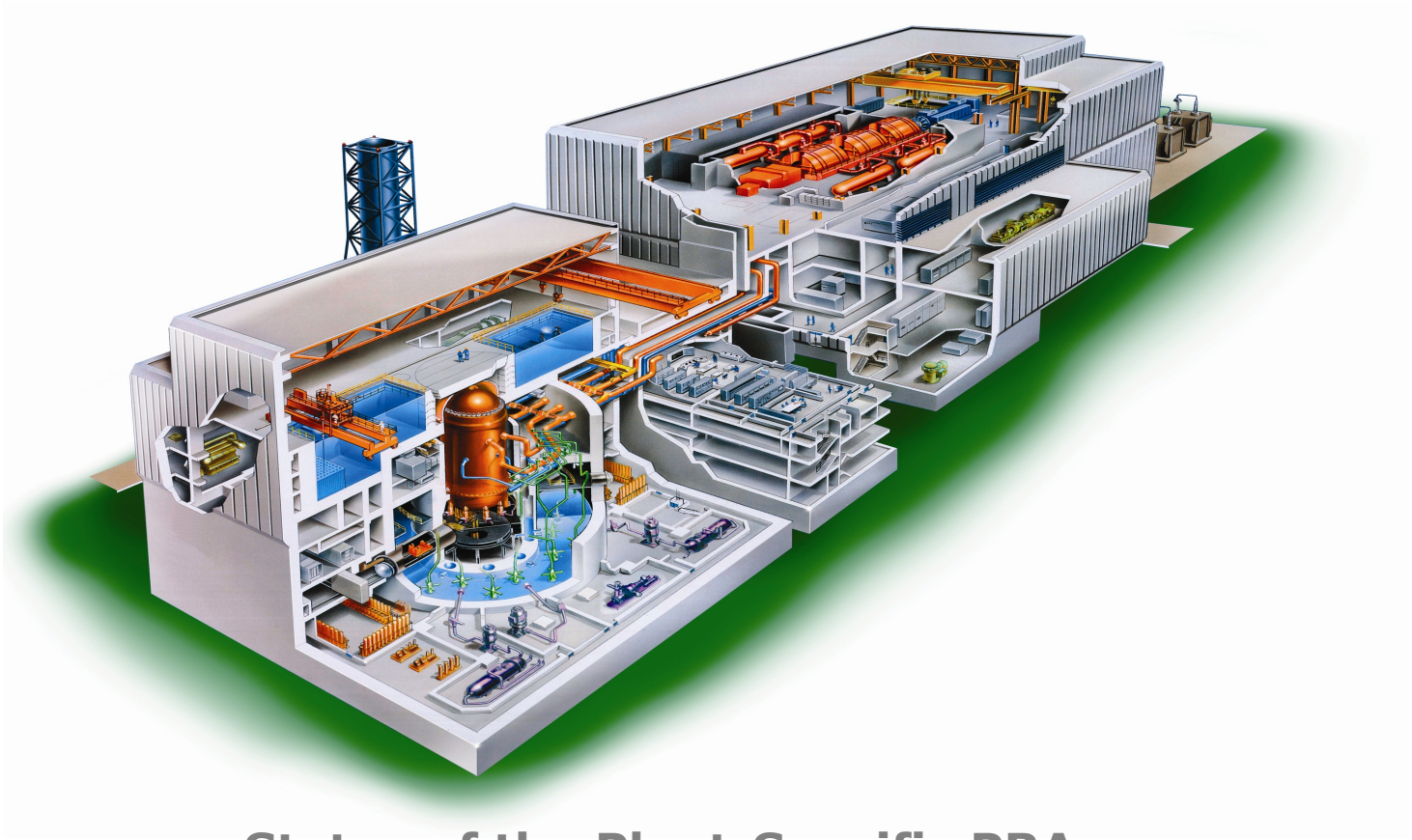
SOUTH TEXAS PROJECT
UNITS 3 & 4



Status of the Plant-Specific PRA

Presentation to the NRC

Desired Outcomes

- Purpose of the PRA project
- Demonstrate
  - Level 1 Results – process and results
  - MAAP Results – process and results
- Discuss Plant Changes
  - Departures and Site-specific Information
- Summary and Conclusions

