UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931

May 29, 2001

EA-01-125

Duke Energy Corporation
ATTN: Mr. W. R. McCollum
Vice President and
Oconee Nuclear Station
7800 Rochester Highway
Seneca, SC 29672

SUBJECT: OCONEE NUCLEAR STATION - NRC INSPECTION REPORT 50-269/01-08, 50-270/01-08, AND 50-287/01-08; PRELIMINARY WHITE FINDING

Dear Mr. McCollum:

On March 23, 2001, the NRC completed an annual baseline inspection of the identification and resolution of problems at your Oconee Nuclear Station. The inspection findings were documented in the subject report, which was issued on April 20, 2001.

Section 4OA2.c.(2).2 of the subject report discusses the inability to align the station auxiliary service water (ASW) pump to supply lake water to the steam generators in sufficient time (i.e., within 40 minutes) to mitigate a design basis tornado event. Using the significance determination process (SDP), this issue was preliminarily determined to be White (i.e., an issue with some increased importance to safety, which may require additional NRC inspection). As indicated in the enclosed SDP Phase III Summary, the issue appears to have a low to moderate safety significance because of the importance of the station ASW pump for mitigating accident scenarios involving tornados.

Two apparent violations related to the inability to align the station ASW pump within 40 minutes were: (1) the failure to comply with Technical Specification (TS) 5.4.1, Procedures, with respect to the adequacy of tornado mitigation procedures; and (2) the failure to promptly correct this condition adverse to quality as required by 10 CFR 50, Appendix B, Criterion XVI, Corrective Action. The three procedures considered to be inadequate are: (1) emergency procedure (EP)/1,2,3/1800/01, Emergency Operating Procedure; (2) abnormal procedure (AP)/1,2,3/1700/011, Loss of Power; and (3) AP/1,2,3/ 1700/006, Natural Disaster. The inadequate corrective action is based on your discovery of the procedural inadequacies on January 27, 2000, and the applicable procedures not being revised as of March 23, 2001, when the inspection ended. These two apparent violations are being considered for escalated enforcement action in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions - May 1, 2000" (Enforcement Policy), NUREG-1600. The current Enforcement Policy is included on the NRC's website at http://www.nrc.gov/OE.

Before the NRC makes a final decision on this matter, we are providing you an opportunity to request a Regulatory Conference where you would be able to provide your perspectives on the significance of the issue, the bases for your position, and whether you agree with the apparent violations. If you choose to request a Regulatory Conference, we encourage you to submit your

evaluation and any differences with the NRC evaluation at least one week prior to the conference in an effort to make the conference more efficient and effective. If a conference is held, it will be open for public observation. The NRC will also issue a press release to announce the conference.

Please contact Mr. Robert Haag at (404) 562-4550 within 7 days of the date of this letter to notify the NRC of your intentions. If we have not heard from you within 10 days, we will continue with our significance determination and enforcement decision and you will be advised by separate correspondence of the results of our deliberations on this matter.

Since the NRC has not made a final determination in this matter, a Notice of Violation is not being issued at this time. In addition, please be advised that the number and characterization of the apparent violations may change as a result of further NRC review.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Loren R. Plisco, Director
Division of Reactor Projects

Docket Nos.: 50-269, 50-270, 50-287
License Nos.: DPR-38, DPR-47, DPR-55

Enclosure: SDP Phase III Summary

cc w/enclosure:
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PUBLIC DOCUMENT (circle one): YES NO

OFFICE							
SIGNATURE							
NAME	RHaag	WRogers	ABoland	RSchin			
DATE	5/24/2001	5/24/2001	5/24/2001	5/24/2001			
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: C:\CHOICELTR.wpd

SDP Phase III Summary

Plant(s): Oconee 1, 2 & 3

Applicable Inspection Report: 50-269,270,287/01-08

Performance Deficiency: As documented in Problem Investigation Process report (PIP) O-00-00363, the licensee is unable to place the station auxiliary service water (ASW) pump into service for feeding the secondary side of the steam generators within 40 minutes following tornados of varying intensity. Specifically, PIP O-00-00363 identified that operators took more than 60 minutes to align the pump during a simulator exercise on January 27, 2000. The simulator exercise had been performed to validate the ability of operators to accomplish the procedural actions within the required times. At the time of the subject inspection in March 2001, the licensee had not implemented corrective actions to assure that operators could align the station ASW pump within 40 minutes.

