871

August 6, 1984

DOCKETED
USNRC

'84 AUG -8 P12:18

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
PHILADELPHIA ELECTRIC COMPANY	)	Docket Nos. 50-352 OL
	)	50-353
(Limerick Generating Station, Units 1 and 2)	)	

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

The NRC staff, pursuant to 10 C.F.R. § 2.754 and this Licensing Board's Order Correcting Schedules for Proposed Findings on NEPA Severe Accident Contentions" (June 22, 1984), hereby submits its reply findings of fact in response to Limerick Ecology Action's (LEA) "Proposed Findings of Fact and Conclusions of Law on LEA Contentions DES-1, 2, 3 and 4" and the City of Philadelphia's "Proposed Partial Initial Decision on the City of Philadelphia's National Environmental Policy Act Severe Accident Concerns," filed July 26, 1984.

The reply findings supplement the Staff's "Partial Initial Decision (On LEA Contentions DES-1, DES-2, DES-3, DES-4 and the City of Philadelphia's City-13 and City-14)" and Partial Initial Decision (On Contention City. 15) filed on July 16, 1984.

Many of LEA's and the City's proposed findings are without record support and therefore cannot form a basis for the conclusions those parties would have the Board reach. Others are not material to the

DS07

issues before this Board and are, therefore, not addressed in the Staff's reply. The Board should reject LEA's and the City's findings and conclusions as unsupported or immaterial and should adopt the findings and conclusions of the Staff as supplemented by the attached "Addenda to Partial Initial Decision on Severe Accident Risk Assessment."

Respectfully submitted,

Benjamin H. Vogler
Counsel for NRC Staff

Ann P. Hodgdon / BHV.
Ann P. Hodgdon
Counsel for NRC Staff

Dated at Bethesda, Maryland
this 6th day of August, 1984

ADDENDA TO PARTIAL INITIAL DECISION
ON SEVERE ACCIDENT RISK ASSESSMENT

The following is supplemental to the Staff's proposed "Partial Initial Decision (On LEA Contentions DES-1, DES-2, DES-3, DES-4 and the City of Philadelphia City 13 and 14" (PID I) and to proposed "Partial Initial Decision (On Contention City 15)" (PID II).

LEA

In its proposed findings 110-117, LEA complains of the Staff's failure to quantify all "costs" of reactor operation on the same basis and of the Staff's statement of the risk posed by severe reactor accidents on a per reactor year basis. We have concluded that the Staff was not required to quantify every potential element of cost. In reaching that conclusion we were guided by the Statement of Consideration accompanying the Commission's revision of Part 51,[1/] where the Commission stated:

> One commenter noted that the term 'cost-benefit analysis' used in §§ 51.20(b), (c) and (3), 51.23 and 51.26(a) of the Commission's former regulations was not retained in the proposed revision of 10 C.F.R. Part 51 and requested an explanation. The change in terminology from the specific expression 'cost-benefit analysis,' which denotes a quantitative analysis expressed in monetary terms, to the generic term 'analysis,' which is intended to include an analysis, evaluation and balancing of important qualitative factors as well as a quantitative cost benefit analysis, reflects in part the shift in emphasis in the CEQ regulations towards a greater awareness of the quality of the environment and the importance of giving full consideration to unquantified environmental impacts, values, and amenities. This change in emphasis is highlighted in 40 C.F.R. 1502.23 which states that the preparation of a cost-benefit analysis are not to be included in the main text of environmental

---

1/ Environmental Protection Regulations for Domestic Licensing and Related Conforming Amendments, 49 Fed. Reg. 9352, 9363. (March 12, 1984).

> impact statements but are either to be incorporated by reference or appended to the statement as an aid in evaluating environmental consequences. Section 1502.23 also states that 'For purposes of complying with the Act [NEPA], the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations * * *.'
>
> The Commission chose to use the generic term 'analysis' because it encompasses all aspects of an environmental analysis, qualitative as well as quantitative. In changing the terminology from 'cost-benefit anlysis' to 'analysis,' the Commission did not intend to convey the impression that cost-benefit analyses of quantifiable environmental impacts are no longer required. Sections 51.54(c) and 51.71(d) both provide that "[t]he analysis will, to the fullest extent practicable, quantify the various factors considered." Instead, the Commission intended to make clear that a comprehensive environmental analysis should include the consideration and balancing of qualitative as well as quantitative impacts.

