Attachment 2

LILCO, June 19, 1985

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Appeal Board

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

AFFIDAVIT OF JOHN D. LEONARD, JR.

John D. Leonard, Jr., being first sworn, deposes and says as follows:

1. My name is John D. Leonard, Jr. I am Vice President, Office of Nuclear Operations, Long Island Lighting Company (LILCO). My work address is Shoreham Nuclear Power Station, North Country Road, Wading River, New York 11792.

2. I received my bachelor's degree in physics from Duke University in 1953, and was President of Sigma Phi Sigma, the Physics Honorary Society. In 1962, I received my master's degree in physics, with a minor in radiobiology from a nuclear engineering curriculum of the U.S. Naval Postgraduate School, Monteray, California. I am a member of Sigma Xi and a registered professional engineer in New York State. I served in the United

States Navy from 1954 to 1974, of which 12 years were spent on nuclear submarines. I was the Commanding Officer of two nuclear submarines, The U.S.S. Abraham Lincoln (S.S.B.N. 602) and The U.S.S. Benjamin Franklin (S.S.B.N. 640). Following my retirement from the Navy with the rank of Commander, I went to work for the Virginia Electric and Power Company from 1974 through 1976; there I was Corporate Supervisor of Operational Quality Assurance. From 1976 through 1980, I was the first Resident Manager of the James A. Fitzpatrick Nuclear Plant, a boiling water reactor very similar to Shoreham, owned and operated by the Power Authority of the State of New York (PASNY). During my tenure as resident manager, the FitzPatrick plant was judged by the NRC, in 1977, to be one of the 12 best-managed nuclear power plants in the country from a safety standpoint. In 1980, I was promoted to Vice President/Assistant Chief Engineer for Design and Analysis at PASNY, with responsibility for the FitzPatrick Plant as well as PASNY's interest in the Indian Point reactors. I remained at that post until I came to work at LILCO as Vice President/Office of Nuclear Operations in May 1984.

3. My professional responsibilities at LILCO include overseeing the safety and operational aspects of the Shoreham Nuclear Power Station (Shoreham) and development of the plant.

4. This Affidavit describes the benefit of low power testing, the need to perform that testing promptly and the low additional incremental effects of Phase III and IV testing. It also addresses the Affidavit of Dale G. Bridenbaugh and Gregory C. Minor in Support of Motion for Stay submitted by Suffolk County and New York State. Many of the statements in the Bridenbaugh/Minor Affidavit are simply inaccurate. Others are misleading. Others involve opinions on matters about which Bridenbaugh and Minor have no expertise.

I. BACKGROUND

5. Shoreham is a boiling water commercial reactor of approximately 810 MW net electrical capacity, owned by LILCO and located at Wading River, on the north shore of Long Island approximately 60 miles east of New York City. I am familiar with the effects of LILCO's being able to conduct low power operations up to 5% of rated power at Shoreham.

6. Low power testing is the first experience of a reactor and its crews with actual operation. It is the foundation for the reactor's entire operating life. A soundly designed and executed low power testing program accomplishes the necessary transition from unirradiated, no-power conditions to irradiated operation at commercial power levels and provides a final check on the physical functioning of reactor systems. It also provides a baseline of training and experience that helps to set the tone for future

operations. Low power testing significantly contributes to improved plant safety by experiencing plant staff and operators and by identifying and correcting potential problems in a controlled and deliberate manner. Shoreham's low power testing program has been divided into four phases designed to emphasize training, deliberate procedural actions, thoroughness in operations, and mechanical soundness of equipment. As a result, LILCO has built more testing and training into its low power testing program than is required or customary, and plant management is under operating instructions to emphasize deliberatness using well-conceived procedures and thoroughness over speed.

7. On December 7, 1984 the Nuclear Regulatory Commission declared effective a September 5, 1984 Licensing Board Order authorizing issuance of a license permitting LILCO to load fuel ("Phase I" of low power testing) and conduct cold criticality testing ("Phase II" of low power testing) at Shoreham. Pursuant to License NPF-19, issued December 7, 1984, LILCO commenced loading fuel on December 21, 1984 and completed that process on January 19, 1985. LILCO commenced cold criticality testing on February 15, 1985, and Shoreham achieved its first self-sustaining nuclear chain reaction at approximately 6:25 pm that day. LILCO completed cold criticality testing on February 17, 1985 at approximately 6:00 am.

8. Shoreham is ready now to proceed to Phase III of low power testing and can do so beginning Thursday morning, June 20, 1985.

9. On June 14, 1985, the Nuclear Regulatory Commission's Atomic Safety and Licensing Board issued a Partial Initial Decision authorizing issuance of a license permitting LILCO to conduct low power testing, which effectively means to proceed to rated temperature and pressure conditions (1% of rated power) (Phase III) and low power testing to 5% of rated power (Phase IV).

10. This Affidavit is written in the context of a motion for a stay of the Partial Initial Decision and the issuance of a low power license pending later reviews on the merits. Consequently, it does not attempt to quantify the monetary cost of delays beyond the time when Shoreham could otherwise enter commercial service. Rather, it focuses on the costs to LILCO of near-term delays and reviews the cost estimates prepared by Petitioners. A summary of this Affidavit is as follows:

a. Shoreham has a soundly designed, four-phase low power testing program. Phases I and II are complete. Fuel has been loaded into the reactor and it has "gone critical" -- it has had its first self-sustaining chain reaction. The reactor's fuel and vessel internals are by now irretrievably irradiated. The plant is ready to embark now on Phases III and IV of low power testing.

b. As presently planned, Phases III and IV could be completed in 70 days, or by about the end of August, if no

complications develop. It would be unusual if at least minor complications, extending the completion of Phases III and IV by several days to several weeks, do not arise.

c. If any delay is imposed on Phases III and IV of low power testing, LILCO will incur, day-for-day, incremental out-of-pocket costs for expert technical advisors at a rate of between $500,000 and $625,000 per month. If LILCO cannot undertake low power testing shortly, it will have to replace the neutron sources. This would mean an unavoidable further delay of approximately 30 to 35 days in the completion of low power testing and ultimate plant operation. Thus if the start of low power testing is delayed, for any reason, beyond the end of June, it will be very unlikely that it can be completed before November; if the start were delayed until the end of July, testing could not readily be completed before December. In addition, delays would disrupt what has been to date an orderly and successful plant startup, and would create the risk of damaging losses by attrition from three groups of expert technical advisors retained to assist in plant startup, from the 300-person Plant Staff, and from 300 persons in related support organizations.

d. New York/Suffolk County overestimate by about a factor of ten the costs of undertaking Phases III and IV of low power testing, assuming Shoreham never subsequently operates commercially. The fuel in the reactor is already irradiated and not usable except at Shoreham; the incremental fuel cost of

proceeding to Phases III and IV is not millions of dollars as NY/SC suggest, but zero. The same is true of control rods and other reactor internals; the incremental cost of proceeding to Phases III and IV is not $1 to $2 million, but zero. The cost of defueling and decommissioning has been estimated by LILCO at $13 million which is a cost already necessitated by having completed Phase II. Thus if Shoreham completes low power testing but never operates commercially, the incremental cost is approximately $13 million. If Shoreham operates commercially, the incremental cost of proceeding to Phases III and IV is zero.

