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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matter of)	
COMMONWEALTH EDISON COMPANY)	Docket Nos. 50-295
(Zion Station, Units 1 and 2))	50-304
)	(Spent Fuel Pool Modification)

NRC STAFF BRIEF IN OPPOSITION TO INTERVENOR'S
BRIEF IN SUPPORT OF EXCEPTIONS

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INTRODUCTION

On April 3, 1980, Intervenor, the Attorney General of the State of Illinois, filed its Brief in Support of Exceptions to the February 14, 1980 Initial Decision of the Licensing Board in the instant proceeding. The Board's decision, inter alia, granted Commonwealth Edison Company's application to expand the spent fuel pool capacity at Zion Station. For the reasons set forth below, the NRC Staff opposes Intervenor's exceptions to the Initial Decision.

STATEMENT OF THE CASE

Reference to Rulings

Under principal review here is the Initial Decision of the Atomic Safety and Licensing Board on the Proposed Amendment to Permit Storage Pool Modification, Zion Station, Units 1 and 2, Docket Nos. 50-295 and 50-304, FOL Nos. DPR-39 and DPR-40, February 14, 1980.

Factual Background

Commonwealth Edison Company (Applicant) has applied for permission to install high-density, neutron-absorbing spent fuel storage racks in the spent fuel pool at Zion Station, Units 1 and 2, Zion, Illinois. The new racks will increase fuel storage capacity from 868 fuel assemblies to a capacity of 2,112 fuel assemblies.

Applicant's application for the operating license amendments was dated April 13, 1978, and subsequently supplemented on eight separate occasions.

Initial notice of the proposed amendment was published in the Federal Register on July 18, 1978. 43 Fed. Reg. 30938. The Attorney General of the State of Illinois (Intervenor) filed a timely petition for leave to intervene and requested a public hearing on the application.

On November 20 and 21, 1978, a special prehearing conference was held in Waukegan, Illinois, for the purpose of ruling on Intervenor's standing to intervene and to determine whether at least one contention proposed by Intervenor met the required standards contained in the Nuclear Regulatory Commission's Rules of Practice. Intervenor was admitted as a party on January 19, 1979.^{1/} At that time, the Licensing Board ruled upon the admissibility of Intervenor's contentions.

Motions for summary disposition were filed by Applicant and by the Nuclear Regulatory Commission staff (Staff). Certain of Intervenor's contentions

^{1/} Order Following Prehearing Conference, dated January 19, 1979.

were summarily dismissed by the Licensing Board on the grounds that no genuine issues of material fact existed as to those contentions.^{2/}

An evidentiary hearing was held in Zion, Illinois, from June 11 through June 15, 1979 and June 20 through June 22, 1979, where evidence was presented by each of the parties with respect to the remaining contested contentions and questions raised by the Licensing Board.

After the closing of the evidentiary record, and after the submission of proposed findings of fact and conclusions of law by the parties, the Licensing Board reopened the record of its own motion to receive additional evidence regarding the potential for intergranular stress corrosion cracking in the proposed storage racks.^{3/}

On February 14, 1980, the Licensing Board issued its Initial Decision, authorizing the requested license amendment. On March 3, 1980, Intervenor filed 15 exceptions to the Initial Decision, and filed a brief in support of exceptions on April 3, 1980.^{4/} Neither Staff nor Applicant filed exceptions to the Initial Decision.

The NRC Staff believes the ultimate findings and conclusions of law contained in the Initial Decision are correct, and files this brief in basic opposition

^{2/} Order, dated May 1, 1979; Order, dated June 4, 1979.

^{3/} Board's Memorandum and Order, dated September 14, 1979.

^{4/} Although the certificate of service is dated April 3, 1980, postal cancellation would indicate mailing as of p.m., April 4, 1980.

to the Intervenor's brief in support of exceptions. As the Intervenor's 15 numbered exceptions have apparently been consolidated into seven specific sections of Intervenor's Brief in Support of Exceptions, this brief will address the sections of Intervenor's brief seriatim,^{5/} as opposed to the original exceptions.^{6/} To the extent that certain exceptions are not addressed in the Intervenor's supporting brief, they may be disregarded on appeal.^{7/}

^{5/} The Staff's Response to Sections 3 and 4 of Intervenor's Brief are combined in Staff's Section 3, infra, because of the close relationship of these issues.

^{6/} The Staff would also note Intervenor's almost thorough failure to provide record references in their brief, as required by 10 C.F.R. § 2.762(b).

^{7/} See, e.g., Public Service Co. of Indiana, Inc. (Marble Hill Generating Station, Units 1 and 2), ALAB-461, 7 NRC 313, 315 (1978); Florida Power and Light Co. (St. Lucie Nuclear Plant, Unit 2), ALAB-435, 6 NRC 541, 542 (1977); Tennessee Valley Authority (Hartsville Nuclear Plant, Units 1A, 2A, 1B, and 2B), ALAB-367, 5 NRC 92, 104 (1977).

STATEMENT OF ISSUES PRESENTED

The following issues are raised by the State of Illinois' brief in support of its exceptions taken to the Initial Decision:

1. Whether Applicant met its burden of demonstrating that corrosion and swelling of the proposed racks which might interfere with fuel movement would not occur.
2. Whether the Board correctly found that the public health and safety do not require imposition of certain requested license conditions and technical specifications.
3. Whether the Board correctly found that a loss of spent fuel pool coolant could not occur from neglect, and that there are sufficient sources of makeup water to ensure that the public health and safety is not endangered by pool boiling.
4. Whether the Board was correct in excluding the testimony of Peter J. Cleary, who was offered as an expert witness on the issue of emergency planning.
5. Whether the Board correctly found that no emergency plan modifications are necessitated by the increase in spent fuel pool capacity.
6. Whether the Board was correct in its refusal to require groundwater monitoring.

