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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

DOCKETED  
USNRC

'84 AGO -6 P2:57

Before the Atomic Safety and Licensing Board

OFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCH

In the Matter of )  
 )  
Philadelphia Electric Company )  
 )  
(Limerick Generating Station, )  
Units 1 and 2) )

Docket Nos. 50-352  
50-353

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APPLICANT'S REPLY TO THE CITY OF PHILADELPHIA'S  
AND LIMERICK ECOLOGY ACTION'S  
PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW  
RELATING TO SEVERE ACCIDENT RISK ASSESSMENT CONTENTIONS

Introduction

Philadelphia Electric Company, Applicant in the captioned proceeding, in accordance with 10 C.F.R. §2.754, hereby submits reply findings on the severe accident contentions in response to "Limerick Ecology Action, Inc.'s Proposed Findings of Fact and Conclusions of Law on LEA Contentions DES-1, 2, 3 and 4 ("LEA Findings"), dated July 26, 1984 and the "City of Philadelphia's Proposed Initial Partial Decision on City of Philadelphia's National Environmental Policy Act Severe Accident Concerns" ("City Findings"), dated July 26, 1984. The reply findings are in the form of insertions to "Applicant's Proposed Findings of Fact and Conclusions of Law Regarding Severe Accident Risk Issues," ("Applicant's Proposed Findings") dated July 5,

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1984.<sup>1/</sup> The reply findings can also be viewed in the order presented in this pleading.

Many of LEA's and the City's Proposed Findings were anticipated in the Applicant's Proposed Findings and, as to those findings, no further reply is necessary. It is also noted that a number of the proposed findings are immaterial to the issues before this Board and many others are unsupported by the record. Thus, the Board should adopt the Applicant's Proposed Findings as amended herein, and reject those of LEA and the City as unsupported by the record evidence or as immaterial to its decision.

#### Discussion

The following changes and additions should be made to the Applicant's Proposed Findings:

#### Reply to City Findings

1. On Page 11 of Partial Initial Decision (on LEA Contentions DES-1, DES-2, DES-3, DES-4 (in part) and CITY-14A), add Paragraphs 21A-21Q following Paragraph 21.

21A. Many of the City's proposed findings were without citations to the record of this proceeding.<sup>2/</sup> Such findings

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<sup>1/</sup> After reviewing the NRC Staff's Findings of Fact and Conclusions of Law in the Form of a Partial Initial Decision, dated July 16, 1984, the Applicant has concluded that no reply is necessary.

<sup>2/</sup> For example, in City Finding 10 at 6, City attempts to break down risk into its constituent elements. Moreover, no citation is given and the source cannot be  
(Footnote Continued)

are not helpful in assisting the Board in its decisionmaking. Moreover, a number of the findings are misleading or incorrect, a few examples of which are provided below for illustration.<sup>3/</sup> While no purpose would be served by attempting to enumerate all of these instances, the Board has placed little reliance of the factual assertions in City's findings when unsupported by record citations.

21B. The City defines severe accidents as "those residual accident possibilities that cannot be prevented through design or operational safety measures" (City Finding 2 at 1). This definition, which is presented without citation to the record, is misleading. Severe accidents are accidents which have lower probability than design basis accidents. Provision is not required under the Commission's regulations for such "severe" accidents. See FES at 5-72 and 5-73 of Staff Ex. 29. The NRC is presently engaged in rulemaking to determine the extent that these accidents need be addressed in the licensing process. See, for example, Proposed Commission Policy Statement on Severe Accidents and Related Views on Nuclear Reactor Regulation, 48 Fed. Reg. 16014 (April 13, 1983). It is not that actions cannot be taken to reduce the effects of such accidents; rather,

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(Footnote Continued)

evaluated. Moreover, upon a cursory examination, it appears that some elements, e.g., deposition processes and definition of pathways have been left out.

3/ See, for example, Findings 21B, 21C, 21J, infra.

because of the development of the Commission's present regulations, their probability has been considered sufficiently low that additional design or operational countermeasures have not been considered necessary.<sup>4/</sup>

21C. The City states that this is the first operating license proceeding in which a NEPA analysis has been done (City Finding 2 at 1). This, too, is incorrect. There have been any number of environmental impact statements prepared by the NRC pursuant to the Commission's Statement of Interim Policy.<sup>5/</sup> Moreover, the statement that severe accidents have only recently begun to receive close scrutiny is not true. As recognized by the City (City Finding 9 at 5), WASH-1400 was published in 1975.

