JUL 27 1988

Docket 72-4

Duke Power Company
ATTN: Hal B. Tucker
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Gentlemen:

This is in response to your submittal, dated March 31, 1988, of the Safety Analysis Report (SAR) for the Independent Spent Fuel Storage Installation (ISFSI) on the site of the Oconee Nuclear Station. We have initially reviewed your SAR and have enclosed our detailed comments.

If you have any questions, please contact me at (301) 492-0608.

Sincerely,

ORIGINAL SIGNED BY:

John P. Roberts, Section Leader
Irradiated Fuel Section
Fuel Cycle Safety Branch
Division of Industrial and
Medical Nuclear Safety

Enclosure:
Comments on the Safety Analysis Report
for the Oconee Nuclear Station
Independent Spent Fuel Storage
Installation

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DFOA
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COMMENTS ON THE SAFETY ANALYSIS REPORT FOR THE OCONEE
NUCLEAR STATION INDEPENDENT SPENT FUEL STORAGE INSTALLATION

CHAPTER 1

1. Page 1.1-2 (para. 1.1). Last sentence should be qualified to the effect that reuse of the DSC for a second charge of fuel rods is not provided for in the NUTECH TR or this SAR.

2. Page 1.2-2 (para. 1.2.3). Paragraph states that for the <u>majority</u> of the fuel to be stored, the radiation sources will be less than or equal to the sources described in the NUHOMS-24P TR. Those radiation sources to be stored which will exceed those of the referenced TR are not described and are not mentioned in the criticality discussion (para. 3.3.4.1) or shielding analysis (para. 7.3.2.2), both of which refer to the referenced TR. Please clarify the intent on storage of fuel which exceeds the design criteria.

3. Table 1.2-2. Performance of step 7 before step 8 is contrary to NUTECH NUHOMS TR and invalidates use by reference of the corresponding radiation shielding operations. It is also contrary to the description of "partial draining" in para. 3.1.2.1 and statement that water will be left in the DSC/Transfer Cask gap during welding operations at para. 7.1.2, p. 7.1-7 (DUKE Oconee SAR). Please address this inconsistency.

4. Table 1.2-2. Step 2 omits sealing the DSC/Transfer Cask annulus, contrary to NUHOMS TR Table 1.2-3 and to DUKE Oconee SAR paras. 3.3.2.1., p. 33-1 and 7.1.2, p. 7.1-7. Please address this inconsistency.

5. Para. 1.2-5 (b). Refers to internal shield blocks inside the HSM to reduce the scatter dose out of the air inlet. Does this refer to the shield blocks which comprise the shielded ventilation plenum?

6. Para. 1.3.1.7 (d). The description of the transfer cask lifting and placement in the spent fuel pool indicates that the transfer cask and the DSC inside the transfer cask are filled. The description of this operation in the TR is more specific and indicates that the transfer cask and DSC are filled "with demineralized water." Discussion in Section 3.3.2.1 indicates that the DSC will be filled with demineralized water. However, other discussions of DSC loading operations (Fig. 5.1-1), discussions of inadvertent fresh fuel assembly loading, as well as the response to questions at the initial presentations by Duke Power personnel indicate that the DSC will be filled with borated water. Given that there is some confusion and concern regarding criticality safety and the misloading of a high enrichment assembly, please be specific as to whether the transfer cask and DSC inside the transfer cask will be filled with demineralized water or with borated water. If borated water, then what boron concentration?

7. Para. 1.3.1.7 (e). Selection of assemblies refers to administrative controls detailed in Section 10.3. Sections 10.3 and 10.3.1.1 provide spent fuel specifications but do not detail how fuel assemblies will be administratively controlled to ensure that the characteristics of a specific assembly are known and verifiable. Section 10.2 5 references use of existing Duke Power Company organizational and administrative systems and procedures, etc. How do these procedures apply to the storage of spent fuel at the Oconee ISFSI? Are the existing procedures sufficient? Do the procedures provide for a verifiable record of a specific fuel assembly from its acceptance on site as a fresh assembly to its placement in the DSC?

8. Page 1.3-2. The SAR states that the peak cladding temperatures are "less than 340°C during long term storage." For what ambient temperature is this correct?

9. Page 1.3-3 (para. 1.3.1.4). It is not adequate to state that the transfer trailer be "designed as low to the ground as possible." The TR has a specific design envelope. DPC must demonstrate that the trailer does not require that the DSC/cask be lifted to a height greater than 60 inches.

If this is not demonstrated, the assumptions regarding maximum deceleration levels for postulated drop accidents are not valid. Note that the dimensions of the transfer trailer must be supplied in the criteria Chapter 3 of the SAR, and reference to these dimensions should be made in the Chapter 8 paragraph 8.2.4 of the SAR.

10. Page 1.3-4 (para. 1.3.1.7c). No keyway is shown in Reference 1.2, App. E.

11. Page 1.3-4. In the discussion of the transfer cask skid, DPC states that several important features are shown in the TR in Figure 1.3-4. Closer examination of that figure reveals that no details are shown regarding the roller surface mount, the four hydraulic positioners, or the restraining bolt system. For the site specific applications for an ISFSI license, DPC should not only show more details, but also define criteria which are necessary for these items, such as minimum load capacity, range of movement, accuracy of alignment, and basic restraint capability of bolts during transport operation.

12. Pages 1.3-5, 3.3-1, and 4.4-1. The SAR states that the annulus between the DSC and the cask will be "mechanically sealed." This should be described. Has the potential dose for this particular operation been estimated?

13. Table 1.2-3. Specify transfer cask movements or clarify why these are not cited. Same applies to transfer cask lid.

14. The design parameter for the Oconee ISFSI (Table 1.2-1) for normal summer ambient conditions is 62 BTU/hr, ft^2. This seems extremely low in view of the fact for a 12-hour day insolation at Columbia South Carolina was 115 BTU/hr, ft^2. Section 8.1.3.c of the Topical Report Rev. 2, February 1988, puts the off-normal or accident condition insolation at 127 BTU/hr, ft^2. These data need clarification.

15. Page 1.4-1, (para. 1.4) of the Oconee ISFSI SAR states that the prime contractor for design and analysis is NUTECH and that fabrication of the

transfer equipment and dry shielded canisters is also the responsibility of NUTECH. Section 11.0 of the SAR states that Duke Power Company maintains full responsibility. Briefly describe how Duke Power Company will assure the quality of the Oconee ISFSI work performed by NUTECH, NUTECH subcontractors, and Duke subcontractors for the items which are within the scope of Conditions 1, 2, and 4 of Duke's QA program.

CHAPTER 2

1. Chapter 2 does not contain a paragraph addressing slope stability (see Reg. Guide 3.48, para 2.6.5). The proposed ISFSI site (e.g., Figure 2.5.1) includes slopes on either side of the access road to the site; fill material at the north and east; and the over 50-foot high cut adjacent to the west end of the HSM array and DSC transfer operation area. Please address slope stability.

