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

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

South Texas Project
Unit 1
Docket Nos. STN 50-498
Revision to Request for Enforcement Discretion for Technical Specification 3.0.3
as it Applies to Operability Requirements for the Fuel Handling Building HVAC

STP Nuclear Operating Company (STPNOC) requests enforcement discretion from the provisions of Technical Specification 3.0.3 as it applies to the requirements of Technical Specifications 3.7.8(b) and 3.3.2 (Table 3.3-3, Functional Unit 11) to maintain three independent Exhaust Booster Fans and three independent Main Exhaust Fans and required actuation instrumentation operable. Exhaust Booster Fan 11A has failed and must be replaced. The failed fan is planned to be replaced within its 7 day allowed outage time. However, replacement of the fan will require making the other two exhaust booster fans that share the common air plenums inoperable for the brief time needed to install and subsequently remove a temporary modification. Specifically, STPNOC requests discretion from the requirement to apply Specification 3.0.3 for the 8 hours required to install the temporary modification and for 6 hours required to remove the temporary modification so that repairs of FHB Exhaust Booster Fan 11A can be completed.

The attached information is provided pursuant to the Nuclear Regulatory Commission guidance for requests for enforcement discretion.

If you should have any questions concerning this matter please contact either A. W. Harrison at (512) 972-7298 or me at (512) 972-7800.

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Plant Manager
Unit 1

PLW/
Attachment: Information in Support of Requested Enforcement Discretion

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INFORMATION IN SUPPORT OF REQUESTED ENFORCEMENT DISCRETION

1) The Technical Specification or other license conditions that will be affected.

Technical Specifications 3.7.8 and 3.3.2 (Table 3.3-3, Functional Unit 11) require three independent Exhaust Booster Fans and three independent Main Exhaust Fans and actuation instrumentation to be operable. In addition, Technical Specification 3.9.12 establishes requirements for FHB HVAC during movement of fuel. No discretion with respect to Specification 3.9.12 is necessary because STPNOC will comply with the applicable action of this specification not to move fuel or operate the crane over the spent fuel pool. (See Compensatory Actions in Item 6, below.)

Operability of the Fuel Handling Building Exhaust Air System (FHBEAS) ensures that radioactive material leaking from the Emergency Core Cooling (ECC) equipment within the FHB following a Loss of Coolant Accident (LOCA) and radioactive material release from an accident involving an irradiated assembly in the FHB are filtered prior to reaching the environment.

Replacement of failed exhaust booster fan 11A will require a temporary modification to isolate the ductwork to the fan from the rest of the system. The process of installing and subsequently removing the temporary modification will require breaching the common air plenums serving the three exhaust booster fans. During the time the plenums are breached, the requirements of Specification 3.7.8 for the FHB HVAC system are not met. In addition, while the modification is being installed and removed, the other exhaust booster fans and the main exhaust fans will be put in pull-to-lock for personnel safety. In this condition, the system cannot automatically actuate and the requirements of Specification 3.3.2, Table 3.3-3, Functional Unit 11 are not met for all trains. Both of these conditions would require that Technical Specification 3.0.3 be entered, and shutdown of Unit 1 would be required.

2) The circumstance surrounding the situation, including root causes, the need for prompt action, and identification of any relevant historical events.

On October 19, 1998, a ground was discovered during a surveillance in Fuel Handling Building (FHB) exhaust booster fan 11A and the fan was declared inoperable at 1414 hours. The Technical Specification 3.7.8 Limiting Condition for Operation action was entered to replace the exhaust booster fan. The inoperable fan placed STP Unit 1 in the ACTION statement of Technical Specification 3.7.8, with 7 days to restore the fan or be in at least hot standby in the next 6 hours and cold shutdown in the following 30 hours.

Prompt action is requested to approve the enforcement discretion to allow replacement work to proceed on the failed fan. Restoring FHB Exhaust Booster Fan 11A to an operable status will require removal and replacement of the motor. As described in Item 1 above, plans for replacement of the fan involve installation and subsequent removal of a temporary modification to isolate the duct to the failed fan from the common air plenums. STPNOC estimates installation of the temporary modification will take no longer than 8 hours, and removal of the temporary modification will take no longer than 6 hours. STPNOC has scheduled the entire replacement evolution to be done within the 7-day allowed outage time of a single failed fan. However, work to install the temporary modification cannot begin until the request for enforcement discretion is approved.