Background: A significant portion of the safety related systems/components at the Oconee site are not protected from tornados. Part of the mitigation strategy for tornados involves a low head/high flow station ASW pump (also referred to as the Tornado Pump) taking suction from the ultimate heat sink via the circulating water header and discharging to the secondary side of the steam generators. This pump is used following the loss of normal main feed water, emergency feed water, and the standby shutdown facility to provide secondary side cooling. The pump must be started within 40 minutes to provide secondary side cooling and to reduce reactor coolant system (RCS) pressure, which stops the loss of RCS inventory out through the RCS safety valves. If the pump is not placed into service within 40 minutes, sufficient RCS inventory will not be maintained to assure the core remains covered. Core damage is postulated, even if the licensee is able to subsequently start the station ASW pump.

Exposure Time: > 1 year

Model Used: Hand calculation with basic event probabilities derived from licensee's full scope model. A special event tree was created to analyze this performance deficiency. For the events of interest, the event tree assumes the tornado damages the 4160 VAC busses in the turbine building and precludes the use of emergency feedwater. Success of Keowee underground lines are assumed.

Summary:

For Units 2 and 3

The Baseline Core Damage Frequency (CDF) for tornado events which credit the station ASW pump is	3.40E-06
The corresponding CDF with the Nonconforming Condition is	6.18E-06
Therefore, the Delta CDF is 6.18E-06 - 3.40E-06 =	2.78E-06

Enclosure

For Unit 1

Baseline CDF for tornado events which credit the station ASW pump (for Unit 1 with the old style reactor coolant pump Westinghouse seals) is 7.02E-07

The corresponding CDF with the Nonconforming Condition is [BEF0ASWDHE = TRUE] 1.28E-06

Delta CDF for one year 5.70E-07

However, during a fall 2000 refueling outage, the Unit 1 reactor coolant pump seals were changed to a Bingham design. Therefore, at the time of this Phase III assessment (71 days from the post-refueling outage startup with the Performance Deficiency still not corrected) the Delta CDF of 2.78E-06 is applicable

The exposure times between the two CDFs are divided accordingly:

2.78E-06 X 71/365 =	5.41E-07
5.70E-07 X [365-71]/365 =	4.59E-07
Total Delta CDF for Unit 1 (sum)	1.00E-06

Conclusions: ***WHITE*** for all three units

Assumptions and Details: See Calculation TORNADO DELTA CDF.xls and Event Tree TORNADO.etg below.

Calculation TORNADO DELTA CDF.xls

#	Inputs	Event Description	Event Probability	Cut Set Probability
1	F2TORNAD	Annual Frequency Of An F2 Intensity Tornado Striking	5.37e-05	3.24e-07
	-BACKHF2DEX	F2 Tornado Hits Keowee Hydro Station and Fails Emergency	9.38e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	NOT	Concurrent Failure of the SSF RCM and ASW Functions	7.60e-01	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
2	F2TORNAD	Annual Frequency Of An F2 Intensity Tornado Striking Oconee Unit 3	5.37e-05	9.73e-07
	-BACKHF2DEX	F2 Tornado Hits Keowee Hydro Station and Fails Emergency	9.38e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	2.40e-01	
	-TSEALS0DEX	Loss of RCP Seal Cooling Leads to Seal Failure	8.56e-01	