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4/ Similarly, on page 2 of its findings, (City Finding 3) the City makes the sweeping statement that "[t]he entire aim of regulation has been to reduce the chances of the worst types of accidents and to minimize environmental impacts resulting therefrom." No basis for this definition is given. While there have been efforts to assess the risk of such accidents, e.g., WASH-1400, to date there has been found to be no general need to "reduce the chances" or "to minimize environmental impacts" from such low probability events beyond that which is assured by compliance with the Commission's present safety regulations.

5/ See, for example, Draft Environmental Statement related to the operation of South Carolina Electric & Gas Company (Virgil C. Summer Nuclear Station, Unit No. 1), Docket No. 50-395 (NUREG-0534, Supplement) (November, 1980).

21D. The City attempts to calculate the "lifetime core melt accident probability" for the Station.<sup>6/</sup> The Board initially notes that the numerical results presented by the City (City Finding 3 at 2) are incorrect.<sup>7/</sup> Even more important, however, is the fallacy in the implied argument. Showing results on a site lifetime basis simply would have no additional meaning. The frequency would still be the same and the risk would also be unchanged. These site lifetime risk values cannot be examined in the abstract, but must be compared to the other risks to which the population of interest is exposed over the same period of time. The Staff and Applicant evaluate these matters on a consistent basis, i.e., annually. To have validity, the risk to the population over the same period from causes other than the Limerick Station would have to be examined by multiplying their annual expectation by 30 or 40 as appropriate. Thus, at most the Board would have to examine a risk multiplier of 2 proposed by the City because of the presence of two units.

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<sup>6/</sup> LEA advances a similar argument. See LEA Finding 4 at 2; LEA Finding 96 at 29; LEA Finding 114 at 33. LEA's argument is deficient for the same reasons discussed in our disposition of the City's Findings with regard to this matter.

<sup>7/</sup> In accordance with the City's reasoning, the probability of an accident over a 40 year operating life (1/250 according to the City) would obviously have to be greater than over a 30 year life (1/166 according to the City), all other things being equal. The City's probability values are therefore somehow incorrect.

However, as we have previously discussed, such a factor is small compared to the uncertainties involved and would not change our view on any matter. See Findings 8-10 in Partial Initial Decision (on LEA Contentions DES-1, DES-2, DES-3, DES-4 (in part) and CITY-14A).

21E. The Board understands that the City's implied argument, although never stated as such, is that considering the risk contribution from Limerick Unit 2, the impacts of severe accidents tip the balance such that an operating license should not be issued for the unit. Unfortunately, the City's reasoning leading to this ultimate conclusion is muddled or lacking and the evidentiary foundation for it is absent from its findings.

21F. The City attempts to utilize extra-record material in its findings.<sup>8/</sup> Specifically, the City states in support of its argument opposing the licensing of Unit 2 that the Pennsylvania Public Utilities Commission ("PUC") "has recently initiated an investigation into any potential benefits that operation of [Unit 2] may offer the public," and asks for a stay of any decision concerning the licensing of that unit until the PUC investigation is complete.<sup>9/</sup>

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<sup>8/</sup> The Appeal Board has held that "[c]itations to such 'authorities' are so much waste ink." Public Service Co. of Indiana (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-459, 7 NRC 179, 191 (1978).

<sup>9/</sup> City Finding 8 at 5. The criteria for a stay have not  
(Footnote Continued)

Inasmuch as this issue is clearly beyond the scope of the instant contentions, this subject matter was never addressed on the record. It is thus improperly before the Board and may not be considered by it. Thus, this Board will ignore all arguments based upon this document.

21G. The City also asserts in this vein that the Commission's final rule relating to consideration of need for power issues at the operating license stage was not intended "to bar the NRC Staff's initiative (or its own) as to need for power or economic consideration at this stage of the licensing process."<sup>10/</sup> This interpretation is incorrect. The Commission has clearly indicated that discussion of need for power and alternative energy source issues is not permitted in environmental statements and reports at the operating license stage except in very unusual cases where it appears that an alternative exists that is clearly and substantially environmentally superior.<sup>11/</sup> Certainly, no such showing has been made in the instant case. A decision by a state agency merely to investigate the need for Unit 2 clearly does not amount to such a showing in any event.

