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BRACH,E.W. Office of Nuclear Material Safety & Safeguards

SUBJECT: Requests exemption from requirements of 10CFR72.212(a)(2) & 10CFR72.214 to permit storage of B&W 15x15 spent nuclear fuel assemblies containing burnable poison rod assemblies in standardized NUHOMS-24P dry shielded canisters.

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August 30, 1999

Mr. E. William Brach, Director
Office of Nuclear Material Safety
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Oconee Nuclear Site
Docket Nos. 50-269, -270, -287
Request for Exemption to Permit Storage of Burnable Poison Rod Assemblies in Standardized NUHOMS®-24P Canisters

Dear Mr. Brach:

Duke Energy Corporation ("Duke") hereby requests an exemption from the requirements of 10 CFR §72.212(a)(2) and 10 CFR §72.214 to permit storage of Babcock & Wilcox 15x15 spent nuclear fuel assemblies containing burnable poison rod assemblies ("BPRAs") in Standardized NUHOMS®-24P Dry Shielded Canisters ("DSCs") at the Oconee Nuclear Site ("Oconee").

In sum, this exemption request is necessitated by Duke's imminent need to reduce the inventory of spent nuclear fuel ("SNF") assemblies stored in the Oconee spent fuel storage pools ("pools") prior to upcoming refueling outages. Oconee needs to remove SNF assemblies from the pools to accommodate planned and potential refueling activities that require empty fuel storage locations. The SNF assemblies that are removed will be loaded into Standardized NUHOMS®-24P DSCs and placed into dry storage in the Oconee Independent Spent Fuel Storage Installation ("ISFSI"). Duke desires to load SNF assemblies containing BPRAs into the NUHOMS®-24P DSCs to avoid having to dispose of them as low level radioactive waste. However, the applicable NRC Certificate of Compliance ("CofC") for these canisters (72-1004) does not currently address storage of BPRAs. Thus,

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an exemption is needed for Oconee's near term loading of fuel assemblies containing BPRAs into its ISFSI using Standardized NUHOMS®-24P DSCs.

As demonstrated in the two Attachments to this letter,[1] Duke's request satisfies applicable NRC requirements as set forth in 10 CFR §72.7 and 10 CFR §50.12, and therefore, should be granted.

Background

Currently, there are not enough empty fuel storage locations in either the shared Oconee Unit 1&2 pool or the Unit 3 pool to accommodate a number of planned and potential refueling activities that require empty spent fuel storage locations. These activities include offloading all fuel assemblies from the reactor, storing new fuel assemblies in the pool, performing fuel inspection and repair, and repairing the fuel transfer system upender, if required.

In July 1990, Duke began operation of the Oconee ISFSI under a 10 CFR Part 72 specific license (SNM-2503). That specific license permits the storage of spent fuel assemblies containing control components, including BPRAs, in site-specific NUHOMS®-24P DSCs. Consistent with that license, it has been Oconee's practice to place SNF assemblies containing BPRAs and other components into dry storage. Of the 40 site-specific NUHOMS®-24P DSCs loaded to date in the Oconee ISFSI, 29 contain BPRAs.

Technical considerations have recently compelled Oconee to transition to the Standardized version of the NUHOMS®-24P system, which Oconee will use under its Part 72 general

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1 Attachment 1 to this letter sets forth the regulatory and technical bases supporting this exemption request. It also provides background information about Oconee's need to load BPRAs into dry storage, summarizes the technical evaluations that demonstrate the low safety significance of BPRA storage in the Standardized NUHOMS®-24P system, and addresses the NRC criteria governing the granting of exemptions under 10 CFR §72.7 and §50.12. Attachment 2 contains information concerning the adverse impact on Oconee's refueling activities of having fewer than the desired empty spent fuel storage locations available during refueling outages.

license. As noted above, CofC 72-1004 for the Standardized NUHOMS®-24P system *does not currently address storage of fuel assemblies containing BPRAs or other control components*. Currently, approximately 78% of the spent fuel assemblies in Oconee's pools contain BPRAs, and approximately 1% contain other control components. Thus, only a small quantity of fuel assemblies without BPRAs or other control components is available for loading into Standardized NUHOMS®-24P DSCs under the existing CofC. Once those assemblies are loaded, Oconee will not be able to continue transferring SNF assemblies from its pools into dry storage with the Standardized NUHOMS®-24P system until some provision is made for the BPRAs.

Having evaluated the options, Duke has concluded that there are two feasible alternatives for the BPRAs: (1) removing the BPRAs from the SNF assemblies that are to be placed into dry storage in the Oconee ISFSI; or (2) amending the CofC for the Standardized NUHOMS®-24P system to allow storage of assemblies containing BPRAs. As discussed more fully in Attachment 1, Duke has determined that removing BPRAs from the fuel assemblies to be placed in dry storage would be a poor choice. The more reasonable alternative is to pursue an amendment to the Certificate of Compliance so that Oconee may store spent fuel assemblies containing BPRAs in the Standardized NUHOMS®-24P DSCs.

