.2 I do not understand why the treatment of operator actions to "jumper DH-11 sol DH-12" are treated exactly the same way in the event tree in pages E-52 and E-53. It seems to me that the action to "jumper DH-12" is correctly treated because it is a step in the Shutdown procedure. However, since to jumper DH-11 the operators would have to make an "error" (because it is not a step in the procedures) the treatment of this action (represented as event L in that ET) does not seem to be correct. In other words, I do not understand why the action "RO fails to instruct I&C to jumper DH-11" can be an error of omission as shown in page E-23. I do think that unless there is something missing in the writeup or in my understanding of the ET, the correct treatment of that action can make a large impact in the quantification of the event represented by that event tree.

3.b Given that the break in the DHR would disable one of the LPI trains for the injection mode (even without any rupture if the operators are following procedures they would have to close DH-2734 and open its breaker), I think that the inclusion of the failure of the other train of DHR/LPI in the injection mode needs to be included in the KT of Fige D-6. My suggestion is that the new ET should be similar to the one in figure 1. I think that, as can be seen in figure 1, based in the large LOCA success criteria used in all FWR FRAS I have seen, a core damage would occur given the failure of the LPI. This does not necessarily means that the break can not be isolated after core damage to avoid an outside containment release. It is also important to note that given the initiator frequency, the core damage frequency from the postulated sequence is going to very high when compared with core damage from large-LOCAs is other PWR FRAS.

3.c The evaluation of the probability for the top event "operators fail to isolate ISLOCA" does not include the failure of the valves themselves. If one uses the same data used in NUREG-1150 the CCF of two MOVs to close is equal to 3.0E-03 * 4.9E-02, i.e. 1.5E-04.

3.d I do not understand why the analysis presented in Appendix H of NUREG/CR-5604 was used for the DHR shutdown ISLOCA. Based on the Davis Besse procedure DB-OP-06903 (Plant Shutdown and Cooldown). Given that the crew decided to go to shutdown prematurely and given that it opens the valves DH-11 and DH-12, following procedures the valves DH-10 and DH-26 will be closed as will also valves DH-1517 and DH-1518. At this point there would be an overpressurization of line 12"-GCB-7 and its possible rupture; at the same time there would be release through the relief valve DH-4849. If the line doss not rupture and the operators do not detect the release through valve DH-4849, they may continue in the process of shutdown. Given that, they would have to open valve DH-1518 (procedural step) and there is a need to verify if this valve is designed to open against the existing differential pressure. Only if the valve DH-1517 can be opened (after the operators fail to detect release through valve DH-4849) the calculations presented in appendix H can be used for the rupture analysis.

4. DER Letdown ISLOCA - Startup

6.2 I do not understand why the "failure to read Note 5.4.43" in the startup procedures would lead to leaving the values DH-11 and DH-12 open, given that the next steps in the procedures (before raising the reactor pressure), require the operators to close those values and also to complete Attachment 12 of the startup procedure; that attachment refers to two independent verifications to check that those values are closed. It seems to me that this was not considered in the MRA ET presented in pages E-65 and E-66.

Note that the same is true for the case (in the HRA ET) in which the operators do not read the note 5.4.48 correctly.

4.b I do not understand why, given that the "RO correctly performs DHR valve lineup" (event t in MRA ET of page E-66), the valves are left in the open position if the RO and the SRO "fail to verify bi-stable light goes out." Given that the valves are correctly line-up they will not change position if the RO and SRO fail to verify the light. Also, here, the next step in the procedures is to perform Attachment 12 of that procedure (same as described above). I do think that this event tree needs to be completely modified.

4.c In all ISLOCA event trees presented in Appendix D, the "operators failure to detect an ISLOCA, correctly, leads directly to the question of mitigation of release. However, for the DHR Letdown (Startup) ISLOCA event tree, even if the operators fail to detect the ISLOCA they can still correctly diagnose the event. I do think that this is not correct.

5. General Comment

I think that in order to be able to multiply the probabilities given in the branches of the event trees all values used need to be mean values. Please note that all the above comments with exception to comment 3.d were discussed in our yesterday meeting with G. Burdick (NRC/RES) and the INEL representatives.

Sammy, if you have any questions or need more information, please let me know.

Sincerely, Ne yoh A. Hanan

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