July 26, 1982

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

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| In the Matter of | ) | |
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| LOUISIANA POWER & LIGHT COMPANY | ) | Docket No. 50-382 |
| | ) | |
| (Waterford Steam Electric Station, Unit 3) | ) | |

# APPLICANT'S REPLY TO JOINT INTERVENORS' PROPOSED FINDINGS ON CONTENTION 8/9 (SYNERGISM)

Louisiana Power & Light Company ("Applicant") submits this memorandum in reply to the proposed findings of fact submitted by Joint Intervenors on Contention 8/9 (Synergism) and in reply to the "Hearing Memorandum" and "Memo on Joint Intervenors Exhibits" that Joint Intervenors filed in support of their proposed findings on that contention.[1/] The first section of this reply memorandum addresses Joint Intervenors' attempt to

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1/ Applicant is largely in agreement with the Staff's brief and proposed findings on Contention 8/9. Accordingly, Applicant has no reply to the Staff's papers insofar as they relate to Contention 8/9.

disavow their counsel's agreement by stipulation to withdraw certain of their proposed exhibits. The second section discusses Joint Intervenors' repeated reliance on material that was never admitted into evidence and is not in the record. The final section replies to the specific findings of fact proposed by Joint Intervenors.

## I. JOINT INTERVENORS ARE BOUND BY THEIR COUNSEL'S STIPULATION ON EXHIBITS

Joint Intervenors are now attempting to repudiate a stipulation entered into by their counsel, Lyman Jones, whereby roughly one-half of Joint Intervenors' proposed exhibits were withdrawn in exchange for Applicant's withdrawal of its objections to the remaining proposed exhibits. Joint Intervenors now claim that their attorney was not authorized to agree to the stipulation, and they request the Licensing Board to consider the withdrawn exhibits as evidence and/or to reopen the hearing so that the withdrawn exhibits can be offered into evidence. For the reasons stated below, Applicant submits that Joint Intervenors' attempt to disavow the stipulation should be rejected.

Virtually on the eve of the hearing, Joint Intervenors submitted a list of 27 exhibits, 25 of which they proposed to offer into evidence.[2/] The proposed exhibits came to be

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2/ See Joint Intervenors' List of Exhibits, served March 17, 1982. Exhibit Nos. 7 and 19 were withdrawn at that time.

regarded as falling into two groups -- those authored by persons scheduled to testify on behalf of Joint Intervenors (Nos. 10, 13-16 and 22-27) and those authored by persons not scheduled to testify (Nos. 1-9, 11-12 and 17-21). The parties generally referred to these two groups as the "witness-authored exhibits" and the "non-witness-authored exhibits," respectively. On March 23, 1982, Applicant filed a memorandum objecting to the admissibility of all Joint Intervenors' proposed exhibits. See Applicant's Objections to Joint Intervenors' Proposed Exhibits.

On Friday, March 26, 1982, during the course of the hearing, the Licensing Board heard argument on the admissibility of Joint Intervenors' proposed exhibits. The Board stated that it had "very grave reservations and doubts" about the admissibility of the non-witness-authored exhibits, and it requested counsel to "get together" and attempt to "work something out" in light of the Board's expressed doubts and reservations about the exhibits.[3/] Tr. 1097-98.

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3/ The Board's reservations were well founded. Applicant believes that Joint Intervenors' proposed exhibits were in fact inadmissible for the reasons stated in its memorandum filed on March 23, 1982. In addition, a subsequent Appeal Board decision reinforces the conclusion that the exhibits -- particularly the non-witness-authored exhibits -- were inadmissible. Duke Power Co. (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-669, Slip opinion at 46 (March 30, 1982). Thus even if Joint Intervenors' counsel was not authorized to enter into the stipulation, his error was harmless because the non-witness-authored exhibits could and should have been excluded from evidence in any event.

When the hearing resumed on Monday, March 29, 1982, Joint Intervenors' counsel, Lyman Jones, began by announcing that he had reached an agreement with Applicant's counsel.[4/] Tr. 1103-07. Under the stipulation, Joint Intervenors withdrew the non-witness-authored exhibits, and in return, Applicant withdrew its objections to the witness-authored exhibits. The Licensing Board approved and accepted the stipulation. Tr. 1107-08. The witness-authored exhibits were thereafter admitted into evidence.[5/] Having received the benefit of the stipulation, Joint Intervenors are now attempting to escape its burdens. Applicant would not have withdrawn its objections to the witness-authored exhibits if it had not received as a quid pro quo the withdrawal of the non-witness-authored exhibits. It would be highly unfair to deprive Applicant of that quid pro

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4/ The transcript shows that Joint Intervenors' other counsel, Luke Fontana, was present at the time the stipulation was discussed. Tr. 1101. While Mr. Jones was subsequently discharged, Mr. Fontana was then and still is counsel for Joint Intervenors, who are therefore chargeable with his knowledge concerning proceedings in the case. See Cooper v. Lewis, 644 F.2d 1077, 1082 (5th Cir. 1981); Marpco, Inc. v. South States Pipe & Supply, 377 So. 2d 525, 527 (La. Ct. App. 1979). Therefore, Joint Intervenors cannot now contend that they were unaware of the stipulation. Certainly there is no excuse for their delay of more than two months in claiming that their counsel lacked authority to enter into the stipulation.

5/ One of the witness-authored exhibits (No. 13) was later withdrawn voluntarily by Joint Intervenors. Tr. 1843. While the Staff did not join in the stipulation, none of the witness-authored exhibits was excluded as a result of a Staff objection.

quo now that Applicant has fulfilled its part of the bargain, Joint Intervenors have gotten the benefit of the stipulation, and the record is long since closed.[6/]

On May 10, 1982, Mr. Jones was discharged by Joint Intervenors. Tr. 3338. Mr. Groesch took over the synergism portion of the case on behalf of Joint Intervenors. At that time, Mr. Groesch gave no indication that Mr. Jones lacked authority to enter into the stipulation on exhibits. Moreover, at the close of the hearing on May 12, 1982, Groesch moved that all the non-witness-authored exhibits be admitted into evidence. Tr. 4004-05. The Board denied the motion, pointing out that those exhibits had been withdrawn by stipulation, and it ruled that "[t]he stipulation will be honored by this Board." Tr. 4006, 4007. At that time, there can be no doubt that Mr. Groesch had actual knowledge of the stipulation, yet he said nothing about Mr. Jones' authority. Applicant submits that the stipulation is binding upon Joint Intervenors and that

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6/ In a case involving a stipulation referring discovery disputes to a master, another Licensing Board has held that "one making a bargain ought to fulfill his obligation, particularly where there appears to have been a reasonable quid pro quo associated with the agreement." Toledo Edison Co. (Davis-Besse Nuclear Power Station, Units 1, 2 and 3), LBP-75-49, 2 N.R.C. 365, 369 (1975). In the same case the Appeal Board went even further, holding that a party who accepts the benefits of a stipulation "is estopped to deny the validity" of the stipulation, "regardless of the ground of attack." Toledo Edison Co. (Davis-Besse Nuclear Power Station), ALAB-300, 2 N.R.C. 752, 767 (1975).

the Licensing Board should adhere to its prior decision to honor and enforce the stipulation.

