STP Nuclear Operating Company
South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

October 30, 2003
NOC-AE-03001605
10CFR50.90

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
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11555 Rockville Pike
Rockville, MD 20852

South Texas Project
Units 1 & 2
Docket Nos. 50-498, 50-499
Response to NRC Questions Regarding
a Proposed License Amendment to Eliminate the Turbine Missile Design Basis

Reference: Letter dated November 14, 2002 from J.J. Sheppard, STPNOC, to NRC Document Control Desk "Proposed License Amendment to Eliminate the Turbine Missile Design Basis" (NOC-AE-02001335)

In the referenced correspondence, STP Nuclear Operating Company (STPNOC) proposed to amend the operating licenses for South Texas Project Units 1 and 2 to delete the UFSAR turbine missile design basis. STPNOC has determined that the turbine missile contribution to risk is so small that no special measures are required beyond normal commercial operating practices.

The attachment to this letter responds to several NRC staff questions regarding this submittal.

A001

If there are any questions, please contact Mr. A. W. Harrison at 361-972-7298 or me at 361-972-7902.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on: October 30, 2003

T. J. Jordan
Vice President
Engineering & Technical Services

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Attachments:

1. Responses to Request For Additional Information on STPNOC's Request To Eliminate The Turbine Missile Design Basis South Texas Project (STP), Units 1 & 2
2. Conditional Core Damage Probability Given a Turbine Missile Is Generated

cc:

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REQUEST FOR ADDITIONAL INFORMATION ON STPNOC'S REQUEST TO ELIMINATE THE TURBINE MISSILE DESIGN BASIS SOUTH TEXAS PROJECT (STP), UNITS 1 & 2

1. **Please provide the following information about the turbine blade missile event of January, 2003:**

   a. **Please include (i) a sketch of a top view showing the strike zone, the turbine, the safety-related essential cooling water (ECW) buried piping, and the portion of the diesel generator building inside the strike zone; (ii) the exiting and landing locations of the broken turbine blade; and (iii) the weight of the broken turbine blade.**

   The STP turbine blade ejection event occurred on December 15, 2002.

   (i) STP UFSAR Figure 3.5-1 is a depiction of the strike zones. The Diesel Generator Buildings (DGB) are labeled on the figure, by the southeast corner of their respective unit's Turbine Generator Building. ECW buried piping runs from the ECW Intake Structure (shown in the northeast quadrant of the site protected area) to the Unit 1 and Unit 2 Mechanical Auxiliary Buildings and the Unit 1 and Unit 2 DGBs.
   (ii) The blade was ejected from the low pressure turbine into the condenser. No ECW buried piping or parts of the diesel generator building were in the vicinity of the blade's impact.
   (iii) The weight of the blade was 44 pounds.

   b. **If the damaged piping is ECW piping or if structures, systems, and/or components (SSCs) that are credited in the probabilistic risk assessment (PRA) were damaged, provide an assessment of the damage.**

   No components credited in the PRA were damaged.

   c. **Provide a plant-specific turbine missile frequency estimate based on this and all previous STP plant-specific turbine missile incidents and actual reactor years for both units.**

   The turbine missile event described in the STP UFSAR is a turbine disk or fragments of a turbine disk being ejected through the turbine casing. The design basis is in accordance with SRP 3.5.1.3, "Turbine Missiles" and meets the intent of R.G. 1.115, Rev.1, "Protection Against Low-Trajectory Turbine Missiles". The design basis requirements are for large missiles as discussed in the STP UFSAR. R.G. 1.115 states:

   > This guide addresses only large missiles that might be ejected in the event of a turbine failure. The inherent protection provided in most plants (generally 1 ½ to 2 feet of reinforced concrete) ensures that minor missiles, which could be ejected

in significant numbers and in widely scattered directions once the casing is breached, would not result in damage to essential systems.

The event described above was a turbine blade, which did not penetrate the turbine outer casing. There have been no main turbine missile events at STP and no other main turbine blade ejections. Consequently, the event described above had no effect on the turbine missile frequency estimate.

