

The Light company

Houston Lighting & Power

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

October 31, 1994

ST-HL-AE-4917

File No.: G26

10CFR50.63

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

South Texas Project

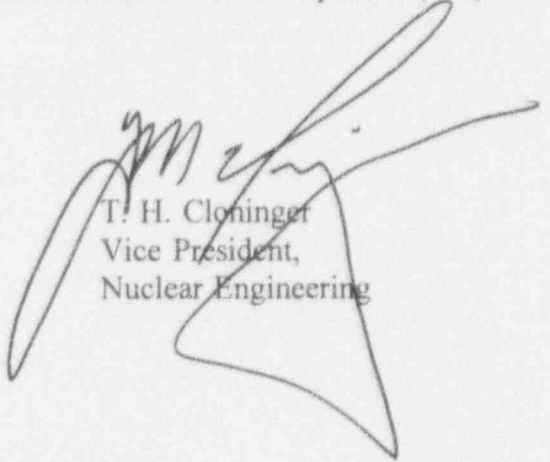
Units 1 and 2

Docket Nos. STN 50-498, STN 50-499

Response to August 23, 1994 Request for Additional Information
Compliance With Station Blackout Requirements

Houston Lighting & Power submits the attached eight (8) responses to the request for additional information noted above. The responses to these questions demonstrate that Houston Lighting & Power Justification for Continued Operation 94-004 complies with the 10CFR50.63 Station Blackout criteria, as clarified by NUMARC Guideline 87-00, Revision 1. Houston Lighting & Power requests that the Nuclear Regulatory Commission Staff consider these responses during the formal review of the revised Station Blackout plan for the South Texas Project. This plan is scheduled for submittal to the Nuclear Regulatory Commission in March, 1995, as described in Licensee Event Report 94-013, Revision 1 for South Texas Project Unit 1, dated October 5, 1994.

If you should have any questions on this matter, please contact Mr. K. J. Taplett at (512) 972-8416 or me at (512) 972-8787.



T. H. Cloninger
Vice President,
Nuclear Engineering

BAN/pas

Attachment: Responses to August 23, 1994 Request for Information

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Project Manager on Behalf of the Participants in the South Texas Project

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C:

Leonard J. Callan
Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011

Thomas W. Alexion
Project Manager
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001 13H15

David P. Loveless
Sr. Resident Inspector
c/o U. S. Nuclear Regulatory Comm.
P. O. Box 910
Bay City, TX 77404-910

J. R. Newman, Esquire
Newman, Bouknight & Edgar, P.C.
STE 1000, 1615 L Street, N.W.
Washington, DC 20036

K. J. Fiedler/M. T. Hardt
City Public Service
P. O. Box 1771
San Antonio, TX 78296

J. C. Lanier/M. B. Lee
City of Austin
Electric Utility Department
721 Barton Springs Road
Austin, TX 78704

G. E. Vaughn/C. A. Johnson
Central Power and Light Company
P. O. Box 2121
Corpus Christi, TX 78403

Rufus S. Scott
Associate General Counsel
Houston Lighting & Power Company
P. O. Box 61067
Houston, TX 77208

Institute of Nuclear Power
Operations - Records Center
700 Galleria Parkway
Atlanta, GA 30339-5957

Dr. Joseph M. Hendrie
50 Bellport Lane
Bellport, NY 11713

Richard A. Ratliff
Bureau of Radiation Control
Texas Department of Health
1100 West 49th Street
Austin, TX 78756-3189

U. S. Nuclear Regulatory Comm.
Attn: Document Control Desk
Washington, D. C. 20555-0001

J. R. Egan, Esquire
Egan & Associates, P.C.
2300 N Street, N.W.
Washington, D.C. 20037

REQUEST FOR ADDITIONAL INFORMATION
REGARDING JUSTIFICATION FOR CONTINUED OPERATION 94-004

NRC Question 1:

"Is training on the revised Severe Weather Guidelines (0POP04-ZO-0002) completed? What personnel are trained in this procedure? How many trained personnel will be available per shift?"