Even if the Board's prior ruling on this matter is disregarded, the outcome would be the same under prevailing legal principles. An attorney has apparent or implied authority to make tactical and strategic decisions during the course of a proceeding, and the client is bound by such decisions regardless of his knowledge or consent.[7/] An illustrative case is Almon v. Black, 611 S.W.2d 368 (Mo. Ct. App. 1981), in which the defendant claimed that her attorney improperly waived her right to a jury trial without authorization to do so. The court rejected this contention, holding:

> [D]efendant's attorney agreed to and signed a written memorandum waiving a jury. Defendant contends this waiver was not valid since she did not authorize it, but it is a well established rule that an attorney in charge of a case has apparent authority to enter into any stipulation to control the progress of the action, and that the client will be bound thereby. Wenneker v. Frager, 448 S.W.2d 932, 937 (Mo. App. 1969). We hold that the waiver of a jury in this civil case by defendant's attorney having apparent authority to do so is binding upon her.

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7/ Such tactical and strategic decisions must be distinguished from actions that dispose of the entire case, such as a settlement or a dismissal with prejudice. In the latter situation, which clearly does not apply here, the attorney's actual authority may be more important. See Hayes v. Eagle-Picher Industries, Inc., 513 F.2d 892 (10th Cir. 1975); Singleton v. Bunge Corp., 364 So. 2d 1321, 1325 (La. Ct. App. 1978).

611 S.W.2d at 369. Many other cases have reached essentially the same result. See, e.g., Link v. Wabash R.R., 370 U.S. 626, 633-34 & n.10 (1962); Buchanan v. Buchanan, 99 Cal. App. 3d 587, 160 Cal. Rptr. 577, 582 (1980); Brumfield v. Brumfield, 178 So. 2d 379, 384 (La. Ct. App. 1965); Snyders v. Hale, 89 N.M. 734, 557 P.2d 583, 584 (1976). Here, the stipulation on exhibits plainly involved a tactical decision in the course of the operating license hearing. Mr. Jones was Joint Intervenors' counsel of record, and he had apparent authority to enter into the stipulation. Accordingly, Joint Intervenors are bound by the stipulation regardless whether Mr. Jones had been given actual authority to enter into it.

Joint Intervenors' arguments are also unsound from the standpoint of administrative policy. It would certainly throw the NRC licensing process into disarray if a party could discharge its attorney at the eleventh hour and then repudiate all the attorney's previous actions in the case by the simple expedient of denying the attorney's authority. Proceedings would never move forward in an orderly fashion if intervenor groups had that potent weapon at their disposal.

In summary, policy considerations, legal precedent and the particular circumstances of this case all compel rejection of Joint Intervenors' attempt to renege on the stipulation concerning exhibits.[8/]

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8/ If the Licensing Board should conclude, contrary to Applicant's arguments, that there is some merit in Joint

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## II. ONLY RECORD EVIDENCE MAY BE CONSIDERED BY THE LICENSING BOARD

Throughout their proposed findings, Joint Intervenors repeatedly refer to and rely upon material that was never admitted into evidence and is not part of the record in this case. In particular, Joint Intervenors cite books, studies and other documents that were not admitted into evidence; they rely on testimony that was withdrawn or stricken; they cite limited appearance statements; and they propose findings for which there is simply no evidence in the record. All such material must be disregarded by the Licensing Board.

The governing principles are well established. Section 2.754(c) of the Commission's regulations provides that proposed findings of fact "shall be confined to the material issues of fact presented on the record, with exact citations to the transcript of record and exhibits in support of each proposed finding." Section V(e)(2) of Appendix A to Part 2 of the regulations further provides that "[g]enerally speaking, a decision by a board must be made on the basis of evidence which is in the record of the proceeding."[9/] The Appeal Board has

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Intervenors' position, then the proper remedy would not be to reopen the record. Rather, the Board should simply review and consider the non-witness-authored exhibits. Applicant believes the Board would conclude that these exhibits have no effect on the disposition of the synergism issue.

9/ The only exceptions to this general rule identified in section V(e)(2) are facts "officially noticed" by the board and

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likewise held that "[i]t is clear that neither we nor a licensing board may base a decision on factual material which has not been introduced into evidence." Tennessee Valley Authority (Hartsville Nuclear Plant, Units 1A, 2A, 1B and 2B), ALAB-463, 7 N.R.C. 341, 352 (1978); accord, Public Service Co. of Indiana, Inc. (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-459, 7 N.R.C. 179, 191 (1978) (citations to extra-record material "are so much waste ink").

In support of several proposed findings, Joint Intervenors cite the written statement of Dr. Samuel Epstein, who was scheduled to be one of Joint Intervenors' witnesses but was unable to attend the hearing. Joint Intervenors attempted to have this statement admitted into evidence, but the Board rejected the tender and received the statement only as a limited appearance statement. Tr. 365. It has long been recognized that "[a] limited appearance statement is not evidence." Iowa Electric Light & Power Co. (Duane Arnold Energy Center), ALAB-108, 6 A.E.C. 195, 196 n.4 (1973). Thus, the Epstein statement cannot properly be used as the basis for proposed findings of fact.

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the board's own expert knowledge and experience, which is to be used in evaluating the evidence in the record. Neither of these exceptions authorizes Joint Intervenors' wholesale reliance on extra-record material.

Joint Intervenors refer to a number of NRC regulations, but none of the citations provides any justification for Joint Intervenors' persistent attempts to draw upon material that is not in the record.[10/] All such extra-record matter must be disregarded by the Licensing Board in reaching its decision. For the Board's convenience, we have listed below all of the passages from Joint Intervenors' proposed findings that must be disregarded because they involve extra-record material.

| | Material To Be Disregarded | Reason |
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| 1. | Joint Intervenors' "Hearing Memorandum" p. 5 (lines 8-25), p. 6 (all), p. 7 (lines 1-4). | The book Shutdown and testimony of Drs. Sternglass and Gofman in another proceeding never offered or admitted in evidence. |
| 2. | Joint Intervenors' Proposed Finding ("J/I PF") No. 1 (all following 1st sentence). | Map attached as Appendix I not in record; no other support in record. |

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10/ For example, Joint Intervenors cite section 2.740, which deals with discovery, not the admission of evidence. Section 2.743(h) deals with the means of authenticating government records; it does not provide that all such records are admissible or that a Licensing Board may consider them even if they have not been introduced into evidence. Section 2.743(i) covers official notice of technical and scientific facts that are matters of common knowledge; it does not apply to the kinds of scientific studies upon which Joint Intervenors are relying here, nor does it apply to opinions, judgments and conclusions. See Niagara Mohawk Power Corp. (Nine Mile Point, Unit 2), LBP-74-26, 7 A.E.C. 758, 760 (1974).

