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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

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| In the Matter of |) | |
| |) | |
| LONG ISLAND LIGHTING COMPANY |) | Docket No. 50-322-OL-4 |
| |) | (Low Power) |
| (Shoreham Nuclear Power Station |) | |
| Unit 1) |) | |

LILCO'S REPLY TO SUFFOLK COUNTY AND
STATE OF NEW YORK PROPOSED FINDINGS OF FACT

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DATED: September 7, 1984

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John OCA*

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DETAILS
MAIL & REPLY
BRANCH

LILCO'S REPLY TO SUFFOLK COUNTY AND
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These reply findings address the majority of the findings proposed by Suffolk County and New York State (Joint Proposed Findings) in more detail than outlined in LILCO's Reply Brief.^{1/} LILCO does not propose that the Board adopt these reply findings. Rather, they demonstrate that the findings proposed by the Intervenors should be rejected by the Board.^{2/} A surprising number of the findings are just plain wrong. For example, Joint Proposed Finding 182 claims only one EMD diesel generator synchronized during a July 2 test; the

1/ This reply follows the format of the Joint Proposed Findings for convenience.

2/ LILCO does not contest the facts asserted in the Staff's Proposed Findings, though LILCO does not agree with several of the conclusions drawn by the Staff from those facts. Those areas of disagreement are evident from LILCO's Brief and Proposed Findings. Accordingly, to avoid repetition, LILCO does not address the Staff's Proposed Findings.

record unmistakably establishes that three machines synchronized. (LILCO Reply Finding 46; see, e.g., LILCO Reply Findings 32, 47, 135). Other findings are wholly unsupported by the evidentiary record. Joint Proposed Findings 416, 417, 424 and 425, for example, are taken from the arguments of counsel or comments of Judge Miller and not sworn testimony. (See, e.g., LILCO Reply Finding 118). Still others misrepresent or omit pertinent testimony. (See, e.g., LILCO Reply Findings 27, 34, 44, 91, 99, 106). Indeed, some findings are contrary to the testimony of the County's own witnesses. (See, e.g., LILCO Reply Findings 11, 15). The Joint Proposed Findings largely reflect the County's and State's prefiled testimony, ignoring much of the cross-examination of its witnesses or direct testimony of other parties' witnesses. (E.g., LILCO Reply Findings 15, 19, 26, 36, 37, 53). In short, they represent an unbalanced and inaccurate treatment of the record that merits little consideration by the Board.

I. RELATIVE SAFETY OF
LOW POWER OPERATION WITH ALTERNATE
CONFIGURATION AND WITH QUALIFIED POWER SOURCES

A. Vulnerabilities to a Seismic Event

1. Joint Proposed Finding 2 discusses Dr. Christian Meyer's qualifications. While Dr. Meyer is well qualified in certain aspects of seismic analysis, his experience does not involve hands-on analysis of the type of equipment which was the subject of his testimony. Dr. Meyer has specialized in the area of analytical techniques and computer code development relating to seismic analysis. (Tr. 2681, Meyer). For example, Dr. Meyer's principal responsibility as a member of the computer department and as a consultant at Stone & Webster was in computer code development for seismic applications. Also, a large part of his work as a structural engineer at Stone & Webster involved the development of mathematical models for seismic analyses. (Tr. 2677-78, Meyer). His consulting work has also focused on the development of mathematical models and computer programs used in seismic analyses. (Tr. 2678-80, Meyer). Meyer has not actually performed any analysis of the types of equipment discussed in his testimony. He has not performed an analysis of the operability of electrical equipment during or after a seismic event. (Tr. 2681, Meyer). He has not performed any seismic analysis on a gas turbine,

electrical control equipment or electrical transmission systems. (Tr. 2682, Meyer). He has never had any principal responsibility for performing seismic analyses of cable trays or cable tray supports. (Tr. 2683, Meyer). Further, his experience does not include hands-on performance of seismic analyses for nuclear power plants. For example, he has never performed walkdowns of cable trays or cable trays supports in conjunction with a seismic analysis, never performed a walkdown of a piping system as part of a seismic analysis, and was not familiar with the term "conduit" as it is used in nuclear power plants. (Tr. 2683-84, Meyer).

2. Joint Proposed Finding 3 demonstrates that Dr. Roesset is well qualified in his area of expertise. Dr. Roesset, however, has not visited the Shoreham site. (Tr 2684-85, Roesset). Thus, he could not sponsor testimony that was based upon Dr. Meyer's opinions and visual inspections. (Tr. 2741, Roesset; see Tr. 2782, 2792).

3. Joint Proposed Finding 4 discusses the qualifications of Gregory C. Minor. The finding is incomplete because it fails to mention that Minor's experience with General Electric was limited to instrumentation and control systems. (Tr. 2424, Minor). He has no experience in gas turbines or diesel generators. (Tr. 2424-28, Minor).

Significantly, Minor has never been responsible for operating any type of power generation equipment, except for a summer job in which he participated in testing hydroplants. (Tr. 2427-28, Minor). He is not experienced in performing seismic analysis of structures (Tr. 2688-89, Minor); his seismic qualification experience is limited to dynamic testing of individual components. (Tr. 2690-91, Minor).

4. Joint Proposed Finding 6 concludes, without citation to the record, that a structural engineer's lack of experience with a particular structure is immaterial to that engineer's ability to perform a structural analysis or predict the response of such a structure. This finding ignores the fact that much of the County's seismic testimony is based primarily upon judgment and not on calculations. (E.g, Tr. 2709, 2787, 2788, 2789, Meyer). Thus, experience, or lack thereof, with a particular type of installation is significant.

5. Joint Proposed Finding 11, dealing with William Museler's qualifications, fails to note that he has had direct responsibility for the review of seismic and structural analyses in his previous positions as Assistant Project Manager and as Manager of Construction and Engineering. (Tr. 535-37, Museler). Moreover, Museler's testimony with respect to seismic matters was based upon consultation with geotechnical

engineers at Stone & Webster. (Tr. 533, Museler). This type of consultation was one of the ways in which Museler normally performed his duties with respect to seismic analyses. (Tr. 538, Museler).

6. Joint Proposed Findings 13, 17, 30, 37, 46, 47, 49, 50, 53, 54, 55, 57, and 78 conclude that certain components of the 138 KV and 69 KV system might fail during a seismic event and cause a loss of offsite power. Yet NRC studies of actual seismic events have shown that it is unlikely that offsite power would be lost during an earthquake. (Tr. 1888, 1894-95, Knox; see also Tr. 430-33, Schiffmacher). In addition, these findings fail to acknowledge LILCO's ability to repair damage in a short period of time. (See LILCO Proposed Finding 139; Joint Proposed Finding 54).

7. Joint Proposed Finding 14 claims LILCO's testimony with respect to the need to consider seismic events did not address the "as safe as" standard. To the contrary, by demonstrating that no safety standards or limits would be exceeded for an essentially unlimited period of time, LILCO's testimony does demonstrate that its proposal for low power testing is as safe as low power testing with qualified diesels. LILCO's witnesses testified about facts, not conclusions more appropriately reached by the Board.

8. Joint Proposed Findings 16, 38-42, 62, and 79 suggest that a seismic event will cause failures in fuel supplies for the 20 MW gas turbine and the EMD diesels. LILCO, however, will have two 9,000 gallon tanker trucks available on site to supply fuel in the event of a failure of either fuel oil supply system. LILCO Proposed Findings 75, 81.

9. Joint Proposed Finding 20 and other findings (e.g., 49, 57) indicate that relative motion between structures and transmission systems may cause problems with insulators. But Dr. Meyer did not have any prior experience with design requirements for insulators on transmission systems. Although he claimed that it is common engineering judgment that insulators are made of ceramic material which is known to be brittle, he did not have any specific information concerning the properties of insulators used in the transmission system and switchyards for Shoreham. (Tr. 2735, Meyer). Schiffmacher testified that under actual earthquake conditions transmission lines have experienced little or no damage. (Tr. 444, Schiffmacher).

10. Joint Proposed Findings 33, 35, 36, 45, 46, 65, and 78 conclude that specific components will fail. These conclusions are based in whole or in part upon Dr. Meyer's judgments and not upon comprehensive calculations of the actual

performance of the equipment during an earthquake. Meyer does not have the experience necessary to make such judgments. (See LILCO Reply Finding 1).

11. Joint Proposed Finding 34 concludes that the cables from the EMD switchgear could fail. This contradicts testimony of a Suffolk County witness who testified that the cables appeared to have sufficient flexibility to withstand a seismic event. (Tr. 2782, Meyer).

12. Joint Proposed Finding 44, which concludes that the air starting unit for the 20 MW gas turbine might be inoperable during an SSE, is not supported by any calculations. (Tr. 2705, Meyer). Normally, this type of equipment would be subject to detailed computer analysis or testing on a shake table in order to determine the seismic capabilities. (Tr. 2705-06, Meyer). But Dr. Meyer's conclusions are only based upon engineering judgment and a visual inspection of this installation. (Tr. 2788, Meyer). As already noted, Dr. Meyer is not experienced in visual inspections associated with seismic analyses. (See LILCO Reply Finding 1). Moreover, Dr. Meyer did not know the function of the link between the air tank and the compressor motor that he described in his testimony and therefore did not know the impact of a break in that line on the ability of the gas turbine to start. (Tr. 2707-08, Meyer).

13. Joint Proposed Finding 49 concludes that an earthquake of intensity 0.14 g would be sufficient to topple over the 13 KV/69 KV transformer in the 69 KV switchyard if this force were applied statically. Dr. Meyer also testified, however, that forces during an earthquake would not be applied statically and that he did not perform any calculations to determine the effect of actual earthquake conditions. (Tr. 2716, Meyer). In addition, the finding suggests that rocking and overturning of transformers have been observed in many earthquakes. This testimony was based in part upon experience in the Sylmar converter station in California. (Tr. 2716, Meyer). But it is not appropriate to draw any conclusions about Shoreham based upon the experiences in California. First, Dr. Meyer testified that ground accelerations in the earthquake in question were in excess of 0.2 g, the safe shutdown earthquake for Shoreham. (Tr. 2717, Meyer). Second, in determining whether a transformer or piece of equipment would rock or overturn, information concerning the geometry of the transformer, including the location of the center of gravity, must be known. (Tr. 2717, Meyer). Indeed, the witness testified that based on his visual observation, he had originally believed that the Shoreham transformers were much more compact than the Sylmar converter station transformers and therefore were less likely to rock or tip over during an

earthquake. It was only after he performed some calculations that he concluded there might be a possibility that the Shoreham transformers might rock. These calculations, however, were static calculations and did not duplicate actual earthquake conditions. (Tr. 2719-20, Meyer).

14. Joint Proposed Findings 50 and 56 deal with the potential of the RSST and the NSST to rock or overturn during an earthquake. Dr. Meyer, however, did not know the location of the center of gravity for these components and indicated that he had only limited experience with specific transformers from which to make any judgments. (Tr. 2728, Meyer). In fact, with respect to the NSST, Dr. Meyer agreed that if one assumes the center of gravity is approximately one-half the overall height of the transformer, rocking would not be a problem. (See Tr. 2722-28, Meyer). He indicated that the assumption for the center of gravity might be a reasonable initial assumption (Tr. 2723, Meyer), but emphasized that he could not reach any final conclusion without knowing the exact location of the center of gravity, which he did not know. (Tr. 2728-29, Meyer).

