December 11, 1981

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

CONSUMERS POWER COMPANY

(Big Rock Point Nuclear Plant)

Docket No. 50-155-OLA

(Spent Fuel Pool Expansion)

INTERVENORS' MEMORANDUM IN OPPOSITION
TO MOTIONS FOR SUMMARY DISPOSITION

Consumers Power Company (Licensee) and the Staff have moved for summary disposition pursuant to 10 C.F.R. §2.749 of previously admitted contentions 2,3, and 8 (Christa-Maria) and IIA, IIB, IIC, IID, IIE-3, IIF, IIG(b), and IIIE-2 (John O'Neill). These challenged contentions relate to the following subjects:

Christa-Maria Contentions

2 - Radiation released at south wall of storage pool where there is less shielding.

3 - Corrossion of autenitic stainless steel - risk to pool and rack integrity.

8 - TMI-2 type accident - prevention of ingress to containment building.

John O'Neill Contentions

IIA-Excessive exposure to workers in violation of limits stated in 10 C.F.R. 20 / excessive exposure through south wall of pool in violation of limits imposed in APP. I to 10 C.F.R. 50

IIB-Hazard of small to medium leaks from expanded SFP.

D503
S01

IIC Licensee's plan providing for make-up water is deficient.

IID Licensee has not provided for protection of public as a result of the crash of a B-52 bomber.

IIE-3 Application has not analyzed the possibility of criticality occuring due to density of storage racks.

IIF Routine release of effluents will no longer meet the guidelines of App. I, §II and IV of 10 C.F.R. Part 50, in violation of App. I, §IIIA.1. because the required calculations do not estimate bio-accumulation factors.

IIG-b The design of the new racks does not address the undiscovered escape of fuel.

IIE-2 Possibility of a Class 9 accident has not been adequately analyzed.

Discussion

The rules and standards established by the federal courts for granting or denying a motion for summary judgment under Rule 56 of the Federal Rules of Civil Procedure are applied by Licensing Board in their consideration of motions for summary disposition. Alabama Power Co. (Joseph M. Farley Nuclear Plant, Units 1 and 2) ALAB - 182, 7 AEC 210, 217 (1974). In line with judicial interpretations of Rule 56, the movant has the burden of proof to clearly demonstrate the absence of any genuine issue of material fact. In determining a motion for summary disposition the record will be viewed in the light most favorable to the party opposing the motion. Pacific Gas & Electric Co. (Stanislaus Nuclear Project, Unit No. 1), 6 NRC 159 (1977), p. 163, following Sartor v. Arkansas National Gas. Co., 321 U.S. 620, 627 (1944). Accordingly, the party opposing the summary disposition motion need not show that s/he would prevail on the factual issues, but only that there

are such issues to be tried. Pacific Gas & Electric Co., supra, at page 163.

In fact, the Supreme Court has underscored the necessity of clearly demonstrating the absence of a triable issue by holding that "where the evidentiary matter in support of the motion does not establish the absence of a genuine issue, summary, judgment must be denied even if no opposing evidentiery matter is presented. Adickes V. Kress & Co., 398 U.S. 144, 157 (1970), (emphasis in opinion), followed by and quoted in Cleveland Electric Illuminating Co., et al. (Perry Nuclear Power Plant, Unites 1&2), 6 NRC 741, 753-54 (1977). In Cleveland Electric Illuminating Co., supra, the Licensing Board (ALB) noted that intervenor had failed to support its contention that additional investigations must be made concerning the geology of the plant site and the possibility of a fault-line, and concluded that "Intervenor had failed to show the existence of any material issue of fact to overturn the findings." The Licensing Appeal Board (ASLAB) ruled that this was error and overruled the ASLAB's grant of summary disposition, noting that intervenors were not compelled to submit any evidence controverting conclusions reached in the Staff SER. The opposing party need not engage in a "battle of affidavits" because it is not compelled to controvert the evidentiary matter of the movant. And regardless of intervenor's opposition to the motion, where the movant does not establish the absence of any

genuine issue, the motion for summary disposition must be denied in accordance with 10 C.F.R. 2.749, Furthermore, the opportunity for cross examination may not be denied where there is a possibility that it will demonstrate the validity of a contention that a threat to the health and safety of the public exists. In Cleveland Electric Illuminating Co., supra, at p. 755, the Board said that "summary disposition is a harsh remedy. It deprives the opposing litigant of the right to cross-examine the witness, which is perhaps at the very essence of a an adjudicatory hearing." It noted that the Administrative Procedure Act Provides that "/a/ party is entitled to conduct such cross-examinations as may be required for a full and true disclosure of the facts." 5 U.S.C. §1556(d).

In addition, the Supreme Court has held that the right to cross-examine expert witnesses should be preserved and not lost through the summary judgment process. In Sartor v. Arkansas Natural Gas Co., 34 U.S. 620 (1944), the Court cited with approval the decision of Justice Cardoza in Dayton Power and Light Co. v. Public Utilities Commission, 292 U.S. 290, 299, holding that "the opinion of experts have no such conclusive force that there is error of law in refusing to follow them. This is true of opinion evidence generally, whether addressed to a jury or to a judge or to a statutory board." (emphasis added). In Sartor, the Court reversed a grant of summary judgment, holding it for the of fact to determine how much weight to give to expert testimony has been tested in the crucible of cross-examination. Even if the weight of evidence may appear to be on the side presenting the experts, the court or agency "may not withdraw these witnesses from cross-examination, the best method yet devised for

testing trustworthiness of testimony. And their credibility and the weight to be given to their opinions is to be determined, after trial, in the regular manner." 321 U.S. at 628-29. Thus, summary judgment for defendants should not have been granted even though plaintiffs did not present any opposing affidavits by e experts and no other affidaivts except that of its attorney.

Sartor also emphasized that the right to cross-examine at the hearing is particularly important where the experts are employed by or allied with one of the parties. Of the eleven contentions challenged in Licensee's motion for summary judgment, nine are challenged by affidavits submitted by Licensee's own employees, and a tenth by an expert employed in the nuclear industry. Only the Air Force employees whose deposition relates only to O'Neill contention IID, is not an employee of Licensee or the industry.

