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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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In the Matter of )  
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LONG ISLAND LIGHTING COMPANY )  
 )  
(Shoreham Nuclear Power )  
Station, Unit 1) )  
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Docket No. 50-322 (O.L.)

SUFFOLK COUNTY SUPPLEMENTAL  
TESTIMONY ON CONTENTION 7B  
BY MARC W. GOLDSMITH, RICHARD B. HUBBARD  
AND GREGORY C. MINOR

March 23, 1983

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I am Marc W. Goldsmith and I am employed by Energy Research Group, Inc. located at 400-1 Totten Pond Road, Waltham, MA 02154. A copy of my professional qualifications appears in the record of this proceeding following Tr. 1113.

I am Richard B. Hubbard and I am employed by MHB Technical Associates, located at 1723 Hamilton Avenue, San Jose, CA 95125. A copy of my professional qualifications appears in the record of this proceeding following Tr. 1113.

I am Gregory C. Minor and I am employed by MHB Technical Associates located at 1723 Hamilton Avenue, San Jose, CA 95125. A copy of my professional qualifications appears in the record of this proceeding following Tr. 1113.

This testimony addresses matters discussed in the February 9, 1983 Affidavit of NRC Staff Member James H. Conran

("Affidavit"), and the NRC Staff Supplemental Testimony on Contention 7B by Roger J. Mattson, Richard H. Vollmer, Charles E. Rossi, Ashok C. Thadani and Franklin D. Coffman, Jr., dated March 10, 1983 ("Staff Supplemental Testimony").

Our testimony is divided into two parts, consistent with Mr. Conran's Affidavit. The first part, sponsored by Messrs. Goldsmith, Minor and Hubbard, addresses points raised by Mr. Conran and the Staff relating to Unresolved Safety Issue ("USI") A-17 -- Systems Interaction. The second part, sponsored by Messrs. Minor and Hubbard, addresses points raised by Mr. Conran and the Staff relating to safety classification.

I. UNRESOLVED SAFETY ISSUE A-17

In his Affidavit, Mr. Conran indicates his agreement with some of the opinions expressed in Suffolk County's original Contention 7B testimony concerning USI A-17, particularly regarding the lack of progress toward timely resolution of that USI and the difficulty in making the North Anna findings given its current status. In the testimony which follows, we set forth comments on particular points made by Mr. Conran in his Affidavit and by the Staff in its Supplemental Testimony.

A. POINT 1 -- Comments on Conran's Baseline Considerations (Affidavit, pages 5-9)

Mr. Conran sets forth five "baseline considerations" in characterizing the decisions and actions taken by the NRC Staff and the Commission relating to the systems interaction issue.



Thus Mr. Conran states that: Staff management and the Commission have judged that the systems interaction issue is "a legitimate safety concern, serious enough to warrant designation as an Unresolved Safety Concern" (Affidavit at 3); that judgment "was reconfirmed and reinforced in the aftermath of the TMI-2 accident" (Affidavit at 3); "staff management and the Commission intended timely resolution of this important issue" (Affidavit at 5); the time originally allowed for resolution of the issue "necessarily implied and, indeed, required assignment of high priority and strong commitment to the USI A-17 program by staff management and the Commission" (Affidavit at 5-6); the post-TMI systems interaction program has a "high priority assignment and timely resolution objective" (Affidavit at 8); and "decisions and actions [on A-17] were based broadly on widely-shared qualitative judgments regarding the importance of the issue involved and the necessity for prompt action and timely resolution . . . . The decisions involved were evolved through a highly-visible and open consensus forming process . . . ." (Affidavit at 9).

For the reasons set forth below, we agree with Mr. Conran: USI A-17 has been accorded a high degree of safety significance which requires a timely resolution, whether the USI A-17 program is viewed as "confirmatory" or is characterized with some other descriptive term. The data and testimony which follow further confirm the high priority accorded to this USI.

Since 1977, the NRC has repeatedly confirmed the high priority given to USI A-17. The Task Action Plan for Task A-17, Systems Interaction in Nuclear Power Plants, was first described in NUREG-0371, Revision 1, Approved Task Action Plan for Category A Generic Activities (December 1977). The original A-17 Task Action Plan stated:

The problem to be resolved by this task is to establish a systematic process to review plant systems to determine their impact on various other plant systems.<sup>1/</sup>

The plan for resolution of USI A-17 was:

to develop and implement, to the extent that a study indicates the need, a method of review that will extend the present review techniques in sufficient breadth and depth to assure a systematic and comprehensive review of systems interaction.

The plan will also include the development of criteria and procedures to assure that applicants incorporate appropriate systems interaction considerations into their design and review process.<sup>2/</sup>

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<sup>1/</sup> Task Action Plan, Task No. A-17, Rev. 0 (November 15, 1977), at 2. This is contained in NUREG-0371, Rev. 1, reprinted as Appendix F to NUREG-0410, NRC Program for the Resolution of Generic Issues Related to Nuclear Power Plants (January 1978).

<sup>2/</sup> Id. The original USI A-17 Task Action Plan identified the following as the major tasks to be performed:

(a) Establish a uniform designation of plant systems and their associated functional inputs and outputs, and determine the interface points or boundaries where interactions can occur, including identification of the types of interactions.

\* \* \*

(Footnote cont'd next page)

In 1977, the Staff's Office of Nuclear Reactor Regulation ("NRR") developed criteria for grouping generic technical activities into categories indicative of their priority. Four categories (A through D) were identified. The NRC's program for resolution of generic issues then focused primary attention on the highest priority activities--those in Category A.<sup>3/</sup> Category A activities were defined as:

Those generic technical activities judged by the Staff to warrant priority attention in terms of manpower and/or funds to attain early resolution. These matters include those the resolution of which could (1) provide a significant increase in assurance of the health and safety of the public, or (2) have significant impact upon the reactor licensing process.<sup>4/</sup>

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(Footnote cont'd from previous page)

(b) Compare the Standard Review Plan (SRP) against item (a) above to determine the extent to which the SRP already adequately addresses interdisciplinary review areas and systems interactions. Also, determine the extent to which the SRP includes consideration of systems interactions. . . .

\* \* \*

(c) Develop, to the extent necessary, revisions of the SRP based on the results of task (b).

\* \* \*

(d) Develop criteria and procedures, including information requirements, for use by applicants in their design and review of plant designs for systems interaction. Id. at 2-4.

<sup>3/</sup> NUREG-0410, at A-3.

<sup>4/</sup> Id., at Appendix B. Categories B-D included activities judged as: "important in assuring the continued health and safety of the public but for which early resolution is not

(Footnote cont'd next page)

USI A-17 was one of 41 tasks, selected from a total of approximately 133, which the Staff's Technical Activity Steering Committee determined to be of the highest priority, and therefore placed in Category "A."<sup>5/</sup> Therefore, the designation of the systems interaction issue as "A"-17 reflects the Staff's view, in 1977, that its resolution could either "provide a significant increase in assurance of the health and safety of the public, or have significant impact upon the reactor licensing process."

