



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 15, 1994

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MEMORANDUM FOR: Suzanne C. Black, Director
Project Directorate IV-2
Division of Reactor Projects, III/IV/V
Office of Nuclear Reactor Regulation

FROM: Eugene V. Imbro, Chief
Special Inspection Branch
Division of Reactor Inspection
and Licensee Performance
Office of Nuclear Reactor Regulation

SUBJECT: SALP INPUT FOR SOUTH TEXAS PROJECT ORAT

Enclosed is a SALP input for the South Texas Project (STP) which is based upon the Operational Readiness Assessment Team (ORAT) inspection conducted by this branch from December 6, 1993 through January 21, 1994. If you have any questions concerning this input, please contact the inspection team leader, Jeffrey Jacobson, at (301) 504-2977.

E. V. Imbro
Eugene V. Imbro, Chief
Special Inspection Branch
Division of Reactor Inspection
and Licensee Performance
Office of Nuclear Reactor Regulation

Enclosure: As stated

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Facility Name: South Texas Project, Units 1 and 2

Summary of Inspection Activities

The NRC Operational Readiness Assessment Team (ORAT) inspection, led by the Special Inspection Branch of the Office of Nuclear Reactor Regulation (NRR), was conducted from December 6-10, 1993, and January 12-21, 1994. The inspection team consisted of staff members from NRR, Region II, and Region III, as well as two consultants. The objective of the inspection was to provide the NRC an independent, broad-scope assessment of the programs, personnel, and management controls in place to support restart of South Texas Project (STP), Unit 1. The ORAT evaluated the areas of plant operations, surveillance, maintenance, modifications, and corrective action programs. The team also reviewed the STP Operational Readiness Plan and the STP Business Plan.

Narrative Discussion of Licensee Performance

The team identified several deficiencies due to ineffective program implementation and procedural weaknesses. Of greatest significance, was the team's finding concerning weaknesses in configuration management which led to numerous unexpected equipment actuations and equipment clearance order inadequacies. These weaknesses, along with several equipment failures, presented unnecessary challenges to control room operators.

During the initial phase of the inspection, senior management was not aware of implementation weaknesses with the postmaintenance test program, even though this issue had been highlighted by internal nuclear assurance group assessments. Due to a lack of management attention, the implementation weaknesses went un-corrected until brought to management's attention by the ORAT.

On the positive side, the team found that HL&P had effectively implemented a comprehensive Operational Readiness Plan for return to power and had developed an ambitious Business Plan which outlined long-range strategies and activities. Work backlogs, both paper, and hardware oriented, had been significantly reduced during the extended outage.

The STP corrective action program was found to be fair, with several future enhancements planned. However, root cause analyses and corrective action evaluations need to be improved. Engineering support to the plant was good, as was the observed physical plant condition. Staff morale and attitude were positive.

Functional Area: Plant Operations

The team observed control room activities throughout the inspection, as well as during a sustained 48-hour period beginning on the evening of January 13, 1994. The team noted that control room access was limited, noise levels were reasonable, and that the newly established operations work control group was effective in limiting the administrative burden on the control room staff. A professional attitude was maintained by operators while carrying out their

assigned duties. Operator awareness to plant status, and attention and response to plant annunciators, was considered good. Operator logtaking was detailed and properly documented plant activities. The professionalism and high morale of the operations staff were identified as strengths by the team.

During the inspection, several events regarding inadvertent equipment actuation or failure of equipment to actuate during testing were noted. In response to the team's concerns in this area the licensee developed and committed to implement a configuration management action plan. The team noted numerous delays of activities because procedures could not be performed as written by operations. For example, plant heatup was repeatedly delayed awaiting the requisite procedure changes to be processed.

During the performance of centrifugal charging pump operability testing, a technical specification violation occurred, due to HL&P's failure to ensure a proper valve line-up prior to testing. Although the valve position of a charging pump discharge valve was visually verified as being closed, it had actually opened prior to the testing. Its true position was not understood due to its power having been previously removed. It was later learned that this event had happened before, but an adequate root cause analysis had not been performed.

The team also identified a large number of out-dated technical specification interpretations which the licensee committed to eliminate.

Functional Area: Maintenance

On the basis of the limited review conducted by the team, and with the exception of the deficiencies noted below with the post maintenance testing (PMT) program, ongoing maintenance activities were found to be properly planned, controlled, and performed in a manner that exhibited adequate technical knowledge of plant systems, good procedural adherence, and an adequate knowledge of station processes and procedures. First-line supervisors appeared to be aware of ongoing work and were involved in close supervision.

