Nuclear Operating Company

South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

December 3, 2001
NOC-AE-01001196
10CFR50.90

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

South Texas Project
Units 1 and 2
Docket No. STN 50-498 and STN 50-499
License Amendment Request -
Proposed Amendment to Technical Specification 3.7.1.2

Pursuant to 10CFR50.90, STP Nuclear Operating Company (STPNOC) hereby requests an amendment to Technical Specification (TS) 3.7.1.2, "Auxiliary Feedwater System," to clarify the required action and allowed outage time (AOT) for one, two, and three inoperable motor-driven auxiliary feedwater (AFW) pumps. The TS currently states that with the Train "A" pump inoperable, corrective actions should be initiated immediately to restore the pump to operable status, but no specific AOT is stated. The proposed amendment better reflects the AFW four-train design by applying the same AOT for any inoperable motor-driven AFW pump, regardless of train. The proposed amendment also extends the AOT for one inoperable motor-driven AFW pump from 72 hours to 28 days, based on a risk-informed approach. A sentence has been added to Action d. stating that Limiting Condition for Operation (LCO) 3.0.3 and all other LCO actions requiring Mode changes are suspended until one of the four inoperable auxiliary feedwater pumps is restored to operable status. There is also an administrative change in the wording of the LCO for TS 3.7.1.2 to clarify that there are only four AFW pumps in each unit. STPNOC has determined that the proposed amendment involves no significant hazards consideration.

Attachment 1 to this letter provides the No Significant Hazards Determination and Attachment 2 provides the TS page marked up with the proposed changes. Attachment 3 provides the retyped TS page. There are no proposed changes to the Bases for TS 3.7.1.2, but they are provided in Attachment 4 for information. Regulatory Guide 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," and Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to Licensing Basis," have been followed in preparing this proposed TS amendment.

The Plant Operations Review Committee and the Nuclear Safety Review Board have reviewed and approved the proposed change. STPNOC has notified the State of Texas in accordance with 10CFR50.91(b).

MB3586 & MB3590

STI: 31350204

STPNOC requests approval of the proposed amendment by June 30, 2002. Once approved, the amendment shall be implemented within 30 days.

If there are any questions regarding this proposed amendment to TS 3.7.1.2, please contact Mr. Scott Head, Manager, Licensing at (361) 972-7136 or me at (361) 972-8757.

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

Executed on 12/3/01

J. J. Sheppard
Vice President,
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Attachments:

1. Licensee's Evaluation
2. Proposed Technical Specification Changes (Mark-up)
3. Proposed Technical Specification Page (Retyped)
4. Bases (For Information Only)

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Attachment 1

Licensee's Evaluation

LICENSEE'S EVALUATION

1.0 DESCRIPTION

This letter is a request to amend Operating Licenses NPF-76 and NPF-80 for South Texas Project (STP) Units 1 and 2. The proposed amendment better reflects the auxiliary feedwater (AFW) system four-train design by specifying the same allowed outage time (AOT) for any one inoperable motor-driven AFW pump, regardless of train. The proposed amendment also extends the AOT for one inoperable motor-driven AFW pump from 72 hours to 28 days. A sentence has been added to Action d. stating that Limiting Condition for Operation (LCO) 3.0.3 and all other LCO actions requiring Mode changes are suspended until one of the four inoperable auxiliary feedwater pumps is restored to operable status. There is also an administrative change in the wording of the LCO for TS 3.7.1.2 to clarify that there are only four AFW pumps in each STP unit.

The reason for the change is twofold. The LCO for TS 3.7.1.2 states:

> "At least four independent steam generator auxiliary feedwater pumps and associated flow paths shall be OPERABLE...".

However, Action a. states:

> "With the Train A motor-driven auxiliary feedwater pump inoperable, initiate corrective actions to restore the pump to OPERABLE status as soon as possible."

Although it has never happened at STP, the Action statement could be interpreted as allowing the Train "A" motor-driven AFW pump to be inoperable indefinitely because no AOT is specified in the Action statement. Therefore, the Action statement must be made consistent with the LCO.

Secondly, STPNOC is employing the STP Probabilistic Risk Assessment (PRA) to support extension of the AOT for one inoperable motor-driven AFW pump. This will reduce an unnecessary burden by providing operational flexibility, i.e., increase the allocation of maintenance time to more safety-significant equipment.

STPNOC requests approval of the proposed amendment by June 30, 2002. Once approved, the amendment shall be implemented within 30 days.

2.0 PROPOSED CHANGE

Specifically, the words "At least" will be deleted in the first sentence in TS 3.7.1.2. The words could be interpreted to indicate that there are more than four AFW pumps per STP unit, which is incorrect.

Actions a) and b) will be deleted and replaced completely. Action a) will address the case of one inoperable motor-driven AFW pump and will require restoration within 28 days.

Action b) will address the case of the steam turbine-driven AFW pump or any two AFW pumps being inoperable and will require restoration of the affected pump(s) within 72 hours.