The high priority accorded to USI A-17 in 1977 was reconfirmed in 1979. In NUREG-0510, the Staff defined an "Unresolved Safety Issue" as:

a matter affecting a number of nuclear power plants that poses important questions concerning the adequacy of existing safety requirements for which a final resolution has not yet been developed and that involves conditions not likely to be acceptable over the lifetime of the plants affected.<sup>6/</sup>

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(Footnote cont'd from previous page)

required"; having "little direct or immediate safety, safeguards or environmental significance, but which could lead to improved Staff understanding of particular technical issues or refinements in the licensing process"; and, not "warrant[ing] the expenditure of manpower or funds because little or no importance to the safety, environmental or safeguards aspects of nuclear reactors or to improving the licensing process can be attributed to the activity." Id.

<sup>5/</sup> Id., Appendix A at A-8 and Appendix D.

<sup>6/</sup> NUREG-0510, Identification of Unresolved Safety Issues Relating to Nuclear Power Plants (January 1979) at 10.

In NUREG-0510, the Staff grouped and categorized issues by activity type (8 categories) and by relative worth based on risk-related criteria (4 categories) to determine which ones were USIs. Task A-17 was identified as involving group 3 type activities ("performing studies to confirm the adequacy of current Staff safety requirements"); it was placed in risk-related category I, defined as "Potential High Risk Items," the highest of the risk-based groupings.<sup>7/</sup>

After evaluating 86 generic tasks that were in Category A (NUREG-0410 ranking), the tasks that were in activity groups 1, 2 or 3, and the tasks in risk-based categories I or II, as well as reviewing the Abnormal Occurrences reported to Congress during 1977 and 1978, the Staff determined that only 17 generic issues qualified as USIs. A-17, Systems Interactions, was among them.<sup>8/</sup> The significance of the Staff's identification of A-17 as a USI is unmistakable, in light of the following Staff explanation of how the USI definition was applied:

In applying this definition, matters that pose "important questions concerning the adequacy of existing safety requirements" were judged to be those for which resolution is necessary to (1) compensate for a possible major reduction in the degree of protection of the public health and safety, or (2) provide a potentially significant decrease in the risk to the public health and safety. Quite simply, an "Unresolved Safety

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7/ Id., Appendix B at B-4, B-13, and Appendix C at C-1.

8/ Id. at 13-16.

Issue" is potentially significant from a public safety standpoint and its resolution is likely to result in NRC action on the affected plants.<sup>9/</sup> (Emphasis added.)

A-17 has never lost its designation as an USI. Rather, as Mr. Conran notes in his Affidavit (page 3), the safety significance and importance of USI A-17 was confirmed and reinforced following the TMI-2 accident by the inclusion of a systems interaction program in the Commission's TMI Action Plan.<sup>10/</sup> The TMI Action Plan provides further evidence of the priority of resolving the systems interaction issue. The Task II.C.3 effort was ranked as having high safety significance and a near term (within 2 years of implementation) benefit.<sup>11/</sup>

Recent Staff actions have again documented the continuing high priority given to USI A-17. In the November 10, 1982 draft of NUREG-0933, Rev. O, "A Prioritization of Generic Safety Issues," the Safety Program Evaluation Branch of the NRC's Division of Safety Technology assigned the highest priority to the systems interaction issue.<sup>12/</sup> The stated purpose of the priority rankings contained in draft NUREG-0933 is "to assist in the timely and efficient allocation of resources to those

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<sup>9/</sup> Id. at 10.

<sup>10/</sup> NUREG-0660, NRC Action Plan Developed as a Result of the TMI-2 Accident, Item II.C.3 (May 1980).

<sup>11/</sup> NUREG-0660, Tables B.2, at B.2-5, and B.3, at B.3-3.

<sup>12/</sup> Draft NUREG-0933, Rev. O, at xxxii.



safety issues that have a high potential for reducing risk and in decisions to remove from further consideration issues that have little safety significance and hold little promise of worthwhile safety enhancement."<sup>13/</sup> Only 15 of the 74 issues considered (certain issues were eliminated) were assigned a "high" priority.

Assignment of a HIGH priority means that strong efforts to achieve an earliest practical resolution are appropriate. This is because (a) an important safety deficiency is involved (though generally the deficiency is not severe enough to require prompt plant shutdown), (b) a substantial safety improvement is likely to be attained at a low enough cost to make the improvement very worthwhile, or (c) the uncertainty of the safety assessment is unusually large and an upper-bound risk assessment would indicate an important safety deficiency.<sup>14/</sup>

USI A-17 received a "high" priority rating in draft NUREG-0933.<sup>15/</sup>

The facts set forth above document the high priority and safety significance which have been accorded to resolution of USI A-17 since it was first identified. We now turn to the actual progress that has been made toward resolution.

B. POINT 2: Lack of Progress in Resolving USI A-17 and Licensing Implications

In his Affidavit, Mr. Conran disagrees with the Staff's position that the USI A-17 program "provides currently an

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<sup>13/</sup> Id. at ii-iii.

<sup>14/</sup> Id. at iv.

<sup>15/</sup> Id. at xxxii.

adequate basis for the 'justification for operation' conclusion required under North Anna . . . ." (Affidavit at 2). Mr. Conran stresses his view that USI A-17 requires timely resolution but that progress toward such resolution cannot be demonstrated. We agree with Mr. Conran's conclusion that there has been a lack of progress toward resolving USI A-17 which renders the program inadequate to provide the basis for a North Anna finding.

In the testimony which follows, we: (1) support the conclusion in Mr. Conran's Affidavit concerning the lack of progress toward resolution of USI A-17; and (2) disagree with the Staff's assertions that current licensing requirements provide reasonable assurance that Shoreham can be operated without undue risk to the public health and safety. (Staff Supp. Test. at 3-4).

1. Lack of Progress Toward Resolution of USI A-17

When the Task Action Plan for systems interaction was initiated in 1977, the date for completion of the task was December 30, 1978. 16/ As of January 1979, the NRC still expected to complete "Phase I" of the task (the development of a workable methodology) by September 1979. 17/ Phase I was to be

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16/ Task Action Plan, Task No. A-17, Revision 0 (November 15, 1977) at 9. See footnote 1.

17/ NUREG-0510, Appendix A at 12.



done under contract by Sandia Laboratories; "Phase II," the application of the methodology to actual plants, was contingent upon whether Sandia actually identified systems interactions as a serious problem.<sup>18/</sup> By September 1979, the target date for Sandia's Phase I study had been moved back to March 1, 1980. The reason given for the delay was that Sandia had underestimated the level of effort required for the task. Phase II was scheduled for completion in March 1981.<sup>19/</sup>

In 1980, the NRC revised and rescheduled the plan for resolution of USI A-17. As of May 1980, the revised plan included: (1) a plan to develop and demonstrate workable methodologies for systems interaction analysis; and (2) a series of nuclear power plant systems interaction reviews.<sup>20/</sup> In connection with the development of methodologies, three NRC contractor laboratories (Lawrence Livermore, Battelle, and Brookhaven) each provided a report to the Staff on the state-of-the-art in systems interactions methodologies.<sup>21/</sup> These

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<sup>18/</sup> Id.