2. **Please confirm that it is your intention to eliminate all current limiting conditions for operation (LCOs), surveillance requirements (SRs), and the turbine system maintenance program described in the updated final safety analysis report (UFSAR) Section 3.5.1.3.4.**

There are no Technical Specification LCOs or SRs affected by the proposed change. STPNOC intends to delete the LCOs and SRs governing turbine overspeed protection from the Technical Requirements Manual (TRM). In addition, STPNOC intends to delete the UFSAR references as described in the original application of November 14, 2002. Although these descriptions and requirements will be deleted from the licensing documents, STPNOC plans to continue to maintain the turbine and provide adequate protection from overspeed and its consequences through its normal commercial programs. For instance, STPNOC has implemented additional turbine vibration monitoring as a result of the blade ejection event.

a. **Please identify all the SSCs included in these current LCOs, SRs, and maintenance programs for which the programs in the UFSAR will be eliminated.**

The components affected in the TRM LCOs and SRs are:

1) Four high pressure turbine stop valves
2) Four high pressure turbine governor valves
3) Six low pressure turbine reheat stop valves
4) Six low pressure turbine reheat intercept valves
5) The electrical and mechanical turbine overspeed protection

STPNOC does not plan to actually eliminate any maintenance programs. The proposed change will allow STPNOC to manage the frequency and scope of the maintenance programs outside of regulatory considerations for turbine missile generation.

b. **Discuss your "maintenance and monitoring program for the turbine for commercial reasons." Identify elements of the maintenance and monitoring program which serve the same purpose and function of the turbine system maintenance program that you proposed to eliminate. Demonstrate that, without the turbine system maintenance program, your turbines will still have sufficient safety margins, and consistency with the defense-in-depth philosophy will still be maintained through meeting General Design Criteria 4 requirements.**

As discussed above, STP does not plan to eliminate the turbine maintenance and monitoring program. It will no longer be governed by criteria described in licensing documents. STP may elect to change the frequency or scope of inspections of the turbine components listed in the response to Question 2.a. The turbine itself remains within the scope of the Maintenance Rule.

STPNOC will continue to comply with GDC-4 when the proposed change is implemented. The safety-related components that are potential targets for turbine missiles are either buried (ECW piping) or protected by safety-related structures (SDGs housed in the Diesel Generator building).

3. **UFSAR Section 3.5.13 states that "[T]he results of this evaluation was that the turbine missile generation probability (P_1) is less than 10^{-4} per year..."**

   a. **Provide the actual P_1 value.**

   From WCAP-14732, "Probabilistic Analysis of Reduction in Turbine Valve Test Frequency for Nuclear Plants with Westinghouse BB-296 Turbines with Steam Chests, Revision 1" June 1997, and Westinghouse Report STP Turbine Valve Test Frequency Extension to 3 Months: An Evaluation of the Applicability of WCAP-14732, Revision 1, to STP Units 1 and 2 (Letter Report ST-WN-NOC-01-000129, June 26, 2001), P_1 is 7.7E-07 per year for a monthly test interval.

   b. **The dominant contributor to P_1 is the destructive overspeed probability, which is a function of the testing frequency of turbine valves (stop, governor, reheat stop, and intercept). Provide an updated estimate of P_1 based on the maximum anticipated surveillance, maintenance, and monitoring intervals for all SSCs whose programs will be deleted from the UFSAR upon deletion of the turbine missile design basis.**

   From the Westinghouse letter report cited above, P_1 is 1.1E-06 for a 3-month test interval.

   Note that STPNOC assumes the missile has been generated in the analysis performed for this application (i.e., $P_1 = 1$). Although P_1 is dependent on the inspection interval, the conditional core damage probability (CCDP) calculated for this evaluation does not depend on the inspection interval since P_1 is assumed to be 1. The results of the analysis are well below the R.G. 1.174 guidance.

   STPNOC plans to extend the test interval incrementally while monitoring the performance of the valves. STPNOC's goal is to balance test frequency to assure high valve reliability against the potential for inadvertent closure of a valve during a test resulting in a turbine trip. STPNOC would not expect the test interval to exceed 12 months. This frequency will allow the station to test the valves sufficiently in

advance of refueling outages to be able to incorporate any required maintenance into the refueling outage schedule.

c. **Reconcile the updated P_1 value in RAI #3.b with that based on the plant-specific failure data that the staff requested in RAI #1.c.**

The event described previously has no effect on the turbine missile frequency estimate.