15. Joint Proposed Findings 58-60 criticize LILCO witness Meligi's conclusions about the EMD diesels because he did not know when the Navy shock tests were performed, when the

EMDs subject to the tests were manufactured or when the Shoreham EMDs were manufactured. But Meligi testified explicitly that the machines tested by the Navy were of the same type as installed at Shoreham. (Tr. 956-57, Meligi). Moreover, as reflected in Joint Proposed Finding 61, Suffolk County witness Meyer agreed that the EMDs were capable of operating after an SSE.

16. Joint Proposed Finding 64 concerning bolting of the EMD switchgear cubicle ignores cross-examination that demonstrated that the drawing upon which Meyer relied is not a Shoreham-specific drawing and that it applies to a concrete pad base rather than the type of base installed at Shoreham. (Tr. 2736-37, Meyer).

17. Joint Proposed Finding 66 concerning the seismic qualification of the EMD diesels ignores Meligi's and Meyer's testimony that the EMD diesel generators will withstand an SSE. (LILCO Proposed Findings 144-48; Joint Proposed Finding 61).

18. Joint Proposed Finding 80 reflects Suffolk County witnesses' unreasoned conclusion that as a result of seismic vulnerabilities, the "as safe as" standard is not met. The witnesses failed to consider the amount of time that would be available in a seismic event to restore AC power in reaching their conclusions. (See Tr. 2696-98, Meyer, Roesset). Thus,

their testimony did not even consider whether the alternate AC power sources would even be needed immediately after a seismic event. (See LILCO Proposed Findings 137-141).

B. Reliability of EMD Diesels and Gas Turbine Compared to Qualified Diesel Generators

19. Joint Proposed Findings 81-97 devote eight pages to the qualifications of its witnesses on the EMD diesels and the 20 MW gas turbine and but two pages to the qualifications of both LILCO's witnesses and the Staff's witnesses. While these proposed Suffolk County findings correctly reflect the County's prefiled testimony and the direct testimony of the witnesses on voir dire, the findings fail to fairly reflect the entire record because they do not acknowledge any cross-examination of the witnesses nor do they accurately depict the qualifications of all the experts who offered testimony on the 20 MW gas turbine and the EMDs.

20. Joint Proposed Findings 82-88 ignore significant testimony on cross-examination concerning the professional qualifications of Smith and Eley. Neither Smith nor Eley has any prior experience with TDI or EMD diesel generators nor knowledge of industry experience with EMD diesels. (Tr. 2418-2423 Smith, Eley).

21. Joint Proposed Finding 90 catalogues Minor's experience but fails to state that he has never operated or designed diesel generators sets or gas turbines and has no experience in the design of electrical transmission systems from the power generation source to the buses powering the plant. (Tr. 2424, Minor). Minor's only experience with power generation equipment was as a college student in a summer job. (Tr. 2427-28, Minor).

22. Joint Proposed Finding 92 implies that much of Minor's experience while with MHB has been in the performance of technical reviews of nuclear power plant systems for both safety and control purposes. In fact, Minor testified that since he and others founded MHB Technical Associates eight years ago, the firm has spent 50-80% of its time in testifying and preparing to testify. (Tr. 2426-27, Minor).

23. Joint Proposed Findings 94-97, which describe Bridenbaugh's professional qualifications, omit significant facts. Bridenbaugh has had no experience with the design of electrical transmission systems, has not operated or installed a gas turbine, has not operated or installed a diesel engine, and has not procured a diesel engine for nuclear service. (Tr. 2175-77, 2428-31, Bridenbaugh). Bridenbaugh's only experience with a gas turbine occurred in 1963-1966 when he coordinated

using the exhaust from an already installed gas turbine to run the forced draft fan for a boiler. Bridenbaugh has had no experience with Pratt & Whitney gas turbines which is the type of gas turbine installed at Shoreham. (Tr. 2428-31, Bridenbaugh).

24. Joint Proposed Findings 96-97 erroneously imply that Bridenbaugh has had direct experience with start-up testing of diesel engines and gas turbines. In fact, as a start-up engineer Bridenbaugh did not have any hands-on experience with diesel generators; he only supervised maintenance, installation and pre-operational testing as an engineer from the level of the control room and not at a foreman's level. (Tr. 2179-80, Bridenbaugh). Moreover, Bridenbaugh had no direct responsibility for engineering associated with diesel engines. (Tr. 2180, Bridenbaugh).

25. Joint Proposed Findings 98-101 address the professional qualifications of LILCO's witnesses. While factually correct, they fail to reflect fairly the full record on the professional qualifications of Messrs. Iannuzzi, Lewis and Gunther and totally omit any reference to Mr. William Schiffmacher, another of LILCO's witnesses who offered testimony on the 20 MW gas turbine and the EMD diesel generators. The omission of significant information about the

background and experience of LILCO's witnesses gives the misleading impression that the experience of the witnesses is limited. As the record demonstrates, LILCO's witnesses have substantial experience with EMD diesels.

Iannuzzi's professional qualifications include his current employment with Morrison and Knudsen as Manager of Engineering where he is responsible for the direct supervision of project engineers who design and build diesel and turbine generator systems for utility, military and emergency applications. These include diesel generator systems and nuclear plants. Prior to his employment with PSD, Iannuzzi was the Supervisor of Systems Engineering at Colt Industries where he supervised engineers responsible for the engineering of diesel engines and diesel generator units for use in a variety of government, nuclear and commercial installations. (Tr. 1042, 1161-63, Iannuzzi).

Lewis' experience is not limited to servicing the Shoreham EMD diesels while they were owned by New England Power Company and now by LILCO; as Technical Services Manager of PSD, Lewis is responsible for all of PSD's service activities. PSD performs field service work in many nuclear plants and in non-nuclear plants around the world on a daily basis. In the years 1982-83, while Lewis has been Technical Services Manager,

PSD has serviced diesel generator at eighteen domestic nuclear plants. The service done under Lewis' supervision runs from complete inspections, installations and overhauls to emergency repairs. Prior to becoming Technical Services Manager of PSD, Lewis was a test technician for PSD and, in that capacity, tested approximately 66 diesel generator units for nuclear service along with several non-nuclear application. (Tr. 1043-44, 1164-65, 1168, 1188, Lewis).

Suffolk County has totally omitted the qualifications of William G. Schiffmacher, LILCO's Manager of Electrical Engineering, who is responsible for all electrical engineering projects at LILCO. (Tr. 480-81, Schiffmacher). Mr. Schiffmacher was responsible for purchasing the EMDs and oversaw the effort to research the reliability of those machines prior to purchase. (Tr. 326-27, 462-63, Schiffmacher).

26. Joint Proposed Finding 102 omits substantial experience of NRC Staff members John L. Knox and Edward B. Tomlinson with both onsite and offsite electric power systems. As Senior Electrical Engineer, Knox performs technical reviews and evaluations of onsite and offsite electric power systems including instrumentation and control. Prior to the NRC, Mr. Knox worked for Potomac Electric Power Company where his duties

included relocation and restoration of underground power and transmission cables. (Tr. 1856-57, 2337-38, Knox).

Edward B. Tomlinson's 24 years of diversified experience in the operation, maintenance and/or application of diesel engines for use as main propulsion engines as prime movers for ship service and stationary generators, (Tr. 1857, Tomlinson), is ignored by Suffolk County's findings. As a mechanical engineer in the Power Systems Branch of the NRC, Mr. Tomlinson's responsibilities include review and evaluation of diesel engines and their auxiliary systems associated with onsite power systems. He is also a member of the NRC's TDI Task Group for Generic Review of TDI diesel engines. Prior to the NRC, Mr. Tomlinson was employed in the Marine Engineering Division of National Ocean Spray, NOAA, where his primary responsibility was maintenance planning and equipment selection for shipboard systems, including diesel powered propulsion and electric generating equipment. In his four and one-half with NOAA, Tomlinson had direct dealing with approximately eight sea-going vessels that used EMD diesels of the same model as are used at Shoreham. (Tr. 1857, 1896, 2339-41, Tomlinson).

1. EMD Diesels

27. Joint Proposed Findings 104-130 discuss the vulnerability of the EMD diesels to a single failure. Throughout these findings, Suffolk County ignores the cross-examination testimony of its witnesses that if the EMDs shut down because of a failure, a double failure would have to be postulated because the 20 MW turbine would have failed in order for LILCO to be relying on the EMD diesels. (Tr. 2480-84, 2500-01, Smith, Eley).

28. Joint Proposed Finding 104 attributes the statement "A failure in any of these systems has the potential to disable the entire 4-unit system and there are a number of such failure possibilities" to Suffolk County's witnesses. No such statement or concept was expressed by Suffolk County's witnesses at the page cited.

29. Joint Proposed Findings 106-109 note that the single electrical output cable of the EMDs is subject to a single failure and, therefore, makes the EMDs less reliable than a qualified set of onsite diesel generators. These findings ignore the availability of an alternate routing of output cable that would be available to mitigate all events other than a LOCA. (Tr. 813-15, Gunther, Schiffmacher; Tr. 818-20, 832-37, 842, 863-65, Schiffmacher; Tr. 832, 862-63,

Gunther; Tr. 1890, Knox, Tomlinson; see also LILCO Proposed Finding 156).

30. In Joint Proposed Findings 114-115, Suffolk County states that the failure of the stepping switch could prevent all four EMDs from starting and that there is no evidence in the record that a failure in the stepping switch could be overridden through manual operation. These findings misrepresent the evidence on the record. Eley stated that the EMD machines could be started manually and that he was not familiar enough with the manual start system to know whether or not the stepping switch could be overridden by manual operation. (Tr. 2468-69, Eley). In addition, Joint Proposed Finding 114 states that the failure of the battery array and/or the battery charger could render the EMD starting system inoperable. The County's finding does not reflect Eley's lack of knowledge as to whether there had been any failures of the batteries or the battery charger on these EMDs or on any EMDs in use at either a commercial or nuclear application. (Tr. 2469 Eley). Finally, neither Smith nor Eley could testify as to whether the starter control mechanism on the EMDs had ever failed to function properly. (Tr. 2469-70, Eley, Smith).

31. Joint Proposed Finding 116 correctly quotes prefiled testimony that the failure of one automatic starter

component could prevent the EMD sets from starting, but ignores statements by Suffolk County's witnesses that it is possible to manually start each of the EMD engines. (Tr. 2468, Eley).

32. Joint Proposed Findings 117 and 126 state that the single fuel supply line that carries fuel to EMD 402 is above-ground and susceptible to missile impact. The Suffolk County witnesses testified, however, that LILCO does plan to bury the fuel line and that if the fuel line were buried, it would remove the concern about any missile impact. (Tr. 2477-78, Smith; see also, Tr. 2587, at n. 4, Eley, et al.).

33. The statement in Joint Proposed Finding 130 that the reliability of the EMDs is reduced because a single failure event could disable all four breakers mischaracterizes the concept of single failure. The finding ignores evidence that LILCO's proposed power system for low power licensing is an integrated system and that the single failure of the EMD breakers would not affect the 20 MW gas turbine's availability to provide power. (See Tr. 2482-84, Smith).

34. Joint Proposed Findings 131-152 on fire detection and mitigation for the EMDs ignore the fact that the EMDs are physically so far separated from the 20 MW gas turbine that a fire in the EMDs would not incapacitate the 20 MW gas turbine. (Tr. 2493, Eley).