We further note that revised Section 51.71(d) explicitly permits qualitative discussions of the effects of the proposed action. Section 51.71(d) states:

> (d) Analysis. The draft environmental impact statement will include a preliminary analysis which considers and balances the environmental and other effects of the proposed action and the alternatives available for reducing or avoiding adverse environmental and other effects, as well as the environmental, economic, technical and other benefits of the proposed action. The analysis will, to the fullest extent practicable, quantify the various factors considered. To the extent that there are important qualitative considerations or factors that cannot be quantified, these considerations or factors will be discussed in qualitative terms. 2/

The passage from Part 51 quoted above is equally applicable to LEA's argument that the risk per reactor year should be multiplied by the anticipated plant life to arrive at a total risk "cost." Neither NEPA nor the Commission's Environmental Regulations require that such a total cost figure be provided nor has LEA pointed to such a requirement.

2/ 49 Fed. Reg. at 9392.

As regards LEA's assertion that the FES impermissibly incorporates material by reference, we note that Part 51 specifically encourages such a practice. Appendix A to Subpart A of Part 51 endorses the CEQ's regulation regarding incorporation by reference. The language of that regulation is:

> Agencies shall incorporate material into an environmental impact statement by reference when the effect will be to cut down on bulk without impeding agency and public review of the action . . . .

We also note that the decision on which LEA relies, Baltimore Gas and Electric v. NRDC, ___ U.S. ___, Slip op. at 11-12, fn. 12 (decided June 6, 1983), actually supports incorporation by reference under conditions which meet the CEQ regulations.[3/] In connection with the environmental review conducted for the Limerick facility, contrary to the assertions made by LEA, reference to documents used in the FES was accomplished in a manner consistent with the Commission's Regulations and the CEQ Guidelines.

In Finding 5, LEA objects to Staff's stating the severe accident risk of the operation of Limerick as a per reactor year risk value. Contrary to LEA's perception, we find it appropriate for the risk to be stated on an annualized basis and note that other "costs" are annualized in environmental impact statements. For example, the fuel cycle impact in Table S-3, which was upheld by the Supreme Court in a decision cited by LEA, considers costs on an annualized basis. Baltimore Gas & Electric Company v. NRDC, Supra. We therefore conclude that LEA has not demonstrated why

---

3/ Furthermore, the footnote 12, referred to by LEA (LEA 3, at 2) dealt with issues that were not raised by the parties on appeal.

risk information presented on an annualized basis is not reasonable method for presenting the risk characteristics of the Limerick facility.

In its Finding 12, LEA notes the conspicuous absence of any testimony on how relocations beyond the "planning zones" would be carried out. The Staff's testimony on LEA's contentions concerned its risk analysis for purposes of which the Staff made certain assumptions regarding emergency response. These assumptions enabled the Staff to provide risk information covering a range of emergency response situations. For this purpose, we find the Staff's assumptions are reasonable. Moreover, LEA has presented no basis material to the question of risk estimates demonstrating that such assumptions are not reasonable. The Court of Appeals has stated in Sierra Club v. Morton, 510 F.2d 813 at 820 (5th Cir. 1975) that in enacting NEPA Congress did not intend to mandate perfection. If the evidence developed at the emergency planning hearings demonstrate that Staff's assumptions are unreasonable to the extent they have a material bearing on risk estimates then LEA will have an opportunity to request our reconsideration.

In Findings 48 and 49, LEA mischaracterizes Dr. Branagan's testimony. Dr. Branagan's testimony was that the number of genetic effects on the genetic effect risk estimator integrated the number of effects over all succeeding generations. Dr. Branagan stated that the mean persistence of genetic effects, depending on the particular category, would be five generations or ten generations according to the BEIR-III report of the National Academy of Sciences. Tr. 11,244-46.