Action c) will be modified to address failure to meet the required action and associated AOT in a) or b), as well as the case of three inoperable AFW pumps. The existing required action for c) will remain as currently stated: i.e., be in at least hot standby within six hours and in hot shutdown within the following six hours.

Finally, a sentence will be added to Action d) stating that LCO 3.0.3 and all other LCO actions requiring Mode changes are suspended until one of the four inoperable auxiliary feedwater pumps is restored to operable status. This statement reflects the same sentence for the case of all AFW trains being inoperable in NUREG-1431, TS 3.7.5.

In summary, the proposed amendment better reflects the AFW four-train design by specifying the same AOT for any one inoperable motor-driven AFW pump, regardless of train. The proposed amendment also extends the AOT for one inoperable motor-driven AFW pump from 72 hours to 28 days, based on a risk-informed approach. A sentence has been added to Action d. stating that LCO 3.0.3 and all other LCO actions requiring Mode changes are suspended until one of the four inoperable auxiliary feedwater pumps is restored to operable status. There is also an administrative change in the wording of the LCO for TS 3.7.1.2 to clarify that there are only four AFW pumps in each unit.

There are no associated changes to the Bases for TS 3.7.1.2.

3.0 BACKGROUND

System Design (UFSAR 10.4.9)

The function of the auxiliary feedwater system (AFWS) is to supply feedwater (FW) to the secondary side of the steam generators (SGs) whenever the normal FW supply is not available. The AFWS is designed to deliver 500 gal/min within one minute of automatic initiation to:

- at least one SG after a feedwater line rupture or steam line break
- each of at least two SGs after a loss of FW accident
- at least two SGs after loss of offsite power (LOOP)

Under any condition, the AFWS is capable of starting and operating unattended for at least ten minutes.

A separate AFW train supplies each SG. Normally closed, fail-closed cross-connections are provided between the four trains to permit flow from any pump to any SG.

Four AFW pumps, each with independent motive power supplies, are provided to comply with redundancy requirements of the safety standards, both for equipment and power supplies. Three

electric motor-driven pumps (Trains A, B, and C) supply one SG each. Each pump motor is supplied power from a separate engineered safety bus and the power supply is separated throughout. The fourth pump (Train D) is a steam turbine-driven unit that supplies FW to the fourth SG. A steam line connection is taken from the Safety Class 2 section of the main steam line of the fourth SG upstream of the main steam isolation valve.

Accident Analysis (UFSAR 15.2.6 and 15.2.7)

Loss of normal feedwater (LONF), from pump failures, valve malfunctions, or LOOP, results in a reduction in capability of the secondary system to remove the heat generated in the reactor core. If an alternative supply of FW were not provided to the plant, core residual heat following reactor trip would heat the primary system water to the point where water relief from the pressurizer would occur, resulting in a substantial loss of water from the reactor coolant system (RCS). Since the plant is tripped well before the steam generator heat transfer capability is reduced, the primary system variables never approach a DNB condition.

The worst postulated LONF event is one in which a LOOP occurs coincident with reactor trip due to the decreased capability of the reactor coolant to remove residual core heat as a result of the reactor coolant pump (RCP) coastdown. Plant Specific Analysis has shown that a LONF with a subsequent LOOP is the most limiting Condition II event in the decrease in secondary heat removal category with respect to the Pressurizer Overfill Criterion.

The LONF analysis is performed to demonstrate the adequacy of the RCS and the AFW in removing long-term decay heat and preventing excessive heatup of the RCS with possible resultant RCS overpressurization or loss of RCS water.

An additional assumption made for the LONF evaluation is that the pressurizer power-operated relief valves (PORVs) are assumed to function normally. Operation of the PORVs maintains peak RCS pressure below the actuation setpoint (2,500 psia) of the pressurizer safety valves throughout the transient.

Within one minute following the low-low steam generator water level signal, at least two AFW trains are delivering flow automatically, reducing the rate of water level decrease. The capacity of the AFW pumps is such that the water level in the SGs being fed does not recede below the lowest level at which sufficient heat transfer area is available to dissipate core residual heat without water relief from the RCS relief or safety valves. The analysis also indicates that at no time is there water relief from the pressurizer; the peak water volume in the pressurizer is less than 2100 ft^3, which is the filled pressurizer volume.

The "A" and "D" trains of AFW both receive start signals from engineered safety features actuation system (ESFAS) Train "A". In the safety analyses, a single failure is assumed to occur in ESFAS Train "A", which results in no start signal reaching either Train "A" nor "D" AFW pump. Therefore, credit is taken for only two AFW pumps, the Train "B" and "C" motor-driven pumps, to provide flow to two SGs.