Meeting Attendees

- STPNOC
  - Scott Head, Manager – Regulatory Affairs, STP 3&4;
  - Bill Stillwell, PRA Supervisor, STP 3&4;
  - Coley Chappell, Licensing, STP 3&4
- ETRANCO Gene Hughes
- RSC, Inc. Ricky Summitt

Purpose of PRA Project

- Develop a PRA model that is consistent with the PRA model of record described in the ABWR DCD and in NUREG-1503, Final Safety Evaluation Report Related to the Certification of the Advanced Boiling Water Reactor Design
- Provide a documented Level 1 and MAAP model representing the ABWR plant with STP 3&4 site-specific information
- Demonstrate capability to use the model to evaluate DCD departures and site-specific information.

Purpose (continued)

- Information Required in COL Application 10 CFR 52.79(d)
  - In addition, the plant-specific PRA information must use the PRA information for the design certification and must be updated to account for site-specific design information and any design changes or departures.

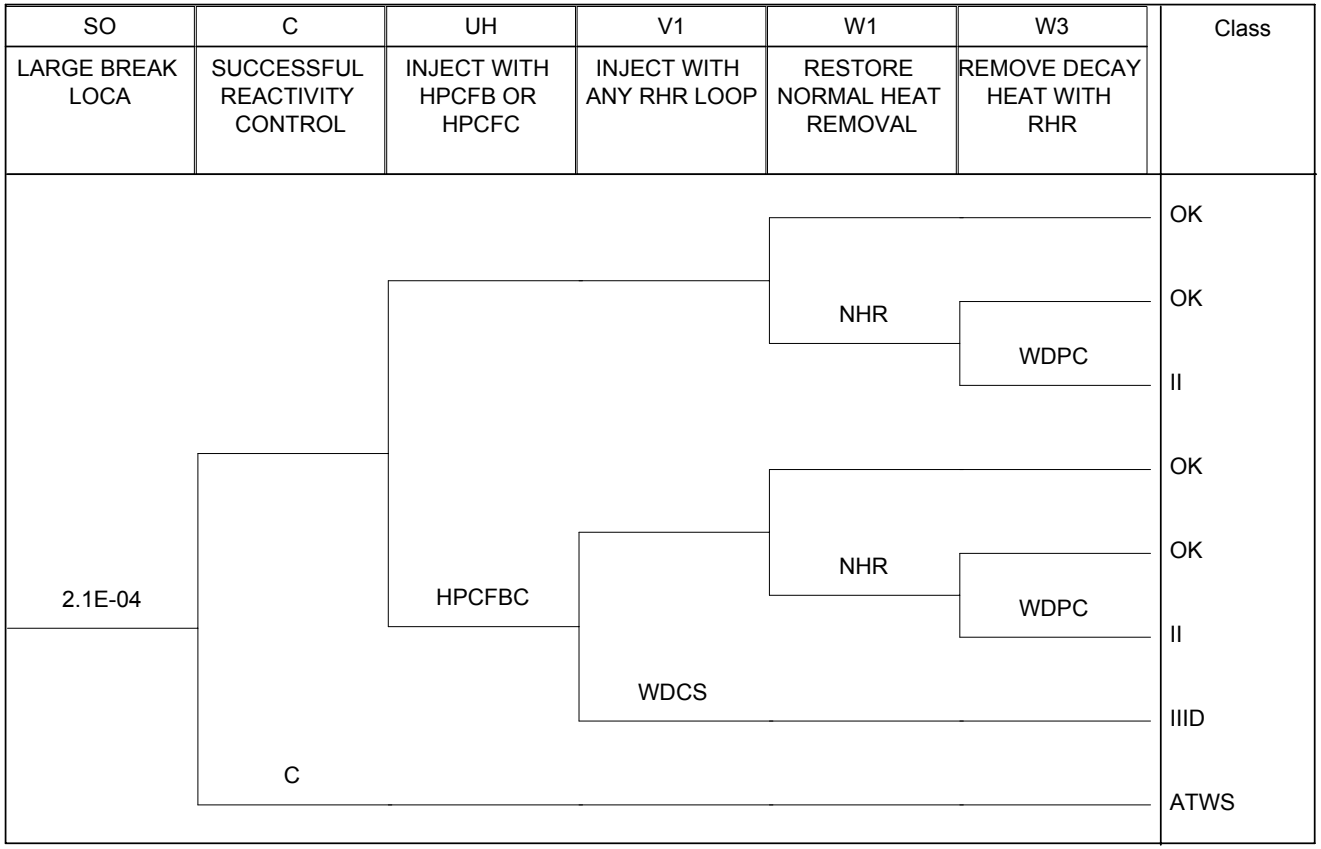