4. **Section 4, "Technical Analysis," of the November 14, 2002, submittal, states that, "the probability of core damage, given that a turbine missile is generated, is 3.74E-8 for shear failure and 3.09E-08 for shear and rotational failure."**

a. **Provide the PRA document showing the detailed PRA analysis and results quoted above. The documentation should identify (i) all sequences and scenarios evaluated and (ii) all SSCs postulated to be failed by missile impacts in each scenario.**

Please see the attached assessment (Attachment 2).

b. **Please confirm that the evaluation done in support of the submittal included all SSCs that are credited in the PRA as potential targets of the turbine missiles and was not restricted to safety related SSCs as implied by the text in Section 4.**

The evaluation focused on safety-related SSC's credited or analyzed in the PRA. Non-safety-related SSC's credited in the PRA were not evaluated. The non-safety related SSC's credited in the PRA that could be potential targets of a turbine missile are:

1. The Balance of Plant diesel generator in either Unit which supplies one instrument air compressor and an air compressor cooling water pump in the Unit. The instrument air system in the PRA is only used for the alignment of outside air to the control room and electrical auxiliary building ventilation systems in the event of loss of chilled water. Failure of this diesel generator without a loss of offsite power has no effect in the PRA. Failure of this diesel generator in the PRA with a loss of offsite power is much less significant than the systems and trains modeled in the turbine missile assessment of Attachment 2.

2. The Technical Support Center Diesel Generator which supplies the positive displacement charging pump used to provide back-up to reactor coolant pump seal cooling. Failure of this diesel generator without a loss of offsite power has no effect in the PRA. Loss of this diesel generator with a loss of offsite power is much less significant than the systems and trains modeled in the turbine missile assessment of Attachment 2.

3. Non-safety related dampers in the control room and electrical auxiliary building ventilation systems used to align outside air for cooling in the event of a loss of essential chilled water. Failure of these dampers without a corresponding loss of essential chilled water has no effect in the PRA. The turbine missile assessment of Attachment 2 does not list the essential chilled water system as a potential target of a missile.

4. Non-safety related electrical distribution switchgear and transformers used to direct power from offsite to Class 1E AC power systems ("off-site power"). Failure of one of the switchgear or transformers has little effect in the PRA because of the Class 1E emergency diesel generators provided to each ESF bus. Failure of an individual Non Class 1E 13.8kV bus or 13.8kv/4.16kV ESF transformer is much less significant than failure of the systems/trains modeled in the turbine missile assessment of Attachment 2 (e.g., MEAB 1 target, loss of 1 electrical train).

c. **Report and justify the risk-ranking of the turbines and related SSCs identified in the response to RAI #2 as equipment of low safety significance, based on the SSC safety categorization approved for your July 30, 1999, risk-informed exemption requests from special treatment requirements.**

Some of the components associated with SSC's identified in the response to RAI #2 are NOT of low safety significance. The EHC Auto Stop Trip (AST) Solenoid valves, which are part of the electrical overspeed protection, are currently Medium in the Graded Quality Assurance (GQA) program. The turbine trip function is ranked Medium in GQA. The turbine governor and turbine stop valves are ranked Low, the reheat stop and reheat intercept valves are not modeled in the PRA.

The proposed changes will not affect the turbine trip design for STP. The categorization of the AST valves will not be affected by the proposed change. STPNOC will continue to maintain these valves in accordance with their risk-significance. The treatment of the turbine overspeed protection components does not depend on their description in the UFSAR or TRM requirements.

5. **Regulatory Guide 1.174 requires an estimate of the change in core damage frequency (CDF) and the change in large early release frequency (LERF) that could be expected if the proposed changes are implemented. Using your responses to RAI #3 (regarding the potential change in failure frequency) and RAI #2 (identifying all SSCs to which changes to the surveillance, maintenance and monitoring programs can be made) please estimate this change in CDF and LERF. This analysis should, for example, include the change in reliability in the turbine valves and overspeed devices based on the maximum anticipated surveillance, maintenance, and monitoring intervals.**

Using the information provided above, the probability of a turbine missile is 1.1E-06 for a three month test interval and the conditional probability of core damage is 3.74E-08 for

shear failure and 3.09E-08 for shear and rotational failure. The estimated core damage frequency is then the initiating event frequency times the conditional core damage probability:

1.1E-06 * (3.74E-08 + 3.09E-08) = 7.5E-14 per year

The change in core damage frequency is calculated by subtracting the turbine missile generator frequency using one month testing frequency, 7.7E-07, from the three month test interval missile generation frequency and multiplying by the conditional core damage probability from turbine missile, or:

(1.1E-06 – 7.7E-07) * (3.74E-08 + 3.09E-08) = 2.25E-14 per year

With the exception of the turbine missile that penetrates the containment, the change in Large Early Release Frequency would be, in most instances, at least a factor of 20 below the change in core damage frequency. For the Medium LOCA induced by a missile into the containment, the CCDP is 5.95E-09. This would be an upper limit on a large release from this missile.

The current Core Damage Frequency for Revision 4 of the STP PRA is 9.08E-06 per year, the current Large Early Release Frequency is 5.37E-07 per year.

ATTACHMENT 2

CONDITIONAL CORE DAMAGE PROBABILITY GIVEN A TURBINE MISSILE IS GENERATED

Purpose and Scope

The purpose of this study is to evaluate the probability of core damage given that the main turbine in either unit generates a missile. Testing of the turbine governor and intercept valves may generate unnecessary exposure to a turbine trip without commensurate exposure to nuclear safety risk.

Background

The STP UFSAR defines the Turbine Missile Impact and Damage Frequency as follows.

> The frequency, f, of unacceptable damage to a system due to a turbine missile is calculated from
>
> $f = f_1 * f_2 * f_3$, where:
>
> f_1 = annual frequency of missile generation
> f_2 = conditional probability of a missile striking an essential system given that a turbine missile has been generated
> f_3 = conditional probability of unacceptable damage to the system given that a missile strikes the system

Given that a missile is generated, the conditional probability of unacceptable damage to an essential system is given by,

$$CP_{damage} = f_2 * f_3$$

The conditional core damage frequency, $CCDF_{cond}$, can be calculated using a RISKMAN model by setting the damaged system to guaranteed failure. The conditional probability of core damage, $CP_{core\ damage}$, is then calculated from,

$$CP_{core\ damage} = CP_{damage} * CCDF_{cond} * AOT / 8760hrs/yr$$, where:

AOT = Technical Specifications Allowed Outage Time for the failed system

The conditional core damage probability, $CCDP_{init}$, is given for initiating events in file: *Initiators STP_1999.xls*. The conditional probability of core damage, $CP_{core\ damage}$, given that a generated turbine missile results in an initiating event (e.g. Steam Line Break, MLOCA, Loss of ECW, Loss of EAB HVAC), is calculated from,

$$CP_{core\ damage} = CP_{damage} * CCDP_{init}$$

Technical Analysis

The probabilities of system damage due to generation of a turbine missile are given in Tables 1 and 2 below. The f_2 and f_3 data are taken from Tables 3.4.7-3 and 3.4.7-4 of the IPE. Damage probabilities are calculated based on the target.

Table 1. Turbine Missile Damage Probabilities, CP_{damage} (Shear Failure)

Target	Unit 1			Unit 2		
	[1]f_2	[1]f_3	CP_{damage}	[1]f_2	[1]f_3	CP_{damage}
RCB 1				1.430E-03	0.0118	1.687E-05
RCB 2	3.450E-04	0.0	0.0			
DGB 1	3.176E-04	0.1583	5.028E-05	1.615E-04	0.7850	1.268E-04
DGB 2	5.206E-04	0.5122	2.667E-04	3.176E-04	0.1583	5.028E-05
FHB 1						
FHB 2						
MEAB 1				2.155E-04	0.1206	2.599E-05
MEAB 2	1.900E-05	0.0	0.0			
AFW Tank 1				2.018E-04	0.8332	1.681E-04
AFW Tank 2						
IVC 1				4.072E-04	0.8178	3.330E-04
IVC 2	3.770E-05	0.1709	6.443E-06			
ECW Intake Structure				1.350E-04	0.8089	1.092E-04

Table 2. Turbine Missile Damage Probabilities, CP_{damage} (Shear and Rotation Failure)

