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UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges

Morton B. Margulies, Chairman Jerry Harbour Frederick J. Shon

In the Matter of PHILADELPHIA ELECTRIC COMPANY (Limerick Generating Station, Units 1 and 2)

Docket Nos. 50-352-OL-2 50-353-OL-2 (Design Alternatives) ASLBP No. 89-589-04-OL-R2 July 18, 1989

#### MEMORANDUM AND ORDER

On June 30, 1989, Limerick Ecology Action (LEA), Philadelphia Electric Company (PECO) and the Nuclear Regulatory Commission Staff (Staff) submitted a report naming six severe accident mi\*igation design alternatives (SAMDAS) upon which they agree fall within the Commission Order of May 5, 1989, that designates the kinds of mitigation alternatives that the agency should consider under remanded LEA Contention DES-5.

The submittal was in response to the Order of the Board made at the prehearing conference on June 6, 1989, which was held in part to define the issues in the proceeding. We requested that the parties submit by July 3, 1989 a stipulation as to those SAMDAs that they agreed should be the subject of the litigation.

They were also directed, as to those proposed SAMDAs upon which they could not agree, to submit memoranda setting forth their differing positions.

In accordance with the filing schedule, LEA submitted a memorandum describing various categories of SAMDAs it claimed fall within the contention to be litigated. Appended to the memorandum was a "List Of Primary Candidates For Severe Accident Mitigation" which described eight mitigating systems. There was also included a "Current 'Best Estimate' Risk Reduction Package For Limerick" which listed ten items. The foregoing lists were made known to the other parties and the Board at the prehearing conference. Also attached to the memorandum was a "Supplemental List Of Litigable Severe Accident Mitigation Alternatives." Listed were more than 80 claimed mitigation alternatives with references to their sources.

Licensee, in its memorandum, discusses the SAMDAs it concludes should be considered for Limerick to satisfy the National Environmental Policy Act (NEPA) and be included in the litigation. It submitted its position on LEA's "Primary Candidates" and "Risk Reduction Package Proposals." As to the "Primary Candidates," it concluded two of the items were within the ambit of the remand. Licensee termed the "Risk

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Reduction Package" a repetition and summary of the "Primary Candidates" list and concluded that it presented no new acceptable alternatives.

As to the "Supplemental List" PECO states that it was received from the Intervenor extremely late, in the period set by the Board for filing, and that the listed items are unfocused, repetitious and are inadequately referenced. PECO comments on the items and concludes that, except as they coincide with mitigation alternatives suggested by the Licensee and accepted by Staff, the supplemental items overall do not present new litigable material in the proceeding.

Staff, in its memorandum, states its position on the LEA proposals contained in the "Primary Candidates" and "Rish Reduction Package Proposal" listings. Except as to two "Primary Candidate" items, the Staff's response to the proposals was negative. It further reported that because of the brief period of time available to it, Staff could not study in any detail LEA's new supplemental list of more than 80 items. Staff requested an opportunity to comment on the items should the Board consider admitting any of the newly listed items.

The Board, having carefully reviewed the parties submittals, in this memorandum defines below the kinds of SAMDAs the Commission in its Order of May 5, 1989 directed

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should be considered in the itigation of DES-5. The defined categories include the SAMDAs that were agreed to by the parties. Essentially, these comprise the bases which we find to support the contention as originally submitted.

### Discussion

This proceeding comes about through a remand by the United States Court of Appeals for the Third Circuit in its decision in <u>Limerick Ecology Action</u>, Inc. v. U. S. Nuclear <u>kegulatory Commission</u>, 869 F.2d 719 (3rd Cir. 1989). The Court granted LEA's petition for review as to its contention that, in granting the full power license, the NRC violated the National Environmental Policy Act of 1969 (NEPA) by failing adequately to consider severe accident mitigation design alternatives (SAMDAs). It then remanded the case to the NRC for consideration of SAMDAs. <u>Id</u>. at 741.