STP 3 & 4 PRA Project

- The work performed involved developing the STP 3 & 4 PRA model defined by and built from the currently available documentation contained in the reference material:
  - The SSAR PRA and documentation associated with Chapter 19 of the ABWR DCD
  - Interactions during the DCD approval process (FSER and DCD Chapter 20)
  - EPRI Advanced Light Water (ALWR) Utility Requirements Document

Level 1 Products

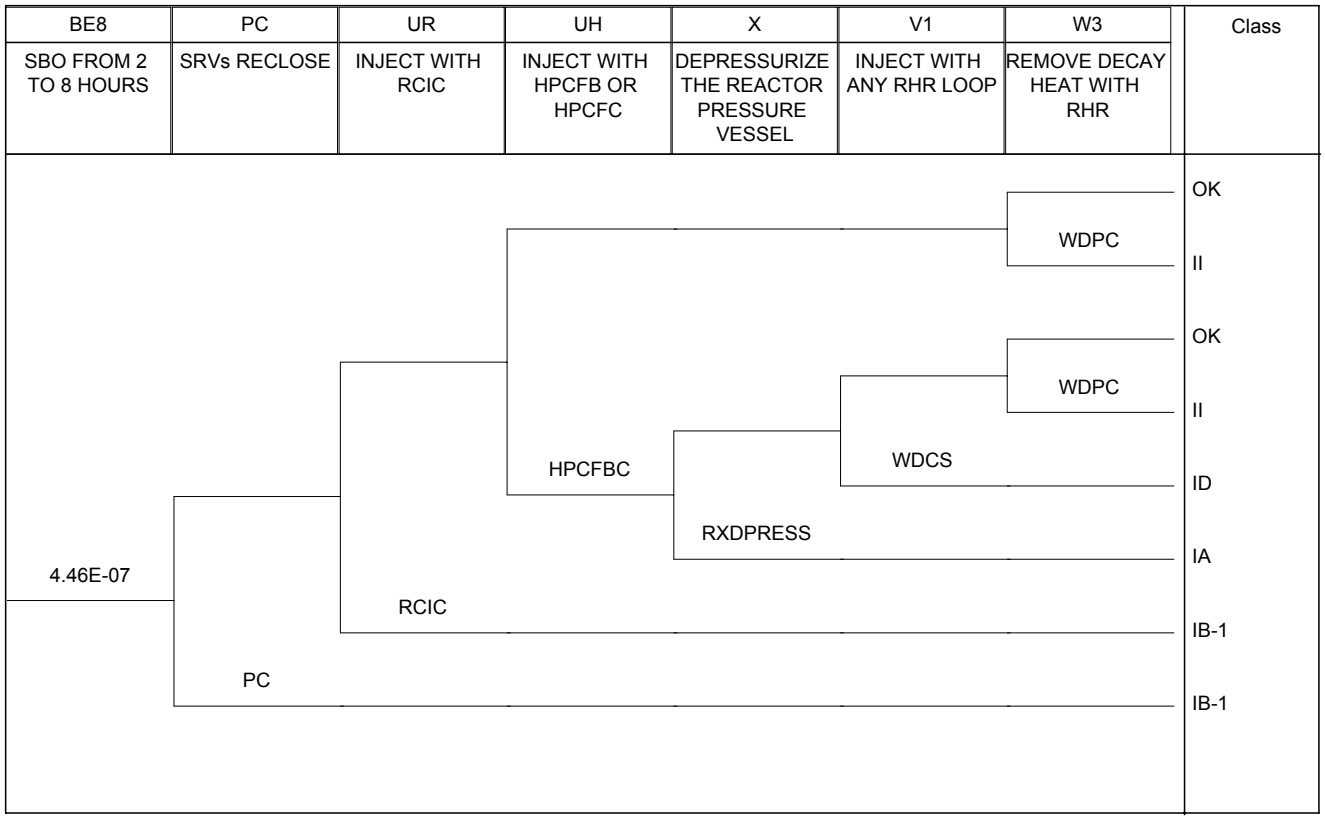
- Initiating event analysis
  - Initiating event listing
  - Success criteria matrix by initiating event
- Event tree and accident sequence models
  - Supporting top logic needed to define frontline system interfaces
  - Frontline and support system models.
- Quantification of model
  - Results for sequences and initiating event groups
  - Overall CDF
- Conform to DCD documentation
  - Sequence by sequence comparison
  - Resolution of any modeling issues
  - Validation of all adjustments required