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(Footnote Continued)

even been addressed by the City. The request, which is totally unsupported and unwarranted, is denied.

<sup>10/</sup> City Finding 7 at 4.

<sup>11/</sup> 47 Fed. Reg. 12940-41 (March 26, 1982).

2H. Moreover, the City's assertion that the Staff's analysis of the economic benefits associated with the operation of both units must be expanded and heard<sup>12/</sup> with respect to the need for power, especially concerning Unit 2, is virtually identical to that proffered in Contention CITY-17, which was previously rejected by the Board.<sup>13/</sup> In rejecting that contention, the Board explained that the Commission has generically made the finding that such issues are not to be considered by Licensing Boards and that the Board was bound by the Commission's pronouncements on that point. It also explained that, consequently, it was irrelevant whether the Staff had included this information in the FES and that the Licensing Board, not the drafters of the FES, are the decisionmakers on this issue.<sup>14/</sup> Finally, the Board explained that even if this were not so, similar contentions had been previously filed in this proceeding and that Contention CITY-17 was therefore late in any event.<sup>15/</sup>

21I. Moreover, it is clear that this Board may not stay its licensing activities waiting for a state agency to act. Duquesne Light Company (Beaver Valley Power Station,

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<sup>12/</sup> City Finding 7 at 4-5.

<sup>13/</sup> Order Confirming Rulings and Schedules Made at Special Prehearing Conference on NEPA Severe Accident Contentions (April 20, 1984) (slip op. at 4).

<sup>14/</sup> Tr. 8632-36, 8787-88.

<sup>15/</sup> Tr. 8635-36, 8788.



Unit 2), Docket No. 50-412, "Report and Order on the Special Prehearing Conference Held Pursuant to 10 C.F.R. 2.751a" (January 27, 1984) (slip op. at 15-16). See also Arizona Public Service Company (Palo Verde Nuclear Generating Station, Units 1, 2 and 3), LBP-82-117A, 16 NRC 1964, 1990-91 (1982). Based on the foregoing, the Board will not stay its actions with respect to the licensing of Limerick.

21J. The City asserts that the only experimental data used in the model is the atmospheric dispersion model (City Finding 13 at 8). This assertion is incorrect. The very citation utilized by the City, Tr. 11175 (Hulman), states the atmospheric diffusion model is an example of verification against experimental data. Tr. 11175, line 11 (Hulman). Furthermore, the record at Tr. 11335 (Levine) specifically discusses the fact that the health effects portion of the model is based in part on experiments.

21K. One theme which permeates the City's Findings is that a CCDF utilizes average values (see, for example, City Finding 12 at 7, 8; City Finding 21 at 12; City Finding 33 at 16) and ignores peaks.<sup>16/</sup> LEA takes this position also

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<sup>16/</sup> The City also argues that the term "risk" has no meaning to decisionmakers. City Finding 33 at 16. This assertion is without basis. The term is defined and certainly understandable to this Board and to decisionmakers within the NRC. In any event, probability and consequence values have been portrayed separately, e.g., via a CCDF and thus this argument has no merit.

(LEA Findings 115 and 116 at 33). This is not the case. A CCDF is constructed by considering all outcomes and their individual associated probabilities. For example, in discussing City Exhibit 2, the Staff stated that their results (CCDF's) included the possible range of outcomes and their associated probability, including the peak or "worst" outcomes, and not merely the mean. Tr. 11886-87 (Acharya). Similarly, the City is incorrect in stating that CCDF curves contain mean or average consequence values for all accident sequences examined and all weather conditions (City Finding 33 at 16). The City complains that the Staff analysis did not include events which would result in high doses substantially beyond 10 miles (City Finding 35 at 17). However, all such events are included in the CCDF's produced by the Staff. The Board finds that the City's position has no merit.

21L. The City asserts that there is a 5% chance that the Staff's results could lie outside of the specified uncertainty range (City Finding 15 at 9; City Finding 21 at 13). The City has confused the Applicant's testimony, as to its methodology with that of the Staff's.<sup>17/</sup> There is no evidentiary support for the proposition cited. Inasmuch as the Staff's uncertainty bounds are significantly larger than

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<sup>17/</sup> The cited witness on Tr. 11315 is Mr. Saul Levine who testified on behalf of Applicant and was clearly addressing the Applicant's analysis.