STP Response:

The Severe Weather Guidelines procedure 0POP04-ZO-0002 was revised to provide a more conservative severe weather shutdown criterion (73 mph vs. 120 mph sustained winds), and to prescribe when the shutdown is to be completed. No shutdown or accident mitigation procedures required revision to implement this philosophy change. The plant operator actions required to perform a plant shutdown were unaffected by the noted procedure change.

The Severe Weather Guidelines procedure revision modified two procedural steps which require operations signature upon completion of each step. A plant bulletin was issued noting the revision to the severe weather shutdown criterion. Special training on the procedure revision from the 120 mph to 73 mph shutdown criterion is not considered necessary, since entry into the procedure occurs when a Hurricane Watch or Warning including the STP site area is issued by the National Weather Service. This action will occur approximately 24 hours before sustained windspeeds at the STP site would reach the shutdown criterion. The procedure step revisions which implement the 73 mph shutdown criterion will be observed well in advance of the actual step implementation. Thus, no formal training has been scheduled for the changes to the Severe Weather Guidelines procedure.

The Severe Weather Guidelines procedure is included in the annual licensed operator requalification training addressing current revisions of plant emergency procedures. Licensed Shift Supervisors, Shift Technical Advisors, Unit Supervisors, and Reactor Operators are trained on the Severe Weather Guidelines during their requalification training.

The typical shift complement of plant operations personnel trained in the Severe Weather Guidelines procedure includes one Shift Supervisor, one Shift Technical Advisor, one Unit Supervisor, and three Reactor Operators per unit. Additional personnel would be available, as described in the Question 2 response, in the event of severe weather.

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NRC Question 2:

"Does the Severe Weather Guidelines Procedure follow NUMARC 87-00, Revision 1, Sections 4.2.3 and 4.3.3? If yes, provide details."

STP Response:

The STP severe weather guidelines are contained in two procedures:

- OPGP03-ZV-0001 Revision 1, "Severe Weather Plan", dated 03/31/94, which serves as the guiding document for STP severe weather preparedness and response.
- OPOP04-ZO-0002 Revision 7, "Severe Weather Guidelines", dated 08/18/94, which provides specific guidelines for plant personnel in the event a Tornado Watch/Warning or Hurricane Watch/Warning is issued for the STP site area.

STP complies with the guidelines of NUMARC 87-00, Revision 1, Sections 4.2.3 and 4.3.3. The STP position for each paragraph of NUMARC 87-00 Section 4.2.3 and 4.3.3 follows.

Hurricane Actions

Sections 4.2.3(1)(a) & 4.3.3(1): "The plant procedures should identify site-specific actions necessary to prepare for the onset of a hurricane. These actions should be initiated when a hurricane warning is issued for the plant site area and should include inspecting the site for potential missiles and reducing this potential."

STP Position: OPGP03-ZV-0001 requires the removal of loose trash and materials, and tie down of temporary and portable structures within the Owner Controlled Area and Protected Area. OPGP03-ZV-0001 also requires tie down of outdoor mobile cranes within the Protected Area. These actions occur when a hurricane has entered the Gulf of Mexico or a tropical storm watch has been posted for the Texas coast between Corpus Christi and Galveston Island.

Sections 4.2.3(1)(b) & 4.3.3(2): "These actions should include reviewing the adequacy of site staff to support operations and repair."

STP Position: OPGP03-ZV-0001 requires Department Storm Crew Rosters, with the Storm Crew assignment, telephone numbers, and home address prepared for plant personnel prior to each May 1. This information is provided when a hurricane enters the Gulf of Mexico or a tropical storm watch is posted for the Texas coast between Corpus Christi and Galveston Island for rotating shift schedule positions.