	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
3	F2TORNAD	Annual Frequency Of An F2 Intensity Tornado Striking Oconee Unit 3	5.37e-05	3.89e-09
	-BACKHF2DEX	F2 Tornado Hits Keowee Hydro Station and Fails Emergency	9.38e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	FEFTDEFWFTS+T&M	TDEFW Fail to Start and Out of Service for Maintenance	1.20e-02	
	NOT BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	7.60e-01	
	NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
4	F2TORNAD	Annual Frequency Of An F2 Intensity Tornado Striking Oconee Unit 3	5.37e-05	1.17e-08
	-BACKHF2DEX	F2 Tornado Hits Keowee Hydro Station and Fails Emergency	9.38e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	FEFTDEFWFTS+T&M	TDEFW Fail to Start and Out of Service for Maintenance	1.20e-02	
	BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	2.40e-01	
	-TSEALS0DEX	Loss of RCP Seal Cooling Leads to Seal Failure	8.56e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
5	F2TORNAD	Annual Frequency Of An F2 Intensity Tornado Striking Oconee Unit 3	5.37e-05	2.75e-08
	-BACKHF2DEX	F2 Tornado Hits Keowee Hydro Station and Fails Emergency	9.38e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	NOT BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	7.60e-01	
	BSSFRCMDEX	Failure To Provide RCM From the SSF	9.00e-02	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	-TSEALS0DEX	Loss of RCP Seal Cooling Leads to Seal Failure	8.56e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
6	F3TORNAD	Annual Frequency Of An F3 Intensity Tornado Striking Oconee Unit 3	4.12e-05	2.24e-07
	-BACKHF3DEX	F3 Tornado Hits Keowee Hydro Station and Fails Emergency	8.45e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	

	NOT BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	7.60e-01	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
7	F3TORNAD	Annual Frequency Of An F3 Intensity Tornado Striking Oconee Unit 3	4.12e-05	6.73e-07
	-BACKHF3DEX	F3 Tornado Hits Keowee Hydro Station and Fails Emergency Power To CT4	8.45e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	2.40e-01	
	-TSEALS0DEX	Loss of RCP Seal Cooling Leads to Seal Failure	8.56e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
8	F3TORNAD	Annual Frequency Of An F3 Intensity Tornado Striking Oconee Unit 3	4.12e-05	2.69e-09
	-BACKHF3DEX	F3 Tornado Hits Keowee Hydro Station and Fails Emergency Power To CT4	8.45e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	FEFTDEFWFTS+T&M	TDEFW Fail to Start and Out of Service for Maintenance	1.20e-02	
	NOT BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	7.60e-01	
	NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
9	F3TORNAD	Annual Frequency Of An F3 Intensity Tornado Striking Oconee Unit 3	4.12e-05	8.07e-09
	-BACKHF3DEX	F3 Tornado Hits Keowee Hydro Station and Fails Emergency Power To CT4	8.45e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	FEFTDEFWFTS+T&M	TDEFW Fail to Start and Out of Service for Maintenance	1.20e-02	
	BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	2.40e-01	
	-TSEALS0DEX	Loss of RCP Seal Cooling Leads to Seal Failure	8.56e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
10	F3TORNAD	Annual Frequency Of An F3 Intensity Tornado Striking Oconee Unit 3	4.12e-05	1.90e-08

	-BACKHF3DEX	F3 Tornado Hits Keowee Hydro Station and Fails Emergency	8.45e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	NOT BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	7.60e-01	
	BSSFRCMDEX	Failure To Provide RCM From the SSF	9.00e-02	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	-TSEALS0DEX	Loss of RCP Seal Cooling Leads to Seal Failure	8.56e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
11	F4TORNAD	Annual Frequency Of An F4 Intensity Tornado Striking Oconee Unit 3	3.59e-05	1.39e-07
	-BACKHF4DEX	F4 Tornado Hits Keowee Hydro Station And Fails Emergency	7.76e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	NOT BRCMASWDEXF4	Concurrent Failure of the SSF RCM and ASW Functions	5.90e-01	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
12	F4TORNAD	Annual Frequency Of An F4 Intensity Tornado Striking Oconee Unit 3	3.59e-05	9.20e-07
	-BACKHF4DEX	F4 Tornado Hits Keowee Hydro Station And Fails Emergency	7.76e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	BRCMASWDEXF4	Concurrent Failure of the SSF RCM and ASW Functions	4.10e-01	
	-TSEALS0DEX	Loss of RCP Seal Cooling Leads to Seal Failure	8.56e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
13	F4TORNAD	Annual Frequency Of An F4 Intensity Tornado Striking Oconee Unit 3	3.59e-05	1.67e-09
	-BACKHF4DEX	F4 Tornado Hits Keowee Hydro Station And Fails Emergency	7.76e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	FEFTDEFWFTS+T&M	TDEFW Fail to Start and Out of Service for Maintenance	1.20e-02	
	NOT BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	5.90e-01	
	NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	

