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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges
John F. Wolf, Chairman
Linda W. Little
Forrest J. Remick

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In the Matter of)
COMMONWEALTH EDISON COMPANY)
(Dresden Station, Units 2 and 3))

Docket Nos. 50-237 SP
50-249 SP

August 17, 1982

FINAL INITIAL DECISION

Appearances

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For the Nuclear Regulatory Commission Staff:

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I. INTRODUCTION

The Commonwealth Edison Company (Applicant) has applied to the Nuclear Regulatory Commission for permission to install new storage racks in the spent fuel pools at Dresden Nuclear Generating Station, Units 2 and 3. The proposed new storage racks in the spent fuel pools would increase the storage capacity from 1400 fuel assemblies for Dresden Unit 2 pool and from 1420 fuel assemblies for Dresden Unit 3 pool to 3537 fuel assemblies for each pool or a total of 7074 storage spaces.

On May 11, 1978, the Applicant requested the issuance of license amendments. Notice of the proposed amendments was published in the Federal Register on August 11, 1978 (43 Fed. Reg. 35763), designating Atomic Safety and Licensing Board members as Dr. Forrest J. Remick, Dr. Linda W. Little and Edward Luton, Esq. Pursuant thereto, the State of Illinois, through the Attorney General of Illinois (Intervenor), filed a timely petition for leave to intervene in the proceedings. In a Notice of Hearing dated March 29, 1979, the Atomic Safety and Licensing Board granted the State of Illinois' petition to intervene.

On July 30, 1979 Edward Luton, Esq. withdrew as Chairman of the Atomic Safety and Licensing Board for this proceeding. He was replaced by John F. Wolf, Esq. (44 Fed. Reg. 45496).

A Prehearing Conference was held on August 19, 1980 at Chicago, Illinois for the purpose of determining whether Intervenor's contentions satisfied the requirements of the Nuclear Regulatory Commission's (NRC) Rules of Practice.

Subsequently, the Atomic Safety and Licensing Board (Board), by its Memorandum and Order dated September 9, 1980, admitted certain of Intervenor's contentions, it dismissed one on the ground that it lacked the necessary basis as required by 10 CFR §2.714(b), and it propounded a Board question to be addressed by the parties.

An evidentiary hearing was held in Morris, Illinois from November 19, 1980 through November 21, 1980. Evidence was presented by the parties about the contentions at issue and the Board question. An opportunity was afforded members of the public to make limited appearances. Only one person accepted the opportunity.

At the hearing session in Morris, Illinois on November 19, 1980 Applicant's Counsel informed the Board that Applicant had received information regarding bowing of the channels of the fuel assemblies; that the information was preliminary and that it was not in a position to state, at that time, whether or not the "bowing phenomenon" was a problem requiring that evidence regarding it be offered on the record. Subsequently, Applicant moved for a continuance of the evidentiary hearing to present evidence relating to bowing of the channels at a later time. Over the objection of the Intervenor, this Board granted the said motion.

The evidentiary hearing resumed in Chicago, Illinois on April 21 and 22, 1981. Applicant and the Nuclear Regulatory Commission Staff (Staff) presented evidence as to whether bowing of the fuel assembly channels might affect use of the proposed racks, as designed and fabricated, for storing channelled spent fuel assemblies, and whether the bowing phenomenon could have significant public health and safety implications.

Applicant filed a motion dated December 1, 1980, to strike portions of the cross-examination by Intervenor of Staff witness, Millard L. Wohl^{1/} on the grounds that the cross examination had no relevance to Intervenor's Contention 6 or any other matter in controversy in this proceeding. Staff supported Applicant's motion in a response dated December 19, 1980. Intervenor still asserted that its Contention 6 required that systems interaction and multiple failure analysis should have been considered in the Safety Evaluation Report (SER). The Board granted the motion to strike. However, on consideration of the facts and arguments contained in Applicant's motion to strike and in the responses of Intervenor and Staff, the Board requested the parties to respond to an additional Board question (Board Question 2, infra) inquiring as to the relevance and the potential health and safety consequences of unresolved safety issues with respect to the proposed spent fuel pool modification.^{2/}

At the Board's request the parties responded to Board Question 2 by submitting affidavits. Affidavits were initially submitted by Applicant, Intervenor, and Staff.^{3/} On March 13, 1981, in a conference call with

^{1/} Tr. 674-84.