<sup>19/</sup> NUREG-0606, "Unresolved Safety Issues" Summary (September 4, 1979) at 1.

<sup>20/</sup> NUREG-0660, Item II.C.3, at II.C-7.

<sup>21/</sup> NUREG/CR-1859, "Systems Interaction: State-of-the-Art Review and Methods Evaluation" (Lawrence Livermore) (January 1981); NUREG/CR-1896, "Review of Systems Interaction Methodologies" (Battelle Columbus) (January 1981); NUREG/CR-1901, "Review and Evaluation of System Interaction Methods" (Brookhaven) (January 1981).

reports, published in January 1981, all suggested that a combination of existing methodologies could be used to provide a systematic approach to systems interaction analyses. The NRC incorporated this guidance into the Staff Summary Letter Report, "The Approach to Systems Interaction in LWRs" and in the "Initial Guidance for the Performance of Systems Interaction Analyses at Selected LWRs."<sup>22/</sup> Although the guidance document is in circulation within the Commission, to our knowledge the recommended methodologies have not been systematically implemented at any plant.

As of May 1980, the Staff's USI A-17 program also included review of three plant-specific systems interaction studies: the Diablo Canyon Seismic Systems Interaction Walkdown; the San Onofre Seismic Systems Interaction Walkdown; and the Indian Point 3 Systems Interaction Review. The Diablo Canyon and San Onofre studies were each limited to spatially coupled interactions initiated by seismic events.<sup>23/</sup> The Indian Point study includes a walkdown and, in addition, a dependency analysis.<sup>24/</sup>

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<sup>22/</sup> Systems Interaction Section, Staff Summary Letter Report, "The Approach to Systems Interactions in LWRs" (June 1981); Reliability and Risk Assessment Branch, "Initial Guidance for the Performance of Systems Interaction Analyses at Selected LWRs (Guidance for Interim Use and Comment)" (January 7, 1982).

<sup>23/</sup> Memorandum from Richard Savio to ACRS Members, "Status of the Review of the Diablo Canyon Systems Interaction Study (October 30, 1980); Memorandum from L.S. Rubenstein to R.L. Tedesco, "Evaluation of San Onofre Units 2 and 3 Seismic Interaction Program" (April 7, 1981) at 4.

<sup>24/</sup> ACRS Subcommittee on Safety Philosophy, Technology, and Criteria, Meeting Transcript, (February 26, 1982) 27, 28, 34, 35, 65-69.

As of the end of September 1981, the NRC Staff had completed its initial evaluation of the methods to be used in the Diablo Canyon and San Onofre systems interaction studies.<sup>25/</sup> In a meeting on July 24, 1981 with the Indian Point licensees, the Staff commented upon its review of a preliminary submittal of the proposed Indian Point 3 study.<sup>26/</sup> In October 1981, a Staff proposal for the review of four plants using NRC-developed methodologies was submitted to the NRR Director. That proposal estimated that a systems interaction analysis of a nuclear plant and its review would take about eighteen months.<sup>27/</sup> Thus, as of October 1981, the Staff intended to gather data from seven plants in the course of its USI A-17 program. Two of the plant reviews (Diablo Canyon and San Onofre) were to be limited in scope; the other five (Indian Point and the four reviews using NRC-developed methodology) were to be more complete.

The situation today is very different. As Mr. Conran notes at page 11 of his Affidavit, the evaluation of

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<sup>25/</sup> Diablo Canyon SER, Supplement 11 (October 1980); San Onofre SER, Supplement 2 (May 1981).

<sup>26/</sup> Meeting Summary and Status Report for Meeting with PASNY/Ebasco on Proposed Indian Point 3 System Interaction Program, July 24, 1981 (undated).

<sup>27/</sup> Memorandum from Thomas Murley to Harold Denton, "Implementation of Systems Interaction Interim Guidance" (October 30, 1981).

interactions identified in the Diablo Canyon walkdown has not been submitted to the NRC, nor is there an agreed-upon date for submittal. Similarly, the unevaluated search results of the Indian Point 3 systems interaction study will not be submitted to the Staff until late 1983. (Conran Affidavit at 11).

The status of the four plant reviews has also changed. As Mr. Conran states in his Affidavit (pages 19-20), following the submission of the October, 1981 Staff proposal recommending the initiation of the four plant reviews, no authorization was received from the NRR. In February, 1982, however, the NRC stated (in a letter to the ACRS) that "[The Staff] proposes to begin soon with reviews of four near-term operating license plants using two different methodologies for two plants each."<sup>28/</sup> It now appears, however, that the Staff USI A-17 program has discarded the four plant reviews altogether. (See Staff Supp. Test. at 6-7).

The foregoing "progress" or lack thereof toward resolution of USI A-17 has been criticized by the ACRS. In January, 1982, the ACRS stated:

The Committee believes that it is already past the time when its recommendation for a systems interactions study on Indian Point 3 should have been completed. The ACRS is also disappointed with the absence of even a limited review of systems interactions by either the NRC Staff or the Applicant in some of the recent operating license reviews.

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<sup>28/</sup> Memorandum from William J. Dircks, NRC, to Paul Shewmon, ACRS, "Systems Interactions" (February 12, 1982).

The Committee believes that the matter of systems interactions has been delayed for too long. Rather than delay another several years for most plants while the Staff decides on the ultimate approach, it appears that a staged approach may be preferable, with latitude to the licensee to do as good a job as he now can.<sup>29/</sup>

Despite this view expressed in January 1982, today, about 14 months later, there has still been no substantial progress toward resolution.

The Staff has stated in its Supplemental Testimony (page 7) that it now believes a basis for new licensing requirements could result from the A-17 program in October 1984. However, based on past history, there certainly is no guarantee that this new schedule will be met. Moreover, the results of the A-17 program as now described in the Staff's Supplemental Testimony (page 7) will yield data from only one plant, Indian Point 3, which is a PWR.<sup>30/</sup> Although the methodology to be used for the Indian Point study now planned by the Staff may be applicable to BWR studies, the Staff apparently does not plan to test those methods on BWRs as part of the USI A-17 program. Therefore, there is no indication that either the current Staff

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<sup>29/</sup> Letter from J.J. Ray, Acting ACRS Chairman, to William J. Dircks (January 8, 1982).

<sup>30/</sup> The two other plant specific systems interactions studies (Diablo Canyon and San Onofre), both of PWRs, are not mentioned in the Staff's latest proposed A-17 plan. (Staff Supp. Test. at 7)

plans for A-17, or the ultimate result if those plans are implemented, will have applicability to the Shoreham plant. Accordingly, not only has progress been exceedingly slow toward USI A-17 resolution, but the "resolution" which the Staff now projects for October 1984 has not been demonstrated to be applicable to Shoreham. Based on the foregoing, we conclude that the NRC's progress toward resolving USI A-17 has been inadequate.