2. Page 2.1-2 (para. 2.1.2.2). There is inadequate discussion and description of "sharing" and other interactions between the ISFSI system and other activities at the site, as required by 10 CFR 72.15(a)(1), and 10 CFR 72.72(d). Extensive interaction and shared use of facilities important to safety occurs at the fuel pool facility, where there are joint use equipment; working, loading and unloading areas; utilities; and accountability and security systems which are shared between ISFSI and other nuclear power plant activities, and where there may be ISFSI-dedicated space (e.g., for cask decontamination and sealing), within a layout which supports many different operations. The required discussion, layouts with relative elevations, and descriptions should be presented at para. 2.1.2.2 and where there are impacts on design, operations, procedures, or other discussion of system use, availability, or effectiveness. Other questions relating to the interactions and shared use are:

   - How much of the ISFSI organization is dedicated exclusively to ISFSI operations?

   - Is there a distinct ISFSI operations control point at the fuel pool facility?

   - What systems or other facility preparations are to be made at the fuel pool facility as part of the ISFSI? Once installed, will these be solely used for ISFSI operations?

3. Page 2.1-3 (para. 2.1.3). Editorial comment: subparagraphs 2.1.3.1 and 2.1.3.2 are missing from submitted SAR.

4. Page 2.1-3 (para. 2.1.4). Paragraph 2.1.4 does not provide sufficient information (see the guidance of Reg. Guide 3.48 para. 2.1.4) in that: uses of all land within a 5-mile radius are not described and localized populations in schools and institutions are not identified. Please use updated census data and address pertinent land use questions.

5. Page 2-3 (para. 2.2). See Reg. Guide 3.48, para. 2.2. Are there any other nuclear facilities (e.g., university research reactors, other nuclear power plants) wit ı 50 miles? State whether there are any railroads or airstrips within a 5-mile radius. (If yes, describe and plot.) Identify the location of airfields in the vicinity and the proximity of approach or take-off paths to the site, (e.g., fields at Anderson, SC or closer.) Are there tall structures on the site?

6. Page 2.4-1 (para. 2.4.1.1). Assertion that flooding at the ISFSI will not occur is not established by preceding discussion. The elevation of the ISFSI site is not mentioned or shown in Figures 2.1-2 or 2.1-3. (Shown as 825 ft in Figure 2.5-1, which makes an excellent case against flooding due to reservoir overflow.)

7. Page 2.4-2 through 2.4-5 (para. 2.4.2.2). The discussion of potential floods establishes (but does not include) that prevention of floods at the site is dependent on levees and control of water behind the levees, since the pond level of Lake Keowee is shown to reach a possible elevation of 808 feet. The elevation of the ISFSI yard and local hydrology of the immediate vicinity are not discussed (elevation is to be 825' per Fig. 2.5-1).

8. Pages 2.5-7 through 2.5-14 (para. 2.5.2). Sources of data should be shown for para. 2.5.2 and all of its subparagraphs.

9. Page 2.5-15 (para. 2.5.4.4). Para. 2.5.4.4 and the referenced section do not discuss anticipated groundwater conditions for the ISFSI site during

construction or its expected life, as suggested by Reg. Guide 3.48, para. 2.6.4.6 (e.g., what will be the impact of removal of up to 60 feet of natural overburden and cutting through the existing water table; where will the future water table be; and will there be springs or seepage in the sidehill cut, uplift under pavement, or reduction of shear resistance along the bedding?). Please address the issues.

10. Page 2.5-15 (para. 2.5.5). Describe or cite basis for determination of in situ static soil bearing pressure of 4.0 kips/sf (include foundation evaluation). Where is the foundation design? This is necessary to verify the adequacy of the treatment of anticipated and potential settlement. These could impact the integrity and therefore the shielding provided by the HSM.

CHAPTER 3

1. Table 3.1-1. The distance between grid straps are different between the NUTECH TR (Table 3.1-2) and the DPC SAR. Discuss this and note any design impact.

2. Page 3.1-1. Should not the section on material to be stored specify the burnup characteristics of the fuel?

3. Page 3.1-2 (para. 3.1.2.1). Description of operations is inconsistent with sequence of steps 7 and 8, Table 1.2-2 (reference to "partial draining, 3rd line from bottom of page).

4. Page 3.1-4 (para. 3.1.2.2.c). Provide details including design criteria specification and dimensions of the cask transfer trailer. Provide similar details for the positioning equipment, and alignment system.

5. Page 3.1-4 (para. 3.1.2.2.d). Provide details of the hydraulic ram.

6. Page 3.1-5 (para. 3.1.2.2). Include design criteria for the transfer cask skid including specifications and dimensions of the system. Provide design criteria and describe the system intended for the transfer cask securing system which are anticipated during normal, off-normal and accident (e.g. earthquakes, tornado missile) conditions during transport between the fuel building and the ISFSI site. Specify the loads.

7. Page 3.2-1 (para. 3.2). Reference to NUHOMS-24P TR is too broad. Incorporate material from other docketed documents by clear and specific reference (per 10 CFR 72.12). The TR, on NRC approval, will not provide all of the information required of a SAR on the system components. As currently indicated by the draft TR, the following additional information will be needed in the SAR for design criteria, etc:

- o HSM - Lightning protection, foundation analysis, and any impacts of use of other than a 3 x 2 array (if other than 3 x 2 arrays are proposed).

- o DSC - Validation that TR drop scenarios envelop the Oconee situation.

- o Transfer Cask - Validation of drop scenarios and analysis of DBT and seismic effects while holding DSC (unless SAR demonstrates such analyses are not required. The current SAR draft does not so demonstrate).

- o Hydraulic ram, transfer positioner, trailer, and tractor, and loading unloading sealing and opening equipment. Design criteria, design, and analyses have been left to the SAR for coverage (some information on the ram is in the TR, which may be included by reference).

- o Hardstand adjacent HSM and roads used in DSC transfer. The TR establishes maximum resistance in cask drop scenarios which is based on an extreme pavement design. The SAR should demonstrate that surfaces which might receive a dropped cask do not exceed the resistance of the analytical case, or if such resistance is exceeded, will not result in decelerations greater than those used for the TR analysis.

8. Pages 3.2-1 and 3.4-1 (paras. 3.2.1.1 and 3.4.c). Current Reg. Guides covering DBT and DBT missile design have been issued since preparation of the Oconee FSAR. The ISFSI system complies with current guidance, therefore rather than reference to the FSAR current DBT characteristics (Reg. Guide 1.76) and missiles (NUREG-0800) should be referenced as enveloping the FSAR unless this is not so. For example, wind velocity should be 290 mph rotational plus 70 mph translational for a maximum of 360 mph and differential pressure should be developed at a rate of 2 psi/second.

9. Page 3.2-2 (para. 3.2.1.3). Current DBT missiles used are the Spectrum I or Spectrum II missiles of NUREG-0800, para. III.4.

10. Page 3.2-2 (para. 3.2.1.3). Current text implies there are no requirements for ISFSI relative to tornado generated missiles. This is not so. The Commission amended 10 CFR Part 72 in July 1988. The stored spent fuel must be protected from adverse effects of DBT missiles. For the NUHOMS 24P system this is considered to require such protection while the spent fuel is in the DSC, in transit, in transfer, and in the HSM. Thus, the HSM is not the only system element whose response to DBT missiles must be considered. Include criteria and analysis for DBT and DBT missile effects during transfer and loading, or establish that such analysis is not required (this is not established by the current SAR or TR).