Applicant's, the degree of confidence that the actual risk would lie within the Staff's uncertainty bounds would be expected to be considerably greater than 95%.

21M. The City also discusses its view as to "the quantitative consequences and probability results" (City Findings 17-21 at 10-13). Unfortunately, the City does not tie the views it presents as to the evidence to the ultimate conclusions which it would have this Board adopt. In any event, as discussed in Findings 21N-21Q, its discussion is severely flawed and has been disregarded by the Board.

21N. Initially, certain statements appear to attack the dose response relationship used in Applicant and Staff's evaluations.<sup>18/</sup> For example, City Finding 20 at 12 characterizes the Staff's dose response relationship to be "as a result of their optimistic view of the health effects of low level radiation." The cited transcript page does not support the City's argument that the dose conversion factors used by the Staff are "optimistic." The value used by Staff and Applicant represent the consensus of the experts in the field. Tr. 11335-36 (Levine).

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<sup>18/</sup> The City has utilized incorrect terminology in defining "dose conversion factor" in City Finding 11 at 7. The level of health consequences that will result from a given dose of radiation is the dose response relationship. The "dose conversion factor" is the dose per curie ingested or inhaled.

210. Furthermore, the City claims in City Finding 20 at 12 that the Staff reduced the health effects by 80% again "as a result of their optimistic view of the health effects of low level radiation." Reference to the cited transcript page, Tr. 11863 (Acharya), shows that from a value of 135 cases of fatalities per million person rem, the adjusted values utilized is 58.6 cases, a reduction of approximately 56%. The use of the value of 58.6 case per million person was thoroughly explained and justified. Tr. 11863-64 (Acharya). The City is equally incorrect in stating in City Finding 21 at 12 that the consequence values are based on dose conversion values of 60-140 latent cancer fatalities per million person rem plus a further reduction by a factor of 5. The value of approximately 60 fatalities per million person rem (58.6) includes the factor of 5 reduction. Tr. 11863 (Acharya). In City Finding 18 at 11, the City seemingly would cast doubt on the Staff's dose conversion factor by using the term "if it is thought appropriate." The Board had previously excluded Contention City-16 which sought to attack the latest consensus information concerning this subject.<sup>19/</sup> Furthermore, as discussed in Finding 11, supra, the Board is interested in the most probable outcome; discussion of extreme, less probable outcomes in isolation

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<sup>19/</sup> Order Confirming Rulings and Schedules Made at Special Prehearing Conference, supra, n.13, (slip op. at 3). See also Tr. 8786-87.

do not assist this Board in resolving the questions before it. Neither does ignoring the uncertainty in the lower direction in favor of looking at the worst outcome place the proper perspective on the results of the analyses.

21P. In order to dramatize the City's view as to the consequences and associated probability of certain accidents affecting it, the City has prepared a table (Table 1, ff. City Findings at 12) which purports to show latent cancer fatalities within a 50 mile radius as adjusted for uncertainty factors supplied by the City.<sup>20/</sup> As discussed below, this table has no validity or meaning.

21Q. The major flaw in City Table 1 is the improper use of uncertainty relationships. The City increases the consequence values by an "uncertainty factor" of 10. See City Finding 16 at 9. The City also increase the probability of occurrence upward by an "uncertainty factor" of 30. Id. This is the equivalent of increasing the area under the CCDF, i.e., the expected value of the risk, by a factor of 300. Initially, as the Staff carefully explained on the record, it is not possible to merely multiply the components of uncertainty to get an overall uncertainty.

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<sup>20/</sup> The City states that the Staff has not shown uncertainty bounds on CCDF's. While true, this subject is explicitly discussed in the FES and the reader is cautioned that the appropriate section must be consulted to fully understand the figure. See, e.g., FES Figure 5.4d and Section 5.9.4.5(7).

Tr. 11286-90 (Acharya). The Staff testified that its total upper range of uncertainty was 40 and was obtained using the square root of the sum of the square of the exponents of the constituent uncertainties. The City has, in effect, come up with an upper uncertainty factor of 300. The fallacy of the argument is demonstrated by reference to City Findings 15 and 16 at 9. The Staff is quoted as stating that the uncertainty "applies to overall risk estimates not to individual probability or consequences." The Staff is further quoted as stating that "we have no estimate of the uncertainty of either, just their product." Nevertheless, the City attempts to break out individual uncertainty constituents, which according to the record evidence, is not justifiable. The Board has completely disregarded this table in preparing its decision.

