Nuclear Operating Company

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

December 28, 2003
NOC-AE-03001660
10CFR50.90

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

South Texas Project
Unit 2
Docket No. STN 50-499
Supplement 2 to Proposed Emergency Change to Technical Specification 3.8.1.1 Note 12

Reference: 1. Letter from David Jaffe, NRC, to J. J. Sheppard, STPNOC, dated December 23, 2003, "South Texas Project, Unit 2 – Issuance of Amendment Concerning One-Time Allowed Outage Time Extension for No. 22 Emergency Diesel Generator (TAC No MC1616)"

2. Letter from G. L. Parkey to NRC Document Control Desk dated December 27, 2003, "Proposed Emergency Change to Technical Specification 3.8.1.1 Note 12" (NOC-AE-03001657)

In Reference 2, STPNOC submitted a proposed emergency amendment to the STP Unit 2 Operating License NPF-80 to extend the one-time allowed outage time (AOT) for Unit 2 Standby Diesel Generator (SDG) 22 from 21 days approved in Reference 1 to 113 days to allow time to complete repair of the SDG. That application is based on no potential for common mode failure. To provide further confirmation that there is no potential for common mode failure, STPNOC committed in Reference 2 to apply the 7-day AOT extension approved by Reference 1 to inspect the connecting rods on the other two Unit 2 SDGs and apprise the NRC of the results of the inspections.

The inspections of the other connecting rods on SDG 22 and the connecting rods on the other two Unit 2 SDGs were completed with no recordable indications. SDG 21 was non-functional for about 7.8 hours during its inspection and SDG 23 was non-functional for about 7.4 hours during its inspection. These times represent a substantial improvement over the durations assumed in the risk assessment performed for the evolution.

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Reference 2 includes the probabilistic risk analysis (PRA) for the proposed TS change, including the treatment of non-safety diesel generators (NDG) being provided as compensatory action. Attachment 1 to this letter provides additional information in response to NRC staff questions regarding the analysis of the NDGs that was provided in Reference 2. Attachment 2 shows the impact from the actual non-functional times for SDG 21 and SDG 23 as noted above.

If there are any questions regarding this response, please contact Mr. Scott Head at (361) 972-7136 or me at (361) 972-7800.

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

Executed on December 28, 2003.
date

G. L. Parkey
Vice President,
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jal/

Attachment:
1. Response to NRC Staff Questions on Non-Safety Diesel Generator (NDG) Analysis
2. Risk Impact of Non-functional Time During Inspections of SDG 21 and SDG 23

cc:
(paper copy)

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Response to NRC Staff Questions on Non-Safety Diesel Generator (NDG) Analysis

NDG Description

The information below was provided in STPNOC's letter dated December 20, 2003 (NOC-AE-03001653). The capability of the four NDGs is 5400 kW, which compares to the 5500 kW rating of SDG 22.

As an additional compensatory action, STPNOC will install four vendor-supplied diesel generator sets to provide temporary power. Each diesel is rated for 1350 kW prime at a 0.8 power factor. The NDGs will be located sufficiently far away from overhead 345 kV and 138 kV transmission lines so not to present a potential hazard. Each NDG will have its own isolation circuit breaker. The temporary equipment will include a set of vendor supplied step-up transformers to facilitate connection to STP's 13.8 kV non-safety switchgear located in the switchyard. The 13.8 kV non-safety switchgear can be connected through the non-safety emergency 13.8 kV electrical system to allow a source of electrical power to the unit's 4160V ESF buses.

The NDGs will be capable of supplying power to an essential cooling water pump, an auxiliary feedwater pump, and required electrical auxiliary building ventilation to provide a backup power source for achieving safe shutdown. Each NDG will be capable of operating for 24 hours without refueling. Only three of the four NDGs are required to supply these loads.

This source of emergency electrical power is a defense-in-depth measure while SDG 22 is being repaired. This source of power is not a substitute for the safety-related emergency power requirements described in the Updated Final Safety Analysis Report.

