BEFORE THE

UNITED STATES NUCLEAR REGULATORY COMMISSION

LICENSE NO. NPF-47

DOCKET NO. 50-458

IN THE MATTER OF

GULF STATES UTILITIES COMPANY

CAJUN ELECTRIC POWER COOPERATIVE AND

ENTERGY OPERATIONS, INC.

AFFIRMATION

I, John R. McGaha, state that I am Vice President-Operations of Entergy Operations, Inc., at River Bend Station; that on behalf of Entergy Operations, Inc., I am authorized by Entergy Operations, Inc. to sign and file with the Nuclear Regulatory Commission, this License Amendment Request #94-09 for the River Bend Station; that I signed this License Amendment Request as Vice President-Operations at River Bend Station of Entergy Operations, Inc.; and that the statements made and the matters set forth therein are true and correct to the best of my knowledge, information, and belief.

John R. McGaha

STATE OF LOUISIANA
WEST FELICIANA PARISH

SUBSCRIBED AND SWORN TO before me, a Notary Public, in and for the County and State above named, this 8th day of September, 1994.

(SEAL)

Claudia I. Hurst
Notary Public

My commission expires: with life

Reason for Request

Recently EOI has determined that a small fuel leak exists in the reactor core at RBS. After reviewing related industry experience (GE SIL 379 Revision 1, "Power Suppression Testing" dated July 16, 1993) and consulting with the fuel vendor (General Electric), EOI has decided to perform a power suppression test to determine the location of the fuel leak. Once this location has been determined, actions can be taken to suppress the local power in the region of the fuel leaker, thereby reducing the potential for further damage to the cladding.

The proposed testing will minimize the nodal power transient caused when withdrawing the control rod. If the control rod is allowed to stop and settle at intermediate positions as required by the Rod Pattern Control System (RPCS) rod withdrawal limiter (RWL), the thermal heat flux will come into equilibrium with the neutron flux off the tip of the control rod. This local increase in power could adversely affect the leaking fuel rod if the clad defect is located in this region. Therefore, the proposed test requires continuous control rod withdrawal. EOI has determined that to support power suppression testing, bypassing the control logic of the RPCS does not pose any significant hazard to the health and safety of the public.

Analytical and Design Basis

The RBS Updated Safety Analysis Report (USAR) identifies that the Anticipated Operational Occurrence (AOO) of concern is the Rod Withdrawal Error (RWE) above 20% thermal power. This event is mitigated by the Rod Withdraw Limiter (RWL) function of the Rod Pattern Control System (RPCS) which is in affect above the Low Power Set Point (LPSP). The RWE is discussed in USAR Section 15.4.2. The event occurs when the highest worth control rod is withdrawn (either by operator error or equipment malfunction) when at a limiting Critical Power Ratio (CPR) condition. This event is terminated by the notch restraints imposed by the RWL prior to exceeding any fuel design limits. This analysis [referenced in GESSAR II, Appendix 15B, BWR/6 Generic Rod Withdrawal Error Analysis] indicates that the fuel design limits will not be exceeded with these notch withdrawal limitations imposed.

The RPCS is a safety-related system, the purpose of which is to limit the consequences of an accident to an acceptable level. This is accomplished by the control logic of the system which restricts the positioning of control rods that can be established to predetermined sets. The control logic is hardwired and is not site-programmable except via an engineering design change and modification of the system's electronic circuit cards. Rod position is the primary data input for the RPCS. Other inputs to the RPCS

controllers include reactor power level, mode of operation, identification of selected rod, and drive mode requested by the operator.

The RWL provides protection from control rod withdrawal error events during high power operation. The purpose of the RWL is to limit control rod withdrawal to preclude violating the minimum critical power ratio-safety limit (MCPR-SL) and the cladding 1% plastic strain fuel design limit that may result from a single RWE event. The RWL supplies a signal which appropriately inhibits control rod withdrawal during power operation greater than or equal to the LPSP.