Event Tree Development



Match Existing Study Documentation – Large LOCA

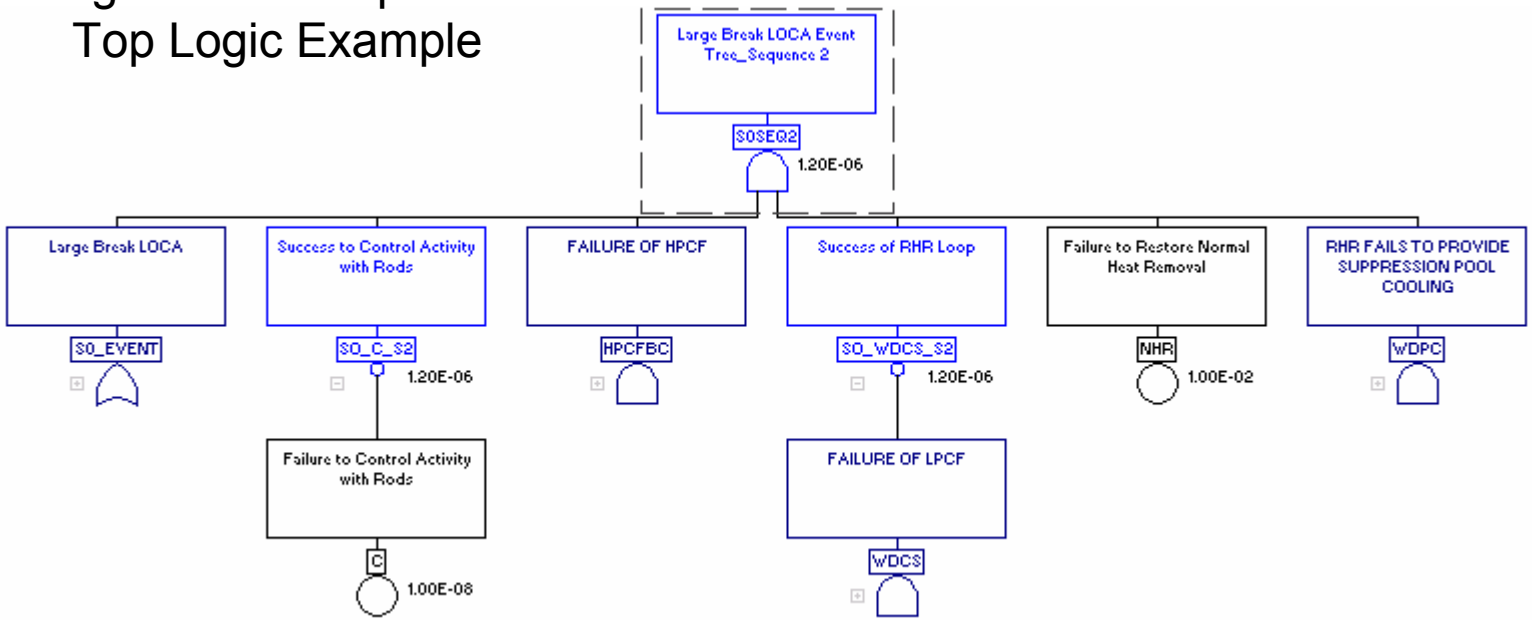
Event Tree Development



Match Existing Study Documentation – SBO 2 – 8 Hrs

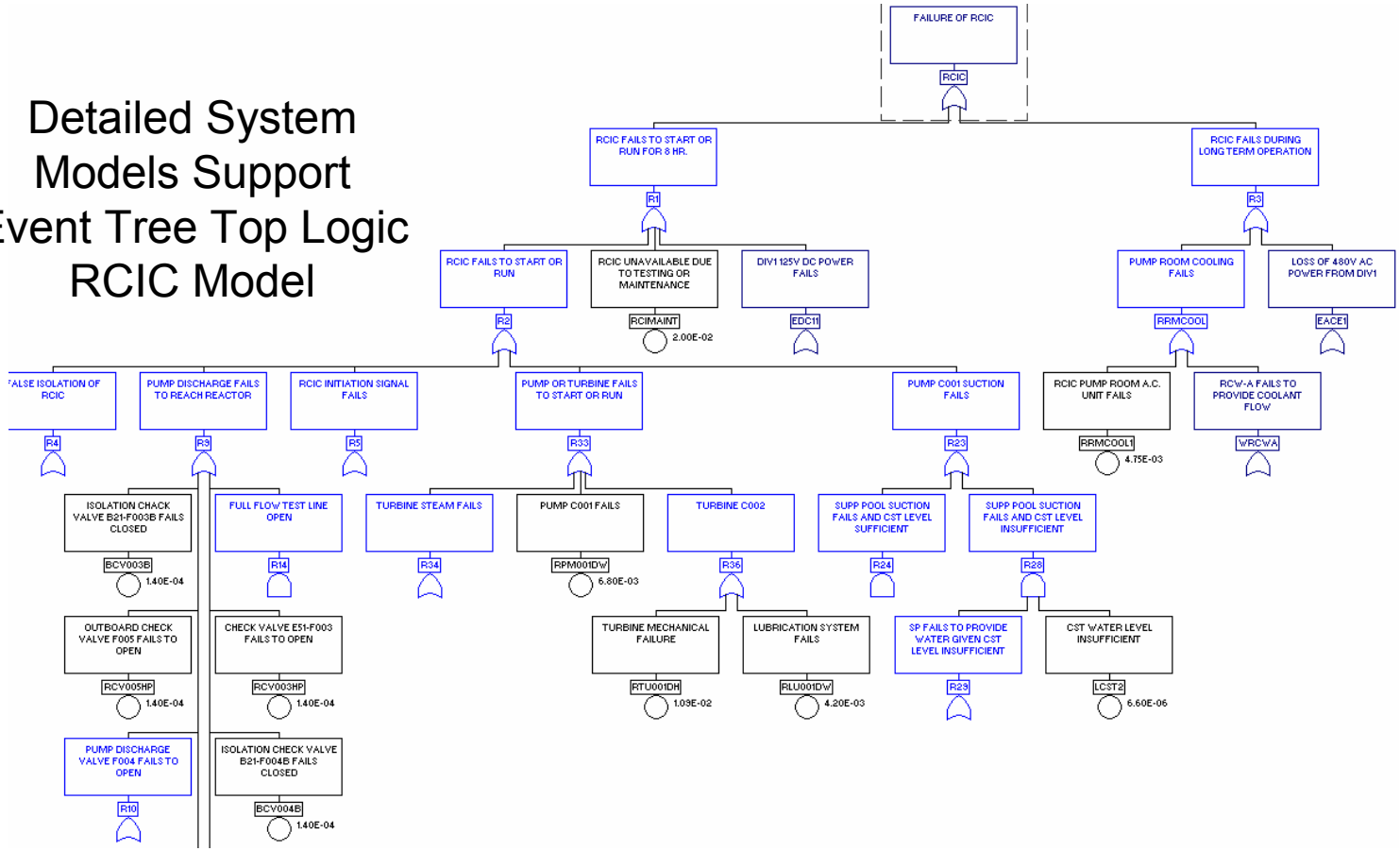
Top Logic Modeling

Large LOCA Sequence
Top Logic Example



One Top Model of Record

Detailed System Models Support Event Tree Top Logic RCIC Model



DCD and NRC Interactions

- PRA Event Trees and Models Plus Data are taken from the DCD available documentation

- Late improvements to the DCD incorporated and documented including:
  - Containment Over Pressure System (COPS) added late and reflected in results.