	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
14	F4TORNAD	Annual Frequency Of An F4 Intensity Tornado Striking Oconee Unit 3	3.59e-05	1.10e-08
	-BACKHF4DEX	F4 Tornado Hits Keowee Hydro Station And Fails Emergency Power To CT4	7.76e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	FEFTDEFWFTS+T&M	TDEFW Fail to Start and Out of Service for Maintenance	1.20e-02	
	BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	4.10e-01	
	-TSEALS0DEX	Loss of RCP Seal Cooling Leads to Seal Failure	8.56e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
15	F4TORNAD	Annual Frequency Of An F4 Intensity Tornado Striking Oconee Unit 3	3.59e-05	1.18e-08
	-BACKHF4DEX	F4 Tornado Hits Keowee Hydro Station And Fails Emergency	7.76e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	NOT BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	5.90e-01	
	BSSFRCMDEX	Failure To Provide RCM From the SSF	9.00e-02	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	-TSEALS0DEX	Loss of RCP Seal Cooling Leads to Seal Failure	8.56e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
16	F5TORNAD	Annual Frequency Of An F5 Intensity Tornado Striking Oconee Unit 3	1.71e-06	5.88e-09
	-BACKHF5DEX	F5 Tornado Hits Keowee Hydro Station and Fails Emergency	6.88e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	NOT BRCMASWDEXF4	Concurrent Failure of the SSF RCM and ASW Functions	5.90e-01	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
17	F5TORNAD	Annual Frequency Of An F5 Intensity Tornado Striking Oconee Unit 3	1.71e-06	3.88e-08
	-BACKHF5DEX	F5 Tornado Hits Keowee Hydro Station and Fails Emergency	6.88e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	BRCMASWDEXF4	Concurrent Failure of the SSF RCM and ASW Functions	4.10e-01	
	-TSEALS0DEX	Loss of RCP Seal Cooling Leads to Seal Failure	8.56e-01	