Duke wishes to point out that such an amendment is currently being sought. On July 26, 1999, Transnuclear West, Inc. ("TNW"), the vendor for the NUHOMS®-24P system, submitted to the NRC an application to amend CofC 72-1004 to explicitly authorize storage of BPRAs in the Standardized NUHOMS®-24P system. However, Duke understands that the NRC may not be able to approve this application in time to meet Duke's near-term requirements at Oconee. For this reason, Duke is seeking an exemption similar to an exemption granted by the NRC earlier this year to Entergy Operations, Inc.[2] The requested exemption would allow near-term storage of BPRAs in the Standardized NUHOMS-24P system at Oconee, in advance of NRC's approval of the CofC amendment.

Duke has worked closely with TNW (and its predecessor VECTRA) since 1995 to complete safety evaluations that would provide for dry storage of Oconee's BPRAs in the Standardized NUHOMS®-24P system. However, Duke only recently became aware of the need for an amendment to the CofC to permit such storage. (A more detailed discussion of the "regulatory history" of this issue, and the events culminating in the need for this exemption request, is set forth in Attachment 1, at pp. 7-8.)

Duke's most immediate need to load BPRAs into dry shielded canisters will be during January-March 2000, when the next Oconee Unit 3 dry storage "loading campaign" is scheduled. At that time, the supply of fuel assemblies available in the Unit 3 pool without BPRAs will be exhausted. These dry

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[2] On April 9, 1999, the NRC issued to Entergy Operations, Incorporated, an exemption from the 10 CFR §72.212(a)(2) general license conditions and 10 CFR §72.214 CofC conditions, allowing storage of BPRAs in the Sierra Nuclear Corporation Ventilated Storage Cask system (VSC-24) at the Arkansas Nuclear One ISFSI. The NRC Staff determined that an adequate safety basis existed to support granting the exemption. See SECY-99-069 (March 5, 1999). In approving this exemption by negative consent, the Commission asked the NRC Staff to "promptly consider exemption requests from other reactor sites." See April 1, 1999 Staff Requirements Memorandum to NRC Executive Director for Operations William Travers from J. Samuel Walker, Acting Secretary.

storage loadings are necessary to accommodate the planned and potential refueling activities during the Unit 3, end-of-cycle 18 refueling. In addition, as discussed in the Attachments to this letter, Oconee's need to transfer SNF assemblies containing BPRAs into dry storage will continue during subsequent loading campaigns, in order to maintain operational flexibility during refueling outages.

In light of the above, Duke appreciates the NRC's prompt consideration of its request for an exemption from the requirements of 10 CFR §72.212(a)(2) and 10 CFR §72.214, as further set forth in Attachment 1 to this letter. Additional background information is provided in Attachment 2 to this letter. Duke requests that the exemption remain valid for all DSC loadings that it may perform at Oconee until the CofC amendment requested by TNW is granted and becomes effective. If possible, Duke requests NRC action on this exemption request by September 30, 1999. Adherence to this schedule would allow sufficient time for Duke to implement alternative actions (i.e., disposal of BPRAs) should NRC not grant the requested exemption.

In accordance with Duke internal procedures and the Quality Assurance Program Topical Report, this request for exemption has been previously reviewed and approved by Oconee's Plant Operations Review Committee and the Duke Corporate Nuclear Safety Review Board. Changes will be required to Oconee's fuel qualification procedure and ISFSI procedures prior to loading BPRAs into Standardized NUHOMS®-24P DSCs at Oconee.

Should you have any questions concerning this submittal, or if Duke can provide additional information, please contact Edwin Price, Jr. at (864) 885-4388.

Very truly yours,

W.R. McCollum, Jr.
Site Vice President
Oconee Nuclear Site

Attachments

cc:

U.S. Nuclear Regulatory Commission Document Control Desk

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ATTACHMENT 1

DUKE ENERGY CORPORATION REQUEST FOR EXEMPTION TO PERMIT STORAGE OF BURNABLE POISON ROD ASSEMBLIES IN STANDARDIZED NUHOMS®-24P SYSTEM AT OCONEE NUCLEAR SITE

Duke Energy Corporation ("Duke") herein requests an exemption from the NRC general license conditions set forth in 10 CFR §72.212(a)(2), and from certain conditions in the NRC Certificate of Compliance ("CofC") 72-1004, as set forth in 10 CFR §72.214. Duke seeks this exemption to authorize the dry storage of burnable poison rod assemblies ("BPRAs") in Standardized NUHOMS®-24P dry shielded canisters ("DSCs") at the Oconee Nuclear Site ("Oconee").[1] Currently, such BPRA storage is not addressed by CofC 72-1004.

