



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D. C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 72 TO FACILITY OPERATING LICENSE NO. NPF-47

ENTERGY OPERATIONS, INC.

RIVER BEND STATION, UNIT 1

DOCKET NO. 50-458

1.0 INTRODUCTION

By letter dated December 8, 1993, as supplemented by letter dated February 3, 1994, Gulf States Utilities¹ (the licensee) requested an amendment to Facility Operating License No. NPF-47 for the River Bend Station, Unit 1. The proposed amendment would revise the Technical Specifications (TS) by granting one-time extensions for certain TS surveillances which are currently required to be performed beginning February 16, 1994. The licensee is requesting extension of the surveillance intervals because the current operating cycle has been extended to approximately April 16, 1994, impacting the required completion dates for these surveillances. Performance of these surveillances within the required intervals (including the 25 percent interval extension allowed by TS 4.0.2) would require that the plant be placed in an undesirable operating configuration, or would necessitate a plant shutdown. The licensee stated that requiring the plant to shutdown solely to perform these surveillance tests would cause an unnecessary thermal transient and result in additional radiation exposure to plant personnel. The February 3, 1994, letter provided clarifying information and did not change the initial no significant hazards consideration determination.

The licensee proposed an amendment of specific TS surveillance requirements to indicate that these tests could be performed during the fifth refueling outage, scheduled to begin April 16, 1994. For certain TS requirements which remain applicable in Modes 4 and 5, the licensee proposed amending the requirements to state that the tests may be extended to the completion of the fifth refueling outage, currently scheduled for June 8, 1994. The licensee stated that these surveillance requirements required extension into the outage to support 'defense in depth' built into the outage schedule to reduce shutdown risk.

2.0 EVALUATION

Generic Letter (GL) 91-04, "Changes in Technical Specifications Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," was published April 2, 1991. The purpose of the GL was to provide guidance to licensees wishing to take advantage of improvements in reactor fuels to increase the duration of the fuel cycle for their facilities. Although the licensee is not requesting a

¹ By Amendment No. 70 to the license, effective January 1, 1994, Entergy Operations, Inc. assumed responsibility for operation of River Bend Station.

change to a 24-month fuel cycle, it is requesting a one-time surveillance extension in which some of the guidance of GL 91-04 will apply.

The staff included in its guidance in GL 91-04 the following statement:

"The NRC staff has reviewed a number of requests to extend 18-month surveillances to the end of a fuel cycle and a few requests for changes in surveillance intervals to accommodate a 24-month fuel cycle. The staff has found that the effect on safety is small because safety systems use redundant electrical and mechanical components and because licensees perform other surveillances during plant operation that confirm that these systems and components can perform their safety functions. Nevertheless, licensees should evaluate the effect on safety of an increase in 18-month surveillance intervals to accommodate a 24-month fuel cycle. This evaluation should support a conclusion that the effect on safety is small. Licensees should confirm that historical plant maintenance and surveillance data support this conclusion."

The licensee's request for surveillance extensions is very similar to one-time extensions granted previously to other NRC licensees to support extended operating cycles.

The staff has categorized the affected surveillances into four groups. The first group of surveillances includes calibration, logic system functional testing, and response time testing of certain instrumentation functions. The next group of surveillances concerns demonstration of automatic isolation of reactor water cleanup (RWCU) system containment isolation valves on receipt of an isolation test signal. The third group of surveillances concerns inspection and testing of dc batteries and battery chargers. The fourth group of surveillances concerns calibration of reactor protection system (RPS) electrical protection assemblies (EPAs). The licensee also proposed reestablishment of the baseline for the "N times 18 months" cumulative surveillance intervals for response time testing by extending the cumulative intervals to coincide with the individual extensions requested.