Technical Specifications

As a result of the four-train AFW design, TS 3.7.1.2 does not currently define a restoration time (or AOT) in the event that the Train "A" motor-driven AFW pump is inoperable. In the safety analyses, credit is only taken for motor-driven pumps "B" and "C" to provide the required flow to two steam generators. The Train "A" pump and motor have always been considered available as spares because the accident analysis only takes credit for two AFW pumps.

The proposed TS amendment would specify the same AOT for any one inoperable motor-driven AFW pump, regardless of train, thus ensuring the availability of the Train "A" pump if it were needed to mitigate the consequences of an accident.

Additionally, there is an inconsistency between the Limiting Condition for Operation (LCO) and Action statement (a) that has existed since initial NRC approval of the TS. The LCO in Technical Specification 3.7.1.2 states:

> "At least four independent steam generator auxiliary feedwater pumps and associated flow paths shall be OPERABLE...".

However, Action (a) states, in part:

> "With the Train A motor-driven auxiliary feedwater pump inoperable, initiate corrective actions to restore the pump to OPERABLE status as soon as possible...".

Although it has never happened at STP, the Action statement could be interpreted as allowing the Train "A" motor-driven AFW pump to be inoperable indefinitely because no allowed outage time (AOT) is specified in the Action statement.

Issue Discovery

The inconsistency between the LCO for TS 3.7.1.2 and Action a) has existed since the TS were approved by the NRC in November 1988. However, while performing non-LOCA sensitivities for the 20% steam generator tube plugging program for STP Unit 2, Westinghouse discovered that the case of 0% tube plugging is most limiting for the LONF coincident with a LOOP analyses. With the current LONF/LOOP analyses being performed at 10% plugging for both Units 1 and 2, and with the small amount of margin to pressurizer fill that currently exists, the 0% plugging sensitivities resulted in filling the pressurizer. This occurs in the LOOP analysis at reduced flow conditions (due to loss of power to the RCPs) while crediting 1000 gpm of auxiliary feedwater (AFW) flow to only two steam generators.

STPNOC intends to change the LONF/LOOP analyses to take credit for starting the third motor-driven AFW pump within fifteen minutes, which will provide sufficient additional cooling to the reactor coolant system to avoid filling the pressurizer. This will be done in accordance with 10CFR50.59.

4.0 TECHNICAL ANALYSIS

The following subsubsections are presented in the order of Regulatory Guide 1.177, Element 4.

4.1 Description of Proposed Change and Reasons for the Change

Refer to Section 2.0 above for a description of the proposed change to TS 3.7.1.2.

Engineering Studies

In the STP PRA, the success criterion is for one of four auxiliary feedwater pump trains to operate and deliver flow to its respective intact steam generator. The success criterion is two auxiliary feedwater pump trains for Anticipated Transient Without Scram events. Two pumps are required for the purpose of dissipating the additional heat that is generated as the result of not being shutdown. Auxiliary feedwater success in the PRA is relative to the figure-of-merits analyzed by the PRA. In other words, the PRA analysis is based on mitigating/preventing core damage and/or radiological release.

A maintenance state is defined as the collection of plant systems and components within the scope of the Configuration Risk Management Program (CRMP) that are non-functional at the same time. As new maintenance states are encountered during operation of the plant, they are evaluated for impact on core damage frequency (CDF) and added to the Risk Assessment Calculator (RAsCal) database. A risk management analysis was performed in support of this TS amendment request in accordance with procedure 0PGP05-ZE-0001, "PRA Analyses / Assessments." The first part of the analysis investigated the change to the AOT for Train "A," "B," and "C" motor-driven AFW pumps, and ascertained the impact of multiple AOT options on core damage frequency/large early release frequency (CDF/LERF). The second part of the analysis determined the number of days that would pass before exceeding the non-risk significant threshold (as defined in procedure 0PGP03-ZA-0091) using the models created in the first part of the analysis. The PRA is performed using the RISKMAN® for Windows software and procedure 0PGP05-ZE-0001 governs the method of application.

The components modeled in the AFW system PRA include the following

- Motor-driven AFW pumps
- Motor-driven AFW pump cubicle HVAC supply fans
- AFW storage tank
- AFW automatic recirculation control valves
- AFW containment isolation stop check motor-operated valves (MOVs)
- AFW flow control MOVs
- AFW inside containment isolation check valves
- Turbine-driven AFW pump
- AFW pump turbine trip and throttle valve
- AFW pump turbine steam inlet MOV

The following key assumptions were made in the AFW system PRA:

- No credit is taken for the crossover valves that allow an AFW pump to feed any SG
- The following valves are closed during maintenance on the AFW pump in that train: pump suction, pump discharge, and pump recirculation line
- The pump recirculation line is required to be open
- Maintenance on the AFW flow transmitters is not included in the scope of the AFW PRA because credit is taken for the operators manually controlling AFW flow

The following support systems are considered in the AFW system PRA:

- Main steam system
- Class IE 4.16 kV AC power distribution system
- Class IE 125 V DC power distribution system
- Class IE 480 V AC power distribution system
- Main steam isolation valve cubicle HVAC system
- Engineered safety features actuation system

NRC PRA Policy Statement

This change meets the objectives of the NRC PRA Policy Statement by making more efficient use of resources and reducing unnecessary burden. Extending the AOT for one inoperable motor-driven AFW pump will reduce an unnecessary burden by providing operational flexibility, i.e., increase the allocation of maintenance time to more safety-significant equipment.

