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April 19, 2001

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

Subject: River Bend Station - Unit 1
Docket No. 50-458
License No. NPF-47
License Amendment Request (LAR 2000-01), "Administrative Change to Spent Fuel Pool Storage Capacity Limits"

File Nos.: G9.5, G9.42

RBEXEC-01-021
RBF1-01-0085
RBG-45710

Gentlemen:

In accordance with 10CFR50.90, Entergy Operations, Inc. (EOI) hereby applies for an amendment of Facility Operating License No. NPF-47 for the River Bend Station (RBS). This request consists of an administrative change to the limit on spent fuel pool storage capacity specified by Technical Specification 4.3.3.1, "Fuel Storage Capacity". Without this change, RBS could lose full core offload capability following Refueling Outage (RF) –11, which is currently planned for the Spring of 2003. This proposed change would allow two additional cycles of operation before losing full core offload capability. Although this change is neither exigent nor emergent, your prompt review is requested. RBS is currently making plans and schedules for dry cask fuel storage and desires approval of the change to assist in the planning efforts. EOI requests that the effective date of the change be within 30 days of approval.

The proposed change has been evaluated in accordance with 10CFR50.91(a)(1) using criteria in 10CFR50.92(c) and it has been determined that this change involves no significant hazards considerations. The bases for these determinations are included in the attached submittal. The attachment also includes marked-up pages reflecting the changes being requested. This request has been reviewed and approved by the RBS Facility Review Committee and the Safety Review Committee. There are no new commitments contained in this submittal.

EOI has also reviewed this request against the criteria of 10CFR51.22 for environmental considerations. As stated above, the proposed change does not involve a significant hazards

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consideration. Also, the type and amount of effluent released from RBS is not changed. Further, the amount of individual or cumulative occupational dose does not increase significantly as a result of this change. Therefore, 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.

If you have any questions regarding this request or require additional information, please contact Mr. Ron Byrd of the Corporate Nuclear Safety and Licensing staff at 601-368-5792.

Pursuant to 28 U.S.C.A. Section 1746, I declare under penalty of perjury that the foregoing is true and correct.

Executed on April 19, 2001.

Very truly yours,

Randall K. Edington

RKE/RJK/RWB
attachment (1)

cc: U. S. Nuclear Regulatory Commission
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ATTACHMENT

TO

LETTER NO. RBF1-00-248

PROPOSED TECHNICAL SPECIFICATION AMENDMENT

AND

RESPECTIVE SAFETY ANALYSES

IN THE MATTER OF AMENDING

LICENSE NO. NPF-47

ENTERGY OPERATIONS, INC.

DOCKET NO. 50-458

DESCRIPTION OF PROPOSED CHANGES

EOI proposes a change to Technical Specification (TS) 4.3.3.1, "Fuel Storage, Capacity". There are no associated TS Bases pages for this TS requirement. TS 4.3.3.1 states,

> "The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 2680 fuel assemblies."

It appears clear from the original River Bend Station (RBS) licensing basis that the above restriction was established only for normal refueling heat loads. It is EOI's position that the limit is in error because the limit should allow capacity for the analyzed maximum abnormal heat load of 3104 assemblies to be consistent with both the original and current licensing basis. The TS as currently worded, is strictly interpreted to limit total spent fuel pool storage to 2680 bundles for both normal and abnormal heat loads. Thus, if RBS reserves a full core offload capacity during plant operation, the normal refueling storage space would be limited to only 2156 bundles (2680 less 424). This administrative limit causes RBS to prematurely lose full core offload capability following RF-11, currently scheduled for Spring 2003.

The proposed TS change would clarify what we believe to be the original intent of the RBS licensing basis by limiting the fuel pool storage capacity to a total of 3104 assemblies. This limit is also consistent with the RBS current licensing basis analyses. The proposed change does not involve a physical alteration of the plant or a change in the methods of spent fuel pool storage or cooling.

BACKGROUND

RBS has a reactor core that operates with 624 fuel assemblies (see Technical Specification 4.2.1) and has two spent fuel storage pools, one in the containment and one in the fuel building. The spent fuel storage racks in the containment fuel pool contain storage space sufficient for 200 fuel assemblies and can only be used for spent fuel storage when the reactor is not operating. The spent fuel storage racks in the fuel building fuel pool contain a storage space sufficient for 3,172 fuel assemblies and 9 defective fuel assemblies with their storage canisters. However, TS 4.3.3.1 limits the storage capacity of the fuel building spent fuel storage pool to no more than 2680 assemblies.