II. THE SHOREHAM LOW POWER TESTING PROGRAM

11. Conducting testing at up to 5% of rated power pursuant to the license for Phases III and IV will produce the following types of benefits, discussed in more detail below:

a. Testing of the reactor and its components at rated temperature and pressure, during both Phases III and IV;

b. Testing steam operated reactor safety equipment such as the High Pressure Coolant Injection System (HPCI) turbine driven pump and the Reactor Core Injection Cooling System (RCIC) turbine driven pump;

c. Testing the main steam system up to and including the turbine, including the main steam piping and steam

drain system, the condenser under vacuum, and operating the steam driven main feed pump turbines;

d. Testing the off gas system including the catalytic recombiner, steam dilution and reheat systems;

e. Testing the rad waste systems and their associated steam driven concentrators;

f. Testing the steam reboiler system, which utilizes reactor steam to produce auxiliary steam from an enclosed pressure vessel in a separated loop, thus precluding radioactivity from the reactor from entering certain auxiliary systems;

g. Identifying and resolving unforeseeable equipment malfunctions and other systems operability problems which can be detected only during startup testing;

h. Training of the reactor's crews and other station personnel;

i. Accelerating the date of commencement of full power operation by approximately 70 days or more.

12. LILCO's division of low power testing into four steps was intended to permit accomplishment of discrete goals at each step. These were described in detail in the attached Affidavit of Jack A. Notaro and William E. Gunther, Jr., dated March 30, 1984, which

accompanied LILCO's Supplemental Motion for Low Power Operating License, and the Testimony of William E. Gunther, Jr. during hearings leading to the Initial Decision now under appeal. (Tr. 152 ff.). Without repeating the details of that Affidavit, the following will summarize the activities at each stage of low power testing:

a. Phases I and II: Fuel Loading and Precriticality Testing (December 21, 1984 - January 19, 1985); and Cold Criticality Testing (February 15-17, 1985) (Gunther-Notaro Affidavit, ¶¶ 6-11): Phase I, now completed, involved placing some 560 fuel bundles, each containing 62 fuel rods, into the reactor at predetermined locations. It also involved installation and utilization of specially designed startup neutron sources and instrumentation to monitor the reactivity in the core and the functioning of reactivity control measures needed beginning with Phase II. Control rod insertion drives, radiation monitoring, and other systems and instruments were checked. During this phase the plant was not critical -- i.e., there was no self-sustaining nuclear chain reaction occurring in the reactor core.

Phase II, also completed, involved withdrawal of control rods from the reactor core to a predetermined extent and sequence so as to achieve criticality -- i.e., a self-sustaining chain reaction -- at extremely low power levels (not above .001% of rated power). The effectiveness of the 137 control rods in controlling reactivity was measured. Plant operators were able to perform reactivity

control manipulations, install vessel instruments under operating constraints, and install instrumentation for later measurement of pipe expansion and vibration upon heatup.

Over 5000 man-hours of valuable training were accumulated during Phases I and II. The plant itself did not become significantly radioactive outside the reactor core. However, as is described more fully below, the reactor fuel itself became sufficiently radioactive during Phase II that it no longer has any commercial value at any plant other than Shoreham as a practical, if not theoretical matter. The same is true of reactor vessel internals (control rods, radiation monitors, etc.).

b. Phases III and IV: Heatup and Low Power Testing to Rated Pressure/Temperature Conditions (1% of Rated Power) (Authorized but not yet commenced); and Low Power Testing (1% to 5% of Rated Power) (Authorized but not yet commenced) (Notaro-Gunther Affidavit, ¶¶ 13-24): Phase III involves plant heatup and pressurization in progressive steps to rated pressure and temperature at 1% of rated power. Each of the six steps in this process includes the performance of a number of tests relating to thermal expansion of piping and training of reactor crews in integrated systems operation under actual operating conditions.

In Phase IV, the reactor is taken initially to 5% of rated power at rated temperature and pressure, tested and then taken through its first cooldown to ambient conditions. The plant is then heated up a second time to rated temperature and pressure;

RCIC, HPCI and reactor feed pumps and associated balance-of-plant equipment are tested; and an endurance run on HPCI and RCIC is conducted. The plant is then cooled again to ambient conditions. Data are taken on nuclear steam supply system thermal expansion during each heatup and cooldown.

13. The Bridenbaugh/Minor Affidavit asserts that there will be minimal benefit in Phase III and IV testing. This is wrong for a number of reasons. See Tr. ff 152, 200-26, 828-30, 837 (Gunther).

14. (a) Bridenbaugh and Minor (¶ 15) erroneously state that the turbine at Shoreham will not roll during Phases III and IV testing and that as a result, the turbine generator and turbine control portion of the EHC systems will not be operated. Although a LILCO witness did apparently state on cross-examination that LILCO did not intend to roll the turbine during Phase III and IV testing, this was incorrect, as shown by LILCO's other evidence in the low power record. William Gunther, the witness, had included with his testimony the Affidavit by him and Jack A. Notaro in which it was clearly indicated that the turbine would be turned, since the turbine generator, turbine EHC and turbine lube oil system would be placed in service, operated and tested during Phases III and IV. See Notaro/Gunther Affidavit ¶ 24. Additionally, the Chapter 15 safety analysis contemplated a turbine trip -- which can only occur if the turbine is spinning --

as a possible event. Tr. 320 (Rao, et al.) In fact, the turbine will roll and the turbine lube oil system, generator seal oil system and steam seal system will be tested during Phase III and IV testing.

(b) Bridenbaugh and Minor are further wrong in their assertion that Phase IV testing will produce insufficient steam to run the turbine (Affidavit ¶ 15); it will. My comments to the Commission on February 8, 1985 are not to the contrary. I indicated that LILCO would attempt to spin the turbine. I have since learned of other BWRs where the turbine has been operated at 5% power and, based upon the analysis of Shoreham's nuclear engineers, I believe that the same will be feasible at Shoreham. In a General Electric Nuclear Service Department Product Experience Report issued in May, 1985 to all BWRs, it was reported that the Limerick Plant has spun its turbine twice pursuant to a 5% license and has not exceeded 4.75% of rated power.

(c) Also, Minor and Bridenbaugh misleadingly rely on "A Startup Test Program Evaluation for a 5% Reactor Power Limitation," SR2-K71-393, October 25, 1983 to argue that the turbine cannot be spun at low power. The conclusion of that report is that the turbine can roll at approximately 1800 rpm at 29 inches condenser vacuum with only 2% of rated steam above auxiliary loads Total steam flow will be below 5% rated flow. Appendix 4, ¶ 4.5.1, n.1.

15. The comments of Bridenbaugh and Minor in paragraph 16 of their Affidavit are misleading in asserting that the tests listed there cannot be properly or completely performed at low power levels. In fact, LILCO will perform all of the listed tests except the local power range monitor calibration, during low power operation. These include: (a) APRM/IRM calibration at overlap point; (b) the initial set of the APRM trip reference point at 55%; (c) initial APRM calibration; (d) turbine roll and balance at 1800 rpm; (e) generator exciter test; (f) moisture separator-reheater and drains; and (g) extraction steam. These tests will be completed insofar as they can be supported by 5% power. No special tests or gimmicks which would necessitate subsequent retesting or which would otherwise invalidate the test results will be employed to complete the scheduled low power testing. Testing not performed now will have to be completed in the future prior to exceeding the 5% threshold. Performance of these tests during Phases III and IV will provide valuable information and will save substantial time and costs in the ultimate ascension to full power.

16. Bridenbaugh and Minor are totally wrong in their assertion that there is relatively little benefit to be gained by system testing during Phases III and IV (Affidavit ¶ 17).

a. Even if Bridenbaugh and Minor had correctly identified tests which will not be performed -- and they have not -- the remaining testing to be performed, which includes thermal expansion testing of primary (reactor and recirculation) systems is important in and of itself. Such testing is time-consuming and often identifies hardware problems which LILCO could correct now if detected, without later disruption of power generation for LILCO's customers.

b. Based on my naval experience as a nuclear submarine commanding officer and my commercial nuclear experience, I am convinced that there is no substitute for actual operation of the nuclear plant both when testing equipment and training personnel. Isolated testing of isolated systems does not provide the same opportunity to detect problems, either with equipment or personnel, as integrated operation.