Reason for Change

The reason for the change is twofold. Action statement a) in TS 3.7.1.2 must be made consistent with the LCO. Technical Specification 3.7.1.2 should be changed to reflect the current licensing basis, i.e., the increased AFW flow requirement to mitigate the consequences of a LONF/LOOP. The increased AFW flow requirement resulted from installation of the Delta 94 replacement SGs and the assumption of 0% SG tube plugging. Secondly, STP is employing the PRA to support extension of the AOT for one motor-driven AFW pump. This will reduce an unnecessary burden by providing operational flexibility, i.e., increase the allocation of maintenance time to more safety-significant equipment.

4.2 Process Used to Arrive at Proposed Change

As described above, 0PGP05-ZE-0001 and the RISKMAN® computer program were used to create a new maintenance state reflecting the AOT for any one inoperable motor-driven AFW pump and then to determine the impact on CDF.

4.3 Traditional Engineering Evaluations Performed

This change to TS 3.7.1.2 does not involve any physical changes to the plant or to the AFW system design that would affect the intent of the GDCs, national standards, or engineering principles. The change is more restrictive in that it specifies an AOT for Train "A" motor-driven AFW pump. At the same time, the change extends the AOT for one motor-driven AFW pump by using the PRA to confirm the acceptability of the extension.

Consistency with the defense-in-depth philosophy is maintained. Reasonable balance among prevention of core damage, prevention of containment failure, and consequence mitigation is preserved. Anticipated operational changes would not introduce new accidents or transients and would not increase the likelihood of an accident or transient. The PRA average maintenance model is used in the risk management analyses/assessments. Thus, average maintenance is considered, which is more conservative than considering no maintenance. This yields more conservative results regarding defense in depth.

The independence of physical barriers has not been degraded by the TS change. The change in AOT does not affect physical barriers in any manner. Defenses against human errors are maintained.

Sufficient safety margins are maintained in that the proposed AOT change is not in conflict with approved Codes and standards relevant to the AFW system. The assessment performed in accordance with procedure 0PGP-05-ZA-0001 demonstrates that the proposed AOT change does not adversely affect any assumptions or inputs to the safety analysis.

There is no adverse effect on the UFSAR acceptance criteria assuming the plant is in the AOT and there are no additional failures.

4.4 Changes Made to PRA for Change Evaluation

The risk analysis used a "Cloned" model titled AFWSTP99 that was created from the effective PRA Reference Model STP_1999. Modifications were made to AFWSTP99 to create the New Baseline Model A, which assumes all motor-driven AFW pumps are treated the same. Case studies 4 and 5 were quantified with minor variable changes using the AFWSTP99 New Baseline Model A configuration.

The PRA includes a top event for each of the four AFW trains. Local unplanned maintenance variables for each train are defined within the top event. All three trains of motor-driven AFW pumps are modeled independently with the same 72-hour unplanned maintenance duration distribution variable (mean 13.4 hours) and maintenance frequency (0.96 times per year). The cubicle fans for the motor-driven AFW pumps are tied logically to the operability of the pumps and are modeled in conjunction with them. Therefore, the maintenance duration of the cubicle vent fans is also manipulated in the analysis. Because motor-driven AFW pump "A" is not controlled in the current TS, a second pump outage in combination with the "A" pump is treated differently than the pump "B" and "C" combination. The Reference Model uses a 6-hour AOT

for the cross-train of "B" and "C", and a 72-hour AOT for the cross-trains of "A" and "B", and "A" and "C".

In the first part of the analysis, two case studies were run for possible AOTs in order to determine the change in CDF, LERF, incremental conditional core damage probability (ICCDP), and incremental conditional large early release probability (ICLERP):

- Case 4 - 14-day single-train AOT / 72-hour cross-train AOT study
- Case 5 - 28-day single-train AOT / 72-hour cross-train AOT study.

A bounding case study quantification was performed in the second part of the analysis, i.e., in determining the number of days before crossing the non-risk significant threshold (as defined in procedure 0PGP03-ZA-0091). A New Baseline Model B was created specifically for this study. This study is bounding because it is not the intention to take all three motor-driven trains of AFW out of service at their current maintenance frequency for the total AOT. Because random and planned maintenance are calculated within the average maintenance model, unplanned maintenance was removed from AFW at the system level, but planned maintenance was left in the event tree level. Though still conservative, this modification minimizes the effects of over-counting maintenance while a train of motor-driven AFW is taken out of service in the average maintenance model. It is important that because unplanned maintenance is removed from AFW in this model, modified AOTs manipulated in the first part of the analysis play no part in this quantification.