1. Applicant Met its Burden of Demonstrating that Corrosion and Swelling of the Proposed Racks which Might Interfere with Fuel Movement Would Not Occur

Intervenor takes exception to the Licensing Board's findings that swelling of the tubes in the spent fuel storage racks, due to accumulation of entrapped gas between the boral and its stainless steel casings, would not occur at Zion; that swelling of the boral itself caused by hydrogen gas, as an off-gas of corrosion, should not occur at the Zion racks; and that swelling of the boral caused by corrosion product buildup will not interfere with the movement of fuel within the storage tubes.^{8/} It is the position of the Intervenor that evidence presented by Applicant and Staff did not establish conclusively that swelling within the fuel storage racks, due to corrosion, would not occur with resultant significant consequences.

The main thrust of Intervenor's arguments is that the substantial quantum of evidence necessary to support the ultimate conclusion that the public health and safety would not be endangered has not been adduced. However, a review of the evidentiary record indicates that Applicant has fully described the unresolved safety problems related to swelling of the boral racks, it has presented a program to resolve these problems which the Staff has analyzed and found satisfactory, establishing thereby that the risk resulting from any possible swelling effect is minimal, and poses no credible threat to the public health and safety.^{9/} Both the Applicant and the NRC Staff presented

^{8/} Intervenor's Brief at 1-4.

^{9/} Virginia Electric and Power Company (North Anna Nuclear Power Station, Units 1 and 2), ALAB-491, 8 NRC 245, 248-49 (1978). See also Gulf States Utilities Company (River Bend, Units 1 and 2), ALAB-444, 6 NRC 760 (1977); Tennessee Valley Authority (Yellow Creek Nuclear Plant, Units 1 and 2), License LBP-78-39, 8 NRC 602 (1978).

expert testimony on the subject of corrosion in the replacement spent fuel storage racks.^{10/} Intervenor presented no expert testimony on this issue, as the testimony of their preferred expert in regard to metallurgy was struck by the Licensing Board,^{11/} but argues that its case was established by cross-examination.^{12/} However, Intervenor has not cited record references, and the Staff counsel cannot locate transcript contents supportive of Intervenor's assertion. As the NRC Staff testimony reviewed below demonstrates, while corrosion will occur to some degree, it will have no significant effects upon the function of the proposed spent fuel storage racks.

There is a major difference in electrical potential between aluminum and stainless steel, and therefore galvanic corrosion will occur between the aluminum cladding in the boral and the stainless steel tubes which encapsulate the boral.^{13/} The corrosive effects which occur will be on the boral plates, because the stainless steel used in the racks and in the stainless steel tubes enclosing the boral plates is electrochemically more noble than the boral itself; thus, structural integrity of the stainless steel components of the racks is not threatened.^{14/} However, any corrosive pitting of the boral plates and their

^{10/} Testimony of J. E. Draley (Draley) following Tr. 1290; Testimony of Frank M. Almeter and Edward Lantz (Almeter and Lantz) following Tr. 1141; Testimony of A. Burtron Johnson, Jr. (Johnson) following Tr. 1057.

^{11/} Tr. 1402-03.

^{12/} Intervenor's Brief at 8.

^{13/} Almeter and Lantz testimony at 3-9.

^{14/} Almeter testimony at 8, Tr. 1141-43; Draley testimony at 5, 10, Johnson testimony at 6.

cladding, where electrical contact with the stainless steel tubes is good, will not lead to serious loss of neutron-absorbing properties of the boral, or cause corrosion product swelling of the boral which would interfere with free movement of the spent fuel stored in the racks due to the self-limiting nature of the corrosion.^{15/} The corrosion rate of the stainless steel tubes themselves will be negligible, due to the differential in electrogalvanic potential.^{16/} Intervenor correctly states that swelling has previously occurred in racks of similar design.^{17/} However, the racks which encountered swelling of the storage rack tubes were not vented to allow the escape of hydrogen gas, resulting from corrosion when water either leaked into the unvented tubes or was sealed within the tubes at the time of fabrication. In contrast, the proposed spent fuel storage tubes to be installed at Zion will contain a one-quarter inch vent hole near the top of each side of each tube, which would penetrate the inside stainless steel wall and allow spent fuel pool water to enter the tube and come in contact with the boral material. This venting will allow gas to escape.^{18/} Thus, swelling which might result from pressures induced by the formation of hydrogen gas should be conclusively prevented by the venting of the storage racks. An additional type of swelling of the boral might occur due to the galvanic interaction between the aluminum in the boral plates and the stainless steel tubes, where the two are pressed

^{15/} Draley testimony at 5-6, 10.

^{16/} Draley testimony at 2-3, 10; Almeter and Lantz testimony at 8, 12.

^{17/} Intervenor Brief at 2; Initial Decision slip op. at 52.

^{18/} Almeter and Lantz testimony at 12-13, Tr. 1141; Draley testimony at 13, Tr. 1290.

together. The resultant solid corrosion product has a greater volume than that of the corroded metal, and local swelling could occur. However, a calculation of the volume of such corrosion product which might occur indicated that corrosion all the way through cladding and material would result in swelling of less than one-quarter inch in thickness, an amount which would not interfere with the movement of fuel within the storage tubes.^{19/} Based on the above uncontroverted evidence of record, Staff submits the Applicant has met its burden to show conclusively that consequential swelling of either the boral or the stainless steel components of the proposed spent fuel storage racks would not occur.^{20/}

Applicant has further committed to conduct a corrosion surveillance program which consists of suspending specimens containing weld geometries and

^{19/} Draley testimony at 12-13, Tr. 1290, 1316-18.

^{20/} Intervenor, in its Brief at 4, asserts that the final design of the racks relative to venting holes had not been determined at the time of the hearing. In fact, the testimony of Applicant and Staff indicated that top and bottom vent holes would adequately prevent corrosion and swelling of the racks. The only question remaining was whether more satisfactory results might occur if only the top vent holes were drilled. See Prefiled Testimony of John L. Zudans, following Tr. 1960 at 3-4; Tr. 1318-19, 1342-45, 1355-58, 1766-68; Staff Exh. 1A, following Tr. 1141 at 2-8; Prefiled Testimony of Joseph E. Draley, following Tr. 1290 at 13.