III. HARM FROM DELAY

17. A delay in undertaking Phases III and IV would have much longer than day-for-day consequences because of inevitable need to replace neutron calibration sources in the reactor core. Such a delay could also jeopardize permanent and temporary plant staffing and training. Any delay imposes out-of-pocket costs.

18. If plant startup were allowed to proceed now without any restraint and if no equipment malfunctions or administrative shortcomings are detected, it is conceivable that Phases III and IV could be completed in as short a period as 42 days; a more reasonable estimate is 70 days. However, a basic purpose of initial plant startup is to detect problems and correct them before the plant enters commercial operation at full power when risks increase and shutdowns become extremely expensive. If a problem is encountered with a safety-related system, correction can be very time-consuming because of the rigid substantive, documentary and quality assurance requirements covering design, procurement and installation of such systems. While it is not expected that problems requiring major delays in the ability to proceed between 5% and 100% of rated power will be encountered in Phases III and IV, the possibility cannot be ignored. It is conceivable that a malfunction in a safety-related system, however unlikely, could require a year to assess, remedy, and receive approval for in the licensing process. For example, the failure of the TDI emergency diesel generators occurred in July 1983. The results of the repairs to them have just been resolved, over 18 months later. While the likelihood of occurrence of this type of problem is, in my judgment, extremely low, other, smaller problems with a presently uncertain potential for delay ranging from several days to several weeks will almost inevitably be detected. My staff has estimated our low power test program will take

approximately 70 days should Shoreham experience standard industry delays and problems. In addition, a problem that would affect Shoreham's completion of low power testing need not even originate at Shoreham; it could originate at any other plant that was similar in relevant aspects. For example, the difficulties experienced at Shoreham with its TDI diesels affected other plants, including Mississippi Power & Light Company's Grand Gulf plant, then in low power testing, for months.

My policy as Vice President-Nuclear has been, and will remain, to detect problems early and correct them systematically and without unnecessary haste. It is the purpose of plant startup to detect problems and correct them at the earliest possible time. A stay of low power testing at Phases III and IV of low power testing would both impair LILCO's ability to execute this sound policy and would enhance the risk that low power testing could delay commercial operation.

19. Neutron sources of significant radioactivity must be in the reactor from initial fuel loading on, at any time when there is fuel in the reactor, in order to provide background levels of radiation in the core against which to calibrate reactor instrumentation. Five sets of these sources were installed at Shoreham in late December 1984 as part of fuel loading. These sources have a radioactive half-life of approximately 60 days, and will decay unless regenerated by other activity in the reactor. When the reactor attains 5% power, the level of radioactivity in

the reactor core is sufficient to substantially delay further decay of the sources; at higher power levels (upwards of about 15%), the sources are regenerated by activity in the core. If Shoreham is prevented from commencing Phases III and IV in the near future, the sources will have to be replaced. This would mean an unavoidable delay of at least 30 to 35 days in commencing low power testing. This is because in order to replace the sources the containment must be disassembled, the reactor vessel head unbolted and removed, and various fuel assemblies removed in order to access and replace the neutron sources. New sources would have to be shipped and replaced, and the reactor reassembled. The reactor would then require hydrostatic and leak rate testing as well as repetition of other types of testing already performed once in Phases I and II. My staff has estimated that this work can be accomplished in 30 to 35 days, using 50% of the plant's maintenance force working 3 shifts around the clock seven days per week. In the meantime, all of the ordinary maintenance these personnel would otherwise perform must be set aside. Deferral of maintenance not only is bad practice; it has cumulative effects. We have estimated an additional 20 to 30 days to catch up on this work. If unforeseeable complications develop (as can easily happen in round-the-clock work) further delays would result. Replacement of the sources would thus entail a delay in resuming Phases III and IV of at least 50 to 65 days and major diversion of personnel resources, in addition to the out-of-pocket monetary cost.

20. A stay which delayed the conduct of Phases III and IV of low power testing would also seriously impair the operational training of the Shoreham reactor crews and could even jeopardize LILCO's ability to retain them, as well as force LILCO to incur out-of-pocket costs ranging between $500,000 and about $625,000 per month for test program support personnel, according to estimates prepared by my staff. LILCO's philosophy for low power operation has been to provide substantially more training of its reactor crews during Phases I-IV of low power testing than is minimally available or required in standard low power testing programs. In Phases I and II the aggregate amount of training totaled about 5000 man-hours. During Phases III and IV it is intended that training will total about 6000 man-hours. This will include repeated startups and heatups to rated pressure and temperature in Phase IV to give each operating crew an opportunity to experience plant response. Altogether in Phase IV, the Shoreham plant staff will be required to place in service, operate, test and maintain 54 plant systems. Notaro-Gunther Affidavit, ¶¶ 12, 24. Delay in Phases III and IV would jeopardize LILCO's ability to see to this training and would force LILCO to make wasted out-of-pocket expenses, in three respects: (a) retention of access to expert personnel from other organizations, now on site to advise and assist in LILCO's low power and power ascension program; (b) out-of-pocket expenses to retain access to the expert advisors; and (c) training and retention of plant staff and related personnel.

a. Pursuant to anticipated technical specifications in its low power license from the NRC, LILCO had retained seven experienced advisors, including employees of other utilities and independent consultants, to act as shift operation advisors during low power testing anticipated to take place in early 1985 and in initial operation thereafter. Technical specifications issued for fuel load deleted the requirement for shift advisors until one week prior to exceeding 5% power. At the present time, due to testing program delay, LILCO has only 3 qualified shift advisors and one in training. LILCO is now in the process of hiring additional advisors to fill the vacancies which have occurred. These shift advisors have sufficient experience in operating nuclear reactors to assist LILCO in the low power testing program and to train LILCO's personnel. The cost to LILCO averages approximately $100,000 per year per advisor, including the cost of their employment and training. If completion of Phases III and IV of the low power testing program is delayed, LILCO will incur out-of-pocket losses for their salaries at the rate of about $35,000 per month.

Two of these advisors are on loan from other utilities. Each of the four has completed or is in the process of completing an eight-week-site-specific training program culminating in examinations to assure familarity with the Shoreham plant. Because two of these advisors are on loan from other utilities, they cannot remain indefinitely at Shoreham. I anticipate that there will be

similar losses as personnel from the other utilities must remain qualified at their "home" nuclear facilities and advance their own careers. Each time LILCO needs to obtain a different advisor to assist in this process, it must conduct the eight-week site-specific training program before the new advisor can apply his knowledge. Thus delay, in addition to being costly, induces turnovers which involve further delay.

b. Also at the Shoreham site are 24 experienced personnel furnished by General Electric Company and 24 furnished by Stone & Webster Engineering Corporation to assist LILCO with its startup and power ascension program assumed to commence in early 1985. The primary purpose of these personnel is to advise LILCO personnel during the low power testing and startup program based on these organizations' previous operating experience at other nuclear facilities. Nineteen of these personnel are scheduled to leave at the completion of Phase IV low power testing; the remaining 33 are scheduled to remain through various stages of power ascension. Delay in completion of low power testing imposes two direct costs on LILCO: out-of-pocket costs, and risk of loss of access.

These contractor personnel are charged to LILCO at a rate equivalent to about $12,000 per man-month. For the approximately 19 of these personnel who are scheduled to depart after the conclusion of low power testing, delay in its commencement represents a direct out-of-pocket cost to LILCO of approximately

$228,000 per month. For the other 33 or so whose contracts run through the end of power ascension, full attribution of their costs (about $396,000 per month) directly to delay in Phases III and IV is less clear-cut than with those scheduled to leave at the end of low power testing, but the cost is real.