2. On page 7 of Partial Initial Decision (on LEA Contentions DES-1, DES-2, DES-3, DES-4 (in part) and CITY-14A), add Paragraphs 11A-11D following Paragraph 11C.

11A. The City asserts in its proposed findings that "NEPA requires [a] worst case analysis, especially if there are uncertainties in the analysis,"<sup>21/</sup> citing Sierra Club v. Sigler, 695 F.2d 957 (5th Cir. 1983), and, although not stated as such, apparently contends that the EIS does not

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<sup>21/</sup> City Finding 32 at 16.

comport with this holding.<sup>22/</sup> The City's assertion that NEPA requires the NRC to perform a worst case analysis is not well founded.

11B. Sigler dealt with an FES prepared under regulations promulgated by the Council on Environmental Quality ("CEQ"), which regulations included a provision providing that subject agencies should, in certain circumstances "include a worst case analysis." 40 C.F.R. §1502.22(b). The court in Sigler specifically relied on that provision in finding that the Corps of Engineers had to include a worst case analysis in its FES.<sup>23/</sup> That provision is specifically not applicable to analyses of severe accidents contained in environmental statements prepared by the NRC.

11C. On March 12, 1984, the NRC published a final rule revising Part 51 of its regulations, relating to environmental protection requirements for domestic licensing to become effective not later than June 7, 1984.<sup>24/</sup> Although the stated purpose of that rule was to reflect "the Commission's policy to develop regulations to take account of

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<sup>22/</sup> Moreover, as discussed in Finding 21K, supra, CCDF's do include "worst cases."

<sup>23/</sup> 695 F.2d at 972-73.

<sup>24/</sup> 49 Fed. Reg. 9352 (March 12, 1984). The rule became effective on June 7, 1984. 49 Fed. Reg. 24512 (June 14, 1984).

the [CEQ's regulations] implementing the procedural provisions of NEPA,"<sup>25/</sup> it was noted that this action was taken subject to certain conditions. Preliminarily, the Commission stated its view that, "as a matter of law, the NRC as an independent regulatory agency can be bound by CEQ's NEPA regulations only insofar as those regulations are procedural or ministerial in nature. NRC is not bound by those portions of CEQ's NEPA regulations which have a substantive impact on the way in which the Commission performs its regulatory functions."<sup>26/</sup>

11D. Moreover, as part of its review, the Commission specifically considered the applicability to its procedures of 40 C.F.R. §1502.22(b), the worst-case analysis provision discussed in Sigler. The Commission found that by "specifying what information the agency must consider . . . §1502.22(b) becomes, in essence, a substantive requirement rather than a procedural requirement" and thus is not binding on the NRC.<sup>27/</sup> The Commission went on to state that its Statement of Interim Policy on Nuclear Power Plant Accident Considerations Under NEPA<sup>28/</sup> set forth its guidance "on the treatment to be accorded nuclear power

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<sup>25/</sup> Id.

<sup>26/</sup> Id.

<sup>27/</sup> Id. at 9356.

<sup>28/</sup> 45 Fed. Reg. 40101-104 (June 13, 1980).



plant accidents in environmental impact statements prepared pursuant to Section 102(2)(C) of NEPA."<sup>29/</sup> Therefore, the "worst case" analysis suggested by the City has been disclaimed by the NRC and will not be required by this Board.

3. On page 15 of Partial Initial Decision (on Contention CITY-15), add paragraphs 33A and 33B following Paragraph 33:

33A. In City Finding 29 at 15 and City Finding 4 at 3, it is alleged that there are no figures for contamination levels in the first few months because of data availability limitations. This is not true inasmuch as Applicant did present data averaged over the first month in its testimony. See, for example, Bartram, et al., ff. Tr. 12007, Figure 4(a). The testimony simply stated that the data base involved monthly averages.

33B. The City states that the Staff calculated a 60% chance that both watersheds would be contaminated citing Wescott at 6. City Finding 27 at 14-15. The cited reference does not support the proposition advanced.

