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To: "Soli T Kheriche/SLK2/LMITCO/INEEL/US" <SLK2@inel....
Date: Friday, November 05, 1999 01:04 PM
Subject: HEPs

Hi Glenn-

Here is a file with the HEPS. I have taken the approach we discussed of defining cases that relate to different plant conditions. That way, sensitivity runs can be made. I found Gareth's work very useful in thinking about the cases and believe that the sensitivity approach will provide you the tool needed to show what improvements might be needed. Anyway, I still need to discuss the results with Soli so this is "draft".
Thanks Harold

(See attached file: Quantification for SFP.doc)

L182

1.2.3 Operator fails to respond to a signal indication in the control room

Case 1 Single alarm, no procedure, no training: 3E-2 (THERP data)
Case 2 Single alarm, procedures, training: 3E-3 (THERP data)
Case 3 Related alarms, procedures, training: 3E-5 (THERP data)

1.3.3 Operator fails to observe the loss of cooling in walkdowns

Case 1 active monitoring, no procedures, no training, no shift changeover discussion: 5E-3 (THERP data)
Case 2 active monitoring, procedures, training, shift change over discussion: (assumes 1 opportunity for recovery that is independent) 1E-5 (THERP data)
Case 3 active/passive monitoring, procedures, training, shift change discussions (assumes 1 opportunity for recovery that is independent) 1E-5 (THERP data)

1.5.3 Operator diagnoses need for alternate makeup

multiple shifts

Case 1 no procedures, no training: 1E-1 (ASP)
Case 2 procedures, training: 1 E-5 (ASP)

1.5.3 Operator fails to start firewater pump and provide alignment

Case 1 no procedures, no training, no equipment/staff: 1E-2 (ASP)
Case 2 procedures, training, equipment/staff: 1E-5 (ASP)

1.6.3 Operator fails to provide alternate source of cooling from offsite

Case 1 no procedures, no training, no equipment/staff: 5E-2 (ASP)
Case 2 procedures, training, equipment/staff: 1E-4 (ASP)

2.3.3 Operator fails to recognize need to start firewater pump

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s

Case 1 no procedures, no training, no shift turnover: 1E-1 (ASP)
Case 2 procedures, training, shift turnover: 1 E-5 (ASP)

2.3.3 Operator fails to start firewater pump and provide alignment

Case 1 no procedures, no training, no equipment/staff: 1E-2 (ASP)
Case 2 procedures, training, equipment/staff: 1E-5 (ASP)

2.4.3 Operator fails to provide alternate source of cooling from offsite

Case 1 no procedures, no training, no equipment/staff: 5E-2 (ASP)
Case 2 procedures, training, equipment/staff: 1E-4 (ASP)

3.3.3 Operator fails to restart/realign the SFP cooling system

9hrs

Case 1 no procedures, no training: 3 E-2 (ASP)
Case 2 procedures, training: 5E-4 (ASP)

3.4.3 Operator fails to establish firewater makeup- power recovered

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s

Case 1 no procedures, no training, no equipment/staff: 1E-2 (ASP)
Case 2 procedures, training, equipment/staff: 1E-5 (ASP)

3.4.3 Operator fails to establish makeup power not recovered

Case 1 no procedures, no training, no equipment/staff: 1E-2 (ASP)
Case 2 procedures, training, equipment/staff: 1E-5 (ASP)

3.5.3

Case 1 no procedures, no training, no equipment/staff: 5E-2 (ASP)
Case 2 procedures, training, equipment/staff: 1E-4 (ASP)

4.3.3 Operator fails to restart/realign the SFP cooling system

Case 1 no procedures, no training: 3 E-2 (ASP)
Case 2 procedures, training: 5E-4 (ASP)

9hrs

4.4.3 Operator fails to establish firewater makeup- power recovered

Case 1 no procedures, no training, no equipment/staff: 1E-2 (ASP)
Case 2 procedures, training, equipment/staff: 1E-5 (ASP)

4.4.3 Operator fails to establish makeup power not recovered

Case 1 no procedures, no training, no equipment/staff: 1E-2 (ASP)
Case 2 procedures, training, equipment/staff: 1E-5 (ASP)

4.5.3 Operator fails to provide alternate source of cooling from offsite

Case 1 no procedures, no training, no equipment/staff: 5E-2 (ASP)
Case 2 procedures, training, equipment/staff: 1E-4 (ASP)