The second type of cost involves access to valuable experts. When no testing is taking place, these personnel are relegated primarily to paperwork. It has been my experience that unless such personnel are actively engaged in supervisory activities for which they were employed, their principals soon transfer them to other jobs where progress is being made and where the personnel can employ their skills. Accordingly, I anticipate that LILCO will lose the benefit of these personnel if low power testing is delayed. While such personnel may ultimately be able to return to Shoreham, scheduling difficulties make it likely that delays in the power ascension program would be necessitated.

c. Shoreham's Plant Staff, including reactor crews, supervisory personnel and staff support, would be adversely affected by a stay. These personnel, who number about 300, are highly trained and much in demand throughout the nuclear industry. While they are, individually and collectively, highly motivated and loyal to LILCO, they cannot be expected to ignore their own self-interest. Shoreham's completion and operation have been delayed time and again for a variety of reasons. The plant staff have endured, just in the past year, a reduction in force and pay

cuts brought about by LILCO's financial difficulties, and a strike. They are at Shoreham for one purpose: to operate the plant. Delays and attendant frustration have cost LILCO valuable people in the past. With the heightened frustration of being unable to operate a plant which is physically complete and has been licensed by the NRC to operate, I fear the loss of knowledgeable, valuable, hard-to-replace personnel. Based on my naval experience as a nuclear submarine commanding officer and as the New York State Power Authority's first resident manager of the Fitzpatrick Nuclear Power Plant, I am convinced that personnel who have gone through the construction period of a plant or ship and the associated preoperational test programs have experience that directly influences safe reactor operation. It is common knowledge among naval commanding officers that the commissioning crew will probably be the most knowledgeable crew the ship ever has.

In addition to the Shoreham Plant Staff, there are approximately 300 additional employees, most of them professional or technical, who work in areas totally or primarily devoted to the support of Shoreham: the Nuclear Engineering Department, the Nuclear Operations Support Division, and the Nuclear Quality Assurance Department. Like the Plant Staff, these employees are highly trained and motivated; like the Plant Staff, they are highly sought after and highly mobile; like the Plant Staff, they have endured economic and other privations. I fear their loss by attrition if startup is delayed.

21. The effect of delay in the conduct of Phases III and IV of low power testing, whether from the stay requested here or other causes, cannot be stated precisely for all circumstances. However, the following things are clear. First, the out-of-pocket cost of expert utility and contractor personnel now onsite for low power testing and, in some cases, power ascension, is over $820,000 per month. At least $228,000 per month is directly attributable, day for day, to any delay in Phases III and IV. Second, purely from an operational standpoint, if we cannot predict before the end of June that low power testing will be complete by September 1, we will have to install new neutron sources, at an additional delay of at least 50 to 65 days. After that, the low power testing which could not be completed before September 1 will have to be completed after source loading is accomplished and associated post-work testing is complete. In short, a delay preventing the undertaking of Phases III and IV of low power testing beyond late June will, in all likelihood, delay completion of that testing until about early November, even if all goes smoothly. If personnel -- advisors, plant staff or supporting personnel -- were affected in the meantime, the effect of delay would be increased by an unquantifiable but potentially long period.

22. Delay of Phases III and IV of low power testing would also lead to delays in LILCO's ability to generate power to its grid once a full power license is issued. LILCO has designed its

ascension test program so that about 60% of the testing activities will be completed by the end of Phases III and IV of low power testing. This is a significantly larger amount of the overall program than is usually completed by the end of testing at 5% power. As a result, when a full power license is issued, LILCO will be in a position quickly to generate power directly to the grid, beginning at approximately 15 to 20% of rated power. Normally, the power ascension program requires the plant to frequently cease power generation to the grid in order to test its reaction to various transients. LILCO will test Shoreham's reaction to the maximum possible number of these transients during Phases III and IV of low power testing. Accordingly, there will be a considerably reduced need to interrupt its power generation to the grid once a full power license is issued.

IV. INCREMENTAL EFFECTS OF PROCEEDING TO PHASES III AND IV

23. The Bridenbaugh/Minor Affidavit compares various costs of permitting Phases III and IV of low power operation (assuming that Shoreham never enters commercial operation), with those of halting operation after Phases I and II. Their assertions are incorrect in many respects. The actual initial cost to LILCO of Shoreham's core was approximately $40 million, and its value for any plant other than Shoreham was effectively reduced to zero when it was irradiated in Phase II. Thus the incremental fuel-related cost of proceeding to Phases III and IV is essentially zero. This is discussed more specifically below.

a. The Bridenbaugh/Minor Affidavit overestimates the salvage value of Shoreham's core, both before irradiation and after Phase II. LILCO paid approximately $40 million for Shoreham's core. Its resale value for any reactor other than Shoreham, even before irradiation in Phase II initial criticality, would have been substantially lower than its value to Shoreham since there is no ready market for the core. Nuclear reactor-cores are custom-designed specifically for (1) the type of reactor (in this case, a BWR Mark 4) and (2) its stage of life (in this case, the first core). LILCO is not aware of, and believes that there are not, any other BWR Mark 4 reactors which have neither entered commercial operation yet nor had their first core already fabricated. Thus in order to be utilized economically and safely in any other reactor, Shoreham's core would have to be redesigned and refabricated. Each of the nearly 35,000 fuel rods in Shoreham's core would have to be separated individually from the others within its fuel bundle. Virtually every, if not every, rod would have to be opened and its nearly 300 individual fuel pellets (of varying degrees of uranium enrichment) and fuel spacing devices removed, evaluated and repacked, rod by rod, in different configurations, on the basis of engineering calculations performed for the other core. The resale value -- more accurately, salvage value -- of Shoreham's core, unirradiated, would reflect the cost of this costly and cumbersome process of removing, sorting and repacking the usable portion of some 10 million fuel pellets.

LILCO knows of no fuel manufacturers willing to perform this salvage process on fuel which has been irradiated as was the Shoreham fuel in Phase II.

b. The Bridenbaugh/Minor Affidavit claims that the resale value of the fuel in the Shoreham reactor will not be substantially affected by irradiation before operation at Phases III and IV. That assertion is simply wrong; the cost, whatever it is, was already incurred in Phase II, when the fuel was initially irradiated. Though the degree of irradiation is not as high as at full power (or even 5%) operation, the fuel must now be treated for regulatory and commercial purposes as irradiated fuel. Thus the processes necessary to make this core usable at any other plant cannot physically be performed anymore without shielding against radiation. In addition, the core could not be removed from the reactor or shipped without shielding in accordance with NRC and DOT regulations. The amount of shielding required for its handling would not render such operations technically impossible. It would, however, render them commercially infeasible, especially in the current market, where neither raw uranium nor enrichment nor fabrication capacity are in short supply. Thus as of completion of Phase II activities, the salvage value of the Shoreham fuel for any reactor other than Shoreham is essentially zero. There are no further costs associated with the fuel in Phases III and IV.

c. Minor and Bridenbaugh are wrong in several other assertions about the irradiation of the fuel. In their comparison of the amount of irradiation in paragraph 11, they neglect 12 training startups adding 12 to 24 additional hours of fuel irradiation to the 36 hours otherwise accumulated in Phase II. Importantly, the difference in megawatt days per ton of irradiation between Phases II and IV is insignificant since the same handling and disposal costs will be incurred after Phase II as after Phase IV. This also exposes an error in paragraph 14 of the Minor/Bridenbaugh Affidavit in which disposal costs are discussed:

(i) The disposal cost of approximately $120,000 per ton is based on full power operation over several cycles of core life.