The results are presented in section 4.8 below.

4.5 Applicability and Quality of PRA Models for Evaluation

STP has a Level 1/Level 2 PRA and Individual Plant Evaluation (IPE) that includes external events. The external events portion contains a fire, flood, and seismic PRA analysis. The STP PRA has been structured to have a comprehensive treatment of common cause failures and plant configurations. A detailed human reliability analysis is also included.

The STP PRA has undergone several extensive NRC reviews in support of license amendments:

- "A Review of the South Texas Probabilistic Safety Analysis for Accident Frequency Estimates and Containment Binning," Sandia National Laboratories, NUREG/CR 5606, dated August 1991
- "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to the Probabilistic Safety Analysis Evaluation," sent to Houston Lighting & Power Company under cover letter dated January 21, 1992 (ST-AE-HL-92962)
- "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to the Probabilistic Safety Assessment - External Events," sent to Houston Lighting & Power Company under cover letter dated August 31, 1993 (ST-AE-HL-93526)

- "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment Nos. 59 and 47 to Facility Operating License Nos. NPF-76 and NPF-80," sent to Houston Lighting & Power Company under cover letter dated February 17, 1994
- "Staff Evaluation of South Texas Project Individual Plant Examination (IPE) (Internal Events Only)," sent to Houston Lighting & Power Company under cover letter dated August 9, 1995 (ST-AE-HL-94279) (included equipment survivability analysis)
- "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment Nos. 85 and 72 to Facility Operating License Nos. NPF-76 and NPF-80," sent to Houston Lighting & Power Company under cover letter dated October 31, 1996 (ST-AE-HL-94678). This amendment allows extension of the standby diesel generator AOT to fourteen days, and extension of the essential cooling water and essential chilled water AOTs to seven days.
- "Safety Evaluation by the Office of Nuclear Reactor Regulation, Houston Lighting & Power Company South Texas Project, Units 1 and 2, Graded Quality Assurance Program," sent to Houston Lighting & Power Company under cover letter dated November 6, 1997 (ST-AE-HL-94983)
- "Safety Evaluation by the Office of Nuclear Reactor Regulation, Risk-Informed Exemptions from Special Treatment Requirements," sent to STP Nuclear Operating Company under cover letter dated August 3, 2001 (AE-NOC-01000845)

4.6 Risk Measures Used in Evaluations

According to Regulatory Guide 1.174, a change in CDF of less than 10^{-6} per reactor year and a change in LERF of less than 10^{-7} per reactor year are considered very small for a change to the PRA. Regulatory Guide 1.174 also considers changes in CDF less than 1.0E-5 and greater than 1.0E-6 to be small changes that require tracking of cumulative impact. Tracking of cumulative impact is accomplished via the Configuration Risk Management Program (CRMP) and station goals.

According to Regulatory Guide 1.177, the licensee has to demonstrate that the extension of the TS AOT has only a small quantitative impact on plant risk. Regulatory Guide 1.177 states that an ICCDP of less than 5.0E-7 and ICLERP of less than 5.0E-8 are considered small for a single AOT TS change. Section 4.8 tabulates the ICCDP and ICLERP calculated in the first part of the risk management analysis performed for the extension of the AOT to 28 days for one inoperable motor-driven AFW pump.

The second part of the analysis uses the requirements of 10CFR50.65(a)(4) in the bounding case to assess and manage the risk that may result from the proposed maintenance activities. An average maintenance model is used to determine the number of days it will take to reach the non-risk significant threshold (as defined in procedure 0PGP03-ZA-0091) for one motor-driven AFW pump being out of service for maintenance.

4.7 Data in Addition to PRA Database

There was no data required in addition to the PRA database.

4.8 Summary of Risk Measures Calculated and Intermediate Results

Case Study	Single Train AOT	Cross-Train AOT	AVG CDF	AVG LERF	ΔCDF	ΔLERF	% Change CDF	ICCDP	ICLERP
Reference Model	72 hr	72/6 hr	1.1709E-5	5.76E-7	NA	NA	NA	NA	NA
New Baseline A	72 hr	6 hr	1.1708E-5	5.7121E-7	-1.0E-9*	-4.8E-9*	~0%	NA	NA
Case 4	14 day	72 hr	1.2432E-5	5.8319E-7	7.24E-7	1.19E-8	5.82%	3.372E-8	5.58E-10
Case 5	28 day	72 hr	1.3220E-5	5.9130E-7	1.512E-6	2.0E-8	11.44%	1.284E-7	1.71E-9

* Expected decreases due to cross-train AOT modifications in the models

As tabulated above, the first part of the analysis demonstrates that the ICCDP and the ICLERP for both cases meet the Regulatory Guide 1.174 definition of a small change for a single AOT TS change. Also, the ΔCDF for the 28-day AOT meets the Regulatory Guide 1.174 definition of a small change, so it requires tracking of cumulative impact via the CRMP. Therefore, prudence requires serious consideration of implementing compensatory measures.

