

Calculation No. <b>MDN-000-999-2008-0151</b>	Rev: <b>001</b>	Plant: <b>WBN Unit 0</b>	Page: <b>259</b>
Subject: <b>WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY</b>			

## 7.2 Figures

Subject: **WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY**

LLOCA	ACC	LPB	LPR3	LPH	Class	Name	PDS
Large LOCA Initiator	Accumulators	RHR Low Pressure Cold Leg Injection (3 of 3 cold legs)	Low Pressure Cold Leg Recirculation (3 of 3 cold legs)	Low Pressure Hot Leg Recirculation (2 of 3 hot legs)			
	Inventory Control	Inventory Control / Heat Removal	Inventory Control / Heat Removal	Inventory Control / Heat Removal			
					Success	LLOCA-001	
					CD	LLOCA-002	NLW
					CD	LLOCA-003	NLW
					CD	LLOCA-004	NLW
					CD	LLOCA-005	NLW

**Figure 1 - LLOCA Event Tree**

Reference 34 – all level 1 event trees

Subject: **WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY**

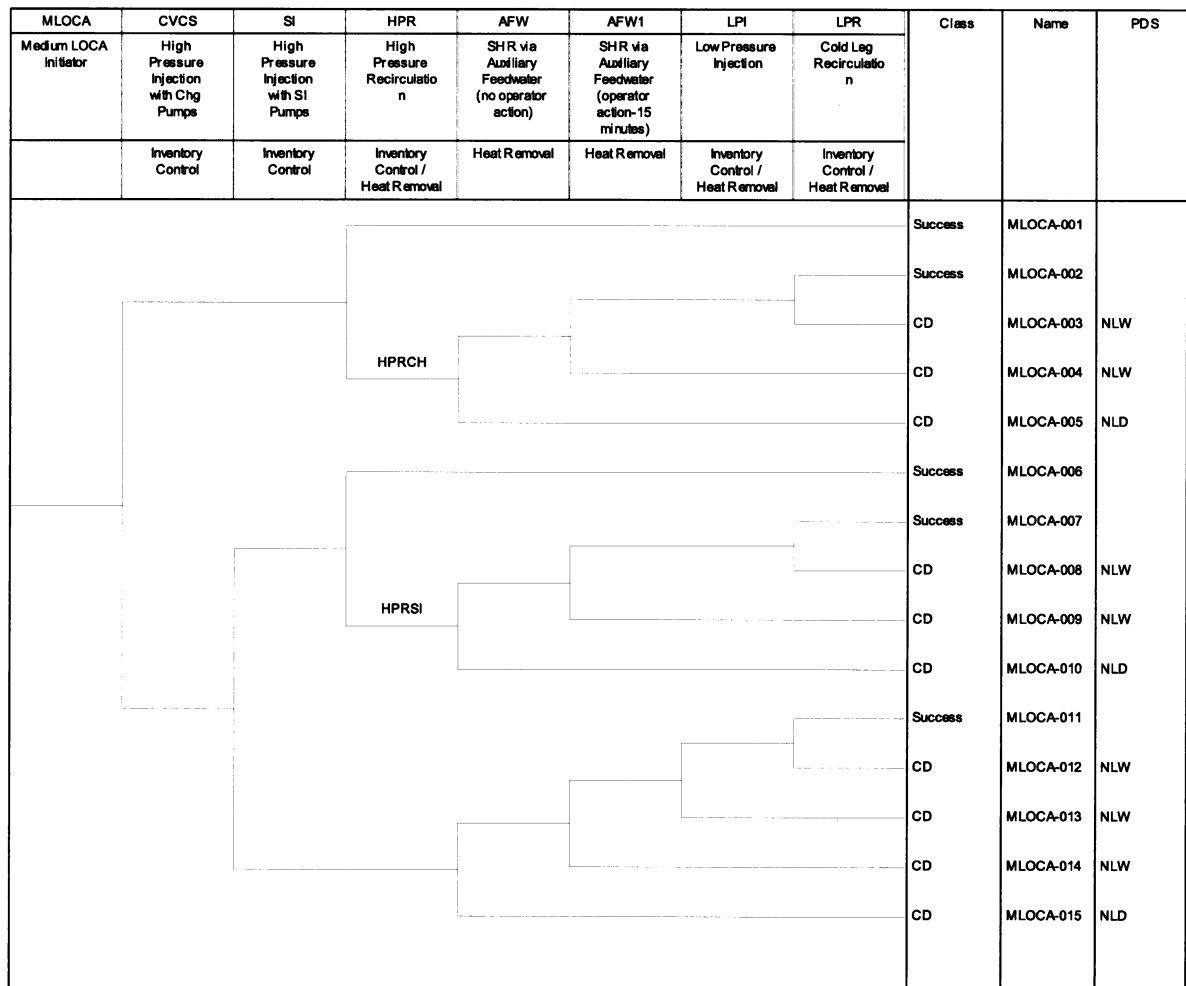


Figure 2 - MLOCA Event Tree

Subject: **WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY**

SLOCA	RT	CVCS	SI	APW	APW2	BF	HPR	APW3	LPI	LPR	LTHR	MUSL	Class	Name	PDS
Small LOCA Initiation	Reactor Trip	CVCS Cold Leg Injection	High Pressure Injection with SI Pumps	SHR via Auxiliary Feedwater (no operator action)	SHR via Auxiliary Feedwater (operator action in 60 minutes)	Bleed and Feed	High Pressure Recirculation	SHR via Auxiliary Feedwater (operator action in 30 minutes)	Low Pressure Injection	Low Pressure Recirculation	Long-Term Heat Removal, Rest CST or Provide Alternate Supply	Use containment spray pumps to fill RWST from Containment Sump			
	Reactivity Control	Inventory Control	Inventory Control	Heat Removal	Heat Removal	Heat Removal	Inventory Control/Heat Removal	Heat Removal	Inventory Control	Inventory Control/Heat Removal	Heat Removal	Inventory Control			
													Success	SLOCA-001	
													CD	SLOCA-002	NHD
													Success	SLOCA-003	
													Success	SLOCA-004	NHD
							HPRCH						CD	SLOCA-005	NLW
													Success	SLOCA-006	
													CD	SLOCA-007	NHW
													Success	SLOCA-008	
							HPRCH						CD	SLOCA-009	NLD
													CD	SLOCA-010	NHD
													Success	SLOCA-011	
													CD	SLOCA-012	NHD
													Success	SLOCA-013	
													Success	SLOCA-014	NHD
							HPRSI						CD	SLOCA-015	NLW
													Success	SLOCA-016	
													CD	SLOCA-017	NHW
													CD	SLOCA-017A	NHD
													Success	SLOCA-018	
							HPRSI						CD	SLOCA-019	NLD
													CD	SLOCA-020	NHD
													Success	SLOCA-021	
													Success	SLOCA-022	NHD
													CD	SLOCA-023	NLW
													CD	SLOCA-024	NLW
													CD	SLOCA-025	NHW
													CD	SLOCA-026	NHD
													ATWS	SLOCA-027	

