UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

Marshall E. Miller, Chairman
Dr. Cadet H. Hand, Jr., Member
Dr. Emmeth A. Luebke, Member

In the Matter of	)	
	)	
DUKE POWER COMPANY	)	
	)	Docket No. 70-2623
(Amendment to Materials	)	
License SNM-1773 for Oconee	)	
Nuclear Station Spent Fuel	)	
Transportation and Storage	)	
At McGuire Nuclear Station)	)	

INITIAL DECISION
APPROVING AMENDMENT TO AUTHORIZE
STORAGE OF OCONEE SPENT FUEL AT McGUIRE

I. BACKGROUND

Duke Power Company ("Applicant") is a private investor-owned utility company providing service in both North and South Carolina. Within the Duke system there is currently one operational nuclear facility, the Oconee Nuclear Station ("Oconee"). Oconee consists of three 2568 MWt, 860 MWe Babcock and Wilcox pressurized water reactor units located on the shore of Lake Keowee in Oconee County, South Carolina. Oconee Units 1, 2 and 3 began commercial operation on July 16, 1973, September 9, 1974, and December 16, 1974, respectively. (Applicant Exhibit 23E, Attachment 1 at p. 1).

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The reactor core of each Oconee Unit contains 177 nuclear fuel assemblies (Staff Exhibit 3 at p. 61). Each fuel assembly consists of a 15 x 15 array of fuel pins with 208 of the pin locations containing the actual UO_2 fuel enriched in the isotope uranium-235. (Applicant Exhibit 23G, Attachment 2 at pp. 4-5 and Staff Exhibit 28 at p. 3-11). During operation, the nuclear fuel is consumed, thus necessitating periodic refueling which consists of replacing, on the average, approximately one third of the 177 fuel assemblies in each core each year. (Applicant Exhibit 23E, Table entitled "Schedule of Discharges and Transfers, 1984," and Staff Exhibit 3 at p. 61). Storage of the spent fuel removed from the Oconee Units is provided by two separate spent fuel pools, the Units 1 and 2 pool originally designed for 336 storage spaces and the Unit 3 pool originally designed for 216 storage spaces. (Applicant Exhibit 2 at p. 1-1). Applicant, in reliance on reprocessing of its spent nuclear fuel 1/, originally sized the Oconee spent fuel pools in 1967 to accommodate the discharge of approximately one full core and one reload batch of fuel. (Tr. 412 and 882-3). As the Commission noted, this practice was prevalent in industry at that time.

> From the early days of the nuclear power industry in this country, electric utilities planning to construct and

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1/ Applicant has a contract with Allied General Nuclear Services to reprocess Oconee spent fuel at the proposed reprocessing plant in Barnwell, South Carolina. (Tr. 411 and Applicant Exhibit 2 at p. 1-1).

> operate light water nuclear power reactors contemplated that the used or spent fuel discharged from the reactors would be chemically reprocessed to recover the remaining quantities of fissile and fertile materials (uranium and plutonium), and that the materials so recovered would be recycled back into fresh reactor fuel. It was contemplated by the nuclear industry that spent fuel would be discharged periodically from operating reactors, stored in onsite fuel storage pools for a period of time to permit decay of radioactive materials contained within the fuel and to cool, and periodically shipped offsite for reprocessing. Typically, space was provided in onsite storage pools for about one and one-third nuclear reactor cores. [40 Fed. Reg. 42801, September 16, 1975]

In 1974-1975 delays in the licensing of spent fuel reprocessing facilities resulted in a serious nationwide shortage of spent fuel storage space for nuclear facilities. As the Commission stated:

> In light of the status of the three planned commercial reprocessing plants in the United States, as outlined above, the earliest that spent fuel reprocessing could begin on a commercial basis, if authorized, would be late 1976. This assumes that the pending licensing proceedings are completed and licenses issued by this date. However, the spent fuel pools at a number of reactors may soon be filled, and still other reactors will have their pools filled before the end of 1978. Accordingly, even if limited reprocessing should begin in late 1976, there would still be a shortage in spent fuel capacity. [40 Fed. Reg. at 42801]

Due to the industry-wide spent fuel storage problem, the Commission in 1975 stated its intent to prepare a

generic environmental impact statement on the handling and storage of spent light-water-cooled power reactor fuel. During the period of preparation of the impact statement, however, the Commission expressly authorized the licensing of individual actions, such as before the Board, designed to ameliorate the shortage of spent fuel storage space at individual facilities. 2/

> The Commission has also given careful consideration to the question of whether licensing actions intended to ameliorate a possible shortage of spent fuel storage capacity, including such actions as the issuance of operating license amendments to permit increases in the storage capacity of reactor spent fuel pools or reprocessing plant spent fuel storage pools, or the licensing of independent spent fuel storage facilities, should be deferred pending completion of the generic environmental impact statement. Such a deferral was requested in the letter on behalf of Natural Resources Defense Council, Sierra Club, and Businessmen for the Public Interest noted above. In considering this matter, the Commission had two basic objectives in mind: on the one hand, the generic impact statement should not serve as a justification for a fait accompli; on the other hand, the public interest considerations associated with such a deferral should be carefully weighed. The Commission has concluded that there

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2/ Subsequent to this 1975 Commission policy statement, numerous licensing actions regarding spent fuel storage have been granted. (e.g., Dairyland Power Cooperative (La Crosse Boiling Water Reactor) LBP-80-2, 11 NRC 44 (1980); Portland General Electric Company (Trojan Nuclear Plant) ALAB-531, 9 NRC 263 (1979); Northern States Power Company (Prairie Island Nuclear Generating Plant, Units 1 and 2) and Vermont Yankee Power Corporation (Vermont Yankee Nuclear Station) ALAB-455, 7 NRC 41 (1978); Duke Power Company (Oconee Units 1 and 2) (Tr. 569).

> should be no such generic deferral, and that these related licensing actions may continue during the period required for preparation of the generic statement, subject to certain conditions. [40 Fed. Reg. at 42801, 42802] 3/

Further the Commission stated:

> The Commission expects that any licensing action intended to ameliorate a possible shortage of spent fuel storage capacity during this interim period would be accompanied by an environmental impact statement (10 C.F.R. §51.5(a)) or impact appraisal (10 C.F.R. §51.5(c)) tailored to the facts of the case. Since the Commission's general conclusion with respect to the five factors, as set forth above, may not fit the actual circumstances of particular licensing actions, the five factors will be applied, weighed and balanced within the context of these statements or appraisals in reaching licensing determinations. [Id.] 4/

Due to the delays in reprocessing of spent nuclear fuel and the resulting shortage of spent fuel storage space, in 1975-1976 it was necessary for Applicant to rerack the Oconee Unit 3 pool with high density racks thus increasing its storage capacity from 216 to 474 spaces. (Tr. 411-413; Applicant Exhibit 2 at p. 1-1). At the time Oconee

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3/ The Board notes that the NRC Staff issued its "Final Generic Environmental Impact Statement on Handling and Storage of Spent Light Water Power Reactor Fuel" ("GEIS") in August 1979. The Board, pursuant to 10 CFR §2.743(i), takes official notice of the Staff position stated therein, viz., transshipment, as proposed here, is a viable alternative. (GEIS at p. ES-10). The Board further notes that the Commission has yet to act on this subject.

4/ See 40 Fed. Reg. at 42802 wherein these five factors are enumerated.

Unit 3 pool was reracked, Applicant still believed that reprocessing would be available. (Tr. 413). Oconee Units 1 and 2 pool was not reracked at that time due to the state of the art of technology regarding the underwater removal of the existing Oconee Units 1 and 2 racks which were welded to the bottom of the Units 1 and 2 pool. (Tr. 759-60).

On April 7, 1977, President Carter announced the indefinite deferral of all civilian reprocessing of spent nuclear fuel. (Applicant Exhibit 19 at p. 1). As a direct result of the initial delay in licensing reprocessing plants and the later indefinite deferral of reprocessing, 52 applications for actions to ameliorate localized spent fuel storage problems were received by the NRC. (Tr. 568). These 52 applications affect 60 of the 67 light water reactors in the United States which have operating licenses. (Tr. 569). Of the 52 applications submitted, 40 have been approved and the remainder are in various stages of licensing. (Tr. 568).

1. Applicant has received, pursuant to 10 CFR Part 70, a special nuclear materials license (SNM-1773) authorizing the storage of new nuclear fuel at the McGuire Nuclear Station. 5/ (Staff Exhibit 28 at p. 1-1).

5/ In addition to its Oconee facility, Applicant has other nuclear facilities in various stages of design and construction. The next nuclear facility scheduled to become operational is the McGuire Nuclear Station located on the south shore of Lake Norman in Mecklenburg County, North Carolina, approximately 17 miles north of Charlotte. McGuire, which will consist of two 3411 MWt, 1180 MWe Westinghouse pressurized water reactor units, has two spent fuel pools, each presently designed to accommodate 500 fuel assemblies. (Applicant Exhibit 2 at p. 1-1 and Staff Exhibits 3 at p. 3 and 28 at p. 3-1).

2. On March 9, 1978, Applicant filed an application to amend the subject special nuclear material license No. SNM-1773. (Applicant Exhibit 2). The amendment requested authorization to store Oconee spent fuel at McGuire. The amendment was sought under 10 CFR Part 70 in that it was not known precisely when the McGuire Part 50 operating license would be issued. (Applicant Exhibit 2 at pp. 1-1). 6/

3. On July 28, 1978, the Commission published in the Federal Register a notice entitled "Opportunity for Public Participation in Proposed NRC License SNM-1773 for Oconee Nuclear Station Spent Fuel Transportation and Storage at McGuire Nuclear Station" (43 Fed. Reg. 32905). This notice provided an opportunity for persons wishing to participate as parties in any proceedings that might be held with respect to the instant application to file petitions to intervene.

4. Pursuant to the Federal Register notice, petitions to intervene were filed by Natural Resources Defense Council ("NRDC") on August 21, 1978; by Carolina Environmental Study Group ("CESG") on September 7, 1978; by Carolina Action on August 18, 1978; by the Safe Energy Alliance ("SEA") on August 22, 1978; by the Davidson Chapter of the North Carolina Public Interest Research

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6/ The staff testified that issuance of the McGuire Part 50 license was not a prerequisite to approval of the application now before this Board. (Tr. 583).

Group ("PIRG") on October 7, 1978; and by the State of South Carolina on August 28, 1978.

5. On October 18, 1978, stipulations with respect to contentions were entered into between Applicant, the NRC Staff, CESG, Carolina Action, and SEA.

6. On October 24, 1978, a prehearing conference was held to rule on intervention, and by Order of November 2, 1978, the Board approved the intervention of CESG, Carolina Action, SEA, and South Carolina. By Order of January 9, 1979, the Board denied the intervention of NRDC and PIRG.

7. On January 22, 1979, PIRG noted an appeal and on February 26, 1979, the Appeal Board reversed the Licensing Board's Order denying PIRG's petition to intervene. In light of the Appeal Board's ruling, by Order of February 27, 1979, the Licensing Board approved PIRG's intervention.

8. On February 13, 1979, pursuant to a stipulation of the parties, the Appeal Board permitted the discretionary intervention of NRDC. On February 23, 1979, the Licensing Board issued an order consistent with the Appeal Board's action.

9. On February 23, 1979, the Licensing Board issued an order admitting contentions 1-3 of CESG, 7/ Carolina

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7/ On September 11, 1979, during the hearing, the Board granted CESG's request to amend its second contention. The amendment related to the adequacy of the Staff and Applicant's analysis of a cask drop or cask tipping incident. (Tr. 4182).

Action and SEA; and contention 4 of Carolina Action.

10. On March 13, 1979, a second prehearing conference was held to rule on NRDC's contentions. By Order of March 16, 1979, the Licensing Board held admissible the six NRDC contentions. 8/

11. On February 23, 1979 and March 27, 1979, the Licensing Board issued orders establishing the appropriate discovery and hearing schedules, respectively.

12. Extensive discovery, pursued by NRDC, CESG, NRC and Applicant, culminated in the filing of motions for summary dispositions by those parties. During the course of discovery, it became apparent that Carolina Action, SEA, and PIRG were not fulfilling their obligations, and accordingly, they were dismissed pursuant to the Board's Orders of May 23, 1979, April 12, 1979, and June 19, 1979, respectively. 9/

13. Public hearings to consider the amendment application to Material License SNM-1773 were held in Charlotte, North Carolina on June 19 through 23, June 25 through 29,

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8/ At the prehearing conference NRDC withdrew a seventh contention related to the adequacy of information provided with the application. (Tr. 136). In addition, NRDC's initial sixth contention relating to sabotage was redrafted to read "Applicant has failed to demonstrate that it is in compliance with applicable Commission regulations with regard to safeguarding spent fuel shipments." (Tr. 343-344).

9/ With respect to PIRG's dismissal, such ruling was made orally by the Board during the June 19, 1979 session of the hearing. (Tr. 343-344).

August 6 through 8, 1979, and April 28 and 29, 1980; and in Washington, D.C. on September 10 through 13, 1979. The parties presenting evidence at the hearings were Applicant, NRC Staff, NRDC, and CESG. The State of South Carolina actively participated through the cross-examination of various witnesses. In addition, Mr. Worth Bateman, Deputy Under Secretary of the Department of Energy ("DOE"), presented evidence as a Board witness.

14. The decisional record in this proceeding consists of the transcripts of the prehearing conferences of October 24, 1978, and March 13, 1979, and the evidentiary hearings referred to above, and all material received into evidence by the Board. 10/

II. BASIC FINDINGS

15. As set forth in paragraph 2, supra, Applicant submitted its application to amendment SNM-1773 on March 9, 1978. The application consisted of a cover letter and supporting document entitled, "Information Supporting Storage of Oconee Spent Fuel at McGuire". (Applicant Exhibit 2).

16. Upon receipt of the amendment application, the Staff instituted its own independent review and analysis. (Staff Exhibit 3 at p. iv). To assist in its evaluation, the Staff requested and received additional information from Applicant. (Applicant Exhibits 23A-H).

10/ An index of exhibits is attached hereto as Appendix A.