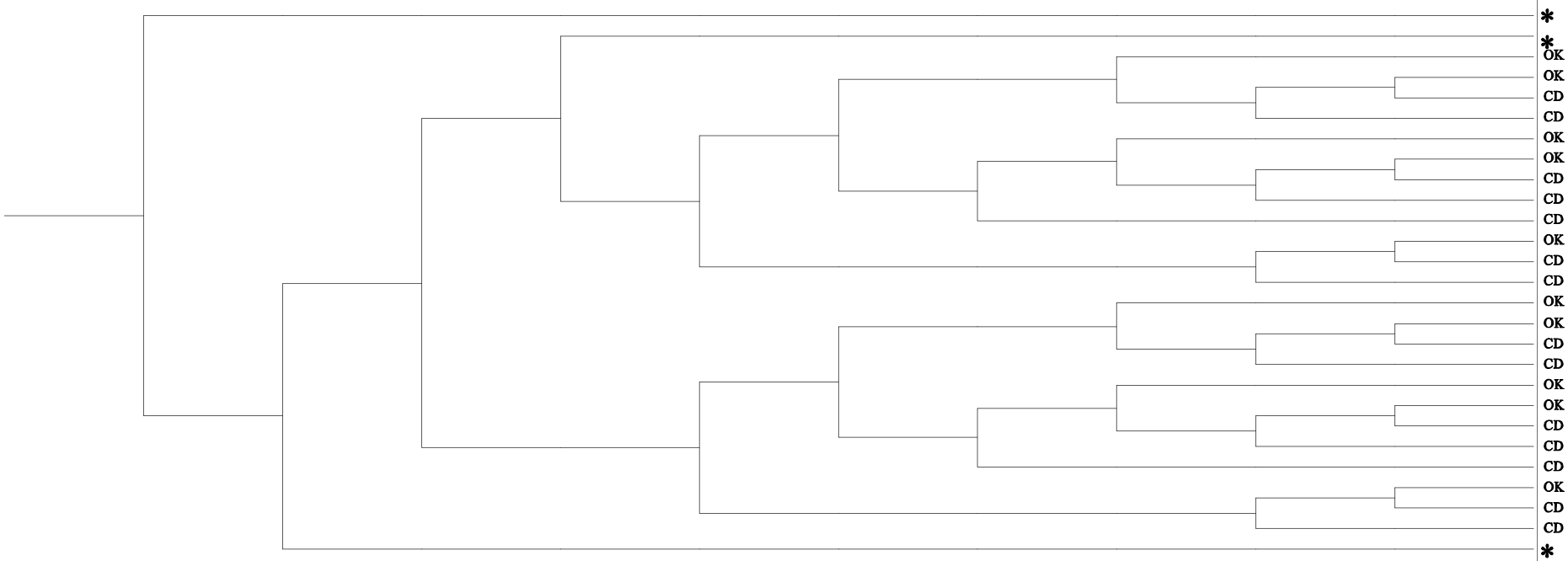
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
18	F5TORNAD	Annual Frequency Of An F5 Intensity Tornado Striking Oconee Unit 3	1.71e-06	7.06e-11
	-BACKHF5DEX	F5 Tornado Hits Keowee Hydro Station and Fails Emergency	6.88e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	FEFTDEFWFTS+T&M	TDEFW Fail to Start and Out of Service for Maintenance	1.20e-02	
	NOT BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	5.90e-01	
	NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
19	F5TORNAD	Annual Frequency Of An F5 Intensity Tornado Striking Oconee Unit 3	1.71e-06	4.66e-10
	-BACKHF5DEX	F5 Tornado Hits Keowee Hydro Station and Fails Emergency Power To CT4	6.88e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	FEFTDEFWFTS+T&M	TDEFW Fail to Start and Out of Service for Maintenance	1.20e-02	
	BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	4.10e-01	
	-TSEALS0DEX	Loss of RCP Seal Cooling Leads to Seal Failure	8.56e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
20	F5TORNAD	Annual Frequency Of An F5 Intensity Tornado Striking Oconee Unit 3	1.71e-06	4.98e-10
	-BACKHF5DEX	F5 Tornado Hits Keowee Hydro Station and Fails Emergency	6.88e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	NOT BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	5.90e-01	
	BSSFRCMDEX	Failure To Provide RCM From the SSF	9.00e-02	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	-TSEALS0DEX	Loss of RCP Seal Cooling Leads to Seal Failure	8.56e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
		THE BASELINE CDF IS		3.40e-06
		THE CDF WITH THE NONCONFORMING CONDITION IS		6.18e-06
		THEREFORE, THE DELTA CDF IS 6.18E-6 - 3.4E-6 =		2.78e-06
		THIS ASSUMES A ONE YEAR EXPOSURE FOR UNITS 2 & 3		

		UNITS 2 & 3 HAVE BINGHAM RCP SEALS Also, the surrogate for the performance deficiency was BEF0ASWDHE = TRUE		
1	F2TORNAD	Annual Frequency Of An F2 Intensity Tornado Striking Oconee Unit 3	5.37e-05	3.24e-07
	-BACKHF2DEX	F2 Tornado Hits Keowee Hydro Station and Fails Emergency Power To CT4	9.38e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	NOT BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	7.60e-01	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
2	F2TORNAD	Annual Frequency Of An F2 Intensity Tornado Striking Oconee Unit 3	5.37e-05	3.89e-09
	-BACKHF2DEX	F2 Tornado Hits Keowee Hydro Station and Fails Emergency Power To CT4	9.38e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	FEFTDEFWFTS+T&M	TDEFW Fail to Start and Out of Service for Maintenance	1.20e-02	
	NOT BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	7.60e-01	
	NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
3	F3TORNAD	Annual Frequency Of An F3 Intensity Tornado Striking Oconee Unit 3	4.12e-05	2.24e-07
	-BACKHF3DEX	F3 Tornado Hits Keowee Hydro Station and Fails Emergency Power To CT4	8.45e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	NOT BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	7.60e-01	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	