The second part of the analysis demonstrates that when all motor-driven AFW pumps are treated the same, and one motor-driven AFW pump is taken out of service, and AFW unplanned maintenance is removed from the quantification, the non-risk significant threshold will be crossed in approximately 28.7 days in all cases. Again, prudence requires serious consideration of implementing compensatory measures.

4.9 Sensitivity and Uncertainty Analyses Performed

All case studies evaluated for the proposed TS change are sensitivity studies on the base model. The results of this analysis introduce no new uncertainties into the STP PRA. The uncertainty of the STP PRA spans one order of magnitude.

4.10 Summary of Risk Impacts and Proposed Compensating Actions

Once the new CDF and LERF were determined, a three-tiered approach was implemented in accordance with Regulatory Guide 1.177 to evaluate the risk associated with the proposed TS AOT as follows.

The Tier 1 evaluation quantifies the impact on plant risk of the proposed TS change as expressed by the change in CDF, ICCDP, change in LERF, and ICLERP.

The Tier 2 evaluation identifies potentially high risk configurations that could exist if equipment in addition to that associated with the change were to be taken out of service simultaneously, or other risk-significant operational factors such as concurrent system or equipment testing were also involved. For this evaluation, the Average Plant Model was used, which accounts for average maintenance, both planned and unplanned, occurring concurrent with the proposed change.

A Tier 3 evaluation was not necessary because STP has a configuration risk management program in place.

Assumptions

1. The following assumptions are made in accordance with Regulatory Guide 1.177:
   - CDF and LERF are estimated using the mean outage times for the current and proposed AOT duration distributions.
   - The average downtime for the motor-driven AFW pumps is assumed to increase proportionally with the proposed AOT for downtimes associated with unscheduled maintenance.
   - Scheduled preventative maintenance downtime is representative of current plant practices.

2. Cubicle vent fan AOT is assumed to be the same as the associated motor-driven AFW pump AOT.

3. All other assumptions in PRA STP_1999 are unaffected by this analysis and remain valid.

The case studies presented are bounding cases and do not represent current or expected plant practices. It is expected that plant maintenance will continue at the current frequency and duration, and that very infrequently a single train will be taken out of service for an extended time. The case studies are required to assume that a train of motor-driven AFW will be taken out of service at the current maintenance frequency for the expected AOT and therefore are conservative in determining a realistic ΔCDF.

Proposed Compensating Actions

Compensatory measures will be used to offset the increased risk of allowing a 28-day AOT and will be implemented when it is recognized that maintenance on a motor-driven AFW pump will last for more than 14 days. The measures will be implemented through a licensee-controlled document.

4.11 Contemporaneous Assessment of the Impact on Safety

STP currently has in place a risk-informed, on-line maintenance tracking and control process. The Configuration Risk Management Program (CRMP) was incorporated into the TS via

Amendments 85 and 72, issued on October 31, 1996. In the Safety Evaluation, the NRC Staff concluded that STP had "provided the necessary assurances that appropriate assessments of the overall impacts on safety functions will be performed prior to any maintenance or other operational activities, including removal of equipment from service."

The CRMP is used to assess the risk impact of equipment out-of-service, to maintain station risk at desired levels, and to assess risk impacts for planned and unplanned equipment outages that are modeled in the STP PRA. The CRMP is applicable to systems, structures, and components (SSCs) within the scope of the station's PRA as reflected in the RAsCal for Mode 1 and 2 operations and Shutdown Risk Assessment for Modes 5, 6, and Defueled.

The CRMP satisfies the requirements of the Maintenance Rule to assess the cumulative effects of maintenance and testing on SSC. The CRMP governing procedure, 0PGP03-ZA-0091, satisfies the Maintenance Rule requirements for the applicable modes, as specified in 10CFR50.65(a)(4).

RAsCal is the computer software used to assess the changes in CDF due to varying plant configurations resulting from planned or unplanned maintenance activities on risk significant equipment in Modes 1 and 2.

The Risk and Reliability Analysis Section assesses the yearly cumulative risk for each unit and communicates the results to affected personnel. Work schedules are adjusted to desired levels of risk for Modes 1 and 2. Unplanned Event Risk Assessments are made for Modes 1 and 2 and outage schedules and risk assessments are performed for Modes 5, 6, and Defueled. Risk assessments consider any significant performance issues associated with the standby trains of the SSC.

On-Line Maintenance - As equipment becomes functional or non-functional, the designated on-shift Senior Reactor Operator is responsible for ensuring the weekly risk profile is updated with actual back in service times and actual out of service times for SSC modeled in RAsCal.