Intervenor further alleges that the Board's conclusions were founded on conclusory statements of Applicant's and Staff's witnesses. These expert witnesses presented extensive testimony on the subject of venting, and its consequences, and were subjected to rigorous cross-examination by counsel for Intervenor. This is hardly equivalent to the lack of "substantive evidence" found in *Baltimore & Ohio Ry. v. Aberdeen & Rockfish Ry.*, 393 U.S. 87, 92 (1968), cited by Intervenor, where no evidence was adduced in support of the conclusions of the administrative tribunal under appellate review.

material similar to those of the fuel racks inside the pool adjacent to the proposed storage racks. These specimens would be examined visually and ultrasonically on a yearly basis.^{21/} Additionally, small vented stainless steel coupons containing boral specimens would be stored in the pool, to be removed periodically, opened, and examined for corrosion damage. Additionally, two full size storage tubes will be placed in the pool near to stored fuel so as to reproduce the radiation exposure as well as the exposure to the borated pool water. These tubes would be examined periodically for visual signs of swelling and will be opened and examined for loss of boron if examination of the miniature coupons indicates a significant reduction in neutron-absorbing material.^{22/} The Staff submits that this corrosion surveillance program, coupled with venting of the neutron-absorbing racks to allow release of any hydrogen gas which might form, is adequate, in terms of prevention and detection of swelling within the proposed storage racks, to assure the protection of the public health and safety.

^{21/} Affidavit of Roger Staehle, November 16, 1979 at 12; Licensee's Response to Memorandum and Order, November 16, 1979 at 2.

^{22/} Draley testimony at 8 and attachment 5.

2. Public Health and Safety Do Not Require Imposition of Certain License Conditions and Technical Specifications Requested by Intervenor

Intervenor takes exception to the Licensing Board's failure to impose certain technical specifications or license conditions which Intervenor had requested. These include requested technical specifications or conditions pertaining to the possibility of corrosion and swelling in the spent fuel storage racks (Intervenor's Exceptions 6 and 8), and a requested technical specification calling for in situ neutron attenuation testing of the proposed racks (Intervenor's Exception 11). Also requested by the Intervenor was a technical specification providing that a dummy fuel assembly test be made of each tube to assure the appropriate clearance before the new racks were placed in the pool, and that a contingency plan be implemented in cases where a boron plate might be found to be missing from a storage tube (Intervenor's Exception 10). The Licensee made commitments covering the technical specifications requested in each of the above exceptions.^{23/}

As to the Intervenor's proposals that the technical specifications include a provision for a dummy fuel assembly test of each tube, and a contingency plan for cases where a boron plate might be found to be missing from a storage tube, the Staff submits that the Intervenor misapprehends the function which is served by technical specifications, and the standard which

^{23/} See Commonwealth Edison's Brief in Support of the Initial Decision (Applicant's Brief), dated May 5, 1980, at 24, n. 31, and references therein. Intervenor acknowledges Applicant's commitments as to the corrosion surveillance plan and the in situ neutron attenuation testing, but erroneously states that Applicant opposed a dummy fuel assembly test of each storage tube and a contingency plan to be implemented if boron plates were found to be missing from a storage tube. Intervenor's Brief at 8.

governs their imposition by a Licensing Board with respect to some particular aspect of the design or operation of the facility.

The Appeal Board has spoken definitively on the standards for imposition of a technical specification or license condition. In the Trojan case,^{24/} the Appeal Board, interpreting 10 C.F.R. § 50.36 and the "Guide to Content of Technical Specifications for Nuclear Reactors," discerned that both the Atomic Energy Act and the regulations appear to contemplate that "technical specifications are to be reserved for those matters as to which the imposition of rigid conditions or limitations upon reactor operation is deemed necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health or safety."^{25/}

In that case, weighing the State of Oregon's suggested technical specifications against this standard, the Appeal Board found the question to be whether the evidentiary record establishes that the inclusion of such a technical specification in the operating license was necessary in order to guard against the contingency or untoward situation or event bringing about a safety threat of some immediacy.^{26/}

The Appeal Board proceeded to discuss the duty imposed upon holders of operating licenses by 10 C.F.R. § 50.59(b). That regulation specifically requires licensees to maintain records of changes in the facility and of changes in

^{24/} Portland General Electric Co. (Trojan Nuclear Plant), ALAB-531, 9 NRC 263 (1979).

^{25/} Id. at 273.

^{26/} Id. at 274 (emphasis added).

procedures, and to furnish to the Commission, at intervals no less than once a year, a report of all such changes including a summary of the safety evaluation of each change. This mandatory obligation which is imposed upon the licensee is just as enforceable as is a technical specification.^{27/}

Looking at the technical specifications which were proposed by the intervenor in the Trojan case, it can be seen that they are, in many respects, similar to those requested by Intervenor in the instant proceeding. Oregon had sought technical specifications which would require the institution of a corrosion coupon program, to determine the existence and rate of any corrosion upon zirconium and stainless steel in the borated spent fuel pool water. Additionally, it sought a technical specification requiring water chemistry monitoring, to detect any corrosion of the zircaloy fuel cladding.^{28/}

In respect to each of these proposals, the Trojan Appeal Board found that there was no immediate risk posed by the conditions which would be monitored, or become the subject of surveillance, under the intervenor's proposed technical specifications. Given the mandatory reporting requirement of 10 C.F.R. § 50.59(b), that Appeal Board was persuaded that any significant deviation, either in the corrosive rate of zircaloy or the stainless steel coupons suspended in the pool, would come to light long before an unsafe operating condition might conceivably develop as a consequence thereof.^{29/} Thus, commitments of the

^{27/} Id. at 274-75.

^{28/} Additional technical specifications sought by the State of Oregon in the Trojan case are not relevant to the discussion here.

^{29/} Trojan, supra, at 275.

Applicant were deemed adequate to protect the public health and safety. In the event Applicant sought to terminate such commitments, the annual reporting requirement would provide ample notice to the NRC Staff, which could then impose a technical specification, if it deemed such action to be required at that time.