Instrumentation Calibration, Logic System Functional Testing, and Response Time Testing Surveillance Requirements

The first group of surveillances includes calibration, logic system functional testing (LSFT), and response time testing of RPS, isolation actuation system, and emergency core cooling system (ECCS) instrumentation; and calibration of control rod block, remote shutdown monitoring, accident monitoring, and feedwater system/main turbine trip system instrumentation. The licensee requested extensions of approximately 27 days to the beginning of the outage and 80 days to the end of the outage for the following instrumentation calibration surveillance requirements:

TS 4.3.1.1, RPS Instrumentation Calibration

Table 4.3.1.1-1:

- Item 2.b, "APRM Flow Biased Simulated Thermal Power - High,"

footnote (o), Flow Reference Transmitters

- Item 3, "Reactor Vessel Steam Dome Pressure - High"
- Item 9.a, "Scram Discharge Volume Water Level - High" *

TS 4.3.2.1, Isolation Actuation Instrumentation Calibration

Table 4.3.2.1-1:

- Item 6.e, "RHR System Isolation - Reactor Vessel (RHR Cut-in Permissive) Pressure - High"

TS 4.3.3.1, ECCS Actuation Instrumentation Calibration

Table 4.3.3.1-1:

- Item C.1.f, "HPCS System Pump Discharge Pressure - High" *
- Item D.1.a, "Loss of Power - 4.16kv Standby Bus Undervoltage (Sustained Undervoltage)" *
- Item D.1.b, "Loss of Power - 4.16kv Standby Bus Undervoltage (Degraded Undervoltage)" *

TS 4.3.6, Control Rod Block Instrumentation Calibration

Table 4.3.6-1:

- Item 2.a, "APRM Flow Biased Simulated Thermal Power - High," footnote (g), Flow Reference Transmitters
- Item 5.a, "Scram Discharge Volume Water Level - High" *
- Item 6.a, "Reactor Coolant System Recirculation Flow - Upscale," footnote (g), Flow Reference Transmitters

TS 4.3.7.4.1, Remote Shutdown Monitoring Instrumentation Calibration

Table 4.3.7.4-1:

- Item 1, "Reactor Vessel Pressure"
- Item 2, "Reactor Vessel Water Level"

TS 4.3.7.5, Accident Monitoring Instrumentation Calibration

Table 4.3.7.5-1:

- Item 1, "Reactor Vessel Pressure"
- Item 9.b, "Drywell Area Radiation Monitor"

TS 4.3.9.1, Plant Systems Actuation Instrumentation Calibration

Table 4.3.9.1-1:

- Item 2.a, "Feedwater System/Main Turbine Trip System - Reactor Vessel Water Level - High Level 8"

- * Extension required to the end of the outage to provide 'defense in depth' during shutdown operations.

The licensee stated that observed drift characteristics, as well as the presence of redundant and diverse channels for most of the affected instrumentation, support extension of these surveillance intervals. The affected instrumentation is subject to periodic channel checks, channel functional tests, and channel calibrations which will continue to be performed during the extension period. Based on the above, and the relatively short

time period of the requested extension, the staff finds the proposed calibration surveillance interval extensions acceptable.

Logic systems are comprised of detection devices activated by certain physical conditions (e.g., pressure switches, temperature switches, etc.) and decision making relay networks that will cause a safety system component or device (e.g., pump, valve, etc.) to operate when needed. Logic system functional tests are surveillance tests of all relays and contacts, trip units, solid state logic elements, and related components from sensor through actuated device to verify system operability. The licensee requested extensions of approximately 29 days to the beginning of the outage and 80 days to the end of the outage for the following LSFT surveillance requirements:

TS 4.3.1.2, RPS Instrumentation LSFT

Table 4.3.1.1-1:

- Item 3, "Reactor Vessel Steam Dome Pressure - High"
- Item 9.a, "Scram Discharge Volume Water Level - High"

TS 4.3.2.2, Isolation Actuation Instrumentation LSFT

Table 4.3.2.1-1:

Item 4, "RWCU Isolation":

- Item 4.a, "Differential Flow - High"
- Item 4.b, "Differential Flow Timer"
- Item 4.c, "Equipment Area Temperature - High"
- Item 4.d, "Equipment Area Differential Temperature - High"
- Item 4.e, "Reactor Vessel Water Level - Low Low Level 2"
- Item 4.f, "Main Steam Line Tunnel Ambient Temperature - High"
- Item 4.g, "Main Steam Line Tunnel Differential Temperature - High"
- Item 4.h, "SLCS Initiation"

Item 6, "RHR System Isolation":

- Item 6.e, "Reactor Vessel (RHR Cut-in Permissive) Pressure - High"