Figure 3 - SLOCA Event Tree

Subject: **WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY**

SLOCAV	RT	AFW	LTHR	CVCS	SI	BF	HPR	Class	Name	PDS
Very Small LOCA Initiator	Reactor Trip	SHR via Auxiliary Feedwater (no operator action)	Long Term Heat Removal	High Pressure Injection with Chg Pumps	High Pressure Injection With SI Pumps	Bleed Operation	High Pressure Recirculation			
	Reactivity Control	Heat Removal	Heat Removal	Inventory Control	Inventory Control	Heat Removal	Inventory Control / Heat Removal			
								Success	SLOCAV-001	
								Success	SLOCAV-002	
								CD	SLOCAV-003	NHW
								CD	SLOCAV-004	NHW
								Success	SLOCAV-005	
								CD	SLOCAV-006	NHW
								CD	SLOCAV-007	NHW
								CD	SLOCAV-008	NHD
								Success	SLOCAV-009	
								CD	SLOCAV-010	NHD
								CD	SLOCAV-011	NHD
								Success	SLOCAV-012	
								CD	SLOCAV-013	NHD
								CD	SLOCAV-014	NHD
								CD	SLOCAV-015	NHD
								ATWS	SLOCAV-016	

Figure 4 - SLOCAV Event Tree

Subject: **WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY**

SSBI	RT	CVCS	SI	AFW	ISOLI	SSI	PR	LTHR	RSI	BF	HPR	Class	Name	POS
Secondary Side Break Initiator	Reactor Protection System	High Pressure Injection with Charging Pumps	High Pressure Injection with SI Pumps	Secondary Heat Removal via Auxiliary Feedwater (no operator action)	Isolate faulted SG	Terminate SI	POV Reclose	Long-Term Heat Removal, Refill C&T or Provide Alternate Supply	Re-Initiate SI	Blowdown Operation	High Pressure Recirculation			
	Reactivity Control	Inventory Control	Inventory Control	Heat Removal	Inventory Control	Inventory Control	Inventory Control	Heat Removal	Inventory Control	Heat Removal	Heat Removal / Inventory Control			
												Success	SSBI-001	
												Success	SSBI-002	
											HPRCH	CD	SSBI-003	NHD
										BFCH		CD	SSBI-004	NHD
												CD	SSBI-005	NHD
												Success	SSBI-006	
											HPRCH	CD	SSBI-007	NHD
												CD	SSBI-008	NHD
												Success	SSBI-009	
											HPRCH	CD	SSBI-010	NHD
												Success	SSBI-011	
												Success	SSBI-012	
											HPRCH	CD	SSBI-013	NHD
										BFCH		CD	SSBI-014	NHD
												Success	SSBI-015	
											HPRCH	CD	SSBI-016	NHD
										BFCH		CD	SSBI-017	NHD
												Success	SSBI-018	
												Success	SSBI-019	
											HPFRSI	CD	SSBI-020	NHD
										BF SI		CD	SSBI-021	NHD
												CD	SSBI-022	NHD
												Success	SSBI-023	
											HPRSI	CD	SSBI-024	NHD
												CD	SSBI-025	NHD
												Success	SSBI-026	
											HPRSI	CD	SSBI-027	NHD
												Success	SSBI-028	
												Success	SSBI-029	
											HPRSI	CD	SSBI-030	NHD
										BF SI		CD	SSBI-031	NHD
												Success	SSBI-032	
											HPRSI	CD	SSBI-033	NHD
										BF SI		CD	SSBI-034	NHD
												Success	SSBI-035	
												CD	SSBI-036	NHD
												CD	SSBI-037	NHD
												CD	SSBI-038	NHD
												ATWS	SSBI-039	