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Hurricane Actions (Cont'd)

OPOP04-ZO-0002 requires Shift Supervisors to ensure additional operations and maintenance support personnel are available for the anticipated duration of the storm. This action is implemented when an issued hurricane warning for the Texas coast includes the STP site.

Sections 4.2.3(1)(c) & 4.3.3(1): "These actions should include expediting the restoration of important plant systems and components to service."

STP Position: The procedural requirements of OPOP04-ZO-0002 state that the Shift Supervisors shall perform the following actions in preparation for the onset of a hurricane.

The following actions are taken when a hurricane **warning** for the Texas Gulf Coast and the STP site is issued:

- Test the turbine generator lube oil pumps.
- Conduct a communications check on all Emergency Communications Systems.

These steps are implemented when a hurricane **watch** for the Texas Coast and the STP site is issued.

- Secure any Standby Diesel Generator Fuel Oil Storage Tank recirculation activities.
- Fill all fuel oil storage, chemical storage and gaseous storage tanks, if necessary.
- Ensure all Standby Diesel Generators are operable.

Sections 4.2.3(1)(d) & 4.3.3(3): "These actions should include warming and lubricating standby (Class 1E) AC power sources."

STP Position: The STP Standby Diesel Generators utilize normally operating jacket water heaters, lube oil heaters and standby lube oil pumps to enhance their availability. No specific preparatory warming or lubrication is required.

Sections 4.2.3(1)(e) & 4.3.3(3): "These actions should include determining the status of Alternate AC sources (if available) and taking necessary actions to ensure their availability."

STP Position: OPOP04-ZO-0002 requires the Shift Supervisors to ensure all Standby Diesel Generators are operable prior to projected hurricane arrival. This action is performed twice: (1) when a hurricane watch for the Texas coast and the STP site is issued; and (2) when a hurricane warning for the Texas coast and the STP site is issued. See the response to Sections 4.2.3(1)(c) and 4.3.3(1) above.

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REGARDING JUSTIFICATION FOR CONTINUED OPERATION 94-004

Hurricane Actions (Cont'd)

Sections 4.2.3(1)(f) & 4.3.3(1): "These actions should include increasing CST inventory."

STP Position: 0POP04-ZO-0002 requires the filling of the following water storage tanks, if necessary: Secondary make-up tanks, auxiliary feedwater storage tanks (the primary condensate storage tanks), reactor makeup water storage tanks, and the demineralized water storage tank. This action is implemented when a hurricane watch for the Texas coast and the STP site is issued.

Sections 4.2.3(1)(g) & 4.3.3(3): "These actions should include placing battery chargers in service (if applicable)."

STP Position: The STP Class 1E Battery Chargers are normally in service, as governed by Technical Specification 3.8.2, to maintain the operability of the battery banks. No specific preparatory charging is needed.

Sections 4.2.3(1)(h) & 4.3.3(1): "These actions should include start and load test EDGs."

STP Position: 0POP04-ZO-0002 requires, at least two hours prior to projected hurricane arrival, the Shift Supervisors to start and load either the Train A or Train C Standby Diesel Generator, and remove the respective ESF Bus from offsite power. The Standby Diesel Generator selected is the unit powering the currently operating Centrifugal Charging Pump.

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Hurricane Actions (Cont'd)

Sections 4.2.3(2) & 4.3.3(2): "Utility procedures should identify additional plant support staff and the method of contacting them once a hurricane notice has been issued by the National Weather Service."

STP Position: OPGP03-ZV-0001 requires Department Storm Crew Rosters, with the Storm Crew assignment, telephone numbers, and home address prepared for plant personnel prior to each May 1. The rosters are provided when a hurricane enters the Gulf of Mexico or a tropical storm watch is posted for the Texas coast between Corpus Christi and Galveston Island for rotating shift schedule positions.

OPGP03-ZV-0001 requires a developed severe weather plan, which includes, means of communication with the storm crews (e.g., telephones, radio station broadcasts) and determination of staffing requirements.

