The Light company
Houston Lighting & Power South Texas Project Electric Generating Station P. O. Box 289 Wadsworth, Texas 77483

December 27, 1995
ST-HL-AE-5238
File No.: G09.16
10 CFR50.55a

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

South Texas Project
Unit 1 and Unit 2
Docket Nos. STN 50-498 and 50-499
Request for Relief from ASME Boiler and Pressure Vessel Code Section XI
Pump Relief Request No. RR-16 (Unit 1) and Pump Relief Request No. RR-16 (Unit 2)

Pursuant to 10CFR50.55a(f), South Texas Project submits Pump Relief Requests (RR) RR-16 for Unit 1 and RR-16 for Unit 2 (Attachment 1 and 2 respectively) to use alternate testing criteria for assessing operational readiness for Essential Cooling Water Pumps. Attachment 3 is provided to support the review. Upon Nuclear Regulatory Commission approval of these relief requests, South Texas Project will commence using this alternate testing criteria for inservice testing of the Essential Cooling Water Pumps and will revise the South Texas Project Unit 1 and Unit 2 Pump and Valve Inservice Test Plans.

If you should have any questions regarding this request, please contact Mr. W. Roger Harris at site extension (512) 972-8475 or me at (512) 972-7902.

T.J. Jordan
Manager,
Systems Engineering

KJT/lf

Attachment 1: South Texas Project Unit 1 Pump Relief Request RR-16
Attachment 2: South Texas Project Unit 2 Pump Relief Request RR-16
Attachment 3: South Texas Project Piping and Instrumentation Diagram Essential Cooling Water System Train 1A, Dwg. No. 5R289F05038 #1 SH1, Rev 6

A047 1/1

Drawing located in Central Files

c:

Leonard J. Callan
Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

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 77404-0910

J. R. Newman, Esquire
Morgan, Lewis & Bockius
1800 M Street, N.W.
Washington, DC 20036-5869

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

Central Power and Light Company
ATTN: G. E. Vaughn/C. A. Johnson
P. O. Box 289, Mail Code: N5012
Wadsworth, TX 77483

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

J. W. Beck
Little Harbor Consultants, Inc.
44 Nichols Road
Cohassett, MA 02025-1166

SOUTH TEXAS PROJECT
UNIT 1 PUMP RELIEF REQUEST RR-16

System

Essential Cooling Water

Components

Essential Cooling Water Pumps 1A, 1B, 1C

Code Class

3

Function

The Essential Cooling Water System supplies cooling for loads (standby diesel generators, safety-related ventilation, and Component Cooling Water System) which are necessary for the safe shutdown of the reactor and to mitigate the consequences of postulated accidents. The Essential Cooling Water System (Ultimate Heat Sink) also supplies cooling water to these systems during normal operation and plant shutdown.

ASME B&PV Code Section XI Requirements For Which Relief is Requested

IWP-3100 states that the resistance of the system shall be varied until either the measured differential pressure or the measured flow rate equals the corresponding reference value. The quantities shown in Table IWP-3100-1 shall then be measured or observed and recorded and compared with the corresponding reference value.

Basis for Relief

1) The Essential Cooling Water System is designed so total pump flow can not readily be adjusted to one reference value for testing without adversely impacting the operating flow balance of the system or utilizing excessive operator resources which would be better utilized to monitor the safe operation of the plant. The Essential Cooling Water Pumps must be tested in a manner that does not adversely affect the flow balance and system operability.

2) The Essential Cooling Water System trains are not designed with a full flow test line with a ingle throttle valve. Flow in each of the three independent trains is balanced through six parallel loads (Standby Diesel, 2 Essential Chillers, Component Cooling Water Heat Exchanger, Component Cooling Water Pump Supplementary Cooler and Essential Cooling Water Pump Lube Water). Total system flow is obtained by totalling flow measurements for each of these loads. The flow through each of these loads is throttled to a specific flow range and changes to flow through one load frequently change the flow through one or more of the other loads. Each of the six loads has a range of acceptable flow. The total flow through the system has an acceptable normal operating range. Adjustment to system resistance, by throttling any combination of these loads, often moves one or more outside its respective operating range. Although the operating range of the Essential Cooling Water pump may remain acceptable, these flow perturbations can require entry into Technical Specification Limiting Condition of Operations (LCO) for the affected individual components until correct flows are reestablished. The requirement to adjust Essential Cooling Water (ECW) flow during quarterly inservice testing challenges the system design, the operators and component operability.