2. The Staff's Supplemental Testimony Provides No Basis for Making the North Anna Findings

The Staff asserts in its Supplemental Testimony (page 4) that USI A-17 "is confirmatory in nature." This statement suggests that the Staff believes the issue has less safety significance than other USIs and that its timely resolution is not an important or necessary consideration in the licensing process.

We disagree. First, even if USI A-17 is "confirmatory," it has been accorded extremely high priority. (See discussion in Point 1). A USI of such high priority--even if "confirmatory"--must have timely resolution or material progress toward resolution such that there is a factual basis for the Staff's opinion that existing licensing review processes are adequate. Further, despite the Staff's statements that "A-17 was initiated to confirm that present review procedures and safety criteria provide an acceptable level of



independence for systems required for safety by evaluating the potential for the more important undesirable interactions between and among systems" (Staff Supp. Test. at 5) (emphasis in original),<sup>31/</sup> the fact remains that such confirmation has not yet occurred. (See discussion of A-17 progress.) Moreover, every NRC priority ranking of generic issues has placed resolution of USI A-17 in the highest possible category. Therefore, even if the adjective "confirmatory" were applicable to the Staff's anticipated results of an eventual A-17 resolution, that fact does not mean that achieving the resolution is "unimportant" or "insignificant."

The Staff states in its Supplemental Testimony (page 5) that:

Progress in this program [Task A-17] to date has provided no indication that present review procedures and criteria do not provide reasonable assurance that the effects of potential systems interactions on plant safety will be within the effects on plant safety previously evaluated (i.e. within the design-basis envelop).

With all due respect, we believe this statement is not entirely correct. The only study in the A-17 program that compared potential systems interaction events with specific Standard Review Plan ("SRP") requirements--the Sandia study--identified deficiencies in the SRP. For example, in its Phase I study

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<sup>31/</sup> See also Shoreham SER, at B-10, for an almost identical statement.

modelling limited portions of the Watts Bar PWR, Sandia found specific examples of failures in the SRP to cover particular adverse systems interactions.<sup>32/</sup> Examples of these deficiencies in the SRP are set forth in the Attachment to this testimony which reproduces Table 7.1 from the Sandia study. The Sandia study methodology was found to be inadequate for broad systems interaction detection; however, the results of the limited Sandia review are important because inadequacies in the SRP were detected. Thus, the existing review procedures, i.e., the SRP, have not been shown to be adequate.<sup>33/</sup>

Weaknesses in the SRP also have been discovered as a result of actual events that involved adverse systems interactions. For example, the Quad Cities flooding incident led to changes in the SRP with respect to internal flooding and high energy line breaks; similarly, the Browns Ferry fire led to SRP changes with respect to fire protection and cable separation. Therefore, in the past, certain potential adverse systems

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<sup>32/</sup> See NUREG/CR-1321, Final Report-Phase I Systems Interaction Methodology Applications Program, (Sandia National Laboratories) (April 1980).

<sup>33/</sup> The Sandia study did not conclude that the soft spots in the SRP--areas when adverse interactions were not accounted for--would have resulted in effects outside the so-called "design-basis envelop." However, the fact that Sandia did identify that the SRP is not complete in accounting for systems interactions, together with the overall lack of A-17 progress, in our opinion, undercut the confidence that can be placed in the existing review procedures.



interactions have not been evaluated in the SRP until after the events had actually occurred. Thus, the SRP has addressed certain systems interactions on a reactive basis, and has been found not to address at all certain other interactions.

The initial results of the Diablo Canyon study, which was limited to the identification of seismic interactions, identified some 677 potential interactions. Of these, 228 resulted in plant modifications.<sup>34/</sup> Because the results of the study have not been fully evaluated, it is difficult to determine how many of these modifications were critical to the plant's safe operation. However, the sheer number of changes suggests that systems interactions are indeed slipping through the review process.

Thus, the few studies on systems interactions done for the Staff and by utilities do not corroborate the adequacy of the existing review process. Rather, these studies have led to changes in plant design. Thus, we agree with Mr. Conran:

Although the results of these efforts have not yet been fully-evaluated by the utilities involved and reviewed by the staff, in several instances on the basis of licensees' own prudent judgment, modifications to facility designs have already resulted as a result of system interaction reviews. (Affidavit at 13).

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<sup>34/</sup> Diablo Canyon SER, Supplement 11 (October 1980), at 6-1.

Finally, we disagree with the Staff's "reasonable assurance" conclusion (Staff Supp. Test. at 5, quoted earlier) as applied to Shoreham because, to our knowledge, there have been no generic or specific BWR systems interaction studies performed or reviewed by or on behalf of the Staff. Therefore, to our knowledge, the Staff has no study data on which to base a BWR- or Shoreham-specific conclusion. In addition, as discussed above, the "progress" in the A-17 program has not yielded any results upon which such a conclusion could be based.

C. POINT 3: Systems Interaction Study for Shoreham

Mr. Conran urges that all licensees and operating license applicants should be required to commence limited systems interaction reviews. (Affidavit at 12-13). He believes such studies would produce beneficial findings for the specific plants involved and would also provide data needed by the Staff in its USI A-17 program. (Id. at 14). We agree on the need for systems interactions reviews at Shoreham.<sup>35/</sup> Set forth below are our views on the outline of such reviews.

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<sup>35/</sup> The matters discussed earlier, including the deficiencies in the SRP, the lack of focus of the Staff's USI A-17 effort on BWR systems interactions, the potential adverse interactions found where SI studies have been conducted, and the lack of progress by NRC on generically resolving the USI A-17 issue, all indicate the need for systems interaction studies at Shoreham.

The NRC-sponsored studies done by the national laboratories indicate that a multiple step process using several methodologies is necessary to assure a systematic evaluation of a plant for systems interactions. These studies also indicate that there are several established methods to accomplish the task and that no particular method is better than another. However, all the methods seem to follow the same grouping of major actions to review and identify systems interactions. These methods were circulated in draft form within the NRC almost two years ago.<sup>36/</sup> In January 1982, a draft "Initial Guidance for the Performance of Systems Interaction Analyses at Selected LWRs (Guidance for Interim Use and Comment)"<sup>37/</sup> was published. This guidance should be considered in preparation of the program for Shoreham systems interaction analyses.

The scope of a study at Shoreham should account for functionally and spatially coupled systems interactions. Human interactions are more complex, involving a combination of plant-specific and generic industry-wide considerations. By concentrating on the first two interactions (spatial and

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<sup>36/</sup> Staff Summary Letter Report, "The Approach to Systems Interactions in LWRs" Systems Interaction Section RRAB, Div. of Safety of Technology (June 1981).

<sup>37/</sup> RRAB, Div. of Safety Technology, Office of Nuclear Reactor Regulation (January 7, 1982).

functional), the impact of human interactions can be significantly reduced. The three step process recommended by the NRC<sup>38/</sup> should be used with one or more methods used iteratively between and within each step. The identification of spatial couplings will require that a systematic visual inspection be made by a multidisciplinary team to provide joint judgment on whether systems interactions exist. Further, it will be important to do this detailed walkdown with checklists for the interaction types (e.g., Diablo-type targets and sources) with different types of engineers evaluating items with respect to their individual specialities.