4	F3TORNAD	Annual Frequency Of An F3 Intensity Tornado Striking Oconee Unit 3	4.12e-05	2.69e-09
	-BACKHF3DEX	F3 Tornado Hits Keowee Hydro Station and Fails Emergency Power To CT4	8.45e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	FEFTDEFWFTS+T&M	TDEFW Fail to Start and Out of Service for Maintenance	1.20e-02	
	NOT BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	7.60e-01	
	NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
5	F4TORNAD	Annual Frequency Of An F4 Intensity Tornado Striking Oconee Unit 3	3.59e-05	1.39e-07
	-BACKHF4DEX	F4 Tornado Hits Keowee Hydro Station And Fails Emergency Power To CT4	7.76e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	NOT BRCMASWDEXF4	Concurrent Failure of the SSF RCM and ASW Functions	5.90e-01	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
6	F4TORNAD	Annual Frequency Of An F4 Intensity Tornado Striking Oconee Unit 3	3.59e-05	1.67e-09
	-BACKHF4DEX	F4 Tornado Hits Keowee Hydro Station And Fails Emergency Power To CT4	7.76e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
	FEFTDEFWFTS+T&M	TDEFW Fail to Start and Out of Service for Maintenance	1.20e-02	
	NOT BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	5.90e-01	
	NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
	BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
	-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
	BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
7	F5TORNAD	Annual Frequency Of An F5 Intensity Tornado Striking Oconee Unit 3	1.71e-06	5.88e-09
	-BACKHF5DEX	F5 Tornado Hits Keowee Hydro Station and Fails Emergency Power To CT4	6.88e-01	
	BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
	BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	

NOT BRCMASWDEXF4	Concurrent Failure of the SSF RCM and ASW Functions	5.90e-01	
BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
F5TORNAD 8	Annual Frequency Of An F5 Intensity Tornado Striking Oconee Unit 3	1.71e-06	7.06e-11
-BACKHF5DEX	F5 Tornado Hits Keowee Hydro Station and Fails Emergency Power To CT4	6.88e-01	
BAC4160DEX	Tornado Winds Fail 4160 Switchgear In Turbine Building	3.80e-01	
BEFUSTWDEX	The Upper Surge Tanks Are Failed By Tornado Winds	5.00e-01	
FEFTDEFWFTS+T&M	TDEFW Fail to Start and Out of Service for Maintenance	1.20e-02	
NOT BRCMASWDEX	Concurrent Failure of the SSF RCM and ASW Functions	5.90e-01	
NOT BSSFRCMDEX	Failure To Provide RCM From the SSF	9.10e-01	
BSSFASWDEX	Failure To Provide ASW From the SSF	9.90e-02	
-TRCSRVLDEX	Either Primary Safety Relief Valve Fails To Close After Liquid Relief	9.00e-01	
BEF0ASWDHE	Operators Fail to Depressurize SGs and Align ASW (Tornado) Pump	5.50e-01	
	BASELINE CDF FOR UNIT 1 - OLD STYLE WESTINGHOUSE SEALS		7.02e-07
	CDF ASSUMING THE PERFORMANCE DEFICIENCY [BEF0ASWDHE = TRUE]		1.28e-06
	DELTA CDF FOR ONE YEAR =		5.70e-07
	HOWEVER, DURING A FALL 2000 REFUEL OUTAGE THE UNIT 1 SEALS WERE CHANGED TO A BINGHAM DESIGN. THEREFORE, FROM THE TIME OF THAT STARTUP UNTIL THE PHASE III WAS PERFORMED THE DELTA CDF OF 2.78E-6 IS APPLICABLE		
	THE EXPOSURE TIMES BETWEEN THE TWO CDFs IS DIVIDED ACCORDINGLY:		
	2.78E-6 * 71/365 =		5.41e-07
	5.7E-7 * [365 - 71] / 365 =		4.59e-07
	TOTAL DELTA CDF FOR UNIT 1 =		1.00e-06

	4160 ESSENTIAL BUSES	KEOWEE HYDRO	EFW SUC SOURCE	TURBINE DRIVEN EFW	SSF DG [ALL Fs] &/OR WEST PEN [F4 & 5][	SSF RCP SEAL CLG	NO RCP SEAL LOCA	SSF 2NDARY SIDE CLG	RCS PZR VLV RECLOSE	TORNADO PUMP		SEQUENCE #
TORNADO	COLORED_BU	KEE	UST	TDEFW	SSF_DG	SSF_RCM	NO_LOCA	SSF_ASW	NO-PSV	ASW		



* UNDEVELOPED PATH (SEQUENCE 1, 2, 27)

Event Tree TORNADO.etg