^{2/} Memorandum and Order, dated January 26, 1981.

^{3/} For Applicant, affidavit of Robert F. Janecek, with three attachments, dated January 30, 1981; for Staff, affidavit of Paul O'Connor, with attached documents, dated March 13, 1981; for Intervenor, "Intervenor's Determination of Generic Unresolved Safety Issues As Relevant to Spent Fuel Pool Modification," and affidavit of Richard B. Hubbard, dated March 17, 1981.

all parties, the Board more specifically identified the "unresolved safety issues" with which it was concerned as being those issues reported to the Congress of the United States pursuant to Section 210 of the Energy Reorganization Act of 1974 and also reported in NUREG-0606, "Unresolved Safety Issues" Summary (the "Aqua Book"). The Board requested affidavits in response, and specifically requested that one affidavit be from a senior staff member addressing the overall relevance and safety significance of the Unresolved Safety Issues. Subsequently, a second round of affidavits was received.^{4/}

Issuance of a decision was withheld pending receipt of answers to a Board Notification, dated May 20, 1981, raising questions regarding the effect, if any, of a seismic occurrence on the Dresden 2 and 3 spent fuel pools. The Staff subsequently requested the Board not to issue a final decision pending Staff's review of this issue.^{5/} Further evidentiary hearings on the seismic issue were held in Bethesda, Maryland, September 11, 1981, and on July 20, 1982.

Because of a scheduled refueling outage and the shortage of spent fuel storage capacity, on September 24, 1981, the Board, in response to Applicant's motion, issued a partial initial decision modifying the operating license to permit installation of five high-density spent fuel

^{4/} For Staff, affidavit of Karl Kniel, dated April 28, 1981; for Applicant, affidavits of Scott Pedigo and A. K. Singh, dated May 5, 1981; and for Intervenor, Richard B. Hubbard, dated May 7, 1981.

^{5/} Letter dated June 29, 1981, to Board Members from Gus C. Lainas, Assistant Director for Safety Assessments, Division of Licensing, USNRC.

storage racks and the withdrawal of thirteen of the original spent fuel racks at Dresden Unit 3. The Board found that the record supported approval of the 5-rack installation and issued a Partial Initial Decision (PID) on September 24, 1981.^{6/}

The Staff's SER was supplemented as directed in our PID (14 NRC 759). The Supplementary SER (SSER)^{7/} and the supporting testimony of Owen O. Rothberg and Gunnar Harstead^{8/} are favorable to the installation of 33 high density racks in each of the Dresden 2 and 3 pools. Based on the completed record before it, the Board finds that the SER, as supplemented by the SSER, indicates that the proposed license amendments are acceptable from a safety standpoint and therefore the modification using the 33 high density fuel storage racks in each of the Dresden SFPs may be implemented.

^{6/} 14 NRC 708 (1981).

^{7/} Staff Ex. 5.

^{8/} Testimony of Owen O. Rothberg and Gunnar A. Harstead regarding Commonwealth Edison's Proposal to Install 33 High Density Fuel Storage Racks (Rothberg and Harstead) following Tr. 1201.

II. FINDINGS OF FACT

A. Board Questions

Board Question No. 1 asks:

- A. What is the current status of the spent fuel unfilled storage capacity at Dresden Units 2 and 3?
- B. When will full core discharge no longer be possible?
- C. When will normal refueling discharge no longer be possible?
- D. What alternatives, if any, exist to shutting down the unit(s) when the spent fuel pool(s) is (are) filled to capacity?
- E. Which, if any, of these alternatives would require subsequent license amendments?

1. Applicant and Staff submitted testimony on Board Question No. 1.^{9/} At present the Unit 2 spent fuel pool (SFP) has empty storage spaces for 508 fuel assemblies; the Unit 3 SFP, with the five high density racks previously authorized, has spaces for 671 fuel assemblies.

^{9/} Testimony of Terry A. Pickens (Pickens) following Tr. 94; testimony of Paul O'Connor (O'Connor) following Tr. 117; Tr. 1265-71.