11. Page 3.2-2 (para. 3.2.1.4). The ISFSI is a system of which the HSM is only one part. Other components important to safety (per 10 CFR 72.72 (b)(2)) are the: transfer cask and the DSC. Components and systems necessary to the safe loading of the ISFSI include the transfer trailer, insertion ram unit, transfer movement path, loading, unloading, and sealing/opening equipment, and procedures and other safeguards. The NUHOMS-24P TR only addressed DBT and DBT missiles in the design of the HSM. It has not been demonstrated that administrative procedures or on-site meteorology can eliminate the threat of DBT and DBT missiles sufficiently to pre-empt design of the transfer cask, DSC (within the transfer cask and during loading/unloading of the HSM), and other transfer equipment so that their capability to perform is not impaired. Include criteria and analysis for DBT and DBT missile effects during transfer and loading, or establish that such analysis is not required (this is not established by the current SAR or TR).

12. Pages 3.2-3 and 3.2-4 (para. 3.2.3.1 and 3.2.5). On page 3.5.1 (para. 3.5) Oconee FSAR was referenced in 3.3. Thus, reference in the parentheses should be 3.3.

13. Page 3.2-3 (para. 3.2.2). There is no Section 2.4.5.1 in reference 3.3. Only 2.4.5 "FLOODING PROTECTION REQUIREMENTS", and it refers to Section 3.4 on page 3.2-3. Please correct the reference.

14. Pages 3.2-3 and 3.4-1. Is the site design basis earthquake 0.17g vertical and 0.25g horizontal (SAR, Page 3.4-1) or 0.15g for both the vertical and horizontal component (SAR, Page 3.2-3)?

15. Page 3.2-3 (para. 3.2.3.1). See guidance of Reg. Guide 3.48, para. 3.2.3.1. A seismic analysis of response and stresses of the actual HSM structure(s) is not included. Determine the appropriateness of the NUTECH data, and reference it as required.

16. Page 3.2-3 (para. 3.2.3.2). Neither the SAR nor the NUTECH TR provide an analysis of the HSM array and foundations or soil conditions sufficient to support approval of the SAR. (See comments made on SAR para. 2.5.5.)

17. Page 3.3-1 (paras. 3.3.1 and 3.3.2.1). Minimization of contamination of Transfer Cask exterior by pool water is as important for radiation protection as contamination of the DSC exterior. Criteria should be in the SAR.

18. Page 3.3-1 (para. 3.3.2.1). Annulus sealing is omitted from Table 1.2-2 of the SAR (included on Fig. 5.1-1). As the annulus seal is a "safety protection system" its design should be submitted for approval. This was not included in the NUTECH TR.

19. Page 3.3-2 (para. 3.3.2.1) and Page 3.4-1 (para. 3.4d). Shipping cask residual contamination requirements must also be met by the Transfer Cask external surfaces. The quantitative residual contamination design limits are not given in the discussion or summary criteria.

20. Page 3.3-3 (para. 3.3.3.1), Pages 3.4-1, and 3.4-2 (para. 3.4). System components considered important to safety include: the HSM, DSC, and transfer cask. Systems and components considered important to the safe operation of the ISFSI or designed, constructed and tested in accordance with good industry practice include: lifting crane, transfer cask and DSC lift beam(s), transfer trailer, insertion ram unit, transfer movement path, and loading, unloading and sealing/opening equipment, and the HSM

foundation. These should all be addressed in such a way that the reader knows what components belong to what safety categories. Previous questions have requested design criteria and performance specifications for these systems and components. See also comment 26 for Chapter 3.

21. Page 3.3-4 (para. 3.3.4.1). How do Oconee administrative procedures assure that only qualified IFAs are loaded for storage in a DSC? Have the Oconee ISFSI Technical Specifications which govern IFA qualification for storage been completed?

22. Page 3.3-4 (para. 3.3.4.1). Do the qualification criteria include a specification of the axial burnup distribution? If not then explain how the qualification of IFAs assures that IFAs selected for storage are consistent with the axial burnup distribution bias factor included in the axial burnup distribution for specific Oconee IFAs?

23. Page 3.3-4 (para. 3.3.4.3). What verification has been performed to indicate the validity or accuracy of the fissile nuclide densities used in the criticality safety analysis? Was the cross section processing and the cell weighting of the cross section performed assuming the burned fuel isotopics or assuming fresh fuel? Which of the 40 critical experiments analyzed were representative of the irradiated fuel storage conditions representative of IFAs to be stored in the DSC? In what way are they representative of the Oconee ISFSI conditions?

24. Pages 3.3-4 and 3.3-5 (para. 3.3.5). Access controls and radiological safety alarms are not addressed, as suggested by Reg. Guide 3.48, paras. 3.3.5.1 and 3.3.5.3.

25. Page 3.3-5 (para. 3.3.7). See guidance of Reg. Guide 3.48, para. 3.3.7. There are items not addressed, even by reference to the FSAR or NUHOMS-TR. Design criteria, criteria for handling damaged fuel elements, radioactive waste treatment, and any waste storage facilities are not addressed, specified, or discussed even to the extent of explaining why they may not apply.

26. Page 3.4-1 (para. 3.4) (also page 3.3-3 (para. 3.3.3.1)). The guidance of Reg. Guide 3.48, para. 3.4 for classification of structures, components, and systems, criteria definition, and cross referencing to other SAR chapters are not met by SAR para. 3.4 or elsewhere in Chapter 3. The guidance is generally addressed in SAR para. 4.5 and Table 4.5-1, but the requirements for design criteria are not met in the SAR Chapter 3, which is entitled, "Design Criteria." What items are under which controls? Identify ISFSI components considered to be important to safety ("Nuclear Safety Related"), important to the safe operation of the ISFSI, or designed, constructed and tested in accordance with good industry practice (see Comment 11 for Chapter 3). These should be listed and the design criteria given: transfer trailer and tractor (e.g., must not allow falls greater than used in the NUHOMS TR accident analysis, including when subject to DBT and seismic effects), transfer cask and DSC beam(s), roads and hard-stands (e.g., must not cause decelerations greater than used in NUHOMS TR under accident drops), loading, unloading, sealing, and opening equipment (e.g., ALARA, must not permit binding causing excessive human exposure in remedial actions, etc.), the cask lifting crane, ISFSI-special lifting devices/connections, HSM site electric power, and any others.

27. Page 3.4-1 (para. 3.4c). Tornado effects do not meet the missile specifications (NUREG 0800 Spectrum I or Spectrum II (SAR is incomplete)), or the windspeeds or pressure drop rate of Reg. Guide 1.76.

CHAPTER 4

1. Page 4.1-1 (para. 4.0). The DPC makes the statement that the ISFSI system interfaces with existing plant equipment end systems. Some of this equipment and systems was identified, but no evidence was given to show that the roadways, buried pipes, trenches, and positioning aprons have been verified to be acceptable for the wheel loadings of the transfer vehicle. Please provide data showing that all proposed transfer routes comply with 72.72b.