(ii) The necessity for disposal of the fuel has already been incurred; the fuel has been irradiated in Phase II. There will be no difference in disposal costs from proceeding further.

(iii) Since the necessity for disposal of the irradiated fuel has been incurred, it must be paid for. That cost is recovered by the federal government by taxing fuel exposure. If Shoreham does not operate, those costs will not be recovered, though they are already necessary costs. There will be no additional cost to LILCO, however, for disposing of the fuel. LILCO has a contract

with DOE to accept Shoreham's spent fuel. Since the fuel will have produced no megawatts of electricity in Phase IV, the disposal cost to LILCO pursuant to the DOE contract will be the same as at the end of Phase II.

(iv) Additionally, the costs for personnel and ultimate need for a disposal facility--not unique to Shoreham--have already been necessitated since it is my understanding that the fuel must now be handled as irradiated fuel.

d. Petitioners claim that proceeding to Phases III and IV will result in other areas of contamination which would not have occurred at Phases I and II: to control rods, radiation monitors and other reactor interals. (See Affidavit, ¶ 13). This assertion is also wrong. These components are as radioactive as Shoreham's fuel and whatever costs may be associated with their irradiation are already sunk.

24. Bridenbaugh and Minor are also wrong where they discuss other components whose potential salvage value would allegedly be lost. All of these components are already irradiated at least to the same degree as the fuel.

a. While control rods could potentially be salvaged for use at other reactors, control rod drives are now in constant use. Indeed, they are used virtually every day at Shoreham. No other facility would

rationally use them without a major overhaul. It is unlikely that any other facility would want to install used parts in its reactor. Accordingly, control rod drives have no effective salvage value.

b. The 31 local power range monitors have no salvage value for all practical purposes. There have been technological advances in local power range monitors which are employed in those now being marketed. No other utility would want to use LILCO's irradiated local power range monitors which do not incorporate these technological advances.

c. Neutron sources are irradiated when purchased. They begin decaying immediately and have a half-life of approximately 60 days unless the reactor reaches 5% of rated power. Therefore, Phase III and IV testing would not eliminate the salvage value of the source range monitors, but instead would increase their useful life for LILCO. Even before Phase III testing, they have no value to any other utility because sources cannot be irradiated except in a commercial reactor. After initial irradiation in the test reactor, the source pins are machined such that they cannot be reinserted into the test reactor.

25. The statement of Bridenbaugh and Minor concerning worker exposure to radiation is misleading. (Affidavit ¶ 10). The level of this exposure has been approved and is bounded by the Shoreham FSAR. Most importantly, failure to proceed promptly to Phase III and IV testing may in fact increase the amount of exposure to workers. This is because failure to reach 5% power will necessitate the more immediate changing of neutron sources, which, in turn, will require entering the reactor vessel.

26. Even if one assumes that Shoreham never reaches commercial operation, the incremental cost of proceeding to Phases III and IV is only $13 million, not the $60-65 million plus $2 million plus uncounted "tens of millions" as postulated by Bridenbaugh and Minor. If Shoreham is assumed to ultimately reach commercial operation, the incremental cost of proceeding to Phases III and IV is zero.

27. It is not surprising that Bridenbaugh and Minor would make such erroneous statements since neither is qualified as a nuclear fuel specialist, nor has extensive operational experience in nuclear plants. The evidentiary record discloses that Minor has never operated a nuclear power plant, has never been licensed to operate a nuclear power plant and has never been responsible for operating any power generation equipment. (Tr. 2423-28) Similarly, Bridenbaugh has never been licensed to operate a nuclear power plant. (Tr. 2428). Their partnership, MHB, spends 50-80% of its time preparing or giving testimony, rather than in

actual practice of nuclear engineering. (Tr. 2426-27). And, their Affidavit indicates no experience or special education concerning testing of nuclear power plants, marketing of nuclear fuel, radiation effects or any other matter qualifying them to render opinions concerning the incremental effects of Phase III and IV testing at Shoreham. In my opinion, the qualifications of such professional witnesses cannot compare with experienced nuclear operators and engineers such as are employed at Shoreham who have determined the accuracy of the statements in this and my earlier affidavits.

State of New York :
: To-Wit:
County of Suffolk :

John D. Leonard, Jr.

John D. Leonard, Jr.

Subscribed to and sworn before me this 24th day of June, 1985.

LINDA A. CRATTY
NOTARY PUBLIC, State of New York
No. 4816267
Qualified in Suffolk County
Commission Expires March 30, 1986

Linda A. Cratty

Notary Public

My Commission expires: March 30, 1986

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

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

AFFIDAVIT OF JACK A. NOTARO
AND WILLIAM E. GUNTHER, JR.

Jack A. Notaro and William E. Gunther, Jr., being duly sworn, depose and state as follows:

(1) My name is Jack A. Notaro and I have been the Chief Operating Engineer for the Shoreham Nuclear Power Station (SNPS) since April 1983. Prior to that time, from July 1978 through April 1983, I was assigned as Operating Engineer for Shoreham. During March-April 1981, I was assigned to the Operations Section of the Millstone Nuclear Power Station for the completion of a refueling outage and power operation training at greater than 20% power. My duties and responsibilities as Chief Operating Engineer of Shoreham include the formulation and implementation of the training programs for all station personnel, direction of the day-to-day operation of the unit, including startup operation and shutdown of all station equipment and development and review of the Operation Section of the Station Operation Manual and the overall management of the Operations, Training and Security sections of the station.

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(2) I have a Bachelor of Mechanical Engineering degree (1970) and a Master of Business Administration degree (1974). I completed the General Electric BWR simulator program in July 1976 and obtained certification at the RO and SRO levels. In November 1982, I obtained a Senior Reactor Operator license on Shoreham.

(3) My name is William E. Gunther, Jr. and I have been the Operating Engineer for Shoreham since April 1983. My duties and responsibilities include the direction of the day-to-day operation and shutdown of all station equipment, final verification of all operating procedures, participation in initial requalification and replacement training programs for licensed and unlicensed operators and the establishment and maintenance of system operability to support fuel load.

(4) I have a Bachelor of Science degree in Electrical Engineering (1970) and a Master of Science degree in Electrical Engineering (1971). I earned a Senior Operator Certification from the General Electric Company on the Brunswick Unit 2 BWR in 1975 and I completed the General Physics Company BWR simulator program in December 1981 and obtained certification at the RO and SRO levels. In November 1982, I obtained a Senior Reactor Operator license on Shoreham.

(5) The purpose of this affidavit is to describe the steps involved in the following phases:

Phase I:	Fuel Loading and Precriticality Testing
Phase II:	Cold Criticality Testing
Phase III:	Heatup and Low Power Testing to Rated Pressure/Temperature Conditions (approximately 1% rated power)
Phase IV:	Low Power Testing (1-5% rated power)

These various phases will be described below, with a brief explanation of the testing and operations to be conducted during each phase.

Phase I: Fuel Loading and Precriticality Testing

(6) Fuel loading and precriticality testing involve placing fuel in the vessel and conducting various tests of reactor systems and support systems. Initial core loading involves the placement of 560 fuel bundles in specified locations within the reactor vessel. This major step requires significant testing as fuel loading progresses, and it takes at least 288 hours. The following testing is associated with initial core loading:

(A) Water chemistry surveillance testing. This testing must be performed prior to, during and after the fuel loading operation. The purpose of water chemistry surveillance testing is to ensure clarity of the water so that the fuel loading process can proceed and to minimize the amount of the corrosion products in the primary system.

(B) Control rod drive stroke time and friction tests. These tests are performed during the fuel loading step to ensure that the reactor shutdown capability is maintained at all times and to ensure the control rod drive mechanisms are performing as designed.