In Proposed Finding 135, the County misrepresents Smith's testimony on emergency DC powered lighting outside buildings. Contrary to the County's finding, Smith testified that he was not aware whether lighting outside the buildings would exist in a blackout situation. (Tr. 2476-77, Smith). Moreover, the Staff's SSER No. 6 specifically requires that LILCO install emergency lighting at the NSST to illuminate the disconnects in a blackout condition and further states that the Staff has evaluated the lighting conditions for the EMD diesel generators and found them acceptable. (Staff Ex. LP-2, SSER 6, at 13-2).

35. The statement in Joint Proposed Finding 136 that smoke from a fire would be drawn inside the engine and would not be visible is inconsistent with the record. Smith's testimony at the pages cited by Suffolk County is that there is some air flowing through the vents on either side of the engine and that, even if the fire was very close to the turbocharger, at some point in time the smoke would be vented. (Tr. 2488-89, Smith).

36. In Joint Proposed Finding 140, Suffolk County again has chosen to ignore cross-examination in favor of its prefiled testimony. The proposed finding states that there is a risk that water used by fire fighters could be drawn into the

running EMDs through their air intakes. It fails to reflect Smith's testimony that the air intake for these units is U-shaped and pointed down to the ground and that it would be unlikely that streams of water could be taken up into the air intakes. Smith believed that spray could be sucked into the air intakes, but not a stream of water. (Tr. 2489, Smith).

37. Joint Proposed Findings 143, 146, 147, 149, 150 and 152 deal with the alleged susceptibility of the EMD diesels to fires and explosions. The findings ignore the testimony of Suffolk County witnesses that they did not know whether there had been a major fire on an operating EMD at either a commercial or nuclear plant. (Tr. 2486, Smith, Eley). Significantly, LILCO's witnesses Iannuzzi and Lewis, who have had substantial experience with EMD diesels, stated that fires with stationary EMD diesels are very rare occurrences. (Tr. 1183, Iannuzzi, Lewis). In addition, the record shows that the operating history of the EMDs at Shoreham did not show any fire caused by the battery charger. (Tr. 2490-91, Smith).

38. Joint Proposed Findings 149, 150 and 152 erroneously conclude that the EMD batteries are not ventilated in a manner which prevents the accumulation of explosive gases. (Tr. 2491). Smith acknowledged that while the diesel generators were running that there would be air circulation.

(Tr. 2492, Smith). Additionally, the threat of any fire is not a single failure which would prevent the supply of AC power when needed. (See LILCO Reply Finding 83).

39. Joint Proposed Finding 160 states that the FSAR lists 38 individual, specific alarms for the TDIs. It is somewhat misleading in that only ten of the 38 alarms are indicated in the control room (Tr. 2497, 2603-04), and some of the alarms on the TDIs are not diagnostic but indicate that the machines have already shut down. (Tr. 2499, Smith).

40. Joint Proposed Finding 171 details the steps which must be taken to bring power from the EMD diesels to Bus 11, but incorrectly indicates that the opening of disconnect switches on the low side of the NSST must be performed every time the EMDs are used. In fact, the disconnect switches must be opened only in the event that a fault exists at the NSST. (Tr. 1830, 1837, Clifford).

41. Joint Proposed Finding 174 states there is no emergency lighting in the vicinity of the NSST and flatly ignores the requirement in SSER. No. 6 that lighting be placed in the area of the NSST. (Tr. 2504-05, Smith; Staff Exhibit LP-2, SSER 6, ff. Tr. 721 at 13-2).

42. Joint Proposed Finding 176 incorrectly implies that the four EMDs will be connected to a low load and, therefore, that the automatic load adjusting system will not work properly causing the machines to go into reverse current and shut down. The EMDs have an automatic load adjusting system. If the system has difficulty balancing load at low power, one of the EMDs would trip off the line and the other EMDs would pick up the load. (Tr. 2506-07, Smith).

43. Joint Proposed Finding 177 misstates the testimony at the page cited. When asked if other EMDs would pick up the load from an EMD that had tripped off due to reverse current, Smith replied that the other EMDs should pick up the load. (Tr. 2506-07). The uncertainty alleged by this finding is not supported by the testimony.

44. Joint Proposed Finding 179 is "no evidence" that the loss of all AC power procedure has been modified to instruct the operators to restore power by means of the alternate configuration proposed by LILCO. While portions of Gunther's prefiled testimony discussing Revision 6 was stricken (see, Tr. 802), he testified on cross-examination that Revision 6 did include specific instructions to the operator on use of the alternate configuration proposed by LILCO. (Tr. 793-94, Gunther).

45. Joint Proposed Findings 180-181 imply that Shoreham control room operators have not received training on the new procedures and that the only testing of the new procedures has been the July 2, 1984, demonstration. This inaccurate finding is contradicted by Joint Proposed Finding 200 which reflects Gunther's testimony that training and walk-throughs of the procedures for surveillance testing of the EMD diesels and the 20 megawatt gas turbine have taken place. Training has also been conducted for all six operating crews and management license holders on the procedures for operating the EMDs and the 20 megawatt gas turbine in an emergency. (Tr. 809, 855-57, 788-90, Gunther). Moreover, Suffolk County's own witness testified that the procedures had been drilled. (Tr. 2504, Smith).

46. Joint Proposed Finding 182 is wrong in stating that only one EMD synchronized and carried load in the July 2 test. All four of the diesels started on the loss of power and three of the four synchronized to their common bus. Engine 403, which did not synchronize in its allowed time and return to an idle condition, remained in a standby mode and the three available engines were lightly loaded. (Tr. 858, Gunther).

47. Joint Proposed Finding 183 is wrong in two respects. First, it states that more than one field operator was used during the July 2 demonstration to perform the functions required for restoring power with the EMD diesels. Only one field operator was used. (Tr. 1837, Clifford). Second, the Staff witnesses did address the time necessary to perform the actions set forth in the LILCO procedures. Clifford noted in his testimony that the operators at the July 2 demonstration completed the necessary actions to restore AC power to the emergency buses with the 20 megawatt gas turbine in approximately 4 minutes and that AC power was restored to the emergency buses using the temporary EMD diesel generators in approximately 9 minutes. (Tr. 1852, Clifford). Finally, the statement that Clifford's conclusions do not relate to any particular pieces of equipment is taken out of context. The actual testimony stated:

- Q. The fact that you mention the TDI diesel generators, I take it that doesn't impact in any way on your conclusions that LILCO can successfully implement or use a supplemental power source within the period of time indicated in your testimony, and I believe it is approximately 4 and 9 minutes?
- A: My conclusion is based on the operator's ability to perform a specified set of actions and a necessary set of actions and did not relate to any particular piece of equipment being relied upon but merely being available.

(Tr. 1840, Clifford).

48. Joint Proposed Finding 188 states that there is no evidence that all the procedural changes required by the Staff SER have been made to LILCO's procedures. Clifford stated that there has been some modification to at least one of the procedures that appears to address some of the items raised in the SSER and that as license conditions, the Staff would review implementation of the conditions on the procedures.

(Tr. 1838-39, Clifford).

49. Joint Proposed Finding 189 is incomplete. Although LILCO does not currently have a standing order or procedure which would require the operators to maintain the reactor below 5% power during Phase IV, Gunther stated that if LILCO were given a low power license, LILCO would provide such procedures or standing orders. (Tr. 180-81, Gunther).

50. Joint Proposed Finding 190 incorrectly states that LILCO's proposed EMD surveillance test procedure does not provide for regular testing of the automatic starting, synchronizing, and load sharing mechanisms in the EMDs. The Staff is requiring LILCO to test the EMDs in all facets of their operation including their ability to start automatically, to pick up load, and to carry full load for an hour. (Staff Ex. LP-2, SSER 6, ff. Tr. 721 at 8-4; Tr. 2495, Smith). Thus,

the conclusion that the surveillance testing of the EMDs would be inadequate is incorrect. Moreover, the opinions cited in the finding are without foundation. One witness expressly admitted that he had never had any involvement with the preoperational or surveillance testing for diesel generators at a nuclear plant, and further, that he had no idea how often a TDI diesel generator would have to test their ability to start automatically and pick up load. (Tr. 2495-96, Smith). Nothing in the record suggests that any other County witness had such knowledge.

51. Joint Proposed Finding 197 has no supporting citation to the record and it is contradicted by Joint Proposed Findings 198 and 199 which note that the Staff's SSER has identified seven changes to LILCO's proposed testing of the EMDs. (See Staff Ex. LP-2, SSER 6, ff. Tr. 721, at 8-3 through 8-5). For the Staff to have identified changes to the proposed testing program, it had to have reviewed the surveillance testing procedures.

52. Joint Proposed Finding 209 juxtaposes two portions of testimony and draws an unjustified inference that parts produced by EMD are not reliable. As Iannuzzi's testimony indicates, the service records for the Shoreham EMD diesels show a number of instances of cracked cylinder heads;

however, Suffolk County neglects to reference the remainder of Iannuzzi's testimony in which he explained that the early design of the cylinder heads was prone to cracking and that EMDs later improved designs have corrected the problem. The maintenance records of the Shoreham EMDs demonstrate that there have been no instances of cracking with the new heads. (Tr. 1174-75, Iannuzzi).

53. Joint Proposed Findings 211 to 213, which address the maintenance and repair history for turbochargers on the Shoreham EMD diesels, rely solely on cross-examination testimony elicited by Suffolk County and ignore clarifying testimony on redirect examination.

54. By placing Joint Proposed Finding 211 directly after one which summarizes the testimony of witnesses Iannuzzi and Lewis that they were aware of no instances in which units had shut down for repairs during operation at NAPCO, the finding misleadingly implies that the failure of the turbocharger on EMD 4 caused the unit to shut down. Lewis stated that the maintenance records did not indicate that the turbocharger had caused the diesel generator to shut down. (Tr. 1118, Lewis). Further, Lewis stated that since he has personally supervised the servicing of the Shoreham EMD units, both at New England Power and now at Shoreham, there have been

no failures of the turbo chargers. (Tr. 1118, Lewis). Lewis stated that smoking turbochargers would not necessarily cause a unit to shut down. (Tr. 1157, Lewis).

55. Joint Proposed Finding 213 has been taken out of context. While Iannuzzi did testify that a diesel could not carry full load without an operable turbocharger, both Iannuzzi and Lewis stated that the engine would be capable of running without a turbocharger. Lewis further testified that even if the engine shut down subsequent to a failure of the turbocharger, the engine could be restarted depending on the mode of failure. (Tr. 1062, 1124, Lewis).

56. Joint Proposed Finding 214, discussing the failure of a generator and dust bin blower on February 20, 1974, fails to consider clarifying redirect examination testimony on the incident in question. The log books and maintenance records do not indicate whether the units actually shut down as a result of the failure of the components. The engine would have to be shut down to remove the parts for changeout and repair. (Tr. 1067-68, 1124-25, Lewis; SC Ex. LP-6; LILCO Proposed Finding 96).

57. Joint Proposed Finding 218 contains bits of testimony assembled in a way that unfairly characterizes the record. Although Lewis did say that a turbocharger failure

might not have been brought to his attention, he further testified that it is likely he would ultimately hear about any failure from the field service personnel. (Tr. 1118-19, Lewis).