OPOP04-ZO-0002 requires Shift Supervisors to ensure additional operations and maintenance support personnel is available for the anticipated duration of the storm. This action is implemented when an issued hurricane warning for the Texas coast includes the STP site.

Sections 4.2.3(3) & 4.3.3(3): "Plant procedures should specify actions necessary to ensure equipment required for station blackout response is available."

STP Position: OPGP03-ZV-0001 requires plant personnel to:

- Perform a periodic inventory check of emergency tools and equipment under their control as specified in their respective Departmental Severe Weather Plan.
- Designate storage locations for initial repair parts identified for plant restoration.
- Coordinate with the STP owners to obtain emergency equipment available at their utilities that would be available for use at the STP during severe weather.
- Move pre-designated emergency equipment inside the Protected Area.

This action is implemented when a hurricane watch for the Texas coast and the STP site is issued.

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Hurricane Actions (Cont'd)

Sections 4.2.3(4)(a) & 4.3.3(4): "Plant procedures should address the following items prior to a hurricane arrival at a site: the site-specific indicator should ensure that the plant would be in a safe shutdown two hours before the anticipated hurricane arrival at the site (i.e., sustained wind speeds in excess of 73 mph)."

STP Position: OPOP04-ZO-0002 requires the following actions at least 12 hours prior to projected hurricane arrival:

- Initiate plant shutdowns per OPOP03-ZG-0006, Plant Shutdown from 100% to Hot Standby.
- Initiate plant cooldowns per OPOP03-ZG-0007, Plant Cooldown and achieve Mode 4, with RCS temperature <230°F within 2 hours of anticipated Hurricane arrival at the site (i.e., sustained wind speeds in excess of 73 mph).

Sections 4.2.3(4)(b) & 4.3.3(4): "Plant procedures should address the following items prior to a hurricane arrival at a site: operator review of station blackout procedures."

STP Position: OPOP04-ZO-0002 requires all licensed operators on shift or coming on-shift during the Hurricane Warning to review the Loss of All AC Power, Loss of All AC Power Recovery Without SI Required, Loss of All AC Power Recovery With SI Required, and Loss of Any 13.8 kV or 4.16 kV Bus procedures at least 12 hours prior to projected hurricane arrival.

Sections 4.2.3(4)(c) & 4.3.3(4): "Plant procedures should address the following items prior to a hurricane arrival at a site: operator review of procedures to line up and operate the switchyard spraydown system (if installed)."

STP Position: The STP site is located approximately 15 miles inland from the Gulf of Mexico. This criterion is not applicable to STP, which does not have nor require a switchyard spraydown system for the removal of salt spray accumulation from the switchyard equipment insulators.

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Tornado Actions

Sections 4.2.3(a) & 4.3.3(a): "Plant procedures should identify site-specific actions necessary to prepare for the onset of a tornado. These actions should include inspecting the site for potential missiles and reducing this potential."

STP Position: 0PGP03-ZV-0001 requires the removal of loose trash and materials, and tie down of temporary and portable structures within the Owner Controlled Area and the Protected Area. These actions are required when a Tornado Watch is issued for the STP site area.

0POP04-ZO-0002 requires operators to inspect the Protected Area for potential missiles and secure loose items, when a Tornado Watch is issued for the STP site area.

STP procedures recognize that tornadoes are often rapidly developing events with limited warning. Normal operating practices thus attempt to minimize the need for specific actions (e.g., crane tie-downs) prior to severe weather.

Sections 4.2.3(b) & 4.3.3(b): "Plant procedures should identify site-specific actions necessary to prepare for the onset of a tornado. These actions should include expediting the restoration of important plant systems and components to service."

STP Position: 0PGP03-ZV-0001 requires prioritization of Storm Crew assignments and announcement of re-mobilization efforts immediately after National Weather Service or National Oceanic and Atmospheric Administration data indicates the severe weather has passed, and site conditions allow for the return to work.