(C) Installation, calibration and utilization of special startup neutron instrumentation. This instrumentation is required for core loading activities to ensure proper monitoring of core conditions by the Operating, Reactor Engineering and Instrumentation and Control personnel. Source range monitor testing and alignment tests calibrate the neutron monitoring instrumentation and verify proper final alignment of this vital equipment.

(D) Core verification instrument operability check. These checks are performed to verify that the equipment utilized to determine that the core has been loaded correctly is operable. Final core verification checks are completed at this time.

The tests listed in (A) through (D) above involve valuable supplemental training and experience for personnel assigned to the Reactor Engineering Section, Radiochemistry Section, Operating Section, Maintenance Section and Instrumentation and Control Section. The training described in

steps (B), (C) and (D) can be fully accomplished only during the fuel load operation.

(7) Following placement of the fuel in the vessel, a number of tests must be performed to verify the operability of systems prior to going critical in the reactor. This phase of startup testing takes approximately 150 hours and includes the following:

(A) Local Power Range Monitor (LPRM) sensitivity data. During this test, the 31 local power range monitor strings are calibrated and verified to be operable. Instrumentation and control technicians will perform this testing, and obtain training in the use of calibration procedures and special test equipment.

(B) Zero power radiation survey for background readings. Various locations in the plant are surveyed by health physics technicians to determine background radiation levels with fuel in the vessel.

(C) Recirculation system instrument calibration checks. Operation of the recirculating pumps with fuel in the vessel is conducted to determine core internal pressure drops and to verify system performance. Operation of the system above minimum speeds with the vessel internals installed can be accomplished only with fuel in the reactor.

(D) Control rod drive scram time testing. Following fuel load, each control rod drive mechanism is scrammed from its full withdrawn position following control rod coupling surveillance testing to verify that rod insertion can be accomplished within the prescribed time.

(E) Cold MSIV timing. This functional test of the main steam isolation valves verifies that their opening and closing times are within technical specification acceptance criteria.

Again, the testing and activities described in (A) through (D) above can be accomplished only after fuel has been placed in the vessel. The experience and training gained from these activities will be an invaluable Shoreham-specific augmentation to the years of extensive preoperational training that the reactor operators have previously undergone.

Phase II: Cold Criticality Testing

(8) This phase involves a specified control rod withdrawal sequence that results in achieving reactor criticality at extremely low power levels (.0001% to .001% of rated thermal power). In addition, this step involves shutdown of the reactor by inserting all control rods in reverse order. While withdrawing each rod, reactor operators monitor the effect of its withdrawal in terms of neutron flux. By analysis and calculation, Reactor Engineering personnel are able to assign a "worth" to each control rod, i.e., the effectiveness of each rod in controlling reactivity. Important operator hands-on experience is gained during this step. Reactor operators must annually perform a minimum of ten reactivity control

manipulations. This experience provides additional training for reactor operators in the use of appropriate instrumentation and equipment to determine when criticality is achieved during the withdrawal of control rods. This important experience on the Shoreham reactor can be gained only after fuel has been placed in the vessel. Similarly, Reactor Engineering personnel obtain valuable training and experience during this closely monitored activity. LILCO plans to repeat the operations during this phase of low power testing to offer each operating shift crew this valuable BWR experience.

(9) Cold criticality testing requires plant maintenance personnel to install vessel internals in accordance with station procedures and with all refuel floor constraints in place. Maintenance personnel gain experience with the operation of the refuel bridge and reactor building crane.

(10) Also performed at this time is the installation of the expansion and vibration instrumentation. Cold baseline data are obtained at this point to determine pipe movement as heatup occurs later in the low power test program. The data provide a benchmark against which subsequent test results can be assessed.

(11) During the course of fuel loading, precriticality testing, and cold criticality testing, the plant staff must place in service, operate, test, and maintain 41 systems. These reactor systems and support systems include the following:

Control Rod Drive System (CRD)
Core Spray System
Diesel Generator
4160 V System
480 V System
120 V AC Instrument Bus
120 V AC Reactor Protection System (RPS)
120 V AC Ininterrupted Power Supply
125 V DC System
24 V DC System
Low Pressure Coolant Injection (LPCI)
HVAC-Drywell Cooling
Reactor Building Closed Loop Cooling Water System (RBCLCW)
Reactor Building Normal Ventilation System (RBNVS)
Residual Heat Removal System (RHR)
Reactor Recirculation System
Service Water
Reactor Building Standby Ventilation System (RBSVS)
Standby Liquid Control System
Condensate System
Feedwater System
HVAC - Control Room
HVAC - Turbine Building
Reactor Water Cleanup System
Station Air System
Turbine Building Closed Loop Cooling System
Containment Area Leakage Detection System
RBSVS & CRAC Chilled Water Systems
Neutron Monitoring Instrumentation
Reactor Manual Control
Radwaste Liquid Collection and Processing
Circulating Water
Demineralized Water
Well Water and Domestic Water System
Normal Station Service Transformer and 138 KV System
Reserve Station Service Transformer and 69 KV System

Fire Protection System
Fire Suppression System
Reactor Vessel Water Level
Radiation Monitoring System
Heat Tracing System

The operation of these systems provides valuable training and experience to operating plant personnel, including licensed operators. LILCO plans to repeat certain of the activities in this phase of low power testing to provide additional, valuable BWR operating experience. It is estimated that there will be 5000 total manhours of training accomplished and achieved during fuel loading, precriticality testing, and cold criticality testing described above.

Phase III: Heatup and Low Power Testing to Rated <u>Pressure/Temperature Conditions (Approximately 1% Rated Power)</u>

(12) During this phase of low power testing, reactor heatup and pressurization commences and the power level is taken in progressive steps to 1% of rated power. Along the way, the heatup and pressurization of the reactor vessel and associated piping systems enables the plant staff to perform important tests relating to thermal expansion of piping and integrated system operation under actual operating conditions. The principal steps associated with this phase of low power testing are described below.

(13) Rod withdrawal sequences are followed to achieve criticality and system heatup from ambient conditions to 150 psig. During this step, the following tests and training are accomplished:

(A) Conduct Source Range Monitor (SRM) response testing to verify source range monitoring calibration and response;

(B) Establish condenser vacuum following establishment of steam seals and other main turbine auxiliary systems;

(C) Obtain initial baseline readings for Nuclear Steam Supply (NSS) system thermal expansion;

(D) Place steam jet air ejectors in service on main steam;

(E) Achieve warmup of the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) systems;

(F) Achieve controlled warmup of reactor feed pump turbines and integrated operations of the condensate and feedwater systems;

(G) Obtain Intermediate Range Monitor/Source Range Monitor (IRM/SRM) overlap data;

(H) Obtain Intermediate Range Monitor (IRM) range 6-7 overlap data; and

(I) Perform an Average Power Range Monitor (APRM) calibration while heating up.

Operating personnel and instrumentation and control

technicians receive valuable training and experience in the course of these steps.

(14) With the reactor at 150 psig and during the continued heatup from 150 to 250 psig, the following system tests are performed:

(A) Drywell inspection;

(B) Data gathering for Nuclear Steam Supply (NSS) system thermal expansion;

(C) Data gathering for Balance of Plant (BOP) system thermal expansion;

(D) Operation of Main Turbine Electro-Hydraulic Control (EHC) System;

(E) Data gathering for Reactor Building Closed Loop Cooling Water (RBCLCW) steady state performance;

(F) RCIC initial operability demonstration with manual start and hot quickstart, condensate storage tank (CST) to CST recirculation;

(G) Motor Operated Valve (MOV) dynamic testing on Residual Heat Removal (RHR) system;

(H) HPCI initial operability demonstration with manual starts and hot quickstarts, CST to CST recirculation;

(I) Maintenance of suppression pool within technical specifications using RHR suppression pool cooling;

(J) Operation of steam seal evaporator, radwaste evaporator and main condenser deaerating system;

(K) Verification of capability to shut down the reactor from outside the control room utilizing the Remote Shutdown Panel.