Background

In July, 1990, Duke began operation of an Independent Spent Fuel Storage Installation ("ISFSI") at Oconee under a specific NRC license (SNM-2503) issued under 10 CFR Part 72 for storage of spent nuclear fuel ("SNF"). In accordance with this specific license, Duke has employed the NUHOMS®-24P dry spent fuel storage system to store forty site-specific dry shielded canisters (DSCs) which have been loaded to date.

Oconee recently completed a transition to the Standardized version of the NUHOMS®-24P system, which it uses under its Part 72 general license. The Standardized NUHOMS®-24P system offers several enhancements to the site-specific version that were either necessary or desired at Oconee. In the Standardized system, the design of the Horizontal Storage Module (HSM) was changed to improve air flow for

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[1] 10 CFR §72.210 issues a general license to store spent fuel in an ISFSI at reactor sites as long as the Part 50 reactor license remains in effect. 10 CFR §72.212(a)(2) limits the storage of spent fuel to casks approved in 10CFR72 Subpart K, and 10 CFR §72.214 lists cask types approved for use under the general license, including the Standardized NUHOMS®-24P. Section 72.214 states that these casks "are approved for storage under the conditions specified in their Certificates of Compliance."

cooling, thus allowing higher decay heat from the stored SNF assemblies. The increased heat capacity of the Standardized system was needed for the more recently discharged Oconee spent fuel assemblies, which have higher burnups and thus greater decay heat production than assemblies discharged earlier. In addition, the Standardized HSM was changed to a modular design which offers some desirable construction and installation advantages. Aside from its revised HSM design, the Standardized system is essentially the same as the site-specific system, except that storage of control components *is* allowed under the site-specific license. In fact, the two alternate DSC designs presented in the current Standardized NUHOMS® Safety Analysis Report for storage of fuel assemblies with or without control components, are identical to the design of Oconee's site-specific NUHOMS-24P DSCs. To date, four Standardized NUHOMS®-24P DSCs have been loaded and stored at the Oconee ISFSI.

Oconee's specific Part 72 license allows storage of control components, including BPRAs, in the site-specific NUHOMS®-24P canisters. Consistent with this license, 29 of the 40 site-specific DSCs loaded to date contain BPRAs. By contrast, storage of control components is not permitted in the Standardized NUHOMS®-24P system because CofC 72-1004 does not specifically address them.

As discussed below, the inability to store BPRAs in the Standardized NUHOMS®-24P canisters has placed Oconee in a situation that necessitates prompt regulatory relief.

Oconee Needs to Load SNF Assemblies into Dry Storage

There are currently 235 empty fuel storage locations in the Oconee Unit 1&2 spent fuel storage pool ("pool") and 195 empty fuel storage locations in the Unit 3 pool. In both cases, the number of empty locations is less than Duke desires for a refueling outage at Oconee. Normally, a minimum of 345 empty fuel storage locations is established in the affected pool before receiving the new fuel assemblies that will be loaded into the reactor for the next operating cycle. The requirements for empty fuel storage locations in the affected pool are as follows:

Core offload:	177	(also required to allow low point reactor coolant system maintenance)
New fuel storage:	60	(Oconee must store new fuel in its pools because it lacks new fuel storage vaults)
Diver clearance:	108	(minimum number of empty storage locations around an upender to permit diver access in case of upender failure; these fuel storage locations can also be used for fuel inspection or repair, if needed)

While the Oconee reactors *can* be refueled with fewer than the desired 345 empty locations, doing so may well result in additional complexity in performing what would otherwise be routine refueling activities, as well as prolonging the refueling outage. (A discussion of refueling activities with less than the desired empty locations is provided in Attachment 2.) The best approach to avoiding this situation is to load sufficient SNF assemblies into dry storage, beforehand, such that the desired number of empty fuel storage locations is available during refueling.

Burnable Poison Rod Assemblies (BPRAs)

Oconee uses BPRAs as one method to control core reactivity. A BPRA is comprised of a stainless steel spider assembly to which are connected up to 16 zircaloy-clad rods containing pellets of Al_2O_3-B_4C. The BPRAs are loaded into the fuel assemblies through the upper end fittings with the rods inserted into the fuel assembly guide tubes. Approximately 80 percent of the new fuel assemblies supplied to Oconee contain BPRAs. Generally, BPRAs remain in the core for one reactor cycle. They are then discharged into "empty" spent fuel assemblies (i.e. fuel assemblies that do not already contain control components) in the spent fuel storage pool.

Oconee Needs to Load BPRAs into Dry Storage

Because of the limitation in the existing CofC 72-1004, Duke is forced to remove BPRAs from SNF assemblies before loading those assemblies into Standardized NUHOMS®-24P DSCs

for dry storage. These removed BPRAs must then be stored in empty spent fuel assemblies in the Oconee pools as long as such assemblies are available, or be disposed of by some other means.