The storage capacity of the fuel building spent fuel pool is limited to less than full capacity based on the design limitations of the spent fuel cooling system. There are two relevant review criteria from the guidance of the Standard Review Plan (SRP), NUREG-0800, that affect the allowed storage capacity.

SRP 9.1.3, paragraph III.d states:

1. "For the maximum normal heat load (*underlined emphasis added*), with normal cooling in operation, and assuming a single active failure, the temperature of the pool should be kept at or below 140°F..." and

2. "For the abnormal maximum heat load (full core unload) (*underlined emphasis added*) the temperature of the pool water should be kept below boiling..."

Other industry and regulatory guidance is found in Generic Letter 78-11 and in ANS-57.2. These documents indicate that the temperature limits are set to preclude fogging and excessive loss of water due to evaporation or boiling. Although heat loads are acceptable just below boiling for the abnormal condition, RBS USAR analyses limit the abnormal heat load to 155.6° F. This limit ensures that temperatures remain within the design limits of the pool liner and structure and the fuel pool maximum temperature assumed for the design of support systems.

The storage capacity of the spent fuel pool in the fuel building is limited by TS 4.3.3.1 to 2680 bundles based only on the 140° F maximum normal heat load. It is clear from the SRP and design guidance that additional heat loads are allowed for a full core offload (maximum abnormal heat load). Both the RBS USAR analysis and more recent evaluations supporting the RBS power uprate show that the pool cooling capability can accommodate a full core off-load with a total of 3104 bundles stored in the pool and maintain temperatures below 155.6°F.

System Description of the Fuel Building Spent Fuel Pools

The spent fuel pool full storage capacity is 3,172 fuel assemblies of which 2680 fuel assemblies are designated for routine spent fuel storage in the fuel building. This provides fuel pool cooling capacity for an offload of a full reactor core (424 fuel assemblies stored in the spent fuel pool, with 200 fuel assemblies stored in the containment fuel pool) in addition to normal storage. The storage capacity of the fuel building spent fuel pool is limited by the Technical Specifications to less than full capacity because of the original licensing basis design limitations of the fuel pool cooling system as explained below. This information is also contained in the RBS USAR.

System Description of the Fuel Pool Cooling Subsystem

In accordance with General Design Criterion (GDC) 44, Cooling Water, the fuel pool cooling subsystem is designed with complete redundancy to allow operation during both normal, abnormal, and accident plant conditions. The fuel pool cooling subsystem consists of two 100 percent capacity centrifugal pumps and two 100 percent capacity coolers. The design parameters of the fuel pool cooling subsystem are provided in USAR Table 9.1-5. Reactor plant component cooling water (RPCCW) is provided as the cooling medium on the shell side of the coolers during normal operation. Standby service water is used for cooling of the heat exchangers if the RPCCW system is out of service. One pump and one cooler are normally in operation for cooling the fuel building fuel

storage pool. The other pump and cooler are in standby or used for containment fuel storage pool cooling.

Either one of the two cooling loops can maintain fuel building fuel storage pool temperature at or below 140°F following a normal refueling outage with a total of 2680 fuel assemblies in the pool. If an abnormal operating condition requires full core removal after 2680 assemblies have already been stored in the pool (total of 3104 bundles in the fuel building pool and 200 in the containment storage pool), the fuel building fuel storage pool temperature will be maintained at or below 155.6°F. This temperature is within the design limits of the pool concrete structure, liner, storage racks, the fuel pool cooling subsystem, and the fuel pool maximum temperature assumed for the design of support systems.

In the event of a temporary loss of all cooling, makeup capability is available to replenish any evaporated water inventory. Normal pool makeup water is taken from the condensate storage tank. A backup source of water is available from the standby service water system, which can be supplied via either of two lines from the reactor component cooling water (RPCCW) system. The fuel pool cooling subsystem and the connecting piping for the backup source of makeup are designed as Seismic Category 1 in accordance with GDC 2, Design Bases for the Protection against Natural Phenomena.

BASIS FOR PROPOSED CHANGE

The proposed change to Technical Specification 4.3.3.1, "Fuel Storage, Capacity" will allow storage in the fuel building spent fuel pools to be increased to the current analyzed capacity of 3104 bundles based on the abnormal maximum spent fuel heat load. The proposed change clarifies that the current limit of 2680 fuel assemblies only applies to normal spent fuel storage heat loads and that a storage capacity of an additional 424 assemblies is allowed for a full core offload. Thus the proposed change would state,

"The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 3104 fuel assemblies."

