September 22, 2003

NOTE TO: Stuart Richards, Chief
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FROM: Mark F. Reinhart, Chief **/RA/**
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SUBJECT: RESULTS OF THE FITZPATRICK GENERATING STATION SDP PHASE 2 NOTEBOOK BENCHMARKING VISIT

During July, 2003, NRC staff and contractors visited the Offices of Entergy Northeast to compare the Significance Determination Process (SDP) Phase 2 notebook and licensee's risk model results for the FitzPatrick Generating Station in Scriba, NY. In addition, the results from analyses using the NRC's draft Revision 3i Standard Plant Analysis Risk (SPAR) model for FitzPatrick were also compared with the licensee's risk model. The results of the SPAR model benchmarking effort will be documented in next revision of the SPAR (revision 3) model documentation.

The benchmarking visit identified that there was good correlation between the Phase 2 SDP Notebook and the licensee's PSA. The results indicate that the FitzPatrick Phase 2 notebook was more conservative in comparison to the licensee's PSA. The revision 1 SDP notebook will capture 100% of the risk significance of inspection findings. A summary of the results of comparisons of hypothetical inspection findings between SDP notebook and the licensee's PSA are as follows.

0%	Underestimates Risk Significance
40.7%	Match Risk Significance
32.2%	Overestimates Risk Significance by 1 Order of Magnitude
23.7%	Overestimates Risk Significance by 2 Orders of Magnitude
3.4%	Overestimates Risk Significance by 3 Orders of Magnitude

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The licensee's PSA staff was very knowledgeable of the plant model and provided very helpful comments during the benchmark visit.

Attachment A describes the process and results of the comparison of the FitzPatrick SDP Phase 2 Notebook and the licensee's PSA.

Attachments: As stated

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Attachments: As stated

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ATTACHMENT A

SUMMARY REPORT ON BENCHMARKING TRIP TO THE FITZPATRICK GENERATING STATION (July 15-17, 2003)

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August 2003

BNL #04334 August 10, 2003

Table of Contents

List of Tables

1. Introduction

The Fitzpatrick SDP notebook was originally prepared in 2000-2001. The Fitzpatrick notebook was reviewed prior to this benchmarking visit in order to identify potential changes that may be needed in order to address generic NRC changes for the Rev. 1 notebook update. The licensee provided comments on the original notebook version via email (Ref. 3) to BNL, and these were also addressed in the revisions. A summary of the changes made were provided to the licensee prior to the benchmarking visit and are listed in Attachment 2. A list of questions was also provided to the licensee in order to facilitate discussions about the notebook. The licensee provided additional comments on changes in the notebook by Ref. 4. This facilitated the onsite benchmarking by identifying early those areas where the notebook and the PRA differed and allowed the team to focus efforts on these key areas.

On July 15-17, 2003, the NRC conducted an SDP Benchmarking visit with the Fitzpatrick PRA staff in the Entergy corporate offices of Fitzpatrick in White Plains, NY (Attachment 1 provides a list of participants). The purpose of this visit was to validate the underlying assumptions of the draft Revision 1, SDP Phase 2 Notebook. The validation was conducted by soliciting comments from the licensee's PRA staff; reviewing differences between the underlying assumption of the notebook and the licensee's PRA; and comparing the safety significance of hypothetical inspection findings using both the notebook and the PRA. The outcome of this SDP Benchmarking visit is the issuance of Revision 1 of the SDP notebook. The SDP notebook is used by inspectors to determine the safety significance of inspection findings.

2. Summary of Results from Benchmarking

The benchmarking visit identified that the notebook is conservative compared to the licensee's PRA. The comparison of the significance between the licensee's PRA and the SDP Phase 2 notebook for hypothetical inspection findings is provided in Table 1. A summary of the results of the risk characterization of hypothetical findings by the SDP notebook are as follows:

0 %	Underestimates Risk Significance (non-conservative)
40.7%	Match Risk Significance
32.2%	Overestimates Risk Significance by 1 Order of Magnitude
23.7%	Overestimates Risk Significance by 2 Orders of Magnitude
3.4%	Overestimates Risk Significance by 3 Orders of Magnitude.

Thus, there were 72.9% that either matched or were just one order conservative, with no non-conservative items.