TS 4.3.3.2, ECCS Actuation Instrumentation LSFT

Table 4.3.3.1-1:

- Item C.1.f, "HPCS System Pump Discharge Pressure - High" *
- Item D.1.a, "Loss of Power - 4.16kv Standby Bus Undervoltage (Sustained Undervoltage)" *
- Item D.1.b, "Loss of Power - 4.16kv Standby Bus Undervoltage (Degraded Undervoltage)" *

TS 4.3.9.2, Plant Systems Actuation Instrumentation LSFT

Table 4.3.9.1-1:

- Item 2.a, "Feedwater System/Main Turbine Trip System - Reactor Vessel Water Level - High Level 8"

- * Extension required to the end of the outage to provide 'defense in depth' during shutdown operations.

The licensee stated that industry reliability studies for boiling water reactors (BWRs) prepared by the BWR Owners' Group (NEDC-30936P) show that

overall safety system reliability is not dominated by the logic system reliability, but by the reliability of the mechanical components (e.g., pumps and valves), which are consequently tested on a more frequent basis. Since the probability of a relay or contact failure is small relative to the probability of mechanical component failure, increasing the logic system functional test interval represents no significant change in the overall safety system unavailability. Based on the above, and the relatively short time period of the requested extension, the staff finds the proposed LSFT surveillance interval extensions acceptable.

Protection system response time is the time interval from when a monitored parameter exceeds its actuation setpoint at the channel sensor to the time at which the actuated equipment reaches the required state (e.g., deenergization of RPS scram pilot solenoids, completion of valve movement to the required position, etc.). The licensee requested extensions of approximately 59 days to the beginning of the outage and 100 days to the end of the outage for the following instrumentation response time test surveillance requirements:

TS 4.3.1.1, RPS Instrumentation Calibration

Table 4.3.1.1-1:

- Item 2.b, "APRM Flow Biased Simulated Thermal Power - High," footnote (i), Simulated Thermal Power Time Constant (Calibration of this time constant is essentially a response time test.)

TS 4.3.1.3, RPS Instrumentation Response Time Test

Table 3.3.1-2:

- Item 2.b, "APRM Flow Biased Simulated Thermal Power - High"
- Item 2.c, "APRM Neutron Flux - High"
- Item 3, "Reactor Vessel Steam Dome Pressure - High"

TS 4.3.2.3, Isolation Actuation Instrumentation Response Time Test

Table 3.3.2-3:

Item 1, "Primary Containment Isolation":

- Item 1.a, "Reactor Vessel Water Level - High"
- Item 1.b, "Drywell Pressure - High"

Item 2, "Main Steam Line Isolation":

- Item 2.a, "Reactor Vessel Water Level - Low Low Low Level 1"
- Item 2.b, "Main Steam Line Radiation - High"
- Item 2.c, "Main Steam Line Pressure - Low"
- Item 2.d, "Main Steam Line Flow - High"

Item 3, "Secondary Containment Isolation":

- Item 3.a, "Reactor Vessel Water Level - Low Low Level 2"
- Item 3.b, "Drywell Pressure - High"

Item 4, "RWCU Isolation":

- Item 4.a, "Differential Flow - High"
- Item 4.e, "Reactor Vessel Water Level - Low Low Level 2"

Item 6, "RHR System Isolation":

- Item 6.d, "Reactor Vessel Water Level - Low Low Level 1"

TS 4.3.3.3, ECCS Actuation Instrumentation Response Time Test

Table 3.3.3-3:

- Item 1, "Low Pressure Core Spray System" *
- Item 2.a, "LPCI Mode of RHR System - Pumps A and B" *
- Item 2.b, "LPCI Mode of RHR System - Pump C" *
- Item 4, "High Pressure Core Spray System" *

* Extension required to the end of the outage to provide 'defense in depth' during shutdown operations.