By limiting the total storage capacity to 3104 fuel assemblies, the proposed change would, in effect, continue to impose a storage limit that ensures pool temperatures do not exceed 140°F (2680 bundles) as currently required, because 424 spaces in the spent fuel pool would be reserved during reactor operation to accommodate a full core offload.

There are no changes being made to the storage pools, pool water level, storage racks, storage arrays, the cooling system or to the heat loads. There are no analysis changes or methodology changes from the current licensing basis (i.e., as documented in Reference 2) required to support the proposed change.

Criticality of fuel assemblies in the spent fuel storage rack is prevented by the design of the racks, which limit fuel assembly interaction. A discussion of criticality control for the fuel building fuel storage pool is provided USAR section 9.1.2.3.1.2. The spent fuel racks are designed in accordance with General Design Criteria 62 of Appendix A to10 CFR 50. Geometrically safe configurations of fuel stored in the spent fuel array are employed such that there is a 95 percent probability at a 95 percent confidence level that the subcritical multiplication factor (k_{eff}) does not exceed 0.95. Analyses are performed for an infinite array of cells on the x and y axes. Therefore the criticality analyses remain bounded by the assumptions and calculations used in the USAR and need not be addressed further for this request.

The pertinent evaluation of interest for this proposal involves the decay heat removal capability. The spent fuel pool cooling system is capable of cooling the spent fuel under both normal and abnormal fuel storage conditions. This capability is described in the RBS USAR. Evaluations performed subsequent to initial licensing also confirmed that the temperature limits can be met for the maximum abnormal heat load of 3104 spent fuel assemblies. In addition, reload analysis procedures require that the impact of decay heat from off loaded fuel for each specific refueling outage be reviewed as part of the reload 50.59 Evaluation.

The spent fuel pool heat loads and peak calculated temperatures were reevaluated to support the review of the RBS request for power uprate (Reference 1). In response to an NRC Request for Additional Information, EOI submitted Reference 2 discussing the effects of the power uprate on decay heat loads associated with fuel discharges. The staff specifically asked EOI to discuss the effects of the elevated pool temperatures during planned refueling outages and unplanned full core off-load events. As in the original USAR analysis, the total number of bundles in the pool following a full-core off load event was assumed to be 3104 bundles. The analysis for power uprate decay heat loads did show that in the unlikely event that a full core offload was performed early in the operating cycle, the rate of fuel transfer would be controlled to maintain pool temperature below 155.6°F.

A discussion concerning the capability of the cooling system to cool the spent fuel under both normal and abnormal fuel storage conditions is provided below.

Normal Heat Loads

The fuel pool cooling subsystem is designed to maintain the temperature of the water in the fuel building fuel storage pool at or below 140°F following a normal refueling outage, with one cooler and one cooling pump in service. The original analysis assumed that a total of 2680 fuel bundles were stored in the pool with the most recent batch being placed in the pool 150 hours after reactor shutdown. These assumptions were more conservative than the SRP guidelines, but showed that the peak pool temperature would be less than 140° F.

A more recent evaluation for the normal heat load condition was performed using the SRP guidelines to support approval of the request for an increase in the licensed reactor thermal power level (Amendment 114). The offload assumptions, heat loads, and calculated peak spent fuel temperatures were provided to the NRC staff by reference 2 and are considered to be the current licensing basis analysis. The normal heat load considered in this analysis consists of the last 3 refueling offloads of 248 bundles each (total of 744 bundles). The 248 bundle refueling offload assumption is conservative (more than one-third of the reactor core). The evaluation confirmed that the temperatures for normal refueling offloads following the power uprate would still be maintained below 140°F.

Abnormal Heat Loads

The fuel pool cooling subsystem is also designed to remove the decay heat from the spent fuel storage pool at a rate sufficient to maintain the temperature of the water at or below 155.6°F when an abnormal heat load (unplanned full core offload) is stored to the pools. The original licensing basis calculation of the water temperature for this abnormal heat load assumed that a full core removal (424 fuel assemblies stored in the spent fuel pool, with 200 fuel assemblies stored in the containment fuel pool) was required early in a fuel cycle at the time when batches from each of the previous refueling outages (2680 assemblies) were already in the pool. Thus the total number of spent fuel assemblies in the spent fuel pool was 3104. These are also the assumptions used in the current licensing basis analysis supporting Amendment 114 (Reference 3), the approved increase in the RBS licensed power level. Because the power uprate results in an increase of the heat load from the offloaded fuel, the maximum pool temperature could also increase unless controls were placed on the rate of full core offload. Therefore RBS committed to implement administrative controls for the rate of full core offload in Reference 2. With these controls in place, the current analysis demonstrates that the maximum pool temperature would not exceed the previous value of 155.6°F during the maximum abnormal heat load of 3104 assemblies.