2. Chapters 4 and 8, pages 4.1-1 and 8.1-1. Margins of safety are not fully addressed. See Reg. Guide 3.48 paras 4.2.3.3 and 8.1.1.3, and 10 CFR 72.15(a)(4)(i). Margins of safety in structural design for design events I and II normal and off-normal ("operational events") occurrences may be determined for the DSC, HSM, and transfer cask from Section 8 of the NUHOMS-24P TR. These should be referenced by DPC. Margins of safety are not provided per se for other aspects of the ISFSI important to the public health and safety. This is not limited to actual versus allowable or ultimate stresses, but can include such aspects as actual versus maximum permitted direct radiation.

3. Page 4.1-1, (para. 4.0). Designs in the NUTECH TR reference of the HSM, DSC,and Transfer Cask may be incorporated by reference. The TR does not provide sufficient information to serve as a reference for the other loading, unloading, or transfer equipment. The SAR must present this information. Loading, unloading, and other transfer equipment are considered important to the safe operation of the ISFSI, in addition to the HSM, DSC, and transfer cask.

4. Page 4.1-2. What is the justification for using ACI-318-83 for construction? ACI-318-83 is not referenced by ANSI 57.9, only ACI-349-80 is referenced.

5. Page 4.1-2 (para. 4.1). Local intense rain may not be a problem, but the HSM drainage pipe at grade level is the lowest opening for water (not the 24" height for the air inlet). Please correct statement about lowest opening or explain why water will not enter at drain.

6. Page 4.1-2 (para. 4.1). Describe in more detail, showing method and data, that the cask movement during transport is within the design basis of the cask drop-analysis.

7. Page 4.2-1 (para. 4.2.1). Transfer trailer (and hydraulic ram, which is used at the storage site) are not adequately covered. See previous questions regarding dimensions, design criteria, and specifications.

8. Page 4.2-1 (para. 4.2.1). The approach aprons, designed to carry the transfer trailer wheel loadings and the hydraulic positioning jack loadings will be a reinforced concrete structure built as a separate structure from the HSM. Will these aprons, in any way, be attached to the HSM or to an along-side apron? If so, how? If not, is differential settling or tilting, particularly during later HSM unloading, anticipated as a problem?

9. Page 4.2-1 (para. 4.2.2). The included figure does not meet the Reg. Guide 3.48 paras. 4.2.2.1 and 4.7.2 guidance for engineering drawings showing layout. The included figures only show a boundary for the HSM arrays.

10. Page 4.3-1 (para. 4.3). Transfer system components are necessary to the safe loading of the ISFSI. Their failure may result in situations requiring avoidable human radiation exposure for correction, or may result in shock or accelerations in excess of that used as the design bases. Design information, component descriptions, and component specification should be included to support SAR approval.

11. Page 4.3-1 (para. 4.3). The hydraulic ram system design bases, loads, description, and design analysis are not included. Please provide this information.

12. Page 4.3-1 (para. 4.3.3.1). Although the TR (para. 4.2.3.3) states that "the liquid neutron shield includes suitable provision to minimize the potential for freezing ...," these provisions are not described. Loss of the neutron shield is considerr to be important to safety. The sequence of operations (SAR Figure 5.1-1, page 1 of 4) indicates that the transfer cask is kept on the transfer trailer, which suggests outside storage. Outside storage indicates that the neutron shield water will be subject to freezing and, with freezing, the jacket is subject to rupture (in absence of provision of structural design calculations in the TR or SAR). There are no steps shown for draining the transfer cask neutron shield after use for DSC transfer or for filling it as part of the fuel loading sequences so it is assumed that the water is kept in the shield. There are no means of draining the water jacket while the transfer cask is in a horizontal orientation, which it would be in while in storage on the transfer trailer (per drawings at TR Appendix E). Will antifreeze be used to prevent freezing of water in the transfer cask neutron shield? If antifreeze is used, how is the effectiveness of the neutron shield impacted? Were radiation shielding calculations performed for a water-antifreeze mixture? If antifreeze is used, what types and concentration limits are acceptable and how will the usage be controlled? If antifreeze is used, are there any neutron activation considerations associated with its components? What procedures are to be used to test the antifreeze? Note that most commercially available antifreeze mixtures have a finite life and must be changed periodically. Please provide details of the liquid neutron shield and maintenance. (Note: resolution of these questions may also affect operational sequences in Chapter 5, radiation levels and doses in Chapter 7, and off-normal or accident situations in Chapter 8.)

13. Page 4.4-1 (para. 4.4.1). Building layouts meeting the guidance of Reg. Guide 3.48, para. 4.7.2.1, are not included or included by reference. The layout of the fuel pool, decontamination areas, and transfer areas of the reactor buildings should be shown, in so far as the spent fuel, transfer cask, and DSC handling, loading, and shipping are involved.

14. Page 4.4-1 (para. 4.4.1.1). There is no keyway interface shown in Ref. 4.1, App. E. There is a chamfered seating interface requiring the precise positioning of the DSC rotationally to mate the rectangular protrusion of the transfer cask bottom cover with the cutout of the alignment plate on the DSC. This final alignment must be done blind and must be coordinated with vertical lowering of the DSC. Use of a keyway is apparently desirable for practical operation. The SAR should specifically note that the keyway is in addition to the TR drawings, and should include a design description of the keyway.

15. Page 4.2-3. Specify the type of pressure/vacuum instrumentation, the range and accuracy and compare these capabilities with the requirements of the design.

16 Page 4.4-3 (para. 4.4.1.3). Describe the process to be used in seal welding the top end shield plug. Will this be accomplished by remote welding machine? Has the equipment necessary for cutting the top shield plug from the DSC while loaded in the transfer cask been identified? What are the plans to test the performance prior to hot loading? (See ANSI 57.9 1984 para. 6.2.2.1.2.a.)

17. Page 4.4-3 (para. 4.4.1.3). Last sentence. The NUTECH TR describes operations and equipment or systems needed. It does not describe or validate the systems and their usage at Oconee. This should be done in the SAR. The interface between TR and SAR for such systems (description, performance, and design) is the transfer cask and DSC envelopes. Where such systems already exist and have been validated for such usage and performance in the FSAR or other docketed documents, the corresponding parts of the FSAR may be referenced rather than duplicated in the SAR.

18. Page 4.4-3 (para. 4.4.1.3). Chapter 5 of the TR is illustrative for handling systems, operations, and procedures. The corresponding SAR material should be developed on a site specific basis for the site and actual equipment and facilities. Chapter 5 of the SAR should be the reference, rather than Chapter 5 of the TR.

19. Page 4.4-3 (para. 4.4.1.4). When DSC e unloaded, as for decommissioning, inspection, following a drop or for other reasons, will the DSC always be returned to the fuel pool for unloading? The unloading sequence included by reference on Fig. 5.1-1 (4 of 4) (Figure 5.1-4 of the NUHOMS-24P TR) shows return to the fuel pool. The TR also (at para. 5.1.1.9, page 5.1-9) discusses two options for unloading, with one of the options involving dry transfer of fuel units. If the only Oconee DSC unloading will be in the fuel pool, this should be stated. If dry unloading is to be retained as an option, procedures and equipment for this should be included in the SAR (or if it only would be during decommissioning, in the Decommissioning Plan).

20. Page 4.4-5 (para. 4.4.6.3). DPC should state what period is required for inspection of the HSM air inlets and outlets. They should supply justification for this period based on adiabatic heat-up rate for the blocked inlet and outlet case. Since the integrity of the stored fuel must be maintained (see 10 CFR 72.33 c(1)(i)), DPC should show that the fuel clad temperature is satisfactory.