There were indications that the licensee was trying to improve the craft's ability to handle possible problem areas that could arise during routine maintenance activities because of inattention to detail. An example of the licensee's efforts in this area was noted in the I&C shop where a simulator training program for increasing the crafts awareness of "attention-to-detail" problems had been developed.

At the end of the first phase of the inspection, the team concluded that, although the licensee had made significant progress in developing an adequate post-maintenance test (PMT) program, implementation of this program appeared to be weak and inconsistent. The maintenance crafts were not adequately trained and appeared uncomfortable with the new PMT program. The team identified work packages with inadequate detail to define PMT acceptance criteria and initial test conditions. The team also identified several packages in which PMT steps were marked N/A with no indication of who determined they were not applicable or when this determination was made.

After bringing these deficiencies to managements attention, the team found PMT implementation to be much improved during the second phase of the ORAT.

Functional Area: Engineering

The team evaluated engineering modification packages, engineering dispositions to corrective action documents (Station Problem Reports), and justifications for continued operations. In general, modifications were properly prepared, implemented, and controlled in accordance with approved licensee procedures. Appropriate post-modification testing was specified as necessary to verify the functionality of the design changes. The engineers were knowledgeable about the relevant procedures and the specific details of the packages.

The justification for continued operation documents reviewed contained supportable engineering analyses and were based on sound engineering judgement. The team did however, identify weaknesses with the dispositions of several station problem reports. In some cases, the root cause of the problem was never addressed, or contributing factors were not evaluated. Also, supporting documentation for the evaluations was often weak. Industry information evaluations were usually supportable, but again, documentation was often weak.



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June 14, 1994

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MEMORANDUM FOR: James M. Taylor
 Executive Director for Operations

FROM: William T. Russell, Director
 Office of Nuclear Reactor Regulation

SUBJECT: NRR STAFF ACTIONS RESULTING FROM THE DIAGNOSTIC EVALUATION AT
 SOUTH TEXAS PROJECT (WITS-93133)

In a memorandum dated August 3, 1993, you assigned responsibilities for resolution of certain generic and plant-specific actions resulting from the diagnostic evaluation team's (DET's) assessment at the South Texas Project. The staff actions involved various administrative and technical issues that were assigned to NRR, Region IV, AEOD, or some combination thereof. In memoranda dated November 2, 1993, and February 1, 1994, Dr. Thomas E. Murley sent you the status of the items assigned to NRR. Mr. James L. Milhoan sent the Region IV response to you in memoranda dated November 2, 1993, and January 12, 1994, which closed the tasks assigned to Region IV.

The status of the remaining items assigned to NRR is summarized below. Memoranda from the technical branches are enclosed for your use.

Action 1.b: Evaluation of generic implications of assigning multiple conflicting responsibilities

The staff has addressed this South-Texas-specific item by including the DET's observations with the operational data used in an ongoing NRC research project, "Nuclear Power Plant Shift Staffing Levels." The research project will establish a technical basis for minimum shift staffing levels of licensed and nonlicensed personnel at nuclear power plants, confirming the adequacy of the requirements of 10 CFR 50.54(m), or will establish a regulatory basis for modifying these requirements. The project team will analyze the workload and function allocation for licensed and nonlicensed personnel both inside and outside the control room for high-workload transient responses. This research project is being tracked under NRR Human Factors Research User Need No. 6, "Shift Staffing Levels."

On February 3 and 4, and May 12 and 15, 1994, NRR and RES staff held discussions with the Brookhaven National Laboratory project team regarding project status and details of the project plan. In addition to the South Texas DET report, the staff specified that operational data from other off-normal events (e.g., at Quad Cities) where shift crews appear to have been challenged in their ability to mitigate events would be included in the research data. The project team has completed the initial review of this data and has observed an emergency exercise to identify situations in which shift staffing may play a significant role. This information has been used to select scenarios for simulator research and task network modeling to evaluate minimum staffing levels needed to successfully accomplish all necessary safety functions. The staff is currently working on candidate sites to conduct the research. The Office of Nuclear Regulatory Research has scheduled completion of this project for early 1995.

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Since this potentially generic issue is currently under active review, it will be tracked and reported through normal generic review methods and reporting requirements. Accordingly, the Human Factors Branch in NRR, in conjunction with the Office of Nuclear Regulatory Research, will supply the necessary update on this issue.