In Sartor, the Court noted that "[t]he mere fact that the witness is interested in the result of the suit is deemed sufficient to require the credibility of his testimony to be submitted to the jury as a question of fact." 321 U.S. at 628. Thus, any reliance must be placed on Licensee's affidavit to support summary disposition, the motion must be denied.

Christa-Maria Contention 8.

-and-

O'Neill Contention II E-2

A. THE CONTENTION

The occurance of an accident similar to TMI-2 which would prevent ingress to the containment building for an extended period of time would render it impossible to maintain the expanded spent fuel pool in a safe condition and would result in a significantly greater risk to the public health and safety than would be the case if the increased storage were not allowed.

B. MATERIAL FACTS AS TO WHICH THERE IS A GENUINE ISSUE TO BE HEARD.

1. Licensee and Staff have performed stress analyses of the effects of pool boiling on the spent fuel pool walls, floor, liner, and racks. However, Licensee and Staff have not analyzed the effects of pool boiling on pipes going into and out of containment, welds, flanges, and values. (Affidavit of Raymond Sacramo)

2. Since Licensee and Staff have not mentioned the effect of pool boiling on these pool components, the structural integrity of these components has not been sufficiently analyzed.

3. Licensee's procedure for adding make-up water to the spent fuel pool in case of prolonged uninhabitability of containment is unacceptable in that Licensee's "back-up" system, utilizing water available from the fire protection system, is designed for fire - related purposes, not for the rate at which water could be lost from the spent fuel pool. (Bordine Affidavit, p. 2)

4. In the event of a failure of the buried fire main, plant personnel would have to install a back-up hose, thus incurring exposures above 25 rem when installing the back-up hose in post-accident conditions.

5. Licensee and Staff have not addressed the functioning of motor - operated valves MO - 7064 and MO-7068 in the high temperature and high pressure environment. (Blanchard Affidavit, p. 10)

6. Licensee and Staff do not address the effects on spent fuel pool equipment due to conditions of high temperature and high humidity associated with a LOCA. (Blanchard Affidavit, p. 5)

7. Although the Probabilistic Risk Assessment (PRA) considers a LOCA preventing access to the containment building, and postalates the reaction of steam with Zircaloy cladding, Licensee and Staff do not consider this event, but only state that fuel pool cooling equipment has not been tested in the high temperature and high humidity environment. (Probabilistic Risk Assessment, p. 103)

8. Licensee is still in the process of meeting Technical Specifications in relation to "TMI-2 LESSONS LEARNED CATEGORY "A" ITEMS - BIG ROCK POINT" issued by the Commission per Amendment No. 49. This amendment incorporates changes in relation to certain TMI-2 Lessons Learned Category "A" requirements. (See "TMI-2 Lessons Learned " - "October 9, 1981, from Crutchfield)

C. DISCUSSION

This contention deals with the occurance of an accident which would prevent ingress to the containment building and the subsequent consequences to the health and safety of the public. All spent fuel pool structures and components should be analyzed in all possible accident conditions to ensure health and safety to the public.

Licensee "material fact" No. 6 states that "A detailed stress analysis of the effects of pool boiling on the spent fuel pool walls, floor, liner, and racks was performed." Then, in "material fact " No. 7, Licensee states that "The structural integrity of the Big Rock Point spent fuel pool walls, floor, liner, and racks, would not be adversely affected by the stresses resulting from the thermal gradients due to pool boiling." Also, the NRC Staff echoes this conclusion in the Staff SER at p. 3-10.
However, neither Licensee nor the NRC Staff addresses the effects of pool boiling on pipes going into and out of containment, welds,

flanges, and valves. These pool components have, evidently, not been subjected to stress analysis test. Hence, the structural integrity of these components is in doubt. Moreover, in Licensee's Answers to Interrogatories Proposed by Christa-Maria. Licensee admits that several pool components have not been analyzed in relation to seismic loading conditions, including spent fuel pool heat exchangers (answer to Interrogatory 3-6(g)), spent fuel pool piping values (Answer to Interrogatory 3-6 II(g)), spent fuel pool strainers (Answer Interrogatory 3-6 II (g)), spent fuel pool piping (Answer to Interrogatory 3-6 IV (g)), spent fuel pool circulation pumps (Answer to Interrogatory 3-6 V (g)), and the spent fuel pool filters (Answer to Interrogatory 3-6 VI (g)). Also, in Licensee's Answer to Interrogatory 3-5 (g), it is admitted that the spent fuel pool liner is not seixmically qualified. The structural integrity of these pool components is not insured if the pool boils as the result of an earthquake. These components should also be subject to stress analysis.

The procedure for adding makeup water to the spent fuel pool in case of prolonged uninhabitability of containment will be to use water from the fire protection system. (Blanchard Affidavit, p. 9) This procedure is deemed acceptable by NRC Staff in the Staff SER. The water capacity of the fire protection system "was designed for fire-related purposes, not for the rate at which water could be lost form the fuel pool." (Bordine

Affidavit, p. 2) From the fire-protection system, water would flow through the buried fire main into other systems to be discharged into the spent fuel pool. If the buried fire main were to rupture, crack, or in any way fail, there would be no alternative menas by which water could be transported to containment form outside containment. Plant Technical Specifications require a back-up hose to provide cooling water to the core spray heat exchanger in the event of a failure of the buried fire main. However, even if plant personnel could get into containment to manually install the back-up hose, evaluation has shown that personnel exposures above 25 rem could be received installing the back-up hose under post-accident conditions. This procedure, because of the potential high radiation doses to plant personnel, is inadequate. The risk to plant personnel during installation of the back-up hose is a material fact that must be addressed. If plant personnel could not enter containment to install the back-up hose, then the health and safety of the public could not be insured. This aspect of Licensee's back-up procedure must also be addressed.

Also, in case of pool boiling, Licensee maintains that containment sprays will be actuated by opening motor-operated valves MO-7064 or MO-7068. Motor-operated values have been questioned as to their functional capability in the high temperature and high pressure range. Since Licensee and Staff have not addressed this question, this is a factor which must be analyzed.