21. Page 4.4-5 (para. 4.4.5). Describe the power source for hydraulic systems and what happens in the event of power failure.

22. Page 4.5-1 (para. 4.5.3) and page 4.5-2 (para. 4.5.5). See comment 26 for Chapter 3.

23. Page 4.5-1 (para. 4.5.3). Editorial Comment: The NUTECH TR did not establish that the HSM design meets the requirements of ACI 349-85 with regard to temperature limits or detailed reinforced steel design. These areas should be resolved as part of the final NRC action on relative to the TR and any modifications (that process is still in process and should be concluded prior to final action on this SAR). (Note: ISFSI design is covered by Reg. Guide 3.60 which adopts ANSI 57.9-1984, which incorporates ACI 349-80 by specific reference. Substitution of ACI 349-85 for ACI 349-80 has not been approved by the NRC. In the areas of concern relative to the NUHOMS-24P TR, however, the 1980 and 1985 codes are identical.)

24. Page 4.5-2 (para. 4.5.5). DPC should state the standards for the design and manufacture of the transfer components. It is not satisfactory to state that they will be designed "in accordance with good industry practices." Which codes will be used? What are the design criteria? What are the specifications? The same comment applies to the instrumentation.

25. Page 4.5-2 (para. 4.5.5). Qualification of the transfer components should be performed. Any delay or halt due to the transfer components' malfunction during transfer of the DSC must be minimized. Also, a maintenance program for the transfer components should be considered.

26. If, during transfer of spent fuel from the fuel handling building to the ISFSI, an event occurred that required return to the fuel handling building, could the tractor-trailer be turned around along the transport route or would the rig have to go to the ISFSI to effect a turnaround? The absence of any scale on SAR Figure 4.1-1 precludes the determination of maneuvering space/facilities along the routes between the fuel handling building and the ISFSI.

CHAPTER 5

1. Chapter 5. Fuel unit handling procedures which should be incorporated in Chapter 5 should include a description of how fuel unit identification numbers will be inspected and verified during loading and retrieval operations (see Reg. Guide 3.60 (ANSI 57.9-84) paras. 5.2.1.15 and 5.11.1). Is this concurrent with inspecting the fuel units for intactness or damage (see ANSI 57.9-84 para. 5.2.2.4)? Also describe clearly how this is to be done. Inspection and fuel unit identification accountability are necessary. The SAR should describe how they are to be done at Oconee. Will any fuel unit cleaning or removing of crud occur on initial loadings or retrieval of fuel units (discussed in ANSI 57.9-84, para. 5.2.2.2)? If so, how, and where in the operational sequence, will this be performed?

2. Since the Oconee ISFSI submission takes burnup credit, means must be provided for verifying that fuel unit burnup is above the design minimum (see Reg. Guide 3.60 (ANSI 57.9-84) para. 5.2.1.18). How, where, and at what point in the fuel unit loading sequence is this to be accomplished? This should be shown in the flow charts and narratives which should be submitted for Chapter 5. It is considered that this guidance is independent of the guidance of ANSI 57.9 paras. 5.2.1.7 and 6.2.2.1.1(2), although verification of decay heat level may be determined by calculations per 6.2.2.1.1(2), once burnup has been verified.

3. Chapter 5. How are the components of the ISFSI to be designed for fuel identification and accountability? See Reg. Guide 3.60 (ANSI 57.9-84, paras. 5.2.2.7, 6.4.1.7, 6.11.2, and 6.11.4)? This should include transfer casks.

4. Page 5.1-1 (para. 5.1.1). The narratives and flowsheets should be revised. See Reg. Guide 3.48, paragraphs 5.1.1 and 5.1.2. Flowsheets should support the comprehensive narrative descriptions and should show "the sequence of operations <u>and their controls</u>." Narratives and flowsheets may be included by actual presentation in the SAR or by clear and specific reference to

elements of the TR (per 10 CFR 72.12). (Note: the narrative and flowsheets of the TR are generally acceptable for inclusion by reference, except that the flowsheets generally do not include the controls on the operation. The SAR is not required to use the TR narratives and flow sheets, but what is not included by reference must be included by presentation in the SAR. There are operations which are addressed generically in the TR but which should reflect the actual Oconee situation or DPC procedures in the SAR.) (Note: controls of operations could be included on the flowsheets by, for example, addition of a column showing the control(s) used for the correct performance of the individual sequence operation, such as overseer checklist, fuel rod number verified against cask loading plan; or by inclusion of the controls in the sequence of operations.)

5. Page 5.1-1 (para. 5.1.1.1(a)). There are no built-in provisions for securing the HSM door in the open position shown in the Appendix E drawings. The design appears to assume removal and replacement or use of a temporary support. Please clarify how the HSM door will be held open during the DSC transfer operation.

6. Page 5.1-1 (para. 5.1.1.1(c)). Describe procedure for safely removing the bottom access plate (since it is supporting the approximately 35,000 pound weight of the bottom end of the DSC).

7. Page 5.1-2. Referring to drawing DUK-03-100-2 of the NUTECH Topical Report, it does not appear to be possible to lower the HSM front access door prior to installing the seismic restraint. It might be possible to partially lower the door, but it is not possible to completely lower the door. Therefore, steps (k) and (l) need to be revised.

8. Page 5.1-2 (para. 5.1.1.2). It is not satisfactory to monitor only the air inlets on a 24-hour frequency. The air inlets <u>and</u> the air outlets must be examined for obstruction and screen damage.

9. Page 5.1-3 (para. 5.1.1.3(c)). See note on para. 5.1.1.1(a).

10. Page 5.1-4 (para. 5.1.1.31). Explain how bottom access plate will be replaced. The NUHOMS-24P TR design of the transfer cask bottom cover-DSC alignment plate interface (TR App. E) holds the DSC off the transfer cask at the bottom end, supported by the bottom cover. Replacing the designed cover may require rotation of the DSC and lifting the bottom end while it is in the transfer cask. Note that there is no means to prevent rotation of the DSC during insertion or extraction. Please resolve this apparent difficulty.

11. Page 5.1-4 (Section 5.1.3.1). This section states that administrative controls will be applied to the selection of fuel for the ISFSI. Please describe the content of these proposed procedures to be used to select and independently verify the selection of the fuel for the ISFSI? If these procedures are to allow for the selection of one or more individual assemblies that exceed the limits of Section 10.3 of the SAR, please provide a description of this also.

12. Page 5.1-4 (para. 5.1.3.2). See the guidance of Reg. Guide 3.48 paragraph 5.4.1. Analysis of DBT effects is based on NUHOMS-24P TR. Paragraphs 3.2.1.3 and 8.2.2.2 of that TR state that administrative controls will be applied to ensure that transfer operations are not subject to DBT effects. Paragraph 10.3.4.3 of the TR indicates that avoidance of transfer operations being affected by DBT effects will be by measurement of wind speeds. None of these are discussed in Section 5 of the license application. (Note: See staff comments on the NUHOMS-24P TR on the effectiveness of administrative controls or micrometeorology to avoid DBT effects.)