When Unit 1 FHB exhaust booster fan 11B failed in April 1998, STPNOC received enforcement discretion for Technical Specification 3.0.3 from the NRC to use the temporary modification described in this request. As a result of that occurrence, STPNOC took a number of actions to improve exhaust booster fan reliability and to prevent circumstances necessitating a request for discretion from Technical Specifications for a similar occurrence. The results of these actions are discussed under Section 12. Since the April 1998 fan failure, a Technical Specification amendment request has been developed and submitted to the NRC. A plant modification is being developed and will be implemented during the Spring 1999 Unit 1 and Fall 1999 Unit 2 refueling outages to allow replacement of FHB exhaust booster fan motors without a need to secure the remaining two FHB exhaust ventilation trains. The purpose of the modification is to facilitate the removal/replacement of the Fuel Handling Building (FHB) exhaust booster fan/motors while maintaining the FHB exhaust system operable, and not require a Tech Spec 3.0.3 entry. The modification addresses personnel safety and precludes the need to disable the fans by placing them in "pull-to-lock." Modifications will be made to both upper (intake) and lower (discharge) booster fan plenums to facilitate rapid access, leak-tight access closure, and provide simplified leak-tight fan isolation utilizing blank-off plates. Additionally, the fall hazard through the open 36" fan suction in the upper plenum will be eliminated.

The modification will have the following features:

1. To facilitate rapid access and closure of the upper plenum, the access will be enlarged and the bolted manway replaced with a "dogged" access door with leak tight seals.

2. To facilitate rapid isolation of the fan/motors in the upper plenum, a collar with studs/bolts will be installed on each booster fan (suction) opening fitted to accept a leak-tight blank-off plate.

3. To facilitate isolation of the fan/motors in the lower plenum, studs/bolts will be installed to accept a leak-tight blank off plate at each booster fan outlet (discharge) to the lower plenum.

4. To facilitate personnel safety, each collar at the fan suction will be fitted with a screen installed over the 36" fan suction opening to eliminate a potential fall hazard and to prevent loose parts from entering the fans.

5. To facilitate and simplify the removal of the "A" train booster fan, structural support steel cross-braces will be removed or modified with break flanges and/or bolted attachments. Train B & C fans do not require modification to structural steel.

STPNOC made reasonable efforts to put in place corrective actions to address the April 1998 occurrence. However, a reasonable period of time was required to implement the necessary corrective actions.

The 11A fan failed due to a ground on the motor, although the cause for the ground has not been determined. There have been three previous failures of exhaust booster fans since STP began operation.

3) **The safety basis for the request, including an evaluation of the safety significance and potential consequences of the proposed course of action.**

The purpose of the Fuel Handling Building HVAC System is to mitigate the consequences of a fuel handling accident as well as a Loss-of-Coolant Accident (LOCA) by limiting plant site boundary dose to within the guidelines of l0CFRl00. This is accomplished by routing exhaust air from the spent fuel pool and the remainder of the FHB through ESF filter units containing HEPA filters and iodine removal carbon filters if high levels of airborne radioactivity are detected in the exhaust air or automatically upon an SI signal.

The major components of the exhaust air subsystem are:

* Three main exhaust fans
* Three booster fans
* Two carbon filters

The three 50-percent-capacity exhaust booster fans are of the vaneaxial type. The fans are of the direct-drive type with single-speed motors. Fan motors are totally enclosed, air-cooled, and statically and dynamically balanced.

Normally, exhaust air bypasses the filter units and is exhausted directly to the plant main vent stack. Upon detection of high radiation or SI signal, exhaust air is routed through the filter units, the exhaust booster fans, and main exhaust air fans, and is then delivered to the plant main vent stack.