## II. SAFETY CLASSIFICATION

The purpose of this section is to set forth our evaluation of the adequacy of the proposed "fix" to the Shoreham safety classification matters presented in the Staff Supplemental Testimony. Our testimony also addresses the related matters presented in the Conran Affidavit.

The Staff proposes a two step "fix" to ensure that LILCO will comply with General Design Criterion 1 ("GDC-1") of 10 CFR Part 50, Appendix A during the operation of Shoreham. (Staff

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<sup>38/</sup> The process involves: (1) "Model the plant to select the combinations of systems for detailed evaluation"; (2) "search the selected combinations of systems"; and (3) "evaluate the discovered systems interactions against criteria for corrective action." Id. at 2-3.

Supplemental Testimony at 11). First, the Staff has proposed for the operational phase that the ASLB find that:

[T]he Staff's definition of 'important to safety' is correct and binding on the Applicant. . . . (Staff Supplemental Testimony at 11).

Second, the Staff requested LILCO to commit in the FSAR that Shoreham will comply with GDC-1 during operations as follows:

Amend the FSAR to commit for non-safety related structures, systems, and components, to include in the preventive and corrective maintenance program, the design change control program, the procedures for procurement of equipment, the procedures for modifications and removal of equipment from service, and the QA program, a provision that, as a minimum, the equipment and associated software shall be accorded the safety significance given to it in the FSAR, the technical specifications and the emergency operating procedures. The charters and decisions of the Review of Operations Committee, the Offsite Nuclear Review Board, and the Manager of Quality Assurance shall also reflect these considerations. (February 18, 1983 Letter, Eisenhut of NRC to Pollock of LILCO, attached to Staff Supplemental Testimony).

LILCO in a March 2 letter to the Staff agreed to amend the Shoreham FSAR and further, in a March 8 letter, LILCO submitted examples of the language it intends to incorporate in the proposed FSAR amendment (these LILCO letters are included as attachments to the Staff Supplemental Testimony). The Staff appears satisfied by LILCO's FSAR commitment. (Staff Supplemental Testimony at 10-12).

In our opinion, the Staff's proposed two step "fix" and LILCO's proposed FSAR amendments are deficient. Our testimony

below discusses the deficiencies by covering the following matters:

- o Conflicts in Terminology Unresolved
  - o LILCO's FSAR Amendment Insufficient
  - o Undocumented Safety Classification Program
  - o The Staff Reliance on the Standard Review Plan and Regulatory Guides is not Justified
  - o Correctness of Safety Significance Assumed Rather Than Demonstrated
- A. Conflicts in Terminology Unresolved

Mr. Conran expressed concern that the terminology differences between LILCO and the Staff are more than just a language problem. He states:

I no longer believe that our [Staff and LILCO] differences involve only a language problem to be sorted out mechanically . . . . [U]nderstanding of the fundamental safety concepts underlying the usage of the term 'Important to Safety' in the regulations cannot be imposed, (as for example by a condition to license). Understanding must be developed, and demonstrated . . . . (Affidavit at 31-32)

The Staff proposes that the Board "fix" LILCO's improper usage of the term "important to safety" by the Board's issuance of a post-facto edict and thus to require LILCO to use the Staff's definition of "important to safety" during the operational phase. Such an edict does not address or remedy the potential deficiencies in classification and QA/QC implementation resulting from LILCO's improper usage of the



classification terminology during the design and construction phase.

Absent issuance of an edict, LILCO proposes to continue during operations, as it did during design and construction of Shoreham, to apply its own terminology rather than that utilized by the NRC Staff. For example, at the February 18 meeting, Mr. Mattson of the Staff inquired:

[H]as LILCO committed to use in operation the terminology 'important to safety', even though you didn't necessarily design with that terminology? Or have you not committed? Tr. 66.

Both Mr. Pollock and Mr. McCaffrey of LILCO responded that "[w]e have not committed." Id. (Emphasis added). Mr. Pollock also added: "I think we have it in testimony and what have you that our approach to importance to safety is that it is safety related, in our judgment." Id. (emphasis added).

Thus, the efforts of the Staff to persuade LILCO to use the Staff's definition of important to safety have been unsuccessful. The differences are further demonstrated by the exchange of letters between LILCO and the Staff (beginning with LILCO's letter of December 16, 1982) and the comments by Mr. Mattson in the February 18, 1983 meeting on classification issues:

I think in your response to Novak's letter of January 10th, if you had said we will accept the Staff's definition as we move into operations, and if you had built into that procedures and a quality assurance program and what have you -- that is, you would have attempted to determine the importance to safety of equipment as you handled it in

operations -- we would not have had today's meeting, or we could have had a very short meeting. . . . If you had agreed in response to that [January 10, 1983] offer for you to agree to accept our definition of 'important to safety'. You obviously did not do that, and sent a letter back in reiterating your December 16th offer. So we were [sic] at a standoff, if you will, today. Tr. 143-144 (Emphasis added).

The agreement to disagree between the Staff and LILCO, and the Staff's proposed "fix" by a Board edict, in our opinion, do not constitute an acceptable resolution of the conflicting use of safety classification terminology. Rather, as suggested by Mr. Conran, and as set forth in greater detail in the remainder of our testimony, we believe understanding of safety classification terminology must be developed and demonstrated, not imposed.

B. LILCO'S FSAR Amendment Insufficient

A fundamental flaw of the FSAR "fix" proposed by the Staff and adopted by LILCO is that it does not resolve the root cause of the problem (i.e., the difference in terminology and its effect in classifying and establishing standards of quality for important to safety but nonsafety-related components). In effect, the Staff "fix" has added no new requirements for Shoreham except inclusion of the associated software and adding the ROC, ONRB and Manager of QA to those to be bound by the resolution. Thus, the FSAR inserts do not ensure that LILCO has paid proper attention to all important to safety equipment and that the proper level of QA has been applied.



Evidence of the ineffectiveness of this resolution is seen in the proposed inserts to the FSAR which LILCO, in its March 8 letter, says are indicative of the types of changes that will be incorporated.<sup>39/</sup> Insert A simply reiterates the words of the Staff directive and calls it a "corporate policy". Insert B specifies that maintenance people on nonsafety-related SS&C's, shall, in exercising their judgment on the appropriate measures to be applied, maintain the safety significance accorded to them in FSAR, TS's and EOP's. Finally Insert C says the QA manager shall also consider the safety significance accorded to nonsafety-related SS&C's and computer software given to them in the FSAR, TS's and EOP's.

Because there is no systematic, clearly documented, and well defined "safety significance" of nonsafety-related SS&C's in the referenced documents (FSAR, TS's, and EOP's), these inserts provide no meaningful direction to Shoreham personnel regarding how to implement the FSAR commitments. Indeed, adding the computer software to the LILCO commitment is meaningless since, to our knowledge, it is not mentioned in the TS's or the EOP's and is given only a functional description in the FSAR; in no case is it assigned a "safety significance."