In the instant case, the Licensing Board issued the requested license amendment indicating it should contain conditions regarding U-235 loading of the fuel to be stored in the pool and limitations on loads which might be carried over spent fuel stored in the pool. It proceeded to state that the aforementioned license amendment "takes into consideration the following commitments by the applicant," which commitments provided for notification of the NRC prior to handling heavy loads in the vicinity of the pool, a corrosion surveillance program for the racks once installed in the pool, and in situ neutron attenuation testing to verify adequacy of neutron absorption by the boral plates in the racks.^{30/} The Licensing Board decision did not require a dummy fuel assembly test of each tube, nor a contingency plan in cases where a boral pipe was missing from each tube, as requested by Intervenor. Subsequently, the NRC Staff imposed technical specifications as requested by the Intervenor with regard to the corrosion surveillance program and in situ neutron attenuation testing.^{31/} The Staff did not impose technical

^{30/} Initial Decision, slip op. at 99.

^{31/} Zion Station, Unit 1, Amendment No. 52 to Facility Operating License DPR-39, and Zion Station, Unit 2, Amendment No. 49 to Facility Operating License DPR-48, dated February 28, 1980.

specifications with regard to a dummy fuel assembly test of each tube, or a contingency plan to be implemented in the event boral plates were found missing from a tube, in spite of Applicant's commitments in these areas.

Initially, as to the requested technical specifications with regard to dummy fuel assembly testing of the tubes and the proposed contingency plan for missing boral plates, the Staff submits that the principle set forth in the Trojan case is controlling, and that the Licensing Board correctly determined that such technical specifications were not required in the license because of the lack of any immediate risk to the public health and safety.^{32/} The Staff submits that public health and safety is adequately protected by the Licensee's commitment to perform this test prior to utilization of the new racks, and to take remedial action as required.^{33/}

The remaining technical specifications requested by Intervenor were, in fact, imposed by the Staff as technical specifications on February 28, 1980, when the amendments to the two units' operating licenses were issued. Thus, Intervenor's exceptions as to the Board's failure to impose these technical specifications are moot. In this regard, however, another issue has arisen. Applicant, in its Brief,^{34/} voices a protest against the Staff's imposition

^{32/} Accord, Virginia Electric and Power Co. (North Anna Nuclear Power Station, Units 1 and 2), ALAB-578, NRC (February 11, 1980) slip op. at 61, 62; but cf. Portland General Electric Co. (Trojan Nuclear Plant), Memorandum and Order, slip op. at 2 (October 18, 1980) (Separate Views of Commissioner Bradford).

^{33/} Tr. 762; Testimony of Jack Leider, following Tr. 758 at 11-12; Tr. 1947-50.

^{34/} Applicant's Brief at 25-26, 30-32.

of three of its commitments as technical specifications of the licenses. Applicant argues that the technical specifications at issue^{35/} go no further toward the protection of the public health and safety than do licensee commitments, and that it has already made commitments covering the substance of each of these technical specifications. It is clear from the Initial Decision of the Licensing Board^{36/} that the Board placed heavy emphasis upon these commitments, and found that their implementation was essential. The Board states as follows:

The Board finds that these commitments by the Applicant add to the assurance of safe operation of the Spent Fuel Pool, and therefore they contribute to the Board's conclusion that the application to modify the Zion spent fuel pool should be granted. Accordingly, the Board finds as a matter of law that the Applicant is bound by these commitments and that failure to implement them is subject to any appropriate sanctions found in the Commission's regulations.

It is clear, from the above paragraph, that the Board found the Applicant to be bound by those commitments, authorized issuance of the license amendments in reliance upon these commitments, and assumed that any failure to implement them would invite sanctions.

^{35/} The Technical Specifications incorporated in the Licenses: read as follows:

The NRC shall be notified in advance should it become necessary to handle heavy loads in the vicinity of the spent fuel storage pool.

Upon completion of the modification a corrosion surveillance program for the racks shall be implemented and kept in force to insure that any loss of neutron absorber material and/or swelling of the storage tubes is detected.

In situ neutron attenuation tests shall be performed to verify that tubes and racks contain a sufficient number of Boral plates such that K-effective will not be greater than 0.95 when the spent fuel is in place. Results of these tests shall be reported to the NRC within 30 days after completion of the modification.

^{36/} Initial Decision, slip op. at 99-100.

The backbone of Applicant's argument that the technical specifications are not required as to these items to which it is already committed is that 10 C.F.R. § 50.59(b) requires recordkeeping and annual reporting of any changes of licensee commitments. However, that section only imposes this reporting requirement as to changes which "constitute changes in the facility as described in the Safety Analysis Report or constitute changes in procedures as described in the Safety Analysis Report." In the Trojan case, the commitments of Applicant were included in documents submitted as part of the license amendment application for docketing. Unlike that situation, the commitments of Applicant in the instant proceeding have not been incorporated in the application for amendment, or in the Applicant's Final Safety Analysis Report for Zion Station, Units 1 and 2. In fact, the only record of such commitments outside of the record of this proceeding is found in the fact that such commitments have been brought to the knowledge of the NRC's Office of Inspection and Enforcement and to the Resident Inspector at the Zion Station, who testified at the spent fuel pool modification hearings. Accordingly, there is, in fact, no reporting requirement imposed upon Applicant by Section 50.59(b) as to these commitments. Therefore, the NRC Staff submits that the imposition of technical specifications, in a case where no reporting requirement exists and where the commitments in question were heavily weighted by the Licensing Board in the issuance of the operating license amendments, is correct. While this may not be the only available means of obtaining enforcement of such commitments, it provides an easily traceable record of such commitments and places the burden upon the Applicant to insure compliance therewith, or to affirmatively inform the NRC of noncompliance or deviation, under threat of regulatory sanctions. As the Applicant has voluntarily committed to perform the duties incorporated in the technical specifications, it should not be heard to complain at this time that such commitments are memorialized in the operating license.