Action 2: Assessment of essential chilled water (ECW) systems, including chiller units

The staff conducted a review of the ECW system. The staff determined that the licensee has completed an acceptable engineering evaluation demonstrating that the system is capable of performing its safety function under design-basis maximum and minimum heat load conditions. The licensee performed a thorough analysis demonstrating that the ECW system would perform acceptably under minimum loading conditions after the modifications to the service water system piping providing cooling water to the essential chillers were implemented. Data from the licensee's post-modification testing were used to validate the results of the analysis. This is documented in NRC Inspection Report 94-04.

The staff found the licensee's test program (baseline and periodic) for the system to be acceptable. The Plant Systems Branch in NRR will prepare an information notice during calendar year 1994 to notify the industry of the licensee's actions in addressing this issue. For additional information, please refer to Enclosure 1, which includes NRC Inspection Report 94-04. This action is considered closed.

Action 4: Assessment of tornado dampers and their periodic testing

The Mechanical Engineering Branch has been reviewing available information related to damper testing and probabilistic risk assessment. A meeting was held with the Probabilistic Safety Assessment Branch to discuss the action plan for damper testing, and the branch commented on the statement of work for contractor assistance. A contractor is expected to be assigned in the near future. Since this issue covers several topical areas (e.g. fire protection, control room habitability, tornado protection, emergency core cooling system equipment room cooling, and isolation/filtration of radiation release), finding a single experienced contractor may be difficult.

Since this issue may be an emerging generic issue, it will be tracked and reported through normal generic review methods and reporting requirements. Additionally, because of the dampers' effect on system operability, the Plant Systems Branch has taken over the lead for, and will supply the necessary update on, this issue.

Action 5: Assessment of rapid refueling system with rod-lockout condition and analysis of boron dilution event

The staff concluded in the February 1, 1994, memorandum (Murley to Taylor) that the licensee's reevaluation of the boron dilution event under all-rods-out conditions and the related Technical Specifications are acceptable. This item was closed in that memorandum.

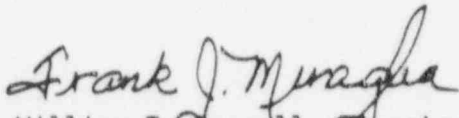
Action 6: Evaluation of the emergency diesel generator high-pressure fuel injection pump hold-down studs and associated operability analysis

In a memorandum dated June 3, 1994 (Chan to Quay), the staff concluded that the failure of the hollow hold-down studs in the fuel injection pumps (which led to the operability analysis of 18 and 19 cylinder operation) was caused by manufacturing tolerances, inadequate design margins, and deficiencies in installation practices. The new fastener design (solid hold-down studs with Belleville washers) is considered adequate. Additionally, the standby diesel generators would be operable with up to two cylinders out of service, provided the standby diesel generators are required to operate at steady-state or decreasing load conditions. This action is considered closed.

Action 7: Evaluation of the applicability of technical specification overtime requirements for plants on 12-hour shifts

The staff concluded in the November 2, 1994, memorandum (Murley to Taylor) that current NRC guidance is applicable to 12-hour shift rotations and additional guidance is not appropriate. This item was closed in that memorandum.

This memorandum completes the reporting requirement for the NRR South Texas Project staff actions as a result of the DET at South Texas Project. Except as noted above, all South Texas Project actions are closed. For those potential generic issues (Action Items 1.b and 4), these items will be tracked and reported through normal generic review methods and reporting requirements by the aforementioned NRR branches.


William T. Russell, Director
Office of Nuclear Reactor Regulation

Enclosures:

1. Memorandum, McCracken to Black, 03/16/94
2. Memorandum, Chan to Quay, 06/03/94

cc w/enclosures:

- E. Jordan, AEOD
- J. Callan, Region IV
- S. Rubin, AEOD

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MAR 1 1994

MEMORANDUM FOR: Suzanne C. Black, Director
Project Directorate IV-2
Division of Reactor Projects III, IV, V

FROM: Conrad E. McCracken, Chief
Plant Systems Branch
Division of Systems Safety and Analysis

SUBJECT: SOUTH TEXAS PROJECT DET STAFF ACTIONS
(TAC NOS. M87165 AND M87166)

Plant Systems Branch has completed its review of staff actions resulting from the Diagnostic Evaluation at South Texas Project Electric Generating Station (STP) regarding essential chilled water (CH) system operation. We determined that Houston Lighting and Power Company (HL&P), the licensee for STP, has completed an acceptable engineering evaluation demonstrating that the CH system is capable of performing its safety function under design basis maximum and minimum heat load conditions. We also found HL&P's test program for the CH system to be acceptable. Plant Systems Branch will draft an Information Notice for release in the second quarter of calendar 1994 to notify the industry of HL&P's actions in addressing this issue.