2. Full core discharge capability (FCDC) is defined as sufficient unused storage capacity in the SFP to receive the total number of fuel assemblies from a reactor core. The reactor cores for Dresden Units 2 and 3 each consist of 724 fuel assemblies. Considering each unit as an entity, Unit 3 lost FCDC in February 1980. Unit 2 lost FCDC at the time of the scheduled refueling outage in 1981.^{10/}

3. Refueling discharge capability (RDC) is defined as sufficient storage capability in the SFP to accept the number of fuel assemblies which must be discharged to accomplish a normal refueling of a reactor based on an 18 month operating cycle. Each Dresden Unit 2 or 3 reload consists of approximately 204 fuel assemblies. Considering each unit as an entity, with normal refueling operations each unit can undergo two additional refuelings before RDC is no longer possible.^{11/} Since FCDC has been lost for both units, the units must shut down no later than 1986. There is a possibility of shutdown before that time due to lack of space in the SFP to accommodate offload of a full core should discharge be necessary for repair or maintenance inside the reactor vessel.^{12/}

4. The data utilized to predict dates for loss of RDC were based on projected refueling outage schedules which did not include power coastdown; however, accounting for power coastdown would extend RDC only about four to five months beyond the dates presented in the prepared testimony.^{13/}

^{10/} Pickens at pp. 3-4; O'Connor at p. 2.

^{11/} Tr. 1266.

^{12/} Pickens at pp. 4-5; O'Connor at p. 2.

^{13/} Tr. 105, 181.

5. In response to Board Question 1D, the following alternatives were considered: shifting of spent fuel assemblies, transshipment to other nuclear stations, reprocessing, away from reactor storage (AFR), on-site independent spent fuel storage installations, and physical expansion of existing spent fuel storage pools.

6. Utilizing the combined storage capacity of the Unit 2 and Unit 3 SFP's by shifting fuel assemblies between pools, the Applicant could maintain FCDC and RDC for one of the units for a longer period of time than if each unit and its SFP were considered separately. Using the combined capacity, FCDC for one unit will be lost in January 1983, and RDC for one unit will disappear in March 1985. Such use offers little improvement in the storage difficulties being encountered by the Applicant. Furthermore, reliance on the transfer of fuel assemblies between SFP's would unduly extend unscheduled outages, because shifting of the assemblies is a slow process. Also, the need for FCDC in one pool or the other could not be anticipated.^{14/}

7. The option of transshipment of spent fuel assemblies to other nuclear stations is not currently available to Applicant. The Applicant has nuclear generating stations located in Illinois at Dresden, Quad Cities, and Zion. The Applicant has filed an application with the NRC seeking permission to transship spent fuel assemblies between the Dresden and Quad Cities Stations. This application is currently the subject of another contested licensing proceeding in which the State of Illinois and others have intervened. Should the application be granted, Applicant

^{14/} Pickens at p. 6; Tr. 123, 126-27.

estimates that FCDC and RDC could be extended for approximately one year. The Staff estimated that transshipment among all three locations could extend FCDC and RDC at Dresden 2 and 3 for three to four years; however, such three-way transshipment is hypothetical and is not based on any specific application.^{15/}

8. Transshipment of spent fuel assemblies from Dresden to Quad Cities would make more intensive use of, rather than increase, the existing spent fuel storage capacity available to Applicant. Authorization to transship fuel will only extend FCDC and RDC at Dresden Units 2 and 3 for approximately one year. Quad Cities nuclear station is projected to lose FCDC in March 1984 and RDC in September 1985. Any transshipments of spent fuel assemblies between Dresden and Quad Cities nuclear stations will use up spent fuel storage capacity at Quad Cities and thereby reduce the time that Quad Cities nuclear station will be available for operation.^{16/} In essence, then, transshipment does not relieve the fuel storage capacity problem but simply transports the problem to another location.

9. Reprocessing of spent fuel assemblies is not an option currently available to the Applicant. At the present time, there are no commercial reprocessing plants in operation in the United States. In December 1977, with the NRC decision to terminate the generic study on

^{15/} Pickens at pp. 6-7; O'Connor at p. 5; Tr. 99-101, 106, 120-21, 172-73, and 182.