As noted above, only two accident scenarios are relevant with regard to the FHB HVAC system. The Fuel Handling Accident will be precluded from occurring by ensuring that no

loads will be carried over the Spent Fuel Pool and no movement of irradiated fuel will take place during the time that the repair activities are occurring. In addition, no loads, as defined in the heavy loads program, will be moved over the ECCS pumps or suction piping in the FHB during this evolution. The Large Break LOCA (LBLOCA), although clearly within the design basis of the plant, is a highly unlikely occurrence. In the event that a LBLOCA were to occur, it would take a minimum of 16 minutes for the Refueling Water Storage Tank to empty and the Emergency Core Cooling system to go into the recirculation mode by taking suction from the containment sump. At that point in time, it would be assumed that radiation leakage from the ECCS would occur that would require the FHB HVAC system to be functional. In the event that maintenance is in progress, 16 minutes is considered ample time to secure the work, restore the plenum and take the fans out of pull-to-lock and for the workers to exit the FHB. Actual experience with previous replacements provides a high level of confidence that these actions can be effectively implemented.

In addition to the above, it should be noted that the Licensing Basis for the South Texas Project includes the Leak-Before-Break concept. This methodology has demonstrated that the deterministic LBLOCA is not a credible event and that in fact any large pipe rupture of the Reactor Coolant System would be preceded by leakage that is detectable by Control Room personnel using instrumentation installed in the containment. The time between initiation of the leakage and the actual break would allow for additional time, i.e., greater than 16 minutes, to restore the plenum and place the booster fans in the standby condition.

A qualitative risk assessment based on the proposed action has been performed. The LBLOCA is an unlikely event, which contributes very little to Core Damage Frequency. The probability that a LBLOCA would occur during the 14 hours requested is less than 0.2% of the annual probability of the LBLOCA. The probability that the compensatory actions would subsequently fail is also considered to be small, making the likelihood of any adverse consequences essentially not credible.

Based on the above, STPNOC believes that safety significance and potential consequences of the proposed plan of action are extremely small.

4) **The basis for the conclusion that the enforcement discretion is not a potential detriment to the public health and safety and that neither an unreviewed safety question nor a significant hazard consideration is involved.**

Determination of No Unreviewed Safety Question.

1. **Does the change involve an increase in the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the Safety Analysis Report?**

The proposed change is to increase the allowable time specified in Technical Specification 3.0.3 before a plant shutdown is required. No increase in the probability of an evaluated accident will occur due to this extension of a time limit. The consequences of an accident also do not increase due to this change because the compensatory actions will be simple, straightforward, and well briefed with all participants prior to starting this evolution. Closing an access door, installing the cover, and manually starting fans or placing them in automatic as required can be easily accomplished in the allowed time. In Modes 1 through 4 the purpose of the Fuel Handling Building Exhaust Air System is to filter ECCS radioactive leakage that occurs during the recirculation phase. Recirculation phase will not occur prior to 16 minutes after an accident. Following an accident, the reactor will be automatically tripped. The plant announcement of this fact and direct communications with the control room will provide sufficient notification to inform the personnel to restore the plenum integrity. The 16 minutes prior to radioactive ECCS leakage occurring is adequate time to secure the work, ensure that the plenum integrity is restored and the FHB Main and Exhaust Booster Fans started or placed in automatic, as required, and for the workers to exit the FHB.

2. **Does the change involve a possibility for an accident or malfunction of a different type than any evaluated previously in the Safety Analysis Report?**

Delaying the plant shutdown required by Technical Specification 3.0.3 does not have the potential to create a new or different kind of accident from any previously evaluated. The system will continue to respond as required by the design with the compensatory measures established to restore plenum integrity.

3. **Does the change involve a reduction in the margin of safety as defined in the basis for any Technical Specification?**

The delay in plant shutdown required by Technical Specification 3.0.3 will not result in a reduction in the margin of safety because compensatory measures will restore the Fuel Handling Building Exhaust Air System prior to the time it is required to remove contaminants in the accident condition.

Based on the above discussions and evaluations and the earlier NRC review and approval of a similar request, no unreviewed safety question exists.