(15) With the reactor at 250 psig and during the continued heatup from 250 psig to 350 psig, the following testing is performed:

(A) Maintain EHC pressure setpoint at 250 psig and withdraw control rods to open turbine bypass valves (BPV) for Safety Relief Valve (SRV) testing;

(B) Functionally test the Safety Relief Valves (SRV) manually opening one SRV at a time;

(C) Obtain drywell piping vibration data while performing the SRV tests;

(D) Gather data for system thermal expansion tests.

(16) With the reactor coolant system pressure between 350 psig and 550 psig, the following testing is performed:

(A) Place one reactor feedwater pump and the low flow feedwater controller in service and monitor their operation to ensure that they perform their function of supplying water to the reactor vessel at the appropriate flow rate;

(B) Gather data for system thermal expansion tests;

(C) Perform Average Power Range Monitor (APRM) heatup rate calibration;

(D) Verify loose parts monitoring system operability.

(17) With the reactor coolant system pressure between 550 psig and 800 psig, the following testing is performed:

(A) Conduct a drywell temperature inspection and gather data for system thermal expansion tests;

(B) Obtain Reactor Building Closed Loop Cooling Water System (RBCLCW) performance data;

(C) Scram selected control rods to obtain scram time data.

(18) With the reactor coolant system pressure at 800 psig and heatup to 920 psig, the following occurs:

(A) Scram selected control rods for scram time data;

(B) Obtain system thermal expansion data for nuclear steam supply systems and balance of plant systems.

Phase IV: Low Power Testing (1-5%)

(19) During this phase of low power testing, the power level is taken in progressive steps from 1% to 5% of rated thermal power. With the reactor coolant system at rated temperature and pressure, the operator will withdraw rods and open one Main Turbine bypass valve to establish a steam flow such that core thermal power is less than 5% rated thermal power. Once this condition is established, the following tests are performed:

(A) Demonstrate RCIC operability;

(B) Demonstrate HPCI operability;

(C) Perform dynamic motor operated valve tests, inservice leak tests and hot hanger sets on plant systems;

(D) Align Traversing Incore Probe (TIP);

(E) Calibrate the bottom reactor pressure vessel head drain line flow indicator and perform main steam isolation valve functional tests;

(F) Perform RCIC and HPCI controller tests (CST to CST recirculation); and

(G) Perform IRM/APRM overlap calibration.

(20) After the completion of the tests just listed, the first cooldown to ambient conditions will commence. During this cooldown, the following activities take place:

(A) Perform source range monitor/intermediate range monitor overlap calibration;

(B) Position one turbine bypass valve so that core thermal power is less than 5% and maximum steam flow is available for HPCI;

(C) Perform a HPCI/RCIC stability test to demonstrate the stability of the controller setting from the 1000 psig test;

(D) Perform a drywell and reactor building inspection of system thermal expansion instruments.

(21) Then comes a second heatup to rated conditions. During this heatup, the key activities include:

> (A) Demonstration of the source range and intermediate range monitor response to control rod withdrawal;
>
> (B) Gathering of system thermal expansion data;
>
> (C) Calibration of the average power range monitors.

(22) When the plant is at rated temperature and pressure, the plant staff verifies that core thermal power is less than 5% rated thermal power by performing a heat balance. After the verification of core thermal power is complete, a RCIC cold quickstart and endurance run are performed.

(23) Subsequent to the completion of the second test period at 920 psig, the plant will be cooled down to ambient conditions. During this cooldown, the plant will obtain nuclear steam supply system thermal expansion data for the second time. When ambient conditions are reached, the low power tests are concluded. Repeated startups and heatups to rated conditions will be performed at Shoreham, however, so that <u>each</u> operating crew can be given the opportunity to experience plant response to the tests and activities presented above.

(24) In order to support and perform all of the functions and tests performed during Phases III and IV described above, the plant staff will be required to place in service, operate, test and maintain 54 plant systems. In addition to the reactor systems and support systems listed in paragraph 12 above, these are as follows:

Automatic Depressurization System (ADS)
HPCI
Offgas System
RCIC
Generator Seal Oil System
Main Steam System
Turbine Generator
Turbine EHC
Turbine Lube Oil System
Steam Seal System
Area Leakage Detection
Reactor Vessel Pressure and Temperature Systems
Remote Shutdown System

It is important to emphasize once more that the operation of these systems and the various functions and tests performed during Phases III and IV of low power testing, as with the activities during Phases I and II, will provide valuable training and experience to operating plant personnel, including licensed operators. As noted in this affidavit LILCO intends to expand the fuel load and precriticality testing, cold criticality testing and low power testing activities to provide Shoreham's operating personnel with additional operating experience above

that which would result from a conventional fuel load and low power testing program. It is estimated that 6000 manhours of training will occur during Phases III and IV, in addition to the 5000 manhours during Phases I and II.

Jack A. Notaro

William E. Gunther, Jr.

STATE OF NEW YORK)
COUNTY OF SUFFOLK) To-wit:
)

Subscribed and sworn to before me this 30 day of March, 1984.

My commission expires: March 30, 1985.

Notary Public

CONNIE-MARIA PARDO
NOTARY PUBLIC, State of New York
No. 52-'6153-10
Qualified in Suffolk County
Commission Expires March 30, 1985

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

MARIO M. CUOMO, GOVERNOR OF THE STATE OF NEW YORK and COUNTY OF SUFFOLK, Petitioners,	)	
v.	)	Docket No. 85-1042 Emergency Motion
UNITED STATES NUCLEAR REGULATORY COMMISSION, Respondent,	)	
and	)	
LONG ISLAND LIGHTING COMPANY, Intervenor.	)	

CERTIFICATE OF SERVICE

I hereby certify that an executed copy of the Affidavit of John D. Leonard, Jr., dated June 19, 1985, with attached Affidavit of Jack A. Notaro and William E. Gunther, Jr., dated March 30, 1984, was served this date on each of the following by U.S. mail, first class, postage prepaid:

Martin Bradley Ashare, Esq.
Suffolk County Attorney
Suffolk County Department of Law
H. Lee Dennison Building
Veterans Memorial Highway
Hauppauge, New York 11788

Lawrence Coe Lanpher, Esq.
Karla J. Letsche, Esquire
Kirkpatrick & Lockhart
1900 M Street, NW
8th Floor
Washington, DC 20036
(Courtesy Copy)

Robert G. Perlis, Esq.
Office of the Executive
Legal Director
United States Nuclear Regulatory
Commission
Washington, DC 20555

William H. Briggs, Jr., Esq.
Michael B. Blume, Esq.
Office of the General Counsel
United States Nuclear Regulatory
Commission
Washington, DC 20555

Peter B. Steenland, Esq.
Jacques B. Gelin, Esq.
Appellate Section
Land and Natural Resources
Division
Department of Justice
9th and Pennsylvania Avenue, NW
Washington, DC 20530

Fabian Palomino, Esq.
Executive Chamber, Room 229
Capitol Building
Albany, New York 12224

Donald P. Irwin

Hunton & Williams
707 East Main Street
Post Office Box 1535
Richmond, Virginia 23212

DATED: June 27, 1985

HUNTON & WILLIAMS
707 EAST MAIN STREET P.O. BOX 1535
RICHMOND, VIRGINIA 23212
TELEPHONE 804-788-8200
TWX-710-956-0061

2000 PENNSYLVANIA AVENUE, N.W.
P. O. BOX 19230
WASHINGTON, D.C. 20036
TELEPHONE 202-955-1500

FIRST VIRGINIA BANK TOWER
P. O. BOX 3889
NORFOLK, VIRGINIA 23514
TELEPHONE 804-625-5501
TELEX 755628

4011 CHAIN BRIDGE ROAD
FAIRFAX, VIRGINIA 22030
TELEPHONE 703-352-2200

299 PARK AVENUE
NEW YORK, NEW YORK 10171
TELEPHONE 212-980-8200
TELEX 754708

B B & T BUILDING P. O. BOX 109
RALEIGH, NORTH CAROLINA 27602
TELEPHONE 919-828-9371

FIRST TENNESSEE BANK BUILDING
P. O. BOX 951
KNOXVILLE, TENNESSEE 37901
TELEPHONE 615-637-4311

FILE NO.