17. As a result of its review, the Staff issued an Environmental Impact Appraisal ("EIA") and a Safety Evaluation Report ("SER"). (Staff Exhibits 3 and 28). These documents were issued in December 1978, and January, 1979, respectively, and copies were provided to the parties. Notice of availability of these documents was published in the Federal Register on December 29, 1978 (43 Fed. Reg. 61058). (Staff Exhibit 35). 11/

18. The EIA describes in detail the impacts of transportation of spent fuel from Oconee to McGuire and storage of spent fuel at McGuire, to include the impact on existing facilities and those under construction at the McGuire site. (EIA at p. 1). On the basis of the evaluation and analysis set forth in the EIA, the Staff concluded that the proposed action meets the requirements of the National Environmental Policy Act of 1969 (NEPA) and the Commission's regulations. (EIA at p. viii). Therefore, the Staff recommended the issuance of the proposed license subject to the following conditions:

    1. Construction of McGuire Unit 1 shall be complete and the spent fuel pool and auxiliary equipment shall be approved by the Staff (See Section 4.0).

    2. Spent fuel shipped to McGuire from Oconee shall have been removed from the reactor no less than 270 days prior to shipment (See Section 7.0).

    3. No more than 300 Oconee spent fuel assemblies shall be transshipped (See Section 5.3).

11/ Subsequent to issuance of the SER and EIA, two errata sheets thereto have been issued. (Staff Exhibits 7 and 24).

4. An environmental radiological monitoring program shall be maintained to assure that sufficient data are available to verify compliance with applicable state and federal regulations (See Section 8.0).

5. Burnup of fuel shipped shall be no greater than 36,000 MW days per metric ton (See Section A.6). [EIA at p. ix].

19. The SER examined the safety aspects of this licensing action and concluded that the issuance of a license amendment would not be inimical to the common defense and security and would not constitute an unreasonable risk to the health and safety of the public. (SER at p. 10-1). In addition, the SER concluded that the Applicant met the specific provisions of 10 CFR Section 70.23(a). (SER at p. 10-1).

20. The evidence presented during the initial phase of this hearing was based on an analysis of shipment of spent Oconee fuel upon one specific route, the primary route. Based on Commission issuance of interim regulations regarding safeguarding of spent fuel in transit [44 Fed. Reg. 34467 (June 15, 1979)], 12/ the Applicant submitted additional routes for consideration. 13/ By "Notice of Resumed Evidentiary Hearing" dated

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12/ These regulations have, subsequently, been amended by Commission action of April 23, 1980. (Tr. 4725 and 4737).

13/ The Board notes that pursuant to 10 CFR §73.37, prior to transshipment of spent fuel the specific route used must be approved by the NRC Staff.

March 7, 1980, this Board formally expanded consideration to four routes. 14/

21. In essence, the proposed action now before the Board is a request to ship in spent fuel shipping casks 300 Oconee spent fuel assemblies, each of which has aged at least 270 days, over various routes from Oconee to McGuire, and subsequently to store these assemblies at McGuire. (EIA at p. ix). The specific casks to be used are NFS-4 casks (also designated NAC-1 casks), owned by Applicant, and designed to transport one PWR assembly. (EIA at p. 160). Each shipment would entail three basic

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14/ The four routes noted in the Board's Order are as follows:

Route No. 1:	From Oconee South on South Carolina (SC) 130 to US 123, East to SC 153, South to I-85, North to North Carolina (NC) 273, North to NC 16, North to NC 73 and on to McGuire.
Route No. 2:	From Oconee South on SC 130 to US 123, East to SC 153, South to I-85, North to SC 18, North on SC 18 and NC 18 to NC 180, then Northeast to NC 150, Northeast to NC 150-US 321, North to NC 27, East to NC 73 and on to McGuire.
Route No. 3:	From Oconee North on SC 130 to SC 183, West to SC 11, East to I-85, and the rest of the way to McGuire using Routes 1 or 2.
Route No. 4: (Primary Route)	From Oconee South on SC 130 to US 123, East to SC 153, South to I-85, North to I-77, North to NC 73, and on to McGuire.

steps: (a) loading the cask at Oconee, (b) shipment, and (c) unloading the cask at McGuire. With respect to loading and unloading operations, the Board notes that Applicant has conducted over 284 transfers between the two Oconee pools involving actions identical to those required for loading and unloading operations relating to the proposed action. (Tr. 748, 1025 and 1718). With respect to transportation of the spent fuel, the Board notes that since 1972 approximately 3600 offsite shipments of spent fuel have been made within the United States with no adverse radiological consequences. (Staff Exhibit 9 at p. 5). In short, transshipment activities as proposed here, present no novel issues that have not been examined on countless occasions in the past. The difference between the transshipment activity proposed here and others is simply the routes which will be used for the transshipment. Each of the proposed routes traverses in varying degrees both interstate highways and two-lane roads. All routes are approximately 160-175 miles in length and the maximum number of individuals living within 0.5 miles of the entire length of any proposed route is approximately 42,000. (Staff Exhibit 37 at p. 5). With respect to economic considerations, the action proposed here would cost approximately $2,000-$3,000 per fuel assembly. (Staff Exhibit 13 and Applicant Exhibit 3 at p. 4).

III. MATTERS IN CONTROVERSY

NRDC Contention 1

22. NRDC contends that the proposed action is a step in a proposed program to handle the shortage of spent fuel storage space by shipping and storing spent fuel away from the reactor where it was generated. The proposed action has no independent value in solving the spent fuel storage problem and is inherently premised on the near-term construction of an interim away-from-reactor storage facility. The proposed action, if taken, will bias the final decision on whether to approve the program by foreclosing at-reactor options at both Oconee and McGuire. The proposed action is therefore inconsistent with the conditions 1 and 2 laid down by the NRC in promulgating the criteria for approval of interim spent fuel storage. (40 Fed. Reg. 42801). Thus, the proposed action cannot be acted upon until completion of impact statements on the proposed program now being conducted by DOE (Storage of U.S. Spent Power Reactor Fuel (DOE/EIS-0015-D) August, 1978, and Supplement, December 1978; Storage of Foreign Spent Power Reactor Fuel (DOE/EIS-0040-D) December 1978; Preliminary Estimates of the Charge for Spent-Fuel Storage and Disposal Services (DOE/ET-0055) July 1978; Charge for Spent Fuel Storage (DOE/EIS-0041-D) December 1978; and NRC (DRAFT Generic Environmental Impact Statement on Handling and Storage of Spent Light Water Power Reactor Fuel (NUREG-0404)).

23. In support of its contention, NRDC presented the testimony of Messrs. Rotow, Cochran and Tamplin (NRDC Exhibits 13A-E, 14A-C, 15 and 17A).

24. Mr. Rotow's testimony focused upon DOE's plans for providing for away-from-reactor (AFR) storage of spent fuel. Specifically, Mr. Rotow took issue with a DOE study conducted to determine the number of utilities which may require in the near term use of such an AFR facility. Mr. Rotow maintained that the DOE study was being used to justify the need for government AFR

storage, and further that if at-reactor storage were pursued, government AFR storage would be unnecessary. (NRDC Exhibit 13B and 13C). To support his allegations, Mr. Rotow conducted a survey of those reactors cited by DOE as needing near-term AFR storage. (NRDC Exhibit 13C-E). He stated that his survey demonstrated that there was no need for current AFR storage, in that expansion of at-reactor storage capacity at such reactors was available. (NRDC Exhibit 13C). Mr. Rotow's survey, however, did not include any of Applicant's facilities. Cross examination revealed that Mr. Rotow had little experience in conducting surveys and the techniques he employed were questionable. (Tr. 1859-1899). Furthermore, with respect to the substance of the survey, cross-examination of Mr. Rotow revealed inconsistencies in the survey data so as to call the accuracy of the entire survey into question. (Tr. 1959-74, 2011-28). Accordingly, the Board is of the view that little weight is to be accorded to the results of Mr. Rotow's survey. 15/ In any event, with respect to Mr. Rotow's

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15/ At the hearing, Applicant objected to the admission of Mr. Rotow's survey into evidence. Applicant relied upon Pittsburgh Press Club v. United States, 579 F.2d 751 (3rd. Cir. 1978). While the Board overruled Applicant's objection and admitted the survey, it is mindful of the holding in Pittsburgh Press Club with respect to the weight to be given the survey. See also Allen v. Morton, 333 F.Supp. 1088, 1094 (D.D.C. 1971).

testimony concerning the accuracy of the DOE study, the Board notes that such testimony is of marginal, if any, relevance to the current proceeding. While such testimony may to some limited extent show the probability of a government AFR option being implemented for possible storage of Oconee fuel in the future, whether such an option would be available is of no moment to the issues raised by NRDC. While Applicant has testified that it recognizes the possibility of a future government AFR storage facility, the proposed action does not depend on the existence of such a facility. (Tr. 1039). Indeed, even if such a facility existed Applicant states that the terms and conditions of its use would dictate whether Applicant would use such a facility. (Tr. 498-9, and 504-5). No evidence has been introduced that indicates that the Applicant's or Staff's position with respect to the proposed action would be altered if a government AFR storage facility was or was not constructed. In any event, the Board notes that testimony of Mr. Worth Bateman, Deputy Under Secretary of the Department of Energy, clearly establishes as DOE policy the need for some AFR storage capacity. (Tr. 4517). Further, use of any government AFR facility will be determined on a case-by-case basis. (Tr. 4526). Thus, if government AFR storage capacity is available, Applicant is not precluded from its use.

25. Mr. Rotow, Dr. Cochran, and Dr. Tamplin also testified that transshipment activities, such as that proposed here, were being used by DOE to justify the need for a government AFR storage facility. (NRDC Exhibit 13B at pp. 3-5, Tr. 2355-56). NRDC reasons that since implementation of a government AFR option may foreclose at-reactor storage options, the proposed action is in effect significantly foreclosing other options. Cross examination revealed that NRDC witnesses were not DOE employees and do not make DOE policy. (Tr. 2249, 2287). Furthermore, DOE policy statements speak for themselves. In this regard, the Board takes cognizance of the numerous DOE documents that have been referenced in the record (e.g., Applicant Exhibits 5, 18 and 19). Specifically the Board notes that Applicant Exhibit 18, a recent letter from a key DOE official, explicitly states a policy contrary to that stated by NRDC witnesses. There, Mr. Worth Bateman, Acting Principal Deputy Assistant Secretary for Energy Technology, DOE, states:

> To the extent that utilities can ship spent fuel within their own systems or among utility systems, the need for AFR storage diminishes markedly. (Applicant's Exhibit 18 at p.1).

Mr. Bateman's testimony at this hearing does not alter the above-stated DOE position. (Tr. 4516). In sum, the Board finds that the action proposed here does not influence DOE policy so as to significantly foreclose other spent fuel storage options.

26. Drs. Cochran and Tamplin, referencing the Interagency Review Group (IRG) report (Applicant Exhibit 5), maintained that the United States does not have a definitive strategy for nuclear waste management and that the earliest date for a final waste repository is in the 1988-95 timeframe. They speculate that in the near future (i.e., pre-1988-95), Applicant will have utilized its entire system spent fuel storage capacity and thus, in view of the assumed lack of availibility of ultimate government storage at that time, Applicant will have to resort to construction of an independent spent fuel storage facility (ISFSI). Such being the case, NRDC argues that construction of an ISFSI should be currently pursued rather than transshipment. (NRDC Exhibits 14A, 15 and 17A). The Board notes that this testimony is relevant not only to the issues presented by NRDC Contention 1, but also to those presented in NRDC Contention 3 relating to alternative analysis. However, for convenience such testimony will be discussed here. The conclusion reached by NRDC, that Applicant cannot accommodate storage of spent fuel within its system without eventual construction of an ISFSI, is contrary to the testimony of both Staff and Applicant. The NRC Staff testified that with spent fuel storage options now available to Applicant (e.g.,

transshipment and poison reracking), Applicant can handle storage of all spent fuel generated in its system through 2007, the date when the Oconee license expires, without construction of an ISFSI. (Tr. 3064-66, Staff Exhibit 22). Further, new technology now emerging (e.g., pin compaction 16/ and dry storage), and potential use of government away-from-reactor storage bolsters Applicant's position that an ISFSI may be unnecessary. (Tr. 2699-700 , 2702-6, 2771 and 2832). Applicant has been closely following such new technology. (Applicant Exhibit 3 at p. 8; Tr. 857 and 1155-6). In sum, the Board finds that the current alternatives available to Applicant, used in combination with options that may in the near term become available, indeed could provide for adequate storage space for the lifetime spent fuel generated by all of Applicant's nuclear facilities without construction of an ISFSI. As such, the Board finds no merit to NRDC's contention that Applicant will ultimately be forced to construct an ISFSI to accommodate spent fuel within its system. (See also paragraph 41, infra.)

27. In addition to NRDC's direct testimony, NRDC conducted extensive cross-examination of Applicant and Staff witnesses. Primary attention was focused on establishing the existence of a proposed transportation

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16/ See note 25, infra.

program involving all of Applicant's proposed and operating nuclear facilities (cascade program) to show that the scope of this proceeding should be broadened to include the entire "cascade program" and alternatives thereto. The Board heard testimony on whether such a program existed. On the basis of the evidence adduced, the Board ruled that it would permit evidence to be presented in this regard, including cross-examination. The evidence clearly shows that Applicant does not have a cascade program; rather, transshipment is only one of the alternatives available to Applicant. (Tr. 417-418, 424, 438, 443-4, 452-3, 475-7, 486-88, 565). In any event, as noted in paragraph 84, infra, even if Applicant was contemplating a transshipment plan (cascade plan) involving more than the 300 shipments proposed in the instant action, detailed consideration of such contemplated actions is not required in the instant proceeding, but will be the subject of any subsequent applications in this regard.

28. With respect to the issues of "independent value" and "foreclosure of options" raised by NRDC Contention 1, Applicant testified that the proposed action is not dependent upon the use of any other spent fuel storage option. (Tr. 1039). The proposed action will provide approximately 2 to 2-1/2 years of additional storage space for all Oconee units. (Tr. 415). Further, offsite

transshipment of spent fuel as proposed in the amendment request is a necessary prerequisite to implementation of other options that may be needed for future storage, such as installation of poison racks at the Oconee Unit 3 pool. (Tr. 3482, Applicant Exhibit 30 at p. 2-3 and Staff Exhibit 36 at p. 4-5). In addition, transshipment would lessen the need for double handling of spent fuel at Oconee and provide Applicant flexibility in its spent fuel management program. 17/ (Applicant Exhibit 30 at p. 3 and Staff Exhibit 36 at pp. 4-5). As to foreclosing options, Applicant stated that the proposed action will not foreclose any future options. 18/ (Tr. 418, 549). Indeed, Applicant has repeatedly testified that its goal is to maintain flexibility by assuring options are not foreclosed. (Tr. 424-5, 437-8, and 553). The Staff concurred in

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17/ For example, without transshipment Applicant would be forced to implement another spent fuel storage option prior to 1986. (Staff Exhibit 36 at Table entitled "Alternatives For The Storage Of Oconee Spent Fuel"). Excluding transshipment and the option it opens (i.e., reracking of Unit 3 pool with poison racks), the only other proven option that will assure adequate storage space for future Oconee fuel is use of an ISFSI. (Staff Exhibit 36 at pp. 4-5). In view of the long lead time necessary to implement the ISFSI option, denial of the instant application would force Applicant into the inflexible position of having to almost immediately commence construction of an ISFSI, an option that is not only unduly costly but also unnecessary. (See paragraph 26, supra, and 41, infra).