0PGP03-ZV-0001 provides requirements for restoration of tornado dampers to the open position, should they be actuated by an actual tornado strike.

Procedure 0POP04-AE-0001, "Loss of Any 13.8 kV or 4.16 kV Bus", describes AC power restoration actions to any 13.8 kV or 4.16 kV bus during all plant operating modes.

Procedure 0POP05-EO-EC00, "Loss of All AC Power", provides requirements to maintain the plant primary and secondary systems in a safe condition, should all AC ESF buses be de-energized.

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NRC Question 3:

"Is there any impact on the operation of the required HVAC loads?"

STP Response:

The STP Station Blackout coping methodology involves reliance on the "B" Train Standby Diesel Generator as a qualified Alternate AC Source, as described in NUMARC 87-00 Appendix B. The "B" Train Standby Diesel Generator powers the "B" Train HVAC systems, including their supporting equipment (e.g., Essential Cooling Water, Component Cooling Water, Battery Room Ventilation).

The only impact on the operation of the required HVAC loads, due to the weaknesses identified in Licensee Event Report 94-013 Rev. 1 for STP Unit 1, relate to the Centrifugal Charging Pump cubicle supplemental cooler. As stated in the response to Question 8, the Centrifugal Charging Pump will be utilized if available during a Station Blackout, but is not essential to successful coping with the Station Blackout scenario. Thus, if the Centrifugal Charging Pump is available and utilized, then the associated pump cubicle supplemental cooler would also be utilized. The Standby Diesel Generator ("B" Train) has sufficient capacity and connectability via the Auxiliary ESF Transformers to power both the Centrifugal Charging Pump and its supplemental cubicle cooler.

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NRC Question 4:

"Do the A and C batteries have adequate capacity to support SBO loads without load shedding? Other than Severe Weather Guidelines, are there additional SBO procedures that require modification?"

STP Response:

As presently analyzed, the Channel I ("A" Train) and Channel IV ("C" Train) battery banks have adequate capacity to operate for a minimum of two hours without load shedding and battery charging support. Preliminary calculations utilizing actual loads, versus nameplate ratings of equipment powered by the batteries, indicate that the batteries have sufficient capacity, with margin, for four (4) hours continuous operation with no load shedding. Operator actions are currently required to maintain battery bank operability for the revised four hour coping duration resulting from the Justification for Continued Operation 94-004 position. The operator actions are the same actions described to the NRC Staff in STP letter ST-HL-AE-3045 (Page 27) dated April 17, 1989, and documented in Section 2.3.2 of the NRC Safety Evaluation Report, dated July 17, 1991. The prescribed operator actions are defined in Addendum 12 of procedure OPOP04-AE-0001 Revision 2, "Loss of Any 13.8 kV or 4.16 kV Bus". The operator actions of the noted procedure are summarized below:

- 1) If one Standby Diesel Generator fails to start, and the 13.8 kV Emergency Bus is energized via the Emergency Transformer, then energize the associated 4.16 kV ESF Bus from the Emergency Bus.
- 2) If 4.16 kV ESF buses "A" AND "C" are de-energized, implement the 4.16 kV ESF Train "B" to ESF Trains "A" or "C" cross-connect to re-energize Train "A" or Train "C" battery chargers (for non-severe-weather conditions).
- 3) If the 4.16 kV ESF Train "B" to ESF Trains "A" or "C" cross-connect is not available, then shed the following loads off the Channel I ("A" Train) DC system, by opening the four breakers associated with the following non-essential loads:
 - 7.5 kVA Channel I NSSS Inverter
 - Train "A" Reactor Trip Switchgear Control Power
 - ESF Load Sequencer Cabinet "A"
 - Reactor Coolant Pump 1A 15 kV Class 1E Cubicle Control Power

In addition, shed the following loads off the Channel IV ("C" Train) DC system, by opening the three breakers associated with the following non-essential loads:

- 7.5 kVA Channel IV NSSS Inverter
- ESF Load Sequencer Cabinet "C"
- Reactor Coolant Pump 1D 15 kV Class 1E Cubicle Control Power

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The noted operator actions ensure restoration of any available AC source to provide battery charging support to the "A" Train and "C" Train Class 1E battery banks. Should no offsite or onsite Train "A" or Train "C" AC source be available, the operator actions will ensure that the "A" Train and "C" Train Class 1E battery banks, with the noted loads shed, will operate for the required four hour Station Blackout coping duration.