58. Joint Proposed Findings 219-228 fail to reflect basic concepts about the maintenance of the Shoreham EMDs which are necessary to put the specific findings in context. First, to the extent that parts were replaced prior to schedule, it is the normal practice for electric utilities to perform recommended maintenance on peaking units in advance when the normal recommended maintenance period would fall during a peak period. (Tr. 2512, Smith). Second, the record demonstrates that there are several maintenance instructions for the EMDs and that a controversy exists as to which maintenance schedule is applicable to the Shoreham EMDs. (Tr. 2517, Smith, Eley; see also LILCO LP-14 at 5). Third, Suffolk County presented no testimony with respect to existing defects in the Shoreham EMD diesels. In contrast, LILCO witness Lewis testified that there was no evidence that the diesels had shut down for major repairs because of an operating condition. Significantly, Lewis has had personal knowledge since 1981 of the repair and maintenance history of the Shoreham EMD diesels as Technical Services Manager of Morrison and Knudson. Even in the light most favorable to Suffolk County, the testimony at best shows

that there were some maintenance problems prior to 1981 which may have caused particular units to shut down. (Tr. 1118, 1173-75, Lewis).

59. Joint Proposed Finding 229, dealing with the manufacturer's recommended replacement schedules, omits Iannuzzi's and Lewis' testimony which states that all recommended maintenance has been performed and that conditions which were discovered during routine maintenance and were remedied as necessary. (Tr. 1073, Iannuzzi, Lewis).

60. Joint Proposed Finding 232 attempts to show that LILCO did not utilize UTEX or new parts based upon a comment in maintenance records that a "used unit" was installed. Both LILCO's and the County's witnesses agree that "UTEX" is a term employed by the Electro Motive Division of General Motors to cover parts which have been remanufactured to "as new" standards. (Tr. 2610, Eley, et al; Tr. 1125-26, Lewis). Thus, UTEX parts are, in effect, used parts which have been remanufactured. As a consequence, it is likely that the notation "used unit" next to "replaced power ASSY" at both 12,922 hours and 13,074 hours in Suffolk County Ex. LP-47 indicates that it was, in fact, a UTEX component.

61. Joint Proposed Finding 233 uses the statements of Lewis out of context, leaving the impression that there was a significant quality control problem with EMD UTEX parts. The contrary is true. Lewis testified that the problems were infrequent and insignificant and that they were not of the type that would cause the unit to fail. (Tr. 1126-27, Lewis).

62. Joint Proposed Findings 235-237 ignores significant testimony about the viscous dampers on three of the four Shoreham diesels. Importantly, based on PSD's inspection of the Shoreham units, there is no evidence of any problem with the three original viscous dampers. Lewis and Iannuzzi also testified that even a failure of the viscous damper would not lead to an immediate catastrophic failure of any unit; it could run approximately 150 hours after such a failure before the unit would develop problems causing a shutdown. Such time is substantially greater than the one hour per month one would expect on an emergency diesel generator at nuclear plant at full power. (Tr. 1174, Iannuzzi, Lewis; Tr. 1088-91, Lewis). Moreover, the EMD recommended replacement schedule gives a very conservative time estimate for replacing the viscous dampers. (Tr. 1092, Lewis).

63. Joint Proposed Finding 242 reports the hearsay commentary of Art Kornichuk, the EMD Regional Sales Manager, about the EMDs fast-start tests. Intervenors ignore Iannuzzi's testimony that, in his professional opinion, the fast-start tests are evidence of the starting reliability of the Shoreham EMD diesels in that the tests demonstrate the ability of the engines to come up to speed after starting that number of times. (See Tr. 1099-100, Iannuzzi).

64. Similarly, Joint Proposed Finding 243 recites the portions of General Motor's report entitled "Starting Reliability of EMDs Model 999 Diesel Electric Generator Sets," but fails to include Iannuzzi's opinion that starting features were added to engines used in nuclear service to enhance starting reliability rather than to attain high reliability. (Tr. 1106, Iannuzzi).

65. Contrary to Joint Proposed Finding 245, Iannuzzi did not testify that he had no knowledge as to what EMD meant by a "successful start" in the report of 1976 which catalogued a success rate of 99.23% on electric start units. Rather, Iannuzzi stated that based on his experience of how successful starts are reported, the term "successful start" was intended to reflect a case where the engine came up to at least an idle condition. (Tr. 1108, Iannuzzi).

66. Joint Proposed Finding 248 implies that Lewis lacked knowledge of the reliability of EMDs with electric start motors. Although Lewis could not provide specific numbers, he testified that the electric start units are reliable based on his professional opinion, his communications with the industry and his knowledge of the reliability of units sold and serviced by PSD. (Tr. 1094-95, 1177, Lewis).

67. Joint Proposed Finding 251 implies that the Staff's testimony concerning the reliability of the EMD diesels is based solely on LILCO's data of 275 successful starts out of 279 attempts and that the staff accepted LILCO's data blindly without attempting to verify its validity in any way. The finding ignores the Staff's testimony that the starting reliability data for Shoreham EMDs was consistent with the Staff's knowledge of the general reliability of EMD diesels. (Tr. 1891, Tomlinson).

2. 20 MW Gas Turbine

68. Joint Proposed Finding 254 claims that there is no evidence that the surveillance testing program for the gas turbine is effective. This finding misleadingly cites the testimony of William Gunther at Tr. 854. Gunther did not testify that the surveillance program was inadequate. To the

contrary, LILCO's Manager of Electrical Engineering, William Schiffmacher, testified that the periodic testing performed on the 20 MW gas turbine will prove its reliability. (Tr. 498, Schiffmacher). Similarly, LILCO witness Museler testified that surveillance testing of the 20 MW gas turbine gives added assurance of the availability of reliable AC power during Phases III and IV of low power testing. (Tr. 577, Museler).

69. Joint Proposed Findings 255-57 incorrectly allege that the surveillance program for the 20 MW gas turbine will only be tested at five to ten percent of capacity. LILCO's original commitment for surveillance testing included bi-weekly testing at 13 MW, over sixty percent of capacity. (Tr. 577, Museler). In addition, to ensure further that the 20 MW gas turbine has sufficient capacity, the NRC Staff has required a one time test of the machine loaded to 20 MW prior to conducting Phases III and IV. (Staff Ex. LP-2, SSER 6, ff. Tr. 721, at 8-2).

70. Joint Proposed Findings 258 and 259 allege that surveillance testing procedures have not been reviewed by the NRC to ensure that the claimed deficiencies have been corrected. But the record reflects that the NRC will ensure that any license conditions imposed by the SER have been implemented. (Tr. 1889, Knox). Technical specifications will be included as part of an operating license. (Tr. 1891, Knox).

71. Joint Proposed Finding 260 is incomplete because it fails to acknowledge that indicating lights are an appropriate and accepted means of indicating that power is available. (Tr. 1836, Clifford).

72. Joint Proposed Findings 263 and 264 discuss starting the 20 MW gas turbine. Finding 264 is inconsistent with Finding 263 in that it asserts that the gas turbine can only be started from the local control panel if it fails to start automatically. As Finding 263 indicates, however, the system operator in Hicksville can start the machine. The control room operator has three means of communication with the system operator, the plant telephone system, a dedicated phone line and a VHF radio link. (Gunther, ff. Tr. 1214, at 15; Tr. 507, Schiffmacher). These communications links would be available despite any loss of AC power. (Gunther, ff. Tr. 1214, at 15).

73. Joint Proposed Finding 267 incorrectly claims that it would take more than ten minutes for an operator to reach the 20 MW gas turbine. An operator can get to it from the control room in approximately seven minutes. It would take less time if the operator was already out in the field. (Tr. 2928, Gunther).

74. Joint Proposed Finding 268 claims the gas turbine is not protected from missiles falling from aircraft. This finding is immaterial for two reasons. First, aircraft crashes and aircraft missiles do not need to be considered for Shoreham because of the extremely low probability of occurrence. (FSAR §§ 2.2.2.5, 2.2.3.1.7, Appendix 2K, 3.5.2.3). Second, even if a missile disabled the gas turbine, it is located approximately 300 feet from the EMD diesels, a sufficient distance to ensure that both power supplies are not affected by the same event. (See Staff Ex. 2, SSER 6, ff. Tr. 721, at 8-5 to 8-6.)

75. Joint Proposed Finding 269 erroneously considers the 20 MW gas turbine in isolation; nothing in the record indicates that a failure of the 20 MW gas turbine would affect the EMD diesels. Moreover, the specific concerns raised about the fuel supply line are unfounded because LILCO will have two 9000 gallon tank trucks on site in the event the fuel supply to the EMDs is disrupted. (LILCO Proposed Findings 75, 81).

76. Joint Proposed Finding 270 fails to note that the Staff's reliance on reliability data for the 20 MW gas turbine provided by LILCO is consistent with Staff practice. (Tr. 1891, Knox)

77. Joint Proposed Finding 271 claims that the Staff had no basis for concluding that refurbishing the gas turbine enhanced its reliability. First, common sense dictates the conclusion that the overhaul of mechanical equipment improves its performance. Second, the Staff's conclusion is consistent with the testimony of Iannuzzi and Lewis in the context of the EMD diesels that maintenance and overhaul schedules are a factor to consider in assessing the reliability of a machine. (See Tr. 1170, Iannuzzi, Lewis). Third, Staff witness Tomlinson had ample qualifications and experience to give testimony concerning the effect of refurbishment on reliability. (E.g., Tr. 1856-57, 2337-41, Tomlinson).

78. Joint Proposed Finding 272 incorrectly asserts that there is inadequate assurance that the 20 MW gas turbine will operate reliably. The finding is based upon the testimony of County witnesses Bridenbaugh and Minor, both of whom lack the requisite expertise to testify concerning gas turbine reliability. (LILCO Reply Finding 21-24). In contrast, William Schiffmacher, LILCO's Manager of Electrical Engineering, testified that there was evidence that the machine would operate reliably. (Tr. 497, Schiffmacher). Schiffmacher has considerable experience with electric transmission and generation equipment, including gas turbines. (Tr. 481-86, Schiffmacher). Moreover, the gas turbine has been tested as

part of the installation process (Tr. 857, 859-60, Gunther), and will be subject to a full load test and periodic surveillance tests. (LILCO Proposed Finding 134; Staff Proposed Finding 44)

79. Joint Proposed Findings 273 and 274 summarize the conclusions of Bridenbaugh and Minor with respect to the 20 MW gas turbine. These conclusory statements merit little weight because of the witnesses' lack of pertinent qualifications. (LILCO Reply Finding 21-24). In addition, the findings are deficient because they rely on matters raised in prior erroneous or immaterial findings.

3. Complexity of the Proposed Alternate AC Power System

80. Joint Proposed Findings 275-79 allege that LILCO's alternate AC power arrangement is more complex than the original AC power system because more devices (circuit breakers, switches, transformers) are involved in delivering power to emergency equipment. These findings, however, fail to consider the large amount of time available to restore AC power (See, e.g., LILCO Proposed Findings 33, 34, 38, 39; Staff Findings 18, 19, 22). Thus, the plant operator has ample time to perform the necessary actions. Importantly, the ability of

LILCO's enhanced AC power system to supply power to the plant's emergency equipment has been demonstrated. (See, e.g., LILCO Proposed Findings 71, 76, 118, 127, 129; Staff Proposed Findings 37, 47). Moreover, the suggestion that the enhanced AC power system is deficient because it relies on manual action is unfounded. County witness Minor testified that in the United States it is an unwritten rule requires actions to be taken in less than 10 minutes should be automated. (Tr. 2534, Minor). For low power testing, more than five times that period is available to act under even the most conservative assumptions. (LILCO Finding 39; Staff Finding 19). Thus, manual action is appropriate under these circumstances. Finally, these findings fail to consider the added complexity of the TDI diesels due to the automatic controls and alarms associated with these machines.