Determination of No Significant Hazard Considerations

The South Texas Project has considered the criteria for assessing the potential of creating an unreviewed safety question or a significant hazards consideration with the exercising of enforcement discretion. In evaluating if discretion in enforcement constitutes a significant

hazard the criteria of 10CFR50.92(c) is discussed below:

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

   The proposed change is to increase the allowable time specified in Technical Specification 3.0.3 before a plant shutdown is required. This change will not increase the probability of an evaluated accident. The consequences of an accident also do not increase due to this extension in allowable time limits since the compensatory actions will be simple, straightforward, and well briefed prior to starting this evolution. In Modes 1 through 4 the purpose of the Fuel Handling Building Exhaust Air System is to filter ECCS radioactive leakage that occurs during the recirculation phase. Recirculation phase will not occur prior to 16 minutes after an accident. Following an accident, the reactor will be automatically tripped. The plant announcement of this fact will provide sufficient notification to inform the personnel to restore the plenum integrity. The 16 minutes prior to radioactive ECCS leakage occurring is adequate time to secure the work, ensure that the plenum integrity is restored and the FHB Main and Exhaust Booster Fans started or placed in automatic, as required, and for the workers to exit the FHB.

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

   Delaying the plant shutdown required by Technical Specification 3.0.3 does not have the potential to create a new or different kind of accident from any previously evaluated. The system will continue to respond as required by the design with the compensatory measures established to restore plenum integrity.

3. **Does this change involve a significant reduction in a margin of safety?**

   The delay in plant shutdown required by Technical Specification 3.0.3 will not result in a significant reduction in the margin of safety because the compensatory measures will restore the Fuel Handling Building Exhaust Air System prior to the time it is required to remove contaminants in the accident condition.

Based on the above evaluation, no Significant Hazard exists.

Because there is no Unreviewed Safety Question or Significant Hazard associated with this fan replacement, there is no potential detriment to the public heath and safety as a result of this request.

5) **The basis for the conclusion that the enforcement discretion will not involve adverse consequences to the environment.**

The South Texas Project has reviewed the proposed Enforcement Discretion request and the Nuclear Regulatory Commission Final Environmental Assessment for South Texas Project Units 1 and 2 and has concluded that pursuant to 10CFR51, there are no significant radiological or non-radiological impacts associated with the proposed Enforcement Discretion request.

This proposed Enforcement Discretion has been evaluated against the criteria for and identification of licensing and regulatory actions requiring environmental assessment in accordance with 10CFR51.21. It has been determined that the proposed changes meet the criteria for categorical exclusion as provided for under 10CFR51.22(c)(9). The following is a discussion of how the proposed Enforcement Discretion meets the criteria for categorical exclusion.

10CFR51.22(c)(9): Although the proposed change involves changes to requirements with respect to installation or use of a facility component located within the restricted area;

(i) the proposed change involves no Significant Hazards Consideration (refer to the No Significant Hazards Consideration section of this Enforcement Discretion Request),

(ii) there is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite since the proposed changes do not affect the generation of any radioactive effluent nor do they affect any of the permitted release paths, and

(iii) there is no significant increase in individual or cumulative occupational radiation exposure.

Accordingly, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10CFR51.22(c)(9). Based on the aforementioned and pursuant to 10CFR51.22(b), no environmental assessment or environmental impact statement need be prepared.

6) **Any proposed compensatory actions.**

The following compensatory action will be taken:

1. Administrative controls will ensure that, in the unlikely event that emergency operation is required, operators have adequate time to ensure that FHB Main and Exhaust Fan motors are manually started or placed in automatic as required. The following defines the conditions where the Fuel Handling Building Exhaust Air

System can be maintained available while the Fans are in the "Pull-to-Lock" position:

a) Prior to opening the FHB Exhaust Booster Fan common plenum access panels, Maintenance personnel will inform the Control Room of their intentions. This information will be noted in the Control Room Log.

b) Following the opening of the plenum access panels, Maintenance personnel will maintain a watchstander at each opening who is in continuous communication with the Control Room.

c) If at any time during this process, the Maintenance personnel are made aware, either via loudspeaker or radio, that a reactor trip has occurred, then the work will be secured, loose material removed, personnel will exit the plenums, and the access panels reinstalled as expeditiously as possible. The Control Room will confirm via continuous communication that the access panels have been reinstalled.

d) Once confirmed that plenum integrity is restored, the Operator will manually start the required FHB Main and Exhaust Booster Fans, or place them in automatic, as required.

e) If at any time during this process the Control Room notices an increase in Reactor Containment Building radioactivity that would be an indication of a Reactor Coolant System leak, or an increase in FHB radiation levels, Maintenance personnel will be informed to secure the work, exit the plenums, and install the access panels as expeditiously as possible. Once confirmed that plenum integrity is restored, the Operator will manually start the required FHB Main and Exhaust Booster Fans or place them in automatic as required.