There are no additional plant procedures addressing Station Blackout which required modification, other than procedure OPOP04-ZO-0002, Revision 7, "Severe Weather Guidelines", which was formally revised on 08/18/94 to incorporate the position of Justification for Continued Operation 94-004.

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NRC Question 5:

"Will the positive displacement pump be available during a SBO? If yes, how will it be powered? If no, why is it not required? Will the core be uncovered during a SBO?"

STP Response:

The positive displacement charging pump could be utilized if available during a Station Blackout, but is not essential to coping with the Station Blackout scenario. The positive displacement charging pump is capable of being powered by the Technical Support Center Diesel Generator. The Technical Support Center Diesel Generator is located outdoors in a non-missile protected enclosure. While the Technical Support Center Diesel Generator is designed to withstand severe weather conditions, its operation cannot be assured during a hurricane. Thus, the positive displacement charging pump, powered by the Technical Support Center Diesel Generator, could be utilized if available during a Station Blackout event. The positive displacement charging pump would be utilized only if a Centrifugal Charging pump is not available. If both the centrifugal and positive displacement charging pumps are not available during a Station Blackout event due to severe weather, as described in Licensee Event Report 94-013 Revision 1, for STP Unit 1, the Reactor Coolant System inventory will be maintained by use of the "B" Train High Head Safety Injection Pump. The core will not be uncovered during a Station Blackout event, even during postulated severe weather conditions.

The first Station Blackout scenario assumes the Centrifugal Charging Pumps and the positive displacement charging pump are not available, and the pump unavailability is the result of a loss of all AC power. The scenario also assumes Reactor Coolant System inventory loss through Reactor Coolant Pump seal leakage is present. The operators would utilize the following procedures in this scenario:

OPOP05-EO-EC00, "Loss of All AC Power", provides the actions required to respond to a loss of offsite power at STP. This procedure is entered on the indication that all 4.16 kV ESF Buses are de-energized, and defines the actions required for maintenance of adequate Reactor Coolant System inventory.

OPOP05-EO-EC02, "Loss of All AC Power Recovery With SI Required", provides the corrective actions required in the event that reactor coolant subcooling or pressurizer level limits are exceeded.

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A second scenario assumes the Centrifugal Charging Pumps and the positive displacement charging pump are not available during a Station Blackout and the pump unavailability is due to a loss of normal offsite and ESF Trains "A" and "C" onsite power. The scenario also assumes Reactor Coolant System inventory loss through Reactor Coolant Pump seal leakage is present, and the Alternate AC source (Standby Diesel Generator "B") is available. The operators would use the following procedures in this scenario:

OPOP05-EO-EO00, "Reactor Trip or Safety Injection", provides the actions required to stabilize the plant and diagnose any abnormal conditions to determine the correct recovery procedure.

OPOP05-EO-EO10, "Loss of Reactor or Secondary Coolant", provides the actions required to determine whether the leak is primary or secondary, and directs to the optimal recovery procedure.

OPOP05-EO-ES12, "Post LOCA Cooldown and Depressurization", provides the actions required to cool down and depressurize the Reactor Coolant System to minimize leakage and recover inventory.

Procedure OPOP04-AE-0001, "Loss of Any 13.8 kV or 4.16 kV Bus", is performed concurrently with the optimal recovery procedures for both of the scenarios described above. This procedure provides the actions required to restore AC power to the remaining ESF bus(es) which facilitate restoration of a Centrifugal Charging Pump and Class 1E battery chargers to power redundant shutdown instrumentation trains.