Licensee and Staff do not address the effects of a high temperature and high humidity environment on spent fuel pool equipment. Licensee's failure to do so may be because "none of the equipment associated with fuel pool cooling has been tested or evaluated in the high tmeperature and high humidity environment associated with a LOCA." (Blanchard Affidavit, p. 5) Although Licensee does not address the LOCA in is summary disposition materials, the Prohabilistic Risk Assessment (PRA) of Big Rock Point does consider a LOCA preventing access to the containment building. The PRA postalates that "Once the water level drops below the top of the active fuel assembly, the fuel rods will become overheated, helped to some extent by the exothermic steam/Zircaloy oxidation process" (PRA, at p. 103) Although the statement of Daniel A. Prelewiez, in Licensee's summary disposition material, notes that when pool boiling begins, steam bubbles are generated in the fuel racks and rise to the surface of the pool, his statement (nor the statement of any other "expert") does not address the possibility that steam may then react with zirconium. Once steam reacts with zirconium, thermal heat is generated, causing the fuel rods to overheat. This reaction also produces hydrogen gas, leading to a very dangerous situation, as evidenced by the TMI-2 accident. Richard E. Webb, in a study entitled "An Analysis of the Accident Hazards of Storing Highly Radioactive Spent Fuel Rods in Spent Fuel Storage Pool...," reported that

"once the zirconium cladding of the fuel rods reaches high temperatures, any attempt to cool the spent fuel pool by injecting water back into the pool could, instead of quenching the pool, hasten its heat-up, becuase water reacts chemically with heated zirconium to produce heat and possible explosions. (See Richard E. Webb, Ph.D., "An Analysis...", April 3, 1979, at p. 13.)

The failure of Licensee to test the pool equipment in the high temperature/high humidity environment, and the failure to consider the consequences of a steam-zirconium reaction, such as that occuring at TMI-2, is equivalent to saying that the spent fuel pool equipment could not withstand a LOCA. These considerations must be addressed to insure the health and safety of the public.

Lastly, an evaluation of Big Rock Point in relation to TMI-2 Lessons Learned Category "A" Items is ongoing at this time. (See, for example, letter from Dennis M. Crutchfield to Mr. David P. Hoffman, date October 9, 1981 on this subject) This evaluation indicates that Big Rock Point is still in the process of incorporating and meeting Technical Specifications in relation to TMI-2 Lessons Learned requirements, including updated monitoring systems and calibration requirements, and other operating requirements.

Until Licensee has conformed to all the requirements in relation to the Commission's TMI-2 Lessons Learned evaluation, summary disposition on Christa-Maria Contention 8 and John O'Neill Contention IIE-2 should be denied.

In conclusion, there are material issues of fact still in dispute concerning these two contentions, and analysis of the above-mentioned points must be made to insure the health and safety of the public before the spent fuel pool is expanded.

O'NEILL CONTENTION II-F

A. THE CONTENTION

Because of the expansion of the spent fuel pool, routine releases, and accidental releases similar to those that have already occured, of effluent will no longer meet the guidelines of App. I, sections II and IV of 10 C.F.R. Part 50 because, in violation of App. I, Section IIA.1, the required calculations do not estimate bio-accumulation factors in a manner appropriate to this site.

B. MATERIAL FACTS AS TO WHICH THERE IS A GENUINE ISSUE TO BE HEARD.

1. Licensee relies on a June 4, 1976 report to show that it meets effluent limitations for Big Rock Point in accordance with 10 CFR 50 Appendix I. This report is insufficient to show that the expanded spent fuel pool will not cause additional effluent releases to the environment.

2. In the Nuclear Regulatory Commission's "Health Physics Appraisal" of Big Rock Point, dated June 13, 1980, the NRC notes several weaknesses associated with airborne effluent controls.

3. There is no removal treatment of airborne effluents at the Big Rock Point Plant. (Health Physics Appraisal, p.33)

4. Licensee's effluent control system is inadequate and outdated.

5. Licensee's detection system, using monitors with alarm features to notify plant personnel of releases exceeding the limits imposed in Appendix I, warns only of releases exceeding limits after leaving the stack and does not provide for pre-release warning of highly radioactive airborne effluents.

6. In a memo from the NRC to Licensee, dated October 20, 1981, NRC notified Licensee that NUREG-0737 requires the installation of high range noble gas effluent monitors. Licensee indicated that it anticipated problems meeting the implementation date of January 1, 1982.

7. Licensee relies on bioaccumulation research it undertook in 1972 and 1973, before the issuance of 10 CFR 50 , Appendix I, to show that it meets the limitations of Appendix I for liquid effluent releases. (Sinderman Affidavit, p. 10)

8. In a table (Table V) provided in Licensee's summary disposition materials, comparing bioaccumulation guidelines for freshwater fish per regulation 1.109 and actual bio-accumulation factors as analyzed by the University of Michigan and the Environmental Research Group (ERG) for Lake Michigan fish, several radioactive elements are found

in greater quantities in Lake Michigan fish than is recommended by NRC guidelines. (See Table V, p. 14)

9. This table represents results obtained for only two sampling periods, and does not estimate bioaccumulation factors for Lake Michigan fish per the expanded spent fuel pool.

10. As a result of the expansion of the spent fuel pool, routine and accidental releases of effluents will not meet the guidelines of Appendix I, Sections II and IV of 10 CFR Part 50.

11. Licensee and Staff calculations of bio-accumulation factors are outdated and inappropriate for measuring compliance with Appendix I of 10 CFR Part 50.