3. The Licensing Board Correctly Found that a Loss of Spent Fuel Pool Coolant Could Not Occur from Neglect, and that There Are Sufficient Sources of Makeup Water to Insure that the Public Health and Safety Is Not Endangered by Pool Boiling

Intervenor takes exception to the Licensing Board's finding that the heat removal capacity of the Zion spent fuel pool cooling system and related cooling systems is adequate to support the expanded pool capacity. Specifically, it challenges the finding that there are sufficient sources of make-up water and adequate access to such sources to insure that the public health and safety would not be endangered by boiling in the spent fuel pool.^{37/}

In arriving at this finding, the Licensing Board, sua sponte, elicited evidence on the existing design and engineered safety features which would reduce the likelihood of a severe drainage accident, in addition to the possibility of pool boiling leading to a loss of coolant.^{38/} Again, Intervenor merely questions the findings of the Licensing Board without pointing to contrary evidence in the record.

Intervenor additionally takes exception to the Licensing Board's finding that a loss of coolant in the pool could not result from neglect, on the grounds that finding was made without an adequate evidentiary basis. While the Board's treatment of this issue in their Initial Decision was not exhaustive, given the abject speculation of Intervenor's witness, such treatment was simply not merited.

^{37/} Intervenor's Brief at 16-17. See also Initial Decision, slip op. at 45.

^{38/} Board Questions 4(g), (h); Initial Decision, slip op. at 84-88.

First, as to adequacy of makeup water supplies, Applicant and Staff each presented testimony on the sources and amounts of available makeup water.^{39/} Second, as to accessibility of these makeup water sources, both Applicant and the Staff testified that the pumps and heat exchangers of the spent fuel pool cooling system and the controls to the makeup water supply are located in an isolated section of the fuel building, completely walled-in by concrete. The testimony of each indicated that such equipment and controls were accessible under any circumstances (even if one of the reactors should experience a loss of coolant accident) by access through a railroad trackway entrance to the fuel building, which could be entered without passing the spent fuel pool.^{40/}

The testimony of Intervenor's witness, Dr. Marvin Resnikoff, did not contradict this testimony regarding accessibility to the spent fuel pool remote controls for cooling the pool. This witness further acknowledged the existence of an extensive network of makeup water systems and engineered safety features which would indicate rising temperatures or decreasing water levels in the pool. In fact, he did not question Applicant's ability to supply cooling water at an adequate makeup rate in the event of pool boiling, if it would be possible to deliver this cooling water to the pool under all circumstances. Thus, based upon the uncontroverted testimony of Staff and Applicant, and Intervenor's witness' admission that adequate sources of makeup

^{39/} Tr. 1032-35; Staff Exh. 1A, para. 2.2.

^{40/} Testimony of Tom R. Tramm, Tr. 1485-86, 1501; Testimony of Gary G. Zech and Edward Lantz, Tr. 1688-89, 1859-63.

water are available, the finding of the Board, as to the availability of cooling water supply and access thereto, was correct.

Having conceded the basic availability of pool cooling capability, Intervenor's witness then testified that the spent fuel pool could boil ^{dry}_{41/} simply through neglect or under a major reactor accident scenario. Upon cross examination, the witness testified that what he meant by that is "if you simply turn off the cooling system . . . and walk away, this accident will then follow."^{42/} He testified that the time periods required for such a boil-off of coolant would vary under different conditions, but would be on the order of ten days.^{43/} He indicated that he felt it possible that the fuel pool could go neglected for a ten-day period, while experiencing boiling,^{44/} in such circumstances as a major accident or war.

Upon cross-examination, he stated that "I could think of situations where a spent fuel pool would be neglected, yes, I can, but those would require major disruptions in our society."^{45/} Finally, he testified that he believed human intervention might not be possible if there were a major accident in the facility and there were a large amount of contamination preventing workers from getting to the facility.^{46/} He did not take issue with the testimony

41/ Testimony of Marvin Resnikoff (Resnikoff) following Tr. 1528 at 1.

42/ Tr. 1560-61.

43/ Tr. 1561.

44/ Tr. 1562.

45/ Ibid.

46/ Tr. 1571.

of Applicant and Staff as to remote control capability,^{47/} but testified that, out of his "concerns," he would suggest fully automated makeup water systems, negating both the possibility of a boil-off through neglect and any need for human intervention.^{48/}

In the instant case, the burden rested upon Intervenor to establish a reasonable issue of fact requiring resolution, by a showing sufficient to require reasonable minds to inquire further.^{49/} As Intervenor asserts,^{50/} once an intervenor has met this burden of going forward, the ultimate burden of proof falls upon the Applicant. It is also clear that an intervenor may build its case defensively, through the medium of cross-examination.^{51/}

This, however, was not the situation confronting the Licensing Board in the instant case. Intervenor's witness provided no basis for his abject speculation that workers might turn off the cooling systems and abandon the reactors.^{52/} His prefiled testimony was addressed toward water loss through boil-off due

^{47/} See n. 39, *supra*.

^{48/} Tr. 1556-60, 1570.

^{49/} Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, 435 U.S. 519 (1978).

^{50/} Intervenor's Brief at 14.

^{51/} Tennessee Valley Authority (Hartsville Nuclear Plant, Units 1A, 2A, 1B, and 2B), ALAB-463, 7 NRC 341, 356 (1978); Commonwealth Edison Co. (Zion Station, Units 1 and 2), ALAB-226, 8 AEC 381, 389 (1974); Wisconsin Electric Power Company (Point Beach Nuclear Plant, Unit 2), ALAB-137, 6 AEC 491, 504-05 (1973).

^{52/} Tr. 1560-61; Initial Decision, slip op. at 44.

to cooling system malfunction, and effects on the fuel.^{53/} Intervenor here sought to challenge the evidence of Staff and Applicant on the issue of pool boiling with mere questions and "concerns" raised by its own witness.