^{16/} Pickens at p. 7; Tr. 107, 182.

plutonium recycle use in mixed oxide fuel (GESMO), commercial reprocessing of spent fuel in the United States was indefinitely deferred, making reprocessing an uncertain alternative in the instant proceeding.^{17/}

10. Storage of spent fuel at reprocessing plants is technically feasible; however, the Allied-General Nuclear Services' (AGNS) facility at Barnwell, S.C. has limited potential space. The availability of space at AGNS for either interim storage or long term storage without reprocessing is unclear.^{18/}

11. While the former Nuclear Fuel Services" (NFS) reprocessing plant at West Valley, N.Y. is currently licensed for spent fuel storage, NFS has announced its withdrawal from reprocessing activities and is no longer accepting spent fuel from utilities for extended storage.^{19/}

12. Away-from-reactor storage (AFR) of spent fuel assemblies at other commercial facilities is another technically feasible but unavailable alternative. The only commercially licensed facility accepting spent fuel assemblies is the General Electric Facility at Morris, Illinois. Applicant has utilized all of its contracted storage space at this facility, and it is unlikely that additional permanent storage space can be obtained. GE-Morris currently accepts for permanent storage fuel from utilities with which it has reprocessing agreements. Applicant is not a party to such an agreement.^{20/}

^{17/} Pickens at p. 7; O'Connor at p. 3; Tr. 118-19, 170

^{18/} O'Connor at p. 3; Pickens at p. 8; Tr. 170.

^{19/} O'Connor at p. 3; Tr. 125.

^{20/} Pickens at p. 8; Tr. 127, 171, 174.

13. Intervenor asked about the potential for interim AFR storage of spent fuel in the event that core discharge would be required for making repairs inside the reactor vessel. The Applicant's witness indicated that GE-Morris, adjacent to the Dresden Station, might be willing to accept spent fuel for brief periods, but that such transshipment would require shipping procedures which would cause lengthy time delays in reestablishing FCDC for Dresden Units 2 and 3. Transshipment would utilize a shipping cask capable of handling seven BWR fuel assemblies at a time and each shipment of fuel would take three to five days.^{21/} No evidence was presented as to whether or not NFS or AGNS would accept fuel for interim storage.

14. At present there are no federally owned or operated AFR facilities, nor has Congress enacted any legislation authorizing federal AFR's and appropriating funds for this purpose. Any such federal facility would require preparation of an environmental impact statement and licensing by NRC prior to operation. Therefore, there is no assurance that storage at a federal AFR is a reasonable alternative to the requested SFP modification.^{22/}

15. As an alternate to federal or commercial AFR storage, an Applicant-owned centrally located AFR facility could be constructed and operated to service Applicant's nuclear generating stations. It is estimated that the cost of storage in such a facility would be in excess of three times that for onsite compact storage; furthermore, the time

^{21/} Tr. 96-99.

^{22/} Pickens at p. 8; O'Connor at p. 4; Tr. 98.

required for its license and construction was estimated as more than six years. Construction of on-site ISFSI's at each of Applicant's nuclear stations would have similar cost and licensing disadvantages. While the NRC has reviewed and issued letters of approval for a standard design for an ISFSI, such approval does not constitute a commitment by the NRC to license such a facility.^{23/}

16. Physical expansion of the existing Dresden Units 2 and 3 SFP's would be both expensive and difficult, requiring complex modification which might necessitate shutdown of the reactors during construction. The Dresden Units 2 and 3 SFP's are located above ground and adjacent to the reactor vessels. Further, there is limited space available for expansion. Physical alteration of the pools would also necessitate relocation of the stored spent fuel during the construction period. Finally, physical expansion would probably present an unreviewed safety question requiring NRC licensing approval.^{24/}

17. Further enrichment of the uranium used in the Dresden Units 2 and 3 reactors is not an alternative to increasing the spent fuel storage capacity. The existing fuel cannot be subjected to additional burnup. The enrichment of the fuel currently in the reactors limits the extent of burnup. Once the reactivity margin built into the fuel is exhausted, the

^{23/} Pickens at pp. 8-9; O'Connor at p. 4; Tr. 119.

^{24/} Pickens at p. 9; Tr. 176.

fuel cannot remain in the reactor and still have the reactor operate at its design rating. Also, NRC regulations limit the amount of fuel burn-up that can be transported.^{25/} Finally, since both Units 2 and 3 have already lost FCDC, extended burn-up programs with new fuel cannot alleviate the present problem, namely, the existing lack of FCDC.