C. DISCUSSION

This contention asks Licensee to estimate bioaccumulation factors in relation to effluent release guidelines of Appendix I, per the expanded spent fuel pool. In analyzing this contention, Licensee relies on a June 4, 1976 evaluation of bio-accumulation factors later submitted to and approved by NRC. However, the findings of this evaluation do not quantitatively, or otherwise, address O'Neill Contention IIF. Licensee's only reference to the spent fuel pool expansion proposal appears in its supporting affidavit, where it is stated that "Operation of the spent fuel pool with additional stored spent fuel may in -

troduce slightly greater quantities of radioactive material into the pool, but not different types of radioactive material" (Sinderman affidavit, p. 4) This vague statement attempts to de-emphasize the possibility of greater quantities of radioactive material accumulating in the spent fuel pool by pointing out that the "types" of radioactive materials in the pool will not be altered. However, this distinction is unavailing because the "types" of radioactive material in the pool are not being challenged in Contention IIF. Rather, O'Neill Contention IIF addresses the problem of greater quantities of radioactive material in the spent fuel pool as effecting bio-accumulation factors. But instead, Licensee avoids this question and focuses on the "types" of radioactive matter in the pool.

This focus may be understandable in view of the NRC's "Health Physics Appraisal", dated June 13, 1980, evaluating the overall adequacy and effectiveness of the health physics program at Big Rock Point. This evaluation voices the general finding that "several significant weaknesses exist in your health physics program." ("Health Physics Appraisal," p. 1) Among these noted weaknesses: (1) Noble gas releases via ventitlation air were not quantified, apparnetly because the noble gas stack monitor is not normally used to quantify noble gas releases, (2) There are no monitors or sampler installed in the ventilation pathway from the chemistry and counting

laboratory, and thus, potential releases from this pathway are not monitored, (3) HEPA filters are not tested in place for leakage, (4) the pressure differential across the laboratory ventilation is not recorded and at the time of the NRC's report, the laboratory ventilation HEPA had not been changed in at least five years. Id. p. 33. Because Licensee's effluent control system is ineffective, Licensee is unable to quantify and verify, on a continuing basis, that release paths other than the offgas system do not contribute significantly to total plant releases. Id p. 34. And even though Licensee has no methods for accurately quantifying effluent releases from all in-plant sources, or to even monitor routine releases from all in-plant sources, there is no removal treatment of airborne effluents (with exception of HEPA filters in offgas and chemistry and counting laboratory). Id. p. 33. The NRC's Health Physics Appraisal indicates that Licensee's effluent control system is inefficient and outdated.

Moreover, in a memorandum from NRC to Licensee dated October 20, 1981, the NRC informs Licensee of the NUREG-0737 requirement to install high range noble gas effluent monitors and provisions for effluent monitoring of radioidines at accident conditions. The memo also states that Licensee has indicated problems with meeting the implementation date of January 1, 1982. This memorandum again demonstrates Licensee's

continuing inability to maintain an effective and efficient effluent control system. This ineffectiveness in adequately controling effluent releases at Big Rock Point relates directly to on-site bioaccumulation factors analysis. Since Licensee has no way of quantitatively verifying plant airborne effluent releases, Licensee's only method of discovering effluent releases from the stack is by an after-the-fact alarm system. (Again, see Health Physics Appraisal and Memo on NUREG-0737) It is maintained that a monitor with an alarm feature will detect any releases from the stack exceeding allowable limits after leaving the stack. (Sinderman Affidavit, p. 5)

In light of the NRC's "Health Physics Appraisal" and the NRC memorandum concerning NUREG-0737 requirements, and from Licensee's own supporting affidavit, it is evident that Licensee's airborne effluent control system is inadequate and outdated. Furthermore, because the NRC and Licensee are still in the process of implementing effluent control requirements at Big Rock Point, there exists material facts as to which there are genuine issues in relation to Contention IIF. Until Licensee conforms to NRC requirements to implement a more effective effluent control system, and until Licensee provides a quantitative analysis of the effects of spent fuel pool expansion on bioaccumulation factors, as Contention IIF addresses, Licensee and Staff's motion for summary disposition must be denied.

Licensee's bioaccumulation research in consideration of plant liquid effluent releases relies on research it under took in 1972 and 1973 in conjunction with the University of Michigan and the Enviromental Research Group (ERG). This study was conducted prior to the issuance of 10 CFR 50, Appendix I to determine bioaccumulation factors in Lake Michigan organisms. (Sinderman affidavit, p 10) One of the comparisons arising from this study is found in Licensee's summary disposition materials. Table V, p. 14 of Sinderman's affidavit shows bioaccumulation factors for Lake Michigan, including actual ERG findings as compared to NRC regulatory guidelines for fresh water fish as outlined in Section 1.109. Of the eight elements published, representing elements released to Lake Michigan from the Big Rock Point Plant in 1980, five of these elements' radioactive isotopes (Cs,Co, I, Fe, La) found in Lake Michigan fish exceeded the limits imposed by NRC guidelines in §1.109. This table represents only two sampling periods, and does not include data for the most recent sampling period. Moreover, if the Table on page 14 represents a list "typical of the radioactive releases for the plant", then such releases are unacceptable. (See Note in p. 14, Sinderman Affidavit)

Again, Licensee (and Staff) does not analyze bioaccumulation factors in relation to liquid effluents per the expanded spent fuel pool.

In conclusion, Licensee's effluent control system is insufficient and outdated. At present, Licensee is still trying to meet standards expounded in the Commission's TMI-2 Lessons Learned requirements. Because Intervenor O'Neill's contention addresses bioaccumulation factors in relation to the expanded spent fuel pool, Licensee and Staff's summary disposition motion is not factually sufficient to adequately analyze O'Neill Contention IIF. Licensee and Staff's motion should therefore be denied.

Christa-Maria Contention 2

-and-

O'Neill Contention IIA

A. THE CONTENTIONS

Christa-Maria Contention 2:

The increase in fuel stored in the Big Rock Point pool will result in an increase in the amount of radiation released to the environment at the south wall of the storage pool where there is less shielding, according to the Licensee's Description and Safety Analysis. This increment in the level of radiating released to the environment enhances the risks to the health and safety of the public in the vicinity of the plant.

O'Neill Contention IIA:

The routine releases of radiactivity during the installation of new racks, the loading of these racks, and storage of fuel in the racks will exceed the exposure of workers, as will the releases of radioactivity through the south wall of the pool exceed the limits imposed by Appendix I to CFR Part 50 or exposure to the general public.