Reply to LEA Findings

4. On page 4, add Paragraphs 6A to 6G to the Partial Initial Decision (on LEA Contentions DES-1, DES-2, DES-3, DES-4 (in part) and CITY-14A) following Paragraph 6:

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<sup>29/</sup> 49 Fed. Reg. 9356.

6A. The Board wishes to discuss one matter to place some perspective on its decision. There is a natural tendency to concentrate on the limited issues before us and to build as complete a record as possible. It is possible, however, to lose sight of the relationship of the issues before us to the remainder of the discussion in the FES. While we believe that we have compiled a full decisional record and our decision disposes of all issues, we also believe that it necessary for us to alert the readers of this decision<sup>30/</sup> so they may keep the discussion of the contentions relating to severe accidents in perspective in relationship to the remainder of the Staff's environmental review.

6B. The evaluation of severe accidents is by its very nature complex and, because of its reliance on computer analysis with a myriad of possible inputs and output variations, is capable of becoming the tail that wags the dog. It is far too easy to allow this limited subject matter which contributes little to the environmental "costs" of the facility to take up a disproportionate amount of space and attention in the FES.<sup>31/</sup> It is far easier for the

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<sup>30/</sup> Our Partial Initial Decision, to the extent it discusses environmental issues becomes part of the Commission's environmental review. See Finding 6D, infra.

<sup>31/</sup> The Commission has taken steps to assure that impacts  
(Footnote Continued)

FES authors to respond to every additional request to do variations on the analysis presented by incorporating the results of additional computer runs or by including additional matters than to defend their original choice of parameters. In terms of comprehensibility and in fulfilling the purposes of NEPA, more is not necessarily better. The Board has attempted to strike a balance in this case by including a discussion of the additional areas suggested by intervenors in the contentions. That is not to say that the matters which the Staff had originally chosen to evaluate were incorrect or inadequate. Considering the stage of development of this severe accident review technique, the Staff approach was not unreasonable and is supported by a consensus of experts in the field. See, for example, Tr. 11329-31 (Levine).

6C. One of the most important steps in the resolution of LEA's contentions is the determination of the ultimate effect of the Board's resolution of the factual issues considered on the record even were the Board to agree with LEA's factual findings in totality. There are, in fact, only a relatively few disputes as to factual findings. The relief sought by LEA on the basis of its findings is not clear. While it would have the Board find that the FES as

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(Footnote Continued)

are discussed in proportion to their significance. 10  
C.F.R. §51.45(b)(1).

published is inadequate and that "[t]he publication of this decision is simply no substitute for the full circulation and comment requirements of NEPA and 40 C.F.R. Parts 1502 and 1503,"<sup>32/</sup> the matter would be left in limbo by LEA. While not articulated, the implication is that the record compiled by the Board with the assistance of all parties and its resulting decision cannot cure any defect in the Staff's FES. However, this is not the case.

6D. A long line of unbroken authority has held that omissions in a FES can be cured by the receipt of additional evidence subsequent to the FES's issuance. See, e.g., Ecology Action v. AEC, 492 F.2d 998, 1000-02 (2nd Cir. 1974); Arizona Public Service Company (Palo Verde Nuclear Generating Station, Units 2 and 3), LBP-83-36, 18 NRC 45, 47-48 (1983); Florida Power and Light Company (Turkey Point Nuclear Generating Station, Units 3 and 4), ALAB-660, 14 NRC 987, 1013-14 (1981); Philadelphia Electric Company (Limerick Generating Station, Units 1 and 2), ALAB-262, 1 NRC 163, 195-97 (1975).<sup>33/</sup> Concomitantly, the Commission's

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<sup>32/</sup> LEA Finding 2 at 1.

<sup>33/</sup> While the provision of the regulation upon which these decisions were at least partially based was not carried over in the recent recodification of 10 C.F.R. Part 51, there was no express provision nor even any implication in the Statement of Considerations that every decision of the Commission had to be recirculated. Moreover, 10 C.F.R. §1.102(c) explicitly does not require this result.

regulations provide that a licensing board's decisions based on the evidentiary record before it shall be distributed in the same manner as the original FES. See 10 C.F.R. §51.102(c). Consequently, to the extent that the FES could be argued to be deficient in the respects put forward by the intervenors in their contentions, our discussion of those matters in the instant decision has cured those defects.