18. In regard to Board Question 1(E), with one exception all the alternatives heretofore discussed would require issuance of licenses by the NRC, to the Applicant or to others. Applicant was granted authority for the one exception, shifting of spent fuel between the Dresden Units 2 and 3 SFP's, by NRC License Amendments 34 and 31 to Facility Operating License Numbers DPR-19 and DPR-25, dated January 30, 1978.^{26/}

19. The Board has evaluated all of the alternatives presented in the record and finds that at the present time there is no reasonable alternative to the proposed reracking if shutdown of the Dresden Station is to be avoided. Further, there is no assurance that any of the alternatives can or will become available in the future in such a time frame that shutdown could be avoided.

^{25/} Tr. 176, 178-80.

^{26/} Pickens at p. 9-10; O'Connor at p. 6; Tr. 108.

Board Question 2 states:

Based on a review and analysis of the various generic unresolved safety issues under continuing study, what relevance is there, if any, to the proposed spent fuel pool modification? Further, what is the potential health and safety implication of any relevant issues remaining unresolved?

20. The Board requested the parties to address Board Question 2 by affidavits (Part I, supra). Affidavits were submitted by all parties. On examination of these responses, the Board more specifically identified the "unresolved safety issues" with which it was concerned as being those issues reported to the Congress of the United States pursuant to Section 210 of the Energy Reorganization Act of 1974 and also reported in NUREG-0606, "Unresolved Safety Issues" Summary (the Aqua Book). An Unresolved Safety Issue "is a matter affecting a number of nuclear power plants that poses important questions concerning the adequacy of existing safety requirements for which a final resolution has not yet been developed and that involves conditions not likely to be acceptable over the lifetime of the plants affected." Generic problems which are candidates for the USI designation are categorized as A, B, C, or D in terms of their safety significance. USIs are usually Category A tasks, judged to be most important in terms of safety significances; Category B issues are less likely to qualify; and Category C and D issues are unlikely to qualify.^{27/} The Board specifically requested an affidavit from a senior staff member addressing the relevance and safety significance of the Unresolved Safety Issues.

^{27/} NUREG-0510, "Identification of Unresolved Safety Issues Relating to Nuclear Power Plants," Report to Congress, January 1979.

21. Subsequently, the parties submitted another round of affidavits (Part I, supra), among them that of Karl Kniel, Chief, Generic Issues Branch, Division of Safety Technology, Office of Nuclear Reactor Regulation, USNRC. Kniel's affidavit identified twenty-one current Unresolved Safety Issues (USI), indicated that he had reviewed each of these and addressed their applicability individually to the Dresden SFP modification, and provided a short description of each.

22. Of the USIs only two, i.e., A-36: Control of Heavy Loads Near Spent Fuel and A-40: Seismic Design Criteria, are relevant to the instant proceeding.

23. The Board finds that the responses provided by the parties satisfy the intent of Board Question No.2.

24. Applicant's affidavit of R. Janecek (March 18, 1981) dealt with the additional unresolved safety issues raised by Intervenor. However, Staff's affidavits did not.

25. Following the evidentiary hearing and the submission of affidavits on Board Question 2 Intervenor moved the Board to order the Staff to address all unresolved generic safety issues including, but not limited to, all Category B tasks, items identified by the Advisory Committee on Reactor Safeguards, and relevant "Three Mile Island" issues. Intervenor asserted that its affidavits of Richard B. Hubbard set forth the nexus of these issues to the Dresden 2 and 3 SFP proceeding and further pointed to the River Bend decision [6 NRC 760 (1977)] as its basis that the Board was required to consider these and all unresolved generic safety issues in the context of this proceeding.

26. Although the Board did not request affidavits on other than Category A items, it nonetheless considered and evaluated the other unresolved safety issues set forth by Intervenor and addressed by Applicant. Based on that review, the Board identified no unresolved safety items except the two cited in paragraph 22 above as applicable to the instant proceeding. Consequently, the Board declined to compel the Staff to undertake further review of the additional unresolved safety issues.