4. Other Aspects of Alternate AC Power Configuration

81. Joint Proposed Finding 280 is incomplete. While Iannuzzi and Lewis did testify that the EMD diesel generators do not strictly comply with all technical requirements for qualified diesels (Tr. 1170, Iannuzzi, Lewis), they provided significant additional testimony which is ignored by the proposed finding. The engines and generators on the four EMDs

at Shoreham are the same as those in nuclear service at several nuclear plants. (Tr. 1171, Lewis; Tr. 1172, 1180, Iannuzzi, Lewis). While the Shoreham EMDs have auxiliary equipment which differs from equipment in nuclear service with respect to some requirements such as environmental and seismic qualification, the systems and the design parameters for them remain the same. There have been no major or catastrophic failures of the type of auxiliary equipment in use at Shoreham of which LILCO's witnesses were aware. (Tr. 1181-82, Iannuzzi, Lewis). The extensive experience of LILCO's witnesses concerning the diesel generators makes it likely that they would be aware of any failures had they occurred, (Tr. 1182, Iannuzzi, Lewis; see, e.g., Tr. 1166-68, 1188-89, 1192, Iannuzzi, Lewis). Finally, unlike qualified nuclear diesels necessary for full power operation, the Shoreham EMDs do not have to "fast start." This reduces wear on the engines and stress on the auxiliary package. (Tr. 1182-83, Iannuzzi, Lewis). (See LILCO Proposed Findings 84, 85, 86, 87).

82. Joint Proposed Finding 281 uses selected portions of the record to imply there is no similarity between the EMD diesel generators at Shoreham and those used to supply emergency onsite AC power at other nuclear plants. LILCO Reply Finding 81 addresses generally the record on similarity. (See also LILCO Proposed Findings 89, 92, 102).

83. Joint Proposed Findings 282 and 284 selectively cite the record to state that County witnesses considered the EMDs and 20 MW gas turbine as a combined system in reaching their opinions on single failure vulnerability. The basis for concluding the combined system is vulnerable to single failure appears to be the fact that the EMDs are not relied upon unless the 20 MW gas turbine has failed. Therefore, a "single failure" of the EMDs defeats the system. The County's witnesses acknowledged, however, that problems in the EMD diesels would not affect the ability of the 20 MW gas turbine to supply AC power to the plant (e.g., Tr. 2462-63, 2465-66, 2471, Eley; 2478, Smith; 2463-65, Minor). They further stated that in applying the single failure criterion, if a failure of the 20 MW gas turbine is postulated, an additional postulated failure of the EMD diesels would be a double failure (e.g., Tr. 2479-84, Smith; 2500-01, Smith, Eley). (See LILCO Proposed Findings 106, 107). Finally, County witness Eley agreed that if power were needed to supply emergency loads at low power testing up to 5% rated power, the combined power of the 20 MW gas turbine and the EMD diesels is not needed. (Tr. 2457, Eley). It follows that either source can be lost without violating the single failure criterion. Consequently, the County witnesses were applying a double failure criterion by considering single failures of the EMDs and the 20 MW gas

turbine individually as opposed to considering them as a system. They compared each source individually to the onsite source described in the FSAR. (See, e.g., Tr. 2452, Eley; Tr. 2578, 2581-91, Eley et al.; 2617, Minor, Bridenbaugh).

84. Joint Proposed Findings 283 and 285 state the TDI generators could supply power to the systems independently, through separate buses as opposed to being paralleled, while the gas turbine and the EMDs cannot be used to supply power at the same time because the procedures require isolating the gas turbine before the EMDs are used, and there is no method to parallel these supplies. These findings are based solely on testimony of the County's witnesses and ignore pertinent portions of the record.

First, County witness Eley, on whose testimony the findings are mainly based, indicated that he was not particularly knowledgeable concerning plant electrical distribution and paralleling of power sources. (Tr. 2449-60, Eley). Second, the procedures mentioned as requiring isolation of the 20 MW gas turbine before use of the EMDs are testing procedures. (Tr. 2449, Eley). Most importantly, the findings are factually wrong about the distribution system. Although the capacity of the sources and requirement of the loads obviate need for simultaneous use of the EMDs and 20 MW gas

turbine, it can be done. The EMDs feed 4 KV bus No. 11 while the 20 MW gas turbine feeds 4 KV bus No. 12. These separate buses can be powered simultaneously without paralleling the sources. Similarly, any of the emergency buses No. 101, 102 and 103 can be fed from either 4 KV bus. Thus, various combinations of emergency buses, and emergency loads, can be fed simultaneously from the sources without their being paralleled. The plant operators are familiar with the plant electric system. (Schiffmacher, Attachment 9, ff. Tr. 336; Tr. 491, 499-98, Schiffmacher; Gunther, ff. Tr. 1214, at 18-19; Tr. 862-63, Gunther).

85. Joint Proposed Finding 286 mischaracterizes the testimony of NRC witness Knox in stating that the EMD diesels and the gas turbine are subject to single failures and single events that could cause the loss of both sources of power. In fact, the witness' testimony did not address the machines themselves, but rather their cables to the emergency load. Only one failure, a failure of the block wall in the non-emergency switchgear room, and one event, a fire in that switchgear room, were identified. (Tr. 1885-86, Knox). Neither of these occurrences present a safety concern. As to a random failure of the block wall, the witness testified the cables are separated by about 40 feet. (Tr. 1886, Knox). Thus, a failure of one section of the wall would not affect

both cables. Further, as the County witnesses testified, their concern for the block wall was not a random failure but a failure due to a seismic event. But the EMD cables do not pass through the wall section of concern for a seismic event. (See Tr. 2774-75, Minor; Tr. 2732-33, Meyer; Tr. 2795-97, Meyer, Roesset, Minor). Moreover, almost unlimited time is available to restore power after seismic event. (LILCO Proposed Findings 136-141; Staff Proposed Finding 46). With respect to protection against fire in the normal switchgear room, the NRC Staff has conditioned low power operation on LILCO either meeting Appendix R fire protection requirements in the non-emergency switchgear room or providing a procedure to bypass the room within 30 days. (Tr. 2354-55, Knox). LILCO has agreed to provide such a bypass. (Tr. 813-15, Gunther, Schiffmacher, Tr. 818-20, 832-37, 842, 863-65, Schiffmacher; Tr. 832, 862-63, Gunther; Tr. 1889-90, Knox).

86. Joint Proposed Findings 287 and 288 cite the testimony of NRC witness Knox that the gas turbine uses a portion of the 69 KV system to discredit his conclusion that the 20 MW gas turbine is independent of the normal offsite power system. But, Mr. Knox testified that notwithstanding the use of the 69 KV lines, the 20 MW gas turbine meets the same standard of independence from the normal offsite system as is required for qualified onsite power sources. (Tr. 1868-70, 2344, Knox).

87. Joint Proposed Finding 289 accurately reflects the testimony of Minor as to why the County witnesses chose not to consider offsite gas turbines when analyzing the availability of AC power to the Shoreham site. Minor's assumption that there will be no means of transmitting power from remote sources to Shoreham is not credible, however, in light of the number, separation and independence of offsite transmission lines to the Shoreham site. (Tr. 371-74, 445-46, 517-19, Schiffmacher; Tr. 2353-54, Knox; LILCO Proposed Findings 54, 55, 56).

88. Joint Proposed Findings 290 through 295 address several aspects of the alternate power supplies and related license conditions which the Staff will impose. Joint Proposed Finding 296 concludes that as presently configured low power operation as proposed by LILCO is not acceptable to the Staff. Joint Proposed Finding 298 concludes, without citation to the record, that there is no evidence that the modifications required by the Staff have been implemented by LILCO. These findings are collectively misleading. As to each area addressed by these findings, the Staff has identified a license condition and its associated basis. (Tr. 2354-55, Knox; Staff Ex. LP-2, SSER 6, ff. Tr. 721, at 8-5, 8-6, 8-8). With implementation of these conditions, LILCO's proposal for the conduct of low power testing is acceptable. The NRC will

review implementation of the license condition. (Staff Ex. LP-2, SSER 6, ff. Tr. 721, at 8-5, 8-6, 8-8; Tr. 1889, Knox).

89. Joint Proposed Finding 292 fails to mention that the Staff did define a license condition requiring a quality assurance program for the alternate AC power sources. The Staff considers the item resolved by the license condition. (Staff Ex. LP-2, SSER 6, ff. Tr. 721, at 8-6). Contrary to the implication of the finding, the Staff did not state that there was any particular lack of quality assurance in the past.

90. Joint Proposed Finding 294 states that the circuits associated with the gas turbine and EMD diesels are not protected in accordance with the requirements of 10 CFR Part 50 Appendix R. The record cited does not state this. Rather, the Staff SSER No. 6 is limited to a license condition to meet the requirements of Appendix R in the non-emergency switchgear room or to develop a procedure by which the room can be bypassed from one source within 30 days. (Staff Ex. LP-2, SSER 6, ff. Tr. 721, at 8-8). LILCO has committed to a bypass (e.g. Tr. 813-15, Gunther, Schiffmacher) which the Staff finds to be more than responsive to its concern. (Tr. 1890, Knox).

91. Joint Proposed Finding 297 mischaracterizes the testimony of Staff witness Knox. While he stated that additional technical specification requirements were possible,

he also testified that he did not expect to see any additional ones beyond those mentioned in SSER No. 6 or the Staff testimony. (Tr. 1879, Knox).

92. Joint Proposed Findings 299 through 304 address LILCO's proposal to provide alternate routing of power from the EMD diesels to the emergency switchgear room, bypassing the normal switchgear room. In summary, these findings state that the proposal is only conceptual, has not been implemented, involves future installations and training, and has not been reviewed in detail by the NRC Staff. These findings are significantly incomplete. They do not note that LILCO has considered the two options for the alternate routing in some detail. The feasibility of the options has been verified. The connections needed are not extraordinary or unique, but rather are in the realm of everyday engineering, and material availability for the modification is known. (Tr. 832-33, 834-36, Schiffmacher). Additional work to implement the bypass can be accomplished in approximately four weeks. If the requested exemption is granted, LILCO will install portions before commencing Phase III testing, with remaining elements being installed when needed. (Tr. 864-65, Schiffmacher).