6E. Recirculation of the FES may only be ordered where there has been a fundamental omission such that the "proposed project has been so changed by the Board's decision as not to have been fairly exposed to public comment during the initial circulation of the FES." Public Service Co. of Oklahoma (Black Fox Station, Units 1 and 2), ALAB-573, 10 NRC 775, 786 (1979). See also 10 C.F.R. §51.02(a)(2), and Turkey Point, ALAB-660, supra, at 1014. LEA has pointed to no such omissions which could arguably indicate a discrepancy of that magnitude in the Limerick FES, nor has our own perusal revealed any such discrepancies within the scope of the admitted contentions. At most, LEA's findings can be construed to argue that the Limerick FES was insufficient with respect to the details of its inquiry into various effects of severe accidents, a fairly limited portion of the FES. It certainly does not contend that the Staff totally failed to evaluate such effects. Accordingly, there is no need for recirculation of the FES as modified by our decision. Recirculation would serve no

real purpose. In any event, our decision will be distributed in a manner similar to the FES.

6F. With respect to LEA's argument regarding the propriety of incorporating material into the FES by reference, the very case relied upon by LEA, Baltimore Gas and Electric Company v. NRDC, 103 S.Ct. 2246, 2254 n.12 (1983), recognizes that incorporation by reference in a FES is permissible if it does not impede agency and public review of the action. LEA has pointed to no instances whereby agency or public review of the Limerick FES was impeded by the incorporation of material into that document by reference. To the extent that it could be argued that such impedimentation took place, our explicit discussion herein has corrected that problem.

6G. LEA argues that the FES fails to comply with NEPA because "the bare numbers" do not convey all the impacts and the CCDF format disguises certain matters. However, the NRC has recognized that qualitative factors should be discussed. It is no longer necessary to prepare a monetary cost benefit analysis. See 10 C.F.R. §51.71(d) and Statement of Consideration supporting the Final Rule, 49 Fed. Reg. 9352, 9363 (March 12, 1984). Therefore, in judging the adequacy of the environmental review, it is clear that we may judge the totality of its effort, and we are not limited to judging the quantitative output.

5. On page 27 of Partial Initial Decision (on LEA Contentions DES-1, DES-2, DES-3, DES-4 (in part) and CITY-14A), add Paragraphs 54A-54B following paragraph 54:

54A. In LEA Finding 11 at 4, LEA argues that since, with a probability of approximately one in a million, 5,000 persons could receive a bone marrow dose of 200 rems, hundreds or thousands of fatalities could result. The Board believes that it is beyond doubt that such a group of individuals could be identified and relocated within seven days, the period during which they would be assumed to accumulate such dose. The evidence on ad hoc evacuations in this record is completely supportive of this conclusion. See Findings 47-48, infra, and 60. See also Finding 61, infra.

54B. In LEA Finding 15 at 6, LEA asserts that field measurements would not be possible in the time needed to determine the population outside of the plume EPZ who might have to be evacuated. The instrumentation available onsite and the requirement of NUREG-0654 to track the plume following an accident (See NUREG-0654, Criterion I.7-11) and the ability of aircraft to track a plume of this magnitude give assurance that such areas could be readily identified. See Finding 36, supra. As discussed in Finding 56, intra, the Applicant's 12 hour relocation assumption is a calculational convenience and represents as far as dose commitment a longer period of time if other reasonable

assumptions as to the behavior of the affected population are utilized.

6. On page 32 of Partial Initial Decision (on LEA Contentions DES-1, DES-2, DES-3, DES-4 (in part) and CITY-14A), add Paragraph 64A following Paragraph 64:

64A. In LEA Finding 24 at 8, LEA makes the point that where delay time is in excess of 3 hours, CCDF curves are generally insensitive to evacuation speeds ranging from 5-40 mph. This statement is irrelevant to the Staff's analysis in that it utilized a 2.5 mph evacuation speed. In any event, Applicant performed a series of computer runs which compared the Staff's evacuation model with that of CRAC-2. See Finding 64, supra. It determined that the results were sufficiently close such that the adequacy of the Staff's two hour delay time assumption was demonstrated. Id.