Analysis has demonstrated that the limiting parameter during a RWE event is the MCPR (GESSAR II, Appendix 15B). The 1% plastic strain limit as measured by linear heat generation rate (LHGR) is not challenged by the RWE event.

The RWL is assumed to mitigate the consequences of an RWE event when operating above the LPSP. Below this power level, the sequence constraints imposed by the Rod Pattern Control System are more restrictive and hence the consequences of an RWE event will not exceed any fuel safety limits. Therefore, the RWL is not required to be operable.

The RPCS conservatively implements the RWL portion of the above requirements, governed by Technical Specification 3.1.4.2. Technical Specification 3.1.4.2 specifies that the RWL function of RPCS be operable greater than or equal to the LPSP. Technical Specification requirements for fuel thermal limits (3.2.3, LHGR and 3.2.4, CPR) administratively limit the initial core conditions in order to remain consistent with RWE analysis assumptions.

The NRC Safety Evaluation Report (SER) (RBS NUREG 0989) Section 15.4.2 concurs with the above assessments for the following reasons:

1. The code used to analyze this transient is approved and accepted by the NRC;

2. The data used for the generic analyses covers a wide range of BWR/6 core sizes and exposures;

3. The allowed withdrawal distances are conservative with respect to the calculated results; and

4. The values of permitted initial CPR are conservative with regard to the transient results and calculated increases.

Specific Analysis and Limits Description

The special analysis as required by the proposed Technical Specification changes will be a test-specific analysis of the core and plant conditions for which the test is planned to be performed. This analysis will set the control rod patterns and core conditions upon which CPR and LHGR analysis has been performed and supports the requirements of the RWE analysis.

For power suppression testing this analysis will have the following general characteristics:

1. As a prerequisite partially inserted control rods will be analyzed assuming the control rods are bypassed via the individual control rod bypass switches and pulled inadvertently from full-in to full-out (now allowed because the RWL function is bypassed for this test) at the anticipated test power condition. The analysis will confirm that inadvertent control rod withdrawal does not violate the CPR/LHGR fuel safety limits during control rod movement.

2. A control rod pattern for the test shall be established such that 1 above can be met. This rod pattern will be administratively controlled by the test procedure and will meet the assumptions of the analysis performed.

With the above two parameters set by analysis any single equipment malfunction or operator error will be within the RWE criteria. The established control rod test pattern will conform with the current Technical Specification requirements for operating thermal limits. With this requirement in place, control rods that are at the full-out position will meet the CPR and LHGR requirements during testing. Therefore, no specific RWE analysis is required for these control rods.

The special analysis methodology to be utilized will be similar to that utilized in the generic RWE approach. Specifically, a delta CPR/Initial CPR (Δ/I) is calculated as a function of control rod withdrawal. The largest Δ/I is converted to the largest ΔCPR by assuming the Initial CPR was at the Operating Limit Minimum CPR (OLMCPR) at the proposed test power level. The calculated MCPR is then confirmed to be greater than the MCPR-SL plus an uncertainty margin based on the bias of the calculational code utilized. This analysis approach is conservative in that it assumes the actual change in CPR is from that of the maximum allowed value rather than the actual anticipated value. Since the analysis will be performed on a case-specific basis, the data will be accurate and up-to-date. LHGR limits will also be verified in a similar fashion, except that these limits will be calculated using actual values instead of assumed limiting values.

Proposed Test

The power suppression test will be performed by reducing core power to approximately 65% rated thermal power, establishing a pre-determined control rod test pattern in accordance with applicable analysis. The RPCS control logic will be bypassed allowing individual manual control rod manipulations using the continuous insertion/withdrawal mode of the Rod Control and Information System. At the time of the test, approximately 120 control rods will be at the full-out position, with the remaining control rods partially inserted. Data will be collected during continuous manual insertion/withdrawal activities for the individual control rod being tested. The continuous withdrawal of a control rod will be limited to its' original pre-test position. The control rod being tested must be returned to its' required test position and unbypassed prior to testing the next control rod. This control rod movement will be allowed by bypassing the individual control rods in the Rod Action Control System (RACS) cabinets. When the control rod is returned to its' required position, the associated bypass switches will be returned to their normal position. Bypass functions will be controlled administratively by procedures.