27. Kniel's review of the 21 USI's identified most as not applicable in this proceeding: A-1 through A-12; A-17; A-24; A-26; A-31; A-39; A-42; A-45 through A-48.^{28/}

28. The final resolution of A-36 was published in NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," July 1980. Staff's Safety Evaluation of the proposed SFP modification, issued November 4, 1980, considered accidents involving heavy loads in the vicinity of the SFP and concluded "there is reasonable assurance that the health and safety of the public will not be endangered". In response to a request to all licensees from NRC, dated December 22, 1980, Applicant again reviewed this subject and intends to comply with schedules set by the Staff in Applicant's submittals of further information.^{29/}

^{28/} ibid., pp. 6-16.

^{29/} Staff Ex. 1; Affidavit of R. F. Janecek, March 18, 1981; Kniel affidavit at p. 12.

29. Resolution of A-40 has not been reached. The proposed racks and pool structures at Dresden 2 and 3 were evaluated for seismic loads in connection with the proposed SFP modifications.^{30/} As explained by Janecek, Applicant's analysis and the Staff's review thereof followed current Staff acceptance criteria. The fundamental input to both the analysis and review was the seismic design response spectrum which was approved by NRC for Dresden Units 2 and 3 at the operating license stage; it was not redone in connection with the instant proceeding. Consequently, it was determined that A-40, which inter alia addresses to what extent old plants meet current design criteria, was relevant in this proceeding.^{31/}

30. A reevaluation of the seismic design of Dresden Unit 2 (in essence, identical to Unit 3) was performed as part of the Systematic Evaluation Program (SEP) and published as NUREG/CR-0891. The SFPs were not specifically analyzed; however the seismic review team generally concluded that structures and structural elements at Dresden are adequate to resist a safe shutdown earthquake (SSE) with a zero period peak horizontal ground acceleration of 0.2g, which is probably slightly greater than the actual seismic hazard at the site.^{32/}

^{30/} Applicant's Ex. 1 (Rev. 4) and Ex. 2 (Rev. 5).

^{31/} Janecek affidavit at pp. 13-15.

^{32/} Janecek affidavit at p. 14 and at Attachment B.

31. As a result of the SEP Branch review of Topic IX-1 for Dresden 2, the Staff concluded that the seismic analysis of the new rack installation conducted by the Applicant did not adequately address several issues.

32. Applicant's responses to Staff's technical review questions on seismic issues were served in Staff's Board Notification of May 20, 1981. Applicant indicated that its responses to these questions were not relevant in the instant proceeding since the "fact that the NRC Staff in the exercise of its independent responsibilities, has seen fit to ask these questions does not make these into issues which must be litigated in this proceeding" and because of the late date the new questions had been raised in this proceeding.^{33/} Subsequently, all but one issue was resolved between the Staff and the Applicant, and the Applicant was permitted to install five new racks in the Dresden Unit 3 pool in order to support a scheduled refueling outage.^{34/}

33. The single issue which remained unresolved was whether the SFP floors could withstand the loads, including impact, which would be imparted if all 33 racks rocked (tipped) during a seismic event and fell back simultaneously onto the SFP floor.^{35/}

^{33/} Letter dated June 12, 1981, transmitting Applicant Exhibit 3.

^{34/} 14 NRC 708 (1981).

^{35/} Rothberg and Harstead at p. 1.

34. On October 2, 1981, the Applicant submitted to the Staff a report entitled "Evaluation of the Effects of Postulated Rocking Racks on Spent Fuel Pool Structures of Dresden Station Units 2 and 3." In that report the results of a non-linear time history analysis of the potential effects of a seismic event were presented. This analysis included the modeling of rack impact on the pool floor due to rocking or tipping.^{36/}

35. The mathematical model of the rack/pool floor used in the analysis accounted for the non-linear effects of fuel bundle rattling within the cells and of the rack tipping on the pool floor. The results of the analysis indicated that the pool floor structure was well within its capacity under simultaneous loading from 33 racks. On December 14, 1981, the Applicant submitted additional responses to previous staff questions which supported Applicant's choice of seismic loading and method of analysis. The Staff found that these presentations demonstrated suitable conservatism in the Applicant's analysis.