Figure 5 - SSBI Event Tree

Subject: **WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY**

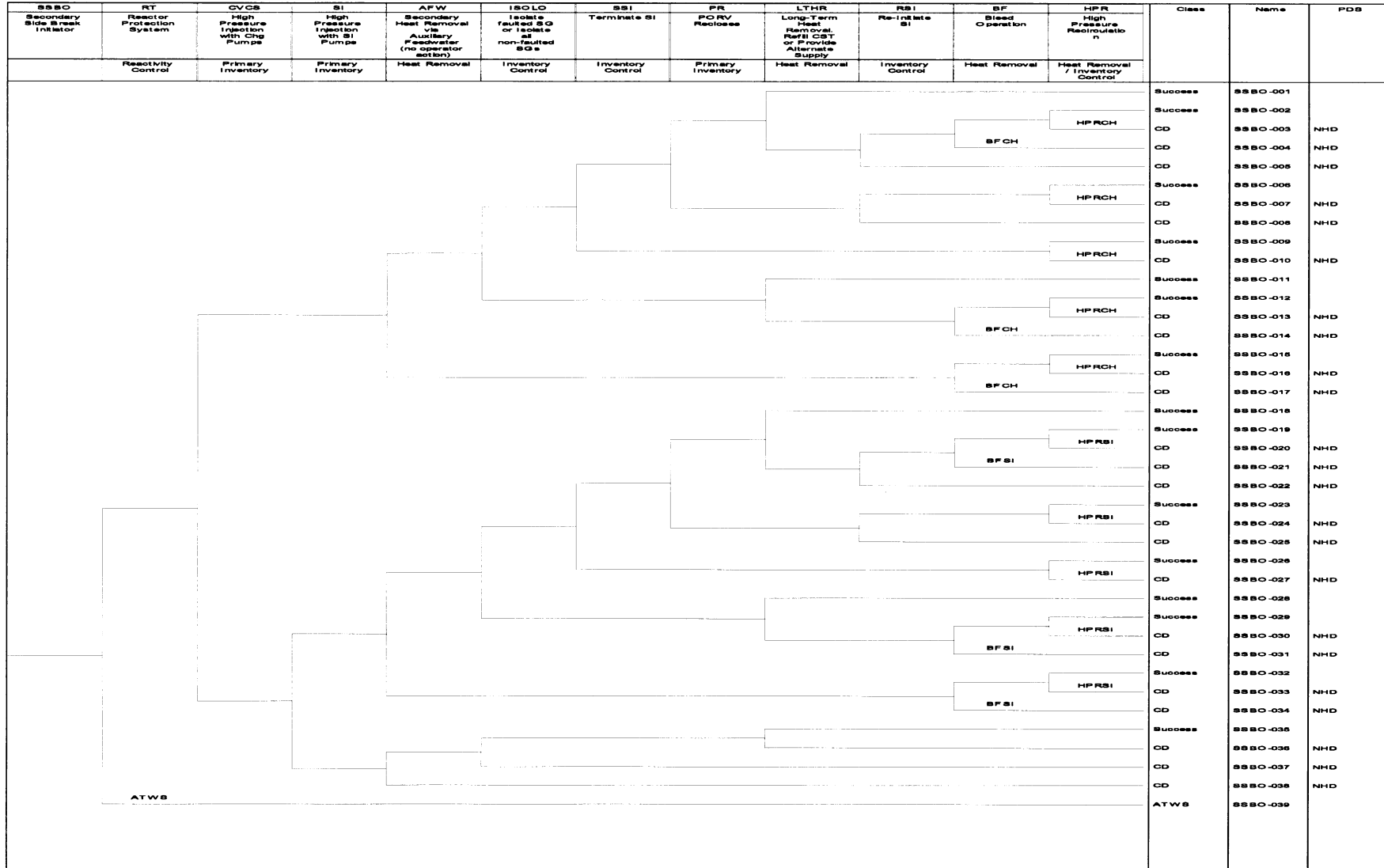
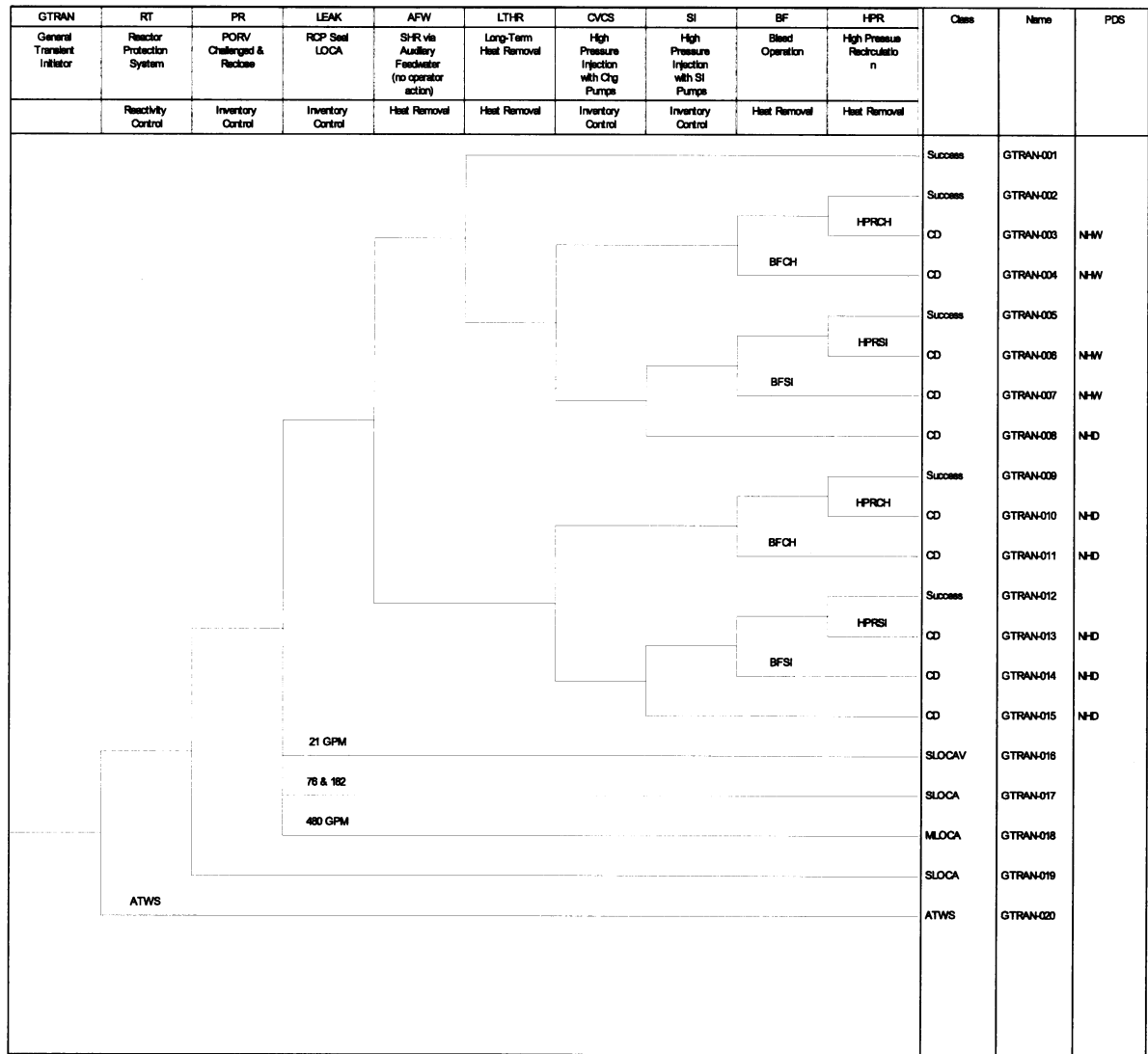