Unplanned Events - During an Unplanned Event, the Shift Supervisor determines whether the SSC is within the scope of RAsCal. If the SSC is not within the scope of RAsCal, then the CRMP does not apply. The designated on-shift Senior Reactor Operator calculates a projected weekly cumulative risk for the expected duration of the Unplanned Event. If the projected weekly cumulative risk will not exceed the Non Risk-Significant Threshold (1.00E-6 events/year), then no further action is required. The Shift Supervisor may heighten station awareness of work that is risk significant to ensure completion of the work as scheduled.

Risk Reduction - If the Non Risk-Significant Threshold is projected to be exceeded within the current work week and the exceedance has not been previously approved by the Plant Manager, the Shift Supervisor notifies the Duty Operations and Duty Plant Manager, and identifies and implements compensatory measures approved by the Duty Plant Manager.

If the Potentially Risk Significant Threshold (1.00E-05 events/year) is projected to be exceeded within the current work week, the Shift Supervisor notifies the Duty Operations Manager and the

Duty Plant Manager, and reviews the Technical Specifications, Technical Requirements Manual and the Offsite Dose Calculation Manual requirements for affected equipment to ensure associated actions are being performed. The Shift Supervisor also evaluates changing current plant conditions to place the Unit in a mode or a power level that may reduce the relative risk.

5.0 REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

STPNOC has evaluated whether a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10CFR50.92 as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The proposed TS change reflects the STP four-train AFWS design in the required actions and AOTs. No actual plant equipment or accident analyses will be affected by the proposed change. Therefore, the proposed AOT change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The administrative change of deleting the words "At least" clarifies that there are only four AFW pumps in the design. The administrative change involves no increase in the probability or consequences of an accident.

If all four AFW trains are inoperable in Mode 1, 2, or 3, the unit is in a seriously degraded condition with only limited means for conducting a cooldown. In such a condition, the unit should not be perturbed by any action, including a power change that might result in a trip. The seriousness of this condition requires that action be started immediately to restore one AFW train to operable status. Required Action d) is modified by adding a sentence indicating that all required mode changes or power reductions are suspended until one AFW train is restored to operable status. This statement reflects the same sentence for the case of all AFW trains being inoperable in NUREG-1431, TS 3.7.5. In this case, LCO 3.0.3 is not applicable because it could force the unit into a less safe condition. Therefore, the addition of the sentence to Action d) involves no increase in the probability or consequences of an accident.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The proposed TS change reflects the STP four-train AFWS design in the required actions and AOTs. No actual plant equipment or accident analyses will be affected by the proposed change and no failure modes not bounded by previously evaluated accidents will be created. Therefore, the proposed AOT change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

The administrative change of deleting the words "At least" clarifies that there are only four AFW pumps in the design. The change does not create the possibility of any accident.

Required Action d) is modified by adding a sentence indicating that all required mode changes or power reductions are suspended until one AFW train is restored to operable status. This statement reflects the same sentence for the case of all AFW trains being inoperable in NUREG-1431, TS 3.7.5. In this case, LCO 3.0.3 is not applicable because it could force the unit into a less safe condition. Therefore, the addition of the sentence to Action d) does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No

Margin of safety is associated with confidence in the ability of the fission product barriers (i.e., fuel and fuel cladding, reactor coolant pressure boundary, and containment structure) to limit the level of radiation dose to the public.

The proposed TS change reflects the STP four-train AFWS design in the required actions and AOTs. No actual plant equipment or accident analyses will be affected by the proposed change. Additionally, the proposed change will not relax any criteria used to establish safety limits, will not relax any safety systems settings, and will not relax the bases for any limiting conditions of operation. Therefore, the proposed AOT change does not involve a significant reduction in a margin of safety.

The administrative change of deleting the words "At least" clarifies that there are only four AFW pumps in the design. The change does not involve any reduction in a margin of safety.

Required Action d) is modified by adding a sentence indicating that all required mode changes or power reductions are suspended until one AFW train is restored to operable status. This statement reflects the same sentence for the case of all AFW trains being inoperable in NUREG-1431, TS 3.7.5. In this case, LCO 3.0.3 is not applicable because it could force the unit into a less safe condition. Therefore, the addition of the sentence to Action d) does not involve a significant reduction in a margin of safety.

Based on the above, STPNOC concludes that the proposed amendment involves no significant hazards consideration under the standards set forth in 10CFR50.92, and, accordingly, a finding of "no significant hazards consideration" is justified.