B. MATERIAL FACTS AS TO WHICH THERE IS A GENUINE ISSUE TO BE HEARD

1. Licensee and Staff cannot agree on the taper of the south wall. In Licensee's summary disposition materials, it is stated

that the south wall of the spent fuel pool tapers from 5ft. 9 inches to a minimum of 3 ft. 6 inches (Axtell Affidavit, p. 4) On the other hand, NRC Staff in the SER states that the pool tapes from 6 feet to 3 feet near one corner (Staff SER, p. 3-13). Yet a third statement indicates that the minimum thickness of the south wall is 2 ft. (See footnote 2 of Axtell's affidavit.)

2. Given these descriptive inconsistencies, it is hard to estimate how Licensee measured radiation dose rates released at the south wall and at what point along the south wall dose rate measurements were actually taken. Accordingly, Licensee's radiation dose rate figures are ambiguous.

3. The existing dose rate at the south wall of the spent fuel pool is about 30-40 mrem/hr due to the filter sock tank. (Licensee Material Fact #10 - summary disposition motion).

4. The NRC Staff SER considers a "dose rate of 38 mrem/hr near this small region (south wall) with one year old fuel stored in its pool on the other side of the wall and the modified pool full" (Staff SER, at p. 3-13)

5. The existing dose rate, 30-40 mrem/hr caused by the filter sock tank, added to the estimated 38 mrem/hr release at the south wall of the SFP, yields a total release rate of 68-78 mrem/hr on the outside of the south wall with one year old spent fuel in the modified pool. This is highly unacceptable in relation to ALARA standards.

6. Dose rates around the spent fuel pool are not "as low as reasonably acheivable," especially when considering that background radiation levels at Big Rock Point are 6 to 7 times higher than at other plants. (Axtell affidavit, p. 13)

C. DISCUSSION

Licensee's "material facts" maintain that the south wall of the SFP tapers from a maximum thickness of 5 ft. 9 inches to a minimum thickness of 3 ft. 6 inches. NRC Staff, on the other hand, maintains that the south wall of the pool "tapers down from 6 feet to 3 feet near one corner". (Staff SER, p 3-13) A third statement maintains that the minimum wall thickness of the south wall is 2 feet thick. (Footnote No. 2, Axtell affidavit) These contradictory statements undermine the credibility and accuracy of Licensee's measurements in relation to radiation releases emanating from the south wall. And whatever is the correct measurement of the taper of the south wall, Licensee and Staff disagree concerning dose rates outside the south wall.

In "material fact" No. 9, and in Axtell's Affidavit, p. 8, Licensee claims that "the dose rates ouside the south wall of the spent fuel pool due to radioactive shine from 1 year old stored spent fuel will be approximately 2 mrem/hr." Additionally, "material fact" No. 10 asserts that "A dose rate outside the south wall of 2 mrem/hr. due to radioactive shine from stored spent fuel is "small" in comparison with the existing dose rates of about 30-40

mrem/hr due to the filter sock tank." On the other hand, NRC Staff estimates a dose rate of 38 mrem/hr (not 2 mrem/hr.) near the south wall with one year old fuel stored in the pool on the other side of the wall (inside containment) and the modified pool full. (See SER, at p.3-13) The SER goes on to say that "this dose rate does not exist now because of the additional water shielding available in the present unmodified pool." On one hand, Licensee maintains that the existing dose rate in the region of the south wall is about 30-40 mrem/hr while the NRC Staff says that a 38 mrem/hr dose rate does not exist now due to water shielding. On the other hand, Licensee asserts that spent fuel stored in spent fuel pool racks nearest the south wall, which has decayed at least one year, will yield a total dose on the outside of the south wall of about 2 mrem/hr. The NRC Staff asserts that one year old fuel stored near the south wall will yield a dose rate of 38 mrem/hr. Thus, Licensee and Staff disagree on two crucial points: (1) the existing dose rate outside the south wall, and (2) the estimated dose rate outside the south wall assuming storage of one year old spent fuel. Given these factual discrepancies, it is difficult to see how Licensee can move to dispose of this contention.

Furthermore, if one is to respect the 30-40 mrem/hr dose rate caused by the filter sock tank that exist now, and add this rate to the expected 38 mrem/hr dose rate occuring in the region outside the south wall, the total dose rate in the area outside the south

wall will be 68-78 mrem/hr. This dose rate is extremely high in relation to other plants and would greatly enhance the risks to the health and safety of the public in the plant's vicinity. Such a dose rate outside the pool wall would surely not conform to ALARA standards, and given the Commission's more aggresive policy concerning low level radiation levels (See Oct. 16 release), such a dose rate is unacceptable.

Also, background radiation doses at Big Rock Point are not "as low as reasonably acheivable" in the area of the spent fuel pool. In December of 1979, the NRC Staff informed C.P.C. that normal background radiation levels over the spent fuel pool at Big Rock Point were higher than at other plants. At the time, radiation doses at Big Rock Point were approximately 15-18 mrem/hr. while other plants had dose rates of about 2 mrem/hr. (Axtell Affidavit, p. 13) This difference in dose rates is credited to the fact that most newer plants have a dedicated spent fuel demineralizer which maintains low dose rates (Axtell Affidavit, p. 13). Although C.P.C. claims to have reduced background radiation dose levels around the fuel pool to 12 mrem/hr (Staff SER says 23 mrem/hr), even this figure represents dose rates six times higher than dose rates at other plants. These background radiation levels are unacceptable, both in terms of ALARA standards and N.R.C. policy to maintain uninformity with respect to radiation standards throughout all licensed nuclear power plants. If other plants have dose rates of 2 mrem/hr, using a dedicated SFP demineralizer to maintain low dose rates, Big Rock

Point can do likewise to insure radiation levels that are "as low as reasonably acheivable."