The NDG capability will only be utilized when the failure of emergency power sources in Unit 2 has occurred such that the remaining emergency power is judged to be inadequate for mitigation of the event. The NDGs are started and switched to the non-safety emergency 13.8 kV electrical system locally. Operating procedures will be developed to line up and control the loading of the NDGs. The operating procedures will include appropriate precautions to prevent crosstie between the STP units.

The temporary equipment is not physically or electrically adjacent to any Class 1E or safety-related equipment. Therefore, the temporary equipment does not directly or indirectly affect the design function of safety-related equipment credited in the safety analyses.

The NDGs will be tested after installation and periodically thereafter. Vendor post-installation testing will include:

1) Verification of alarm functions, normal operating parameters, phase rotation, and the phasing between the NDGs is synchronous,
2) Load testing utilizing a load bank to ensure that the load demand on the NDG is distributed appropriately.

3) Verification that the phasing between the NDGs and the emergency transformer are synchronous.
4) Verification that the starting batteries will perform their function.

The NDGs will be inspected weekly and operated monthly on a load bank to verify their availability.

Alternate Onsite A.C. Source Precedent

Although a change to the STP Technical Specifications regarding the use of the NDGs as a compensatory measure is not being requested, it should be noted that the NRC has previously licensed the substitution of an alternate onsite emergency power source (i.e., non-safety related diesel generator) as an SDG replacement. The STP Technical Specifications were amended to allow the use of a non-safety diesel generator as a replacement for one of the two required SDGs in Mode 5 and in Mode 6 with less than 23 feet of water above the reactor vessel flange. This change to STP Technical Specification 3.8.1.2 was issued in Amendments 71 (Unit 1) and 60 (Unit 2) on February 14, 1995 (TAC Nos. M90798 and M90799).

PRA Analysis of Temporary Diesel Generator Capability

As described in STPNOC's letter dated December 27, 2003 (NOC-AE-03001657), STPNOC has determined that an extension of the SDG AOT to 113 days is necessary and can be justified. The proposed AOT extension meets the criteria of Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis" and Regulatory Guide 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants" with no additional compensatory measures required beyond those actions established by the STP Configuration Risk Management Program (CRMP).

However, even though not required to meet the Regulatory Guides, STPNOC will also put in place the additional compensatory measure of incorporating temporary non-safety-related diesel generator capability in order to provide added safety margin.

The use of the NDGs can be explicitly credited in STP's PRA for this issue. The NDGs are assumed to provide power to Unit 2 'B' Train components in the event of a Loss of Offsite Power (LOOP). The NDGs have arrived on site with installation activities in progress, but for the PRA analysis they are assumed to be available on January 15, 2004. The NDGs are conservatively not being credited for safety injection (SI) conditions (i.e., LOCAs, Steam Generator Tube Ruptures, and Steam Line Breaks).

The capabilities of the NDGs are such that the essential equipment for supporting safe reactor shutdown is fully supported. The external events included in the PRA that affect the plant switchyard are also assumed to affect the NDGs. These include external floods, seismic events, and high winds. For external floods, the NDGs are not credited in the most severe cases, which are the loss of the main coolant reservoir impoundment in differing locations. For seismic events, the NDGs are not credited with the same level of robustness as the SDGs. The NDGs are

assumed to fail with the same likelihood as the electric grid. It is also important to note that unlike the permanent SDGs, the NDGs are not dependent upon essential cooling water for cooling. The NDGs are stand-alone devices with all support functions resident with the NDG itself. The PRA was modified to remove the essential cooling water system dependency from the Train B components in the event of a LOOP for the time duration that the NDG is present and functional. The LOOP event initiators where the NDGs are credited include both internally initiated LOOP scenarios (i.e., transient induced) and externally initiated LOOP scenarios. Since the NDGs are credited to support only LOOP scenarios and not SI scenarios, automatic actuation of the NDGs in prescriptive timeframes is not required (i.e., manual operator action is adequate). For purposes of the analysis, an NDG failure rate of 0.1 and an operator action failure rate of 0.1 is considered appropriate and conservative.