The benchmarking team noted several reasons why the notebook is more conservative than the PRA. The principle reasons for the differences are as follows:

- The PRA credits injection after containment failure (Key assumption below).
- The PRA uses lower failure probabilities than the notebook.
- The PRA credits certain recovery actions that are not included in the notebook.

- The PRA has not fully incorporated human action dependencies into the model.

These reasons are discussed below in section 3.1.

3. Proposed Revisions to Rev. 0 SDP Notebook

3.1 Benchmarking Details

Benchmarking Methodology

The licensee's PRA information used during this benchmarking visit was based on the 2002 version of the Fitzpatrick PRA, as updated in July, 2003. The baseline PRA core damage frequency (CDF) from internal events was 2.2E-6 core damage events per reactor-year (RY), including internal flooding, which was about 1% of the CDF.

During the beginning of the benchmarking visit, the team reviewed the notebook with the licensee's staff and obtained comments from the licensee. These comments were incorporated, as appropriate, into the notebook prior to the onsite benchmarking.

The team computed the break points in RAW values for the different SDP colors based upon a current PRA total internal events CDF of 2.2E-6 core damage events per RY. The team pre-selected components and human actions, as listed in Table 1, that would be evaluated for the effect of having the component or human action fail. The team developed the color corresponding to failure of each item. The latest revised version of the notebook was used to develop the color corresponding to failure of each item and compared that to the color that would be implied by the item's RAW value from the PRA. Table 1 tabulates the results of the benchmarking of both the Rev. 0 and the modified Rev. 1 worksheets that are contained in the risk-informed inspection notebook for Fitzpatrick.

In developing the colors from the notebook, the team evaluated all sequences in each worksheet that contained the item (component or human action). A number was obtained for each re-evaluated sequence. A "counting rule" was used to cascade lower value sequences to higher value ones as follows. For example, three sequences of value 8 (shorthand for an estimated sequence frequency of 1E-8 events per RY) were equivalent to one sequence of value 7. Likewise three sequences of value 7 (3-7s) were equivalent to one sequence of value 6 (1-6). Also, 3-6s were equal to 1-5, and so on. Colors were developed as follows:

Sequences of value 7, 8, and higher	Green (G)
Sequences of value 6	White (W)
Sequences of value 5	Yellow (Y)
Sequences of value 4	Red (R)
Sequences of value 3	Double Red (RR)
Sequences of value 2	Triple Red (RRR)

Key Fitzpatrick PRA Assumption

The JAF PRA credits late injection (LI) with HPCI, RCIC, CRD, or condensate after containment failure on some CHR-CV sequences in order to prevent core damage. This is typically credited with a "Flag-leak" term that varies from 0.4 to 0.7 that determines where the containment failure is and whether LI can be credited. Then, as an example, LI with CRD is credited at 0.11. This means a typical net credit of 0.077 after containment failure.

The benchmarking team also noted that failure probabilities used in the PRA are generally lower than those assumed in the SDP notebook, leading to overall conservative results.

Non-conservative Benchmark Results

For this benchmarking, there were no items that were non-conservative.

Discussion of Conservative Benchmark Results

As stated above in the paragraph "Key Fitzpatrick PRA Assumption," there were many items that benchmarked as conservative (notebook gave a color closer to Red than the PRA RAW value). These items are discussed below.

Items 3 orders conservative:

There were 2 items that were 3 orders of magnitude conservative.

DC charger B was 3 orders of magnitude conservative, in that the charger was Red while the PRA RAW was Green. The notebook evaluates the charger the same as a DC bus (but reduced by one color to account for manual alignment of the spare charger). This evaluation assumes that failure of the charger on an initiating event will eventually lead to loss of the DC bus due to battery depletion. Examination of the dominant PRA cutsets for DC charger failure shows that the PRA credits the battery as backup to the charger with an unavailability of 7.5E-4. This causes a large mismatch in the importance.

The other item that was 3 orders of magnitude conservative was the operator action to perform CHR in either the SPC (W1) or containment spray (W2) mode. The current PRA model credits separate operator actions for CHR in either the SPC (HEP = 1.4E-4) or containment spray (HEP = 0.04) model in the same cutset. Also, in some sequences, separate operator actions for remote CV (HEP = 1.9E-3) and local CV (HEP = 6.5 E-3) are also credited in the same cutset. This creates an overall failure probability of about E-6 for CV. The PRA did not fully model dependency between these actions and as a result give too much credit to the operator actions. This notably affects the TPCS-CHR-CV sequence that drives the importance for several components in the notebook. The crediting of LI after containment failure also contributes to the over -conservatism.