In our opinion, the proposed LILCO commitments provided in the FSAR amendment inserts will not result in an effective

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<sup>39/</sup> March 8, 1983 letter, Pollock to Eisenhut, SNRC-854.

solution to the safety classification issue. Rather, they perpetuate the existing difference (as addressed by Conran at pp. 28-33). There will likely be little or no substantive impact from these statements since the Shoreham documents, particularly the FSAR, will continue to be permeated with the fundamental difference in terminology and approach to classification which the resolution is intended to correct.

The Staff's proposed "fix" does not require LILCO to review the FSAR and determine the true meaning of the term "important to safety" at every place that it appears in the FSAR. The "fix" also does not require LILCO to review the FSAR to determine whether the term "important to safety" should be used in some instances where the term "safety-related" now is used. Such reviews and FSAR correction, where appropriate, should be part of any "fix."

Incorrect usage of terms can influence the Staff's review of FSAR commitments. For example, the Staff acknowledged during prior testimony on Contention 7B that it had previously erroneously approved LILCO's commitments in Section 3.1 of the FSAR related to GDC-1 due to misunderstanding of the terminology of the LILCO commitment. Thus, in our opinion, LILCO should promptly correct all usages of the term "important to safety" and "safety-related" in the FSAR in accordance with the Staff's definitions. The Staff should then evaluate the changes in LILCO's commitments to confirm that all the Shoreham design,

construction, and operation commitments are in accordance with NRC safety requirements.

In addition, Staff reviewers involved in plant assessments during the 40 year life of Shoreham should not be faced with the potential confusion resulting from LILCO's incorrect terminology. Both Mr. Haass and Mr. Mattson of the Staff expressed concern at the February 18 meeting that LILCO's informal safety classification could result in problems. Mr. Haass observed:

I think the question here is, are you really addressing the safety aspects. I think that's the question, and we are not hearing an assurance that your system does address that. Tr. 124.

Mr. Mattson twice questioned whether LILCO's informality in safety classification might result in a serious problem at some time in the future. First, Mr. Mattson followed Mr. Haass's previous statement with his query:

The point Walt was making is the answer we got was they stay, kicking the tires day in and day out; they see the plant, they know its operation, but Walt Haass was making the point ah, but there are Chapter 15 events, for example, or other accident situations that don't happen, God willing, never, but they certainly don't happen day by day.

Will, over a period of time, cognizance of the importance of a piece of equipment, maybe a tertiary system to the functioning of safety equipment, be lost because the FSAR relevance of the equipment is not by procedure, continually brought before the person making the judgment about what to do? Tr. 125.

Earlier in the February 18 meeting, Mr. Mattson had expressed a similar question about future activities:

That's a wonderful philosophy, Mr. Pollock. Your philosophy is the kind of philosophy we want to hear from people at your level. I don't quarrel with that a bit. Your philosophy of wanting availability and safety to go hand in hand and have an excellence of operation at all levels, that is super stuff. I wish everybody had that philosophy.

But what about 30 years from now? Tr. 78  
(Emphasis added).

In our opinion, GDC-1 requires documented, systematic consideration of all SS&C's important to safety and assignment of QA/QC measures in order to assure that the items will not be degraded as a result of activities occurring during the 40 year life of the plant. Absent complete correction of FSAR terminology, there will always be concern whether LILCO personnel and Staff reviewers properly understand LILCO's FSAR commitments.

C. Undocumented Safety Classification Program

A further deficiency in the Staff "fix" is that it does not require LILCO to rely on an objective, systematic, documented program for considering SS&C's and for assigning QA/QC requirements. Rather, LILCO appears to depend upon a highly subjective design and operating philosophy, which will remain essentially unchanged under the Staff "fix." For example, Mr. Pollock stated the following on February 18 with regard to how Shoreham's management systems will control the operation of the facility:

It's not a defined procedure; it is through training, it is through our operating philosophy and years of operating philosophy and maintaining the integrity of the facility. So it is training. And now I can get into our training programs, our operator training programs, which are not just specifically licensed-required [sic] training, but it is balance of plant training and operating philosophy. Tr. 65.

Mr. Pollock acknowledged there was no labeling on a drawing or on the Shoreham equipment to identify LILCO Category 2 (nonsafety-related) items which are important to safety:

[T]here is not a tag that says 'important to safety.' But the training and philosophy of the plant -- and I can't disassociate operating reliability and operating availability with safety. They are hand in hand . . . .

So our philosophy is, by definition, an interpretation of what does it mean to the operating reliability of the plant if that equipment is going to be, and the availability of that plant, and that manifests itself in a safety issue as well.

So I don't have a terminology of important to safety in that connotation, but I am trying to define how we approach it, which we think does address that concept of what is important. Tr. 67-68.

Mr. McCaffrey of LILCO also acknowledged LILCO's failure to utilize the NRC safety terms, but he relied on other LILCO programs to compensate for the failure to systematically identify SS&C's important to safety:

You don't need to agree on the terminology. That's where we continue to have the problem. I think Mr. Novak said it's the care and fee[d]ing. You can achieve the same assurance, I hope, in your mind, from the examples and the thought process and the programs that are in place and the feedbacks and the updates and all of that should give

give you the sense of -- we don't ignore that other-than-safety-related. We don't have to call it important to safety. It has, obviously a certain importance, but I think we achieve the same effect by the programs we have. Tr. 68.

In our opinion, compliance with the regulatory requirements for SS&C's important to safety cannot be demonstrated by references to a philosophy, a thought process, training, or narrow programs and procedures. These, of course, are important but cannot substitute for documented safety classification measures. Thus, in our opinion, the regulations clearly require that the classification and resulting QA/QC measures for SS&C's important to safety, but not safety-related, be set forth in an objective, documented, controlled mechanism.

D. The Staff Reliance on the Standard Review Plan and Regulatory Guides is Not Justified

The Staff asserts that LILCO has demonstrated compliance with the substantive regulatory requirements for plant items "important to safety" during the design and construction phase by virtue of the Applicant's alleged compliance with Regulatory Guide 1.70 and the SRP. (Staff Supplemental Testimony at 10, 12). For design and construction, Mr. Conran states that the SRP and Regulatory Guides can, perhaps, provide a safety net or backstop to mitigate serious misunderstandings in the meaning of the regulatory terms. (Affidavit at 32). We believe, however, that the Staff and Mr. Conran, to the extent he agrees with the Staff witnesses, are not in a position to conclude



that LILCO's alleged compliance with these Staff guidance documents ensures proper treatment of SS&C's important to safety during the design and construction phase.

For example, the Staff suggests that it is satisfied that LILCO has applied proper quality standards to all SS&C's important to safety. However, the Staff's ability to reach such a conclusion is sharply undercut by the Staff's admission in its Contention 7B Findings that the Staff does not review or inspect the adequacy of LILCO's quality assurance activities for SS&Cs important to safety but not safety-related.