93. Joint Proposed Findings 305 and 309 state that LILCO and Staff testimony concerning the consequences of the events considered in Chapter 15 of the FSAR, if they occurred during low power testing, does not address the standard enunciated by the Commission in CLI-84-8. Thus, the Intervenors argue that the testimony compares low power versus full power as opposed to low power versus low power, with and without a fully qualified AC power system. This is not true. Both the LILCO and Staff witnesses evaluated the events at low power and concluded that with the enhanced offsite power the deterministic thermal and radiological success criteria are met assuming no qualified diesels. These are the same criteria that would be met at low power with a qualified power source. Indeed, the Staff states that for most transients and accidents at 5% rated power no fuel failures occur whether or not the TDI diesels are available. For those few instances, such as a fuel handling accident, in which fuel failure can occur, the activity available for release to the environment is negligibly small whether or not the TDI diesels are available. (Staff Ex. LP-2, SSER 6, ff. Tr. 721, at 15-1). That comparisons are also made to FSAR full power evaluations which are available and bounding (see, e.g., Tr. 1755, Hodges) does not alter the factual showings made for 5% operation without qualified diesels.

94. Joint Proposed Finding 307 mischaracterizes the record by stating that Mr. Hodges testified that there is less margin of safety with the alternate configuration than there would be with qualified TDI diesels. Mr. Hodges clearly testified that less margin in terms of a difference in temperature between the regulatory limit and the maximum that would be achieved during a transient would not mean there is less margin of safety. As Mr. Hodges stated, "It's kind of like driving on a four-lane bridge, being in the outside lane near the edge as opposed to the inside lane. Is there less margin of safety?" (Tr. 1749-51, Hodges).

95. Joint Proposed Finding 310 describes a potential LOCA scenario which prompted LILCO to commit to station an equipment operator in the Reactor Building. The operator's function is to manually close two 3/4 inch valves to assure containment isolation in the event of a LOCA during Phase III or Phase IV testing. This finding correctly states this commitment will be a license condition or technical specification (Tr. 1765-66, Hodges), but does not acknowledge that, with this commitment, the Staff finds that containment integrity is assured. (Staff Ex. LP-2, SSER 6, ff. Tr. 721, at 15-6). Further, the finding fails to point out that only this particular scenario could threaten containment isolation and that it is an unlikely event. (Staff Ex. LP-2, SSER 6, ff. Tr. 721, at 15-6).

96. Joint Proposed Findings 311 and 312 provide an incomplete and, therefore, inaccurate statement of the availability of, and necessity for, operation of the Standby Gas Treatment System (SGTS). These findings conclude that (1) the SGTS would not be available to reduce the quantity of radioactive iodine released to the environment if there were a fuel handling accident and a loss of offsite power, and (2) that a fuel handling accident is not precluded. The record is clear, however, that the Staff's conclusion on acceptability of loss of the SGTS is not predicated on finding that fuel handling is unlikely and thus precludes an accident. Rather, the combination of low fission product inventory in the fuel due to low power operation, and the small fraction of that inventory that will leave the fuel and enter the fuel-cladding gap, compensates for the loss of the SGTS. The activity available for release is negligibly small. (Tr. 1797-98, Quay; Staff Ex. LP-2, SSER 6, ff. Tr. 721, at 15-1, 15-6). Further, it is only partially correct to say the SGTS mitigative effects would not be available; Quay testified isolation capability is available although it is not typically relied upon in a Staff analysis. (Tr. 1769, Quay).

97. Joint Proposed Finding 313 deceptively mischaracterizes the record. It cites the testimony of NRC witness Tomlinson in concluding that there is no evidence that

additional sources of AC power, such as a generator from the Army Corps of Engineers, would be available to Shoreham if needed, or that such sources would be feasible or compatible. Contrary to this finding, Mr. Tomlinson clearly stated that he knew mobile generators would be available from the Army Corps of Engineers non-tactical generator program. The basis for his testimony was an interpretation of the Atomic Energy Act and conversations between himself, and others, and the Corps of Engineers and FEMA. (Tr. 1867, Tomlinson).

II. EXIGENT CIRCUMSTANCES

A. LILCO's Asserted Training Benefits

98. Joint Proposed Findings 314-328 misleadingly imply that there is no additional benefit from performing low power testing early because each phase of low power testing will be performed whether or not the exemption is granted. These findings ignore the evidence described in LILCO Proposed Findings 186-190. Specifically, additional testing and training during Phase II will allow operating crews to take the reactor critical for several hundred manhours of additional training in the use of appropriate instrumentation and equipment to determine when criticality is achieved during the withdrawal of control rods. (Tr. 764-66, 773, 829, 849,

Gunther; LILCO Proposed Finding 188). Additionally, at the conclusion of Phase IV additional reactor heatups will be performed to give all operating crews additional training. (Tr. 775-77, 851-52, Gunther; LILCO Proposed Finding 189). Overall, LILCO will have flexibility to perform additional testing and training during low power testing as a result of the earlier schedule. (Tr. 830, Gunther; LILCO Proposed Finding 190).

99. Joint Proposed Finding 317 argues that there is no evidence that Phase I of LILCO' proposed low power testing program would result in any additional or augmented training beyond that which would be received by operators if low power testing were to take place without an exemption. This ignores the uncontradicted testimony by Gunther that all phases of the proposed low power testing will allow additional flexibility to perform additional testing and training. (Tr. 830, Gunther; LILCO Proposed Finding 190).

100. Joint Proposed Findings 319 and 321 misleadingly implies that only 72 hours of additional training will take place during Phase II. William Gunther testified that 72 sequential hours will be added to the length of Phase II testing. In fact, hundreds of manhours of additional training will be achieved. (Tr. 829, Gunther; LILCO Proposed Finding 188).

B. LILCO's Asserted Good
Faith Efforts to Comply with GDC 17

101. Joint Proposed Findings 340 and 341 deal with LILCO's effort to determine the adequacy of the TDI diesel generator crankshafts prior to the failure of the crankshaft in Diesel Generator 102. The findings fail to mention that, although quality assurance programs review various aspects of a manufacturer's operation, torsional fatigue calculations are not the type of detail that such a program would normally review. Moreover, prior to the failure of the crankshaft, there was no basis for questioning the adequacy of the crankshaft. (Tr. 1472, McCaffrey).

102. Joint Proposed Findings 343-347 deal with an NRC Notice of Violation concerning diesel generator testing. These findings are incomplete because they fail to acknowledge that, in large measure, the violation stemmed from differing interpretations of the requirements of a regulatory guide covering diesel generator testing. (LILCO Ex. LP-9, at 5.) No guidance existed on how to interpret a requirement that diesels must be tested at a "load equivalent to the two hour rating of the diesels" (Id. at 5-6). LILCO interpreted this to mean that the integrated load profile during the two hours of the test should be equivalent to running the diesel for two hours at the two-hour rating. The load profile for the test in question

represented in excess of 99% of the integrated two-hour load. (Id. at 6). Thus, LILCO believed the test was satisfactory. Although the NRC ultimately disagreed with LILCO's interpretation, the fact remains that the load test was performed with substantial load on the diesel. (Id. at 5-6). Moreover, the suggestion in Joint Proposed Finding 347 that the crankshaft failure might have been found earlier had the test been properly run has no basis. Indeed, when the NRC raised initial concerns about the load test, it was repeated successfully using the NRC's acceptance criteria. (LILCO Ex. LP-9 at 7; see also LILCO Ex. LP-10 at 7). This violation was the first and only time the NRC has imposed a fine on LILCO. (Tr. 1534, McCaffrey).

103. Joint Proposed Findings 348-354 deal with problems found with the TDI diesel generators at Shoreham and LILCO's response to those problems. They attempt to give the impression that LILCO's Diesel Generator Operability Review Program was, in hindsight, defective because it did not involve disassembly of the engine. The findings fail to reflect that LILCO studied the problems that had been found, assembled a group of LILCO and Stone & Webster experts, and devised the elements of a program that these experts felt would be adequate. (Tr. 1496-97, McCaffrey). This program was reviewed by the NRC Staff. (Tr. 1708, McCaffrey).

104. Joint Proposed Findings 356-365 reflect questions asked of Brian McCaffrey concerning defects in TDI diesels generators at other facilities. These findings, which generally recite that McCaffrey did not know whether LILCO had knowledge of specific defects, are irrelevant to the present inquiry. The significant point is that LILCO made reasonable efforts to discover problems with TDI diesel generators. As the record reflects, LILCO discussed TDI problems with other owners, joined the Institute of Nuclear Power Operations (INPO), installed a computerized Note Pad system to communicate with other utilities, and participated in the NPRDS system. These systems are designed to provide utilities with information about industry problems. (Tr. 1500, 1510-11, McCaffrey). For example, the the INPO system screens licensee event reports and generates significant event reports designed to notify utilities of important developments at other plants. (Tr. 1511-12, 1521-22, McCaffrey). In fact, LILCO was tied into all known systems to provide information about problems in the industry. (Tr. 1524, McCaffrey).

105. Joint Proposed Finding 357 seems to suggest some delay in LILCO's actions by stating that LILCO did not join the TDI Owners Group until January 1984. The finding fails to note that LILCO was instrumental in forming this Group and that LILCO employees played key roles in it. The Owners

Group program was modeled on LILCO's own DRQR program. (Tr. 1711, McCaffrey).

106. Joint Proposed Finding 366 is incomplete; it reflects only part of McCaffrey's answer. He also stated that the cracks in the blocks of TDI diesels 101 and 102 will not grow and will not affect the availability or operability of the TDI diesels. (Tr. 1496, 1497, McCaffrey).

C. LILCO's Asserted Undue
Burden from NRC Licensing Proceedings

107. Joint Proposed Finding 377 erroneously claims that Mr. McCaffrey's testimony contained no other facts, beyond those discussed in Joint Proposed Findings 373-376, to support his assertions that LILCO was held to a higher standard than other applicants. McCaffrey testified that NRC project management and Staff personnel have indicated that LILCO is indeed held to a higher standard. They attributed this to the Shoreham litigation. (Tr. 1652-53, McCaffrey; see Tr. 1666-68, McCaffrey).

108. Joint Proposed Findings 378-380 deal with Mr. McCaffrey's testimony that the Staff Safety Evaluation Report (SER) could have been issued in late 1978 or early 1979. They fail to mention that in early 1979 the Staff had prepared a

draft SER which was about to be released. (Tr. 1653, McCaffrey).

109. Joint Proposed Finding 404 recites conclusions from the Marburger Commission Report. The finding fails to indicate that the Report's conclusions must be read in light of the more detailed views of the Commission's members expressed elsewhere in the Report. (Tr. 1607, 1610, 1614, McCaffrey).

110. Joint Proposed Finding 406 suggests that Mr. McCaffrey's testimony concerning the effect of the extended hearing process on Shoreham's fuel load is incorrect because the plant was not ready to load until April 1984. This finding ignores McCaffrey's testimony that the hearing process slowed the NRC Staff's review and diverted significant LILCO resources. (Tr. 1716-17, 1722-23, McCaffrey).

111. Joint Proposed Finding 410 attacks Mr. McCaffrey's qualifications to give testimony concerning public perception concerning Shoreham. Although he is not a social scientist or statistical analyst, his testimony reflects that he has been involved in public presentations on behalf of LILCO relating to Shoreham. (Tr. 1633-34, McCaffrey).

112. Joint Proposed Finding 411 erroneously states that Mr. McCaffrey was unable to say how the adverse public

perception created by the extended Shoreham licensing hearings related to LILCO's exemption request. He testified that it related to the exigent circumstances surrounding the request. (Tr. 1635, 1729-30, McCaffrey; Joint Proposed Finding 409).