Pursuant to the Order of the Commission of May 5, 1989, this proceeding was instituted. In its Order, the Commission directed that a Licensing Board in considering DES-5,<sup>1</sup> LEA's contention underlying its appeal to the Court,

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<sup>&</sup>lt;sup>1</sup> Contention DES-5 provides "The environmental risk of accidence during operation of the Limerick facility as proposed for licensing is significant, and preventative and/or mitigative alternatives to the design, mode of operation, procedures, and/or number of reactors presently proposed must be considered for purposes of compliance with the National Environmental Policy Act of 1969 and with 10 CFR Secs. 51.20(b), 51.21, 51.23(c) and 51.26. None have [sic] been considered."

limit consideration to those mitigation alternatives identified by the Appeal Prard as being supported with the required bases and specificity. The Order stated that "the Appeal Board indicated that WRC-sponsored studies on severe acc? Tent mitigation identified by LEA or submitted to the Licensing Board provided bases and specificity for the contention. ALAB-819, 22 NRC 681, 693-94 (1985)."

LEA in its memorandum argues that the matters to be litigated in this proceeding are those issues raised by Contention DES-5 as drafted. LEA Memo at 2-3. The Commission's Order of May 5, 1989 is to the contrary and we are bound by the Commission's Order. A Licensing Board is a body of limited jurisdiction. Its jurisdiction is defined by the Commission and the Licensing Board cannot enlarge the jurisdiction conferred by the Commission. <u>Duke Power</u> <u>Company</u> (Catawba Nuclear Station, Units 1 and 2), ALAB-825, 22 NRC 785, 790 (1985).

To comply with the Commission's Order, one must look to the portions of the Appeal Board decision it cited. Our perusal of the cited passages has brought out that the Appeal Board did not specifically name particular SAMDA designs which it considered properly supported. Rather it considered several documents in reaching its conclusion that some alternatives had been supported with the proper basis and specificity. Among the documents considered were

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NUREG/CR-2666, "PWR Severe Accident Delineation and Assessment" and a status report on a study by R&D Associates (RDA). As to NUREG/CR-2666, the Appeal Board appears to have dismissed that document as "largely qualitative (rather than quantitative)" and as presenting "no cost-benefit analysis for any design feature". ALAB-819, 22 NRC 681, 694.

To the RDA status report, however, the Appeal Board apparently gave its imprimatur, quoting a paragraph from that report and terming it "more enlightening" than NUREG/CR-2666. The quoted paragraph contains the statement that "[f]or Mark II containment as exemplified by the Limerick Plant, mitigation requirements (functions) have been identified, including containment heat removal, core residue capture and retention without concrete atta k, and ... some kind of venting system." Id. The Appeal Board then noted that the RDA project would not be completed for some time but that the interim material available (presumably the status report guoted) "appears to have satisfied the threshold basis and specificity requirements for admission of the contention; that is, particular design changes that might be cost-effective were at least identified." Id.

We are thus led to the conclusion that, in the Appeal Board's view, only design alternatives aimed at containment

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heat removal, core residue capture, and venting were adequately supported. The fact that the Board noted the pending nature of the RDA study suggests to us that designs aimed at the three approved ends, designs that might have in fact persisted into the final report, would, in retrospect, also be adequately supported even if they had not been specifically treated in the status report.

With the foregoing set of ground rules in mind, we turn now to the individual SAMDAs that have beer proposed for ligation.

In the Report of the Parties (Report) jointly filed on June 30, 1989, six SAMDAs were accepted by all parties as litigable matters in this proceeding. Report at 2-3. They are:

a. Pool Heat Removal System - A separate independent dedicated system for transferring heat from the suppression pool to the spray pond utilizing a diesel driven 3,200 gpm pump and heat exchanger without dependence on the Station's present electrical power or other systems. The diesel is cooled with water tapped off the spray pond suction line.

b. Drywell Spray - A new dedicated system for heat and fission product removal using Pool Heat Removal System described in (a) above to inject water into the drywell.

c. Core Debris Control (Core Catchers) - Two techniques, either a basemat rubble bed or using a dry crucible approach, to contain the debris in a known stable condition in the containment.

d. Anticipated Transient Without Scram (ATWS) Vent - A large wetwell vent line to an elevated release point to remove heat added to the pool in an ATWS event and prevent overpressurization.