The Staff does not review the quality assurance program for items important to safety but not safety-related, nor does it inspect for compliance with such a program. (NRC Staff Proposed Opinion, Findings of Fact, and Conclusions of Law, Volume 2, Finding 7B:82, p. 85.)

Similarly, we disagree with the Staff reliance on Regulatory Guide 1.70 and the SRP for its conclusion that during design and construction LILCO has satisfactorily met requirements for SS&C's important to safety but not safety-related. The Staff does not know the degree to which LILCO has complied with this Staff guidance. The Staff does not identify in the SER the extent to which Shoreham complies with all applicable or current Regulatory Guides and the SRP. The Shoreham SER also fails to document the justification for any instances of non-compliance with the preceding Staff licensing practices. Thus, the Staff is simply not in a position to assert that LILCO has complied with its regulatory guidance.

The Staff has recognized that its review practices are inadequate to provide detailed knowledge concerning an applicant's compliance with Staff regulatory guidance. Thus, in a June 13, 1980 letter to Mr. Dircks, Executive Director for Operations, Mr. Denton, NRR Director, while stating his overall belief that the public is adequately protected by the Staff's safety review process (a conclusion which we do not support), sets forth the following general problems in documenting the extent of licensee compliance with the Staff requirements, which cast serious doubt upon the Staff's reliance upon the completeness of its review process for Shoreham:

The first problem involves the fact that the staff's current review procedures are not directed toward providing a detailed and specific accounting of compliance with each and every regulatory requirement and related regulatory guide. Rather, the radiological safety review of operating license applications is based on the Standard Review Plan (SRP) which incorporates by reference applicable regulatory guides and all approved Branch Technical Positions ... Conformance with the Standard Review Plan and its references is generally believed to constitute compliance with applicable NRC regulations, although a systematic analysis to establish this congruence has not been conducted.

A second problem is that the staff's review is of the audit type; that is, not all plant features are reviewed by the staff for conformance to the Standard Review Plan. Given the nature of an audit review, it is not possible for the staff to demonstrate in detail that an application is in complete compliance with all elements of either the Standard Review Plan or the applicable regulations.

A third problem involves the fact that there are some regulations for which there is no



corresponding guidance to reviewers in the SRP. One known example is that General Design Criterion 51, "Fracture Prevention of Containment Pressure Boundary," is not explicitly referenced in the relevant SRP sections.

A fourth problem is that the staff Safety Evaluation Reports have always been written to summarize the results of the audit reviews and were not intended to document all aspects of the review. These reports tend to highlight those areas in which disagreements occurred between the staff and the applicant and the way in which these areas were resolved. Therefore, it is not always possible to find in these reports an accounting of the conformance of these applications to some of the NRC regulations or regulatory guidance that received most of the staff attention in these reviews. (emphasis added).

Further, the Shoreham FSAR does not provide assurance that the safety classification treatment for SS&C's important to safety is adequate. For example, the SRP calls for application of GDC-1 to all important to safety items in Section 7.0 of the FSAR. SRP Rev. 2, July, 1981, § 7.0. LILCO's FSAR for Shoreham does not mention GDC-1 as an applicable criteria but does list IEEE 336<sup>40/</sup> and Regulatory Guide 1.30<sup>41/</sup> for most items. Those items which are not shown as having either GDC-1, IEEE 336 or Regulatory Guide 1.30 as criteria or guidance would be assumed to have little, if any, safety significance. FSAR

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<sup>40/</sup> IEEE 336 "Installation, Inspection, Testing Requirements for Instrumentation and Electrical Equipment During the Construction of Nuclear Power Generating Stations," 1971.

<sup>41/</sup> Regulatory Guide 1.30, "Quality Assurance Requirements for the Installation, Inspection, and Testing of Instrumentation and Electric Equipment," 1972.

Table 7.1.1.2 lists 38 major systems categories, four of which indicate the above standards and regulatory guide are not applicable. Among the systems not receiving these considerations are the Remote Shutdown System and Recirculation Pump Trip, both of which clearly are important to safety. This omission is inconsistent with our view of the importance-to-safety and safety significance of these items. Until LILCO prepares a list of SS&C's, identifies the safety significance of individual pieces of equipment, and defines the applicable codes, regulations, and QA/QC measures for each, there can be no demonstration that the Shoreham treatment, in fact, is consistent with the importance-to-safety of the item or with the SRP.

Similarly, the SRP and Section 7.1<sup>42/</sup> of the Shoreham FSAR are also not consistent and there is no way to verify that all important to safety equipment is included in the FSAR nor that the equipment included is considered in the manner called for by the SRP. The review method proposed in SRP Section 7.1 (p. 7.1-14) for determining compliance with GDC-1 QA requirements refers the reviewer to Section 17 of SRP. However, Section 17 of the SRP only lists criteria for the QA review of safety-related SS&C's. Likewise, Section 17 of the Shoreham

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<sup>42/</sup> SRP Rev. 2, July, 1981, Section 7.1, and FSAR Section 7.1, including Figure 7.1.1-2.

FSAR only refers to the QA/QC program for safety-related items. Therefore, it is not possible to draw the overall conclusion that the SRP and FSAR assure proper safety classifications for design and construction activities.<sup>43/</sup> Indeed, even the latest revision of the SRP does not insure proper QA treatment for important to safety, but not safety-related, equipment since there is no description of what equipment is included in this category (Appendix D of Section 3.2.2 of the July, 1981 version of the SRP is still in the course of preparation). Likewise, neither Section 3.2.2 nor Section 17 of the latest version of the SRP provides detailed criteria concerning how to meet the requirements of GDC-1.

In our opinion, the Staff's general reliance on LILCO's alleged compliance with the SRP and Regulatory Guides is without substantiation until the validity of the Staff's assumptions is properly verified.

E. Correctness of Safety Significance Assumed Rather Than Demonstrated

Recognizing the conflict in safety classification terminology between the Staff and LILCO, the Staff at the conclusion

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<sup>43/</sup> The Staff states that LILCO has identified and properly treated SS&C's important to safety and that this has been documented in the SER. Staff Supplemental Testimony at 12. However, the Staff's SER is totally silent regarding QA applied by LILCO for SS&C's important to safety but not safety-related.

of the February 18 meeting issued a letter to LILCO requesting that the FSAR commitment be amended. The FSAR additions proposed by the Staff call for measures to ensure that:

[E]quipment and associated software shall be accorded the safety significance given to it in the FSAR, the technical specifications and the emergency operating procedures. (Letter Eisenhut to Pollock, February 18, 1983) (Emphasis added).