III. PUBLIC INTEREST

A. LILCO's Asserted Foreign Oil Benefit

113. Joint Proposed Findings 412-28 argue that there is no public benefit from reducing LILCO's dependence on foreign oil three months sooner because of uncertainties as to whether there will be any disruption in oil supplies or any increase in price of oil. While uncertainties exist, LILCO's customers will benefit by insulating themselves from those uncertainties by reducing LILCO's dependence on an uncertain and unpredictable supply of oil. Thus, while they may be no oil shortage or price increase, there is at least an equal probability that there will be. (Tr. 1275, Szabo). Thus, the national policy of the United States is to reduce dependence on foreign oil. (Tr. 1270, Szabo; LILCO Proposed Finding 204).

114. Joint Proposed Finding 413 misleadingly implies that Cornelius Szabo's prior experience was limited to consulting for six public service commissions in the area of

fuel prices, fuel supply and oil availability. In fact, Szabo's experience was much broader. It included, for example, eight years in the petroleum industry with Mobil, Exxon and Shell in both marketing and planning related functions, employment as a management consultant whose clients included utilities in 13 states, federal energy agencies and investment bankers involved in the financing of coal and petroleum projects and involvement in a special management audit for the Board Chairman of Arabian American Oil Company (ARAMCO). Additionally, Szabo was Manager of LILCO's Fuels and Chemical Division from January 1982 through October 1983. (Tr. 1328-29, Szabo).

115. Joint Proposed Finding 413 also misleadingly implies that Szabo admitted that he was not qualified to opine about the likelihood of a cutoff of foreign oil supplies as a result of Iraq-Iran war. Szabo merely admitted that he was not a military expert. Szabo emphasized that he had a great deal of information about the Middle East beyond that which a lay person would have and was aware of many sociological and economic factors which could disrupt the oil supply from the Middle East. (Tr. 1219-21, 1224-25, 1275-76, Szabo).

116. The words "if ever" on lines 4 and 5 at the top of page 157 in Joint Proposed Finding 415 should be deleted. Whether LILCO attains commercial operation is not relevant to this proceeding. When Shoreham may reach commercial operation is relevant.

117. Joint Proposed Finding 415 erroneously argues that earlier low power testing is not relevant to whether the requested exemption should be granted. If this exemption allows early low power testing which in turn leads to early commercial operation, there will be a benefit from the reduction of dependence on foreign oil at an earlier date. If this exemption does not lead to earlier low power operation, there will be no detriment. Thus, the evidence concerning dependence on foreign oil is relevant and demonstrates a potential public benefit.

118. Joint Proposed Findings 416, 417, 424 and 425 are not based on evidence. All are taken from the argument of counsel or comments by Judge Miller. Neither counsel nor the judges are witnesses. Their comments cannot constitute findings.

119. Joint Proposed Finding 418 misleadingly argues that Szabo was unable to state whether a disruption in the availability of foreign oil would be likely to occur now,

within the next three months, or within the next ten years. In fact, Szabo testified that there is a potential for a serious disruption in the oil markets at any time. (Tr. 1273, Szabo). He expressly noted such a potential in the next 90 days. (Tr. 1275, Szabo).

120. Joint Proposed Finding 419 erroneously states that Szabo's principal basis for concern about future disruption in oil supplies is the ongoing war between Iraq and Iran. Szabo did not so testify. He specifically noted that his concern over potential disruptions was "not limited to an ongoing major war." (Tr. 1240, Szabo). Additionally, his testimony is repleat with other reasons for concern, such as the decreasing leverage of the United States in controlling oil prices, the reduced oil reserves in the United States, the commercial trend toward upgrading distilling facilities so as not to produce residual oil and the like. (See LILCO Proposed Findings 194-96, 201). Joint Proposed Finding 419 also misleadingly fails to assert that the present glut of oil arises because of the intentional efforts of Saudi Arabia. (Tr. 1271, Szabo). Much of the uncertainty which Szabo described arose from the fact that Saudi Arabia virtually controls the world's oil markets and has a substantial potential for political instability. (Tr. 1275-77, Szabo).

121. Joint Proposed Finding 421 fails to reflect Szabo's testimony that the strategic petroleum reserve in the United States might not operate properly. Szabo only testified that there may be sufficient oil when the reserve is "operating" and "if they can get it out." (Tr. 1278, Szabo).

122. Joint Proposed Finding 423 incorrectly implies that a disruption in oil markets would have to occur during a narrow period beginning two months before commencement of commercial operation of Shoreham and persist for three months thereafter. Szabo only testified that any such disruption would have to be in effect during commercial operation for Shoreham and that in order for such a disruption to take effect, it would have to exist at least two months before commercial operation. (Tr. 1302-03, Szabo).

123. Joint Proposed Finding 426 misleadingly argues that Middle Eastern events have no effect on LILCO's oil supplies because only one percent of LILCO's oil is derived from the Middle East. In fact, Szabo testified that:

(a) A disruption in the Middle East would affect oil worldwide in terms of price and availability. Oil is fungible and any shortage in the Persian Gulf which currently produces 20% of the world's oil and three-quarters of its spare capacity would cause an increase in price. (Tr. 1277, Szabo).

(b) If there were a major disruption in foreign oil markets, LILCO would find it difficult, if not impossible, to buy residual oil derived from domestic crude. (Tr. 1339, Szabo).

(c) Even the availability and price of the domestically derived residual oil burned by LILCO is affected by events related to foreign oil to a very great, if not total, extent. (Tr. 1269-70, 1333-40, Szabo).

(See LILCO Proposed Findings 194, 200-01).

124. Joint Proposed Finding 427 fails to reflect Szabo's testimony that any attempt by LILCO to increase the amount of its petroleum reserves would entail a substantial additional cost to LILCO. (Tr. 1319, Szabo). Further, Proposed Finding 427 wrongly states that LILCO could purchase futures contracts on oil. Szabo testified that "no one trades in futures on residual oil." (Tr. 1320, Szabo). Additionally, there would be substantial additional costs if LILCO tried to trade crude oil futures against residual oil. (Tr. 1320, Szabo).

B. Economic Impact of the Exemption

125. Joint Proposed Finding 429 erroneously states that Richard Kessel testified as to whether there will be any economic benefit to the public as a result of the requested

exemption. Kessel did not purport to perform any economic analysis. Additionally, Kessel was unqualified to render any such opinion, even to the extent that his testimony might have touched on this area. Kessel has degrees in political science (Tr. 2881, Kessel), not economics. He has never worked for a utility (Tr. 2881, Kessel), has no engineering background (Tr. 2882, Kessel) and has never held a management position with any private business (Tr. 2882, Kessel). For the reasons discussed in the next section, his testimony is irrelevant and unsupported.

126. Joint Proposed Finding 429 also erroneously states that Madan and Dirmeier testified about whether there would be any economic benefit. Madan and Dirmeier performed no independent analysis, but purported solely to "test the assumptions or . . . conclusions" reached by LILCO's witness Nozzolillo. (Tr. 1967, Madan, Dirmeier). In fact, Madan and Dirmeier did not address Nozzolillo's analysis, but addressed an earlier computer run upon which LILCO's evidence was not based. (See LILCO Reply Findings 131, 132, 134, 135).

127. Joint Proposed Findings 430 and 431 incompletely reflect the background of Madan and Dirmeier. Madan's limited experience in working for a utility, Public Service Electric & Gas of New Jersey, did not include any

responsibility for maintaining or supervising the maintenance of power generation equipment or any responsibility for deciding when electric generation equipment would be brought on line or taken out of service. (Tr. 1922, Madan). Dirmeier had never worked for a utility and had no experience in operating electric generation equipment. Neither Madan nor Dirmeier had any background in any technical area related to the safety of operation of a nuclear power plant. (Tr. 1926, Madan, Dirmeier).

128. Joint Proposed Finding 433 states that Richard Kessel has worked "in the public interest" for approximately ten years. While that proposed finding accurately reflects Kessel's conclusory testimony, the record does not reflect that Kessel has, in fact, worked in the public interest. During that ten-year period, Kessel did not hold any public office. It has only been since January 1984 that he has been Director of the New York State Consumer Protection Board. (Tr. 2918, Kessel). Kessel does not represent the "public interest" and has no special power to assess it either in his private capacity or in his capacity as Director of the New York State Consumer Protection Board.

129. Joint Proposed Findings 434, 441 and 442 incorrectly characterize Nozzolillo's testimony concerning the range of economic benefits to LILCO's customers. Proposed Finding 434 states that the alleged economic benefit to LILCO's customers will be either \$8 million or \$45 million, depending on the timing of the receipt of certain tax benefits. In fact, Nozzolillo testified that there could be a range of benefits from \$8-\$45 million. (Tr. 1359-61, 1407, Nozzolillo). Proposed Findings 441 and 442 imply that Nozzolillo determined this range by adding the \$8 million benefit for the three-month change to an additional \$37 million benefit which could be attained only if Shoreham can be synchronized in 1984. In fact, Nozzolillo did not arrive at the range of benefits in that manner. He computed three different income streams. He did not merely identify the \$37 million difference and attribute it to taxes. (Tr. 1361, Nozzolillo).

130. Joint Proposed Finding 436 misleadingly characterizes Nozzolillo's testimony that his models "are not the real world today." That statement dealt solely with the fact that the model assumes conventional ratemaking and further assumes that LILCO could borrow short-term debt of \$378 million. (Tr. 1376-77, Nozzolillo). Nozzolillo acknowledged that LILCO had financial difficulties which made such borrowing uncertain. Changing these assumptions would affect the amount

of the benefit. If, for example, Nozzolillo assumed a rate moderation plan, the \$8 million benefit would become a \$45 million benefit.

131. Footnote 3 to Joint Proposed Finding 437 completely mischaracterizes the record concerning the computer runs upon which Nozzolillo's testimony was based. The record reflects as follows:

(a) Though the earlier irrelevant computer runs and those upon which Nozzolillo based his testimony reflected results in the same order of magnitude, the earlier runs used different interest rates and different input. (Tr. 1372, Nozzolillo).

(b) There were substantial differences in the runs, for example, in the "retrofits" account showing post-commercial operation capital expenditures. (Tr. 2009-13, Nozzolillo).

(c) The differences in the computer runs should have had a substantial effect on Madan and Dirmeier's conclusions had they not overlooked the differences. (See LILCC Reply Findings 132, 134, 135).

(d) Madan and Dirmeier testified on direct examination that they had received and reviewed the computer runs upon which Nozzolillo based his testimony, that those new computer runs contained numerous subsidiary changes and assumptions and slight changes in numbers throughout, but that Madan and Dirmeier's conclusions did not change. (Tr. 1912-13, Madan, Dirmeier). Cross-examination revealed that Madan and Dirmeier had simply missed some of the changes and had made mistakes in their analysis. (See LILCO Reply Findings 134, 135).

132. Joint Proposed Findings 444, 445 and 447 discuss the increase in rates in the first three months and in the first year as a result of earlier commercial operation for Shoreham. These proposed findings unfairly isolate the first year of operation. Earlier commercial operation would result in a lower book cost over the life of the Shoreham facility which would result in an overall lower amount of rates for the years 1985-2000 (Tr. 1366, 1409, Nozzolillo) and the years 2000-2015. (Tr. 2055-56, Dirmeier, Madan).