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e. Filtered Vent - Drywell and wetwell vents to a large filter (two types-gravel or enhanced water pool) to remove heat and fission products and prevent overpressurization.

f. Large Containment Vacuum Breaker - To restore containment pressure to atmospheric level through 20" valves in certain severe accident cases where a vacuum has been produced.

Clearly all of these design alternatives fall within that three types of devices specified by the Appeal Board. While the drywell spray system was among those in NUREG/CR-2666 given a cool reception by the Appeal Board it is also a specific matter mentioned in the final RDA report, NUREG/CR-4025 (in just this configuration: working in conjunction with the pool heat removal system). NUREG/CR-4025 at 3-35. All of them are accepted for litigation.

Staff is expected to consider the SAMDA's approved above, under its NEPA obligation, along with any subsequent updating to the studies that the Appeal Board found provided basis and specificity for the contention. Subsequently developed information that further supports or alters the studies is relevant and should be considered. Asserted deficiencies in the Staff's future review of the SAMDAs may result in litigation of such matters at the appropriate time.

Intervenor claims that those alternatives and the supporting documents which were identified to the Licensing Board prior to the Appeal Board decision on the

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admissibility of the contention are relevant and should be considered in this proceeding. LEA Memo at 5-7. LEA's position has merit only to the extent that the SAMDAs and supporting documents referred to are those that the Appeal Board identified as providing basis and specificity for the contention, i.e., the RDA reports and the SAMDAs they identify. That is to what the Commission limited this litigation. The other alternatives and supporting documents that were otherwise identified to the Licensing Board are beyond the scope of this proceeding.

LEA would have convidered as relevant to the proceeding anything that the state of the art has developed since 1984 in severe accident mitigation designs. LEA Memo at 8-9. That is beyond the scope of the proceeding ordered by the Commission and it cannot be considered.

We will accept in this proceeding matters clearly indicated by the Appeal Board in ALAB-819 as having been stated with adequate basis and specificity at the time of that decision. In doing so we shall, of course, recognize the admissibility of information developed more recently to the extent such information pertains to the SAMDAs then extant. We shall not, however, deal with SAMDAs which have themselves arisen only in the interim. The Commission has set the standard that LEA should have "the same opportunity to obtain consideration of specific SAMDAs as it would have

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had if its SAMDA contention had been fully litigated before the Licensing Board when it was submitted." CLI-89-10, slip op. at 3-4, n. 1 (July 7, 1989) (emphasis added). Any other SAMDAs will be considered as late-filed. Id.

As to the matter of fuel pool fires Intervenor wants considered, even LEA admits the chief concern here would occur "particularly after re-racking" and would influence choices "sometime over the next decade". LEA Memo at 11, Attach. 1 at 5. The matter might be litigable if and when it is raised in a license modification proceeding; we will not accept it now.

We reject the LEA position that matters other than design alternatives (modifications in training or procedures, for example) are appropriate for our consideration here. LEA Memo at 12-13. The very acronym itself suggests otherwise, and the court in its remand stated:

Severe accident mitigation design alternatives are, as the name suggests, possible plant <u>design</u> modifications that are intended not to prevent an accident, but to lessen the severity of the impact of an accident should one occur.

869 F.2d 719, 731 (emphasis added, footnote omitted).

By the same token, we reject the Intervenor's position that there is no "bright line" between mitigation and prevencion. LEA Memo at 4, n. 7. We will consider only those measures meant to reduce the consequences of an

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accident that is already severe, not measures intended to reduce the probability of a severe accident. We shall take as "severe" any accident involving serious core damage and shall look only at measures meant to "truncate" the accident after such damage has occurred.