13. Page 5.1-5 (para. 5.1.3.3). DPC must add "and air outlets" for the discussion on maintenance techniques.

14. Figure 5.1-1 (page 1 of 4). Recommend inclusion of a step for verifying that the neutron shield water jacket of the transfer cask is full.

15. Figure 5.1-1 (Page 1 of 4). Step 8 involves filling DSC cavity with borated water while NUHOMS-24P TR para. 5.1.1.1 step 8 has the DSC filled with demineralized water. Discuss any impact of this departure from the TR.

16. Figure 5.1-1 (Page 2 of 4). Step 13. Explain how top-end shield plug will be installed within the fuel pool in view of extremely tight tolerances, submergence, and attendant displacement of fluid within DSC.

17. Figure 5.1-1 (Page 2 of 4). How much is the water in the DSC/cask annulus to be lowered? Figure 5.1-1 step 17 indicates "1 foot." Paragraph 1.3.1.7(h) states "approximately 8-10 inches." Reference 5.1 paragraph 5.1.1.3 step 38 indicates "approximately ten inches." What water level in the annulus was assumed for the radiation calculations in Table 7.3-1, DSC in cask, entry 2.2 and Table 7.4-1. Annulus water level appears to be critical to radiation dose rates and doses. How is the amount of water drained to be controlled?

18. Figure 5.1-1 (Page 2 of 4). There is no mention of sealing DSC top and shield plug, vents, or cover plate between Steps 17 and 19. When does this sealing occur?

19. Figure 5.1-1 (Page 3 of 4). Since the annulus seal is removed at step 17 there will be an uncontrolled discharge during rotation of the casks on the transfer trailer skid at step 22 through the vent grooves under the top cover plate. Further, the transfer cask drain will be pointing vertically upward above the fluid level after cask rotation (Reference 5.1, Figure DUK-03-2003). Therefore, sequence of step 24 is questioned.

20. Figure 5.1-1 (Page 2 and 3 of 4). The steps involving welding the DSC lids, removal of water from the DSC, evacuation, and leak testing of the welded DSC were not included in these figures.

21. Figure 5.1-1 (Page 4 of 4). The steps involving installation of the seismic restraint are missing.

22. Figure 5.1-1 (Page 4 of 4). Step 32 in error. Is it meant to be "Withdraw Ram"?

23. Figure 5.1-1 (Page 4 of 4). Figure 5.1-4 of reference 5.1 was submitted to NRC as illustrative, and it does not fully track the narrative at 5.1.1.3 (Page 5.1-3) of the SAR. The operations which include unloading the fuel from the DSC and decontamination should be included in the SAR. This should fully track the corresponding narrative in the SAR.

24. Figure 5.1-1 (Page 4 of 4). Figure 5.1-4 on page 5.1-21 of NUHOMS-24P TR included by reference. Design of Transfer Cask (coupling at drain and vented top flange) permits filling the annulus with water even before the flange is removed, once the cask is vertical. Recommend the annulus be filled as part of retrieval operations after step 13 (placing cask in vertical position) as shown in TR Figure 5.14, for ALARA considerations.

CHAPTER 7

General Comment. The data provided by DPC in its license application for the Oconee Nuclear Station needs revision to account for the installation and use of up to eighty-eight Horizontal Storage Modules (HSM). The dose rate information important to assess worker exposures during HSM loading, surveillance, additional HSM construction, and public radiation exposures is not included. It would be appropriate to correlate this dose rate information with Duke's presently proposed module construction and filling rate. The Oconee Safety Analysis Report (SAR) incorporates the NUTECH TR by reference. This report only considers a 2x3 array. For eighty-eight HSMs it is not clear that self shielding can be neglected nor can scatter from the hidden modules be ignored. In the NUHOMS-24P report, page 7.4.2, the statement is made that the storage term dose assessment should be evaluated by the utilities submitting site specific safety analysis reports. This analysis is not present in the Oconee SAR.

1. Page 7.1-7 (para. 7.1.2). What is the relationship between the transfer cask bottom shield plug and the HSM opening? Seventh entry on page is not understood. (Do you mean the HSM access door?)

2. Page 7.1-7 (para. 7.1.2). There is no description or other discussion of the design of "portable shielding, during DSC drying/welding operations to limit streaming from top end shield plug/DSC annulus." (Credit was taken for its use in Table 7.3-1.) Please describe this shielding.

3. Page 7.1.2. What is the basis for the 20 mr/hr average surface dose on the HSM? Please indicate that this design criteria is as low as reasonably achievable.

4. Table 7.3-1. "DSC in Cask" entries. What is the water level in the DSC and annulus for these entries?

5. Table 7.4-1. Define "GA" in the table.

6. Table 7.4-1. What is water level in DSC and annulus after lowering and before removing?

7. Table 7.4-1. In absence of calculations there is an apparent disparity between the dose acquired while installing cover (86 mrem) and removing covers (14 mrem).

8. Table 7.4-1. Installation of seismic restraint omitted.

9. Figure 7.4-2. What is the gamma ray (primary plus scatter) and neutron spectrum calculated at the surface of an HSM from which the dose rates in Figure 7.4-2 were derived?

10. Please provide the radiation dose profiles (isodose curves) out to the fence of the HSM compounds when eighty-eight HSMs are filled. Include gamma, neutron, and scatter radiations. Please identify the codes, assumptions including their technical bases and provide a copy of the input data and the output calculations. Provide the calculations for the arrays as they are expected to be built, e.g. 2x3, 2x10, 2x36, and 2x88 HSM unit arrays.

11. How will construction workers be protected (shielded) when building additional HSM units? Will adjacent HSMs be left vacant? What doses (man-rem) are projected for construction such as presented in Table 7.2.1 for operations? It is not clear from the text if the 293 person-rem applies to constructing a series of independent 2x3 arrays or larger arrangements. Please identify the conceptual shielding plans or actions to be taken during construction to keep worker doses ALARA. Certain radiation fields can approach 50-100 mrem/hr. State the assumptions and basis for establishing an average dose rate of 2.5 mr/hr for the construction of additional HSMs.

12. Please provide the calculated absolute and relative increase in the occupational collective dose for all employees at the Oconee site under the anticipated HSM module filling plan.

13. What radiation protection procedures or practices will be modified or created to perform the activities associated with the loading, transfer, storage, monitoring, and retrieval of a DSC? Provide a copy of the existing procedures which require modification and those new procedures now available. If they are not available, please identify the major points which will be in the procedures when they are written.

14. Provide input and output data from the ANASN computer code (neutron and gamma fluxes, dose rates and flux to dose conversion factors) as discussed in Paragraph 7.3.2.2 Computer Codes. Include the same information for the computer code SKYSHINE, paragraph 7.4.2.

15. Please provide an updated Figure 7.4-1 "Dose Rate vs. Distance from Surface of HSM" to represent the Duke Oconee proposal to install eighty-eight HSMs.

16. The data presented in the NUTECH-24P TR Figure 7.3.2 is incomplete regarding the Gamma ray group fractions. Provide complete data used as the basis for all the Oconee calculations used in the SAR.

17. Are any radiological alarms or alarm systems planned for the Oconee Independent Spent Fuel Storage Installation? If so, provide the basis for their selection and use. Reference 10 CFR 72.74(b), (c)2.