18/ Clear indications that spent fuel storage options have not been foreclosed are evidenced by Applicant's subsequent application for high density reracking and its stated intent to seek approval of poison reracking for its Oconee Units 1 and 2 pool. (Applicant Exhibit 30).

this analysis. (Tr. 2697, 2746-8, and 2770-71). The Staff testified with respect to independent utility that:

> The transfer of 300 assemblies as proposed in this licensing action . . . requires no other action on the part of the applicant either prior to or subsequent to transfer of the Oconee spent fuel to storage at McGuire to ensure its utility, nor do other licensing applications need to be made to ensure such utility. This action would provide 2-1/3 years of continued operation of the plants, and subsequent continued electrical power generation. Thus this action stand (sic) alone, has an independent utility regardless of any other actions of this type that the applicant may or may not pursue to provide additional future alleviation of storage capacity shortfall. (Staff Exhibit 16A at p. 3).

The Staff testified with respect to foreclosure of options that:

> [T]he proposed action] does not involve commitment of resources such as men and materials, and use of space and environmental resources (air, aquatic, and terrestrial resources); expensive equipment modifications; or construction and operation of fixed based facilities to the great extent that the other suggested options would. Thus, the proposed action is unique in the physical sense in that it would commit little, if any, material resources to a commitment that cannot be reversed. The Oconee spent fuel can always be moved at a later time from the available McGuire space if such a decision requires it.
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> Accordingly, based on our consideration of these factors, the proposed transshipment action does not constitute a commitment of resources that would tend to significantly foreclose other actions to ameliorate Duke Power Company's spent fuel storage space shortage at the Oconee facility. (Staff Exhibit 16A at pp. 4-5).

29. On the basis of the above, the Board finds the proposed action does have independent utility and will not significantly foreclose other options. 19/ 20/

NRDC Contention 2 and CESG Contention 3

30. NRDC contends that the proposed action is a major federal action significantly affecting the quality of the human environment and cannot be acted upon until preparation of a final environmental impact statement.

31. CESG contends that factors set forth in CESG Contentions 1 and 2 require the preparation of an Environmental Impact Statement because the proposed action is a major federal action of the Commission significantly affecting the quality of the human environment.

32. The NRC Staff, consistent with applicable provisions of 10 CFR Part 51, prepared an Environmental Impact Appraisal (EIA). Therein the NRC Staff stated:

> Based on staff reviews, it was determined that an environmental impact statement need not be prepared for the proposed action. In accordance with 10 CFR Part 51, a negative declaration and an environmental impact appraisal were prepared. [EIA at p. iv]

19/ As to NRDC's contention that it is the Commission's position that actions such as that proposed here must be delayed pending completion of various generic impact statements, the Board notes that subsequent to the aforementioned Commission statement, many such actions have been approved and implemented. See note 2, supra.

20/ The Board notes that the Staff has presented testimony with respect to the remaining three factors presented in the Commission statement of September 16, 1975 (40 Fed. Reg. at 42802). (EIA at pp. 63-64). This testimony is bolstered by evidence which demonstrates that the requested amendment application is both warranted and necessary. (See paragraph 28, supra). The Board, upon weighing and balancing the five factors, concludes that the proposed action should be permitted.

Continuing the NRC Staff found that:

> To determine the significance [of the proposed action], the environmental, economic, technical, and other benefits were weighed against environmental costs and available alternatives with respect to environmental issues. The staff has determined that the impacts will not significantly affect the quality of the human environment. [EIA at p. v]. 21/

33. In addition to the EIA, testimony of Staff's witnesses (i.e., Staff Exhibits 6, 9, 10A, 13, 19A, 19D and 36) and Applicant's witnesses (i.e., Applicant's Exhibits 8, 9, 11, 12, 15, 22, 24, 25 and 32) clearly demonstrates that the environmental impacts are negligibly small, and, therefore, insignificant.

34. Section 102(2)(C) of the National Environmental Policy Act (NEPA) 42 U.S.C. §4332(2)(C), provides that:

> "...all agencies of the Federal Government shall...(C) include in every recommendation or report on proposals for legislation and other major federal action significantly affecting the quality of the human environment, a detailed statement by the responsible official on...the environmental impact of the proposed action...."

NEPA does not require an environmental impact statement every time a federal agency takes any action; rather, before such a statement is required, the proposed action must be "major" and its effect on

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21/ Although the EIA was developed considering only the primary route, the NRC Staff has testified that upon consideration of the other routes in question, the Staff's conclusions as expressed in the EIA are applicable to all the routes under consideration. (Staff Exhibit 37 at p. 2).

the human environment must be "significant." 22/ See Portland General Electric Company, et al. (Trojan Nuclear Plant), ALAB-531, 9 NRC 263, 266-267; see also Northern States Power Company (Prairie Island Nuclear Generating Plant, Units 1 and 2), LBP-77-51, 6 NRC 265, 267-68 (1977) and Vesmont Yankee Nuclear Power Corporation (Vermont Yankee Nuclear Power Station), LBP-77-54, 6 NRC 436, 445 (1977).

35. On the evidence before us, we do not believe that the action proposed can reasonably be said to be one "significantly affecting the quality of the human environment." We, therefore, conclude that no environmental impact statement is required in this case and affirm the Staff in its determination to make a negative declaration to that effect.

NRDC Contention 3

36. NRDC alleges that the following alternatives to the proposed action have not been adequately considered:

    a. The alternative of using Oconee as a last-on, first-off, base-loaded plant to reduce spent fuel discharge requirements is not considered.

    b. The alleged economic cost of increased purchases of power if Oconee is shut down is speculative because there is insufficient information to justify the conclusion.

22/ 10 CFR 51.5(b) and (c)(2) authorize the issuance of a negative declaration and an environmental impact appraisal in circumstances where the NRC Staff has determined that the proposed licensing action would not have a significant effect on the quality of the human environment.

c. There are no technological or economic disadvantages to expanding spent fuel pool capacity at Oconee if it is assumed that all Oconee spent fuel will be stored there until it is shipped to a legally approved permanent storage facility for nuclear wastes. This option will reduce the risks of routine, accidental and intentional (sabotage) releases of radioactivity during transportation. 23/

d. Applicant has not fully utilized all of the potential it has to compact spent fuel in existing pools at Oconee and has not provided adequate justification for the assertion that storage expansion at Oconee Units 1 and 2 is not viable.

37. The Board notes the Appeal Board's holding in Trojan, supra, wherein it affirmed the Licensing Board's decision to refrain from considering alternatives. The Trojan Licensing Board reasoned:

> It is not necessary, however, to choose among alternatives or to predict needs on the basis of the present evidence. In our findings, supra, we have determined that the adverse environmental impacts of this license amendment will be negligibly small. Clearly, if the adverse impacts of the proposed action are negligible, the impacts of any alternative must be equal or greater, and it has been held that "an alternative which would result in similar or greater harm need not be discussed". (Sierra Club v. Morton, 510 F.2d 813, 825 (5th Cir. 1975)). As to the question of need for power, as we view it, that question can only be considered against the background of a cost-benefit balance, and absent any substantial environmental costs, any benefit whatever would tip the scale. We therefore believe that we need not consider alternatives or the need for modification in any detail. Indeed, in the opinion of this Board, not only is such consideration unnecessary, it is very inadvisable, since it infringes upon those very prerogatives

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23/ The consequences of accidental releases of radioactivity are addressed in paragraph 76, infra. With respect to intentional sabotage, see paragraph 66, infra.

> and duties of corporate management which we should eschew usurping. To be sure, were there substantial adverse environmental impacts, our duties under NEPA would require us to balance them against benefits and examine less damaging alternatives. But where, as here, the proposed action has no such impacts, we can leave considerations such as economic advantage, capacity requirements, and the vigor with which offsite storage should be pursued to those within the company to whom such decisions are normally entrusted. Portland General Electric Company (Trojan Nuclear Plant), LBP-78-32, 8 NRC 413, 454 (1978).

In passing upon this reasoning, the Appeal Board stated:

> As we read it, the NEPA mandate that alternatives to the proposed licensing action be explored and evaluated does not come into play in such circumstances--in short, there is no obligation to search out possible alternatives to a course which itself will not either harm the environment or bring into serious question the manner in which this country's resources are being expended.

In light of the above, and in light of the evidence in this case, we are of the view that the environmental impacts of the proposed action will be negligibly small, and, thus, it is unnecessary to examine alternatives. However, since such examination has been conducted by Applicant and Staff, we will issue findings on the matter.

38. NRDC did not present direct testimony on this contention; rather its case is built upon cross-examination of Applicant and Staff witnesses who did present direct testimony. (Applicant Exhibits 3, 6 and 13; and Staff Exhibits 13, 17B and 19B).

39. With regard to use of Oconee as a last-on, first-off plant, Applicant's witness D. H. Sterrett stated that:

> The Oconee units are not designed for cyclic operation, and are constrained by operating limits. In addition to shortening the life of the turbine rotors because of the transient thermal conditions encountered with cyclic operation, the build-up of Xenon in the reactor core under these operating conditions has been well documented. A return to full load while the Xenon level is high cannot be accomplished. From an operating standpoint, the physical constraints on the Oconee units are such that the units could not follow the system load, should such an attempt be made. (Applicant's Exhibit 13 at p. 2)

In addition, Mr. Sterrett testified that:

> [O]peration in a cyclical manner would be very costly in terms of system production expense. Operating the Oconee units in base yields the lowest total system production cost under economic dispatch, and operation in any other mode requires more energy to be produced from units burning coal, at a considerably higher fuel cost. (Applicant's Exhibit 13 at pp. 2 and 3).

NRC Staff witness Darrell A. Nash presented similar testimony. (Staff Exhibit 17B at pp. 1-3).

40. With regard to cost of purchased power, Applicant's witness D. H. Sterrett stated that:

> The shutdown of Oconee becomes expensive in terms of replacement power in two ways. The energy not produced by Oconee would have to be replaced insofar as possible by energy produced from other generating units on the Duke system, which burn either coal or oil; and, that energy which could not be provided from within the Duke system, would have to be purchased from sources external to the Duke system.
>
> The cost to produce the energy on the Duke system can be determined with a considerable

degree of certainty. The average variable O&M [operating and maintenance] and fuel costs for Duke's base-load units have been calculated to be the following in 1979:

Unit(s)	Cost in $/Mwh Variable O&M	1979 Average Fuel
Belews Ck. 1 & 2	.192	12.80
Marshall 1 & 2	.366	16.55
Marshall 3 & 4	.431	16.28
Allen 5	1.082	13.66
Oconee 1, 2, & 3	.525	4.44

The cost to purchase energy is speculative in the sense that Duke has no contract at present by which such energy could be purchased. However, based on experience with short term power purchases which have been made in the past, a reasonable estimate of the cost of purchased power can be made.

The probable cost of firm capacity would be between $3.25 and $3.75 per kW-month plus the cost of energy which would be no less than 20 mills per kWh. Based on an average value of $3.50 per kW-month, the cost of a one-year contract to replace the Oconee capacity would be $108,360,000. Assuming a minimum energy cost equal to that of the Duke system fossil-fuel units, the total cost of purchased energy would be $257,514,000. The total cost of purchased power to replace Oconee for one year, therefore, would be $365,874,000.

Actually, in the light of the current status of units which have been removed from service for environmental or other regulatory reasons, and in view of the delayed start-up dates of units on neighboring systems, there is no assurance that firm power could be contracted for at any price.
(Applicant Exhibit 13 at pp. 3 and 4).

Again, the NRC Staff witness Darrell A. Nash presented similar testimony. (Staff Exhibit 17B at p. 3).

41. With regard to consideration of alternatives of expanding spent fuel pool capacity at Oconee, the Board notes that current technologically viable alternatives for

such expansion include use of high density and poison racks (discussed in paragraph 42, infra) as well as construction of an independent spent fuel storage facility (ISFSI). Applicant witnesses Bostian and Hager testified as to Applicant consideration of the independent spent fuel storage facility (ISFSI) alternatives. (Applicant's Exhibits 3 at pp. 8-9 and 6 at pp. 4-5). The testimony reflected that Applicant has been considering the ISFSI concept since 1975 but the $55-$61 million cost of such a facility has prevented it from becoming a viable option. (Applicant Exhibits 1 and 23B). In this regard, Applicant testified that due to the time required to bring an ISFSI on line, 45-60 months, installation of poison racks at existing Oconee spent fuel pools would be necessary prior to completion of an ISFSI in order to maintain a full core reserve capacity at the Oconee site. (Tr. 531 and 564-65; see also Applicant Exhibit 6 at pp. 3-4). Thus,the cost of implementing the ISFSI concept would also include the cost of installation of poison racks. Cross-examination of Applicant focused upon, inter alia, a Stone & Webster proposed ISFSI design (NRDC Exhibit 10) wherein a lower cost and shorter completion time was stated. However, Applicant witnesses demonstrated the flaws in relying on such figures. (Tr. 1122-26, 1152, 1168-76, 1225-29, 1233). Applicant also testified that since no facility built specifically for this

purpose has been developed in the United States, there is scarce experience to draw on. (Applicant Exhibit 3 at p. 9). The NRC Staff presented similar testimony. (NRC Staff Exhibits 13, 19B and 27A; Tr. 2859-62; EIA at pp. 52-3). The NRC Staff concluded that construction of an ISFSI was not cost effective. (NRC Staff's Exhibit 13 and 19B; see also Tr. 2699-2706). The Staff also was of the view that use of an ISFSI would significantly foreclose other options due to the extremely large monetary commitment of such option. (Tr. 2746-47, 2834, and 3183-4). In addition, the NRC Staff testified that emerging options such as pin compaction and dry storage may provide lifetime storage of spent fuel assemblies from all of Applicant's nuclear facilities without use of an ISFSI. (Tr. 2772-78).