The Staff submits that, in this instance, the Applicant, through its own testimony coupled with testimony of the Staff, has met its burden of proof, and that the Licensing Board, based upon its balancing of the evidence of record, properly found that Applicant had satisfied the burden of proof on this issue.^{54/}

The Staff submits that even a cursory review of the above testimony clearly establishes the sufficiency and correctness of the Licensing Board's finding.^{55/}

Accordingly, the Staff submits that the findings of the Licensing Board on the issue of pool boiling should be affirmed.

^{53/} Resnikoff following Tr. 1528.

^{54/} Intervenor alludes to the Licensing Board placing a "rubber stamp" on the credibility of Staff's and Applicant's witnesses, finding Intervenor's witness less credible. Intervenor's Brief at 16. Reference to the testimony adduced on this issue, discussed above, clearly demonstrates a lack of substantive evidence, as opposed to queries or hypothetical events, in opposition to the testimony of Staff's and Applicant's witnesses.

^{55/} Cf. Wisconsin Electric Power Company (Point Beach Nuclear Plant, Unit 2), ALAB-78, 5 AEC 319, 322 (1972).

4. The Board Did Not Err in the Exclusion of the Intervenor's
Prefiled Testimony of Peter Cleary

Intervenor asserts that the Board erred in excluding the prefiled written testimony of its proposed witness on Board Question 4(b) (emergency planning portion) on the grounds that he was not qualified to offer an expert opinion on the question posed and further that his prefiled testimony, and appendices, were irrelevant thereto.^{56/} The Staff believes that the Board's disputed ruling was proper, does not constitute an abuse of discretion, and should be upheld.

As relevant to the instant exception, the Licensing Board propounded the following question regarding emergency planning for the Zion Station, Units 1 and 2:

4(b) As a result of the proposed modification of the spent fuel pool and the proposed operation of the Station with increased spent fuel storage capacity, will it be necessary to modify . . . the Emergency Plan for the Station.

Both the Staff^{57/} and the Applicant^{58/} introduced expert testimony in response to this question. The Intervenor proffered the prefiled testimony of Peter

^{56/} Brief at 18-24.

^{57/} See Supplemental Testimony of John R. Sears on Board Question 4(b), following Tr. 2053.

^{58/} See Testimony of Denton Louis Peoples, following Tr. 2044

Cleary, a staff physicist for the Citizens for a Better Environment (CBE),^{59/} and four written appendices.^{60/} In its brief, Intervenor complains solely over the exclusion of two such documents (CBE-7865 and CBE-79137), and, thus, the Staff does not understand Intervenor to take exception to the exclusion of the other two subject documents.^{60/}

Following voir dire examination of Mr. Cleary by Applicant^{61/} and Staff counsel,^{62/} both parties moved to disqualify Mr. Cleary on the grounds that he had not demonstrated an expertise on the matters raised in Board Question 4(b) and that the appendices to his testimony were either irrelevant thereto, or, even if relevant, that their probative value was outweighed by a tendency to confuse or unduly burden the record.^{63/} The Board granted this motion.^{64/}

^{59/} Tr. 1581. The Appendices include: CBE-79137, entitled "Analysis of NUREG-0396" (March 1978); CBE-7865, entitled "Nuclear Power Plant Evacuation Plans" (May 1978); Article of D. D. Comey, entitled "Do Not Go Gentle Into That Radiation Zone," Bulletin of Atomic Scientists (November 1975); and NRC Staff "Analysis of the Highlights of . . . [CBE-7865]. . ." (May 1978).

^{60/} Brief at 21.

^{61/} Tr. 1582-94

^{62/} Tr. 1594-1601.

^{63/} Tr. 1593-94, 1600-01.

^{64/} Tr. 1610.

The Federal Rules of Evidence provide,^{65/} in relevant part, that a person who seeks to testify as an expert must be qualified by "knowledge, skill, experience, training or education" such that his opinion will assist the trier of fact in his understanding of the evidence and resolution of the facts at issue.^{66/} The necessary qualifications must be expressly shown by the party offering the witness.^{67/} An expert witness must be shown to possess special knowledge of the very question upon which he or she is to express an opinion.^{68/} The admission of expert testimony lies within the sound discretion of the trier of fact.^{69/} His judgment should not be disturbed unless manifestly erroneous^{70/} or an abuse of discretion.^{71/} The Staff believes that the Board properly excluded the prefiled testimony of Mr. Cleary. The proffered testimony was irrelevant to the Board's question of whether the expansion of the spent fuel pool required modification of the Station's emergency plan, and Mr. Cleary was not shown qualified to offer an expert opinion on the additional emergency risk that might result from the Zion

^{65/} Fed. R. Evid. 702.

^{66/} Universal Athletic Sales Co. v. American Gym, Recreational and Athletic Equipment Corp., Inc., 546 F.2d 530, 537 (3rd Cir. 1976), cert. denied, 430 U.S. 984 (1977).

^{67/} Smith v. Hobart Manufacturing Co., 185 F.Supp. 751, 756 (E.D. Pa. 1960).

^{68/} George v. Morgan Construction Co., 389 F.Supp. 253, 259 (E.D. Pa. 1975).

^{69/} Mercado v. Wollard Aircraft Equipment, Inc., 574 F.2d 654, 655 (1st Cir. 1978).

^{70/} Fernandez v. Chios Shipping Co., Ltd., 542 F.2d 145, 153 (2d Cir. 1976), citing Salem v. United States Lines Co., 370 U.S. 31, 35 (1962).

^{71/} Miller's National Insurance Co., Chicago, Ill. v. Wichita Flour Mills Co., 257 F.2d 93, 100 (10th Cir. 1958).

spent fuel pool expansion and the resultant effect on the existing emergency plan for the station. ^{72/}

72/ In fact, Mr. Cleary disavowed any expertise in regard to the limited issues posed by Board Question 4(b), upon voir dire examination by Staff counsel.

Q Do you consider yourself an expert in probabilistic analysis?

A No.

Q Do you consider yourself an expert in risk assessment of nuclear accidents?

A No.

Q Do you consider yourself an expert in evaluating the emergency risks associated with spent fuel pool modification?

A Could you explain that a little more?