In conclusion, if one is to accept Mr. Axtell's statement that dose rates at the south wall are 30-40 mrem at present because of the filter sock tank and NRC's statement that the expanded pool will increase dose rates to 38 mrem outside of the south wall, then clearly, a total dose rate from these two sources making up radioactive shine on the outside of the south wall is unacceptable, especially since most plants show dose rates of 2 mrem/hr from radiactive shine. Since the modified pool will cause added radioactivity to be released at the region outside the south wall, and since background radiation levels around the pool are not "as low as reasonably acheivable", the expansion of the spent fuel pool will cause a greater risk to workers at the plant and the general public. Because of the many factual discrepancies in Licensee's summary disposition motion and NRC Staff's SER and summary disposition materials, Licensee's motion should be denied pursuant to the resolution of these material issues of fact.

A. THE CONTENTION

The Licensee's plan is deficient in failing to discuss the environmental hazards associated with small to medium leaks of radioactive water from the expanded spent fuel pool.

B. MATERIAL FACTS AS TO WHICH THERE IS A GENUINE ISSUE TO BE HEARD

1. The detection of small to medium leaks from the spent fuel pool is not made by monitoring or sampling equipment. All leaks "eventually" pass through radwaste system. (Bordine Affidavit, p. 3)

2. Licensee's only way of detecting small to medium leaks of radioactive water from the spent fuel pool to other systems is by visual observation of water levels in the spent fuel pool surge tank, in the waste hold tanks, or in unexplained increases of radioactivity in either system. (Bordine Affidavit, p. 8)

3. Demineralized water system piping is located partly outside of containment. Leaks from the spent fuel pool into the demineralized water system would pass through the system piping, which is not seismically qualified.

4. Licensee maintains that all leaks would eventually end up in the radwaste system. The radwaste system storage capacity is taxed during routine operations and would be incapable of handling sudden increases of highly radioactive water. Also, the radwaste

system tankage is not adequately shielded. (Probabilistic Risk Assessment, p. 32)

5. Due to a check valve failure between the SIPCS and the demineralized water system, undetected contaimination of the demineralized water system occured. (See LER RO-78-32) Although Licensee has corrected the check value problem, detection of leakage from the spent fuel pool still relies largely on only visual observation.

6. Based on material facts 1 through 5 above, Licensee does not have a monitoring system capable of detecting leakage from the spent fuel pool to other systems and cannot insure that leakage of radioactive water will not be released to the environment.

C. DISCUSSION

In Licensee's summary disposition materials, Licensee indicates that all small to medium leaks originating from the spent fuel pool would "eventually" flow to the containment sump. From there "it will be processed through the liquid radwaste system". (Bordine Affidavit, p.3) Once in the radwaste system, Licensee maintains that "no small to medium leaks from the spent fuel pool can result in uncontrolled releases to the environment." (Bordine Affidavit, p. 9)

Although Licensee gives assurance that no leakage from the spent fuel pool would result in "uncontrolled" releases to the environment, Licensee does not indicate whether any on-site

monitoring system would be able to detect source leakage from the spent fuel pool. In fact, in any situation where radioactive water might be leaking from the spent fuel pool, it would only be detected through highly subjective means. Detection of leakage "could be identified by increasing levels of water in the waste hold tanks or decreasing levels of water in the spent fuel surge tanks or unexplained increases or decreases in the radioactivity of either sytem." (Bordine Affidavit, p. 8) That detection of leakage of intensely radioactive water depends on visual observation, possibly after a substantial amount of water has been released through the leakage path, is unacceptable. A medium-sized leak or a combination of small leaks could cause a substantial amount of highly radioactive water to accumulate in the radwaste system tankage over a relatively short period of time. Add to this scenario the unreliability of Licensee's detection procedures and a dangerous situation might result. This is particularly true when one considers the Probababilistic Risk Assessment (PRA). In its discussion of the radwaste system, the PRA provides this analysis:

> "System storage capacity is limited (about 35,000 gal.) and is taxed at times during routine operations, especially when condenser tube leakage becomes significant. The system tankage, not all of which is shielded, typically is approximately 1/3 full. Due to shielding and capacity limitations, the liquid radwaste system would be of limited usefulness in accidents which generated large quantities of high activity water. An additional impediment to to use of the radwaste tanks to contain highly radioactive water is that the tanks vent into the plant with removal via the ventilation system to the plant stack. (P.R.A., at p. 32) Emphasis added.

As the P.R.A. points out, the storage capacity of the radwaste system tankage is limited. It is possible that even small leaks could add significantly to total radwaste volume, thus taxing the tanks' capacity. Such a buildup in the radwaste system tanking would pose a threat to the environment, particularly when considering that not all of the system tankage is shielded. Also, as the P.R.A. notes, the tanks vent directly into the plant, allowing high-level radioactivity to be released via the ventilation system to the plant stack. This "impediment" in the use of the radwaste system presents an environmental hazard not addressed in Licensee's summary disposition materials. Small to medium leaks of highly radioactive water from the spent fuel pool would accumulate in the radwaste system tankage. The radioactivity of this water would then be free to escape through the open pathway leading to the plant stack, thus releasing intense radioactivity to the environment. The poorly shielded radwaste system tankage is ill-equipped to handle small to medium leaks from the spent fuel pool and cannot effectively insure that intense radioactivity will not be released to the environment.

At Big Rock Point, demineralized water system piping is located partly inside and partly outside of containment. Leaks from the spent fuel pool into the demineralized water system, such as the one occuring in 1978 (report No. RO-78-32), could allow highly radiactive water to pass through the portion of demineralized system piping outside of containment. This would pose a threat to the environment because this piping has not been subjected to

stress analysis and is not seismically qualified, as noted in Licensee's answer to Interrogatory 3-6.

In conclusion, Licensee's procedure for detecting small to medium leakage from the spent fuel pool is inadequate. Detection of source leakage depends largely on visual observation or "unexplained" increases in radioactivity in the pool surge tanks or waste hold tanks. Once leakage has begun, Licensee's capacity to control radioactivity from the highly radioactive water is lacking. The radwaste system tankage, limited in capacity and poorly shielded allows venting to proceed directly to the plant stack. This unconstrained radioactive release pathway poses a direct hazard to the environment and the general public. For these reasons, Licensee's motion for summary disposition of this contention does not adequately address the factual issues raised by this contention and should therefore be denied.