Currently, there are few empty assemblies available for storing removed BPRAs at Oconee. As indicated above, approximately 78% of Oconee's SNF assemblies already contain BPRAs, and approximately 1% contain some other type of control component. This large inventory of control components has reduced operational flexibility during refueling outages. During refueling, Oconee offloads the fuel assemblies from the reactor into the spent fuel pool, where the control component shuffle is performed. This shuffle consists of relocating control rod assemblies, and transferring spent BPRAs from fuel assemblies that will be reloaded into the reactor to empty spent fuel assemblies in the pool. In the interest of operational flexibility, it is desired to have a large number of empty spent fuel assemblies located near the offloaded assemblies. This allows simplified and shortened pathways for these transfers and helps to minimize the time needed for refueling.

To establish the 345 empty locations needed for normal refueling operations, additional Standardized NUHOMS®-24P storage units must be loaded. Current plans are to load 2 DSCs from the Unit 1&2 pool during the period of September-October 1999 and 5 DSCs from the Unit 3 pool during the period of January-March of 2000[2].

While Duke prefers to load DSCs with fuel assemblies containing BPRAs because of the operational considerations discussed above, a few additional DSCs could be loaded without BPRAs. There are enough fuel assemblies without control components to permit loading of the next two DSCs from the Unit 1&2 pool. However, there are not enough empty assemblies in the Unit 3 pool for the five DSC loadings planned in January-March 2000. Thus, some action must be taken to address BPRAs before these loadings can occur.

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[2] In the Unit 1&2 pool, there are enough empty assemblies to load a total of 10 DSCs without BPRAs or other control components. In the Unit 3 pool, there are only enough empty assemblies to load one DSC without BPRAs or other control components.

Evaluation of Oconee's Options

Duke has evaluated its options for creating the needed empty storage locations in the Oconee pools. Generally, empty locations may be created either by installing additional storage locations, or by removing SNF assemblies from existing locations and placing them into dry storage. However, for the reasons previously stated, the latter course requires disposition of BPRAs, as well. The options Duke has considered are as follows:

1. Add Fuel Storage Locations to the Oconee Pools

There is no room in the spent fuel pools to place an additional storage rack. Re-racking the pools is impractical, given the current high SNF inventories. Also, very few additional fuel storage locations could be created by a re-rack since the Oconee pools already employ high-density, neutron-absorber racks. The designs used in Oconee's pools, while not the most recent, provide only slightly fewer storage locations than that afforded by more recent designs. In any event, the creation of only a few additional fuel storage locations would not justify the increased radiological occupational exposure associated with re-racking, and the large quantity of low level radioactive waste ("LLW") created.

2. Amend the Specific License to Include Standardized NUHOMS®-24P Components and Higher Decay Heat Capacity

Storage of SNF assemblies containing BPRAs is already authorized by Oconee's specific Part 72 license. However, Duke would have to seek an amendment to this license to accommodate both the Standardized NUHOMS®-24P HSMs already installed at Oconee's ISFSI and the increased decay heat capacity needed for Oconee's SNF assemblies. Again, it is unlikely the NRC's approval of such an amendment could be completed in time to address Oconee's imminent needs.

3. Remove BPRAs from SNF Assemblies and Store in the Oconee Pools

This alternative would not create any empty fuel storage locations. Since there are no separate storage locations for BPRAs, any BPRA removed from a fuel assembly being loaded into dry storage must be placed in an empty spent fuel storage location. Thus, no additional empty storage

locations are created, and Oconee's operational concerns are not alleviated.

4. Remove BPRAs from Assemblies and Dispose of as LLW

This alternative has a number of considerations. First, additional plant operations would be required to facilitate disposal of the BPRAs as LLW. The BPRAs would have to be segmented, compacted, and placed in disposal containers for shipment to a LLW disposal facility. Such operations, although supported by Oconee personnel, would have to be performed by a contractor since Oconee has neither the necessary equipment nor expertise in such operations. Also, these operations would result in additional radiological exposure to the involved workers. The cost of this approach may be as much as $10,000 per BPRA.[3]

Further, these activities would require use of the same areas of the spent fuel pool needed for DSC loading operations, and would require vendor support from the same Oconee personnel who perform DSC loadings. This would have the effect of reducing the time available for the planned DSC loadings.

5. Store BPRAs in Standardized NUHOMS®-24P DSCs

Storage of fuel assemblies containing BPRAs is not currently permitted under the general license since storage of control components is not addressed in CofC 72-1004. Thus, BPRAs cannot be placed in the Standardized NUHOMS®-24P until an amendment is approved by the NRC or, alternatively, an exemption from the requirements of 10 CFR §72.212(a)(2) and 10 CFR §72.214 is granted by the NRC.