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| 3. | J/I PF No. 2 (all). | Harris report (attached as Appendix II) never offered or admitted in evidence. |
| 4. | J/I PF No. 3 (all). | Referenced study (attached as Appendix III) withdrawn as an exhibit by Joint Intervenors and is not in evidence; Epstein limited appearance statement not evidence. |
| 5. | J/I PF No. 7 (all following 1st sentence). | Epstein limited appearance statement not evidence. |
| 6. | J/I PF No. 8, word "radiation" (line 1) | Stricken from Campbell's testimony by stipulation. Tr. 1053-54. |
| 7. | J/I PF No. 8, passage beginning "it is now proposed . . ." and ending ". . . who lives in the area." (lines 8-16). | Stricken from Campbell's testimony by stipulation. Tr. 1053-54. |
| 8. | J/I PF No. 8, last sentence. | Epstein limited appearance statement not evidence. |
| 9. | J/I PF No. 20 (all following 1st sentence). | Papers by Rothman and Blot never offered or admitted in evidence. |
| 10. | J/I PF No. 21 (last two sentences). | Greenstock study, attached as Appendix IV, withdrawn as an exhibit by Joint Intervenors and is not in evidence. |
| 11. | J/I PF No. 22 (all after 1st sentence). | Brodsky paper, attached as Appendix V, withdrawn as an exhibit by Joint Intervenors and is not in evidence. |

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| 12. | J/I PF No. 23, quotations from Wilson, Stannard and Upton papers (lines 10-21) | Papers not in evidence; Upton paper withdrawn as an exhibit by Joint Intervenors. |
| 13. | J/I PF No. 23, remainder of proposed finding (lines 1-9, 21-27). | Not supported by Bross' answer to Q. 38, which is cited by Joint Intervenors, or by anything else in Bross' direct testimony. |
| 14. | J/I PF No. 25, study by Cole (lines 13-20). | Cole study never offered or admitted in evidence; the passage quoted was never read into the record. The study was merely cited by Drs. Hamilton and Goldman for a different proposition. See Hamilton direct testimony, p. 13; Goldman direct testimony, p. 11. |
| 15. | J/I PF No. 27, reference to Commerce Dep't study (lines 12-13). | Study not in evidence; it was cited once by Bross (Tr. 1733), but that testimony was stricken (Tr. 1743). |
| 16. | J/I PF No. 31, last two sentences (lines 17-28). | Not supported by Bross' answer to Q. 51, which is cited by Joint Intervenors, or by anything else in Bross' direct testimony. |
| 17. | J/I PF No. 32, quotation from Kraybill paper (lines 15-28). | Kraybill paper never offered or admitted in evidence. |
| 18. | J/I PF No. 36, references to Argonne and Watts papers (lines 5-11). | Neither paper offered or admitted into evidence. |

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| 19. | J/I PF No. 44, reference to Index Medicus (lines 5-9). | Index Medicus never offered or admitted in evidence; Dr. Hamilton was not questioned about it. |
| 20. | J/I PF No. 49, references to New York Times and Science articles (lines 19-32). | Articles never offered or admitted into evidence. |
| 21. | J/I Appendices I through VII | Documents never admitted into evidence. |

## III. REPLY TO JOINT INTERVENORS' PROPOSED FINDINGS

In this section, Applicant replies to certain of the findings proposed by Joint Intervenors. We have not attempted to respond here to each proposed finding with which Applicant disagrees or to note in each instance where there is substantial disagreement among the parties. Nor is the Board required expressly to treat in its decision each and every individual finding proposed by every party. See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-422, 6 N.R.C. 33, 41 (1977) (and cases cited therein). Where the disagreements are plain, and the positions are accompanied by accurate citations to the record, for example, we have not repeated our position, but rely upon Applicant's Proposed Findings of Fact, Conclusions of Law, and Brief in the Form of a Proposed Initial Decision, dated June 11, 1982 ("Applicant's PF"). In some cases, where a number of findings are common to

one subject, or in Applicant's view suffer from a common fault, our reply may address a group of findings together. We have not replied to the portions of the proposed findings that, as discussed above, are based upon extra-record material. This should not be taken as in any way admitting that Applicant agrees with those findings. The reply is written in the form of a Licensing Board decision.

## A. Louisiana Cancer Rates

1. Joint Intervenors rely extensively upon the testimony of Dr. Velma Campbell to establish that southeastern Louisiana has an elevated cancer rate and that the excess cancer is caused at least in part by chemical carcinogens in the environment. J/I PF Nos. 4-8. However, certain facts brought out on cross-examination leave Dr. Campbell's conclusions in some doubt.

2. To establish the elevated cancer rate, Dr. Campbell relied principally upon a report from the National Cancer Institute's SEER Program entitled "Cancer Incidence and Mortality in the United States, 1973-1977." Campbell direct testimony, A.9. The National Cancer Institute ceased collecting data from the New Orleans area for the SEER Program at the end of 1978. Tr. 1067, 1069 (Campbell). There was some

evidence that the New Orleans area was dropped from the SEER Program because of "inconsistencies" in the data supplied by the tumor registry in that area. Tr. 2085-89 (Campbell). The evidence was not conclusive on this issue one way or the other. However, more recent data published by the American Cancer Society, which Dr. Campbell regards as a "widely respected organization," indicate that the Louisiana cancer rate is actually below the national rate or only slightly above it. Tr. 2093, 2094, 2097-98, 2100-01 (Campbell). The American Cancer Society statistics were based primarily on data from the New Orleans area. Tr. 2113-18 (Campbell).

3. In addition, conflicting inferences can be drawn from the data in the SEER Report itself. For example, the New Orleans mortality rates for some types of cancer are above the national average, while the incidence rates for the same types of cancer are actually below the national rates. Tr. 2060-63 (Campbell). Dr. Campbell testified that it is "always hard to pin down" discrepancies between incidence and mortality rates. Tr. 2062 (Campbell). Nevertheless, it would seem logical to conclude that incidence rates are far more significant in determining whether chemical carcinogens are causing an elevated level of cancer in a particular area.