3) Each train of ECW is flow balanced when it is returned to service following a refueling or LCO outage to ensure all loads are adequately supplied. A flow range is specified for each load to balance all the flows against each other. Once properly balanced, very little flow adjustment can be made without adversely impacting the operability of the remaining loads. Each time the system is balanced, proper individual component flows are produced, but this in turn does not necessarily result in one specific value for total flow. Because each load has an acceptable flow range, overall system flow has a range. Overall system flow can vary from a low of approximately 15,700 gpm to a high of approximately 20,610 gpm. Consequently, adjusting flow to one specific value on a quarterly basis for the performance of inservice testing conflicts with the system design and challenges system operability.

Alternate Testing to be Performed

As an alternative to the testing requirements of IWP-3100, South Texas Project proposes to assess pump performance through the use of reference pump curves as discussed in Section 5.2 of NUREG-1482. Flow rate and pump differential pressure will be measured during inservice testing in the as found condition and compared to an established reference curve. The following elements will be used in the development of the reference pump curves.

1) A reference pump curve (flow rate vs. discharge pressure) will be established for each of the ECW pumps from data taken when these pumps are known to be operating acceptably.

2) Pump curves will be established from measurements taken with instrumentation meeting or exceeding the accuracy requirements listed in Table IWP-4110-1 or OM Part 6, Table 1.

3) Each curve will be based on at least five points beyond the flat portion of the pump curve in the normal operating range of the pumps (at flows greater than 15,700 gpm). Rated capacity of these pumps is 19,280 gpm. The pumps will be tested at their full design flow rates, approximately 15,700 gpm minimum and approximately 20,610 gpm maximum.

4) The reference pump curves will be based on flow rate vs differential pressure. The acceptance criteria (i.e. acceptable, alert, and required action) curves will be based on differential pressure limits given in IWP-3100-2 or OM Part 6, Table 3b when this system is converted to OM Code.

5) Vibration levels will be measured at each of the reference points. If negligible variation in the vibration readings is observed over the range of pump conditions, a single reference value may be assigned to each vibration measurement location. If vibration readings change over the range of pump conditions, appropriate acceptance criteria will be assigned to regions of the pump curve. The acceptance criteria for vibration will be based on the limits given in IWP-3100-2 or OM Part 6, Table 3a when this system is converted to OM Code.

6) After maintenance or repair that may affect the existing reference pump curve, a new reference pump curve shall be determined or the existing pump curve revalidated by an inservice test. If necessary, a new pump curve shall be established based on at least five points beyond the flat portion of the pump curve.

Quality/Safety Impact

The design of the South Texas Project Unit 1 and 2 Essential Cooling Water systems make it impractical to adjust system resistance to obtain a single fixed reference value for inservice testing without adversely affecting the system flow balance and Technical Specification operability requirements of the components cooled by ECW. The use of pump curves for reference values of flow rate and differential pressure is an acceptable alternative if the impracticality of establishing a fixed set of references has been clearly demonstrated by the licensee (NUREG-1482, Section 5.2 - Use of Variable Reference Values for Flow Rate and Differential Pressure During Pump Testing). The proposed alternate testing using a reference pump curve for each pump provides adequate assurance and accuracy in monitoring pump conditions to assess pump operational readiness and detect pump degradation. Alternate testing will have no impact on plant and public safety.

SOUTH TEXAS PROJECT
UNIT 2 PUMP RELIEF REQUEST RR-16

System

Essential Cooling Water

Components

Essential Cooling Water Pumps 2A, 2B, 2C

Code Class

3

Function

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