Figure 6 - SSBO Event Tree

**Subject: WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY**



**Figure 7 - GTRAN Event Tree**



Subject: **WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY**

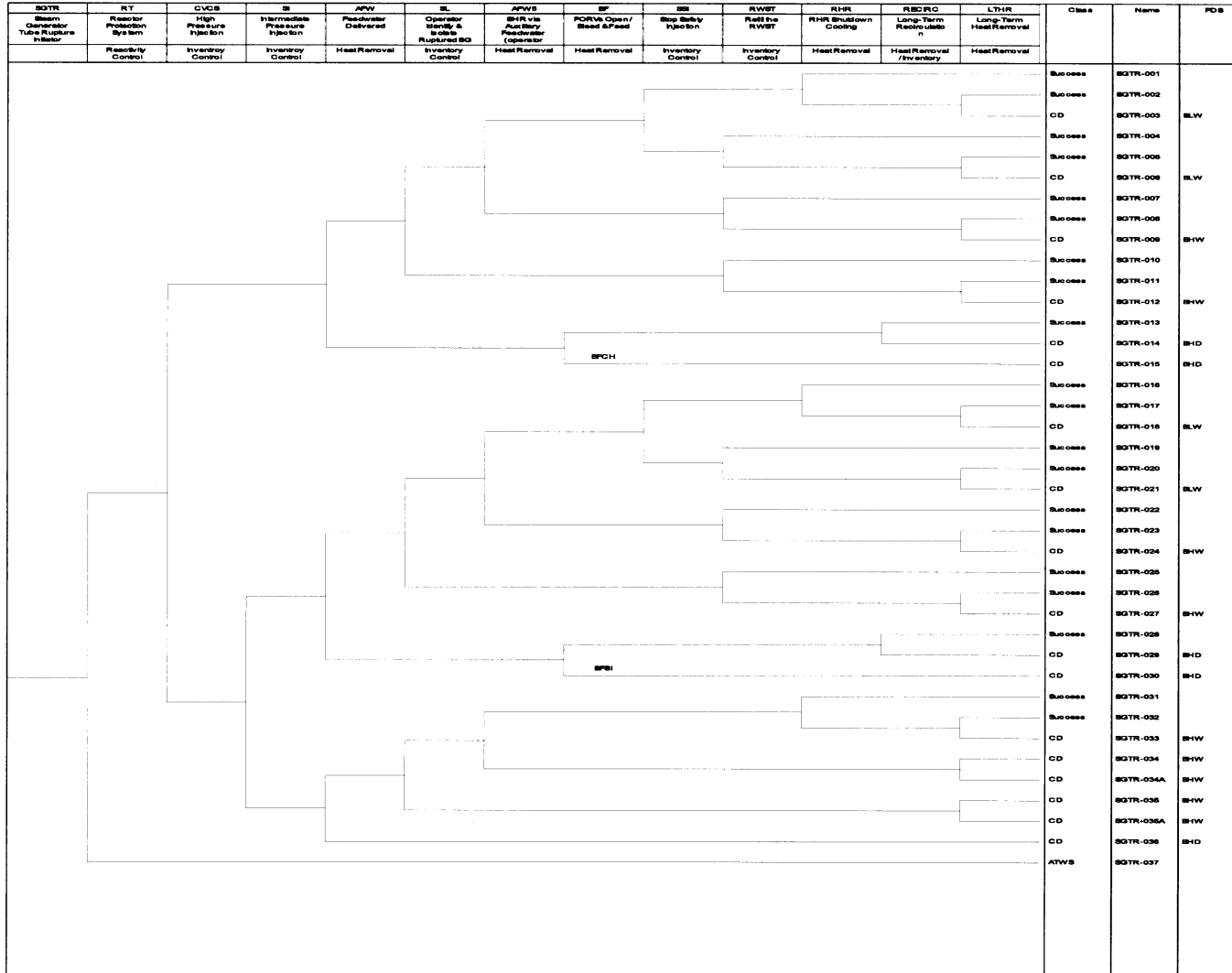


Figure 8 - SGTR Event Tree

Subject: **WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY**

ATWS	MRI	AM	AF 100	AF 50	SR	LTS	LTHR	Class	Name	PDS
ATWS Initiating Event	Manual / Automatic Rod	ATWS Mitigation System	AFW System Provides 100% Flow	AFW System Provides 50% Flow	Availability of Primary Pressure	Long Term Shutdown	Long-Term Heat Removal.			
	Reactivity Control		Heat Removal	Heat Removal	Inventory Control	Heat removal	Heat Removal			
								Success	ATWS-001	
								Success	ATWS-002	
								CD	ATWS-003	NHW
								CD	ATWS-004	NHW
								Success	ATWS-005	
								Success	ATWS-006	
								CD	ATWS-007	NHW
								CD	ATWS-008	NHW
								CD	ATWS-009	NHD
								CD	ATWS-010	NHD
								Success	ATWS-011	
								Success	ATWS-012	
								CD	ATWS-013	NHW
								CD	ATWS-014	NHW
								Success	ATWS-015	
								Success	ATWS-016	
								CD	ATWS-017	NHW
								CD	ATWS-018	NHW
								CD	ATWS-019	NHD
								CD	ATWS-020	NHD