DIRECT DIAL NO. 804 788-

June 27, 1985

Mr. George A. Fisher, Clerk
U. S. Court of Appeals for the
District of Columbia Circuit
Room 5419, United States Courthouse
3rd & Constitution Avenue, N.W.
Washington, D.C. 20001

Mario M. Cuomo, et al. v. USNRC, et al.,
No. 85-1042: Emergency Motion for Stay

Dear Mr. Fisher:

Enclosed you will find the original and three copies of the executed Affidavit of John D. Leonard, Jr., dated June 19, 1985, with an attachment consisting of the Affidavit of Jack A. Notaro and William E. Gunther, Jr. Mr. Leonard's affidavit, not yet executed because of time constraints, was attached to the June 25 Response of [Intervenor] Long Island Lighting Company to Emergency Stay Motion. Please substitute this version of Mr. Leonard's affidavit for the unexecuted version, to which it is otherwise identical.

Very truly yours,

Donald P. Irwin
Counsel for Long Island
Lighting Company

Enclosure

CERTIFICATE OF SERVICE

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

I hereby certify that copies of a letter, dated July 2, 1985, from Donald P. Irwin to the NRC Commissioners and the Appeal Board, with attached Affidavit of John D. Leonard and attachment thereto, were served this date upon the following by U.S. mail, first-class, postage prepaid:

Chairman Nunzio J. Palladino
U.S. Nuclear Regulatory
Commission
1717 H Street, N.W.
Washington, D.C. 20555

Commissioner James K. Asselstine
U.S. Nuclear Regulatory
Commission
1717 H Street, N.W.
Washington, D.C. 20555

Commissioner Lando W. Zech, Jr.
U.S. Nuclear Regulatory
Commission
1717 H Street, N.W.
Washington, D.C. 20555

Commissioner Frederick M. Bernthal
U.S. Nuclear Regulatory
Commission
1717 H Street, N.W.
Washington, D.C. 20555

Commissioner Thomas M. Roberts
U.S. Nuclear Regulatory
Commission
1717 H Street, N.W.
Washington, D.C. 20555

Alan S. Rosenthal, Chairman
Atomic Safety and Licensing
Appeal Board, United States
Nuclear Regulatory Commission
Fifth Floor (North Tower)
East West Towers
4350 East-West Highway
Bethesda, Maryland 20814

Gary J. Edles
Atomic Safety and Licensing
Appeal Board, United States
Nuclear Regulatory Commission
Fifth Floor (North Tower)
East West Towers
4350 East-West Highway
Bethesda, Maryland 20814

Howard A. Wilber
Atomic Safety and Licensing
Appeal Board, United States
Nuclear Regulatory Commission
Fifth Floor (North Tower)
East West Towers
4350 East-West Highway
Bethesda, Maryland 20814

Judge James L. Kelley,
  Chairman
Atomic Safety and Licensing
  Board
U.S. Nuclear Regulatory
  Commission
Fourth Floor
East-West Towers (West Tower)
4350 East-West Highway
Bethesda, MD 20814

Judge Glenn O. Bright
Atomic Safety and Licensing
  Board
U.S. Nuclear Regulatory
  Commission
Fourth Floor
East-West Towers (West Tower)
4350 East-West Highway
Bethesda, MD 20814

Mr. Marc W. Goldsmith
Energy Research Group
4001 Totten Pond Road
Waltham, Massachusetts 02154

Lawrence Brenner, Esq.
Atomic Safety and Licensing
  Board Panel
U.S. NRC
4350 East-West Highway
Fourth Floor (West Tower)
Bethesda, Maryland 20814

Dr. Peter A. Morris
Atomic Safety and Licensing
  Board Panel
U.S. NRC
4350 East-West Highway
Fourth Floor (West Tower)
Bethesda, Maryland 20814

Dr. George A. Ferguson
Atomic Safety and Licensing
  Board Panel
U.S. NRC
4350 East-West Highway
Fourth Floor (West Tower)
Bethesda, Maryland 20814

Secretary of the Commission
U.S. Nuclear Regulatory
  Commission
Washington, D.C. 20555

MHB Technical Associates
1723 Hamilton Avenue
Suite K
San Jose, California 95125

Judge Elizabeth B. Johnson
Oak Ridge National Laboratory
P.O. Box X, Building 3500
Oak Ridge, Tennessee 37830

Edwin J. Reis, Esq.
Bernard M. Bordenick, Esq.
Office of the Executive
  Legal Director
United States Nuclear
  Regulatory Commission
Maryland National Bank Bldg.
7735 Old Georgetown Road
Bethesda, MD 20814

Honorable Peter Cohalan
Suffolk County Executive
County Executive/
  Legislative Building
Veteran's Memorial Highway
Hauppauge, New York 11788

Fabian G. Palomino, Esq.
Special Counsel to the
  Governor
Executive Chamber, Room 229
State Capitol
Albany, New York 12224

Stephen B. Latham, Esq.
Twomey, Latham & Shea
33 West Second Street
Post Office Box 398
Riverhead, New York 11901

Mr. Martin Suubert
c/o Congressman William Carney
113 Longworth House
  Office Bldg.
Washington, D.C. 20515

James Dougherty, Esq.
3045 Porter Street, N.W.
Washington, D.C. 20008

Jay Dunkleberger, Esq.
New York State Energy Office
Agency Building 2
Empire State Plaza
Albany, New York, 12223

Johathan D. Feinberg, Esq.
State of New York
Department of Public Service
Three Empire State Plaza
Albany, New York 12223

Howard L. Blau
217 Newbridge Road
Hicksvile, New York 11801

Stephen B. Latham, Esq.
Twomey, Latham & Shea
33 West Second Street
P. O. Box 398
Riverhead, New York 11901

Ralph Shapiro, Esq.
Cammer and Shapiro, P.C.
9 East 40th Street
New York, New York 100016

Martin Bradley Ashare, Esq.
Suffolk County Attorney
H. Lee Dennison Building
Veterans Memorial Highway
Hauppauge, New York 11788

Docketing and Service Branch
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Herbert H. Brown, Esq.
Lawrence Coe Lanpher, Esq.
Karla J. Letsche, Esq.
Kirkpatrick & Lockhart
1900 M Street, NW
8th Floor
Washington, DC 20036
(Courtesy Copy)

Robert G. Perlis, Esq.
Office of the Executive Legal Director
United States Nuclear Regulatory Commission
Washington, DC 20555

William H. Briggs, Jr., Esq.
Michael B. Blume, Esq.
Office of the General Counsel
United States Nuclear Regulatory Commission
Washington, DC 20555

Peter B. Steenland, Esq.
Jacques B. Gelin, Esq.
Appellate Section
Land and Natural Resources Division
Department of Justice
9th and Pennsylvania Avenue, NW
Washington, DC 20530

Donald P. Irwin

Hunton & Williams
707 East Main Street
Post Office Box 1535
Richmond, Virginia 23212

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