Original Licensing Basis for the TS Limit

It can be reasonably concluded from the RBS Safety Evaluation Report, NUREG-0989, that the current TS limit only applies to the normal storage condition. The original licensing basis analysis indicates that 3104 is the maximum storage allowance with 2680 bundles being the limit for normal storage conditions (reserving 424 storage locations in the spent fuel pool and 200 locations in the containment pool for a full core offload). The SER states,

> "The maximum normal heat load is based on storage of 2680 spent fuel bundles. Space for an emergency core offload is available. Under normal refueling conditions, the last refueling discharge will be placed in the spent fuel pool 150 hours after reactor shutdown. Using the reactor plant component cooling water system, the pool temperature would be maintained at or below 139.8°F with one pump and one fuel pool cooler in operation, which is acceptable

> because it is less than the staff acceptance criterion of a maximum temperature of 140°F under a "normal" heat load. The capacity of the spent fuel storage facility is 3172 fuel bundles; however, the storage of only 2680 fuel bundles is permissible based on the inability of the cooling system to maintain a pool temperature of less than 140°F with a single active failure.
>
> Under abnormal heat load conditions, the reactor plant component cooling water (RPCCW) system provides cooling water to the fuel pool heat exchangers. The maximum abnormal heat load is based on a full-core offload 10 days after the last normal refueling outage and a storage load of 3104 spent fuel bundles. Under these conditions, the cooling system will maintain the temperature of the water at or below 156°F. If the reactor plant component cooling water system is not available, the safety-related standby service water system would be available to cool the heat exchangers through the portion of the RPCCW piping to the standby service water system, which is designed to seismic Category I and Quality Group C standards for this purpose. The FSAR states that BTP ASB 9-2, "Residual Decay Energy for Light Water Reactors for Long Term Cooling," was used to calculate the heat loads. The applicant has committed to providing a Technical Specification that will prohibit storage of spent fuel in the upper containment fuel storage pool during normal operation."

It is evident that the NRC acknowledged the ability to store and cool 3104 bundles in the spent fuel pool under abnormal decay heat load conditions during the initial licensing process. This ability was reaffirmed during discussions involving decay heat loads for the power uprate request (References 1 and 2). Since the spent fuel pool and the spent fuel pool cooling system are capable of accommodating an abnormal heat load, it is desired that the TS be amended to address the total storage capacity for the maximum abnormal condition of 3104 spent fuel assemblies.

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

Entergy Operations, Inc. (EOI) proposes to change the River Bend Station (RBS) Technical Specifications, to increase the limit on spent fuel storage capacity from 2680 assemblies to 3104 assemblies. The current limit was based only on the temperature limitations for normal refueling heat loads. The proposed limit will allow additional pool storage to accommodate an unplanned full core offload in addition to the normal refueling heat loads. In effect, the revised Technical Specification will continue to limit the number of fuel assemblies stored in the pool to 2680 during reactor operations in order accommodate an additional 424 assemblies for a full core offload. EOI has reviewed the proposed change and has concluded that it does not involve a significant hazards consideration. The Commission has provided standards for determining whether an amendment involves no significant hazards consideration. These standards are stated in 10 CFR 50.92(c). A proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or (2)

create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety. EOI has evaluated the proposed license amendment in accordance with 10 CFR 50.91(a), and is providing its analysis of the issue of no significant hazards consideration using the three standards in 10 CFR 50.92(c).

1. The proposed change does not significantly increase the probability or consequences of an accident previously evaluated.

The proposed change revises the Technical Specification administrative limit for spent fuel storage to allow storage of up to 3104 bundles to accommodate a full core offload. The current licensing basis analysis demonstrates that spent fuel pool temperatures will remain below the spent fuel pool design limitations assuming a full core offload is required early in an operating cycle. There are no changes being made to the storage pool structure, the pool water level, the storage racks, the cooling system, or to fuel storage arrays as currently described in the Updated Safety Analysis Report (USAR). The decay heat loads for the proposed storage capacity have been previously evaluated and are not increased by the proposed change. Therefore there is no affect on spent fuel reactivity control, shielding, or cooling capability. The fuel handling accident analysis as presented in the USAR is also not affected by the proposed change.