The possibility of core damage and offsite dose releases exceeding the present design basis is not affected by this configuration because the administrative controls to be employed for this test prevent any adverse conditions from occurring.

Continuous control rod withdrawal is desired in order to limit the magnitude of the thermal flux peak which occurs when control rod motion is stopped at intermediate points (as required by the RWL when above the low power setpoint). If a control rod is pulled in a continuous motion, the neutron flux peak that follows the control rod will only exist at the various elevations of control rod travel for less than a second. Therefore, the heat flux created by the neutron flux peak is minimized (due to the thermal time constant of the fuel pellet of approximately six seconds). Withdrawing a control rod past its original pre-test position is not desirable because such movement could adversely affect a leaking fuel rod that could be uncovered by this maneuver.

To perform the power suppression test without risking further damage to the failed fuel assembly requires bypassing the control logic of the Rod Pattern Control System (RPCS) in accordance with Technical Specification 3.10.2, "Special Test Exceptions-Rod Pattern Control System". Technical Specification 3.1.4.2, "Rod Pattern Control System", requires the RPCS be operable such that certain sequence or notch restraints are imposed on control rod groups based upon thermal power levels. EOI desires to bypass the notch restraints imposed by the RPCS to allow for continuous rod withdrawal of an individual control rod to a specific notch position.

erformance of power suppression testing without bypassing the RPCS notch constraints was considered. Because of the potential to adversely affect the fuel failure at these conditions and at the recommendation of the fuel vendor, the method described in this submittal is required.

Proposed Change

RBS would like to implement the proposed changes to Technical Specification 3.10.2 regarding controls of bypassing the RPCS sequence constraints for the purpose of power suppression testing. These proposed changes are consistent with Improved Technical Specification LCO 3.3.2.1, "Control Rod Block Instrumentation", allowances to bypass RWL functions for determining the location of leaking fuel assemblies.

Testing will be performed in accordance with REP-0038, "Power Suppression Testing". A surveillance test procedure, STP-500-0705, "Rod Sequence Verification When RPCS is Bypassed for Testing", will be used to control bypassing individual control rods in the RPCS. These administrative controls provide adequate assurance that movement of control rods will be limited to an established control rod sequence for the specified test. This allowance is consistent with present allowances in Technical Specification 3.10.2 for control rod testing. The above controls ensure that positioning and movement of bypassed control rods remain within the bounds of the appropriate analysis.

Presently, Technical Specification 3.10.2 allows the pattern constraints imposed by the RPCS to be bypassed using the individual rod position bypass switches for four specific tests, including scram time tests. This specification requires that additional administrative requirements be imposed when these sequence constraints are "bypassed". The administrative requirements include specifying a second verification by either a licensed operator or other technically qualified member of the unit technical staff for the bypassed control rods as well as conformance with test control rod patterns. The applicable requirements to be performed to comply with Technical Specification 4.10.2, "Special Test Exceptions", will be maintained during the power suppression test. This proposal will expand this flexibility to allow the control rod to be bypassed for power suppression testing.

Implicit in this allowance is that control rod positioning be in conformance with applicable safety analysis; the generic RWE analysis or with a special analysis to ensure that the conclusions of the RWE analysis remains supported (described above). The power suppression testing performed under the proposed change will be more

conservative than the requirements imposed by the RWL, since the RPCS-bypassed control rod will not be withdrawn past its' original pre-test position. Therefore, the evolution is less severe than that assumed in the analysis.

When operating below the LPSP of the RPCS, the applicable analysis is the control rod drop accident (CRDA). Compliance with this analysis is ensured by conformance with the generic Banked Position Withdrawal Sequence (BPWS) analysis or a specific BPWS analysis for the evolution.