The licensee stated that there are redundant and diverse channels available to perform each of the affected functions. Instrumentation response times and failure probabilities are small fractions of the overall system response times and failure probabilities. With respect to the main steam line radiation monitor response time test (TS 4.3.2.3, Table 3.3.2-3, Item 2.b), the licensee referred to a General Electric Licensing Topical Report, NEDO-31400, which justified removal of the main steam isolation valve (MSIV) closure and reactor scram functions of the main steam line radiation monitors (MSLRMs). The licensee stated that the topical report is applicable to River Bend Station. The NRC has previously reviewed and approved this topical report in a safety evaluation dated May 15, 1991. The staff determination that the subject MSLRM functions are not required for safe operation provides additional justification for extension of the subject surveillance interval. The extensions requested are for a short time period relative to the required surveillance intervals. Based on the above, the staff finds the licensee's request for a one-time extension of the response time testing surveillance intervals to be acceptable.

Cumulative Response Time Testing Surveillance Interval Baseline

The licensee also proposed reestablishment of the baseline for the "N times 18 months" cumulative surveillance interval for response time testing by extending the cumulative surveillance interval to coincide with the individual extensions discussed above. The licensee stated that extending the cumulative intervals will ensure that future response time testing intervals will not become overdue prematurely due to the interval extensions requested by this amendment. Extension of the cumulative intervals would not be for more than the individual extensions requested. Due to the fact that the individual extensions have been shown to be acceptable as discussed above, extending the cumulative surveillance interval for response time testing is acceptable to the staff.

Reactor Water Cleanup System Containment Isolation Valves

TS Surveillance Requirement 4.6.4.2 requires demonstration of automatic actuation of the isolation valves listed in Table 3.6.4-1 on receipt of an isolation test signal. The licensee requested an extension of approximately 13 days for the surveillance interval requirement for eight RWCU system valves.

The licensee stated that the containment penetrations have redundancy such that failure of a single valve does not prevent containment isolation. Furthermore, the containment isolation system is subject to periodic testing, including inservice tests of the valves. Based on the above, and the short time period of the requested extension, the staff finds the proposed isolation valve surveillance interval extensions acceptable.

DC Battery and Charger Inspection and Testing

The third group of surveillances concerns inspection (TSs 4.8.2.1.c.1, c.2, and c.3), service tests (TS 4.8.2.1.d.1), and performance tests (TS 4.8.2.1.e) of dc batteries; and load tests of the battery chargers (TS 4.8.2.1.c.4). The licensee requested extension of these surveillance interval requirements until the end of the refueling outage to provide 'defense in depth' during shutdown operations, an estimated extension period of 66 days.

The licensee stated that past battery inspections have found no visual abnormalities or unacceptable resistance measurements. Past service tests of the batteries have consistently yielded acceptable results. Pilot cells, monitored weekly, have not indicated any degraded conditions. Quarterly measurements of cell voltage, temperature, and specific gravity have not indicated any battery degradation. The licensee stated that the charger load tests have always yielded satisfactory results, with the voltage never falling below the test acceptance criteria. Finally, the extensions requested are for a short time period relative to the required surveillance intervals. Based on the above, the staff finds the licensee's request for a one-time extension of the dc battery and charger surveillance intervals to be acceptable.

The licensee also proposed an editorial change to TS surveillance requirement 4.8.2.2, which references TS 4.8.2.1, for the surveillances required to demonstrate operability of dc sources required during shutdown operations.

The licensee proposed to include a note for this surveillance requirement to provide consistency with TS 4.8.2.1 surveillance items for which extensions have been proposed. This is primarily an editorial change to maintain consistency between these specifications. The surveillance interval extensions have been found acceptable by the staff as noted above. Therefore, this change is acceptable to the staff.

RPS Electrical Protection Assemblies

The fourth group of surveillances concerns calibration of RPS electrical protection assemblies. The licensee requested an extension of these surveillance interval requirements until the end of the refueling outage, an extension of approximately 42 days.

The RPS consists of two independent trip systems; each subsystem has redundant channels. The RPS logic is such that a single failure will neither cause nor prevent a reactor scram. The licensee stated that laboratory testing of the EPAs has exhibited little or no drift and a review of the operating history of

the EPAs indicated only one failure attributed to drift since 1985. Based on the observed lack of drift of the EPAs, the redundancy of the system logic, and the relatively short time period of the requested extension, the staff finds the proposed surveillance interval extension acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Louisiana State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (59 FR 2630). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Date: February 18, 1994