Therefore, the proposed change does not result in a significant increase in the probability or the consequences of previously evaluated accidents

2. The proposed changes would not create the possibility of a new or different kind of accident from any previous analyzed.

The proposed change only affects the allowed quantity of spent fuel stored in the existing fuel racks located in the fuel building spent fuel pool. The fuel arrangement in this storage pool has previously been analyzed for criticality control, the effects of a fuel handling accident, and for the decay heat loads caused by both normal and abnormal conditions. The proposed change does not involve a physical alteration of the plant or a change in the methods of spent fuel pool storage or cooling. Therefore, the proposed change does not introduce the possibility of a new accident precursor or result in creating the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed changes do not involve a significant reduction in a margin of safety.

The proposed change is considered to be an administrative change to the fuel storage capacity limitations. The fuel arrangement in this storage pool has previously been analyzed for criticality control, the effects of a fuel handling accident, and for the decay heat loads caused by both normal and abnormal conditions. These analyses are not impacted by the proposed

change. The proposed TS limits on spent fuel pool storage capacity will continue to maintain pool temperatures to less than those allowed by the Standard Review Plan (SRP), NUREG 0800. Therefore, the change remains within the current licensing basis margins and does not involve a significant reduction in a margin of safety.

Therefore, based on the reasoning presented above and the previous discussion of the amendment request, Entergy Operations has determined that the requested change does not involve a significant hazards consideration.

ENVIRONMENTAL IMPACT CONSIDERATION

Pursuant to 10 CFR 51.22(b), an evaluation of the proposed amendment has been performed to determine whether or not it meets the categorical exclusion set forth in 10 CFR 51.22(c)(9) of the regulations. The basis for this determination is as follows:

1. The proposed change does not involve a significant hazards consideration as described previously in the evaluation.

2. This change does not result in a significant change or increase in the radiological doses for any Design Basis Accident. Also, the proposed change does not result in a significant change in the types or a significant increase in the amounts of any effluents that may be released off-site because the fuel storage limits of the original and current licensing basis analyses are preserved..

3. Likewise, the proposed license amendment does not result in a significant increase to the individual or cumulative occupational radiation exposure because the fuel storage limits of the original and current licensing basis analyses are preserved.

EOI has reviewed the guidance for spent fuel storage applications provided by Generic Letter (GL) 78-11. This GL primarily concerned the installation or modification of fuel storage racks in an existing pool structure to increase capacity beyond that previously reviewed and approved by the staff. The GL included specific factors that should be considered in such a request. The environmental aspects of the review concerned the increase in thermal and radiological releases under normal as well as accident conditions, the occupational radiation exposures, the generation of radioactive waste, and other information needed to determine the cost/benefit balance. However, this request, if approved, will not create any additional thermal or radiological releases beyond what the staff has already reviewed. As stated previously in the submittal, both the normal refueling discharge storage limit of 2680 bundles and maximum abnormal heat load of 3104 fuel assemblies have been reviewed by the NRC staff as documented in the RBS Safety Evaluation Report, NUREG-0989.

Therefore, 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.

REFERENCES

1) Entergy Operations, Inc. (EOI) letter to the USNRC, RBG-45007, dated July 30, 1999.

2) EOI letter to the USNRC, RBG-45428, dated July 18, 2000.

3) USNRC letter to EOI (TAC NO. MA6185) dated October 6, 2000.

Marked-up Technical Specification Changes

4.0 DESIGN FEATURES

4.3.1.1 (continued)

b. A nominal fuel assembly center to center storage spacing of 7 inches within rows and 12.25 inches between rows in the low density storage racks in the upper containment pool; and

c. A nominal fuel assembly center to center storage spacing of 6.28 inches within a rack and 8.5 inches between cell centers of adjacent racks in the high density storage racks in the spent fuel storage facility in the Fuel Building.

4.3.1.2 The new fuel storage racks are designed and shall be maintained with:

a. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.1.1 of the USAR;

b. A nominal fuel assembly center to center storage spacing of 7 inches within rows and 12.25 inches between rows in the new fuel storage racks.

4.3.2 Drainage

The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 95 ft.

4.3.3 Capacity

4.3.3.1 The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than ~~2680~~ 3104 fuel assemblies.

4.3.3.2 No more than 200 fuel assemblies may be stored in the upper containment pool.