Items 2 orders conservative:

There were 14 items that were 2 orders of magnitude conservative, as follows: an SRV fails to open, RHR pump A, RHR HX A or B, RHRSW pump A or B, one CV valve, one SLC pump, CAC HVAC train A, 4 kVAC bus 10500 or 10600, DC charger A, and operator actions to CV or LI with RHRSW crosstie.

The conservatisms in the RHR related components and in their cooling train from CAC are generally caused by several issues:

- The PRA credits recovery of PCS on TPCS sequences (T2) at a non-recovery probability on 7E-3. The notebook does not credit this.
- The CV valve failure probability is 1E-3 and the CV operator action HEP is 1.9E-3, while the notebook credits CV at 2.
- The PRA credits injection after containment failure (Key assumption above).
- Lower failure probabilities used in the PRA than in the notebook.

The RHR SW pumps are Yellow but the RAW gives a green. They are used for suppression pool cooling in the CHR function. Thus, they are affected by the same reasons as noted above for RHR items. Additionally for the RHRSW pumps, our method of evaluation counts many low level sequences and these cascade to a Yellow.

Since CV appears in key sequences and cutsets with CHR the CV components are affected by the same factors as RHR noted above.

For the 4 kVAC buses 10500 or 10600, the PRA RAW calculation did not address any changes in the related special initiator for loss of these buses (TAC5 or TAC6). This significantly lowers the RAW values creating the mismatches. Additionally, the key PRA assumption affects these items.

The PRA credits success of SLC on an MSIV closure ATWS as 1/2 SLC pumps within 5 minutes with an HEP of 9E-3. Based on the generic NRC BWR position, we have credited this as a single train and required 2/2 SLC pumps. The RAW for one SLC pump is Green since the PRA only requires 1/2 pumps, but the RAW for the SLC operator action is Yellow. The notebook gives a yellow for 1 pump.

One SRV ‘fails to open’ benchmarks as Yellow versus a PRA RAW of Green. The notebook just ‘evaluates’ DEP and overpressure since DEP requires 2/11 SRVs and overpressure requires 9/11 SRVs. This gives a conservative benchmark since there are so many extra SRVs beyond those needed for success. If we evaluate just the ATWS overpressure function, then both the RAW and the notebook give a Green.

DC charger A was R while the PRA RAW was White. The reasons for this mismatch are similar to those explained for DC charger B above.

LI with the RHRSW crosstie benchmarked as Yellow but had a RAW of 1.0. The main notebook sequences that contributed to the Yellow were on the three special initiators LOSW, LOIA, and LOTBCLC. Also, the sequences were of the type LOIA-CHR-LI. Examination of the PRA cutsets

for the RHRSW crosstie did not reveal any of this type. This explains why the RAW is low, but not why those cutsets are missing. The licensee stated that they would examine their model to determine why they are not there.

3.2 Specific Changes to the Rev. 0 SDP Notebook for Fitzpatrick

A number of changes were made to the Fitzpatrick Rev. 0 notebook in the process of developing the Rev. 1 notebook. Some of these were made prior to the onsite benchmarking effort. Additionally, at the conclusion of the benchmarking, further changes were made to the notebook in order to minimize the differences between the notebook and the licensee's PRA, while maintaining consistency with the NRC notebook construction rules. Attachment 2 contains a summary of the changes.

3.3 Generic Changes in IMC 0609 for Guidance to NRC Inspectors

- Need improved guidance for calculation of the color of DC battery charger findings, that includes consideration of spare or backup chargers and whether their connection is automatic or manual.

The following two areas are important in SDP notebook construction, SDP evaluation and subsequent Phase III evaluations.

- NRC should develop a position on the crediting of injection post-failure of CHR-CV. Such a position may allow some credit for certain analytical situations. Guidance would be useful for how much credit is reasonable and what the analysis guidelines are for providing such credit. Items to consider are: the strength of containment, timing of the failure, location of failure, systems inpacted by the steam and temperature, and the systems that can be credited for reactor vessel/RCS injection after such failures.

- NRC should also provide guidance on the acceptable minimum HEPs allowable, both for single human actions and for combined dependent human actions.

3.4 Generic Changes to the SDP Notebook

None.

4. Discussion on External Events

The licensee's updated PRA does not have a quantitative external events model.