133. Joint Proposed Finding 455 erroneously states that "it does not appear possible" for Shoreham to be synchronized in 1984. Nozzolillo testified that a 1984 synchronization was achievable. (Tr. 1373, Nozzolillo). Madan and Dirmeier acknowledged that there were many uncertainties in the schedule making it unpredictable. (Tr. 1984, 1985, 1991, Madan, Dirmeier). Thus, a 1984 synchronization is possible, though uncertain.

134. Joint Proposed Findings 449, 456 and 457-67, reflecting Madan's and Dirmeier's erroneous conclusions completely ignore the cross-examination of Madan and Dirmeier. Those findings should reflect as follows:

(a) There is no "mismatch" in LILCO's analysis. The perception of a mismatch resulted from a mistake in Madan's and Dirmeier's analysis. (Tr. 1992-2027, Madan, Dirmeier).

(b) The perceived mismatch did not exist in the computer runs upon which Nozzolillo based his testimony. Instead, it appeared in earlier computer runs upon which Nozzolillo did not base his testimony. (E.g., Tr. 2022, Dirmeier).

Since Madan and Dirmeier performed no independent analysis and had no independent knowledge of the facts underlying Nozzolillo's computer runs, their testimony concerning computer runs which were not the basis of his testimony is irrelevant and ought not to be considered.

(c) The basis for the perceived mismatch was Madan's and Dirmeier's view that a decrease of \$59 million in the cash cost of Shoreham if full power operation is moved up by three months should be equalled by a \$59 million increase in post-commercial operation expenses when Shoreham is operated three months earlier. (Tr. 1992-93, Dirmeier).

(d) Before commercial operation, all expenditures, including expenses and capital items, are capitalized. (Tr. 1998, 2002, Dirmeier).

(e) After commercial operation, expenses and capital investment are treated differently. Expenses may be recovered immediately in the rate base, while capital

expenditures are capitalized. (Tr. 1998, Dirmeier).

(f) The perceived \$28 million mismatch results from a comparison of pre-commercial operation capitalization (including capital expenditures and expenses) solely with post-commercial operation expenses. (Tr. 2006-13, Dirmeier). Madan and Dirmeier failed to take into account an increase of \$11 million in the capital retrofits account, representing capital expenditures, after July 1985 commercial operation. (Tr. 2007, Dirmeier).

(g) Madan and Dirmeier had no independent facts upon which to base their opinions. Yet, they did not agree that the remainder of the difference between pre- and post-commercial operation expenditures could be attributable to an actual difference in pre- and post-commercial operation expenditures. (Tr. 2041-53, Dirmeier, Madan). Madan's testimony in this regard was simply incredible. He expressed the opinion that there would be

no change in the level of pre- and post-commercial operation expenses. (Tr. 2046-47, Madan). He did not believe, for example, that consultant fees would be reduced after commercial operation or that the longer LILCO kept consultants at the plant, the more expensive their bills would be. (Tr. 2047-48, Madan). He further believed that the cost of licensing proceedings would not change regardless of their length. (Tr. 2052-53, Madan). Such an inherently incredible opinion does not contradict LILCO's business records, upon which Nozzolillo based his testimony, that there were differences in pre- and post-commercial operation expenses.

135. The conclusions expressed in Joint Proposed Findings 462-67 are erroneous. Economic analysis of the effect of earlier commercial operation on rates for the years 2000-2015 would add a benefit of approximately \$6,200,000 to the \$8 to \$45 million present worth benefit already proved by LILCO for the following reasons:

(a) LILCO's analysis contains no implicit assumption that early low power operation results in greater lifetime energy production from Shoreham as implied in Joint Proposed Finding 462. Similarly, there can be no assumption that beginning commercial operation three months earlier will cause the plant to be retired three months earlier as suggested in Joint Proposed Finding 463. Neither Madan nor Dirmeier had any experience in decisionmaking as to when plants would be taken out of service or put into service. (Tr. 1922, Madan, Dirmeier). They could not know, for example, whether a utility's practice would be to remove plants from service during offpeak times. It does not necessarily follow, therefore, that Shoreham will be taken out of operation three months earlier as a result of beginning commercial operation three months sooner and Madan and Dirmeier were incompetent to express any such opinion.

(b) Proposed Findings 463, 464, 465 erroneously assumed that Shoreham will be displaced by oil-fired plants of the same efficiency as those now in service in order to calculate the alleged fuel offset at the conclusion of Shoreham's useful life. (Tr. 2058-61, Madan). In fact, it is now unlawful to construct baseload oil-fired generation plants. (Tr. 1270, 1299-1300, Szabo; Tr. 2062, Madan). Because of the depleting nature of oil, it is very unlikely that the next plant replacing Shoreham would be an oil-fired plant. Most probably some other technology, such as coal, solar, nuclear or other will replace Shoreham. (Tr. 1270, 1299-1300, Szabo). Thus, there may be no fuel offset at all.

(c) Though they purported to comment upon Nozzolillo's analysis and performed none of their own, Madan and Dirmeier did not compute their alleged fuel offset using the same assumptions as Nozzolillo used in his model. In their calculations, Madan and Dirmeier deceptively increased the cost

of oil at a rate of 13% per year. (Tr. 2065-66, Madan). Nozzolillo's analysis used a 6% inflation rate. (Tr. 2066-67, Madan). Madan and Dirmeier conceded that if one were to use a 6 1/2% escalation rate, the proper formula for calculating fuel offset would be:

$$\frac{\$50,000,000 \times (1.065)^{30}}{(1.13)^{31} \times .96}$$

(Tr. 2069-70, Dirmeier). That calculation results in only a \$7.8 million offset.

(d) Madan and Dirmeier calculate that lower revenue requirements for the years 2000 to 2015, before factoring in the alleged fuel offset, would be worth \$14 million in present worth benefits to LILCO's ratepayers. (Tr. 2055-56, Madan).

(e) Accordingly, even if there were a fuel offset, using the assumptions in Nozzolillo's analysis, the benefit of \$14 million would be offset by only \$7.8 million, for a net benefit of \$6,200,000, for the years 2000 through 2015. This would increase the overall benefit

postulated by Nozzolillo to \$14.2 to \$51.2 million.

C. Other Results of the Grant of the Exemption

136. Joint Proposed Findings 468 and 469 state that Richard Kessel testified about the public interest. Only Kessel's self-serving statements mentioned the public interest. In fact, the record shows that Kessel has no engineering background, has never been in a management position in private business, has no experience with nuclear fuel, has never worked for a utility, has no formal economics education and has been avidly anti-LILCO for much of his career. (Tr. 2881-83, Kessel). At best, Kessel can be characterized as a consumer advocate and has spent his career dealing with pricing of consumer goods and dating of perishable foods, intervening in rate cases, organizing commuter strikes on railroads, performing surveys of the prices of Halloween candy, Thanksgiving turkeys, Valentine hearts and Mother's Day roses and worrying about "butterless buttered popcorn," "alcoholless apple champagne," and "leaded leadfree gasoline." (Tr. 2918-19, Kessel).

137. Joint Proposed Finding 470 should be revised to reflect that despite New York's recognition of the necessity for reducing its dependence on foreign oil and its numerous measures to attempt to reduce its consumption, New York State burns more oil to produce electricity than any other state. (Tr. 1307-08, Stipulation). Moreover, the latest version of the New York State Energy Master Plan emphasizes that New York's consumption of petroleum products must be reduced and calls for the utilization of Shoreham plant to provide electricity for New York State. (Tr. 2886-87, Kessel).

138. Joint Proposed Finding 471 is irrelevant. It is based on Kessel's irrelevant testimony that Shoreham should not be contaminated before "the uncertainties surrounding its future operation have been resolved." (Tr. 2912, Kessel).

(a) This Licensing Board has ruled on at least two occasions that consideration of such uncertainties is irrelevant. (Tr. 2145-48, Board; June 27 Order Regarding Discovery Rulings).

(b) The Commission has ruled on at least two occasions that consideration as to whether Shoreham will be licensed ultimately is not relevant to the

determination regarding a low power license. Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), CLI-84-9, 19 NRC _____ (June 6, 1984); Long Island Lighting Company (Shoreham Nuclear Power Station, Unit 1), CLI-83-17, 17 NRC 1032 (1983).

(c) The only variable here is when Shoreham will conduct low power operation. Once qualified diesel generators are licensed, LILCO will have the right to conduct low power testing regardless of the resolution of any emergency planning matters necessary for a full power license. Thus, the so-called "uncertainties" are not unique to the grant of this exemption and, therefore, are not relevant to this proceeding.

(d) Kessel has no expertise and no facts upon which to base this opinion. As reflected in Joint Proposed Finding 471, Kessel's opinion is predicated upon an unsupported assertion that if Shoreham were to be operated at low power and

subsequently abandoned, costs would increase unnecessarily, for example, the value of nuclear fuel would be substantially reduced. Kessel has no expertise upon which to base such an opinion and there are no facts in the record upon which he could base such an opinion.

139. Joint Proposed Finding 472 dealing with an alleged decline in quality of LILCO's service is irrelevant and unsupported.

(a) The Board previously ruled that any decline in the quality of service was not relevant. (Tr. 2146, Board).

(b) There are no facts in the record indicating that there has in fact been a decline in the quality of service by LILCO to its customers.

140. Joint Proposed Finding 473 is at most a bald assertion that "austerity measures have been and will be implemented by LILCO" have affected its non-nuclear operations. Kessel did not establish any personal knowledge of such austerity measures or their effect on LILCO's service.

141. Joint Proposed Finding 473 also is contingent upon Kessel's opinion that LILCO's proposed accelerated low power testing will require the expenditure of additional funds. There are no facts in the record to support this opinion and Kessel has no expertise on which to found such an opinion. In fact, Kessel has never worked for a utility, has never worked at a nuclear facility and has no experience with nuclear fuel. (Tr. 2881-83, Kessel).

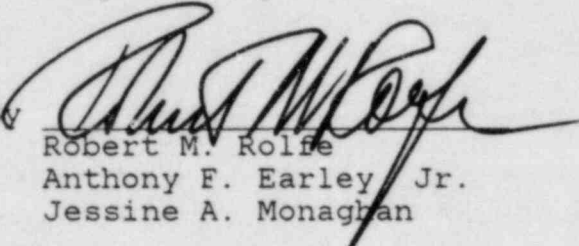
142. Moreover, the uncontradicted testimony of Anthony Nozzolillo established that LILCO's financial hardships might be alleviated by granting the requested exemption, refusal to grant the exemption might exacerbate LILCO's financial problems and adversely affect the level of service.

143. Joint Proposed Findings 474 through 493 argue that it is not in the public interest to allow a financially weakened utility to operate a nuclear facility. Memorandum and Order Denying Suffolk County and the State of New York Petition for Exception from Regulations Precluding Financial Qualifications Contentions and Motion for Certification to the Commission, Long Island Lighting Company (Shoreham Nuclear Power Station, Unit 1), LBP-84-30 (Aug. 13, 1984); see also Order Regarding Discovery Rulings, June 27, 1984. Financial qualifications are irrelevant in a licensing proceeding. The

facts in these Joint Proposed Findings, to the extent correct, are relevant only to the financial hardships now being suffered by LILCO which comprise one of the "equities" outlined by the Commission.

144. Joint Proposed Findings 483(a) and 488 dealing with the Public Service Commission "prudency proceeding" are also irrelevant and no findings should be made in connection with this subject. Those proceedings have not been concluded. Any findings based on them would necessarily be speculative.

Respectfully submitted,

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