LEA also argues that genetic effects should have been discussed because a severe accident might result in a greater number of such effects than of any other health effects. (LEA 40-53, at 14-17). The Staff's response was that the risk assessment community agrees that the

important impacts are early fatalities and latent cancer fatalities and that the ratio of the number of such effects resulting from a severe reactor accident to the background number would be greater than the ratio of genetic effects attributable to a severe accident to the background number for such genetic defects. (Tr. 11,276, Branagan; 11,339-40, Goldman).

In Findings 51-53, LEA complains of the Staff's use of the term "genetic change" in the FES as a "carefully chosen, neutral term which does not suggest the true nature of the health risks involved." However, in the same paragraph in which the term appears in the FES, the term "genetic defects" is also used. The terms appear to be used interchangeably and LEA's implied suggestion of an intent to conceal is without foundation.

The Board thinks it appropriate to address the question of perspective in environmental impact statements particularly in view of the Commission's having recently addressed the issue in its revised Environmental Regulations published in the Federal Register on March 12, 1984. LEA would have the Staff discuss in its FES details of the ultimate impacts of accidents of very low probability. We think it necessary to view any requirement that NEPA and the Commission's interim policy impose on the Staff to discuss severe accident risks in preparing its FES in the context of the rather obvious proposition that the most important impacts to be discussed in the FES relate to the normal operation of the plant. Part 51, Appendix A to Subpart A - Format for Presentation of Material in Environmental Impact Statements, presents the following instructions at "6. Affected environment":[4/]

4/ 49 Fed. Reg. at 9399.

> The environmental impact statement will succinctly describe the environment to be affected by the proposed action. Data and analyses in the statement will be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced. Effort and attention will be concentrated on important issues; useless bulk will be eliminated.

Obviously to discuss the ultimate consequences of low probability accidents in greater detail than that accorded to normal plant operations would be to skew the FES and to obscure the likely environmental impacts of plant operation. The question is whether the Staff drew the line in a reasonable place in limiting its discussion of certain consequences of severe accidents. In light of the Commission's recently expressed position in this regard, we cannot find that the Staff acted unreasonably in drawing the line where it did.[5/]

CITY

At the outset, the Board notes that a number of statements made by the City in its findings are not supported by reference citations to the record in this proceeding. In addition, the City, when it refers to the record, has not in all instances identified the witness making the statement as directed by the Board. (Memorandum and Order Establishing Format of Proposed Findings of Fact and Conclusions of Law, Slip Op. at 3, (December 9, 1983)). Finally, some of the City's findings are not in accord with the record or are simply incorrect. Although the Board

---

5/ To the extent that LEA argues that the publication of this document is no substitute for the full circulation and comment requirements of NEPA, we suggest that our regulations, as cited by LEA (10 C.F.R. § 51.102(c) and Commission case law (see e.g. Public Service Electric and Gas Company et. al. (Hope Creek Generating Station, Units 1 and 2), ALAB-518, 9 NRC 14, 39 (1979) establish that the FES can be modified by this Board in a manner consistent with the requirements of NEPA.

cites some of these findings below it has not listed all of City's findings found to be defective.

The City's definition of a severe accident (City 2, at 1) is incorrect. City defines severe accidents as--- "those residual accident possibilities that cannot be prevented through design or operational safety measures." There is no reference, transcript or record citation relied upon by the City to support this definition. Design basis accidents and severe accidents are discussed in the FES, Section 5.9.4.5 at pages 5-72 and 5-74. In essence, severe accidents are considered less likely to occur than design basis accidents, so that operational safety or design measures are not required. (See, Statement of Interim Policy, 45 Fed. Reg. 40101, June 13, 1980). (See also, our discussion of severe accidents supra).

Also in City 2, the City states that this is the first operating license proceeding in which a National Environmental Policy Act analysis has been done for severe accidents. (City-2, at 1) Again, the City does not support its statements with any reference, record or transcript citations. There have been several NEPA severe accident risk analyses conducted by the NRC staff. See, e.g., Duke Power Company et al, (Catawba Nuclear Station, Units 1 and 2), 50-413, 50-414, Partial Initial Decision, Slip op. (June 22, 1984).