2. During the repair of FHB Exhaust Booster Fan 11A and the duration of the discretion, no irradiated fuel movement will occur and no loads will be moved over the Spent Fuel Pool. In addition, no loads, as defined in the heavy loads program, will be moved over the ECCS pumps or suction piping in the FHB during this evolution.

3. For the duration of the discretion, no activities will be conducted that could affect the level or cooling of the Spent Fuel Pool.

The above methodology is deemed acceptable because in Modes 1 through 4 the purpose of the Fuel Handling Building Exhaust Air System is to filter ECCS radioactive leakage that occurs during the recirculation phase. Recirculation phase will not occur prior to 16 minutes after an accident. Following an accident, the reactor will be automatically tripped. The plant announcement of this fact or radio communications will provide sufficient

notification to inform the personnel to restore the plenum integrity. The 16 minutes prior to radioactive ECCS leakage occurring is adequate time to secure work, ensure that the plenum integrity is restored and the FHB Main and Exhaust Booster Fans started, or placed in automatic, as required, and for the workers to exit the FHB.

7) **The justification for the duration of the enforcement discretion.**

The duration for the requested enforcement discretion from the requirements of Specification 3.0.3 is 8 hours for the installation of the temporary modification and 6 hours for the removal of the temporary modification. These durations are reasonable and allow the maintenance personnel adequate time to perform their work safely with some margin.

8) **A statement that the request has been approved by the Plant Operations Review Committee**

The South Texas Project Plant Operations Review Committee has reviewed the proposed Enforcement Discretion request and concurs with the content of this request.

9) **Discussion of How the Applicable Notice of Enforcement Discretion Criterion for the Appropriate Plant Condition Specified in Section B is Satisfied**

The applicable Notice of Enforcement Discretion criteria for the subject request is to avoid undesirable transients as a result of forcing compliance with the license condition and, thus , minimize potential safety consequences and operational risks that are inappropriate for the particular plant condition.

Since no fuel will be moved during the exhaust booster fan replacement evolution, the fuel handling accident is not credible and the only event for which the FHBEAS provides protection is the large break loss of coolant accident. The large break is an extremely low probability event and the durations for which the mitigation system will be unavailable are relatively small. In addition, the compensatory actions mitigate the technical inoperability of the FHB HVAC exhaust components and provide reasonable assurance that they can perform their design function in the unlikely event of an accident. Consequently, it is not appropriate to put the plant through a shutdown transient because a large break in the relatively short unavailability durations under consideration is not a credible event and the mitigation features are expected to function as required.

10) **Follow-up License Amendment Required**

None.

11) Statement that prior adoption of approved line-item improvements to the Technical Specification or the Improved Technical Specification would not have Obviated the Need For the Notice of Enforcement Discretion Request

STPNOC has reviewed the proposed Improved Technical Specifications for the South Texas Project and concluded that they would not have obviated the need for the Notice of Enforcement Discretion.

STPNOC is not aware of any line item improvements that would have provided relief from the condition.

12) Any other information the NRC staff deems necessary before making a decision to exercise enforcement discretion.

History

A tabular summary of the related failures is provided.

DATE	FAN	DESCRIPTION	CAUSE
September 3, 1987	Unit 1 - Train C FHB	Failed prior to Unit 1 License	Unknown
August 15, 1992	Unit 2 -Train C FHB	Fan dead headed	Unknown
April 30, 1998	Unit 1 - FHB Train B	Ground indication	See root cause below
October 19, 1998	Unit 1 - FHB Train A	Ground indication	Not yet determined

Corrective Action Plan

In April, 1998, Unit 1 FHB exhaust booster fan 11B failed and the motor required replacement. STPNOC received enforcement discretion from Technical Specification 3.0.3 to allow more than one Fuel Handling Building (FHB) exhaust ventilation train and two exhaust air filter trains to be inoperable to install and remove the temporary modification described above. As a result of that failure, STPNOC committed to take the following actions in Reference 1:

1. Perform a root cause evaluation of the 11B exhaust fan failure.

   Inspection of the motor revealed inadequate strand to strand varnish adhesion. Individual exterior strands and interior strands in several coils were found loose. Several coil bundles were found loose at the exit of the slot. Several u-shaped top liners could be depressed within the slot with little effort, some as much as 1/8" depression. The inspection of top liners indicated poor strand to liner adhesion and, in many cases, a visible gap between the liner and coil bundle.

   The looseness of coils and strands allow relative movement and subsequent chafing of the strand insulation resulting in a turn to turn short. Once a turn to turn short develops, the

massive circulating currents quickly elevate temperature causing insulation breakdown and melting of copper conductors. Within seconds, the winding either open circuits or shorts to ground.

Therefore, it has been determined that inadequate insulation design and manufacturing quality of the Reliance frame 326TCZ motor will not sustain a 40-year life in this application. The 40-year life of the motor was a factor in the design of the plant configuration which does not currently support periodic replacement. Because of these findings, the following actions have been taken:

a) Revised specifications for Class 1E low voltage (480V) motors to require improved design and manufacturing processes.

b) Finalize a plan of action to rewind failed and spare Reliance frame 326TCZ motors to improved standards and systematically replace/repair all FHB exhaust booster fan motors. Details of this plan of action will be included in Unit 1 LER 98-010 which will be submitted by November 20, 1998.

2. Evaluate physical plant modifications that would enhance the ability to isolate the individual components or trains.

   STPNOC is developing a modification that will allow maintenance and/or replacement of a FHB booster fan without rendering the other two fans inoperable. This modification will be implemented for Unit 1 in 1RE08 (Spring 1999) and for Unit 2 in 2RE07 (Fall 1999).

3. Review the design basis for the three-train system to determine if adequate design margin can be maintained with one train inoperable.

   STPNOC has performed a review and has conducted testing which indicates that adequate margin can be maintained with one booster fan inoperable and assuming a single failure of another fan. Action has been identified in our Corrective Action Program to incorporate these findings into our design and licensing basis.

4. Review the applicable Technical Specifications to determine if there might be changes that would facilitate the ability to work on this system in the future. STPNOC submitted a Technical Specification amendment on September 28, 1998, (NOC-AE-000305) to modify requirements associated with Control Room and Fuel Handling Building Ventilation Systems.

5. Review periodic and preventive maintenance to identify actions that could be taken to preclude failures.

   Periodic vibration analysis conducted on the FHB exhaust booster fan motors has not been successful in identifying precursors to the motor failures experienced to date. Adjustments to the vibration data collection parameters have been made in an attempt to identify the stator coil pass frequency that may be indicative of stator winding resonance. The magnitude and sideband characteristics associated with the resonant frequency could potentially be used to

identify the degree of stator coil looseness. However, further evaluation and testing is required to determine if this unproven technique provides meaningful data to predict future motor performance. The schedule for completion of this evaluation and testing will be provided in Unit 1 LER 98-010 which will be submitted by November 20, 1998.

Annual insulation resistance testing (megger) will be conducted using improved techniques that incorporate winding temperature correction and measurement of wet bulb and dry bulb temperatures to assist in more meaningful interpretation of trend data. This differs from earlier PM practices that required an insulation resistance test, with no supporting temperature data, which was subsequently deleted in 1993 due to the lack of value added.

STPNOC has also initiated PMs that require direct current step voltage testing at 1000 VDC (nominally twice nameplate voltage) to provide a more rigorous test of the condition of the insulation between the stator winding conductors and ground. These PMs are being scheduled at a minimum of 3 year intervals.

Due to the vaneaxial design, the FHB exhaust booster fan motors are not accessible for thermographic inspections.

STPNOC will adjust the corrective action plan as needed after completion of the investigation of the 11A failure.

Reference

1. Letter from Mr. Steve Thomas, STPNOC, to the NRC Document Control Desk, dated May 4, 1998 (ST-NOC-AE-000155).