4. To establish that excess cancer is caused by chemical carcinogens, Dr. Campbell cited three studies dealing, respectively, with lung cancer, pancreatic cancer, and cancer of the colon and rectum. Campbell direct testimony, A.9. Two of these studies are death certificate analyses with considerable inherent limitations such as the inability to control for smoking or alcohol consumption. Tr. 2066-68, 2070-71 (Campbell). The studies also caution against drawing any causal inferences from the data presented. Tr. 2068-71 (Campbell). Dr. Campbell did not cite a 1977 paper by T. A. DeRouen and J. E. Diem entitled "Relationships Between Cancer Mortality in Louisiana, Drinking Water Source and Other Possible Causative Agents" or a 1978 study prepared by the National Academy of Sciences for the Environmental Protection Agency entitled "Epidemiological Studies of Cancer Frequency and Certain Organic Constituents of Drinking Water." Both papers cast doubt on the proposition that cancer is caused by chemical carcinogens in the drinking water in southeastern Louisiana. Tr. 652-55, 658-67 (Hamilton).

5. Joint Intervenors contend that Dr. Hamilton displayed no knowledge of the types, sources and concentrations of chemicals that might interact with radiation in the area around Waterford 3. J/I PF No. 41. This is clearly incorrect. Dr. Hamilton stated that he reviewed the literature concerning

environmental pollutants in southern Louisiana, including the studies cited by Joint Intervenors' witnesses and studies not cited by Joint Intervenors. Tr. 644 (Hamilton). Dr. Hamilton's familiarity with the literature was demonstrated during his cross-examination, where he discussed at some length a number of papers on this subject. See, e.g., Tr. 645-55, 658-72, 674-79 (Hamilton). Based on his review of the scientific evidence, Dr. Hamilton in general saw no clear relationship between the cancer incidence in the general population and environmental pollutants in southeastern Louisiana. Tr. 675-76, 679, 685 (Hamilton).

6. In summary, it may be that there is an elevated rate of cancer in southeastern Louisiana, and it may be that the cancer rate is caused in part by chemical carcinogens and environmental pollutants. However, the evidence in the record on these points is unclear, and the causal relationships remain obscure.

## B. Source Term and Dose Calculations for Waterford 3

7. Joint Intervenors rely primarily upon the testimony of Dr. Carl Johnson to support their contention that the source term and dose calculations for Waterford 3 performed by Applicant and the Staff are inaccurate. J/I PF Nos. 10, 14, 15.

However, Dr. Johnson has never performed source term or dose calculations for Waterford 3 or any other commercial light water reactor, and he does not consider himself an expert in these areas. Tr. 1847-54, 1886-87, 1947 (Johnson). Accordingly, Dr. Johnson's opinions on this subject are entitled to little weight.

8. In particular, Joint Intervenors believe that the inhalation and ingestion pathways of exposure will be the most important sources of exposure from Waterford 3 and that these exposures have been poorly evaluated. J/I PF No. 10. The record does not support Joint Intervenors' position. Applicant's dose calculations take into consideration the inhalation pathway and the ingestion pathway, including ingestion of vegetables, beef, milk, water and aquatic foods. Mauro direct testimony, p. 5; Tr. 498, 501-02, 521, 604-05 (Mauro). The Staff's dose calculations are based on Regulatory Guide 1.109, which contains equations and detailed data for modeling the inhalation and ingestion pathways. Branagan direct testimony, p. 5; Final Environmental Statement for Waterford 3 ("FES") (Staff Ex. 1) § 5.9.1 & Appendix J. We conclude that the inhalation and ingestion exposure pathways have been adequately evaluated by Applicant and the Staff.

9. Joint Intervenors also assert, based on Dr. Johnson's testimony, that there is a high water table in Louisiana that will result in special risks associated with ground water radionuclide contamination. J/I PF No. 14. Dr. Johnson has made no study of the hydrology or geology in the area around Waterford 3, and he is not familiar with the aquifers, aquicludes or sources of drinking water in the area. Tr. 1964-65 (Johnson). By contrast, the Staff has studied this subject in some detail and does not share Dr. Johnson's views. See FES (Staff Ex. 1) § 5.3.1. Since Dr. Johnson's opinions are without any real factual foundation, they are entitled to little or no weight.

10. Joint Intervenors further doubt that the actual exposures at Waterford 3 will be as low as predicted, especially in view of the 240 radionuclides that, Dr. Johnson testified initially, are routinely released from nuclear power plants. J/I PF No. 14. On cross-examination, Dr. Johnson admitted that the 240 radionuclides were taken from a Health Physics article listing dose conversion factors for all the radionuclides associated with the entire nuclear fuel cycle. Tr. 1937-39 (Johnson). This listing says nothing about the radionuclides that will be released from Waterford 3 or any other commercial light water reactor.

11. Joint Intervenors assert that Dr. Johnson has seen records of large radioactive releases from five reactors and that these "published releases are considerably higher than the proposed releases of the Waterford 3 plant." J/I PF No. 15. During his cross-examination, Dr. Johnson referred to a table he prepared, showing releases from Oyster Creek and from Westinghouse, Combustion Engineering, Babcock and Wilcox and General Electric plants. Dr. Johnson's table is not in the record, and, for the reasons discussed below, it does not appear to be a reliable representation of actual plant releases.

12. Dr. Johnson testified that the figures for Oyster Creek were derived from an EPA report. Tr. 1909-10 (Johnson). He tabulated figures for the manufacturers from numbers in a report prepared by J. C. Malaro and T. H. Essig, entitled "Doses from Radioactive Actinides Released in Liquid Effluents from Light Water Cooled Nuclear Power Reactors." Tr. 1986 (Johnson). Contrary to Joint Intervenors' statement in PF No. 15, Dr. Johnson did not receive NRC figures for releases from the exhaust plume. Tr. 1911 (Johnson). Dr. Johnson believes that the figures on his table represent releases from single reactors made by the listed manufacturers, but he could not name the plants. Tr. 1986-89 (Johnson). Nor did he recall whether the numbers on his table are based on actual releases

or projections of releases or what differences exist between the plants. Tr. 1904, 1912 (Johnson).

13. Dr. Johnson understands Waterford 3 to be a PWR manufactured by Combustion Engineering, but he did not know whether Combustion Engineering has more than one type of reactor design or effluent treatment system. Tr. 1989 (Johnson). His table showed a Combustion Engineering plant that releases 10 million picocuries of Neptunium 239. He acknowledged that the Staff's corrected estimate projects releases of 30 million picocuries of Neptunium 239 from Waterford 3, which is three times greater than the Combustion Engineering plant releases represented on his table. Tr. 1989-92 (Johnson). Thus, Dr. Johnson's table suggests, if anything, that the Staff's estimates are conservative.