42. With regard to compacting spent fuel in existing pools at Oconee, both Applicant and NRC Staff addressed the matter. (Applicant Exhibits 3 and 6, and Staff Exhibits 13 and 19B). Applicant testified that it has examined a number of ways to increase the storage capacity at its spent fuel pools, including use of high density and poison racks and use of pin compaction. (Applicant Exhibit 3 at pp. 8-9). These options have been found to be more costly than transshipment. (Tr. 1157-58; Applicant Exhibit 6 at p. 3; and Staff Exhibit 13). However, due to delays in the instant proceeding and to pursue all feasible alternatives to assure that

the Oconee Units have sufficient spent fuel storage space to permit continued operation, Applicant has, after appropriate amendment to its Oconee operating licenses, reracked the majority of the Oconee Units 1 and 2 spent fuel pool with high density racks, and made the decision to seek authorization to rerack the Oconee Units 1 and 2 pool with poison racks. 24/ (Applicant Exhibit 30 and Staff Exhibit 36 at pp. 4-5). In that the reracking of the Oconee Unit 3 pool with poison racks is not viable without off-site transshipment, a decision regarding such reracking must await, inter alia, the outcome of this instant proceeding. (Id.) As to other compaction options such as pin compaction, these are based on emerging technologies requiring solutions of outstanding problems (Tr. 1155-60). However, Applicant has not foreclosed any of these options. (Tr. 549-51). NRC Staff testimony recognized the options referenced by Applicant. (Tr. 2806-07 and Staff Exhibit 36 at pp. 4-5). The NRC Staff stated that pin compaction 25/ and dry storage were emerging technologies. (Tr. 2806-09).

24/ It has been argued that Applicant's decision to seek approval to install poison racks has rendered the instant amendment application moot. (Tr. 4759). To the contrary, Applicant testified that favorable licensing action is presently warranted for the four reasons set forth in paragraph 28, supra.

25/ The Board recognizes that an application for pin compaction has been filed by the Maine Yankee Atomic Power Company (44 Fed. Reg. 61273, Oct. 24, 1979) (Staff Exhibit 36 at p. 2). However, in that pin compaction has not yet been implemented at any plant, the Board still considers it an emerging technology. (Tr. 4001-2).

43. On the basis of the above, the Board concludes that if alternatives are to be considered at all, Applicant and NRC Staff's treatment thereof leads us to find that alternatives to the proposed action have been adequately considered and no obviously superior alternative exists.

NRDC Contention 4

44. NRDC alleges the proposed action increases the exposure to radiation of workers and the general public beyond what is ALARA.

    a. ALARA can be achieved by on-site expansion of spent fuel pool storage capacity at Oconee, including building another spent fuel pool.

    b. The residual health risks which remain even if the present NRC regulations on exposures to workers are met are major costs of the proposed action which tip the balance against the proposed action.

45. In support of this contention NRDC presented direct testimony (NRDC Exhibits 16 and 18) as well as cross-examination of the testimony of Applicant and Staff witnesses. (Applicant Exhibits 2, 12, and 15 and Staff Exhibits 3, 10A, 11A, 20 and 21). NRDC's testimony consisted of an examination of various documents to determine the adequacy of the NRC Staff and the Applicant's efforts to meet the "as low as reasonably achievable" (ALARA) requirements as it pertains to consideration of alternative means of providing adequate storage space for Oconee spent reactor fuel. (NRDC Exhibit 18). NRDC concluded that as a result of such review "there is nothing

approaching what would be required for a considered ALARA determination relative to spent fuel management alternatives...." (NRDC Exhibit 18 at p. 7).

46. The Board notes that the application of the "as low as reasonably achievable" (ALARA) standard is limited to the option selected and does not pertain to alternatives. The definition of ALARA is contained in 10 CFR §20.1(c) and quoted below:

> "(c) In accordance with recommendations of the Federal Radiation Council, approved by the President, persons engaged in activities under licenses issued by the Nuclear Regulatory Commission...should, in addition to complying with the requirements set forth in this part, make every reasonable effort to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas, as low as is reasonably achievable. The term 'as low as is reasonably achievable' means as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to the utilization of atomic energy in the public interest." (emphasis added).

To assure that any activity meets the ALARA criteria as imposed by 10 CFR §20.1(c), detailed analyses of that activity are required. Such analyses would require, inter alia, detailed designs, procedures, operational parameters and siting analyses. To require this type of in-depth analysis for each possible alternative is unwarrated. This, of course, does not mean that where a proposed action has a significant impact on the environment there is no requirement to evaluate the various

alternatives in light of their relative costs and impacts upon the environment. Indeed, such a requirement exists. However, this requirement stems from NEPA and not from the definition of ALARA. The Commission has imposed under NEPA the requirement that, under certain circumstances, a NEPA comparison of alternatives must be performed, consistent with a rule of reason. The rule of reason does not require a detailed ALARA type analysis for each alternative. 26/ It is only when the appropriate alternative is selected that ALARA comes into play. At that stage, as an additional measure of protection, the actions under the selected alternative must be analyzed in detail and appropriate licensing conditions imposed (i.e., "improvements") where needed, to assure that the ALARA criteria are met. As the Appeal Board in Northern States Power Co. (Prairie Island Nuclear Generating Plant, Unit 1 and 2) and Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station), ALAB-455, 7 NRC 41, (1978) 27/ stated:

26/ See Public Service Company of New Hampshire, et al. (Seabrook Station, Units 1 and 2), CLI-77-8, 5 NRC 503, 528-29 (1977); Boston Edison Comp[illegible] et al. (Pilgrim Nuclear Generating Station, Un[illegible], ALAB-479, 7 NRC 774, 791 (1978).

27/ In State of Minnesota v. NRC, 602 F. 2d. 412, (D.C. Cir. 1979), the Court upheld the Commission's issuance of licensing amendments but remanded the proceeding on other grounds.

> "It bears emphasis that the ALARA standard comes into play only after it has been determined that the applicant's proposal will comply with all other requirements imposed by Part 20...." 7 NRC at 56, note 13.

In other words, the ALARA standard only addresses the activity under question in any proceedings (e.g., in the instant proceeding this activty is shipment of Oconee fuel to McGuire) and not all alternatives under consideration. Both the Applicant and Staff subscribe to this position. (Tr. 1752-56, 2533-36, 2617-19, and 3017). On the basis of the above, the Board finds that there is no merit to NRDC's contention that ALARA requires a detailed analysis and comparison of all alternatives.

47. No issue has been raised that the proposed transportation activity itself is not ALARA relative to other transportation activities. The Board upon its review does not find otherwise. The Board notes that Applicant testified with respect to the ALARA requirement relating to implementation of sound health physics practices. (Applicant Exhibit 2 at 9-1). Further, Applicant explained the ALARA measures taken in

loading a spent fuel assembly in a cask. (Tr. 1718-19). Also, Applicant specifically set forth its basis for assuring that the transportation dose is ALARA. (Tr. 1715-18). With respect to the Staff's ALARA review of the proposed action, the Staff testified:

> While the NRC has not issued specific guidance related to ALARA considerations involved with fuel storage or transfer, we have issued Regulatory Guides 8.8, 'Information Relevant to Ensuring That Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As is Reasonably Achievable,' and 8.10, 'Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable.' These guides spell out our ALARA philosophy and describe the ALARA approach to reduction of exposures. These considerations have been applied in our review of the applicant's proposals regarding spent fuel transfer and storage at Oconee and McGuire. (Staff Exhibit 11A at p.6).

The Staff after reviewing the proposed action concluded:

> The applicant has taken appropriate action to assure that occupational radiation exposures will be as low as is reasonably achievable, including:
>
> * retention at Oconee of any fuel element known to be leaking;
>
> * storage of fuel for a minimum of 270 days at Oconee prior to shipment;
>
> * routine treatment of pool water at Oconee by operation of fuel pool purification equipment, to reduce concentrations of radioactive materials in the water being transshipped.
>
> The Staff concludes that occupational radiation exposures resulting from the proposed transshipment of Oconee spent fuel to McGuire will be ALARA. (Staff Exhibit 11A at p. 4. See also Staff Exhibit 11A at p. 5, and Tr. 2530-31).

Accordingly, the Board finds that the instant activity is ALARA.

48. Relative to alternatives, the Board is cognizant that Applicant and NRC Staff have evaluated alternatives with respect to dose commitments. The Board finds that it would be useful to set forth these evaluations and appropriate comments thereon. These findings are not made pursuant to ALARA requirements, for such are not applicable. Rather, these findings are set forth so as to provide a full and complete decisional basis of pertinent matters addressed. 28/

49. Applicant reviewed and estimated the doses associated with the proposed action and the alternatives thereto as follows:

Viable Alternatives	Total Dose (person-rem)	Dose Differences (person-rem)
1. Modification of Existing ONS Spent Fuel Pool, Unit 1 - 2 29/	84	35
2. Installation of Poison Racks, Units 1, 2 and 3 30/	107	58

28/ The Board notes that some confusion has arisen over the Staff's comparison of alternatives. At times Staff witness has stated that such was an ALARA comparison. However, as clarified by the witness, there are two levels of ALARA review, the first is the Part 20 concept of ALARA, the second is a NEPA-type comparison. (See Tr. 2982-83, 3017-18).

29/ As a result of actual experience in reracking the Oconee Units 1 and 2 pool, this estimate was found to be conservative. (Tr. 1717, 1764, 1760 and 4751).

30/ Based on actual experience with the installation of high density racks at Oconee, the estimates concerning installation of poison racks may be conservative. (Tr. 1765, 1760, 2539 and 4751).

Viable Alternatives	Total Dose (person-rem)	Dose Differences (person-rem)
3. Construction of Separate Fuel Storage Facility at Oconee	49	0
4. Construction of Separate Fuel Storage Facility away from Oconee but not at McGuire	72	23
5. Shipping/Storage at McGuire	65	16

(Applicant Exhibit 15 at p.3).

The Staff presented similar testimony. (Staff Exhibit 11A at Table entitled "Projected Occupational Doses Based On Duke Power Estimates.") 31/

50. With respect to the estimated doses from the various alternatives the Staff testified:

> The total man-rem doses projected to result from the...[viable alternatives] would be in the same general dose range over a period of years. Therefore, because of the inexact nature of the estimating process, there would be no basis for concluding that any of the [viable alternatives] is clearly to be preferred from the point of view of radiation risk, nor that any significant dose saving would be expected to result from the selection of any one of the [viable alternatives]. [Staff Exhibit 11A at p. 5].

51. The Staff stated that one cannot distinguish between the alternatives based on dose. On this basis, the

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31/ Staff stated that this table was not an ALARA comparison. (Tr. 2610).

Staff concluded that:

> If projected radiation doses from a number of options turn out to be in the same general range of values, the decision as to which alternative is to be selected is determined by factors other than radiation dose. What this means in this case is that none of the options discussed (for example, reracking or building a new spent fuel pool) will significantly reduce doses, relative to the transshipment option. (Staff Exhibit 20 at p. 5).

52. On the basis of the above, the Board finds that Applicant and Staff gave proper consideration to alternatives, relative to dose commitments, and that with respect to such dose commitments approval of the proposed amendment is proper.

53. With respect to the residual risk resulting from the proposed action, NRDC testified that "most radiation health physicists agree that it must be assumed that there is no safe level of radiation and even very small doses must be assumed to be harmful." (NRDC Exhibit 16). The Staff, however, explained that while this assumption is made for the purposes of conservatism in calculations, it is equally true that there may be no effects from the type of radiation of concern in this proceeding, i.e., low energy transfer radiation such as that released from spent fuel. (Tr. 2575-76).

54. With respect to the proposed action, Staff testified that even if doses were 100 times higher than estimated,

based on very conservative assumptions, there may not be any health effects resulting from the proposed action. (Tr. 2571-73). Staff's analysis of the residual risks associated with the various alternatives is contained in Staff Exhibit 10A wherein Staff concludes that the residual risk is very low. (Staff Exhibit 10A at p. 4).

55. Applicant's detailed analysis of the residual risk associated with the proposed action and alternatives thereto is contained in Applicant's Exhibit 12, wherein Applicant concludes:

> The overall health effects, i.e., the total expected risks of cancer and of genetic effects in the general population and in workers, occupationally exposed, from any of the options - reracking, poison racks, AFR on-site, AFR off-site, and transportation and storage at McGuire - are very small, both in terms of total risk and of risk to any individual. (Applicant Exhibit 12 at p. 13).

Applicant's witness testified that due to the conservative assumption used in his analysis a factor of 10 increase in the doses associated with the various alternatives would not affect his conclusions. (Tr. 1429-31, 413-16, 1446-47).

56. On the basis of the above, the Board finds that the residual risk associated with the proposed action are extremely small, and are acceptable. 32/

32/ The Board notes that alternate routes were considered by both the Applicant and Staff and use of such routes would not significantly affect their testimony (Staff Exhibit 37 and Applicant Exhibits 24, 25, and 32).

NRDC Contention 5

57. NRDC alleges that Applicant overstates the need for action at this time by using the one-core discharge capacity reserve standard as if it were a requirement where in fact it is not a requirement of NRC regulations.

    a. Either Applicant should be bound to comply with the one-core discharge capacity standard or it should have to demonstrate on a cost/benefit basis that holding that capability is more valuable than the costs of shipment off-site of one core of spent fuel.

58. NRDC did not present direct testimony in support of this contention; rather, its case is premised upon cross-examination.

59. Applicant and the NRC Staff addressed the matter of maintenance of a full core reserve (FCR) capability (Applicant Exhibits 3 and 13 and Staff Exhibit 18A).

60. Applicant testified that during a three-year period beginning in 1974 all Oconee units made at least one full core discharge. Applicant explained:

> Oconee 2 required defueling from February 20, 1974 to April 5, 1974 to remove loose parts. All three Oconee units required full core discharge in 1976 for removal of specimen holder tubes. Oconee 1 was down from April 18 to May 31 for its work, Oconee 2 was down from April 7 to July 12, and Oconee 3 was down from September 18 to November 11.
>
> Fortunately, in each of these four (4) defuelings full core storage space was available, thus there was no added cost incurred because of the lack of FCR. In each of these four defuelings there would not have been a hazard to the public health and safety had the FCR not been available. Had the FCR not been available, the fuel would have remained in the core with the unit out of service until the

> FCR was restored in the pool or sufficient storage space secured elsewhere. Thus, in these four defuelings the question of FCR or lack thereof is simply one of cost, not reactor safety. (Applicant Exhibit 3 at p. 12).