  - CRD flow success reflected in results quoted in final revision of Chapter 19
  - Sequences identified early as “nil” in the DCD are now recalculated.

Overall CDF Comparison

Initiating Event	DCD (/yr) Table 19D.4-17	STP 3 & 4 PRA (/yr) (Truncation E-12)
ATWS	2.70E-10	2.69E-10
BE2	6.67E-08	6.67E-08
BE8	2.57E-08	2.79E-08
BE0	1.17E-08	1.72E-08
S0	9.02E-11	ε
S1	3.42E-10	1.55E-10
S2	2.55E-10	2.41E-10
TE2	4.47E-09	5.16E-09
TE8	2.88E-09	3.31E-09
TEO	1.69E-09	4.06E-10
TIO	1.24E-09	1.08E-09
TIS	1.70E-08	1.64E-08
TM	1.15E-08	1.11E-08
TT	6.83E-09	6.56E-09
Total	1.51E-07	1.57E-07

Level 1 PRA Conclusions

- The STP 3 & 4 PRA provides similar results to the DCD with all sequences matching to a reasonable degree of accuracy.

- Total CDF for reconstituted model within 5% of target value.

- STP 3 & 4 PRA provides an acceptable tool to assess the impact of changes to and departures from DCD.

MAAP – STP 3 & 4 MODEL

- DCD analyses performed using MAAP 3.0B, modified for the ABWR, which is no longer supported

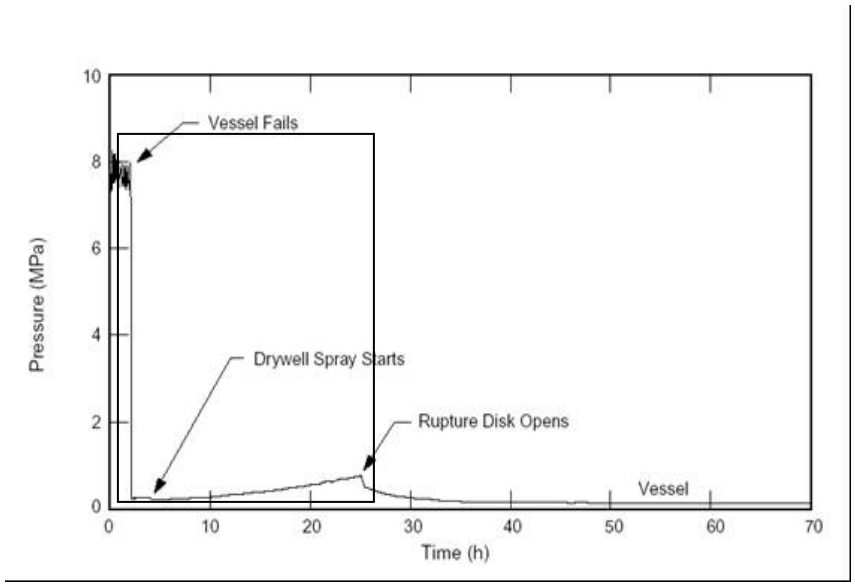
- In order to provide STP 3 & 4 with a tool to investigate changes and departures, STP 3 & 4 developed model utilizing current version (MAAP 4.0.7)
  - Development of ABWR parameter file
  - Development of ABWR accident sequence input files