## LEA's "List of Primary Candidates"

LEA attached to its Memorandum as Attachment 1 its "List of Primary Candidates for Severe Accident Mitigation". These are eight items described in some detail that LEA believes should also be accepted as possible SAMDAs. These include:

## Venting/Filter Devices:

LEA describes two types of devices: filtered containment venting and a wetwell vent. Both are accepted above under items d and e above.

# Containment Spray/Flooding Modifications:

LEA suggests that a modification similar to that carried out by Boston Edison Co. at its Pilgrim plant might be in order. It would involve modifying the existing drywell spray system by plugging certain spray nozzles and developing alternate supply paths for that system. The theory is that the additional paths would increase the reliability of the system and the reduction in flow rate would make a larger number of alternate systems capable of sustaining a spray. LEA Memo Attach. 1 at 3-5. The idea is not without some appeal, since it might be that the cost of such design changes would be small enough to compensate for their lessened effectiveness compared to that of the completely new system that we have admitted to litigation.

The Licensee argues that LEA has not shown how this alternative derives from any of the alternatives discussed in ALAB-819 (PECO Memo at 9), and that is true, although clearly a drywell spray of any sort is a heat removal mechanism, and LEA also suggests a further modification that could be viewed as providing some core residue control. LEA Memo Attach. 1 at 4.

The Staff notes that modifications to an existing system are "not among the design alternatives listed in the...RDA report" cited by the Appeal Board. Staff Memo at 4. That too is true, although the final RDA report includes an analysis of a completely new system as admitted in alternative b above.

We must, we believe, apply our criteria strictly. The Appeal Board did not specifically mention any such modified system. It did, in fact, include a disclaimer of sorts of any such intent when it noted that, in the material before it, "[t]he authors of NUREG/CR=2666 did not include consideration of the containment spray system currently installed at Limerick". ALAB-819, 22 NRC 681, 694, n. 5. Thus such modifications are matters that the Appeal Board

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could not have had in mind. They represent an apploach to mitigation that arose in its entirety, not from the materials considered in ALAB-819, but from later thinking, presumably involving Boston Edison Co. and others. Thus the Commission in CLI-89-10 has precluded us from considering this approach save possibly as a late-filed contention. CLI-89-10, slip op. at 3-4, n. 1 (July 7, 1989). Containment Heat Removal Modifications:

LEA mentions a variety of modifications that could result in more effective heat removal. LEA Memo Attach. 1 at 4-5. There is no indication that these modifications were all contemplated by the Appeal Board, and in fact even LEA recognizes that the only real potential candidate for use at Limerick is an augmented suppression pool cooling function. That SAMDA has been admitted as system a above. Otherwise, the containment neat removal modifications listed are not accepted for litigation.

Spent Fuel Pool Accident Risk Modifications:

For the reasons set forth above, this type of modification will not be accepted for litigation. LEA Memo Attach. 1 at 5-6.

Human Factors Modifications (Including Procedures):

As we have explained above, procedural and training modifications are not within the scope of this proceeding. LEA attempts to include these items, as well as seismic

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modifications, the latter modifications including chatterinsensitive relays. LEA Memo Attach. 1 at 6-8. As we have explained, none of these matters is within the scope as contemplated by the Appeal Board in ALAB-819. The same is true of the notion of control room design review for human factors deficiencies mentioned by LEA in the same section of its submittal. LEA Memo Attach. 1 at 7-8. Seismic Modifications

LEA devotes a separate section to additional seismic modifications. LEA Memo Attach. 1 at 8-9. Such modifications would be aimed primarily at reducing accident frequency. Further, there is no indication they were among the matters sanctioned by the Appeal Board. Thus these modifications are beyond the scope of the proceeding. Reduction of Transient Initiator Frequency:

LEA would litigate modifications intended to reduce transients and hence reduce accident frequency. LEA Memo Attach. 1 at 9-11. As we have explained above, we consider such measures clearly beyond the scope of the remand. Reactor Pressure Vessel Depressurization System Modifications:

LEA would introduce this subject as a "way to reduce core damage frequency". LEA Memo Attach. 1 at 11. Since it is only aimed at reducing core damage frequency, it is not admissible here.