7. On page 25 of Partial Initial Decision, (on LEA Contentions DES-1, DES-2, DES-3, DES-4 (in part) and CITY-14A), add Paragraph 50A following paragraph 50:

50A. In LEA Findings 33-39 at 11-13, LEA disputes Applicant and Staff's analyses as to the effect of persons not evacuating. Based upon the experience in Louisiana near the Waterford Station, where less than one-half percent of all individuals elected not to evacuate and were quickly identified, we believe that the Applicant and Staff's analyses reasonably bound the situation. See Finding 48, supra. In any event, we believe that the 2-3 day period for the "non-participating" fraction of the population to be



identified and convinced to leave is not unreasonable. The Board sees no reason to doubt that most if not all of the "non-participating" fraction will heed the authorities and leave the area if their lives or health were threatened.

8. On page 14 of Partial Initial Decision (on LEA Contentions DES-1, DES-2, DES-3, DES-4 (in part) and CITY-14A), add Paragraphs 26A-26B following paragraph 26:

26A. In LEA Finding 48 at 16, it is alleged that the Staff testified that its estimates for genetic effects were limited to 5 generations whereas the mean persistence of certain defects could be 10 generations. However, the cited transcript page, Tr. 11246 (Branagan), states that the Staff integrated the total number of genetic effects through all succeeding generations. The Board finds no merit in LEA's assertion.

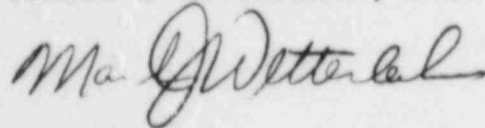
26B. In LEA Finding 62 at 20, LEA asserts that 30 years instead of 10 should be considered as the period of risk for in utero exposure based upon the testimony of a Staff witness. However, reference to the cited transcript page, Tr. 11250 (Richter), reveals that the witness was responding to a question concerning "most types of cancer" and may not have been addressing those associated with uterine exposures. The particular subject of uterine exposure was addressed particularly by the Staff witnesses at Tr. 11251 (Acharya) wherein FES page 5-66 is referenced. That later reference states that the latent period is 10 years.

9. On page 18 of the Partial Initial Decision (on LEA Contentions DES-1, DES-2, DES-3, DES-4 (in part) and CITY-14A), add paragraph 35A following paragraph 35:

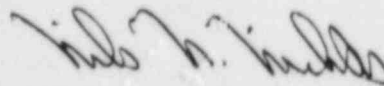
35A. In LEA Findings 75 and 76 at 23-24, it is argued that a large portion of the infants born after a severe accident at Limerick would be developmentally impaired. However, the testimony of Dr. Goldman, Applicant's witness, which we find to be authoritative in this matter was that this effect was extremely small. Tr. 11317-18 (Goldman).

Respectfully submitted,

CONNER & WETTERHAHN, P.C.



Mark J. Wetterhahn



Nils N. Nichols  
Counsel for Applicant

August 6, 1984

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

DOCKETED

'84 AGO -6 P2:58

In the Matter of )  
 )  
Philadelphia Electric Company ) Docket Nos. 50-352  
 ) 50-353  
(Limerick Generating Station, )  
Units 1 and 2) )

CERTIFICATE OF SERVICE

I hereby certify that copies of "Applicant's Reply to the City of Philadelphia's and Limerick Ecology Action's Proposed Findings of Fact and Conclusions of Law Relating to Severe Accident Risk Assessment Contentions" dated August 6, 1984 in the captioned matter have been served upon the following by deposit in the United States mail this 6th day of August, 1984:

- |   |   |
|---|---|
| * Lawrence Brenner, Esq. (2)<br>Atomic Safety and Licensing<br>Board<br>U.S. Nuclear Regulatory<br>Commission<br>Washington, D.C. 20555 | Atomic Safety and Licensing<br>Appeal Panel<br>U.S. Nuclear Regulatory<br>Commission<br>Washington, D.C. 20555  |
| * Dr. Richard F. Cole<br>Atomic Safety and<br>Licensing Board<br>U.S. Nuclear Regulatory<br>Commission<br>Washington, D.C. 20555        | Docketing and Service Section<br>Office of the Secretary<br>U.S. Nuclear Regulatory<br>Commission<br>Washington, D.C. 20555                                   |
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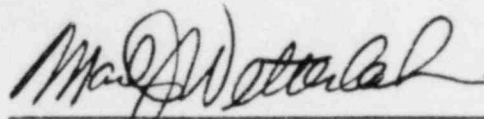
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