14. Dr. Johnson's only evidence from an operating plant that the Staff's estimate may be inaccurate is a comparison of that estimate to the releases from Oyster Creek. He admitted that Oyster Creek is a BWR and that he does not know the manufacturer or the type of effluent treatment system used at that plant. Tr. 1992-93 (Johnson). He recognized the wide disparity among the calculated releases from plants represented on his table and that different release rates may be expected from various systems. Tr. 1993 (Johnson).

15. A comparison of Dr. Johnson's representation of widely varying release rates attributed to different types of plants with the projected releases from Waterford 3 is meaningless. We conclude that there is no persuasive evidence in the record to support Joint Intervenors' statement that "published releases are considerably higher than the proposed releases of the Waterford 3 plant."

16. In the final analysis, it was Dr. Johnson's view that operating experience at existing nuclear power plants is the best measure of the releases to be expected from a new plant coming on line. Tr. 1877 (Johnson). In this connection, we note that Applicant's estimates of the releases expected from Waterford 3 were made by using mathematical models that are based on operating experience at other plants around the country. Tr. 490-94 (Mauro). In addition, Dr. Mauro independently checked his release estimates for Waterford 3 and found them to be in close agreement with recent operating experience at other plants. Id. Thus we conclude that, even by Dr. Johnson's standards, the source terms calculated for Waterford 3 are reasonable estimates of the source terms that may be expected during plant operation.

17. Joint Intervenors rely upon Dr. Branagan's testimony for the proposition that the annual radiation exposure to the

maximally exposed individual from Waterford 3 will be 23 mrem, and that this exposure amounts to 27% of the existing natural background radiation. J/I PF Nos. 35, 38. Based on this conclusion, Joint Intervenors suggest that there will be a 27% increase in cancer deaths. J/I PF No. 43. We believe that Joint Intervenors have misunderstood Dr. Branagan's testimony.

18. The 23 mrem figure was taken from Table J-5 of the FES (Staff Ex. 1). Dr. Branagan derived the figure at the request of Mr. Jones by adding together the Appendix I Design Objectives for the dose to total body from all pathways for liquid effluents (3 mrem), the dose to total body from noble-gas effluents (5 mrem), and the dose to any organ from all pathways for radioiodines and particulates (15 mrem). Tr. 879-80 (Branagan). It is important to note that these figures represent the Appendix I Design Objectives; they are not the calculated doses that, according to the Staff's FES, the maximally exposed individual is actually expected to receive from Waterford 3. When Dr. Branagan performed an analogous calculation using the Staff's actual calculated doses to the maximally exposed individual, the result was an annual dose of about 6 mrem. Tr. 1000, 1010 (Branagan). This dose falls well within the variation in natural background radiation in the area around Waterford 3. See Applicant's PF, pp. 9, 17. Therefore, the testimony by Dr. Branagan cited by Joint

Intervenors further supports Applicant's position that the increase in synergistic effects caused by operation of Waterford 3, if any, will be undetectably small. Id.

19. It is also clear from Dr. Branagan's testimony that the maximally exposed individual is truly a hypothetical individual. In order to obtain the annual dose of 6 mrem mentioned by Dr. Branagan, this individual would have to be physically located at the site boundary ESE of the plant 100% of the year, and he would have to be outside and unshielded from gamma radiation 70% of the year. Tr. 747, 1006 (Branagan); FES pp. 5-29, J-6. In addition, the individual would have to eat fish from the plant's discharge canal, eat meat from an animal located 0.8 mile NW of the plant, drink milk from a cow located 0.9 mile NW of the plant, and eat vegetables from a farm 0.31 mile ESE of the plant. Tr. 1001-02, 1006-08 (Branagan); FES p. J-6. Accordingly, it is highly unlikely that any individual would actually receive all the dose components assumed for the maximally exposed individual. Tr. 1002, 1014 (Branagan). It is for this reason that the Staff does not ordinarily add up the doses from all of the various exposure pathways to which the maximally exposed individual is hypothetically exposed. Tr. 1008 (Branagan).

20. Moreover, we do not believe that the dose to the hypothetical maximally exposed individual is the best measure of the health effects from any synergism between the routine radioactive releases from Waterford 3 and existing environmental pollutants. Joint Intervenors' Proposed Conclusion of Law No. 2 indicates that their concern is for the health of "thousands of Louisianians" living in a "corridor stretching from Baton Rouge to the mouth of the Mississippi." To address this concern for the general population, it is more realistic to consider the dose received by the general population resulting from routine operation of Waterford 3. Applicant has estimated that the average individual in the areas surrounding the Waterford 3 site will receive a dose of less than 0.01 mrem per year. Mauro direct testimony, p. 5. The accuracy of this estimate was never put in serious question during the hearing. See Applicant's PF, pp. 9-14. The average dose of less than 0.01 mrem is, of course, an exceedingly small fraction of the variation in natural background radiation around Waterford 3.

21. We also find no evidence in the record to support Joint Intervenors' suggestion that a 27% increase in natural background radiation would lead to a 27% increase in cancer deaths. This conclusion assumes that all cancer deaths are attributable to natural background radiation, which is clearly inconsistent with the evidence in the record. Tr. 666-67, 671-72 (Hamilton); Tr. 3570 (Fabrikant).

22. Finally, Dr. Hamilton testified that the radiation added by Waterford 3 will be only a "tiny fraction" of the existing natural background radiation. Hamilton direct testimony, p. 10. Joint Intervenors attack Dr. Hamilton's testimony by stating that "[h]e apparently does not know the exact figures to which he refers as 'tiny' and nowhere in his testimony offers a specific amount in rems or a percentage of background radiation." J/I PF No. 38. We are at a loss to understand how Joint Intervenors can make this assertion. Dr. Hamilton's direct testimony was part of a panel presentation that included in Table 2 the calculated average annual individual dose of 0.01 mrem resulting from routine operation of Waterford 3. Dr. Hamilton referred specifically to this average dose of 0.01 mrem several times during his testimony. Tr. 637, 639, 683, 715-16 (Hamilton). Furthermore, Table 3 to the panel's direct testimony showed the natural background radiation from external sources at various locations around Waterford 3; the measured doses vary from 69.2 to 88.48 mrem per year. Dr. Hamilton also noted that the background radiation from internal and external sources would total approximately 100 mrem per year, and that the external background radiation varies by as much as 20 mrem per year around Waterford 3. Hamilton direct testimony, p. 15; Tr. 683 (Hamilton). It is clear that Dr. Hamilton in fact was familiar with the average dose expected from Waterford 3 and that this

dose is indeed a "tiny fraction" of the existing background radiation in the area.