Christa-Maria Contention 3

A. THE CONTENTION

The use of type 304 austenitic steel in the new spent fuel storage racks could lead to corrosion cracking in the pool environment, with the resultant risk to the integrity of the racks and the continued safe storage of the fuel. J.R. Weeks, in his July 1977 report on "Corrosion of Materials in Spent Fuel Storage Pools" has indicated that "[s]tress corrosion of stainless steel components or zircaloy cladding cannot be entirely ruled out because of the lack of understanding of the stress states and the degree of sensitization of stainless steel."

B. MATERIAL FACTS AS TO WHICH THERE IS A GENUINE ISSUE TO BE HEARD.

1. During fabrication, certain techniques increase the susceptibility of type 304 stainless steel to stress corrosion cracking.

2. Neither Licensee or Staff analyze the susceptibility of type 304 stainless steel to stress cracking in the high temperature range.

3. Licensee disclaims the need for such an analysis by noting that the service temperature of the B.R.P. spent fuel pool is less than 100° F, "well under the 300° F to 400° F range of influence". (Birkle Affidavit, p. 5)

4. The NRC Staff SER reports that "[c]orrosion rate measurements for this material in water of this quality and temperature (95° F) are not available, and any estimate of corrosion rates must be extrapolated down from measurements at higher tmeperature." (NRC Staff SER, p. 3-10)

5. The lack of corrosion rate measurements of type 304 austenitic steel at various temperature ranges is underscored by the evident lack of qualified data on corrosion rates and "the lack of understanding of the stress states and the degree of sensitization of stainless steel." (J.R. Weeks, "Corrosion Materials in Spent Fuel Storage Pools")

C. DISCUSSION

Type 304 stainless steel will be used in the fabrication of the new spent fuel pool storage racks. As Licensee explains in its summary disposition materials, during fabrication, "certain' techniques will increase the suseptibility of the stainless steel alloy to stress corrosion cracking." (Birkle affidavit, p.3) This increased susceptibility is due to "sensitization" during welding, when the molecular composition of the material is altered in such a way as to make it more susceptible to stress corrosion cracking. Id. Although Licensee recognizes the susceptibility of this material to stress corrosion cracking, the effects of variable spent fuel pool temperatures are not analyzed by Licensee or Staff. Instead, Licensee, although maintaining

that "[w]ater temperature in the range of 300° F to 400° F increases the susceptibility of type 304 stainless steel to stress corrosion cracking," dismisses this possibility by claiming "the service temperature of the Big Rock Point spent fuel pool is less than 100° F, well under the 300° F to 400° F range of influence." (Birkle affidavit, p. 5) This statement makes the assumption that the temperature of the spent fuel pool will never exceed the service temperature.

Although this is an optimistic assumption, it is neither conservative nor safe. Safety to the public demands that all possible situations, including accidents, be postulated and analyzed. In this case, spent fuel pool temperatures above the service water temperature should be analyzed to determine the effects on type 304 stainless steel in the high temperature range. The failure of Licensee to quantitavely evaluate stress corrosion cracking may be because "[c]orrosion rate measurements for this material in water of this quality and temperature (95° F) are not available, and any estimate of corrosion rates must be extrapelated down from measurements at higher temperatures "(NRC Staff SER, §3,4.1.2., at p. 3-10) Emphasis added. No where in Licensee's materials has Licensee analyzed stress corrosion rates for type 304 stainless steel, in either the service temperature range (maybe because such measurements are not available) or in the high temperature range. The lack of any quantitative data on the effects of high water temperature on type 304 steel makes it difficult for Intervenors to infer the corrosion rate of type

304 stainless steel. Corrosion rates must be analyzed and recorded in the high temperature range to insure that the alloy will not crack and separate, allowing fuel rods to become exposed. Intervenor O'Neill's contention, quoting Mr. Week's phrase that "stress corrosion of stainless steel components or zircaloy cladding cannot be entirely ruled out becuase of the lack of understanding of the stress states and the degree of sensitization of stainless steel" is merely reflective of both Licensee's lack of quantitative and qualitative analysis, and the NRC SER, stating that corrosion rate measurments, even at the service temperature range, are "not available."

Because Licensee does not analyze the effects of variable water temperatures on type 304 austenitic stainless steel, especially in the high temperature range, and fails to provide corrosion rate measurements even at the spent fuel pool service temperature, there are still genuine issues of material fact that need to be heard. Although Licensee attacks Intervenor's phraseology of contention 3, Licnesee and Staff supply nothing to dispute the subject-matter of the contention. Licensee and Staff's motion concerning Christa-Maria 3 should accordingly be denied.

O'NEILL CONTENTION IID

A. The Contention

The Licensee has not adequately provided for protection of the public against the increased release of radioactivity from the expanded fuel pool as a result of the breach of the containment due to the crash of a B-52 bomber.

B. Material Facts As To Which There Is a Genuine Issue To Be Heard.

1. At least six crashes of Air Force B-52 and FB-111 using the low level practice range (Bayshore) that passes adjacent to Big Rock Point Plant have occurred in nine years and one of these crashes involved a crash of a B-52 into Lake Michigan in the immediate vicinity of the plant. (Betourne-Thomas Depo., Exhibit #2, April 26, 1971, Risk Analysis, pp. 4-5).

2. On July 5, 1979, a B-52 bomber overflew the Big Rock Point Plant (Betourne-Thomas Depo., p.94). This overflight occurred despite the fact that the crew was notified by radio of deviation from course and an instructor was on the plane as well as regular crew. Pentagon tele-communication, July 18. 1979, attached to Desposition.

3. On the Bayshore Range, B-52 bombers fly at a descending altitutde and pass over or adjacent to the Big Rock Point Plant at 400 feet, and FB-111 bombers at 200 feet. (Betourne-Thomas Deposition, p. 29).

4. On July 22, 1981, Ohio National Guard planes flew directly over the Big Rock Point Plant. (Consumer Power Memo RMM 81-24, dated July 23, 1981, filed with NRC Septmeber 14, 1981).

5. Each year there are at least three thousand "scored" Air Force low level bombing runs over or adjacent to the Big Rock Power Plant and an undetermined number of unscored runs. (Betourne-Thomas Deposition, p. 5153, and 61).