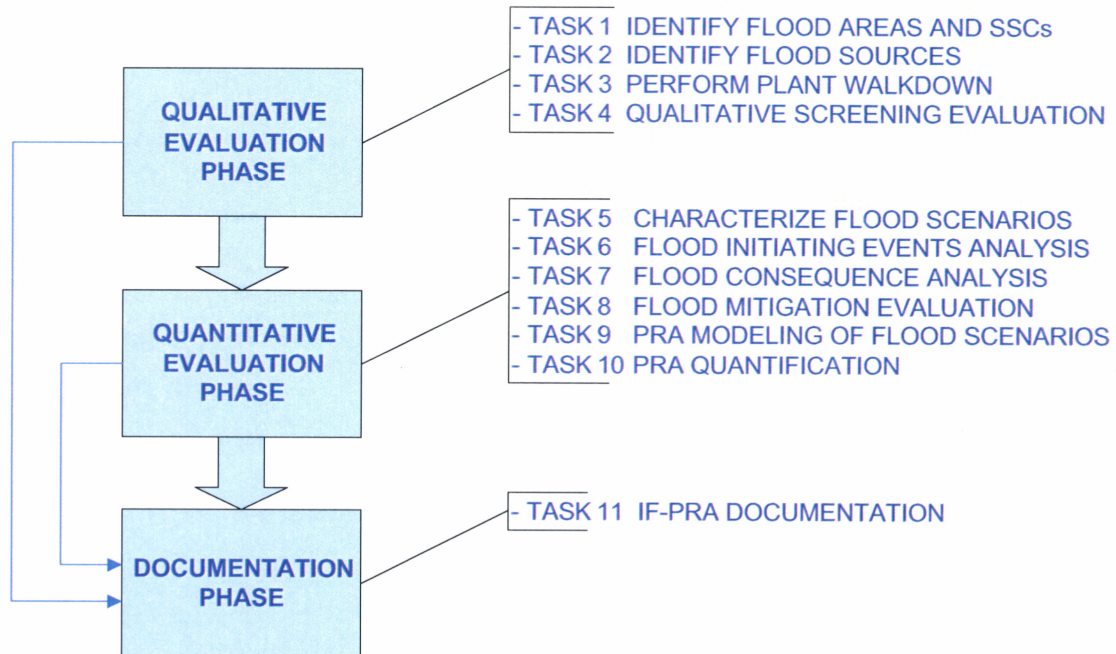
Figure 9 - ATWS Event Tree

Subject: **WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY**

ISLM Medium/Large Interfacing System LOCA	RT Reactor Protection System	CVCS High Pressure Injection with Chg Pumps	SI High Pressure Injection with SI Pumps	STL Flow Path Isolation	AFW SHR via Auxiliary Feedwater (no operator action)	LTHR Long-Term Heat Removal, CST Pass or Provide	BF Bleed Operation	HPR High Pressure Recirculation	RWST Refill RWST	Class	Name	PDS
Initiating Event	Reactivity Control	Inventory Control	Inventory Control	Inventory Control	Heat Removal	Heat Removal	Heat Removal	Inventory Control /	Inventory Control			
										Success	ISLM-001	
										Success	ISLM-002	
										CD	ISLM-003	BLW
										CD	ISLM-004	BLW
										Success	ISLM-005	
										CD	ISLM-006	BLD
										CD	ISLM-007	BLD
										Success	ISLM-008	
										CD	ISLM-009	BLD
										Success	ISLM-010	
										Success	ISLM-011	
										CD	ISLM-012	BLW
										CD	ISLM-013	BLW
										Success	ISLM-014	
										CD	ISLM-015	BLD
										CD	ISLM-016	BLD
										Success	ISLM-017	
										CD	ISLM-018	BLD
										CD	ISLM-019	BLD
										ATWS	ISLM-020	

Figure 10 - ISLOCA Event Tree

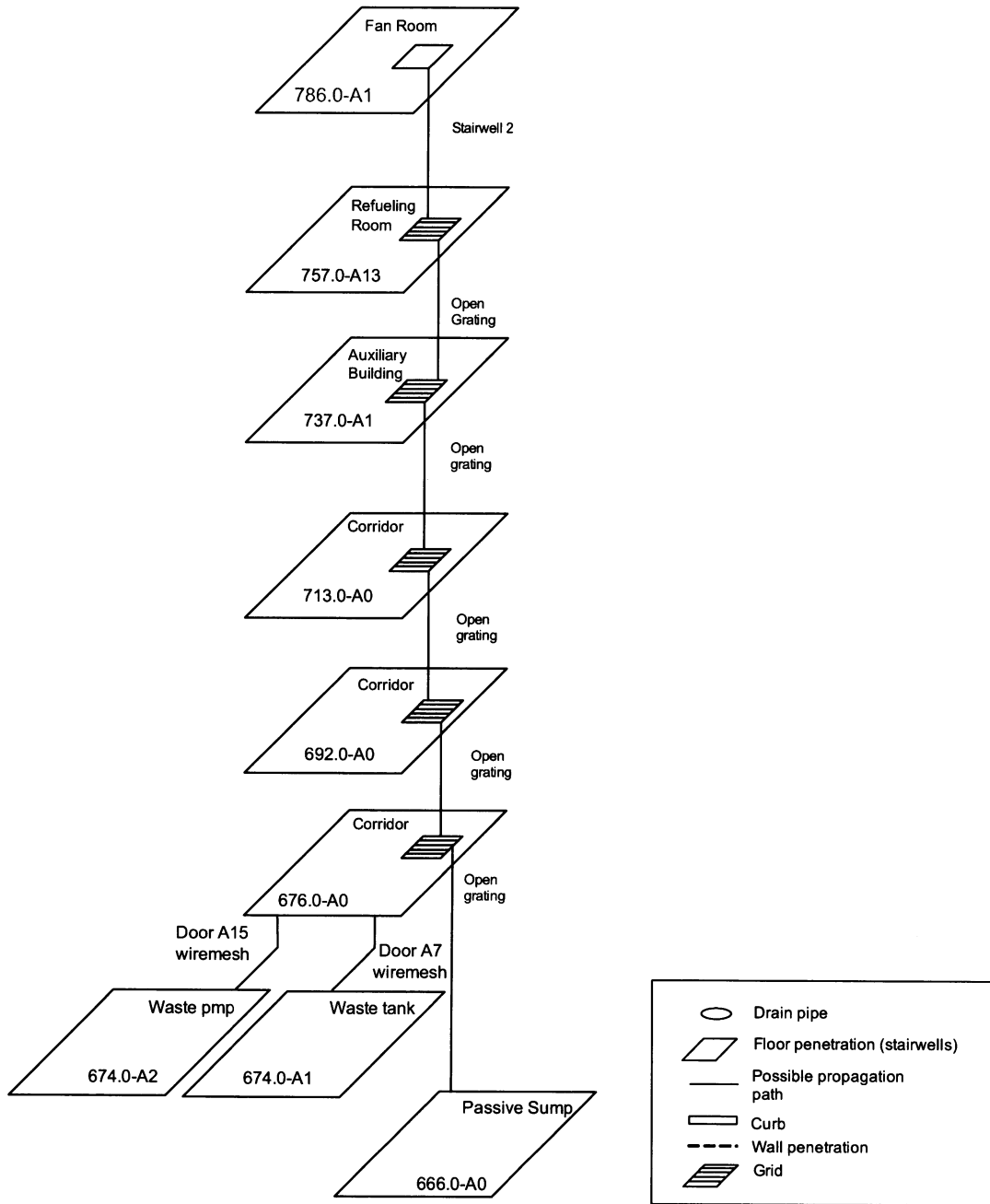
Subject: **WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY**