In response to Staff Action 2(a), the staff assessed HL&P's engineering analysis of CH system operation. This assessment is documented in Section 2 of NRC Inspection Report 50-498/94-04; 50-499/94-04 (Enclosure 1), issued February 11, 1994. Steve Jones, a Reactor Systems Engineer in Plant Systems Branch, participated in the inspection and provided the input for that section of the report. In the report, the inspectors concluded that the licensee's analysis had demonstrated that the essential chillers will perform acceptably under minimum loading conditions after full implementation of modifications to the service water piping providing cooling water to the essential chillers. However, the inspectors noted that additional administrative controls were necessary to justify certain assumptions in the analysis. These controls consisted of providing additional procedural guidance to operators to ensure acceptable chiller performance greater than 30 minutes following the accident initiating event when the chillers may be operating at a minimum steady state load and maintaining control room temperature above a minimum temperature when operating with low service water temperatures in order to satisfy assumptions used in computing the minimum chiller loading. Region IV is tracking these needed administrative controls for followup.

The licensee performed post-modification testing to evaluate the ability of the essential chillers to start and operate successfully with the modified service water piping configuration. The licensee evaluated the data collected from these tests to validate the methodology used in the engineering analysis of essential chiller operation. The staff also reviewed the test procedure and the evaluation of results. This review is documented in Section 3 of Enclosure 1. Although the testing alone did not demonstrate the ability of

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the chillers to perform their safety function under design basis maximum and minimum heat loads, the testing in combination with the engineering analysis did satisfactorily demonstrate that capability. In addition, HL&P provided a letter documenting agreement of the essential chiller vendor with the licensee's evaluation of essential chiller performance. The licensee submitted the post-modification test procedure, the safety evaluation for the bypass modification, and the vendor agreement letter as attachments to a letter dated February 15, 1994.

Action 2(b) requested that the staff assess the need and scope of baseline testing of the CH system that would more closely simulate design basis accident heat load conditions and validate operability. The engineering analysis and the post-modification testing provide assurance of the adequacy of CH system design, consistent with Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. Simulation of design basis conditions for testing is impractical and unnecessary to demonstrate operability under limiting conditions. Therefore, we conclude that the scope of baseline testing performed by the licensee is acceptable.

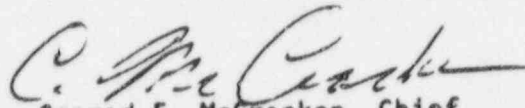
Action 2(c) requested that the staff assess the need and scope of periodic testing of the CH system to ensure that it can perform its safety function. The licensee had previously developed procedure OPEP07-CH-0001, "Essential Chiller Performance Test," to conduct periodic performance monitoring of the essential chillers and for post-maintenance testing of the essential chillers. The licensee submitted a description of this test in a letter dated February 10, 1994. Periodic verification of CH system valve position to the positions established during flow balancing, and periodic inservice testing of the CH system pumps and valves in accordance with 10 CFR 50.55a provide assurance that acceptable chilled water flow rates are maintained. Based on this periodic monitoring, we conclude that the licensee conducts acceptable periodic testing of the CH system that is consistent with Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50.

The generic adequacy of chilled water system testing has been evaluated in NUREG-1427, "Regulatory Analysis for the Resolution of Generic Issue 143: Availability of Chilled Water System and Room Cooling." The regulatory analysis determined that the evaluated alternatives did not satisfy the Commission's guidance for imposing new requirements and that safety significant deficiencies are likely to be plant specific. Individual licensee quality assurance programs implementing the requirements of Appendix B to 10 CFR Part 50 provide an enforcement mechanism to address testing deficiencies identified at individual facilities through inspection activity. Based on these considerations, we concluded that the appropriate generic correspondence is an Information Notice to inform the industry of actions taken by HL&P to demonstrate the functional capability of the CH system.

Suzanne C. Black

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If you have questions regarding our assessment of essential chilled water system capability, please contact Steve Jones at 504-2833. Our SALP input is provided in Enclosure 2.



Conrad E. McCracken, Chief
Plant Systems Branch
Division of Systems Safety and Analysis

Enclosure:
As stated

cc w/enclosure:
L. Kokajko

CONTACT: S. Jones
504-2833