From the foregoing discussion, it can be seen that bypassing the control logic of the RPCS and subsequent insertion/withdrawal of individual rods to their original position for the purpose of power suppression testing will not result in undue risks to the health and safety of the public.

No Significant Hazards Consideration

1) The request does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The event of concern is the RWE at power, which is assumed to occur when the highest worth control rod is withdrawn while at a limiting CPR condition. The rod withdrawal limiter (RWL) provides protection for control rod withdrawal error events. The purpose of the RWL is to limit control rod withdrawal to preclude a violation of a fuel design limit.

   Administrative controls for bypassing the RWL constraints in the RPCS will include; direct control to be maintained and an approved procedure to be used to control the bypassing of individual control rods in the RPCS. A test specific analysis will be performed assuming the RWE occurs and a test pattern will be administratively imposed (i.e. controlled by procedure) that precludes any violation of fuel safety limits.

   Performance of the power suppression testing with RWL notch constraints bypassed will be more conservative since the bypassed control rod will not be withdrawn past its original pre-test position. The expected test conditions for which the power suppression test will be performed will also be much less than the assumed limiting thermal limit conditions expected by the safety analysis. Therefore, the evolution is less severe than that assumed in the safety analysis.

   If an operator continuously withdraws a previously partially inserted control rod to its' original position or beyond, an analysis will show there is no increase in

the consequences of a rod withdrawal error of the type described in the basis for Technical Specification 3.10.2. Therefore, the RPCS sequence constraints are not required for this special test, and the operation of the plant will remain as previously analyzed with the response of the plant within the limits of the analyses.

2) The request does not create the possibility of occurrence of a new or different kind of accident from any accident previously evaluated.

Performance of the power suppression testing performed under the proposed change will be more conservative than previously reviewed events since the RPCS-bypassed control rod will not be withdrawn past its original pre-test position. Therefore, the power suppression testing evolution is less severe than that assumed in the safety analysis and the response of the plant will remain within previous analysis.

The positioning of control rods will be in conformance with applicable safety analysis; the generic RWE analysis or with a special analysis, to ensure that the conclusions of the RWE analysis remains supported. The maintenance of these analysis limits will be through the use of administrative controls.

The use of operational control in lieu of control rod blocks will assure this analysis remains supported. This action is consistent with present allowances in Technical Specification 3.10.2 Therefore the above administrative controls ensure that positioning and movement of bypassed control rods remain within the bounds of the previous analysis.

3) The request does not involve a significant reduction in a margin of safety.

Technical Specifications currently allow bypassing a single control rod for the purpose of fully withdrawing the control rod to perform the four tests specified in Technical Specification 3.10.2. The margin of safety associated with the bypassing and withdrawal of control rods is established in the Technical Specifications for control rod scram time testing. Also the controls being placed on power suppression testing will assure fuel safety limits are met. Therefore, the margin of safety associated with power suppression testing is enveloped by the margin of safety defined for current control rod testing.

Therefore, the analysis, the hardware controls, and the administrative requirements all support and meet the requirements of General Design Criteria 10, Fuel Design Limits

are not exceeded; 25, Protection System requirements for Reactivity Malfunctions; and 29, Protection against Anticipated Operational Occurrences.

Environmental Impact Consideration

EOI has reviewed this Request against the criteria of 10CFR51.22 for environmental considerations. The request does not affect any system discharging radwaste to the environment or monitoring any such discharge. Also, the request does not adversely affect any system designed to monitor or isolate gaseous radioactive effluents to the environment. Therefore, the request; does not involve a significant hazards consideration, does not significantly increase the types or quantity of effluent that may be released offsite, and does not significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, EOI concludes that the proposed change meets the criteria given in 10CFR51.22 (c)(9) for a categorical exclusion from the requirement for an Environmental Impact Statement.