Q Do you consider yourself an expert in evaluating the additional probability or consequences of an incident resulting from the proposed modification that could give rise to an emergency response?

A Perhaps you could split that question down into different sections.

Q Okay. Do you consider yourself an expert in evaluating what additional probability there may be of an incident resulting from the proposed modification that could give rise to an emergency response?

A No.

Q Do you consider yourself an expert in evaluating what additional consequences there may be to an incident resulting from the proposed modification that could necessitate an emergency response?

* * *

A No.

Tr. 1598-99.

The substance of Mr. Cleary's prefiled testimony is that the existing Zion emergency plan is inaccurate, cannot be effectively implemented in the event of an evacuation, and that public evacuation drills should be undertaken.^{73/}

It does not address the limited issues posed by the Licensing Board concerning changes necessitated by the spent fuel pool capacity expansion. CBE-7865 is described as dealing with the emergency plans designed to mitigate the results of a reactor core meltdown and subsequent release of large amounts of activity. It does not provide details of any sequence of events which might lead to that level of release of radioactivity.^{74/} CBE-79137 deals basically with the coordination of State and Federal programs for emergency planning and the funding for governmental participation in those planning activities.^{75/}

On voir dire examination, Mr. Cleary stated that he did not know whether the Zion station emergency plan met the requirements of Appendix E to 10 C.F.R. Part 50^{76/} or Regulatory Guide 1.101.^{77/} He further acknowledged that he was not competent to calculate the increased radiological hazards^{78/} or emergency risk^{79/} from spent fuel pool expansion. He also stated that he was

^{73/} Tr. 1603-04.

^{74/} Tr. 1583.

^{75/} Tr. 1590.

^{76/} Tr. 1591.

^{77/} Id.; "Emergency Planning for Nuclear Power Plants" (Rev. 1, March 1977).

^{78/} Tr. 1591.

^{79/} Tr. 1598.

not an expert in evaluating the additional probability^{80/} or consequences^{81/} of an incident resulting from a spent fuel pool expansion that could give rise to an emergency response. On examination by Intervenor's counsel, the proposed witness described his expertise as follows: "I think I have expertise to be able to tell whether or not a nuclear station emergency plan would function the way in which it is designed to do, whether it will be able to, so to speak, deliver the goods."^{82/}

It is clear from the foregoing examination of the proposed witness that, while he has decided views and some practical experience on the subject of emergency planning in general, he is without special "knowledge, skill, experience, training or education" concerning the limited area of interest to the Board, namely, the effect of the spent fuel pool modification on existing station emergency plans. Therefore, his prefiled testimony was properly excluded.

Although the Zion station emergency plans are mentioned in CBE-7865,^{83/} it is not in the context of the spent fuel pool expansion. In fact, spent fuel pools are not mentioned in that document.^{84/} Neither the Zion emergency

^{80/} See n. 72, supra.

^{81/} Id.

^{82/} Tr. 1607.

^{83/} Tr. 1584

^{84/} Tr. 1583.

plan nor the subject of spent fuel pools are mentioned in CBE-79137.^{85/} Consequently, these appendices to Mr. Cleary's prefiled testimony were properly excluded as irrelevant by the Board.

To the extent that the Board's ruling is grounded on the hearsay character of the appendices, Intervenor argues that, since Mr. Cleary should have been permitted to testify as an expert, the appendices were admissible as an exception to the hearsay rule.^{86/} Since Mr. Cleary's expertise on the matter in question was not demonstrated, the referenced exception^{87/} is unavailable.

Accordingly, the Staff believes that the Board properly excluded the pre-filed testimony and appendices of Mr. Cleary. Intervenor has not demonstrated that this ruling is erroneous or constitutes an abuse of discretion.^{88/} The exception, therefore, should be denied.

^{85/} Tr. 1590

^{86/} Brief at 23.

^{87/} Fed. R. Evid. 803 (13).

^{88/} Fernandez, supra, 542 F.2d at 153; Miller's National Insurance Co., supra, 257 F.2d at 100.

5. The Board Did Not Err in Finding That There is No Need to Change the Applicant's Emergency Plan as a Result of the Spent Fuel Pool Modification

Intervenor takes exception to the Board finding ^{89/} that there is no need to change the Applicant's emergency plan due to the proposed modification and operation with increased spent fuel storage capacity. ^{90/} Intervenor contends that the sole evidentiary basis for this finding is the testimony of the Applicant and Staff and that it had no opportunity to comment on the record on the alleged problems that exist in the emergency plan. ^{91/} The Staff disagrees and submits that the Board's finding was properly grounded on competent and substantial evidence in the record.

As already noted, the subject of emergency planning arose in connection with Board Question 4(b). Both the Applicant and Staff presented direct testimony on this question. ^{92/} The propriety of the Board's ruling to exclude the prefiled testimony of Intervenor's proffered witness on this matter is explained above.

The Applicant adduced the testimony of its Assistant Division Manager of the Nuclear Stations Division and Command Center Director under the Applicant's Generating Stations Emergency Plan (GSEP) applicable to all nuclear stations operated by the Applicant. ^{93/} This witness explained the contents

^{89/} Initial Decision, slip op., at 79-80.

^{90/} Brief at 24.

^{91/} Id.

^{92/} See ns. 58, 59, supra.

^{93/} Tr. 2043.

and organizational responsibility for implementing the GSEP, the various emergency classifications and responses under the plan, and the conduct of emergency training and practice drills.^{94/} He testified that the plan is not conditioned upon a fixed quantity of nuclear fuel in use or in storage at the facility. Nor, according to the witness, is it linked to specific accidents or equipment failures which have been hypothesized for safety analysis purposes. Therefore, he believed that the Zion spent fuel pool expansion and subsequent storage of additional spent fuel would not require a change to the GSEP.^{95/} Intervenor cross-examined this witness.^{96/} The Staff adduced the testimony of a nuclear engineer responsible for the evaluation of emergency plans for operating reactors.^{97/} This witness explained that the NRC Staff had favorably reviewed the GSEP and the Zion Station Emergency Plan (ZSEP), developed separately for the Zion station, in its Safety Evaluation Report, dated October 6, 1972, wherein it concluded that the plans met the requirements of Appendix E to 10 C.F.R. Part 50.^{98/} The referenced SER section was attached to the witness' prefiled testimony. It was further concluded in the SER that the plans provide reasonable assurance that appropriate protective measures can and will be implemented

^{94/} Peoples' Testimony, following Tr. 2044.