36. In addition, a non-linear analysis of the pool and rack system for Dresden Unit 2 was performed by a staff consultant. It was found that the SFP structure is conservatively capable of withstanding the postulated loads imposed by the full 33 rack installation.^{37/}

37. A comparison also was made between the recent Quad Cities SFP expansion seismic analysis and the analysis used for Dresden 2. Both plants are Mark I boiling water reactors founded on rock in the same tectonic

^{36/} Applicant's Ex. 6.

^{37/} Staff Ex. 3.

province. Although the Quad Cities plant is arranged somewhat differently than at Dresden, the SFP structures are identical in dimension and very similar in construction. The seismic event postulated for Quad Cities was a 0.24g maximum event based on the 1957 Golden Gate Park earthquake time history. The floor response spectra at the Quad Cities pool floor was developed from this event and used for construction of the plant.^{38/}

38. The Staff considered that conclusions could be made regarding the adequacy of the proposed 33 rack Dresden installation by studying results of the analysis performed for Quad Cities. The Quad Cities 2 pool structure was found to be conservatively capable of withstanding the loads imposed by 3970 fuel assemblies which will be arranged in 20 racks. The Dresden pools will each be capable of holding 3637 fuel assemblies arranged in 33 racks. The fact that the Quad Cities structures were found to be acceptable provides some additional assurance, in the form of another analysis, that the Dresden spent fuel pool structures are adequately constructed to withstand the loads which are postulated for their seismic event under a full 33 rack load.^{39/}

39. The Board finds that the spent fuel floors of Dresden Units 2 and 3 spent fuel pools are adequate to withstand the loads, including impact, which could be imparted if all 33 racks rocked or tipped during a seismic event and fell back simultaneously to the pool floor.

^{38/} Rothberg and Harstead at 2; Staff Ex. 5, Enclosure at 2-3.

^{39/} Rothberg and Harstead at 3; Staff Ex. 5, Enclosure at 3.

40. The Board finds that although USI A-40, Seismic Design Criteria remains unresolved, the proposed racks and pool structures were evaluated conservatively for seismic loads utilizing current staff acceptance criteria. Therefore, the Board finds that there is no health and safety implication of this issue remaining unresolved as related to the proposed spent fuel pool modifications.

B. Accident Analysis Addendum

41. Intervenor's Contention 6 asserted that the application for the SFP modifications inadequately addressed the increased consequences of accidents due to the increased number of spent fuel assemblies and additional amount of defective fuel to be stored in the spent fuel pool as a result of the modifications.

42. The Board found in its earlier PID relative to Contention 6 that the consequences of the accidents considered in the FSAR, SER and FES associated with the operating license review of Dresden Units 2 and 3 will not be increased as a result of issuance of the proposed license amendment permitting installation of five high density storage racks in the Unit 3 SFP.^{40/}

43. At that time, the Board indicated that resolution of whether the existing structures are adequate to withstand the additional loads of 33 racks during the SSE must await further analysis.^{41/} The issue

^{40/} 14 NRC 708 (1981), § 164.

^{41/} *ibid.*, § 163.

awaiting further analysis was whether the SFP floors could withstand the loads, including impact, which would result if all 33 racks rocked or tipped during a seismic event and fell back simultaneously onto the SFP floor.

44. As indicated above (Part I, supra) that issue has now been resolved in favor of proceeding with the installation of the 33 racks in each pool. Therefore, the Board amends § 164 of its PID in that the Board finds that the consequences of the accidents considered in the FSAR, SER and FES associated with the operating license review of Dresden Units 2 and 3 will not be increased as a result of issuance of the proposed license amendment permitting installation of 33 high density storage racks in the Units 2 and 3 SFPs.

III. CONCLUSIONS OF LAW

1. At the present time there is no reasonable alternative to the proposed reracking of Dresden Units 2 and 3 spent fuel pools if shutdown of the Dresden Station is to be avoided. Further, there is no assurance that any of the alternatives can or will become available in the future in such a time frame that shutdown could be avoided.

2. Although the generic seismic design criteria issue (USI-40) remains unresolved, the proposed racks and pool structures for Dresden Units 2 and 3 were evaluated conservatively for seismic loads utilizing current staff acceptance criteria. There is no health and safety implication of this issue remaining unresolved as it relates to the proposed modification.