The City, in its Finding 3, states that "Human errors of comission and sabotage are not included in these estimates. Tr. 11,192." This too is incorrect. NRC staff witness Hulman at Tr. 11,192-93 advised that errors of cmission and sabotage are not included. Human errors of comission are factored into the Staff's probability calculations.

In City Findings 5, 5, 7, and 8, the City discusses the fact that the Pennsylvania Public Utility Commission (PUC) has recently initiated, by a majority vote, an investigation into the operation of Limerick Unit 2 in order to determine, inter alia, whether Unit 2 is needed for reliability purposes and whether there are less costly alternatives. (City 8, at 5). In view of the PUC investigation the City requests a stay of any decision concerning the licensing of Limerick Unit 2 until the investigation is complete (City 8, at 5). The request for a stay for Limerick Unit 2 based on the PUC investigation involves a matter that is not in evidence and has not been addressed by the parties to this proceeding. As such, it is extra-record material and has been placed improperly before this Board by the City. Therefore, we will not entertain any findings and conclusions reached by the City that are predicated on the PUC investigation.

In City Finding 7, the City states that the Staff is not prohibited from raising on its own initiative the need for power or economic considerations of Limerick Unit 2 at this stage of the licensing process and indicates that such an analyses should be greatly expanded by the Staff after the PUC has completed its investigation. (City 7, at 4). The Board disagrees. The Commission, in its Statement of Consideration accompanying the change in 10 C.F.R. Part 51, relating to Need for Power and Alternative Energy Issues in Operating Licensing Proceedings (47 Fed. Reg. 12940, (1982)) stated that it is not necessary, absent a showing of special circumstances, to consider the issues of the need for power and alternative energy sources at the operating license stage of a licensing proceeding. (See also 10 C.F.R., Section 51.53(c)). In the Board's opinion, the City has not made a showing of special circumstances in this

proceeding and therefore the issue is not a proper subject for review by the Board.

Finally, the Board notes that City now raises the same issue it raised as Contention City 17, at a Special Prehearing Conference earlier in this proceeding. The Contention was opposed by the parties and rejected by the Board. (Memorandum and Order Confirming Rulings and Schedules Made at Special Prehearing Conference on NEPA Severe Accident Contentions, (April 20, 1984), Slip Op. at 4). For all of the above reasons the Board rejects the City's findings and conclusions related to need for power and alternative energy issues.

In its Finding 13, the City notes that, "The only experimental date (sic) used in the models is the atmospheric dispersion model, Tr. 11,175, ---." (City 13, at 8). City's statement is in error. Staff witness Hulman clearly advised that the atmospheric dispersion model, has been verified against experimental data. (Tr. 11,175, Hulman).

City Finding 15, which deals with the question of uncertainty states: "This range of uncertainties is estimated to result in 'risk' values that may be too low by a factor of 40 and too high by a factor 400. Tr. 11,176. There remains a 5% chance that the values could lie outside the uncertainty range. Tr. 11,315." (City 15, at 9). The statement does not make sense because the City has confused the Staff's uncertainty range of 40 and 400 (Tr. 11,176, Hulman) with the Applicant's values of 5% and 95% (Tr. 11,315 -16 Levine/Kaiser). As such, City's assertions in this regard are wrong.

In City 17 it is stated "To get person rem and then latent cancer fatality values for the City, these values can be derived in rough terms by multiplying the mid-point value of 8 rems times the City of Philadelphia's population of 1.7 million." (City 17, at 10). This calculation is in-

correct because not all 1.7 million people will be exposed to 8 rems at the same time and because the cloud area will not cover both sectors of the city. (See, Tr. 11,852-54, Acharya). In City 18, effort is again made to combine the East and East Southeast sectors of the City in order to increase the risk probabilities. (City 18, at 10-11). As noted in response to City 17 above, the calculation is incorrect because the cloud area will not cover both sectors of the city. Staff witness, Dr. Acharya, discussed Philadelphia's contribution to total risk at Tr. 11,851-54 and determined that the City's contribution to risk in relation to the risk of the entire region is 12%. (Tr. 11,854 Acharya).