5. References

8. James A. Fitzpatrick PRA, dated April, 1998.

9. Risk-informed Inspection Notebook for Fitzpatrick Generating Station, Revision 1, July 2003.

10. Email from C. Yeh to NRC & BNL dated 4/3/2003.

11. Email from C. Yeh to NRC & BNL, dated 7/8/2003.

Table 1: Summary of Benchmarking Results for James A. Fitzpatrick

**Internal Events CDF is 2.2 E-6 events per reactor-year including internal flooding of 1.0%
at a 1E-11 truncation limit
RAW thresholds are W = 1.45, Y =5.55, R = 46.5, DR = 455.**

Component Out of Service or Failed Operator Action	SDP Worksheet Results (Before)	Fitzpatrick Basic Event	Fitzpatrick RAW Ratio	Color by Fitzpatrick RAW	SDP Worksheets Results (After)	
Component						
HPCI	Y	HCITDPFSHCIPM	8.38	Y	R	conservative
RCIC	Y	RCIMAIMARCICM	8.56	Y	R	conservative
PCS steam	Y	TBVEDCLOSS	1.67	W	Y	conservative
PCS feed	Y	FWSFCVCC137	2.7	W	Y	conservative
1 SRV fto	Y	ADSSRVCC-RV171A CDF calculation	1.01	G	Y	conservative 2 orders
1 SRV ftc	Y	P1& IE-T3C CDF calculation	1.49	W	Y	conservative
CS pump A	G	LCSMAIMA LOOPA	1.01	G	G	
RHR-pump A	W	LCIMDPFRRP3A	1.96	W	R	conservative 2 orders
RHR-pump B	W	LCIMDPMARP3B	1.0	G	W	conservative
RHR HX A	R	LCIHTXVFHE2A	1.81	W	R	conservative 2 orders
RHR HX B	R	LCIHTXVFHE2B	3.31	W	R	conservative 2 orders
RHRSW-pump A	W	RSWMDPMAMP-1A	1.0	G	Y	conservative 2 orders
RHRSW-pump B	W	RSWMDPMAMP-1B	1.01	G	Y	conservative 2 orders
ESW pump A	Y	ESWMDPFSP2A	8.51	Y	Y	
1 CV valve (27AOV-	R	NVPAOVCC117	8.07	Y	RR	conservative

Component Out of Service or Failed Operator Action	SDP Worksheet Results (Before)	Fitzpatrick Basic Event	Fitzpatrick RAW Ratio	Color by Fitzpatrick RAW	SDP Worksheets Results (After)	
117 or 118)						2 orders
1 SW pump	Y	SWSMDPFRP1A	4.85	W	W	
condensate pump B	G	CDSMAIMA33P8B	3.82	W	W	
SLC pump A	Y	SLCMDPMAMDP-2A	1.01	G	Y	conservative 2 orders
RPT 1 train	G	AC4SBRCC-RPBKA	4.22	W	Y	conservative
RPT both trains	Y	AC4SBRCC-RPBKA&B	6.2	Y	Y	
EDG DGA	G	EDGMAIMA-EDGAM	1.35	G	G	
EDG DGB	G	EDGMAIMA-EDGBM	1.36	G	G	
Both EDG A & C	Y	EDGMAIMA-EDGBM & EDGCM CDF calculation	16.05	Y	Y	
4 kV (Bus 10500)	RR	AC4BACST10500	22.83	Y	RR	conservative 2 orders
4 kV (Bus 10600)	RR	AC4BACST10600	13.57	Y	RR	conservative 2 orders
HVAC for EDG Room 1A	G	DGVRCKNOFN1A	1.42	G	G	
HVAC for Crescent Area A Train	RR	Crescent A CDF calculation	1.98	W	R	conservative 2 orders
CRD pump A	G	CRDMAIMAP16A	1.07	G	G	
IA compressor A	W	IAS (2Comp.)	1.07	G	G	
Nitrogen system	G	NSS	1.0	G	G	
RBCLC pump A	G	RBCMDPFSP2A	1.0	G	G	
TBCLC pump A	W	TBCRCKNOP2A	5.17	W	W	
125V DC Control Board A	RR	DC1BDCST-BCB2A	387.1	R	RR	conservative
125V DC Control Board B	RR	DC1BDCST-BCB2B	67.0	R	RR	conservative
125V DC Battery A	Y	DC1BATHW-BATTA	17.03	Y	R	conservative
125V DC Battery B	Y	DC1BATHW-BATTB	23.79	Y	R	conservative
419V DC Battery A	G	LIPMAIMALIPA	1.01	G	G	