3. The issuance of the license amendment requested in this proceeding, installation of thirty-three high density racks in the Dresden Units 2 and 3 spent fuel pools, is not a major Commission action significantly affecting the quality of the human environment and therefore it does not require the preparation of an environmental impact statement under the National Environmental Policy Act of 1969, 42 U.S.C. Section 4321, et seq., and Part 51 of the Commission's regulations, 10 CFR Part 51.

4. There is reasonable assurance that the activities authorized by the requested operating license amendment can be conducted without endangering the health and safety of the public provided that the conditions set forth in the Order contained in the Partial Initial Decision are incorporated into the license, and provided that the commitments set forth in the Partial Initial Decision are followed.

5. The activities authorized by the requested operating license amendment will be subject to compliance with the Commission's regulations.

6. The issuance of the requested operating license amendment will not be inimicable to the common defense and security or to the health and safety of the public provided there is compliance with the conditions and commitments set forth in the order below.

IV. ORDER

In accordance with the Atomic Energy Act, as amended and the regulations of the Nuclear Regulatory Commission, and based on the findings and conclusions set forth herein it is

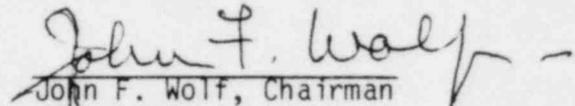
ORDERED

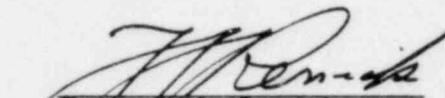
that the Director of Nuclear Reactor Regulation make appropriate findings in accordance with the Commission's regulations and issue the appropriate license amendment authorizing the installation of a total of 33 high density storage racks in each of the Dresden Station Units 2 and 3 spent fuel pools.

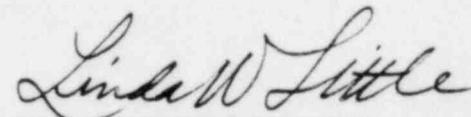
It is further ORDERED in accordance with 10 CFR 2.760, 2.762, 2.764, 2.785 and 2.786, that this initial decision shall be effective immediately and shall constitute the final action of the Commission forty-five (45) days after the issuance thereof, subject to any review pursuant to the above-cited Rules of Practice.

Within ten (10) days after service of this initial decision any party may take an appeal to the Commission by the filing of exceptions to this decision or designated parts thereof. A brief in support of the exceptions shall be filed within thirty (30) days thereafter [forty (40) days in the case of the Staff]. Within thirty (30) days of the filing and service of the brief [forty (40) days in the case of the Staff] any party may file a brief in support of, or in opposition to, the exceptions.

THE ATOMIC SAFETY AND
LICENSING BOARD


John F. Wolf, Chairman
ADMINISTRATIVE JUDGE


Forrest J. Remick
ADMINISTRATIVE JUDGE


Linda W. Little
ADMINISTRATIVE JUDGE

Dated at Bethesda, Maryland
this 17th day of August 1982

APPENDIX

Exhibits

<u>Staff's Exhibit No. and Title</u>	<u>Admitted</u>
3. Dresden 2 & 3: Impact Effects on Spent Fuel Pool Slab, from Gunnar A. Harstead, dated May 19, 1982	Tr. 1231
4. Regulatory Information Distribution System Accession No. 8112180367, "Subject: Forwards addl background info on high density spent fuel racks...", dated December 14, 1981.	Tr. 1230
5. Supplementary Safety Evaluation Report for Dresden Nuclear Power Plant Units 2 and 3 Proposed Expansion of Spent Fuel Storage Facilities, transmitted May 26, 1982.	Tr. 1231

<u>Applicant's Exhibit No. and Title</u>	<u>Admitted</u>
6. Letter from T. J. Rausch to Dennis M. Crutchfield, dated October 2, 1981, transmitting the report "Evaluation of the Effects of Postulated Rocking of Racks on Spent Fuel Pool Structures of Dresden Nuclear Station Units 2 and 3" by Quadrex Corporation	Tr. 1250
7. Letter from T. J. Rausch to Dennis M. Crutchfield, dated January 20, 1982, summarizing Applicant's resolution of SEP concerns.	Tr. 1250
8. Résumé of Krishna P. Singh	Tr. 1250