City Finding 20 is also erroneous because City has again taken the probability values for accident and wind direction toward the East and Eastsoutheast sectors and added them together for a projected probability value of 5×10^{-7} (City Finding 20, at 11) This is incorrect for the reasons set forth in our Findings 17-18 supra. The figure cannot be combined to calculate a risk estimate. It also distorts the probability values calculated by the Staff. In addition, the City concludes at the end of Finding 20, that the Staff reduced the expected health consequences by 80% as a result of their "optimistic view" of the health effects of low level radiation. (City 20, at 12). This statement is also incorrect. The Staff did not reduce all cancers by 80%; the Staff's estimate clearly shows that from a central estimate of 135 cases of cancer fatalities of all forms the Staff calculated a reduction of approximately 56%. The Staff's reasoning is clearly set forth in the record and need not be repeated here. (Tr. 11,863-64, Acharya).

In City Finding 21, the City has produced a table (ff. City Findings at 12) entitled "NRC's Calculated Latent Fatalities Within a Fifty Mile

Radius, Using 30-40 Cancers Per Million Person Rems and As Adjusted For Uncertainty Factors" (emphasis added). The table is incorrect because of its adjustment for uncertainty factors. The City in Column (4) of its table states that it has adjusted its uncertainty by a factor of 30. (City 21 at 12-13). Use of a factor of 30 in column (4) is not supported by the record citation relied upon by the City. The use of a factor of 30 in column (4) is also incorrect. The Staff stated that the factor of 30 applies only to the probability of worst accident releases and not to all accidental releases as used by the City. (Tr. 12,279-80, Acharya). In addition, City has increased by a factor of 10 of the figures in Column 5, but has not decreased by a factor of 10 the figure in Column 5 in order to portray the range of uncertainity. Therefore, City's figures are biased.

In City 29, the statement is made that no figures are availalbe on Delaware River contamination levels in the first few months following a severe reactor accident at Limerick because of limitations on data availability (City 29, at 15). The Board disagrees. The Staff noted that the probability of not exceeding 1/3 MPC after the initial run off is 95% and there is a high probability that the Delaware River, if contaminated at all, would be interdicted for a period of less than two months. (Acharya, ff. Tr. 12,141 at 11).

The City states that a worst case analysis is required by the Commission in its NEPA analysis and cites for support Sierra Club v. Sigler, 695 F.2d 957 (5th Cir. 1983). (City 32, at 16). It is not clear whether the City is suggesting that the FES in this case is inadequate because it fails to make such an analysis or whether it is merely stating that such a requirement exists. Regardless of the reason for the

citation, the Commission has in fact determined how the consequences of nuclear plant accidents should be evaluted from the standpoint of environmental impacts.[6/] The Commission has addressed to question of how the regulations promulated by the Council on Environmental Quality (CEQ) considered in Sierra Club v. Sigler, supra, would be applied in NRC environmental reviews. The Commission has stated that it is bound by those portions of the CEQ regulations which are procedural or ministerial in nature but as an independent agency, the Commission is not bound by any CEQ regulation that has a substantive impact on the way in which the Commission performs its regulatory function.[7/] The Commission has determined that with respect to the CEQ regulation considered in Sierra Club v. Sigler, supra,[8/] when the regulations state that under certain circumstances the environmental analysis shall "include a worst case analysis and an indication of the probability or improbability of its occurrence" the regulation becomes a substantive requirement which the Commission is not bound to follow. See also, Statement of Consideration accompanying the Commission's revised Environmental Regulations, 49 Fed. Reg. 9352 at 9358. Thus, the Commission has established, in its interim policy, (June 1980) how the environmental impacts of accidents must be considered and it was with these instructions that the FES was prepared for the Limerick facility.

6/ Environmental Protection Regulations for Domestic Licensing and Related Conforming Amendments. 49 Fed. Reg. 9352 (March 12, 1984) and Statement of Interim Policy on Nuclear Power Plant Accident Considerations Under NEPA. 45 Fed. Reg. 40,101-04 (June 13, 1980).

7/ 49 Fed. Reg. 9352 (March 12, 1984).

8/ 40 C.F.R. § 1502.22(b).