With respect to potential costs resulting from loss of a FCR, Applicant testified that:

> From a cost standpoint it becomes one of replacement power cost - what does it cost to generate the power lost from having an Oconee unit idle because of the lack of FCR. This added production cost will depend upon where the replacement power is generated or purchased.
>
> As another general rule, an additional 8000 tons of coal will be burned each day an Oconee unit is idle - that is if there is sufficient coal-fired capacity in reserve. If not and purchase power is unavailable, it is then necessary to operate oil-fired combustion turbines. Duke's twenty-four combustion turbines consume 930,000 gallons of No. 2 fuel oil per day when operated at full load. (Applicant Exhibit 3 at pp. 12-13).

Further, Applicant testified that the minimum cost of not operating an Oconee unit is $165,000 per day. (Applicant Exhibit 13 at pp. 4-5, Tr. 1677-8).

61. Under cross-examination Applicant testified that while it was preferable to maintain a FCR discharge capacity for each unit or for each of the Oconee pools (TR. 753, 756, 757, 761, 774), Applicant's current plan is to maintain at least one FCR discharge at each site. (Tr. 1036). Further, Applicant stated that the $165,000 per day cost associated with not operating an Oconee Unit would be realized when it was necessary to discharge fuel and a FCR was unavailable. (Tr. 1685).

62. With respect to the Commission's position, the Staff testified that:

> The Commission does not require a full-core reserve capability at a reactor site. It recognizes the prudent benefits of having storage capability such as a full-core reserve, and would encourage the licensee to have it. (Tr. 2676-7, See also Staff Exhibit 18A at pp. 1-2).

Further, the Staff testified that the NRC had previously considered and rejected the addition of a regulation requiring a FCR. (Staff Exhibit 18A at p. 3). The Staff explained that:

> None of the postulated situations presented any compelling safety basis for requiring maintenance of a full-core reserve; however, lack of such capability can be costly in terms of extended outage time. The benefits from prudent design, in availability of the facility and reduction of man-rem exposures for inspections and repairs, are self evident. Therefore, the licensing staff points out these benefits to applicants and licensees, but has not established a basis for imposing a requirement to maintain full core reserve fuel storage capability (Staff Exhibit 18A at p. 4).

63. On cross-examination Staff testified that the benefits relating to man-rem exposure that may be achieved by retention of a FCR capability would occur in a situation where activities needed to be conducted around the core (reactor vessel) and exposure reduction could be achieved by removal of the core from the vessel. (Tr. 3737). Staff thus reasoned that retention of a FCR capability may promote the ALARA concept. (Tr. 3737).

64. On the basis of the above, the Board finds that it would be prudent for Applicant to maintain a full-core reserve capacity for each of the three Oconee units. The Board recognizes that events may transpire that will render this objective impractical. In such circumstances, the Board refrains from imposing a requirement that a full-core reserve capability be maintained, rather this decision is left to Applicant's management.

NRDC CONTENTION 6

65. NRDC alleges that Applicant has failed to demonstrate that it is in compliance with applicable Commission regulations with regard to safeguarding spent fuel shipments. (Tr. 343).

66. The Board notes that NRDC's concern in raising this issue relates to the size of the security force Applicant will use in transporting the spent fuel through highly populated areas. (Tr. 344). Significantly, the contention was raised in response to proposed interim Commission regulations which required use of a security force of undefined size when shipping spent fuel through such areas. (10 CFR §73.37(d). See 44 Fed. Reg. 34466, June 15, 1979). (Tr. 343-4). The Board takes official notice of subsequent Commission action of April 23, 1980, concerning approval of amendments to the interim regulations which specifically sets forth the required size and type of security force needed in such cases. (Pending

regulations, 10 CFR §73.37(c)(1)). (Tr. 4736). In this regard, Applicant has committed to comply with the appropriate regulations. (Tr. 347, 4725-6, 4738, and 5106-9). Apparently, in light of these facts, NRDC has chosen not to pursue the matter, and accordingly, the contention must be viewed as withdrawn. In any event, there being no evidence to the contrary, this Board finds that as a condition of its license, Applicant is required to, and will, comply with the appropriate Commission regulations regarding safeguarding of spent nuclear fuel in transit.

CESG CONTENTION 1

67. CESG alleges that shipment of Oconee spent fuel to McGuire for storage is unacceptable as compared to other alternatives:

    a. Modification of the existing Oconee spent fuel pools to provide additional storage capacity;

    b. Construction of a new and separate spent fuel storage facility at the Oconee site;

    c. Construction of a new and separate spent fuel storage facility away from the Oconee site, but other than McGuire. 33/

68. As the Board noted in paragraph 37, supra, the environmental effects of the proposed action are negligible, and, as such, consideration of alternatives thereto is not required. However, since such examination has been conducted by Applicant and Staff, we will issue findings on the matter.

33/ CESG Contention 1c was withdrawn during the course of the hearing. (Tr. 2388).

69. CESG did not present any direct testimony in support of this contention, rather its case consists of cross-examination of Applicant and Staff witnesses.

70. Applicant's testimony regarding dose commitments of the various alternatives advanced by CESG is set forth supra, under the discussion of NRDC Contention 4. Economic and scheduling data pertinent to the alternatives raised by CESG was addressed by Applicant as follows:

a. Modification of existing Oconee spent fuel pools:

In that physical modification to the size of the existing pool is technologically not feasible (Tr. 3301-2 and 3318-9), the options currently available to be considered under this contention include installation of high-density racks and installation of poison racks. In 1976 the Oconee Unit 3 pool was expanded by installation of high-density racks (Applicant Exhibit 6 at p. 3). Applicant has essentially completed installation of high density racks at the Oconee Units 1 and 2 pool at a cost of approximately $2.6 million. 34/ (Applicant Exhibit 30 at p. 1).

34/ Due to the possibility of further reracking the Oconee Units 1 and 2 pools with poison racks, Applicant has decided not to install the three remaining high density modules at this time. (Applicant Exhibit 30 at p. 1).

Applicant has decided to seek approval of a licensing amendment to install poison racks at its Oconee Units 1 and 2 pool at an estimated installed cost of $2.6 - $3.0 million. (Id. at p. 2). The poison reracking of the Oconee Units 1 and 2 pool, if approved, will provide an additional 562 storage locations for a total of 1312 spaces. (Id.) Due to technical problems associated with removal of current racks in the Unit 3 pool (Tr. 3481 and 3483), the Unit 3 pool cannot be reracked with poison racks without offsite shipments of spent fuel. (Tr. 3481-2). Thus, Applicant's decision to seek approval to rerack with poison racks its Unit 3 pool providing an additional 367 storage locations for a total of 841 spaces at a cost of approximately $1.8 - $2.0 million is dependent upon and must await the decision in this proceeding. (Applicant Exhibit 30 at p. 2).

b. Construction of a separate storage facility at Oconee:

Construction of such a facility would require a total time of 45-60 months. (Applicant's Exhibit 6 at p. 4). Due to the long lead time required, such a facility would not be available when needed unless another storage option was first implemented. (Tr. 522-3). The cost of such a facility with a capacity of 1500 assemblies is estimated to be

$55,824,000 or $37,200 per fuel assembly. (Applicant's Exhibit 1) (See also, paragraph 41, supra).

c. Construction of a separate storage facility away from Oconee but not at McGuire:

Such a facility would be comparable to the one discussed in paragraph 70b above. However, the cost and lead time would be greater due to needed additional investigation and site related work. (Applicant Exhibit 6 at p. 5). Further, such a facility would more adversely affect the environment and require transshipment of fuel substantially in excess of that being considered in the subject licensing amendment. (Applicant Exhibit 6 at p. 5).

71. Applicant also made reference to other alternatives, such as pin compaction (Tr. 409-10, 424-25, 834-36) and horizontal storage. (Tr. 1012). Applicant expressed the view that such options were not state-of-the-art. Additional Applicant testimony related to alternatives is noted supra, in paragraphs 41 and 42.

72. The Staff presented similar testimony (Staff Exhibits 13, 19C, 26B, 27A and 36). In conclusion, the Staff stated:

> In summary, for the foregoing reasons, we have determined that the proposal to transship is an environmentally sound option, with negligibly small, and, therefore insignificant impacts. In general, the use of neutron absorbing (poison) racks is an accepted practice. However, in this case it may not be the optimum alternative. Additionally, the construction of a new facility either on or away from the Oconee site has been shown, like poison racks, to not be cost-effective. Although we find these alternatives technologically feasible, they are not preferred alternatives when compared to the proposed action to transship and store Oconee spent fuel at McGuire. (Staff Exhibit 19C at pp. 2-7; See also Staff Exhibit 13).

Additional Staff testimony related to alternatives noted is contained in paragraphs 41 and 42, supra. 35/

73. In light of the above, the Board finds that there is no obviously superior alternative to the transportation activity under review.

CESG CONTENTION 2

74. CESG alleges that transportation of spent nuclear fuel from the Oconee Nuclear Station for storage at the McGuire Nuclear Station will create an unacceptable hazard by significantly increasing the radiation doses to persons in the region near the proposed transportation routes between the two facilities. Specifically:

    a. There will be an unacceptable incremental burden of radiation dose to persons living in the vicinity of the transportation routes.

    b. There will be an unacceptable incremental burden of radiation dose to persons traveling over the transportation routes concurrently with spent fuel shipment.

35/ The Board notes that alternate routes were considered by both the Applicant and Staff and use of such routes would not significantly affect their testimony. (Staff Exhibit 37 and Applicant Exhibit 24, 25 and 32).

c. There is likely to be an unacceptable incremental burden of radiation dose to persons in the vicinity due to an accident or delay in transit.

With respect to case three of the cask drop analysis of Applicant's FSAR, 9.1.2.3.2, submitted involving a postulated cask drop accident at the spent fuel pool, the Applicant's analysis and Staff's review are inadequate. Case three involves tipping or dropping and tipping the cask, located above the floor or in contact with the floor level of the pit wall opposite the fuel pool side. 36/

75. In support of its contention CESG presented the testimony of Jesse L. Riley (CESG Exhibit 5, 13 and 16). With respect to Contention 2a, b and c, Mr. Riley's testimony alleged that many private buildings are nearer to the primary route than the 30 meters assumed in the EIA to be the distance of the "maximum individual" (CESG Exhibit 5 at p. 8); that forty students in a school bus stopped in a traffic jam alongside a shipment of spent fuel for three hours would receive a total exposure of 3 man-rem (CESG Exhibit 5 at p. 9); and that passengers in a car "tail-gating" a truck carrying spent fuel for four hours would receive a dose of 36 mrem. (CESG Exhibit 5 at p. 9). Upon voir dire examination, Mr. Riley acknowledged that he was not a licensed physician, health physicist or licensed surveyor. (Tr. 2410-11). Under cross-examination it

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36/ During the course of the hearings, Contention 2 was amended to include this quoted cask tipping contention (Tr. 4181).

was demonstrated that CESG's calculation of dose resulting from a school bus stopped alongside a spent fuel cask was unrealistic and failed to take into account numerous factors. (Tr. 2430-33, 2440-42). Mr. Riley also acknowledged that the doses calculated by CESG relating to a hypothetical tailgater was overstated by a factor of 4. (Tr. 2434-36). In addition, the Staff stated that the 30 m figure was determined to be valid by observation of the buildings along the route. (Tr. 1540-41).

76. Applicant's witness, Mr. L. Lewis, testified that the average individual living along the primary route proposed by Applicant might receive a dose of 0.003 mrem from 400 shipments of spent fuel. 37/ This dose is approximately 1/42,000 of the average annual dose from natural background radiation. (Applicant Exhibit 15 at p. 4). The maximum individual under the same conditions might receive a dose of 0.01 mrem or 1/10,000 of the average annual dose from natural background radiation. (Applicant Exhibit 15 at p. 4). Further, Mr. Lewis testified that the maximum dose an individual might receive from "tailgating" a shipment for 10 hours is 0.4 mrem. (Applicant Exhibit 15 at p. 4). In addition, the maximum dose a member of the public

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37/ The Board notes that consideration of shipment of 400 assemblies for calculational purposes instead of the 300 assemblies proposed in the instant application request provides more conservative conclusions.

might receive due to a delay in traffic or an accident involving the cask in which the individual was in the proximity of the cask for 10 hours is 30 mrem. (Applicant Exhibit 15 at p. 4). Mr. Lewis also testified that the other routes proposed by Applicant would result in doses not substantially different than that calculated for the primary route. (Applicant Exhibit 32). Applicant's witness, Dr. Garrick, testified that the probability of an accident on any of the routes involving a spent fuel shipment resulting in exposure to a member of the public above normal background radiation is extremely small. (Applicant Exhibits 9 and 25). Further, Applicant and Staff testified that even in the event of a very serious accident, the casks are designed and constructed to greatly minimize the probability of a significant release of radioactive material. (Applicant Exhibits 8 and 10; and Staff Exhibits 3 at pp. 16-17 and 33-37, 9 at pp. 2-12, and 28 at pp. 4-1 - 4-2). From the above, Applicant's witness, Dr. Hamilton, concluded that the radiological risks to the public from normal transportation, delays in transit or accidents along any of the routes are extremely small. (Applicant Exhibits 12 and 24).

Further, Dr. Hamilton testified that due to the conservatism factored into the calculations and the type of radiation involved, the risks were very minute and for all practical purposes, zero. (Tr. 1413-1416 and 1446-1447). Dr. Hamilton also testified that an increase in dose by a factor of 10 would not affect his conclusions. (Tr. 1429-1431). The Staff also presented similar testimony. (Staff Exhibits 6, 9, 10A, 21 and 37; EIA at pp. 30-43).

77. With respect to CESG's amendment to Contention 2 addressing the case 3 cask tipping analysis, CESG presented the testimony of Mr. Riley (CESG Exhibit 13) which, based on preliminary calculations, questioned whether a cask could tip so as to fall into the spent fuel pool. Further, Mr. Riley's testimony questioned whether administrative controls were adequate to prevent such a possible tipping incident. Cross-examination revealed extensive inaccuracies and erroneous calculations involving Mr. Riley's testimony. (Tr. 4474, 4486-7, 4488, 4489, 4490, 4492, 4493-5). Further, cross-examination revealed that the methodology used in calculations in Mr. Riley's testimony was incomplete. (Tr. 4475-77). In addition, over Applicant's objection, Mr. Riley presented supplemental testimony concerning the results of a test involving an "accurate model of the cask, cask pit, and

pit/pool wall." (CESG Exhibit 15 at p. 1). Mr. Riley testified that when the model cask was tipped toward the model spent fuel pool wall, the model cask would tumble into the spent fuel pool. (Id.) Cross-examination, however, revealed that there were significant differences between the models and the actual cask and walls such as to call the results of the entire test into question. (Tr. 4877-4884). Applicant, on the basis of an in-depth analysis, testified that in a case 3 tipping incident the spent fuel cask would not fall into the spent fuel pool. (Applicant Exhibit 28; Tr. 4339-41 and 434). In any event, Applicant testified that the administrative controls implemented by Applicant were such that it is highly unlikely that the cask would ever be in a position that a cask tipping incident would occur (Tr. 4332-3). The NRC Staff testified that:

> Additionally, the applicant has proposed, and the staff has accepted, administrative control procedures restricting the traveling path of the cask to insure that the cask will not fall into the spent fuel pool. These procedures will be incorporated into the applicant's operating procedures, and will be validated by NRC Inspection and Enforcement (I&E) personnel. We conclude that with the proposed administrative procedures established, the cask will not fall into the spent fuel pool when it breaks free during the postulated cask drop accidents. (NRC Staff Exhibit 33 at p. 2).