The NDGs, when installed, will substantially restore STP's original levels of defense-in-depth for LOOP scenarios and provide a significant decrease in station risk levels (i.e., ICCDP and ICLERP) for the SDG 22 outage.

	ICCDP	Total CDF	ICLERP	Total LERF
STP Unit 2 before proposed change	-	9.1E-06/yr	-	5.2E-07/yr
Results with 92 days additional AOT without credit for temporary diesel power	6.2E-06	1.5E-05/yr	4.3E-07	9.4E-07/yr
Results with no available NDG from 12/30/2003 to 1/15/2004	9.6E-7	-	7.1E-8	-
Results with NDG available from 1/15/2004 to 3/31/204	2.8E-7	-	1.5E-8	-
Total Results for the time period from 12/30/2003 to 3/31/2004	1.2E-06	1.0E-05/yr	8.6E-08	6.0E-07/yr
RG 1.174 Criteria	>1.0E-06 <1.0E-05	<1.0E-04/yr	>1.0E-07 <1.0E-06	<1.0E-05/yr

As committed in STPNOC's letter dated December 20, 2003 (NOC-AE-03001653), STPNOC has procedural guidance to supply electrical power to an ESF bus in a unit that has lost all electrical power to its ESF busses from a functioning Emergency Diesel in the opposite unit. This procedure will only be implemented when the failure of emergency power sources in a unit has occurred (including the NDGs) such that the remaining emergency power is judged to be inadequate for mitigation of the event and sufficient power is available in the opposite unit to meet its electrical power requirements. This compensatory action is not credited in any of the PRA analyses.

The NDGs described above are credited in the PRA only for powering the Unit 2 'B' Train ESF bus that normally gets emergency power from SDG 22. However, the NDGs can be aligned to provide emergency power to any Unit 2 ESF bus.

Basis for NDG Failure Rate Assumptions

The PRA evaluation of the non-safety diesel generators used as back-up power for 4.16kV bus E2B uses assumed failure rates for the NDG system and the operator actions necessary to align this source to provide power. The NDG system is assumed to fail at a frequency of 0.1. This includes start, connect to the temporary bus and run for 24 hours. The likelihood of operator failure is assumed to be 0.1 for aligning power once the NDGs are operating and successfully starting the equipment necessary to mitigate the consequences of loss of offsite power. This discussion provides additional justification for the assumed failure rates.

The STP PRA includes two non-safety related diesel generators, the balance-of-plant (BOP) unit and the technical support center (TSC) unit. The failure rates in the PRA for these diesel generators are:

Name	Decription	Mean
ZTDGB1	BOP/TSC Diesel Generator - Fail in First Hour, STP_REV4	1.5E-02
ZTDGB2	BOP/TSC Diesel Generator - Fail After First Hour, STP1999	2.3E-03
ZTDGBS	BOP/TSC Diesel Generator - Fail to Start, STP_REV4	2.7E-02

For a 24-hour mission time, the likelihood of failure of either of these units is 9.6E-02. The NDG units being used are standard commercial design and as such should have a similar or slightly better failure likelihood than the non-safety units installed in the plant.

The operator action likelihood assumed in the PRA evaluation is based on the presence of temporary operating procedures, operator training on these procedures, and the amount of time available to perform the actions. The amount of time available for operator action given a station blackout with no turbine driven auxiliary feedwater pump operating is one hour, with the turbine driven auxiliary feedwater pump operating, the time goes to greater than four hours. From the PRA, several operator actions are shown below in order to place the 0.1 value in perspective. The action most similar in timing and the post alignment actions to that associated with the NDGs is HEOXB, Align the Emergency Transformer. The operator actions necessary to establish bleed and feed must be accomplished in a very short time and are somewhat complex while the operator actions necessary to manually trip the reactor are not complex and are almost

a reflex action. The operator actions shown below are based on recently completed operator action interviews with STP operating crews.