18. Section 7.6 of the SAR states: "The current environmental monitoring program for Oconee Nuclear Station will also serve as the operational program for the ISFSI." The installation and operation of the ISFSI will undoubtedly require an increase in the scope of the present monitoring programs, such as additional dosimeters in the area surrounding the ISFSI site. Please identify and describe all the anticipated changes to the current program.

CHAPTER 8

1. Page 8.1-1 (para. 8.1). We recommend inclusion of the following as off-normal events, accompanied by the appropriate analysis:

   - Use of transfer cask without any or some of the water filling of the neutron shield water jacket, as might result from undetected leakage or negligence. Radiation consequences and preventive measures should be addressed. (It is noted that there are no verification procedures listed among the operational steps, and that there is no external evidence that the jacket is or is not fully incorporated in the design. Leakage could result from poor joints, poor valves, failure to use antifreeze and freezing of the fluid. (Note: the transfer cask design shown in the NUTECH TR, Appendix E does not include an accumulator, although one is shown in Figure 1.3-2a.) (Also see comment on para. 4.3.3.1.)

   - DSC top plug inner cover plate fails to seat or jams during placement in the fuel pool. The tight tolerances, the relatively imprecise position control during lowering, and the lack of any effective positioning guides, poor visibility, and the piston-like action on the fluid-filled cylinder may lead to difficulty in seating the plate. The result of not seating could be excessive radiation exposure to workers on removal.

   - Individual fuel assemblies are loaded into the DSC which are new or have not experienced the burn-up assumed for the ISFSI system design.

2. Page 8.1-2 (para. 8.1.1.3). The DPC statement that the analysis presented in the NUTECH TR relative to the DSC jamming off-normal case is applicable for the Oconee ISFSI operation may be valid provided the operator does not exercise override control of the hydraulic pressure in the ram, which exceeds a maximum force of 80,000 pounds. DPC should describe what means are provided to prevent exceeding 80,000 pounds. (DPC incorrectly referenced the paragraph dealing with the jammed DSC as 8.1.1.3 in the TR. The correct paragraph is 8.1.2.1.)

3. Section 8.1. DPC is requested to address the off-normal thermal conditions for the extreme ambient temperatures at the Oconee site. This was omitted from the SAR. If the ambient extremes are less than those assumed in the TR, then so state.

4. Page 8.2-2. Due to a lack of details on drawings DUK-03-1000-1, 2 and 3, it is not possible to determine how the shield blocks are attached to the HSM. Consequently the recovery scenario, which includes bolting new blocks in place, cannot be evaluated. DPC should show that a bolting operation is all that is required, rather than drilling concrete and grouting new hold-down studs.

5. The closest distance between the ISFSI and S.C. Highways 130 and 183 is the same, 1,100 feet. The explosion of a gasoline tanker truck at these points, on either highway would subject the ISFSI to a surface overpressure in excess of 1 psi (Ref. Reg. Guide 1.91). The effects of this postulated accident have not been considered/addressed in the SAR, but should be.

6. Page 8.2-3 (para. 8.2.2.2). The DBT design parameters specified in Section 3.2.1 are not identical to those used in the reference Topical Report. The TR used DBT parameters which are in accordance with Reg. Guide 1.76. The values for maximum wind speed and time for pressure drop (or rate) in Section 3.2.1 of the SAR are lower than the Reg. Guide. This is not expected to impact the analysis or design of the HSM as this was performed using the Reg. Guide values for the TR. This does impact the design or safety analysis for possible DBT effects on the fuel rods while in a transport or transfer mode between the fuel pool enclosure and the HSM. The tornado generated missiles shown in Section 3.2.1.3 do not comply with Spectrum I or Spectrum II of NUREG-0800, Rev. 2, July 1981. The design criteria of Section 3.2.1 are not applied to analyze the safety of the fuel rods while the DSC is being transported or transferred.

7. Page 8.2-4 (para. 8.2.4.1). DPC states that the postulated drop height of the DSC is 60 inches. Since the center-line for the DSC cavity in the HSM is 102 inches, and the diameter of the DSC is 67.25 inches, the cask could fall through 68.4 inches in a side drop orientation during loading.

DPC should provide dimensions of equipment showing all aspects of the cask handling and inspection (HSM) operation. DPC should show that the cask cannot be higher than 60 inches during these operations. If DPC cannot show that, then they must demonstrate the integrity of the DSC for higher drops.

8. Page 8.2-4 (para. 8.2.4). To be able to evaluate the results of a site specific DSC drop onto DPC surfaces, following information is required:

   - o Reinforcement of the slab (size and yield strength)
   - o Slab thickness
   - o Concrete strength
   - o Soil ultimate strength
   - o Soil elastic modulus
   - o Poisson's ratio of soil

10. Section 8.2.5.1 of the SAR states: "The likelihood of lightning striking the HSM and causing an off-normal operating condition is not considered a credible accident given the HSM lightning protection provided. The lightning protection system for the ISFSI is designed in accordance with NFPA 78-1979 Lightning Protection Code. This system precludes any damage to the HSM or its internals due to lightning." This is undoubtedly true, but the ISFSI is also provided with a 240/120 VAC power supply for operation of the transfer trailer hydraulic positioners and the hydraulic ram. Does the HSM lightning protection system also protect the electrical power supply? A detailed drawing of the complete lightning protection system would be most helpful in evaluating its overall effectiveness. There is no evidence on the DUK-03-1000-1-3 drawings of the lightning protection system.

11. During the months of June, July and August, Charlotte, North Carolina reported an annual average of 38 thunderstorm days and 35 at Columbia, South Carolina with 11.8 and 15 cloud to ground lightning flashes per square mile, respectively. At the Oconee Plant the annual recorded actual thunderstorms, vice thunderstorm days, was 68.3, almost twice the numbers reported by Charlotte and Columbia. It would therefore, seem

reasonable to assume the number of cloud to ground flashes in the Oconee area was almost twice as many per square mile. NUREG/CR-3759 suggests that the possible recurrence of the number of lightning strikes with surges as high as 200 KA increases with the number of cloud to ground flashes that occur. Page 8.2-5 (para. 8.2.5). The worst case lightning scenario would appear to be during DSC transfer from the transfer cask to the HSM. This should be addressed. (Note: damage to fuel rods within the DSC is probably not a credible event, but the current could weld the DSC to the rails and/or transfer cask in a partly inserted position. The safety implications of concern could be the radiation dosage associated with the corrective actions. (Assurance of good grounding between the transfer cask and the HSM reinforcing steel may be an adequate precaution.)

12. Page 8.2-7 (para. 8.2.7.3). See Reg. Guide 3.48, paragraph 8.2.1.2. Please provide a fuller analysis or description of the analysis.

13. Page 8.2-8 (para. 8.2.8). The most serious consequences of accidental pressurization of the DSC could occur in conjunction with opening the DSC for down loading, especially since there would be no outward evidence of increased internal pressure. The adequacy of procedures and integral and attached systems and equipment to prevent release or excessive human exposure should be addressed.

14. Section 8.2. DPC is requested to address the accident case for flooding at the Oconee site. This was omitted from the SAR. If the elevation of the ISFSI site is higher than the flood level, then so state in Section 8.2.