Component Out of Service or Failed Operator Action	SDP Worksheet Results (Before)	Fitzpatrick Basic Event	Fitzpatrick RAW Ratio	Color by Fitzpatrick RAW	SDP Worksheets Results (After)	
DC Charger A	R	DC1BCCHW-BATCA	1.99	W	R	conservative 2 orders
DC Charger B	R	DC1BCCHW-BATCB	1.1	G	R	conservative 3 orders
1 DD Fire Pump	G	NRFPSRHRSW-MV	1.03	G	G	
1 SP vac. bkr	R	VSSVBRCO1	46.43	Y	Y	
2 SP vac. bkrs.	R	VSSVBRCO1&2	46.43	Y	R	conservative
Failed Operator Actions						
DEP	RR	X2, ADSXHEFOX1S1, ADSXHEFOX1T1 CDF calculation	961.9	RR	RRR	conservative
DEP on ATWS	G		1.16	G	W	conservative
CHR with FW pump crosstie to RHRSW	G	NRFPSRHRSW	1.01	G	G	
RHR SPC mode	Y	SPCXHEFO W1	1.98	W	Y	conservative
RHR CHR (SPC or cont. spray mode)	RR	SPCXHEFO-W1&W2 CDF calculation	24.68	Y	RRR	conservative 3 orders
LI with FW crosstie	G	NRFPSRHRSW MV	1.03	G	G	
LI with RHRSW crosstie	W	RSWXHEFOV4S1	1	G	Y	conservative 2 orders
LI with CRD	W	CRDXHEFOU3, NRCRDF1	1.50	W	W	
INH on ATWS	Y	IX-TM	4.26	W	Y	conservative
LC for ATWS	Y	C1-T, C1-TM, LEVCONTRL-1&2	20.09	Y	Y	
SLC for ATWS	Y	C1-T, C1-TM, SLCXHEFOISLCS	20.32	Y	Y	
Overfill for ATWS	G	-	-	-	W	-

Component Out of Service or Failed Operator Action	SDP Worksheet Results (Before)	Fitzpatrick Basic Event	Fitzpatrick RAW Ratio	Color by Fitzpatrick RAW	SDP Worksheets Results (After)	
CV	R	NVPXHEFO-LVENT, NVPXHEFO-RVENT	38.67	Y	RR	conservative 2 orders
SUCXFR	-	U1X-T2	1.05	G	W	conservative
R4	-	NRLOSP4HR	1.1	G	G	
R8	-	NRLOSP8HR	2.35	W	Y	conservative
DC load shed	-	DC-SHED	1.0	G	W	conservative
Fire water crosstie on SBO	-	NRFPSESW, ESWA, ESWB	1.18	G	G	

Notes:

1. Fitzpatrick's RAW values are from the internal events PRA, average maintenance case.

2. The Δ CDF used in RAW value calculations represented the change in CDF due to the component being out of service for 1 year.

3. For a component, such as a pump, the licensee was asked to select the RAW values for the basic events which were the highest (more conservative) value, or to use a synthesized RAW value separately calculated by the licensee that included all failure modes. Where the basic event column indicates by CDF calculation, the licensee separately calculated a RAW by setting all the appropriate system events to true (or failed) and resolving the model to obtain the new higher CDF.

4. For those items where the basic event column has a dash (-), the PRA did not separately model the item and so a PRA RAW value was not available.

5. Originally the notebook did not credit condensate for the TAC or TDC worksheets, but this resulted in several mismatches during the benchmarking. The licensee justified its credit given in the PRA and thus it was added here, resulting in a match for the condensate pump.

6. When comparing the modified SDP worksheet color to the color by the Fitzpatrick RAW, many colors were found to be conservative. Each color of conservatism represents approximately one order of magnitude in Δ CDF. The comments column indicates by how many orders of magnitude the item is conservative.

7. The 2 items that were 3 orders of magnitude conservative were DC charger B and the operator actions to perform CHR in either the SPC or containment spray mode.