This "fix" thus assumes that the safety significance accorded to equipment and software in the FSAR, TS's, and EOP's is correct.<sup>44/</sup> Given the sharp difference between LILCO and the Staff in interpretation of the key regulatory term important to safety, we do not agree that such an assumption can or should be made. Rather, LILCO should be required to demonstrate that equipment and software have been assigned the appropriate safety significance and the commensurate QA treatment. Without such a demonstration, the "fix" merely specifies that deficiencies built into the LILCO safety assessment classification and assignment of QA levels to specific items will be perpetuated during the operating phase of the plant. Thus,

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<sup>44/</sup> The term "safety significance" has not been defined by the Staff either in its letters to LILCO or in the Supplemental Testimony. It must be defined if LILCO is to attempt to comply with the Staff "fix." In our view, determining safety significance should include analysis of factors such as the effects of the performance or failure of a component on a safety function, or on a support function (e.g. power distribution, HVAC, service water), and the potential for misleading the operator, contributing to a distracting event, or causing a reduction in safety margins.

since the future treatment of SS&C's during operation will be based on the original classification and QA/QC requirements, it is imperative that LILCO demonstrate that the initial design, fabrication, and construction activities, including classification and QA/QC requirements for all SS&C's important to safety, were systematically applied and implemented in accordance with the Staff requirements.

To make the demonstration urged herein, LILCO should be required to identify components which are important to safety and for each item of equipment and associated software, identify the safety significance and QA activities applied. LILCO should then assess whether the safety significance and QA activities for items identified in the first step are correct, and if not, amend, as required, the various programs identified in the Staff February 18 letter (i.e., corrective and preventive maintenance program, QA program, etc.) to reflect the proper safety significance and QA treatment.

In order to carry out the foregoing steps -- indeed, for the Staff's proposed "fix" to have any substance -- LILCO must compile a list of SS&C's important to safety. Without such a list, it is impossible for LILCO to demonstrate that the proper safety significance and QA controls are being applied, because the precise items as to which the "fix" is to be applied will remain only a generalized concept, rather than a concrete set of items whose safety significance can be clearly assessed.

Mr. Conran also calls for a listing by LILCO of SS&C's important to safety.

[A] condition for (i.e., prerequisite to) a license in this case should be development by LILCO of a listing of 'Important to Safety' structures, systems and components for Shoreham . . . . (Affidavit at 32).

We support Mr. Conran's position. It is our belief that such a listing of components is essential if LILCO is going to demonstrate that it does know how to classify and treat important to safety SS&C's.

Recent events on February 22 and 25, 1983 at the Salem nuclear plant underscore the importance of properly assessing the safety significance of components and providing the commensurate level of QA and preventive maintenance. The scram breakers involved in the Salem events were supposedly classified as safety-related but the safety significance of attached trip functions (undervoltage and shunt trip coil) was not properly assessed. The result was that the attached trip functions were not identified as safety equipment and did not receive required maintenance. Their failure to operate properly was a direct result of a maintenance deficiency<sup>45/</sup> and prevented the operation of the automatic reactor trip.

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<sup>45/</sup> Letter Rahe (W) to Denton (NRC), Mar. 1, 1983, Attached to BN 83-26, Mar. 3, 1983.



The Salem events are directly relevant to Mr. Conran's concern because they show why LILCO must systematically identify equipment important to safety and demonstrate that the consideration given to such equipment (including such matters as maintenance) is consistent with its safety significance. The Salem failures demonstrate also that the Staff must be assured that LILCO has implemented a systematic quality program that provides the necessary care for the equipment according to its safety significance.<sup>46/</sup> In our opinion, the only means to ensure that the safety significance and treatment, including maintenance, of items important to safety has been carefully considered is to specifically identify--list--these items as a first necessary step in rectifying LILCO's classification difficulties. Accordingly, a retrospective Shoreham safety classification and quality program review should be promptly initiated. This review should have, at a minimum, the following major elements:

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<sup>46/</sup> For example, the Salem plant had a Q list and a Master Equipment List but the scram breaker's shunt relay (which is important to safety) was not included on the safety-related list. Thus, for years the relay was given no maintenance. When it failed the first time (February 22, 1983), it was given ordinary commercial treatment which proved to be inappropriate. The result was that the breakers again failed on February 25, 1983. (SECY-83-98 and Attachments to BN 83-26).

1. Review Shoreham SS&C's and their associated software and assess their safety significance.
2. Assess whether the safety significance accorded in guiding documents (such as the FSAR and QA manuals and procedures) is correct.
3. Prepare a list of SS&C's which are important to safety. The Shoreham list should be accomplished at the equipment component level, rather than at the system level, due to the likelihood of divergent QA/QC measures being assigned to civil, mechanical, and electrical components within a particular reactor system and since QA measures are generally assigned at the equipment component level.<sup>47/</sup>
4. Identify the QA/QC program elements applicable to each item and assess whether these elements are commensurate with the identified safety significance.
5. Complete the requirements of the "fix" defined by the NRC Staff.

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<sup>47/</sup> A report prepared for the NRC by EG&G, (EG&G-EA-6109) "Identification and Ranking of Nuclear Plant Structures, Systems, and Components, and Graded Quality Assurance Guidelines -- Draft", November, 1982, is one such equipment listing and safety classification review effort of which we are aware. The EG&G Report includes a partial listing and ranking by QA level of SS&Cs important to safety. It also provides 23 factors or guidelines for ranking components within the systems, as to their QA level (EG&G, attached to BN 83-13, Feb. 17, 1983, at pp. 16-17).

6. Document the results of the above steps in the FSAR.
7. The Staff review should be documented in a SEP supplement to verify compliance with GDC-1.

In our opinion, absent such a review there can be no assurance that Shoreham complies with GDC-1.

ATTACHMENT 1

NUREG/CR-1321  
SAND80-0384  
AN

FINAL REPORT  
PHASE I  
SYSTEMS INTERACTION METHODOLOGY APPLICATIONS PROGRAM

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NRC FIN No. A1113

TABLE 7.1

## Generic Analysis Conclusions

<u>Systems</u>	<u>Commonality</u>	<u>Comments</u>
<u>Interactions of Most Significance Not Covered in the SRP</u>		
Pressurizer Power Operated Relief Valves Fail Open and Relief Isolation Valves Fail Open	Actuation Location	- Potential Single Event Resulting in Breach of Boundary
Auxiliary Feedwater Fails	Cooling	- Potential Subtle Inter- actions Could Lead to Loss of Decay Heat Removal
Auxiliary Feedwater Fails	Location	- Potential Subtle Inter- actions Could Lead to Loss of Decay Heat Removal
Pressurizer Heaters Fail	Motive Power	- Loss of Absolute Pres- sure Control Reduces Margin of Safety
RWST Output Valves Fail Closed	Location	- Source of Water Neces- sary for Inventory Makeup Needed to Maintain DHR



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of )  
)

LONG ISLAND LIGHTING COMPANY )

(Shoreham Nuclear Power Station, )  
Unit 1) )

) Docket No. 50-322 (O.L.)

CERTIFICATE OF SERVICE

I hereby certify that copies of Suffolk County Supplemental Testimony on Contention 7B by Marc W. Goldsmith, Richard B. Hubbard and Gregory C. Minor were served upon the following, on March 23, 1983, by first class mail, postage prepaid, except as otherwise indicated.

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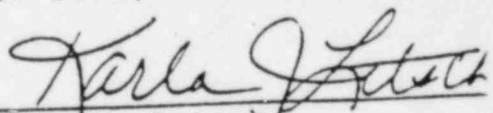
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