## C. Synergistic Effects

23. Joint Intervenors begin by asserting as an "established fact" that fractionation of radiation dose does not diminish the carcinogenic effect that would result from a single exposure to the same total dose of radiation. J/I PF No. 25. No evidence in the record is cited in support of this proposition. On the other hand, both Dr. Hamilton and Dr. Fabrikant testified that radiation doses delivered at low dose rates are relatively less damaging than doses delivered at high dose rates, primarily because of the body's repair mechanism. Hamilton direct testimony, pp. 11-12; Tr. 691-94 (Hamilton); Tr. 3660-64 (Fabrikant). Dr. Goldman agreed. Tr. 903, 917-18 (Goldman). Certainly the record in this case does not prove Joint Intervenors' assertion as an "established fact."

24. Joint Intervenors make an argument based upon a study by J. A. DiPaolo that is cited as Reference (6) on page 13 of Dr. Hamilton's direct testimony. J/I PF No. 39. The study is entitled "X-Irradiation Enhancement of Transformation by Benzo(a)Pyrene in Hamster Embryo Cells," Proceedings of the

National Academy of Sciences 68:1734 (1971). The study itself is not in the record, and Dr. Hamilton was never questioned about it and therefore had no opportunity to respond to the argument that Joint Intervenors now base upon the study. Dr. Goldman was questioned about the study, although he did not cite it in his direct testimony. Tr. 969-75 (Goldman). See Finding of Fact No. 32, infra. Although the study is not technically in the record, under the circumstances we will consider the issue raised in J/I PF No. 39.

25. In Dr. Hamilton's view, the significant point about the DiPaolo experiments is that enhancement of transformation requires a dose of 250R, and a beginning of such enhancement is seen with doses of 150R. As Dr. Hamilton pointed out, these doses and dose rates are many times greater than those received even by the maximally exposed individual at Waterford 3. Hamilton direct testimony, p. 13. Joint Intervenors argue that DiPaolo's study is significant because it finds a lack of transformation by X-irradiation alone. Thus they believe that the study constitutes "a viable model for the environmental situation at hand" because it shows that "a non-carcinogenic (or non-transforming) dose of radiation, which is no hazard alone, becomes a hazard by causing more cancers (or transformations) than would be expected from a given dose of chemical carcinogen alone." J/I PF No. 39. The problem with

this argument is that one can hardly refer to a dose of radiation of 150R or 250R as non-carcinogenic or no hazard alone. This simply does not make sense. Moreover, the fact that X-irradiation was non-transforming under the experimental conditions of this study hardly makes these in vitro experiments on hamster embryo cells an appropriate model. See Tr. 969-75 (Goldman). We believe that the difficulties of relating morphological changes at the cellular level to actual malignancy demonstrable in vivo, the possible presence and activation of latent tumor viruses in experimental animal systems, and other biological mechanisms by which transformation can be achieved, all contradict any generalizations about a model that one can deduce from DiPaolo's experiments. See id. The crucial point of the DiPaolo study for our purposes is that one needs a substantial dose of irradiation in order to see an effect.

26. It is Applicant's position that the health effects -- synergistic or otherwise -- of the radiation added to the environment by Waterford 3 will not be significant because the additional radiation will be only a small fraction of the existing natural background radiation. Joint Intervenors challenge this conclusion by arguing that background radiation results only in external exposure to the populace, whereas the exposure pathways from Waterford 3 include internal exposures

through inhalation and ingestion of food and water. J/I PF No. 40. We cannot accept Joint Intervenors' argument. Background radiation is composed of two components -- external and internal radiation. The external component consists primarily of cosmic and terrestrial radiation and was measured at approximately 80 mrem per year in the areas around Waterford 3. Kenning direct testimony, Table 3; Tr. 475-78 (Kenning and Mauro). In his testimony Dr. Hamilton was careful to point out that he was using a dose of approximately 100 mrem per year for background radiation, which includes both the external component described above and the internal component, which is approximately 20 mrem per year. Hamilton direct testimony, p. 15; Tr. 680-81 (Hamilton).[11/] Accordingly, we think Applicant is on firm ground comparing the routine emissions from Waterford 3 to the existing natural background radiation.

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11/ The internal component of background radiation comes from radionuclides that are inhaled (primarily radon and its daughters) and ingested (primarily K-40). National Academy of Sciences, Advisory Committee on the Biological Effects of Ionizing Radiations, The Effects on Populations of Exposure to Low Levels of Ionizing Radiation, at 12 (Nov. 1972) ("BEIR I"). The BEIR I Report was not offered or admitted into evidence. However, it was cited repeatedly during the hearing, and Joint Intervenors rely on it extensively in their proposed findings. See J/I PF Nos. 25, 30, 43. In addition, Applicant cited this page of BEIR I in support of its estimate of background radiation. Mauro direct testimony, Table 2 n.1. Finally, the Commission has held that we may take official notice of BEIR I. Public Service Co. of Oklahoma (Black Fox Station, Units 1 and 2), CLI-80-31, 12 N.R.C. 264, 277 (1980). Accordingly, it is appropriate for us to rely upon BEIR I here.

27. Joint Intervenors acknowledge Dr. Hamilton's familiarity with the literature on synergism between chemicals and radiation, but they contend that he offered no conclusions on the possibility of simple additive or cumulative effects. J/I PF No. 41. To the contrary, the record reflects that Dr. Hamilton consistently stated his views in terms of "cumulative and/or synergistic effects," which tracks the wording of Contention 8/9. Hamilton direct testimony, pp. 10, 14, 15; Tr. 683-84 (Hamilton). Dr. Goldman did the same. Goldman direct testimony, pp. 3, 9-10.

28. Joint Intervenors' discussion of Dr. Goldman's testimony concentrates on the following four studies relating to the interaction of chemicals and radiation: Myers, "Effects of X-Radiation and Urethane on Survival and Tumor Induction in Three Strains of Rats," Radiation Research 65:292 (1976); Cole & Foley, "Modification of Urethan-Lung Tumor Incidence by Low X-Radiation Doses, Cortisone, and Transfusion of Isogenic Lymphocytes," Radiation Research 39:391 (1969); Kennedy, et al., "Enhancement of X-ray Transformation by 12-0-Tetradecanoyl-phorbol-13-acetate in a Cloned Line of C3H Mouse Embryo Cells," Cancer Research 39:439 (1978); and DiPaolo, et al., "X-Irradiation Enhancement of Transformation by Benzo(a)Pyrene in Hamster Embryo Cells," Proceedings of the National Academy of Sciences 68:1734 (1971). J/I PF Nos. 45-47. None of these

studies is itself in the record. However, the studies were cited in Dr. Goldman's direct testimony and/or discussed by him on cross-examination. Accordingly, we will consider Joint Intervenors' arguments even though the studies are technically not in the record. From this material, Joint Intervenors draw two basic conclusions: (1) that synergistic interactions do in fact occur at low levels of radiation, and (2) that such interactions are more likely when the dose is fractionated than when the same total dose is received in a single exposure. As discussed below, we do not believe that either conclusion is warranted by the evidence cited.