Target	Unit 1			Unit 2		
	[1]f_2	[1]f_3	CP_{damage}	[1]f_2	[1]f_3	CP_{damage}
RCB 1				1.566E-03	0.0	0.0
RCB 2	3.779E-04	0.0	0.0			
DGB 1	5.288E-04	0.0	0.0	0.0	0.0	0.0
DGB 2	7.882E-04	0.3782	2.981E-04	5.288E-04	0.0	0.0
FHB 1						
FHB 2						
MEAB 1				2.534E-04	0.0073	1.850E-06
MEAB 2	2.340E-05	0.0	0.0			
AFW Tank 1				2.066E-04	0.7849	1.622E-04
AFW Tank 2						
IVC 1				4.502E-04	0.8207	3.695E-04
IVC 2	4.570E-05	0.1438	6.572E-06			
ECW Intake Structure				1.422E-04	0.7197	1.023E-04

Note: Blanks are for those targets located either outside the low trajectory missile strike zone or shaded by other targets.
[1] South Texas Project IPE, Table 3.4.7-4 and 3.4.7-3

Given a turbine missile impact on one of the targets identified in Table 1 or Table 2, the following assumptions are used to develop a conditional probabililty of core damage.

1. A turbine missile striking the Reactor Containment Building (RCB 1 & 2) could be assumed to cause unacceptable damage to a Reactor Containment Fan Cooling train or to the reactor coolant piping systems resulting in a Medium LOCA or to the steam generator steam or feed lines.

2. A turbine missile striking the Diesel Generator Building (DGB 1 & 2) could be assumed to cause unacceptable damage to an Emergency Diesel Generator.

3. A turbine missile striking the Mechanical Electrical Auxiliary Building (MEAB 1 & 2) could be assumed to cause unacceptable damage to Class 1E Electrical Systems or EAB HVAC systems resulting in loss of a train of EAB HVAC or Class 1E electrical power.

4. A turbine missile striking the Auxiliary Feedwater Storage Tank (AFW Tank 1 & 2) could be assumed to cause unacceptable damage to the storage tank resulting in the unavailability of all four trains of Auxiliary Feedwater.

5. A turbine missile striking the Isolation Valve Cubicle (IVC 1 & 2) could be assumed to cause unacceptable damage to piping systems resulting in a Steam or Feed Line Break. The limiting event in terms of Conditional Core Damage Probability (CCDP) is the Steam Line Break Outside Containment with a value of 3.258E-05.

6. A turbine missile striking the Essential Cooling Water Intake Structure (ECW Intake Structure) could be assumed to cause unacceptable damage to an Essential Cooling Water train.

7. It is not likely that a turbine missile would penetrate additional barriers, such as reinforced concrete walls or flooring and physical spacing, that separate safety trains in safety related structures. Therefore it is reasonable to assume that damage to safety related structures would be limited to a single safety train in the targeted structure.

The core damage probabilities, $CP_{core\ damage}$, resulting from possible system damage from a turbine missile are given in Tables 3 and 4 below. Core damage probability is calculated as follows.

For initiating events, the $CCDP_{init}$ from model STP_1999 is multiplied by the conditional probability of damage from a turbine missile, CP_{damage}. The effect of support system initiators are included with the associated equipment failure CDF contribution.

For equipment failures that are not initiating events, the core damage frequency per year given the equipment failure, $CCDF_{cond}$, is multiplied by the conditional probability of damage from a turbine missile, CP_{damage}, and by the total time identified in the Technical Specifications to achieve stable conditions (AOT + mode changes). This product is divided by 8760 to convert years to hours.

Core damage probability, $CP_{core\ damage}$, is the sum of the two calculations.