The operator actions required by the Emergency Operating Procedures maintain Reactor Coolant System inventory, by depressurizing the Reactor Coolant System to limit inventory loss, and by providing inventory makeup via the High Head Safety Injection pump. Thus, the reactor core will remain covered, even with the loss of both centrifugal charging pumps and the positive displacement charging pump.

An analysis was performed to confirm that core uncover would not occur assuming no operator actions, with the only available AC power from Standby Diesel Generator "B" at ten minutes into the Station Blackout event. Primary system pressure decreased to the High Head Safety Injection pump initiation setpoint (below the pump maximum discharge pressure) in less than two hours. The Reactor Coolant System pressure was then maintained at the discharge pressure of the "B" Train High Head Safety Injection pump. The peak coolant temperature in the reactor core does not exceed 600°F during this transient, and stabilizes at the approximate normal T_{ave} value. The pressurizer level decreases to near the bottom of the pressurizer, and then increases following initiation of safety injection, which indicates that the core remains covered. This analysis is considered to be bounding for the STP Station Blackout scenario.

The initial conditions of entry into a Station Blackout event (i.e., 100% power) are no longer credible for hurricanes at STP. Justification for Continued Operation 94-004 requires plant shutdown to Mode 4, with Reactor Coolant System temperature < 230°F, within 2 hours of anticipated hurricane arrival.

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NRC Question 6:

"Will HHSI flow indication be available during SBO?"

STP Response:

The STP position regarding High Head Safety Injection flow indication has not changed by issuance of Licensee Event Report 94-013, Revision 1 for STP Unit 1 or the Justification for Continued Operation 94-004. As stated in STP letter ST-HL-AE-3729, dated April 12, 1991, the High Head Safety Injection flow indicator is a non-Class 1E indicator which conforms to the Category D2 requirements of Regulatory Guide 1.97 Revision 2. The High Head Safety Injection Class 1E indications include unique "HHSI Pump Stopped/Running" lamps and "HHSI Pump Injection MOV Open/Closed" lamps, dedicated to each High Head Safety Injection train, installed in the main control room. Verification of system operation is provided by indication that the HHSI pump is operating and the motor-operated injection valve is open. The Class 1E indication will be available during a Station Blackout event. This position was reviewed and accepted by the NRC, as noted in Section 2.3.6 of the NRC Safety Evaluation Report dated July 17, 1991.

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NRC Question 7:

"In view of this change was the NRC Safety Evaluation dated July 17, 1991, together with the TER, reviewed and its impact evaluated?"

STP Response:

The NRC Safety Evaluation Report and the NRC Contractor Technical Evaluation Report were reviewed and the impact evaluated prior to preparation of Justification for Continued Operation 94-004. The response to Questions 2, 3, 4, 5, 6 and 8 reflect the STP Station Blackout methodology and demonstrate that the NRC Safety Evaluation Report and the NRC Contractor Technical Evaluation Report were reviewed. Any impacts of the noted documents were evaluated prior to adoption of the STP Station Blackout interim position defined by Justification for Continued Operation 94-004.

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NRC Question 8:

"Before this change, the charging pumps were powered from the "B" SDG. Now that the cross-tie will not be used, how is HL&P compensating for the charging pump, or is the charging pump no longer needed/used?"

STP Response:

The centrifugal charging pump would be utilized, if available, during a Station Blackout event, but is not essential for coping with the Station Blackout scenario. As stated in the response to Question 5, the positive displacement charging pump will be utilized only if a Centrifugal Charging pump is not available. If both the Centrifugal and positive displacement charging pumps are not available during a Station Blackout event, the Reactor Coolant System inventory will be maintained by use of the "B" Train High Head Safety Injection Pump, as generally described in Section 2.3.6 of the NRC Safety Evaluation Report dated July 17, 1991. A detailed discussion of this issue is provided in the Question 5 response.