- Confirmatory analysis of accident sequences assessed in DCD used to validate MAAP 4.0.7 model

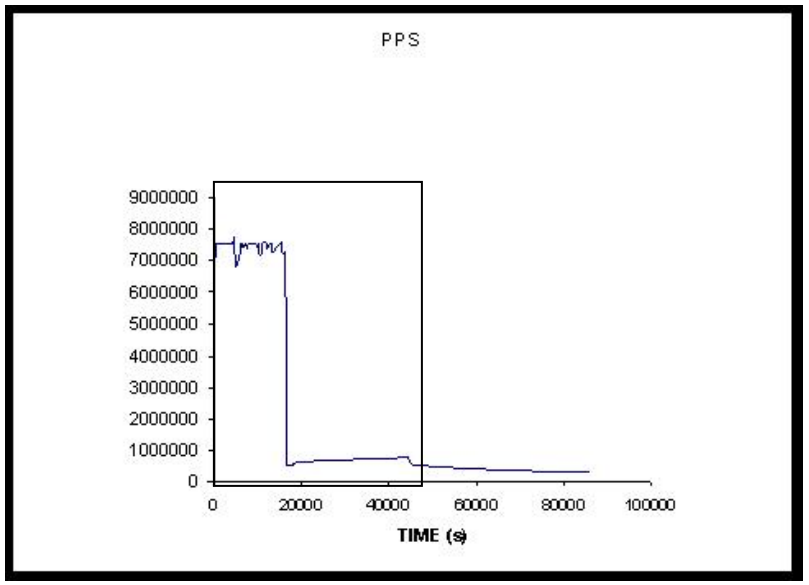
DCD Accident Sequences

- Fifteen accident sequences defined by DCD
- MAAP 4.0.7 utilized to assess sequences
- Confirm results compared to DCD
  - Timing of events (core uncovery, RPV failure, overpressure)
  - Key severe accident parameters (pressure, temperature, level)

Comparison to DCD Results



DCD Results



STP 3 & 4 Results

Example Results - LCHP-PFS
For comparable times the results match
when changes in MAAP code considered.

MAAP Modeling Conclusions

- MAAP 4.0.7 model provides comparable results to DCD
- Some timing differences noted due to improved models present in current version of MAAP
- In all cases changes tend to support improved severe accident performance
- STP 3 & 4 MAAP model capable of assessing changes and departures

Plant Changes

- Site-specific Changes
  - External floods (main cooling reservoir, dam failures) – T1
  - LOOP frequency – Site-specific change
  - Ultimate Heat Sink and Reactor Service Water Pump House (Internal flooding in pump house, cooling tower and fans) – Site specific change
  - Two unit site (No shared safety SSCs, Cross-tie CTG) (no change to model) – T2
- Departures
  - RCIC – T1 (minor changes to model)
  - 3rd RHR for spent fuel pool cooling – T1 (no change to model)
  - 4th Division Class 1E 120V Vital AC bus – T1 (minor changes to the model)
  - I&C Changes – T1 (no change to model)
  - Class 1E AC distribution – T2
  - RSW (System flows) – T2 (minor change to the model)
  - Correct CCF in RSW – T2 (identified in the SSAR)

Summary and Conclusions

- PRA model is consistent with the DCD PRA model
- Model can be used to evaluate plant-specific departures and changes
- STP ready to support NRC review of FSAR Chapter 19