Still, this option is preferred for a number of reasons. These reasons are outlined below:

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[3] Finally, such LLW disposal results in Duke's paying twice for the disposal of BPRAs since the U.S. Department of Energy (DOE) has defined spent fuel acceptable for disposal under Duke's SNF disposal contract as including control components.

a. Occupational exposure is minimized;

b. It avoids the shipment of the irradiated BPRAs to a LLW disposal facility;

c. It avoids the need for burial at a LLW disposal facility;

d. It is consistent with the DOE disposal contract;

e. It avoids paying twice for BPRA disposal;

f. It avoids the potential for increased complexity in refueling activities and a prolonged refueling outage.

Regulatory History Associated With TNW's Request to Amend the CofC for the Standardized NUHOMS-24P Storage System

Duke only recently became aware of the need to obtain prior NRC approval before storing BPRAs in the Standardized NUHOMS®-24P canisters. To explain, in April 1995, Duke contracted with TNW's predecessor, VECTRA Technologies, Inc. ("VECTRA") to supply the Standardized NUHOMS®-24P components. As a condition of the supply contract, VECTRA evaluated a change to the DSC to permit storage of control components. This change was evaluated pursuant to Condition 9 of the CofC, which allows changes to the storage system *without prior NRC review*, provided that the changes meet certain specified criteria. VECTRA concluded that the addition of control components, including BPRAs, did in fact satisfy these specified criteria and subsequently, included this change in the 1996 revision (Revision 4A, June 28, 1996) to the Standardized NUHOMS Safety Analysis Report.

At that time, it was also Duke's understanding that prior NRC review of the proposed change was not required, and that the storage of control components in the Standardized NUHOMS®-24P system was permitted under these Condition 9 evaluations. It was not until late-April 1999 when Duke learned that, in fact, the NRC would not allow such storage without a prior NRC review.[4] In subsequent discussions between the NRC staff, representatives of TNW (VECTRA's successor), and Duke, the NRC indicated that storage of SNF assemblies containing control components under the existing CofC would require specific authorization by the CofC, and therefore, prior approval by the NRC.

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[4] The NRC's position on this issue was set forth in the documentation accompanying the 1999 publication of a proposed CofC amendment and preliminary Safety Evaluation Report. VECTRA had originally submitted the amendment request on February 16, 1996, in an effort to add new fuel qualification tables and to permit higher fuel assembly burnup. (See April 29, 1999 Memorandum to Patricia K. Holahan from Susan F. Shankman, re: "Forwarding of a Proposed Certificate of Compliance for Standardized NUHOMS® Horizontal Modular Storage System and Documents to Support Rulemaking.") In the 1999 NRC memorandum, the NRC indicated in Section 1.2.1 (Fuel Specifications) of the proposed CofC that storage of control components was not permitted under the proposed CofC.

As a result of these discussions and at Duke's request, TNW submitted an application to the NRC on July 26, 1999 for an amendment of CofC 72-1004 to allow storage of spent fuel assemblies containing BPRAs. However, based on discussions with knowledgeable NRC officials, Duke understands that it is unlikely the NRC can process and issue an amendment in time to meet Oconee's immediate needs which will arise as early as January 2000.[5]

In summary, Duke has determined that an amendment to CofC 72-1004 to allow loading of fuel assemblies containing BPRAs into Standardized NUHOMS®-24P DSCs is the most reasonable regulatory means to address this situation.

This Exemption Request Satisfies 10 CFR §72.7 Requirements

10 CFR §72.7 allows the Commission, upon application by any interested person, or upon its own initiative to "grant exemptions from the requirements of the regulations . . . as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest."

Duke submits that granting this exemption request is authorized by law, because such exemptions are explicitly contemplated by 10 CFR §72.7. Further, granting this exemption request will not endanger life or property or the common defense and security and are otherwise in the public interest. In support of this assertion, we note that technical evaluations were performed by TNW and submitted to the NRC as part of TNW's July 26, 1999 application to amend CofC 72-1004. The results of these evaluations, which are summarized in the section below, demonstrate that storage of BPRAs in Standardized NUHOMS®-24P DSCs will not endanger life or property or the common defense and

[5] In this regard, we emphasize that to provide the empty storage locations in the spent fuel pool needed for the EOC18 refueling outage, additional DSCs must be loaded from the Oconee Unit 3 spent fuel pool starting in January 2000. Although authority to conduct this activity for BPRAs now stored in the Unit 1&2 pool is not needed as urgently, Duke has nevertheless planned to load all subsequent DSCs with BPRAs until the inventory of BPRAs is substantially reduced in both Oconee pools. Thereafter, BPRAs will be loaded into DSCs as required to maintain needed operational flexibility.

security and are otherwise in the public interest. Moreover, NRC approval of this exemption would be consistent with its grant of an exemption for Arkansas Nuclear One to load VSC-24 dry storage casks with BPRAs.[6]

Technical Considerations Support Issuance of the Exemption

1. Structural Evaluation

   The addition of BPRAs does not affect the structural evaluation of the long cavity DSC presented in the SAR. The weight of a Babcock and Wilcox ("B&W") 15X15 fuel assembly containing a BPRA is less than the maximum fuel assembly weight analyzed in the SAR, and currently authorized by the CofC.