^{95/} Id. at 15.

^{96/} Tr. 2045-50.

^{97/} Sears' Testimony, following Tr. 2053.

^{98/} SER § 13.3 attached to Sears' Testimony, following Tr. 2053.

promptly and effectively in the event of an accident.^{99/} Detailed implementing procedures are inspected and evaluated by the NRC Office of Inspection and Enforcement.^{100/} The Staff witness personally reviewed these plans. He testified that the plans are designed to cope with the consequences of a spectrum of accidents, including the design basis loss-of-coolant accident and design basis fuel-handling accident in the spent fuel pool, that could result in radiological releases from the station.^{101/} The doses for the design basis loss-of-coolant accident and fuel-handling accident were presented in the prefiled testimony of this witness.^{102/} The witness further testified that the spent fuel pool expansion would not significantly affect the assumptions underlying the design basis fuel-handling accident or its consequences due primarily to decay of the gaseous activity in the stored assemblies.^{103/} In addition, the witness stated that no changes to the GSEP or ZSEP are required as a result of the spent fuel pool modification and proposed operation of the facility with increased spent fuel storage capacity.^{104/} Intervenor did not cross-examine this witness.^{105/} The Board conducted some brief examination.^{106/} The testimony of the Applicant and Staff witness are

^{99/} Id.

^{100/} Id.

^{101/} Id.

^{102/} Id. at 3.

^{103/} Id.

^{104/} Id.

^{105/} Tr. 2054.

^{106/} Tr. 2054-56.

uncontroverted on the record and the Board properly concurred in their conclusions. Accordingly, the instant exception is without foundation in fact and must be rejected.

6. The Licensing Board Correctly Refused to Require Groundwater Monitoring

Intervenor takes exception to the Licensing Board's finding that groundwater monitoring involves matters beyond the scope of this proceeding. Intervenor then proceeds to argue that the increased amount of radioactive material in the spent fuel pool justifies increased monitoring.

In fact, the amount of radioactive material in the pool is not factually relevant to the issue of groundwater monitoring in this case. In the area of Zion Station, the groundwater flow is down-gradient from west to east, or toward Lake Michigan.^{107/} Thus, wells in the vicinity of the plant would be located upgradient, and would not be capable of detecting leakage of radioactive effluent into the groundwater.^{108/} Moreover, any water leaking from the spent fuel pool travels through leakoff channels into the drain collection tank, and is processed as normal radwaste water. Recent sampling indicates such leakage is occurring at the rate of approximately one quart per day,^{109/} which

^{107/} Final Environmental Statement Related to Operation of Zion Station, Units 1 and 2, Commonwealth Edison Company, Docket Nos. 50-295 and 50-304, December 1972 (FES), at II-5, II-8.

^{108/} Tr. 1011.

^{109/} Initial Decision, slip op. at 87, referencing Tr. 588, 1921-22, 1926-29.

the Board found to be negligible, and not to represent a significant safety or environmental concern.^{110/}

Intervenor voices a generalized demand for groundwater monitoring. However, it did not introduce any evidence on this issue, and does not identify any evidence of record that would commend the initiation of such a program, and the evidentiary record is devoid of same. The Board did, as noted by Intervenor, identify salient characteristics of the Zion site, and it acknowledged the present lack of any groundwater monitoring.^{111/} However, it did not go so far as to recommend that such a program be instituted, if indeed it did presume it lacked authority to order the desired action.^{112/}

Accordingly, as there is no evidence of record indicating that the public health and safety require that a program of groundwater monitoring be initiated, the Licensing Board's refusal to take any steps toward the initiation of such a program was correct.

^{110/} Initial Decision, slip op. at 88.

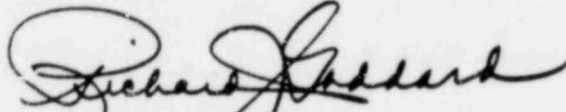
^{111/} Initial Decision, slip op. at 95-96.

^{112/} The Licensing Board did not articulate its basis for finding groundwater monitoring to involve matters outside the scope of this proceeding; therefore, Staff has not spoken directly to the correctness of this finding. The Staff position that groundwater monitoring is factually irrelevant, however, is unequivocally established by the evidentiary record and other findings of fact which were made by the Licensing Board. This should render moot the question of whether the Board did in fact perceive itself unable to act and, if so, whether such perception was correct.

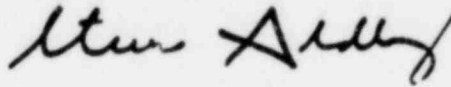
CONCLUSION

In light of the above, the Staff urges rejection of Intervenor's exceptions and affirmation of the Licensing Board's Initial Decision.

Respectfully submitted,



Richard J. Goddard
Counsel for NRC Staff



Steven C. Goldberg
Counsel for NRC Staff

Dated at Bethesda, Maryland
this 19th day of May, 1980

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matter of)
COMMONWEALTH EDISON COMPANY) Docket Nos. 50-295
(Zion Station, Units 1 and 2)) 50-304

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF BRIEF IN OPPOSITION TO INTERVENOR'S BRIEF IN SUPPORT OF EXCEPTIONS" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class or, as indicated by an asterisk, through deposit in the Nuclear Regulatory Commission's internal mail system, this 19th day of May, 1980.

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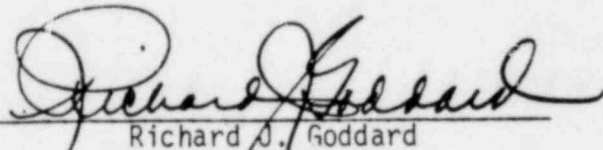
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