**Figure 11 – Major Phases and Tasks of IF-PRA**

Reference 39, Figure 3-1

Subject: **WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY**

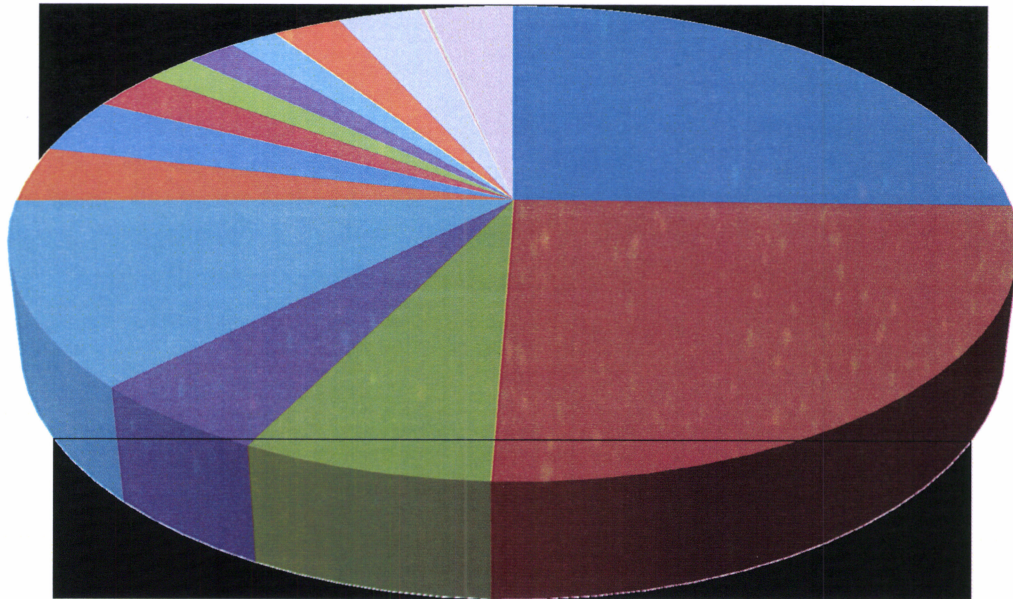


**Figure 12 -- Sample Propagation Path Diagram**

Reference 39, Figure 4-9

Subject: **WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY**

### Initiator Distribution U1\_CDF (Flood)= 5.08E-06



■ %0FLRCW772A8 (25.29%)	■ %0FLRCW772A9 (25.29%)	■ %0FLHPPAB757A2 (6.76%)
■ %0FLHPPAB757A24 (5.05%)	■ %0FLTBSPRAY5 (12.49%)	■ %0FLRCW757A17 (3.73%)
■ %0FLRCW757A9 (3.73%)	■ %0FLHPPAB757A5 (2.56%)	■ %0FLHPPAB757A21 (1.98%)
■ %0FLHPPAB772A7 (1.90%)	■ %0FLHPPAB772A10 (1.85%)	■ %0FLTBMF (2.60%)
■ %0FLDWSAB (3.18%)	■ %0FLERCW2AESFRCF (0.11%)	■ %0FLRCW737A5F (0.13%)
■ Other (3.34%)		