29. With respect to the Myers study, Joint Intervenors quote a passage from the abstract stating that the two agents produced "more lymphatic disorders . . . than expected from the sum of the effects of the two agents separately in Collip rats." J/I PF No. 45. This quotation is misleading when taken out of context. The full quotation from the abstract is as follows:

> X-Radiation and urethane together produced more lymphatic disorders but fewer skin and mammary tumors than expected from the sum of the effects of the two agents separately in Collip rats. However, these results were not always paralleled by those obtained in the other two strains of rats. As judged from the cumulative mortality curves for all three strains of rats tested, it would appear that the overall carcinogenic stimulus and life-shortening effect of X-radiation and urethane together was not greater than the

> sum of their separate effects at the dosage levels studied.

Thus the study in fact demonstrates simple additive effects, not synergism. In addition, we note that the radiation dose used in the Myers study was five exposures of 165R each delivered at a dose rate of 55R per minute. This is hardly comparable to the doses and dose rates expected from Waterford 3.

30. Joint Intervenors believe that the Cole & Foley study demonstrates that several "small" radiation doses are more effective in producing synergistic interactions than a single large dose. J/I PF Nos. 45, 46. Again, the doses used in this study can hardly be regarded as "small" -- a single dose of 300R and a fractionated dose of six 50R exposures. Moreover, Dr. Goldman was quite specific in his testimony on two points: (1) that the study shows additivity, not synergism; and (2) that more tumors were seen with the fractionated dose because the acute 300R dose killed so many cells that might otherwise have transformed into tumors, and not because the fractionated dose is inherently more hazardous. Tr. 983-84 (Goldman).

31. The Kennedy study, according to Joint Intervenors, showed that the chemical agent enhanced transformation most effectively at low doses of radiation. J/I PF Nos. 46, 47.[12/]

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12/ In discussing the Kennedy study, Joint Intervenors erroneously quote Dr. Goldman's direct testimony (p. 10) as

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Again, Dr. Goldman's testimony is illuminating. First, he stated that Kennedy was unable to get any transformations without 50 to 100 rads, which he regards as a fairly large dose of radiation. Tr. 950 (Goldman). In addition, Dr. Goldman reviewed the range of doses used by Kennedy, from 50 to 600 rads, and concluded that the data were convergent toward no enhancement factor. This suggested to Dr. Goldman a threshold effect, with a radiation level below which no enhancement, or synergism, occurs. Tr. 951-53 (Goldman).

32. Finally, Joint Intervenors contend that the DiPaolo study provides a valid model for low-dose situations such as Waterford 3. J/I PF No. 47. Dr. Goldman testified unequivocally that the DiPaolo experiment does not provide an acceptable model for predicting synergism in vivo. Tr. 971-75 (Goldman). See also Finding of Fact No. 25, supra. More significantly, the DiPaolo data suggest, as Dr. Goldman noted, that synergistic effects diminish exponentially as the radiation dose goes down. Tr. 971-72 (Goldman).

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(Continued)

stating that the maximum enhancement factor was seen in studies "using relatively high radiation doses (20 mrem or more)." J/I PF No. 47. The parenthetical in Dr. Goldman's testimony actually states "(25 rem or more)." We assume that this was a typographical error.

33. In summary, we believe that the studies discussed by Joint Intervenors do not undermine but rather support the testimony given by Dr. Goldman in this proceeding. In particular, the studies support Dr. Goldman's opinion (1) that high doses of radiation are more hazardous than low doses (Tr. 903-05, 917-18); (2) that high dose rates are more hazardous than low dose rates (Id.); and (3) that synergism probably does not occur at all at low levels of radiation such as those expected from Waterford 3 (Goldman direct testimony, pp. 3, 14-15; Tr. 945, 987-89).

34. No one disputes that the cancer cases in southeastern Louisiana are occurring in people who have been continuously exposed to natural background radiation at the rate of about 100 mrem per year. We also find it difficult to disagree with Applicant's view that if synergism occurs at all at these low levels of radiation, it is already occurring in the interaction between the background radiation and the chemical carcinogens assumed to be in the environment. Thus, the existing cancer rates in southeastern Louisiana must already reflect any synergistic and/or cumulative effects that are occurring. Applicant points out that the radiation added to the environment by routine operation of Waterford 3 will be a minute fraction of background radiation and therefore concludes that the additional synergistic effects caused by Waterford 3, if

any, will be proportionately minute and in fact will be completely undetectable because of the variation in background radiation around the plant.[13/] It is at this step in the reasoning that Joint Intervenors part company from Applicant. Joint Intervenors contend that synergistic effects will not decrease proportionately as the radiation dose decreases and that any such linear dose-effect curve for synergism greatly underestimates the actual risk. J/I PF No. 43. Joint Intervenors cite no evidence in support of their position other than the BEIR I Report, and we are not persuaded.

35. Unlike Joint Intervenors, Applicant has provided evidence to support its position. Dr. Hamilton testified that since the increase in radiation caused by Waterford 3 will be only a tiny fraction of natural background radiation, the increase could not possibly represent any significant additional hazard beyond that to which the population is already exposed. Tr. 716 (Hamilton). He stated that the existing scientific evidence does not provide an adequate basis for extrapolating from synergistic effects shown at high doses down to small doses such as those expected from Waterford 3. Tr. 716-17 (Hamilton). However, he testified that, assuming for

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13/ Applicant's position is discussed in greater detail in its Proposed Findings of Fact, at 16-18.

reasons of conservatism that synergism does occur even at the lowest conceivable doses, he would expect the results of the addition of the radiation from Waterford 3 to be directly proportional to the increase in dose of radiation. Tr. 717 (Hamilton). Moreover, Dr. Hamilton believes that his conclusion is conservative because of two rather conservative assumptions: (1) that synergistic and/or cumulative effects do in fact occur at low levels of radiation such as those involved in this case;[14/] and (2) that the body's normal radiation repair mechanism is to be disregarded. Tr. 716-19 (Hamilton). By ignoring the repair mechanism and assuming a linear dose-effect curve, Dr. Hamilton believes that we will arrive at an upper-boundary risk estimate that in fact overstates the actual risk, including any additional risk resulting from the synergistic and/or cumulative interactions that may be occurring at these low levels of radiation. Tr. 719 (Hamilton).

36. In the same vein, Dr. Fabrikant testified that attempts have been made to extrapolate down linearly from experiments showing synergism at high doses to low doses such

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14/ It is important not to lose sight of the fact that the preponderance of the evidence in this record indicates that synergism will not occur at all at the low levels of radiation involved in this case. Tr. 716-19 (Hamilton); Goldman direct testimony, pp. 3, 14-15; Tr. 945, 987-89 (Goldman); Tr. 3656-57 (Fabrikant).

as those involved here. Tr. 3647 (Fabrikant). In his view, these efforts have not been particularly useful. Id. Dr. Fabrikant went on to testify, however, that in his opinion synergistic effects would not occur at all at low levels of radiation and that if they did occur, the effects would be so small as to be clinically undetectable. Tr. 3656-57 (Fabrikant). We believe this testimony provides further support for Dr. Hamilton's conclusions.