6. There are currently approximately 80,000flight operations at the six civilian air fields located within 25 miles of Big Rock Point Plant. (Air Force memorandum, January 2, 1980, par. 8, attached to Betourne-Thomas Deposition). There is no coordination between civilian and military flights in the area of the Big Rock Pont Plant.

7. Crews flying the Bayshore training run come from bases all over the United States and have no personal experience with the area around the Big Rock Point Plant, (Betourne-Thomas Deposition, p. 24.)

8. Navigation on the Bayshore training run is entirely in the hands of the navigator on the bomber; they do not follow a tracking signal from the Bayshore site but rely solely on navigational means. There are at least 60 gross navigational errors in navigation each year. (Betourne-Thomas affidavit, pp. 52-59).

9. In 1979, there were at least five power outages totalling 20 hours which cut off radio transmission from the Bayshore tracking station to the B-52 bombers. Alternative sources of power require at least one mirute to restore radio communication. Radar equipment

requires a longer period of time to restore because of the necessity for warm-up. A loss of power thus eliminates the possibility of radio advice to bombers to correct navigational errors taking the bomber over the plant for several minutes. At the end of the Bayshore run, adjacent to or over the Big Rock Point Plant, B-52's cover fifty miles in seven minutes. Thus a deviation from five miles off the route takes less than one minute and eleven miles off the route takes two minutes to place the bomber directly over the plant. (Betourne-Thomas Deposition, pp. 69-79, 88).

10. A crash of a B-52 bomber into Big Rock Point Plant could occur on any day. (Betourne-Thomas Deposition, p. 84.)

11. A major structural failure such as loss of a wing or mid-air crash could result in the plane risking the ground in an undetermined direction and distance depending on a variety of factors. (Betourne-Thomas Deposition, p. 109)

12. The safest procedure for a B-52 pilot whose plane is about to crash is to eject rather than to guide the plane to a crash landing. (Betourne-Thomas Deposition, p. 112)

13. The probability calcualtions of the Air Force attached to the Betourne-Thomas Deposition do not take into account the possibility of a mid-air collision between bombers on the 3000 annual bombing runs over the Bayshore route and the 80,000 annual flights orginating from six airports within twenty-five miles of Big Rock Point Plant. (Betourne-Thomas Deposition, p. 86).

14. The probability of a crash of a B-52 bomber into the Big Rock Point Plant is less than 10^{-6} per year.

15. A crash of a B-52 bomber into the Big Rock Point Plant would release additional amounts of radiation into the the environment if the spent fuel pool is expanded.

16. A crash of a B-52 bomber into the Big Rock Point Plant would breach containment.

DISCUSSION

There is one material fact that Licensee and Staff have not addressed because they must concede - that a crash of a B-52 bomber into Big Rock Point Plant would breach containment and the ensuing release of radiation would be increased by reason of the increased quantity of spent fuel in an expanded pool. They concede that a crash can occur any day. (Betourne-Thomas Deposition, p. 84.) Clearly, Licensee and Staff have not met their burden of demonstrating there is no material fact to be heard on these points. Instead, they seek to dispose of the risk by a highly questionable probability analysis, the validity of which can only be judged by cross examination because the facts demonstrate that the premises of the analysis are incorrect.

The material facts in issue, set forth above, numbers 1-13, are all taken from the deposition submitted in support of the motion for summary disposition. They show that at least 3000 times each

year training missions fly at altitudes of 200-400 feet within five or ten miles of the Big Rock Point Plant; that at least 60 gross navigational errors occur annually, the result of human error; that the planes are flying at approximately 500 miles per hour so that a navigational error can bring a bomber over the plant in approximately one minute; that power failures cause lengthy loss of communication between the ground tracking station and the bombers and even longer loss of use of radar equipment.

Most importantly for purposes of the analysis is its failure to take into account mid-air crashes between the 3000 bombers and the 80,000 civilian flights which occur each year in the immediate area of Big Rock Point Plant. A mid-air crash is the most dangerous in terms of crashing into the plant because the direction of the plane after the crash depends on kinetic energy of the two bodies coming together, not the control by the crew. (Betourne-Thomas deposition, p. 109).

Other matters for cross examination are also present. For example, the estimate of 3000 bombing runs per year on which the probability determinations were calculated used only "scored runs" (deposition pp. 50-51). The actual number of bombing runs was not used and is undisclosed because whenever a navigator deviates from course as little as four nautical miles, the run is aborted and not scored. (Deposition p. 61). Similarly, the figure of sixty navigational errors annually are only "gross errors" and the actual number of errors are not disclosed.

The six crashes of bombers on the Bayshore run, one in the vicinity of the plant, the 1979 overflight, and the overflights by Ohio Air National Guard planes, demonstrate that the threat of a crash on the plant is a real one. As the Betourne-Thomas deposition established, it could happen any day. (Deposition p. 84). Certainly there is an issue of fact as to whether the probability exceeds the NRC standard of 10^{-6} or 10^{-7} in Section 2.2.3 of the Standard Review Plan. In addition, the numerous navigational errors, six actual crashes of bombers, the human errors which can lead to flights directly over the plant, the more than 80,000 annual flights in the plant vicinity, all demonstrate there is an issue of fact as to any qualitative arguments concerning the probability of a crash into the plant Sec. 2.2.3, supra.

RESERVATION OF RIGHTS

Additional discovery requests remain outstanding concerning contentions as to which a motion for summary disposition is pending. Intervenors reserve the right to supplement the record on the motions for summary disposition when discovery is completed. Intervenors believe that negotiations with Licensee are proceeding safisfactorily and expect discovery to be completed by mid-January.

Intervenors have also previously moved for an extension of time to respond to motions for summary disposition as to

Christa-Maria Contentions 2 and 8 and O'Neil Contentions IIA and IIF-2.

Respectfully Submitted

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CERTIFICATE OF SERVICE

I, Herbert Semmel certify that copies of Intervenors Memorandum in Opposition to Motions For Summary Disposition were served on the attached list by U.S. Mail, first class, postage prepaid, this 11th day of December, 1981.

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