78. During the hearing, the Board raised as a concern the consequences of the hypothetical cask drop incident.

(Tr. 4439-47). Subsequently, by Order of October 31, 1979, the Board requested that all parties provide numerical analyses of the consequences of an assumed incident involving a cask dropped into the McGuire spent fuel pool with respect to (1) the effects of the resulting radioactive releases on the general public and plant operating personnel, and (2) the potential for achieving criticality in the pool. Both Applicant and Staff provided testimony in this regard. (Applicant Exhibit 33 and Staff Exhibits 40, 41, 42, 43 and 44).

79. The Staff testified that the resulting off-site doses of such a hypothetical incident would be well below the 10 CFR Part 100 off-site exposure guidelines. (Staff Exhibit 42 at p. 6). Applicant presented similar evidence. 38/ (Applicant Exhibit 33 at p. 4). The Staff also testified that occupational doses associated with such a hypothetical incident would be well within the guidelines set forth in 10 CFR Part 100 regarding accidents. (Staff Exhibits 43 at pp. 4-5, and 44 at p. 5). Applicant presented similar testimony. (Applicant Exhibit 33 at p. 4, and Tr. 5070-71).

38/ When Applicant developed this testimony, Applicant assumed that transfer of Oconee spent fuel to McGuire would be completed between the time of initial loading of McGuire fuel into the McGuire reactor and removal of the first batch of McGuire spent fuel from the reactor. (Tr.5098). Thus, in Applicant's analysis, it did not consider McGuire fuel as being in the pool. (Tr. 5067 and 5069-70).

80. With regard to criticality, Staff witneses testified that such a hypothetical cask drop incident on Oconee or McGuire spent fuel would result in a k effective of approximately 0.92, well below the value of 1.0 necessary to achieve criticality. (Staff Exhibit 40 at Figure 1, and Tr. 4978). Applicant presented similar testimony with regard to Oconee spent fuel (e.g., k effective is approximately 0.95). (Applicant Exhibit 33 at pp. 5-6). 39/ With respect to McGuire fresh fuel, Staff testified that without taking into account realistic conditions the k effective associated with a cask drop on such fuel would be 1.06. (Staff Exhibit 40 at Figure 2). However, taking into account the actual situation at the McGuire spent fuel pool (e.g., separation between fuel assemblies, actual enrichment percent of fresh fuel, angle iron separating assemblies, and burnable poisons) and considering a 2% factor for uncertaintities, calculations would result in a k effective of 0.98. (Tr. 4943-4945). To put such criticality figures in perspective, Staff testified that a reactor completely shut down has a k effective of approximately

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0.94-0.95. (Tr. 4984). A k effective of 0.98 is considered a safe value in that each succeeding generation of neutrons would result in a smaller and smaller value of k effective. (Tr. 4946-4947). Further, the Staff testified that in the event of such an incident, in all probability, the fuel pins would be damaged and the latice structure of the assemblies would be disrupted which would result in a dramatic decrease in k effective. (Tr. 4988). Thus, the Staff concluded that even if a cask fell into the McGuire spent fuel pool impacting McGuire fresh fuel, it is highly unlikely (i.e., approximately 10 to the -7 or 10 to the -8) that criticality would be achieved. (Tr. 4987).

81. On cross-examination, Staff and Applicant testified that if the concentration of boron in the spent fuel pool, which was assumed in their calculations to be 2000 parts per million (ppm), decreased by 100 ppm this would result in an approximate increase in k effective of 1%. (Tr. 4973 and 5075). Hypothetically then, criticality could be achieved if there was a significant reduction in the boron concentration at the same time that the cask fell into the McGuire spent fuel pool perfectly compacting spent fuel contained therein. However, Applicant's witness testified that the boron concentration in the spent fuel pool is governed by station limits set at 2,000 ppm plus or minus 5 ppm. (Tr. 5082 and 5092). Further, surveillance requirements mandate that such

concentrations be checked twice a week. (Tr. 5082). Applicant's witness testified that, during the operation of the Oconee Units, the boron concentration in the spent fuel pools has never been out of specification. (Tr. 5081). The McGuire spent fuel pool is essentially the same as the Oconee spent fuel pool, and, thus, similar results should be expected. (Tr. 5082). Applicant's witness also testified that the only method of lowering the boron concentration would be to dilute the spent fuel pool water with unborated water. (Tr. 5084). However, level alarms on the pool would alert the operator in the event of such an occurrence. (Tr. 5084-5). In conclusion, Applicant testified that a decrease in the concentration of boron in the spent fuel pool was highly unlikely. (Tr. 5084). Staff testimony was consistent with this conclusion. (Tr. 4985).

82. The Board, after reviewing the evidence, is satisfied that even if a spent fuel cask were to tip into the spent fuel pool the resulting worker and general population doses would be below appropriate criteria for such doses. Further, based upon the k effective calculations, and the Staff and Applicant's explanation thereof, the Board is satisfied that the probability of attaining criticality in a cask drop incident is so low as not to be inimical to public

health and safety. This finding is bolstered by the Applicant's operating history with regard to the maintenance of adequate boron levels in the Oconee spent fuel pool, as well as the system design which alerts the operator to conditions which may be indicative of reduced boron concentrations.

83. On the basis of the above, the Board concludes that the transportation activity proposed does not present an unacceptable radiation hazard.

IV. ADDITIONAL FINDINGS

84. A question arose at this hearing concerning the proper scope of analysis required by NEPA for the evaluation of the proposed actions. At issue is whether the scope should be limited to the proposal before the NRC or should be broadened to include Applicant's so-called "cascade plan" which sets forth other possible subsequent transshipment actions. In response thereto the Board has chosen to articulate its understanding of the relevant case law.

In Kleppe v. Sierra Club, 427 US 390 (1976), several environmental groups sought the preparation of a comprehensive, regional EIS by the Department of Interior (DOI) prior to DOI issuance of individual leases for coal mining operations in that region. (427 US at 395). While the DOI had prepared several studies

with respect to the impact of coal mining operations in the region, the Supreme Court ruled that those studies were only efforts to gain background information for subsequent application in the decision-making process and did not constitute federal "contemplation" of a regional development plan or program. (427 US at 403-4). However, the Court stated that even if a regional program was "contemplated" by DOI, there is no support in the language or legislative history of NEPA for requiring a regional EIS until a "proposal" for federal action on a regional scale was before the agency (427 US at 404-5). Further, the Court explained:

> At some points in their brief respondents appear to seek a comprehensive impact statement covering contemplated projects in the region as well as those that already have been proposed. The statute (NEPA), however, speaks solely in terms of proposed actions; it does not require an agency to consider the possible environmental impacts of less imminent actions when preparing the impact statement on proposed actions. Should <u>contemplated actions</u> later reach the stage of actual proposals, impact statements on them will take into account the effect of their approval upon the existing environment; and the condition of that environment presumably will reflect earlier proposed actions and their effects. (emphasis supplied). 427 US at 410 note 20.

In sum, <u>Kleppe</u> teaches that there is no NEPA requirement to consider environmental impacts of contemplated actions which are not the subject of the proposed

action and which are not so related to the proposed action as to fall within the scope of Section 102(2)(C) of NEPA. 40/

Therefore, the proper test to be used in determining whether consideration is required of subsequent actions beyond that addressed in the specific proposal for federal action and reasonable alternatives thereto is whether the instant action proposed is substantially independent from such subsequent actions. As the Supreme Court in Kleppe states:

> Nor is it necessary that petitioners always complete a comprehensive impact statement on all proposed actions in an appropriate region before approving any of the projects. As petitioners have emphasized, and respondents have not disputed, approval of one lease or mining plan does not commit the Secretary to approval of any others: nor, apparently, do single approvals by the other petitioners commit them to subsequent approvals. 427 U.S. at 414, note 26.

40/ "Section 101(2)(C) states that the statement must be a detailed statement on - -

'(i) the environmental impact of the proposed action,

'(ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,

'(iii)alternatives to the proposed action,

'(iv) the relationship between local short-term uses of man's environmental and the maintenance and enhancement of long-term productivity, and

'(v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented." (Emphasis added.)

This test finds substantial support in cases dealing with segmentation. In Trout Unlimited v. Morton, 509 F.2d 1276 (9th Cir. 1974), the court ruled that an EIS addressing only the first phase of the Teton Dam and Reservoir Project was adequate. In so ruling the court stated:

> The appellants contend that the EIS is fatally inadequate because it does not discuss the environmental impact of the Second Phase. They rely upon cases which hold that a series of interrelated steps constituting an integrated plan must be covered in a single impact statement. We believe these authorities are inapposite and that the failure of the EIS to discuss the Second Phase does not render it inadequate. The distinction between those situations in which it has been held that the EIS must cover subsequent phases and that before us is that here the First Phase is substantially independent of the Second while in those in which the EIS must extend beyond the current project, that project was dependent on subsequent phases. The dependency is such that it would be irrational, or at least unwise, to undertake the first phase if subsequent phases were not also undertaken. 509 F.2d at 1285 (footnote omitted).

In Sierra Club v. Froehlke, 534 F.2d 1289 (8th Cir. 1976), an action brought to enjoin construction of the Meramec Park Lake Dam, the plaintiffs contended that the EIS filed should have considered the entire Meramec Basin Plan and not the Maramec Dam Project alone. The court in rejecting this contention stated:

> Where it is found that the project before the court is an essentially independent one, an EIS for that project alone has been found sufficient compliance with the act [NEPA]. In such case there is no irretrievable commitment of resources beyond what is actually expended in an individual project. 534 F.2d at 1297.

Further, the court in Sierra Club v. Froehlke stated:

> It is clear that, while each reservoir has an incremental effect in meeting the total flood control and water quality needs of the Meramec River Basin, the proposed dams would operate independently of each other. It is clear that each reservoir, acting alone, would satisfy a portion of the river basin's needs. The evidence further shows that a determination of whether or not any of the other proposed reservoirs will ever be built would require speculation on the part of this Court. 534 F.2d at 1299.

In Conservation Society of Southern Vermont v. Secretary of Transportation, 508 F.2d 927 (2nd Cir. 1974), the court ruled that an EIS which addressed only a 20 mile segment of a 280 mile superhighway was inadequate. The Supreme Court granted certiorari and remanded the case to the Appeal Court. 423 US 809 (1975). On remand, the Appeal Court stated:

> The Supreme Court remand here cites SCRAP, supra, which holds that a federal agency must prepare its EIS at 'the time at which it makes a recommendation or report on a proposal for federal action.' 422 US at 320, 95 S.Ct. at 2356, 45 L.Ed.2d 215 (emphasis in original). Here the findings of the district court were that, although federal officials had knowledge of the overall planning process of state officials, there was 'no overall federal plan' for improving the corridor into a superhighway. 362 F.Supp. at 636. The federal action being taken here relates only to the twenty-mile stretch between Bennington and Manchester in Vermont. The stretch is 'admittedly a project with local utility,' 508 F.2d at 935. Hence we see no irreversible or irretrievable commitment of federal funds for the entire corridor and under SCRAP no obligation for a corridor EIS. See Friends of Earth v. Coleman, 513 F.2d 295, 299-300 (9th Cir. 1975); Trout Unlimited v. Morton, 509 F.2d 1276, 1283-85 (9th Cir. 1974). (emphasis supplied) 531 F.2d 637, 339-40 (1976).

In Swain v. Brinegar, 542 F.2d 364 (7th Cir. 1976), another highway segmentation case, the court held that

the proper test was:

> 1. Does the proposed segment have a substantial utility independent of future expansion? 2. Would its construction foreclose significant alternative routes or locations for an extension from the segment? 3. If, as here, the proposed segment is part of a larger plan, has that plan become concrete enough to make it highly probable that the entire plan will be carried out in the near future? 542 F.2d at 369

In Friends of Earth v. Coleman, supra, the court stated that the proper test for determining whether an EIS should consider subsequent projects is "whether completion of one project will inevitably involve an irreversible and irretrievable commitment of resources to the second." 513 F.2d at 299.

In State of Minnesota v. NRC, 602 F.2d 412, (D.C. Cir. 1979), the United States Court of Appeals for the District of Columbia in reviewing the Appeal Board's decision in Northern States Power Company (Prairie Island Nuclear Generating Plant, Units 1 and 2) and Vermont Yankee Power Corporation (Vermont Yankee Nuclear Station), ALAB-455, 7 NRC 41 (1978), addressed the exact issue raised here. The Court, in disposing of the matter stated:

> The Minnesota Pollution Control Agency makes an additional argument. It contends that NRC violated NEPA by improperly "segmenting" its consideration of the environmental impact of expansion of onsite storage capacity at Prairie Island. The theory is that because the present expansion of the spent fuel pool will accommodate the spent fuel assemblies produced at Prairie Island only until 1982, a request for further expansion is inevitable. Citing Kleppe v. Sierra Club, 427 U.S. 390 (1976), Minnesota argues that the NRC was required to take into account the

environmental impact of this "unavoidable consequence" of the current expansion.

> We find this argument without substance. Minnesota has not pointed to any consequence of future expansion that could not be adequately considered at the time of any requests for further expansion. Indeed, the NRC Staff in its environmental impact analysis of the proposed expansion expressly considered five factors articulated by the NRC for consideration of individual license amendment applications pending preparation of a generic EIS on the question of interim on-site storage of spent fuel assemblies. See 40 Fed. Reg. 42, 802 (1975). The Staff specifically found that the licensing action here would not foreclose alternatives available with respect to other licensing actions designed to ameliorate a possible shortage of spent fuel capacity (noting that "taking this action would not necessarily commit the NRC to repeat this action or a related action") and that addressing the environmental impact associated with the proposed licensing action would not overlook any cumulative environmental impacts. J.A. at 239-42. State of Minnesota v. NRC, 602 F.2d 412, 416, note 5 (D.C. Cir. 1979).