Table 3. Conditional Core Damage Probabilities, $CP_{core\ damage}$ (Shear Failure)					
Damage event	CP_{damage}	[1]$CCDP_{init}$	[2]$CCDF_{cond}$	[3]AOT (hrs) / 8760(hrs/yr)	$CP_{core\ damage}$
RCB 1, loss of 1 RCFC train Unit 2 missile	1.687E-05	--	1.171E-05	204 / 8760	4.602E-12
RCB 1, MLOCA Unit 2 missile	1.687E-05	3.528E-04	--	--	5.953E-09
RCB1, SG steam or feed line break, Unit 2 missile	1.687E-05	3.079E-05	--	--	5.195E-10
DGB 1, loss of 1 DG train Unit 1 missile	5.028E-05	--	4.085E-05	372 / 8760	8.721E-11
DGB 1, loss of 1 DG train Unit 2 missile	1.268E-04	--	4.085E-05	372 / 8760	2.199E-10
DGB 2, loss of 1 DG train Unit 1 missile	2.667E-04	--	4.085E-05	372 / 8760	4.625E-10
DGB 2, loss of 1 DG train Unit 2 missile	5.028E-05	--	4.085E-05	372 / 8760	8.721E-11
MEAB 1, loss of 1 EAB train Unit 2 missile	2.599E-05	--[4]	3.754E-04	204/8760	2.272E-10
MEAB 1, loss of 1 electrical train, Unit 2 missile	2.599E-05	--[4]	2.055E-04	44/8760	2.682E-11
AFW Tank 1, loss of all AFW, Unit 2 missile	1.681E-04	--	6.045E-02	16 / 8760	1.857E-08
IVC 1, Steam line break Unit 2 missile	3.330E-04	3.258E-05	--	--	1.085E-08
IVC 2, Steam line break Unit 1 missile	6.443E-06	3.258E-05	--	--	2.099E-10
ECW Intake Structure, loss of 1 ECW train, Unit 2 missile	1.092E-04	--[4]	9.241E-05	204/8760	2.350E-10
				Total	3.745E-08

[1] Initiators STP_1999.xls
[2] Sensitivity study model: MISSILE (cloned from model STP_1999, 10/25/01)
[3] Technical Specifications, South Texas Project, Unit Nos. 1 and 2, based on loss of one train. Includes the time to a stable plant condition as defined in the Technical Specifications (Cold shutdown or hot shutdown)
[4] The effect of the support system initiators - Loss of EAB HVAC, Loss of ECW, and Loss of CCW, are included in the $CCDF_{cond}$/year presented

Table 4. Conditional Core Damage Probabilities, $CP_{core\ damage}$ (Shear and Rotation Failure)					
Damage event	CP_{damage}	[5]$CCDP_{init}$	[6]$CCDF_{cond}$	[7]AOT (hrs) / 8760(hrs/yr)	$CP_{core\ damage}$
DGB 2, loss of 1 DG train Unit 1 missile	2.981E-04	--	4.085E-05	372 / 8760	5.171E-10
MEAB 1, loss of 1 EAB train Unit 2 missile	1.850E-06	--[8]	3.754E-04	204/8760	1.617E-11
MEAB 1, loss of 1 Electrical train, Unit 2 missile	1.850E-06	--[4]	2.055E-04	44/8760	1.909E-12
AFW Tank 1, loss of all AFW, Unit 2 missile	1.622E-04	--	6.045E-02	16 / 8760	1.791E-08
IVC 1, Steam line break Unit 2 missile	3.695E-04	3.258E-05	--	--	1.204E-08
IVC 2, Steam line break Unit 1 missile	6.572E-06	3.258E-05	--	--	2.141E-10
ECW Intake Structure, loss of 1 ECW train, Unit 2 missile	1.023E-04	--[4]	9.241E-05	204/8760	2.202E-10
				Total	3.091E-08

Conclusions

Based on the PRA analysis, the risk of core damage associated with the proposed change is insignificant (<1E-06) and does not involve a significant increase in the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety. The probability of core damage, given that a turbine missile is generated, is 3.74E-08 for shear failure and 3.09E-08 for shear and rotational failure. Justification for periodic testing of the turbine governor and intercept valves should be based upon factors other than nuclear safety.

References:

1. South Texas Project Level 2 Probabilistic Safety Assessment Individual Plant Examination, Section 3.4.7.2, Turbine Missile Risk, 2/1992.
2. Initiators STP_1999.xls
3. STP PRA model STP_1999, October 25, 2001.

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[5] Initiators STP_1999.xls
[6] Sensitivity study model: MISSILE (cloned from model STP_1999, 10/25/01)
[7] Technical Specifications, South Texas Project, Unit Nos. 1 and 2, based on loss of one train. Includes the time to a stable plant condition as defined in the Technical Specifications (Cold shutdown or hot shutdown)
[8] The effect of the support system initiators - Loss of EAB HVAC, Loss of ECW, and Loss of CCW, are included in the $CCDF_{cond}$/year presented