8. The 14 items that were 2 orders of magnitude conservative were: an SRV fails to open, RHR pump A, RHR HX A or B, RHRSW pump A or B, one CV valve, one SLC pump, CAC HVAC train A, 4 KVAC bus 10500 or 10600, DC charger A, and operator actions to CV or LI with RHRSW crosstie.

9. The 19 items that were 1 order of magnitude conservative were: HPCI, RCIC, PCS Steam, PCS Feed, 1SRV ftc, RHR pump B, 1 train of RPT, 125 VDC Control Board A or B, 125 VDC Battery A or B, 2 suppression pool vacuum breakers, and operator actions (SUCXFR, DEP, RHR in SPC mode, Inhibit on ATWS, DEP on ATWS, DC load shed, & R8).

10. There were no non-conservative items after the changes were made during the benchmarking.

Table 2: Comparative Summary of the Benchmarking Results

	Rev. 0 SDP Worksheets		Rev. 1 SDP Worksheets, as Modified	
	Number of Cases	**Percentage**	**Number of Cases**	**Percentage**
SDP: Non-Conservative	2	3.7	0	0
SDP: Conservative	26	48.1	35	59.3
by one order	16	29.6	19	32.2
by two orders	8	14.8	14	23.7
by three orders	2	3.7	2	3.4
SDP: Matched	26	48.2	24	40.7
Total	54	100	59	100

Notes:

1. Before the benchmarking there were 2 non-conservative items. After the benchmarking, there were no non-conservative items.

2. Before the benchmarking there were 26 conservative items. After the benchmarking, there were 35 conservative items, 19 by one order, 14 by two orders, and 2 by three orders of magnitude. These conservative items and discussed in Section 3.1 above.

3. While the before benchmarking numbers appear to be reasonably good, the set of actual worksheets was not complete and did not agree well with the current version of the PRA. There were no worksheets for LOIA, LOSW, or LOTBCLC.

ATTACHMENT 1

List of Participants

NRC/NRR

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James Higgins

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Bob Buell

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Terence Murphy
Pete Kokolakis
Antonios Zoulis
Clem Yeh
John Bretti
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John Favara

ATTACHMENT 2

Notebook Changes at BNL Prior to Onsite Visit

1. Addressed as possible Entergy's comments received by email from C. Yeh to NRC & BNL dated 4/3/2003.
2. Addressed Entergy's comments on the SDP notebook and Entergy's responses to BNL questions received by email from C. Yeh to BNL dated 7/8/2003.
3. Updated initiating event frequencies.
4. Updated Table 2 to latest format and corrected some support systems.
5. Added fire water to Table 2.
6. Added more detailed footnotes to Table 2.
7. Made editorial changes throughout.
8. Added base case credits to the worksheet sequences and updated footnotes to worksheets.
9. Adjusted operator action credit based on latest PRA HEPs.
10. Added train information to worksheets.
11. Standardized function names across the worksheets.
12. Changed credit for condensate pumps from 1/3 to 1/2. Removed condensate pumps from TPCS.
13. Changed IORV worksheet and ET to SORV.
14. Removed credit for the stuck-open relief valve in DEP.
15. Changed EC on MLOCA to multi-train system.
16. Changed credit for LPCI on LLOCA to single train.
17. Updated LOOP tree based on JAF responses.
18. Split Inhibit and level control on ATWS into separate rows.
19. On ATWS, added CS to LPI and deleted RCIC from HPI.
20. Updated the TAC5, TAC6, TDCA, and TDCB worksheets to correctly reflect loads lost.
21. Dropped credit for condensate from LOIA.

Notebook Changes Made During & After Benchmarking Visit

22. Updated initiating event frequencies in Table 1.
23. Updated Table 2 equipment, support systems, and footnotes.
24. Added worksheets for LOSW and LOTBCLC.
25. Updated description of PCS in worksheets.
26. Updated operator action credits in worksheets based upon current PRA HEPs.
27. Updated the footnotes to all worksheets.
28. Revised the treatment of LI to group the various sources.
29. Revised LOOP worksheet and ET to reflect: the unique design of the 4 EDGs at JAF, the latest battery depletion calculations, and to model load shed and blocking of HPCI suction transfer.
30. Changed credit for SLC on ATWS to single train.
31. Added credit for fire water to TAC5 & TDCA.
32. Added credit for condensate pumps in LPI and LI on the TAC5, TAC6, TDCA, and TDCB worksheets.
33. Dropped credit for CRD from LLOCA