In sum, the above cited cases clearly establish that the relevant test for determining the scope of the environmental analysis required in the instant proceeding is not the existence of plans for subsequent actions, but the independence of the proposed action. This conclusion is consistent with the Commission's October 16, 1979, Memorandum and Order regarding Metropolitan Edison Company (Three Mile Island Nuclear Station, Unit 2), Docket No. 50-320, _____ NRC ____ (16 October 1979), wherein the Commission stated:

> In reaching this conclusion the Commission has taken note of comments which argue that the Commission has violated NEPA by considering the impact of EPICOR-II separately and apart from the overall impact of a complete program for decontamination of TMI-2. The Commission does not believe

> this "illegal segmentation" argument is well-founded in this case. In meeting NEPA requirements an agency may focus on the impact of a single action, even when it is arguably a segment of a larger program, when the action in question has independent utility. See e.g., Lookout Alliance v. Volpe, 484 F.2d 11 (8th Cir. 1973); Friends of the Earth v. Coleman, 513 F.2d 295 (9th Cir. 1975). The Commission finds that use of EPICOR-II meets this test (footnote omitted) Slip. Op. at 5.

Testimony has clearly established that Applicant is not committed to proceeding with this or any other plan for future storage of spent fuel. (Tr. 417-18,424,438, 443-4, 452-3, 475-7, 486-8 and 565). Further, the proposed action does have utility independent of other actions of this type (Tr. 415, 729-30, 756, and 1039: EIA at 62 and Staff's Exhibit 16A at p. 3-4). In addition, approval of this action does not commit the NRC to approval of any subsequent actions (EIA at 63).

In sum, it is clear that the proposed action, transshipment and storage of 300 spent fuel assemblies from Oconee to McGuire is independent of subsequent actions, and therefore, the proper scope of analysis in the instant proceedings is limited to the proposed action.

85. A question arose at this hearing concerning the implications of a recent D.C. Circuit decision, State of Minnesota v. NRC, 602 F.2d 412, (D.C. Cir. 1979), on the instant proceeding. At issue is whether the requested amendment can be issued absent a formal determination of reasonable assurance that an ultimate

or interim offsite spent fuel storage solution or safe on-site spent fuel storage will be available when needed. In response thereto the Board has chosen to articulate its understanding of the relevant case law.

State of Minnesota v. NRC had its genesis in a combined Appeal Board decision affirming the award of licensing amendments to expand spent fuel storage capacity at the Vermont Yankee and Prairie Island nuclear generating stations. ALAB-455, 7 NRC 41 (1978). Intervenors in the Commission proceeding appealed the decision and renewed their primary contention before the court:

> Prior to the issuance of a license amendment permitting expansion of on-site storage capacity, the NRC must make a determination of probability that the wastes to be generated by the plants can be safely handled and disposed of. If no "off-site" solution (either an ultimate solution to the problem of waste disposal, or some interim solution involving storage facilities off the reactor site), is projected as probably available, the NRC must take into account the safety and environmental implications of maintaining the reactor site as a nuclear waste disposal site after the expiration of the license term. 602 F.2d at 416.

The court noted that the NRC, in rejecting a previous NRDC petition for rulemaking, had stated that it was "reasonably" confident that solutions to the waste disposal problem would be available when needed. The court found that the NRC's previous conclusion on the reasonable assurance issue was based upon a description of current federal efforts in the area, but not upon a rulemaking record devoted expressly to consi-

dering the question. (602 F.2d at 417). Accordingly, the court, being cognizant of the fact that the NRC was conducting the ongoing Table S-3 proceeding, concluded that:

> It would be inappropriate for this court to ignore the relevance of proceedings in which some of the basic questions raised now are the subject of current exploration. Since the disposition of the S-3 proceeding, though it has a somewhat different focus, may have a bearing on the pending cases, and being advised of recent developments that raise new issues about the feasibility of disposal solutions, we think it appropriate in the interest of sound administration to remand to the NRC for further consideration in the light of its S-3 proceeding and analysis. In particular, the court contemplates consideration on remand of the specific problem isolated by petitioners determining whether there is reasonable assurance that an off-site storage solution will be available by the years 2007-2009, the expiration of the plants' operating licenses, and if not, whether there is reasonable assurance that the fuel can be stored safely at the sites beyond those dates. We neither vacate nor stay the license amendments, which would effectively shut down the plants. (emphasis added) 602 F.2d at 418.

It could be argued that the D.C. Circuit's holding stands for the proposition that prior to approval of a proposal to permit expanded storage of spent fuel a formal determination concerning the reasonable assurance of future storage must be made. If, however, the D.C. Circuit had so held, that holding would have been in conflict with the holding of the 2nd Circuit in NRDC v. NRC, 582 F.2d 166 (1978). But the D.C. Circuit was careful not to create a conflict with the Second

Circuit. 41/ More importantly, in the very cases before it, the D.C. Circuit did not stay, suspend or otherwise hinder the licensing actions and gave absolutely no intimation that other licensing actions that other licensing actions pending before the agency were to be treated any differently. Judge Leventhal's opinion in Minnesota v. NRC stresses that the court was not granting the relief sought by petitioners there, but was rather requiring the Commission to consider in a more formal way, in the pending S-3 proceeding or otherwise, its earlier policy pronouncement regarding reasonable assurance of spent fuel storage (602 F.2d at 418). In short, the court was simply "inquiring into the basis of [NRC's] assurances of confidence" (602 F.2d at 419), not rejecting or striking those assurances.

Subsequent to the Minnesota decision, the Commission has published a "Notice of Proposed Rulemaking" (44

41/ The concurring opinion of Judge Tamm makes explicit what is implicit in Judge Leventhal's opinion:

> This interpretation of the relevant statutes is consistent with the re .t decision of the Second Circuit in NRDC v. NRC, 582 F.2d 166 (1978). The Court of Appeals in that case held that Commission need not halt licensing of nuclear plants pending a determination that an approved method of permanent nuclear waste disposal exists. Minnesota, supra, (Judge Tamm's Concurring Opinion, 602 F.2d at 419-420.)

Fed. Reg. 61372, October 21, 1979) relating to the required reassessment of its degree of confidence concerning timely storage of radioactive waste. Therein the Commission stated:

> During this proceeding the safety implications and environmental impacts of radioactive waste storage on-site for the duration of a license will continue to be subjects for adjudication in individual facility licensing proceedings. The Commission has decided, however, that during this proceeding the issues being considered in the rulemaking should not be addressed in individual licensing proceedings. These issues are most appropriately addressed in a generic proceeding of the character here envisaged. Furthermore, the court in the State of Minnesota case by remanding this matter to the Commission but not vacating or revoking the facility licenses involved, has supported the Commission's conclusion that licensing practices need not be altered during this proceeding. However, all licensing proceedings now underway will be subject to whatever final determinations are reached in this proceeding (44 Fed. Reg. 61373).

In sum, while the Court's decision in Minnesota v. NRC is not a model of clarity it does not stand for the proposition that licensing amendment requests such as now before this Board cannot be issued pending further Commission action on the reasonable assurance of safe spent fuel storage. This conclusion is consistent with the Commission's Memorandum and Order dated October 19, 1979, Portland General Electric Company (Trojan Nuclear Plant) Docket No. 50-344. ____ NRC ____ (October 19, 1979) wherein the Commission declined to review the Appeal Board's decision affirming the issuance of a licensing amendment to expand spent fuel storage capacity at the

Trojan Nuclear Plant; and the Commission's actions in approving the Applicant's licensing amendment application to rerack Oconee Units 1 and 2 spent fuel pool with high density racks. (Tr. 569).

86. During the limited appearance phase of the hearing concerns were raised by Gaston County, North Carolina. (Tr. 5114-15). These concerns are set forth in a position document that was prepared by Gaston County and was presented to the Board. (Tr. 4699). The concerns fall into several general categories. These categories are discussed below.

a. Accident Consequences

The record reflects that the probability of a cask rupture is extremely unlikely. (See paragraph 76, supra). However, in the event of a release of radioactive material from a cask as the result of an accident, the consequences would be insignificant. (See paragraph 76, supra). As to the release of contaminated water from the cask, Staff Exhibit 36, p. 2, reflects that at present only a dry cask would be used. Accordingly, if a leak were to develop it would not involve release of contaminated water.

b. Emergency Response

In response to a concern raised by the State of South Carolina, extensive testimony was presented concerning

actions to be taken in an accident situation. (Tr. 3860-3937).

c. Legal/Financial Responsibility

On January 8, 1979, the Commission published notice of its intention to extend Price-Anderson coverage to the transportation and storage of Oconee spent fuel at the McGuire Nuclear Station. (44 Fed Reg. 1751).

d. Physical Security

The Board recognizes that the Applicant is required to provide physical security for spent fuel shipments consistent with 10 CFR Part 73.

e. Route Approval

Pursuant to 10 CFR §73.37, Applicant has sought approval of various routes for use in transporting Oconee spent fuel to McGuire Nuclear Station. These routes were extensively discussed at the evidentiary hearing. (See aragraph 76, supra).

f. Retention Of Spent Fuel On Site

The regulations provide for transportation of spent nuclear fuel. In addition, the record reflects that the instant transportation activity is environmentally acceptible and poses no significant adverse public health and safety impact. (See for example, paragraphs 17-19, supra). Further, the evidence demonstrates that the subject transportation activity is warranted. (See paragraph 28, supra).

V. CONCLUSIONS

Based upon our evaluation of the Staff's Safety Evaluation Report And Environmental Impact Appraisal, the application for license amendment submitted by Applicant, the written testimony of all of the witnesses, as well as the answers elicited from these witnesses in response to questions of the Board and the parties and the exhibits admitted into evidence, all as described earlier in this Decision, the Board makes the following conclusions of law:

1. Subject to the conditions outlined earlier in this Decision, there is reasonable assurance that the activites authorized by the requested license amendment relating to the storage of Oconee spent fuel in the McGuire spent fuel pool, can be conducted without endangering the health and safety of the public.
2. The activities authorized by the license amendment will be conducted in compliance with the Commission's regulations.
3. The issuance of the license amendment will not be inimical to the common defense and security or to the health and safety of the public.
4. The issuance of the license amendment does not significantly affect the quality of the human

environment and does not require the preparation of an environmental impact statement under the National Environmental Policy Act of 1969, as amended, 42 U.S.C. 4321, et seq., and Part 51 of the Commission's regulations, 10 CFR Part 51.

5. The environmental impact of the license amendment activity will not significantly affect the quality of the human environment.

6. The appropriate cours of action from an environmental standpoint is the issuance of the requested license amendment, subject to the conditions outlined earier in this Decision.

ORDER

It is ORDERED, in accordance with the Atomic Energy Act, as amended, the National Environmental Policy Act, as amended, and the regulations of the Nuclear Regulatory Commission, and based on the findings and conclusions set forth herein, that the Director of Nuclear Material, Safety and Safeguards is authorized to make appropriate findings in accordance with the Commission's regulations and to issue the appropriate license amendments authorizing the storage of spent Oconee fuel in the McGuire Unit 1 spent fuel pool upon the following conditions:

1. Construction of McGuire Unit 1 shall be complete and the spent fuel pool and auxiliary equipment shall be approved by the Staff.

2. Spent fuel shipped to McGuire from Oconee shall have been removed from the reactor no less than 270 days prior to shipment.

3. No more than 300 Oconee spent fuel assemblies shall be transshipped.

4. An environmental radiological monitoring program shall be maintained to assure that sufficient data are available to verify compliance with applicable state and federal regulations.

5. Burnup of fuel shipped shall be no greater than 36,000 MW days per metric ton.

In accordance with 10 CFR 2.760, 2.762, 2.764, 2.785, and 2.786, this Initial Decision shall be effective immediately 42/ and shall constitute the final action of the Commission forty-five (45) days after the issuance thereof, subject to any review pursuant to the above-cited Rules of Practice. Exceptions to this Initial Decision may be filed by any party within ten (10) days after service of this Initial Decision. A brief in support of the exceptions shall be filed within thirty (30) days thereafter (forty (40) days in the case of the NRC Staff). Within thirty (30) days of the filing and service of the brief of the appellant (forty (40) days in the case of the NRC Staff), any other party may file a brief in support of, or in opposition to, the exceptions.

42/ This proceeding is not covered by the Commission's recent suspension of the immediate effectiveness rule (10 CFR 2.764) for certain purposes. 44 Fed. Reg. 65049 (November 9, 1979).

IT IS SO ORDERED.

THE ATOMIC SAFETY AND
LICENSING BOARD

Dr. Cadet H. Hand, Jr., Member

Dr. Emmeth A. Luebke, Member

Marshall E. Miller, Chairman

Dated at Bethesda, Maryland,
this __ day of _____, 1980.

ATTACHMENT A

DOCUMENTARY EVIDENCE

A. At the hearing, the Applicant offered and the Board admitted into evidence the following documents:

1. Applicant Exhibit No. 1: Memorandum from T.L. Bradley to W.O. Parker of June 15, 1979, regarding "Spent Fuel Storage Study For Oconee And McGuire." (Tr. 1201). 1/

2. Applicant Exhibit No. 2: "Information Supporting Storage Of Oconee Spent Fuel At McGuire (March 9, 1978)." (Tr. 651).

3. Applicant Exhibit No. 3: "Testimony of Ralph W. Bostian". (Tr. 1062).

4. Applicant Exhibit No. 4: Memorandum of H.T. Sneed of August 16, 1976 regarding "Spent Fuel Storage Review 8/11/76". (Tr. 1201).

5. Applicant Exhibit No. 5: "Report to the President by the Interagency Review Group on Nuclear Waste Management (March, 1979)." (Tr. 1053).

6. Applicant Exhibit No. 6: "Testimony of S.B. Hager," (Tr. 1236).

7. Applicant Exhibit No. 8: "Testimony of Robert H. Jones," (Tr. 1356).

8. Applicant Exhibit No. 9: "Testimony of Dr. B. John Garrick". (Tr. 2729).

9. Applicant Exhibit No. 10: "Testimony of Roger W. Carlson". (Tr. 1361).

10. Applicant Exhibit No. 11: "Risk Analysis of Transporting Oconee Spent Nuclear Fuel to the McGuire Nuclear Station" prepared by Pickard, Lowe and Garrick, Inc. for Duke Power Company, June, 1979. (Tr. 2729).

1/ The transcript designations (Tr.) in this document refer to the page of the hearing transcript on which the exhibit was admitted into evidence.