**Figure 13 -- Unit 1 Flooding CDF**

Reference 39, Figure 5-12

Subject: WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY

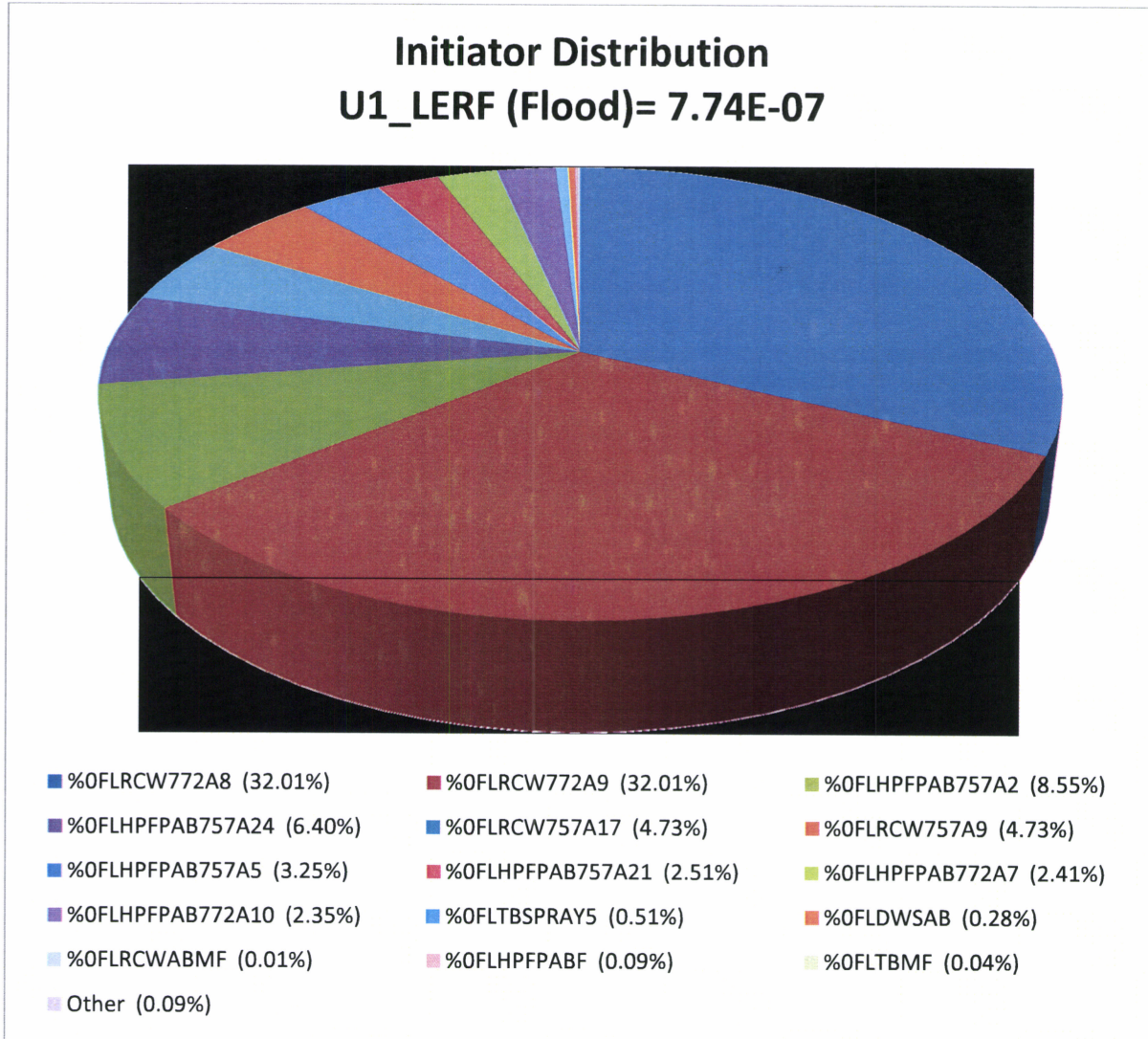
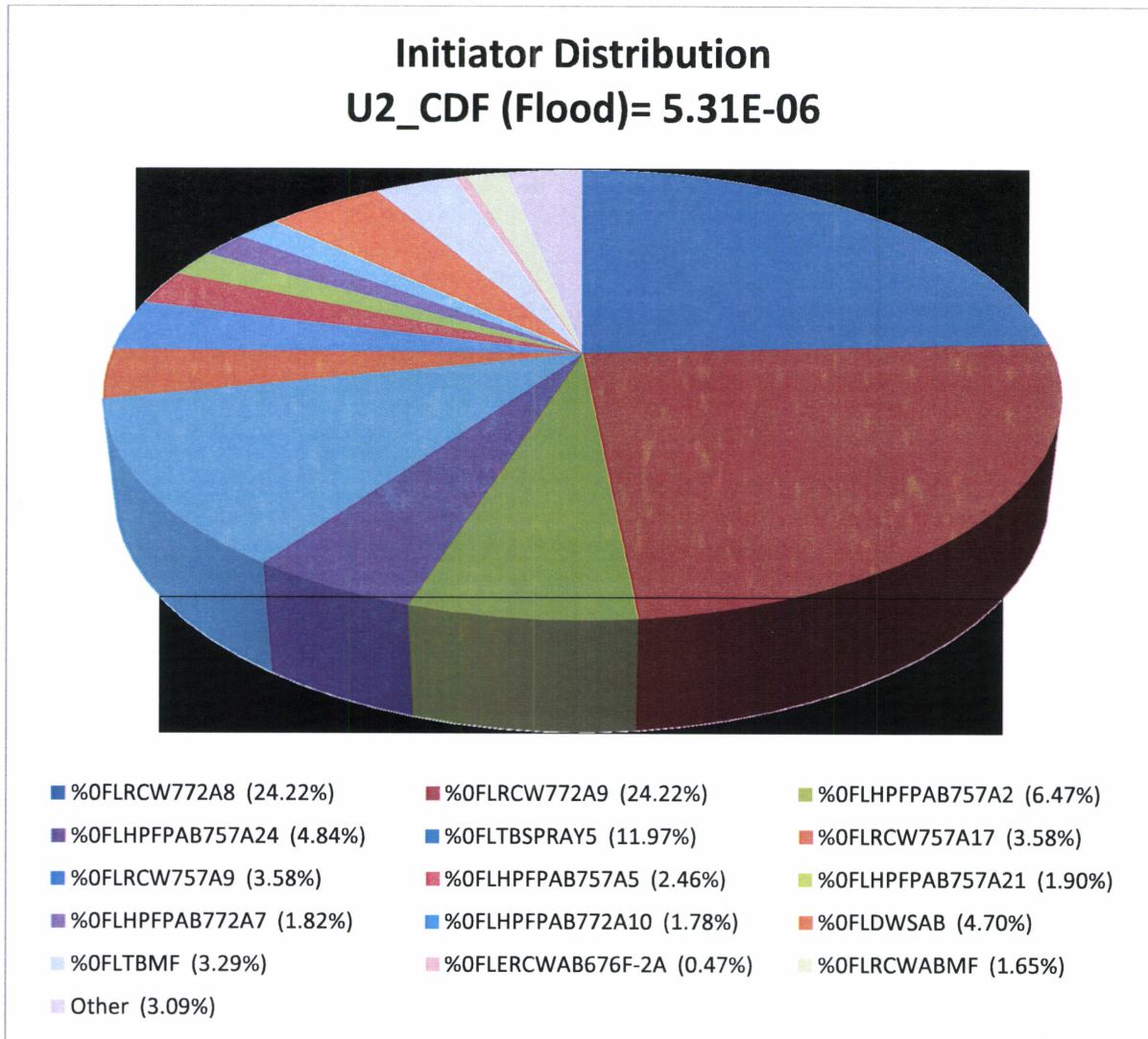