2. Thermal Evaluation

   The addition of BPRAs has no negative impact on the thermal conductivity of the fuel assemblies stored in the NUHOMS®-24P DSC. (Thermal conductivity is actually improved.)

   Using bounding assumptions, TNW has calculated a maximum decay of 8 watts per BPRA. This additional heat source term will be accounted for during the qualification of Oconee fuel assemblies containing BPRAs.

3. Pressure Evaluation

   TNW has evaluated the impact of BPRAs on the DSC internal pressure during normal, off-normal, and accident conditions. Internal pressure remains bounded by previous analyses while accounting for the additional heat source term; release of backfill helium from the BPRA rods (from initial backfill and

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[6] In fact, the staff previously issued such an exemption to Entergy Operations, Inc. on April 9, 1999 under similar circumstances to allow loading of BPRAs into the VSC-24 dry storage casks at the Arkansas Nuclear One ISFSI, pending rulemaking. Further, as noted in Footnote 2 of the cover letter, the Commission has asked the NRC Staff to "promptly consider exemption requests for other reactor sites."

generation within the rods during reactor operation); and change in free volume of the DSC internal cavity.

4. Radiological Source Term

Overall radiological source terms for the DSC contents are not increased with respect to offsite exposures. Existing values were maintained by reducing fuel source terms to offset the addition of source terms for the worst-case BPRA. Accordingly, TNW's submittal revises the CofC fuel specification to increase cooling requirements such that the necessary reduction in fuel source term is achieved. Duke will use this revised fuel specification in qualifying fuel assemblies containing BPRAs for dry storage to ensure the radiological source terms are not exceeded.

5. Shielding Evaluation

The addition of BPRAs will increase dose rates at the top end of the DSC, primarily due to the presence of inconel in the spider region of the worst-case BPRA. TNW has calculated a worst-case increase of 576 mrem/hr at the center of the top shield plug prior to welding operations. (Previous loading experience at Oconee indicates that a smaller dose rate increase, if any, will actually be observed due to the small percentage of BPRAs with inconel in the spider region, as well as less irradiation and greater cooling than assumed in the evaluation.) TNW's submittal revises CofC dose rate limits for the DSC top end to account for this increase in calculated dose rates. Again, Duke will use this revised fuel specification in qualifying fuel assemblies containing BPRAs for dry storage to ensure the revised dose rates are not exceeded. Minor increases (no more than 7.2 mrem/hr) were calculated for HSM surface dose rates. Calculated total dose rates at the HSM remain within the current CofC limits.

6. Criticality Evaluation

TNW evaluated the impact of displacing borated water from the fuel assembly guide tubes when BPRAs are included. The entire range of borated water density is evaluated, and no credit is taken for any neutron absorption from the BPRA cladding or absorber

material. The evaluation concluded that a B&W 15X15 assembly containing a BPRA is less reactive than a B&W 15X15 assembly without a BPRA.

As demonstrated by the evaluation results summarized above, the granting of this exemption would have low safety significance. Therefore, it would not endanger life or property or the common defense and security and would otherwise be in the public interest. By contrast, denying Duke the ability to store BPRAs in the Standardized NUHOMS®-24P canisters would arguably be contrary to the public interest. Denial of this exemption could increase doses to plant workers, decrease availability of Oconee for power generation, create the need for shipment of the irradiated BPRAs to a LLW facility, and create the need for LLW disposal of BPRAs. Moreover, as noted above, other feasible options for dispositioning BPRAs at Oconee will be much more costly. Thus, under the criteria set forth in Section 72.7, the NRC should issue the requested exemption.

"Special Circumstances" Support Issuance of this Exemption

While 10 CFR §72.7 does not specifically require a showing of "special circumstances" like those required under 10 CFR Part 50, Duke's exemption request can be further justified using several of the special circumstances that the Commission has identified as relevant under 10 CFR §50.12. The applicable special circumstances are discussed below:

1. 10CFR50.12(a)(2)(ii)- Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule.