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# Current "Best Estimate" Risk Reduction Package for Limerick

Under this caption LEA presents what is apparently a summary of ten previously mentioned modifications that together comprise LEA's notion of the optimum package. LEA Memo Attach. 1 at 12. Some (e.g., items a. and b.) have already been accepted for litigation in whole or in part. The rest have been rejected for reasons set forth above. (We presume that item j, "spent fuel proof accident risk modification", was meant to read "spent fuel pool accident risk modification".)

### LEA's Supplemental List

LEA attached to its Memorandum a supplemental list of approximately 85 items it seeks also to litigate. LEA Memo Attach. 2. This list was submitted to Staff and Licensee shortly before the deadline for briefing the Board, and both these parties complain of the tardiness of the submittal PECO Memo at 8; Staff Memo at 3. PECO attempted to treat of these items in groups. PECO Memo at 14 ff. Staff declined even to attempt a treatment because of the brief time that then remained. Staff Memo at 3. We have examined the list. It is redundant, and it is notably lacking in scrutability. Many of the items simply urge us to consider the alternatives "described in" wome report. Others appear to duplicate one another or to duplicate matters already dealt with, but the descriptions are so sparse as to make it

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impossible to determine exactly whether they overlap or not. Clearly this submittal does not meet the threshold test of specificity under any circumstances. We do note one feature, however: buried deep within the rambling and redundant pile presented is a series of "core catcher" alternatives. LEA Memo Attach. 2 at 4-5. Licensee has stated that "[t]o the extent these alternatives were later examined by RDA and included in its final report with costs and benefits related to Limerick discussed with reasonable specificity, Licensee does not object to the consideration of those alternatives". FECO Memo at 32.

The only two core debris control schemes the parties have agreed to examine are a basemat rubble bed and a dry crucible (cf. Item c, <u>supra</u>). We note the final RDA report included analysis of a third approach to core debris control: diking and thoria plates on the diaphragm floor and thoria covered gravel beneath the downcomers in the suppression pool. NUREG/CR-4025 at 3-39 ff. The costs derived for this system are quite comparable to those for the rubble bed and substantially less than those for the dry crucible. <u>Id</u>. at 3-44, 47, 50. However, it does not appear that any of LEA's listed devices would correspond directly to the third RDA scheme. We therefore believe that the third scheme falls into the category of approaches that can

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only be introduced as late-filed contentions and that none of the LEA proposals is presently admissable.

The "Supplemental List" appears to be a catch-all of items that might have application to severe accident mitigation, irrespective of whether or not the items fall within the Commissions's standard for SAMDAs that are to be considered in this proceeding. The list, being too cryptic for meaningful analysis, will not be considered further. No request will be made of the Staff to comment on the list.

### Conclusion

The Board has determined that the SAMDAs to be considered pursuant to NEPA in this proceeding consist of the following: containment heat removal, core residue capture, and venting. As agreed to by the parties, and approved by the Board, the SAMDAs include the following: pool heat removal system, drywell spray, core debris control, anticipated transient without scram vent, filtered vent and large containment vacuum breaker.

It is so ORDERED.

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THE ATOMIC SAFFTY AND LICENSING BOARD

Harbour, Member

ADMINISTRATIVE JUDGE

Frederick

Frederick J. Shon, Member ADMINISTRATIVE JUDGE

Morton B. Margulies, Chairman ADMINISTRATIVE LAW JUDGE

Bethesda, Maryland July 18, 1989

### UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

Docket Nr. 1

#### CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing LB M&D LBP-B9-19 (7/19/89) have been served upon the following persons by U.S. mail, first class, except as otherwise noted and in accordance with the requirements of 10 DFR Sec. 2.712.

Administrative Judge Christine N. Kohl Chairman	Administ. Ltive Judge
Atomic Safety and Licensing Appeal	Atomic Safety and Licensing Appea
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Dated at Rockville. Md. this 19 day of July 1989

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