Name	Description	Mean
HEOT01	Manually Trip Reactor, No MFW, ATWS	1.18E-03
HEOXB	Align Emergency Transformer - No 345kV	4.04E-02
HEOB02	Bleed & Feed - No AFW (GT Tree) - STP Rev. 4	6.07E-03

Based on the evaluation above, STPNOC has concluded that using the 0.1 value for NDG failure and operator action failure is conservative.

A sensitivity evaluation for the NDGs installed in the switchyard was performed by increasing the PRA failure probabilities for the NDG system and the operators. The diesel failure probability was increased from 0.1 to 0.2 and the operator error probability was increased from 0.1 to 0.25. The set of plant conditions with the NDGs included were reevaluated for the period of time from December 31, 2003 to March 31, 2004. With the higher failure probabilities, the ICCDP for the NDGs increased from 2.8E-07 to 9.0E-07 and the ICLERP increased from 1.5E-08 to 5.5E-08. The total CDF with the increases is 1.1E-05 per year and the total LERF is 6.4E-07 per year. This sensitivity study demonstrates the results continue to remain acceptable with respect to Regulatory Guide 1.174.

Risk Impact of Non-functional Time During Inspections of SDG 21 and SDG 23

The results for the 7-day extension granted in Reference 1 of the cover letter, and incorporating the contribution to risk levels from the SDG 21 and SDG 23 inspections based on actual return to functional times are shown in the table below.

Non-functional SDG Combinations	Hrs	ICCDP	ICLERP
SDG22 SDG21	7.72	4.2E-07	3.5E-08
SDG22 SDG23	7.42	3.9E-07	3.1E-08
SDG22	152.86	3.8E-07	2.8E-08
Total	168	1.2E-06	9.4E-08

The table below assumes no credit is given for the NDGs and incorporates the 7-day SDG 22 AOT extension from December 23,2003 to December 30, 2003 for inspection of SDG 21 and SDG 23. By incorporating the 7-day extension, the total impact to CDF and LERF for the total SDG 22 outage from the end of the current Technical Specification SDG AOT (14 days) to SDG 22 return-to-service time (March 31, 2004) is seen to meet the RG 1.174 criteria even without NDG credit.

	ICCDP	Total CDF	ICLERP	Total LERF
Results with 7 day extension and DG 21/23 Inspections from 12/23/2003 to 12/302003	1.2E-06	-	9.4E-08	-
Results with 92 days additional AOT without credit for temporary diesel power	6.2E-06	-	4.3E-07	-
Total Results for the time period from 12/23/2003 to 3/31/2004	7.4E-06	1.6E-05/yr	5.2E-07	1.0E-06/yr
RG 1.174 Criteria	>1.0E-06 <1.0E-05	<1.0E-04/yr	>1.0E-07 <1.0E-06	<1.0E-05/yr

The table below takes credit for the NDGs and incorporates the 7-day SDG 22 AOT extension from December 23, 2003 to December 30, 2003 for inspection of SDG 21 and SDG 23. Incorporating the 7-day extension, the total impact to CDF and LERF remains within the RG 1.174 criteria.

	ICCDP	Total CDF	ICLERP	Total LERF
Results with 7 day extension and DG 21/23 Inspections from 12/23/2003 to 12/302003	1.2E-06	-	9.4E-08	-
Results with no available NDG from 12/30/2003 to 1/15/2004	9.6E-7	-	7.1E-8	-
Results with NDG available from 1/15/2004 to 3/31/204	2.8E-7	-	1.5E-8	-
STP Unit 2 before proposed change	-	9.1E-06/yr	-	5.2E-07/yr
Total Results for the time period from 12/23/2003 to 3/31/2004	2.4E-06	1.2E-05/yr	1.8E-07	7.0E-07/yr
RG 1.174 Criteria	>1.0E-06 <1.0E-05	<1.0E-04/yr	>1.0E-07 <1.0E-06	<1.0E-05/yr