The underlying purpose of 10 CFR §72.212 and §72.214 is to allow reactor licensees to utilize dry fuel storage casks that have previously been found by the NRC to be safe for use. As stated earlier, the storage of BPRAs in Oconee's site-specific NUHOMS®-24P DSCs has been previously found by the NRC to be safe. Further, the DSC that will be used for storage of BPRAs in the Standardized NUHOMS®-24P is identical to the site-specific DSC. Finally, TNW's evaluations, as described above, further demonstrate that storage of BPRAs in Standardized NUHOMS®-24P DSCs is safe. Thus, application of 10 CFR §72.212 and §72.214 so as to preclude storage of BPRAs in the Standardized NUHOMS®-24P

DSCs is not necessary to serve the underlying purpose of these regulations.

2. 10CFR50.12(a)(2)(iii)- Compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or those incurred by others similarly situated.

The definition of spent fuel included in 10 CFR §72.3 states that spent fuel "includes the special nuclear material... and other radioactive materials associated with fuel assemblies." Since BPRAs are utilized while contained in a fuel assembly, are physically connected to the assembly during use, and become radioactive as a result of use, Duke concludes that BPRAs are associated with the fuel assemblies and meet the definition of "other radioactive materials." Moreover, BPRAs are already stored in the site-specific NUHOMS®-24P at Oconee. Therefore, it may be argued that storage of control components was contemplated when Part 72 was initially adopted.

Since CofC 72-1004 for the Standardized NUHOMS®-24P system does not currently address control components, there exists the potential for "undue hardships and other costs significantly in excess of those contemplated" when Part 72 was adopted. Absent an amendment to the current CofC, Oconee would have to dispose of its BPRAs as LLW.[7] Such disposal requires additional pool operations and costs for LLW transport and disposal, which Duke argues were not contemplated when the NRC provided for storage of "other radioactive material" associated with fuel assemblies in its original issuance of Part 72.

Additionally, failure to approve storage of BPRAs in the Standardized NUHOMS®-24P system would result in costs significantly exceeding "those incurred by others similarly situated." As noted, the NRC has granted a similar exemption to another reactor licensee under similar circumstances. To deny Duke the same relief would result in significant costs to Duke that will not be incurred by the other, "similarly situated" licensee.

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[7] See previous discussion of Duke's alternatives in the section entitled "Evaluation of Oconee's Storage Options."

3. 10CFR50.12(a)(2)(v)- The exemption would provide only temporary relief from the applicable regulation and the licensee or applicant has made good faith efforts to comply with the regulation.

Since TNW's NRC amendment request seeks to allow storage of BPRAs under CofC 72-1004, Duke's requested exemption need only provide "temporary relief" from the applicable NRC regulations during the interim until the requested amendment is issued and becomes effective.[8] Duke has made good faith efforts by requesting as early as 1995 that TNW's predecessor, VECTRA, perform the necessary activities for authorization to store BPRAs in the Standardized NUHOMS® 24-PDSC. Since VECTRA had discussed this matter with the NRC Staff, Duke concluded that a change to permit inclusion of control components could be accomplished via Condition 9 of the CofC, which stipulates the conditions under which the storage system may be changed without prior NRC approval. Subsequent NRC Staff guidance now requires that the NRC review and approve any such change to the contents of the approved storage system.

Conclusion

In conclusion, Duke requests an exemption to the requirements of 10 CFR §72.212(a)(2) and 10 CFR §72.214 to allow loading and storage of BPRAs in Standardized NUHOMS®-24P DSCs. Duke also requests that the exemption remain in effect for all DSC loadings it might perform until such time as the amendment to CofC 72-1004, as requested by TNW on July 26, 1999, has been issued and is effective. Finally, for the reasons outlined above, Duke respectfully requests that this exemption be approved by September 30, 1999.

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[8] Duke has reviewed and concurred with the proposed changes to the NUHOMS® CofC, submitted by TNW in its July 26, 1999 amendment request for storage of BPRAs. These changes affect the fuel specification section and dose rate specifications for the DSC top end and transfer cask. Changes to existing Duke procedures will be required to characterize the fuel and BPRAs which will be placed in the DSCs. These changes will conform to the proposed revisions to Section 1.2.1 that were submitted by TNW in its amendment request.

ATTACHMENT 2

DUKE ENERGY CORPORATION REQUEST FOR EXEMPTION TO PERMIT STORAGE OF BURNABLE POISON ROD ASSEMBLIES IN STANDARDIZED NUHOMS®-24P SYSTEM AT OCONEE NUCLEAR SITE

As discussed in Attachment 1, Oconee's usual practice is to establish a minimum of 345 empty spent fuel storage locations in the affected pool prior to receiving new fuel assemblies in support of a refueling outage. These empty spent fuel storage locations are necessary to accommodate the planned or potential refueling activities requiring such locations. These activities include offloading all fuel assemblies from the reactor; storing new fuel assemblies in the spent fuel pool; performing fuel inspection/repair, if required; and repair of the fuel transfer system upender, if required.