37. The only evidence cited by Joint Intervenors in PF No. 43 is the BEIR I Report and in particular the following passage:

> [B]ecause there is greater killing of susceptible cells at high doses and high dose rates, extrapolation based on effects observed under these exposure conditions may be postulated to underestimate the risks of irradiation at low doses and low dose rates.

BEIR I, at 88. From this, Joint Intervenors argue that linear dose-effect curves underestimate the actual risk. However, the passage quoted by Joint Intervenors is but the last sentence of a long paragraph in BEIR I. The entire pertinent portion of the paragraph states as follows:

> At background radiation levels, ionizing events in individual mammalian cell nuclei occur at a rate of much less than one per day, whereas at the higher dose rates mentioned, ionization events occur in cells at a frequency of the order of 2600 per second. This enormous difference may have important implications with respect to the

> production of radiation damage within cells and its repair at the molecular level. On the basis of the likelihood of such repair, the risk of cancer induction at low doses and low dose rates might be expected to be appreciably smaller per unit dose than at high doses and high dose rates, as has been observed to be the case in certain radiation-induced tumors of experimental animals. 5, 10, 19. Hence, expectations based on linear extrapolation from the known effects in man of larger doses delivered at high dose rates in the range of rising dose-incidence relationship may well overestimate the risks of low-LET radiation at low dose rates and may, therefore, be regarded as upper limits of risk for low-level low-LET irradiation. The lower limit, depending on the shape of the dose-incidence curve for low-LET radiation and the efficiency of repair processes in counteracting carcinogenic effects, could be appreciably smaller (the possibility of zero is not excluded by the data). On the other hand, because there is greater killing of susceptible cells at high doses and high dose rates, extrapolation based on effects observed under these exposure conditions may be postulated to underestimate the risks of irradiation at low doses and low dose rates.

BEIR I, at 88. The crucial point here is that risk estimates are not derived from those portions of the curves where there is greater killing of susceptible cells. They are derived from the linear, i.e. rising, portion of the curves only. This caveat was included by the BEIR Committee to emphasize the well-known fact of cell-killing by ionizing radiation at high doses and the hazards of extrapolating from such situations. The last sentence does not undermine the basic conclusion that extrapolation downward from the linear portion of the dose-effect curve probably overstates the actual risk.

38. On the whole, Joint Intervenors have presented nothing that undercuts Applicant's basic position on Contention 8/9.

## D. Qualifications and Objectivity of Applicant's Witnesses

39. Joint Intervenors attack Dr. Hamilton's objectivity (J/I PF No. 42) and his qualifications (J/I PF No. 44). Neither attack is persuasive.

40. As to Dr. Hamilton's objectivity, Joint Intervenors contend that he had a "selectively bad memory" and "had to be prompted by the Board" before acknowledging that he testifies regularly for utilities. Nothing in the record suggests that Dr. Hamilton had a "selectively bad memory," and the transcript pages cited (540-44) show that his memory was not "prompted" by the Board. The only comment by the Board was a request that Dr. Hamilton speak into the microphone so that the Board could hear him better. Tr. 544. Dr. Hamilton did state that he has testified for other utilities in the past, but he also pointed out that his work is broadly supported by the Department of Energy and the Environmental Protection Agency and that his group has assisted the New York Sierra Club and several heart and lung associations. Tr. 533-36 (Hamilton). Finally, Dr. Hamilton has never taken a position for or against the

licensing of a particular plant, but has simply given his opinions on the scientific facts about which he was asked. Tr. 540 (Hamilton). We see no evidence of bias or lack of objectivity here.

41. As to Dr. Hamilton's qualifications, Joint Intervenors cite Index Medicus and dispute the statement in his Personal Qualifications (p. 5) that he has published 150 scientific papers. J/I PF No. 44. Index Medicus is not in the record and cannot properly be considered by the Board. Dr. Hamilton was not cross-examined on his publications, and it is too late now to attempt to impeach his statement of qualifications, which is in evidence, with assertions unsupported by anything in the record. In any event, we have no doubt of Dr. Hamilton's qualifications, and we note that the Appeal Board has recently described him in a case involving similar issues as a "highly qualified expert witness" with "impressive qualifications." Philadelphia Electric Co. (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-654, 14 N.R.C. 632, 634-35 & n.6 (1981).

42. In support of their views about the role of the "radiation protection community" in the peer review process, Joint Intervenors cite the examination of Dr. Hutchison regarding his participation in a congressional hearing on the

termination of funding for Dr. Mancuso's study of the Hanford workers. J/I PF No. 49. Joint Intervenors' lengthy voir dire regarding the congressional hearing (Tr. 3350-97) established that Dr. Hutchison in fact recommended continuation of Dr. Mancuso's project and that Dr. Mancuso be retained as the principal investigator. Tr. 3381 (Hutchison). The project was terminated because Mancuso and his colleagues had been involved in the research for many years without publishing reports in the scientific literature and because Mancuso had been searching unsuccessfully for a statistician needed to publish the major analysis. Tr. 3360-61, 3440-41 (Hutchison). During redirect examination, Dr. Hutchison stated that the General Accounting Office investigated the termination of the Mancuso contract, and found nothing unusual and no need for government action. Tr. 3441-42 (Hutchison). We see nothing in this suggesting the existence of a "radiation protection community"

that undertook to block Dr. Mancuso's work because the "community" disagreed with his conclusions, as Joint Intervenors would have us believe.

Dated: July 26, 1982.

Respectfully submitted,

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July 26, 1982



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

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| In the Matter of | ) | |
| | ) | |
| LOUISIANA POWER & LIGHT COMPANY | ) | Docket No. 50-382 |
| | ) | |
| (Waterford Steam Electric Station, Unit 3) | ) | |
| | ) | |

CERTIFICATE OF SERVICE

I hereby certify that copies of "Applicant's Reply To Joint Intervenors' Proposed Findings On Contention 8/9 (Synergism)" and "Applicant's Reply To The Proposed Findings of Fact and Conclusions of Law On Contentions 17/26(1) and (2) (Emergency Planning) Filed By Joint Intervenors and NRC Staff" were served upon those persons on the attached Service List by deposit in the United States mail, postage prepaid, this 26th day of July, 1982.

Delissa A. Ridgway

Delissa A. Ridgway

Dated: July 26, 1982

UNITED STATES OF AMERICA
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