CHAPTER 9

1. Page 9.2-1 (Section 9.2). Will the preoperational testing include:

    - o the loading of dummy spent fuel elements?

    - o the simulated drainage, evacuation, and helium filling of the DSC?

    - o checking of both transport routes from the pools to the storage area?

2. Page 9.2-2. DPC is asked to provide the maximum temperature of the fuel cladding for IFAs which are loaded in the DSC which is loaded in the transfer cask. This is requested in order to justify their statement that the "IFAs could be safely stored for an indefinite period of time either in the transfer cask ..." DPC should show this for the 100°F and 125°F ambient temperature as well as off-normal conditions, such as absence of neutron shielding. Table 8.1-13 of the NUTECH TR states that the cladding temperature reaches 421°C for a DSC in the cask without neutron shielding. The 421°C temperature is higher than the 340°C acceptance criteria, therefore the fuel cannot be "indefinitely" stored in the cask.

3. Pages 9.2-3 and 9.2-4. DPC has not mentioned any pre-operational testing designed to verify the thermal-hydraulic analyses of the DSC loaded in the HSM. See question 3 in Chapter 10 of the question set submitted by the NRC to NUTECH Engineers, dated May 24, 1988.

4. Pages 9.3-1 and 2. Which Oconee organization (operations, maintenance) will perform the DSC draining, evacuation, and He filling? Will these operations be included in the training program for the particular organization?

5. Page 9.3-2 (para. 9.3.3). This section identifies the training which the plant Health Physics personnel receive. Will the Health Physics personnel also be trained in the shielding issues associated with the transfer of the DSC from the transfer cask to the HSM and back again?

6. Page 9.4-1 (para. 9.4). The SAR description of Normal Operations does not meet the guidance of Reg. Guide 3.48 in that:

   o A list of detailed written operating, maintenance, and testing procedures governing ISFSI operations is not included (suggested by Reg. Guide paragraph 9.4.1).

   o Will the Oconee Nuclear Station system of records, reports and inspections be modified to accommodate all the requirements of 10 CFR 72, Subpart D?

7. Page 9.5.1 (Section 9.1). This section of the SAR states that the emergency plan for the station will be reviewed and changes made as necessary. Please provide information on when this review will occur and when the necessary changes (if any) will be made?

CHAPTER 10

1. DPC should specify the maximum available force available to the hydraulic ram operator for use during an off-normal DSC loading event. References to the NUTECH TR specifies the maximum design load of the ram to be 80,000 pounds force.

2. Page 10.2-1 (para. 10.2.1). "Functional and operating limits for an ISFSI are limits on fuel handling and storage conditions that are found to be necessary to protect the integrity of the stored fuel, to protect employees against occupational exposures and to guard against the uncontrolled release of radioactive materials" (quoted from 10 CFR 72.33(c)(1)(i)). The ISFSI is considered a system which includes structures, equipment, procedures, and trained personnel. Operating controls and limits are not just those applicable at the HSM site but must include those associated with fuel assembly loading/unloading, transfer, and transport. Loading, sealing, and moving the DSC; decontamination of the transfer cask; and eventual opening and down-loading the DSC should all be addressed to the extent that there are or should be operating controls and limits.

3. Page 10.2-1 (para. 10.2.2.2). The following should be included:

   o Level of fluid in the DSC and annulus after partial drawdown.

   o Height above surface for the lifting of transfer cask containing DSC containing fuel.

4. Page 10.2.2. Please present arguments for omitting three technical conditions and characteristics which were proposed in the NUTECH TR.

5. Page 10.2-2. Regarding surveillance requirements, DPC has omitted surveillance of the HSM outlets on a regular 24-hour basis. This is not acceptable. Also, it is contrary to the TR for the 24 P design.

6. Page 10.2-2 (para. 10.2.4). Section 10.2.4 of the NUTECH TR is not considered suitable or adequate for incorporation in the SAR by reference. It does not address configuration control or specifications for welding for the DSC; confirmation and configuration for the HSM; material specifications control for the transfer cask; minimum performance or configuration limits for the hydraulic ram, transfer trailer, and skid; or specifications for equipment used within the fuel pool building for lifting, transfer or support. The "design features" shown for the transfer cask are not design features. The reliance (in the TR) on statements of functional requirements elsewhere in the TR does not satisfy 10 CFR 73.33(c)(4). See the guidance of Reg Guide 3.48, para. 10.2.4.

7. Page 10.2-2 (para. 10.2.5). Were no additional administrative systems or procedures necessary for safe operation of the Oconee ISFSI? Have these procedures been reviewed elsewhere for applicability to operation of the Oconee ISFSI and specifically to the qualifications of IFAs for loading in the DSC?

8. Section 10.3 provides a discussion of spent fuel specifications but does not indicate how administrative controls provide assurance that a specific IFA to be loaded into the DSC had known fuel characteristics which comply with the fuel specifications? What can go wrong? How do the administrative controls preclude errors?

9. Page 10.3-2. The choice of words used to describe the condition of the fuel cladding in the DPC license application is quite different from the TR. Provide justification for relaxation of this proposed operational limit.

10. Page 10.3-4. DPC has omitted five out of nine limiting conditions for operation compared to the TR. Any deviation from the TR must be justified. Of particular concern are the omission of the following conditions:

   - Helium leak detection for the primary seam welds
   - The dose rate at and of the DSC lead shield plug
   - The surface dose rates of the HSM while the DSC is in storage
   - The maximum air exit temperature.

11. Page 10.3-5. What is "sufficient to demonstrate stable conditions."? The TR specified 30 minutes.

12. Page 10.3-10. DPC has specified a need for fuel assembly retrieval and inspection following a drop height of sixty inches. The TR specified a drop height of 15 inches. Even though the reference, UCID 21246, shows that axial buckling of the fuel does not occur until 147g and yield for side drop bending does not occur until 101g for B&W 15x15 fuel, and the reference, NP-4830, shows that the DSC would not experience more than 75g for a 60-inch drop, the NUTECH 24P design criterion is based on ASME Section III, Service Level D. While this is a plastic design criterion, and the DSC internals may plastically deform during a drop, fuel assemblies must be retrievable. Please provide arguments as to why the 15-inch drop limit should not apply.

13. Page 10.3-13. DPC has omitted the operating control specified by the NUTECH TR that the HSM air outlets be inspected every 24 hours. This omission is unacceptable.

14. Chapter 10. DPC has omitted the operating limit specified by the NUTECH TR that the maximum air temperature rise be measured 24 hours after loading the DSC into the HSM. The maximum air temperature rise is not permitted to exceed 60°F. DPC must observe the TR operating limit unless it can provide experimental evidence, based on test of a full scale model with the correct heat load, that this limit is not necessary.

15. Chapter 10. DPC has omitted the limit specification that the primary seal weld for the DSC be inspected by helium detection method. The dye penetrant method is not a satisfactory substitute.

16. Page 10.3-15. DPC should justify why they only need the transfer route surface within a five-foot proximity to the trailer to be at the same elevation, instead of the eight -foot proximity specified by the NUTECH TR.

17. Chapter 10. DPC has omitted the operational limit of maximum wind speed during transfer operations as specified by the NUTECH TR. This is unacceptable.