It is possible for Oconee to complete a refueling outage without 345 empty locations. However, doing so subjects Oconee to additional complexity in performing what would otherwise be routine refueling activities and could prolong the refueling outage[1]. Duke desires to avoid this situation.

The impact upon Oconee's refueling activities of having less than the desired 345 empty storage locations in a given pool prior to receiving new fuel is discussed below. Two ranges are addressed: (a) between 237 and 344 empty locations prior to new fuel receipt, which *may* cause impacts; and (b) less than 237 empty locations prior to new fuel receipt, which *will* cause impacts.

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1 In recent refuelings, Oconee has been forced into just such circumstances (i.e. performing refueling operations with less than the desired empty spent fuel storage locations). This situation was caused by a disruption in the fabrication of its NUHOMS®-24P components while the previous vendor addressed compliance and quality program issues. These issues have now been fully addressed, and the current vendor, Transnuclear West, Inc. (TNW), has resumed fabrication. Thus, it is Duke's desire to return Oconee's pool inventories to normal levels as soon as possible.

Refueling with 237 to 344 Empty Locations Before Receiving New Fuel

With between 237 and 344 empty fuel storage locations in the affected pool prior to receiving new fuel for a refueling, there are not enough empty locations for repair of one of the fuel transfer system upenders, should one fail during the offload. Sixty (60) of the empty fuel storage locations will be used for new fuel assemblies. This reduces the number of empty fuel storage locations to between 177 and 284 prior to the core offload. Following core offload, the number of empty fuel storage locations is reduced to between 0 and 107. However, a minimum of 108 empty fuel storage locations, in addition to the 60 new fuel assemblies, must be established around the upender to provide enough clearance from spent fuel for a diver to perform repairs. The redundant fuel transfer systems for each of the Oconee reactors are located adjacent to spent fuel storage racks without intervening shield walls, and the upenders cannot be isolated from the spent fuel pool for repairs. Thus, if one of the redundant upenders were to fail during the reactor core offload or reload, a diver could not access the upender for repair. In order to establish the needed diver clearance, it would be necessary to transfer fuel assemblies back to the reactor using the other operable upender and fuel transfer system. This could cause a delay in the offload or reload and prolong the refueling outage.

Also, with less than 277 empty fuel storage locations in a pool prior to a refueling, Oconee loses the ability to perform concurrent fuel assembly ultrasonic testing (UT) and fuel assembly reconstitution ("Recon") and would have to perform them sequentially. UT, requiring 24 empty fuel storage locations, is performed on reload fuel assemblies if reactor coolant chemistry indicates failed fuel rods in the previous cycle. Recon, requiring 16 empty fuel storage locations, is performed on any reload assemblies with failed fuel rods. It is the process in which failed rods are removed and new fuel rods or stainless steel rods are inserted in their place. Performing these operations concurrently, then, requires 40 empty fuel storage locations. During this time the 177 fuel assemblies from the reactor core have been offloaded, and the 60 new fuel assemblies have already been loaded into the pool. Thus, a total of 277 empty fuel storage locations are required

prior to the refueling. These operations could be performed sequentially, or performed concurrently if some of the fuel assemblies were reloaded into the reactor to create the needed space. However, this would be at the expense of lengthening the outage.

Refueling With Fewer Than 237 Empty Locations Before Receiving New Fuel

Fewer than 237 empty fuel storage locations in the affected pool prior to receiving new fuel for a refueling (the current situation in both Oconee pools) *will* result in impacts on refueling activities. Concurrent storage of both the new fuel and the core offload requires 237 empty locations. With fewer than the necessary fuel storage locations to accommodate both the offload (177 locations) and storage of the new fuel assemblies (60 locations), some or all of the new fuel assemblies must be temporarily stored outside the spent fuel storage pool. These new fuel assemblies could not be transferred to the pool until the core reload is underway and sufficient fuel storage locations are vacated by reloaded fuel assemblies. Once sufficient empty fuel storage locations were available, the core reload would have to be interrupted to allow transfer of the new fuel assemblies because both activities require use of a single fuel handling crane. Also, the new fuel containers would likely have to be stored outside the fuel building since the fuel receiving area (FRA) is occupied by other outage-related equipment. In this case, core reload would have to be interrupted while the outage-related equipment in the FRA is moved outside and the new fuel containers are brought into the FRA because irradiated fuel movement is prohibited while the FRA exterior doors are open. An additional potential for outage delays results from damage that might occur as a new fuel assembly is being transferred under these circumstances. Ordinarily, the new fuel is received and transferred into the pool well in advance of the outage, such that sufficient time is available to receive and replace the fuel assembly. If new fuel assemblies are not transferred to the pool until during the outage and some damage occurs in the process of transferring them, the lead time for supply of a replacement new fuel assembly would result in an outage delay.