Figure 14 -- Unit 1 Flooding LERF

Reference 39, Figure 5-13

Subject: **WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY**



**Figure 15 -- Unit 2 Flooding CDF**

Reference 39, Figure 5-14



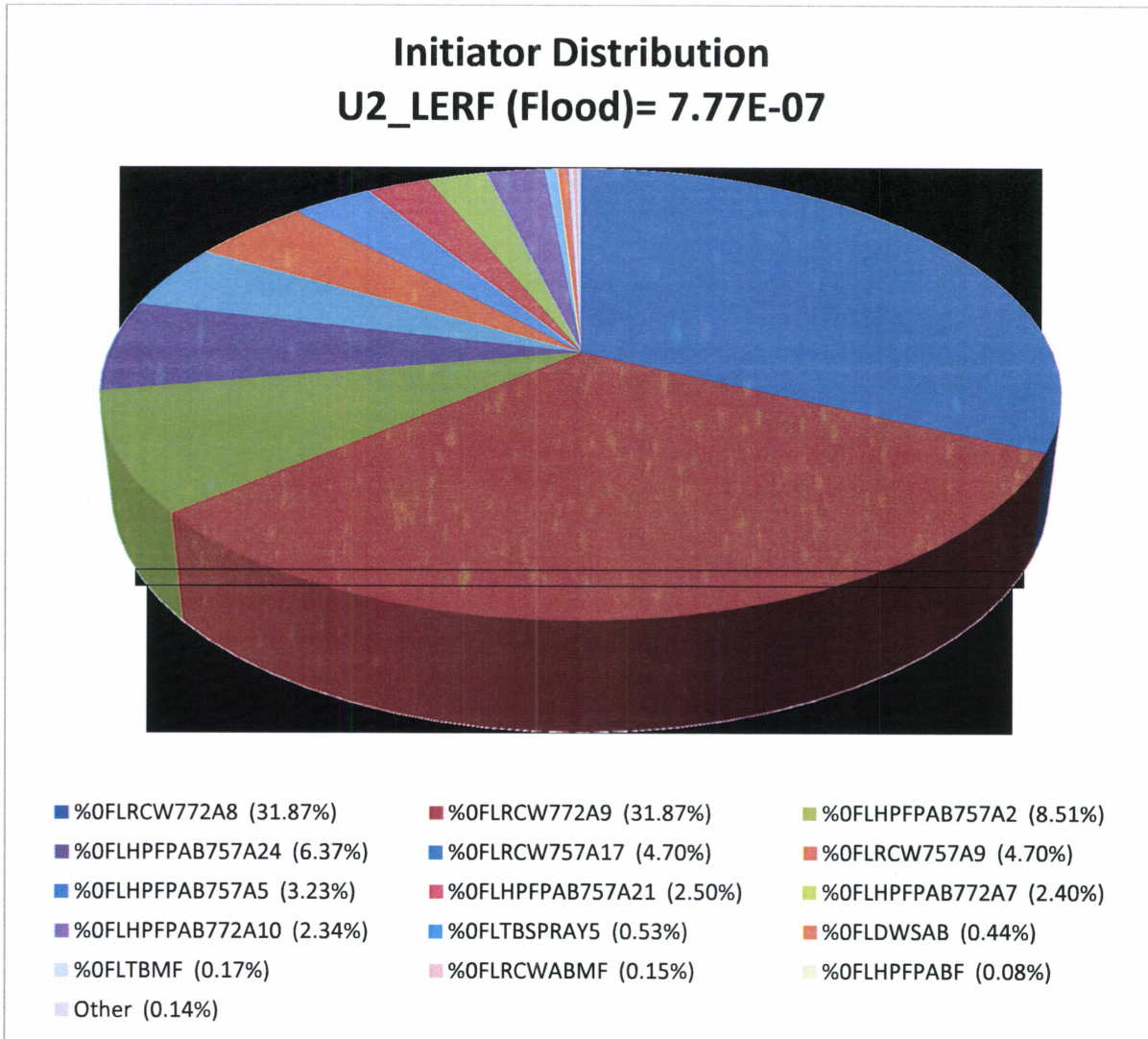


Figure 16 -- Unit 2 Flooding LERF

Reference 39, Figure 5-15

Subject: **WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY**

**Figure 17 -- Containment Event Tree**



CET



PI-SGTR Event Tree



TI-SGTR Event Tree

Reference 40, Appendices B, C

Subject: WBN PROBABILISTIC RISK ASSESSMENT – SUMMARY

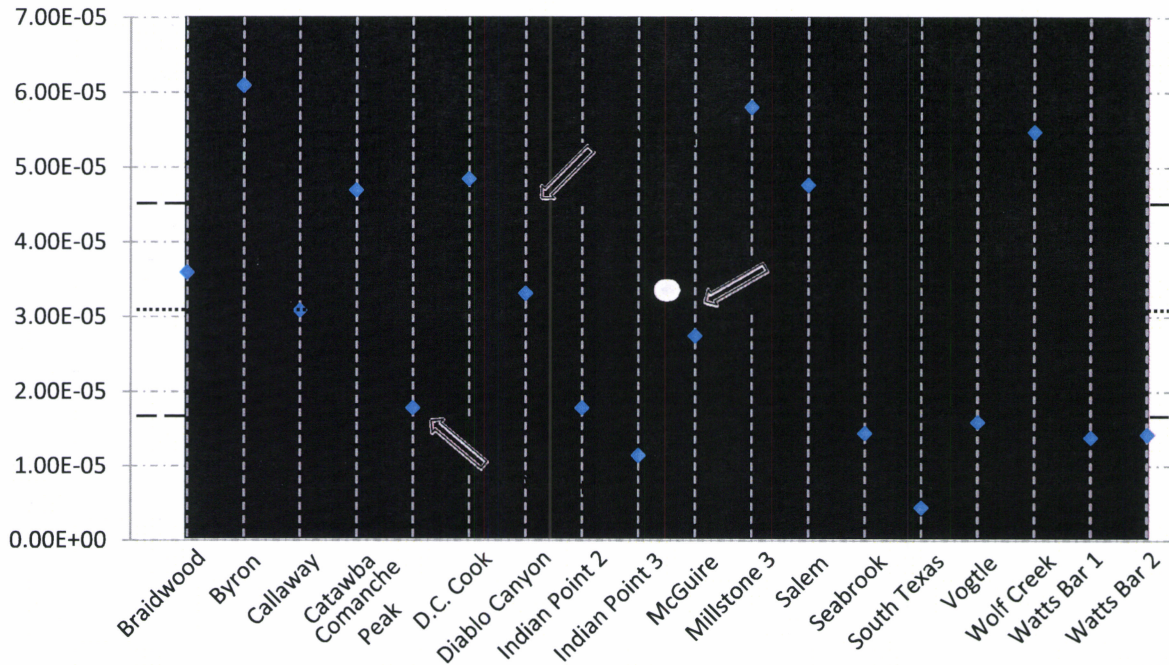


Figure 18 – Industry Comparison of CDF

Reference 44, Figure 5.4-1