5.2 Applicable Regulatory Requirements/Criteria

Section 4, "Technical Analysis," provided the information required by Element 4 of Regulatory Guide 1.177. Based on the considerations discussed in Sections 4 and 5 above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10CFR20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10CFR51.22(c)(9). Therefore, pursuant to 10CFR51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 REFERENCES

7.1 Regulatory Guide 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications"

7.2 NUREG-1431, "Standard Technical Specifications – Westinghouse Plants"

7.3 Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis"

Attachment 2

Proposed Technical Specification Changes

(Mark-up)

PLANT SYSTEMS

AUXILIARY FEEDWATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.2 ~~At least four~~ **Four** independent steam generator auxiliary feedwater pumps and associated flow paths shall be OPERABLE with:

a. Three motor-driven auxiliary feedwater pumps, each capable of being powered from separate emergency busses, and

b. One steam turbine-driven auxiliary feedwater pump capable of being powered from an OPERABLE steam supply system.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

SEE INSERT NEXT PAGE

~~a. With the Train A motor-driven auxiliary feedwater pump inoperable, initiate corrective actions to restore the pump to OPERABLE status as soon as possible. The provisions of Specification 4.0.4 are not applicable.~~

~~b. With any of the following combinations of auxiliary feedwater pumps inoperable:~~

~~1) Train B or Train C motor-driven pump,~~
~~2) Train D turbine-driven pump and any one motor-driven pump,~~
~~3) Train A and either Train B or Train C motor-driven pump, or~~
~~4) Train D turbine-driven pump~~

~~Restore the affected auxiliary feedwater pump(s) to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours. The provisions of Specification 3.0.4 are not applicable for entry into Mode 3 for the turbine driven pump.~~

~~c. With Train B and Train C motor driven pumps, or any three auxiliary feedwater pumps inoperable, be in at least HOT STANDBY within 6 hours and in HOT SHUTDOWN within the following 6 hours.~~

ADD

d. With four auxiliary feedwater pumps inoperable, immediately initiate corrective action to restore at least one auxiliary feedwater pump to OPERABLE status as soon as possible. **LCO 3.0.3 and all other LCO actions requiring Mode changes are suspended until one of the four inoperable auxiliary feedwater pumps is restored to OPERABLE status.**

INSERT FOR PAGE 3/4 7-4

a. With one motor-driven auxiliary feedwater pump inoperable, restore the pump to OPERABLE status within 28 days.

b. With the turbine-driven auxiliary feedwater pump inoperable, or with any two auxiliary feedwater pumps inoperable, restore the affected auxiliary feedwater pump(s) to OPERABLE status within 72 hours. The provisions of Specification 3.0.4 are not applicable for entry into Mode 3 for the turbine-driven pump.

c. With three auxiliary feedwater pumps inoperable, or if the required action and associated allowed outage time for a) or b) is not met, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

Attachment 3

Proposed Technical Specification Page
(Retyped)

PLANT SYSTEMS

AUXILIARY FEEDWATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.2 Four independent steam generator auxiliary feedwater pumps and associated flow paths shall be OPERABLE with: I

a. Three motor-driven auxiliary feedwater pumps, each capable of being powered from separate emergency busses, and

b. One steam turbine-driven auxiliary feedwater pump capable of being powered from an OPERABLE steam supply system.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one motor-driven auxiliary feedwater pump inoperable, restore the pump to OPERABLE status within 28 days.

b. With the turbine-driven auxiliary feedwater pump inoperable, or with any two auxiliary feedwater pumps inoperable, restore the affected auxiliary feedwater pump(s) to OPERABLE status within 72 hours. The provisions of Specification 3.0.4 are not applicable for entry into Mode 3 for the turbine-driven pump.

c. With three auxiliary feedwater pumps inoperable, or if the required action and associated allowed outage time for a) or b) is not met, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

d. With four auxiliary feedwater pumps inoperable, immediately initiate action to restore at least one auxiliary feedwater pump to OPERABLE status as soon as possible. LCO 3.0.3 and all other LCO actions requiring Mode changes are suspended until one of the four inoperable auxiliary feedwater pumps is restored to OPERABLE status.

Attachment 4

Bases

(For Information Only)

FOR INFORMATION ONLY

AUXILIARY FEEDWATER SYSTEM BASES

The OPERABILITY of the Auxiliary Feedwater System ensures that the Reactor Coolant System can be cooled down to less than 350°F from normal operating conditions in the event of a total loss-of-offsite power.

Each auxiliary feedwater pump is capable of delivering feedwater to the entrance of the steam generators with sufficient capacity to ensure that adequate feedwater flow is available to remove decay heat and reduce the Reactor Coolant System temperature to less than 350°F when the Residual Heat Removal System may be placed into operation. Verifying that each AFW pump's developed head at the flow test point is greater than or equal to the required developed head ensures that AFW pump performance has not degraded during the cycle (Ref.: Calculations MC-5861 and ZC-7019). Flow and differential head are normal tests of centrifugal pump performance required by Section XI of the ASME Code. The AFW pumps are tested using the test line back to the AFST and the AFW isolation valves closed to prevent injection of cold water into the steam generators. This testing methodology confirms one point on the curve and is indicative of overall performance. Such inservice tests confirm component OPERABILITY, trend performance, and detect incipient failures by indicating abnormal performance. Performance of inservice testing, discussed in the ASME Code, Section XI, satisfies this requirement. The STPEGS isolation valves are active valves required to open on an AFW actuation signal. Specification 4.7.1.2.1 requires these valves to be verified in the correct position.