11. Applicant Exhibit No. 12: "Testimony of Dr. Leonard D. Hamilton". (Tr. 1460).

12. Applicant Exhibit No. 13: "Testimony of D.H. Sterrett". (Tr. 1704).

13. Applicant Exhibit No. 15: "Testimony of Lionel Lewis". (Tr. 1924).

14. Applicant Exhibit Nos. 16A-P: Survey Worksheets of NRDC. (Tr. 2029+).

15. Applicant Exhibit No. 17: Draft worksheet/rough notes concerning Prairie Island Nuclear Plant. (Tr. 2040).

16. Applicant Exhibit No. 18: Letter from Worth Bateman to the Honorable John Dingell (April 4, 1979). (Tr. 2035).

17. Applicant Exhibit No. 19: October 18, 1977 DOE Information Sheets regarding Spent Fuel Policy. (Tr. 2278).

18. Applicant Exhibit No. 20: "Oconee Capacity Factors". (Tr. 2376).

19. Applicant Exhibit No. 21: Table I regarding cask comparison figures. (Tr. 2457).

20. Applicant Exhibit No. 22: "Stipulation Regarding Testimony of Garrick". (Tr. 2729).

21. Applicant Exhibit Nos. 23A-H: Applicant Responses to NRC Questions. (Tr. 3723).

22. Applicant Exhibit No. 24: "Supplemental Testimony of Dr. Leonard Hamilton". (Tr. 2949).

23. Applicant Exhibit No. 25: "Supplemental Testimony of Dr. B. John Garrick". (Tr. 3949).

24. Applicant Exhibit No. 26: "Qualifications Statement of C.L. Ray, Jr." (Tr. 4329).

25. Applicant Exhibit No. 27: Diagram of truck cask/fuel pool-sketch #3. (Tr. 4329).

26. Applicant Exhibit No. 28: "McGuire Nuclear Station Truck Cask Drop Analysis Case #3". (Tr. 4628).

27. Applicant Exhibit No. 29: Letter from W.O. Parker to Harold R. Denton, March 2, 1979. (Tr. 4510).

28. Applicant Exhibit No. 30: "Further Supplemental Testimony of Ralph W. Bostian". (Tr. 4799).

29. Applicant Exhibit No. 31: "Spent fuel shipping schedule assuming no McGuire shipments, no shipments during refueling or receipt of new fuel at sender or receiver". (Tr. 4799).

30. Applicant Exhibit No. 32: "Supplemental Testimony of Lionel Lewis". (Tr. 4804).

31. Applicant Exhibit No. 33: Letter from W. L. Porter to Board with attached Affidavit of S.B. Hager, February 12, 1980. (Tr. 5101).

B. At the hearing, the NRC offered and the Board admitted into evidence the following documents:

1. Staff Exhibit No. 2: "Professional Qualifications of Carl B. Sawyer." (Tr. 1465).

2. Staff Exhibit No. 3: "Environmental Impact Appraisal Related To Spent Fuel Storage of Oconee Spent Fuel At McGuire Nuclear Station -- Unit 1 Spent Fuel Pool", December 1978. (Tr. 4649).

3. Staff Exhibit No. 4: "Professional Qualifications of C. Vernon Hodge". (Tr. 1515).

4. Staff Exhibit No. 5: "Professional Qualifications of Reeley D. Glenn". (Tr. 1517).

5. Staff Exhibit No. 6: "Testimony of C. Vernon Hodge and R. Daniel Glenn". (Tr. 1547).

6. Staff Exhibit No. 7: "Errata Sheet Regarding Amendment Of Materials License, Duke Power Company Spent Fuel Storage of Oconee Spent Fuel at McGuire Nuclear Station -- Unit 1, Docket No. 70-2623". (Tr. 4649).

7. Staff Exhibit No. 8: "Professional Qualifications of Jerry E. Jackson". (Tr. 1551).

8. Staff Exhibit No. 9: "Testimony of C. Vernon Hodge and Jerry E. Jackson". (Tr. 1551).

9. Staff Exhibit No. 10A: "Testimony of Dr. Michael A. Parsont". (Tr. 2627).

10. Staff Exhibit No. 10B: "Professional Qualfications of Dr. Michael A. Parsont". (Tr. 2627).

11. Staff Exhibit No. 11A: "Testimony of Dr. John V. Nehemias". (Tr. 2627).

12. Staff Exhibit No. 11B: "Professional Qualifications of John V. Nehemias". (Tr. 2627).

13. Staff Exhibit No. 11C: "Affidavit of Dr. John V. Nehemias", dated May 11, 1979. (Tr. 2624).

14. Staff Exhibit No. 12: "Regulatory Guide 8.8, Revision 3 (June 1978)". (Tr. 2629).

15. Staff Exhibit No. 13: "Testimony of Brett S. Spitalny and R. Daniel Glenn". (Tr. 3841).

16. Staff Exhibit No. 15: "Statement of Professional Qualifications of Brett S. Spitalny". (Tr. 3841).

17. Staff Exhibit No. 16A: "Testimony of Brett S. Spitalny and John P. Roberts ". (Tr. 3841).

18. Staff Exhibit No. 16B: "Statement of Professional Qualifications of John P. Roberts". (Tr. 3841).

19. Staff Exhibit No. 17A: "Testimony of Darrel A. Nash". (Tr. 3841).

20. Staff Exhibit No. 17B: "Testimony of Darrel A. Nash" (related to NRDC Contention 3). (Tr. 3841).

21. Staff Exhibit No. 17C: "Statement of Qualifications of Darrel A. Nash". (Tr. 3841).

22. Staff Exhibit No. 18A: "Testimony of T. Jerrell Carter, Jr.". (Tr. 3841).

23. Staff Exhibit No. 18B: "Professional Qualifications of T. Jerrell Carter, Jr.". (Tr. 3841).

24. Staff Exhibit No. 19A: "Testimony of Brett S. Spitalny". (Tr. 3841).

25. Staff Exhibit No. 19B: "Testimony of Brett S. Spitalny and R. Daniel Glenn". (Tr. 3841).

26. Staff Exhibit No. 19C: "Testimony of Brett S. Spitalny and R. Daniel Glenn" (related to Contention 1 of CESG). (Tr. 3841).

27. Staff Exhibit No. 19D: "Testimony of Brett S. Spitalny" (related to CESG Contention 3). (Tr. 3841).

28. Staff Exhibit No. 20: "Testimony of John V. Nehemias". (Tr. 3053).

29. Staff Exhibit No. 21: "Supplemental Testimony of Michael A. Parsont". (Tr. 3054).

30. Staff Exhibit No. 22: "Spitalny Worksheet for Spent Fuel Discharge From Duke Facilities". (Tr. 3841).

31. Staff Exhibit No. 24: "Second Errata Sheet Regarding Amendment of Materials License, Duke Power Company Spent Fuel Storage of Oconee Spent Fuel at McGuire Nuclear Station -- Unit 1, Docket No. 70-2623". (Tr. 4649).

32. Staff Exhibit No. 25: Diagram of Unit 3 Spent Fuel Pool. (Tr. 3922).

33. Staff Exhibit No. 26A: "Testimony of Darrel A. Nash". (Tr. 3841).

34. Staff Exhibit No. 26B: Supplemental Testimony of Darrel A. Nash. (Tr. 3841).

35. Staff Exhibit No. 27A: "Testimony of Clayton L. Pittiglio, Jr.". (Tr. 3841).

36. Staff Exhibit No. 27B: "Statement of Professional Qualifications of Clayton L. Pittiglio, Jr.". (Tr. 3841).

37. Staff Exhibit No. 28: "Safety Evaluation Report Related To Spent Fuel Storage of Oconee Spent Fuel At McGuire Station Unit 1 Spent Fuel Pool, Duke Power Company (January 1979)". (Tr. 4649).

38. Staff Exhibit No. 29: "U.S. Nuclear Regulatory Commission Certificate of Compliance, Certificate No. 6698, Revision No. 8". (Tr. 3922).

39. Staff Exhibit No. 30: "Radiation Exposures Associated with Increasing the Storage Capacity of Spent Fuel Pools". (Tr. 4077).

40. Staff Exhibit No. 31: "Professional Qualifications of Richard J. Kiessel". (Tr. 4185).

41. Staff Exhibit No. 32: "Professional Qualifications of Vincent T. H. Leung". (Tr. 4187).

42. Staff Exhibit No. 33: "Staff Report Related To Spent Fuel Storage of Oconee Spent Fuel at McGuire Nuclear Station -- Unit 1, Duke Power Company, Docket No. 70-2623". (Tr. 4647).

43. Staff Exhibit No. 34: Diagram of Fuel Pool Area Cask Route. (Tr. 4458).

44. Staff Exhibit No. 35: "Negative Declaration Regarding Proposed Amendment to Material License SNM-1773, 43 Fed. Reg. 61057 (December 29, 1978)". (Tr. 4651).

45. Staff Exhibit No. 36: "Testimony of Brett S. Spitalny." (Tr. 4855).

46. Staff Exhibit No. 37: "NRC Staff Testimony of R. Daniel Glenn and C. Vernon Hodge". (Tr. 4870).

47. Staff Exhibit No. 38: "NRC Attachment to Testimony of R. Daniel Glenn and C. Vernon Hodge". (Tr. 4870).

48. Staff Exhibit No. 40: "Testimony of Charles R. Marotta". (Tr. 4990).

49. Staff Exhibit No. 41: "Testimony of Edward Lantz". (Tr. 4990).

50. Staff Exhibit No. 42: "Testimony of Dr. Jack N. Donohew". (Tr. 5026).

51. Staff Exhibit No. 43: "Affidavit of Jack N. Donohew" (regarding Oconee Fuel in the McGuire Pool). (Tr. 5026).

52. Staff Exhibit No. 44: "Affidavit of Jack N. Donohew" (regarding McGuire Fuel in the McGuire Spent Fuel Pool). (Tr. 5026).

C. At the hearing, the NRDC offered and the Board admitted into evidence the following documents:

1. NRDC Exhibit No. 2: Memorandum of H. T. Sneed (March 23, 1979). (Tr. 1202).

2. NRDC Exhibit No. 3: Handwritten Memorandum of R. M. Glover (approximate time-frame of writing is December, 1978). (Tr. 1202).

3. NRDC Exhibit No. 5: Handwritten Memorandum of R. Glover (December 8, 1978). (Tr. 1202).

4. NRDC Exhibit No. 7: Memorandum of R. Michael Glover (April 26, 1979). (Tr. 1202).

5. NRDC Exhibit No. 8: Handwritten Memorandum of R. Glover (October 17, 1978). (Tr. 1202).

6. NRDC Exhibit No. 9: Handwritten Memorandum of R. Glover regarding Cost Comparison of Re-racking Oconee Units 1 and 2 Pool with transshipment (October 17, 1978). (Tr. 1202).

7. NRDC Exhibit No. 10: Letter from Mr. W. Willoughby, II, Stone and Webster Engineering Corporation to Mr. Furman Wardell, Duke Power Company, enclosing Stone and Webster's Interim Spent Fuel Storage Facility Study (September 6, 1978). (Tr. 1202).

8. NRDC Exhibit No. 12: Handwritten memo of R. Glover ("notes from meeting w/design on reracking") (October 17, 1978). (Tr. 1202).

9. NRDC Exhibit No. 13A: "Brief Resume of Dimitri Rotow." (Tr. 2229).

10. NRDC Exhibit No. 13B: "Testimony of Dimitri Rotow". (Tr. 2229).

11. NRDC Exhibit No. 13C: "NRDC Findings on the Alleged Need for Acquisition or Construction of An Away From Reactor Spent Fuel Storage Facility". (Tr. 2229).

12. NRDC Exhibit No. 13D: "No Need for AFR's" (May 1, 1979). (Tr. 2229).

13. NRDC Exhibit No. 14A: "Testimony of Arthur R. Tamplin and Thomas B. Cochran". (Tr. 2370).

14. NRDC Exhibit No. 14B: "Professional Qualifications of Arthur R. Tamplin". (Tr. 2370).

15. NRDC Exhibit No. 14C: "Resume of Thomas B. Cochran, PhD". (Tr. 2370).

16. NRDC Exhibit No. 15: "Testimony of Arthur R. Tamplin, PhD". (Tr. 2370).

17. NRDC Exhibit No. 16: "Testimony of Arthur R. Tamplin (II)". (Tr. 2370).

18. NRDC Exhibit No. 17A: "Affidavit of Thomas B. Cochran, PhD (5/25/79)". (Tr. 2370).

19. NRDC Exhibit No. 18: "Affidavit of Thomas B. Cochran, PhD (5/1/79)". (Tr. 2370).

20. NRDC Exhibit No. 19: Letter from H. T. Sneed, Duke Power Company, to Worth Bateman, DOE (March 7, 1979). (Tr. 2368).

D. At the hearing, CESG offered and the Board admitted into evidence the following documents:

1. CESG Exhibit No. 2: NRC Inspection Report Nos. 50-269/78-15, 50-270/78-15 and 50-287/78-16 (pages I-VII through I-X). (Tr. 1735).

2. CESG Exhibit No. 4: "Statement of Professional Qualifications of Jesse L. Riley". (Tr. 2412).

3. CESG Exhibit No. 5: "Testimony of Jesse L. Riley". (Tr. 2455).

4. CESG Exhibit No. 11: Letter from A. Schwencer, NRC, to W. O. Parker, Jr., Duke Power Company (September 10, 1976) and enclosures. (Tr. 4295).

5. CESG Exhibit No. 13: "The Cask Drop Problem, Testimony of Jesse L. Riley". (Tr. 4467).

6. CESG Exhibit No. 14: Cover letter for group of Amendments No. 38 to the FSAR for McGuire to Mr. Harold R. Denton, NRC (August 31, 1979). (Tr. 4630).

7. CESG Exhibit No. 15: "Supplemental Testimony of Jesse L. Riley". (Tr. 4911).

8. CESG Exhibit No. 16: Spent Fuel Shipping Schedule Introduced by Applicant as Applicant Exhibit No. 31 with Handwritten Notes of Jesse L. Riley. (Tr. 5114).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

In the Matter of	)	
	)	
DUKE POWER COMPANY	)	Docket No. 70-2623
	)	
(Amendment to Materials License SNM-1773 for Oconee Nuclear Station Spent Fuel Transportation and Storage at McGuire Nuclear Station)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "Applicant's Proposed Findings of Fact and Conclusions of Law in the Form of an Initial Decision" dated May 19, 1980, in the above-captioned matter have been served upon the following by deposit in the United States mail this 19th day of May, 1980:

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