

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. 50-322-1  
(OL)

AFFIDAVIT OF ANDREW J. SZUKIEWICZ  
IN RESPONSE TO ALAB-788

I, Andrew J. Szukiewicz, depose and say:

1. I am a Task Manager within the Generic Issues Branch, Division of Safety Technology, Office of Nuclear Reactor Regulation, United States Nuclear Regulatory Commission. A statement of my Professional Qualifications is attached. This Affidavit is submitted in response to that portion of ALAB-788 dealing with Unresolved Safety Issue (USI) A-47.
2. In summary, USI A-47 concerns the potential for transients or accidents being made more severe as a result of control system failures or malfunctions. These failures or malfunctions may occur independently or as a result of the accident or transient under consideration. One concern is the potential for a single failure-- such as a loss of a power supply, short circuit, open circuit, or sensor failure--to cause simultaneous malfunction of several control features. Such an occurrence could conceivably result in a

transient more severe than those transients analyzed as anticipated operational occurrences. A second concern is that a postulated accident could cause control system failures that would make the accident more severe than analyzed. Accidents could conceivably cause control system failures by creating a harsh environment in the area of the control equipment or by physically damaging the control equipment. Although it is generally believed that such control system failures would not lead to serious events or result in conditions that safety systems could not safely handle, indepth studies have not been rigorously performed to verify this belief. The potential for an accident that would affect a particular control system, and effects of the control system failures, may differ from plant to plant. Therefore, it may not be possible to develop generic answers to all these concerns; it is, however, possible to develop generic criteria that can be used for future plant-specific reviews. The purpose of the USI A-47 task is to verify the adequacy of existing criteria for control systems or propose additional criteria (if necessary) that will be used for plant-specific review.

3. The Shoreham safety systems have been designed with the goal of ensuring that control system failures (either single or multiple) will not prevent automatic or manual initiation and operation of any safety system equipment required to trip the plant or to maintain the plant in a safe shutdown condition following any anticipated operational occurrence or accident. This has been

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- accomplished by either providing independence between safety- and nonsafety-grade systems or providing isolating devices between safety- and nonsafety-grade systems. These devices preclude the propagation of nonsafety-grade system equipment faults so that operation of the safety-grade system equipment is not impaired.
4. A wide range of bounding transients and accidents is presently analyzed to ensure that the postulated events would be adequately mitigated by the safety systems. In addition, systematic reviews of safety systems have been performed with the goal of ensuring that the control system failures (single or multiple) will not defeat safety system action.
  5. In addition, and as noted in ALAB-788, the applicant has been requested by virtue of NRC Information Notice 79-22, "Qualification of Control Systems," September 17, 1979 to (1) review the possibility of consequential control system failures that exacerbate the effects of high-energy line breaks (HELBs) and (2) adopt new operator procedures, where needed, to ensure that the postulated events would be adequately mitigated. As part of the review, the staff is also evaluating the applicant's qualification program to ensure that equipment that may potentially be exposed to HELB environments has been adequately qualified or an adequate basis has been provided for not qualifying the equipment to the limiting hostile environment. The staff's evaluation of the applicant's response to Information Notice 79-22 and the adequacy of the Shoreham qualification program are reported in Section 7.7.1 of SSER 4 and Section 3.11 of SSER 7. The Staff's conclusions in this

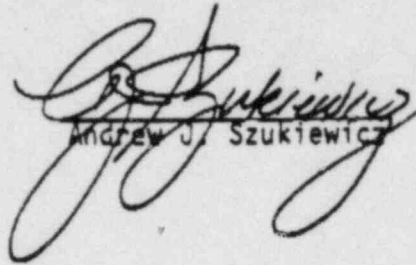
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regard are set forth in the affidavit of Jerry L. Mauck (Mauck Affidavit) and in the affidavit of Robert G. LaGrange (submitted in connection with the portion of ALAB-788 dealing with "environmental qualification").

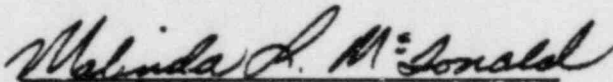
6. With the recent emphasis on the availability of postaccident instrumentation (Regulatory Guide 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant Conditions During and Following an Accident"), the staff evaluates the designs to ensure that control system failures will not deprive the operator of information required to maintain the plant in a safe shutdown condition after any anticipated operational occurrence or accident. The applicant was requested to evaluate the Shoreham control systems and identify any control systems whose malfunction could impact plant safety. The applicant has been requested to document the degree of interdependence of these identified control systems and identify the use (if any) of common power supplies and the use of common sensors or common sensor impulse lines whose failure could have potential safety significance. These reviews and the staff's evaluation are contained in Section 7.7.2 of SSER 4. A summary of the Staff's evaluations is set forth in the Mauck Affidavit.
7. In addition, IE Bulletin 79-27 ("Loss of Non-Class IE Instrumentation and Control Power System Bus During Operation," November 30, 1979) was issued to the applicant requesting that evaluations be performed to ensure the adequacy of plant procedures for accomplishing shutdown on loss of power to any electrical bus supplying power for instruments and controls. The results of this

review are contained in SSER 4, Section 7.5 and are also summarized in the Mauck Affidavit.

- 8. On the basis of the above considerations, the Staff is able to conclude that USI A-47 does not prevent the staff from concluding that there is reasonable assurance that Shoreham can be operated, at any power level, before the ultimate resolution of this generic issue without endangering the health and safety of the public.

  
 Andrew J. Szukiewicz

Subscribed and sworn to before me  
this 13<sup>th</sup> day of November, 1984

  
 Notary Public

My Commission expires: 7/1/86

STATEMENT OF PROFESSIONAL QUALIFICATIONS

Andrew J. Szukiewicz

I have been with the U. S. Nuclear Regulatory Commission (NRC) since August 1973. Since March 1981, I have been the Task Manager of the Unresolved Safety Issue Task A-47, "Safety Implications of Control Systems" in the Generic Issues Branch, Division of Safety Technology, Office of Nuclear Reactor Regulation (NRR). I am responsible for (1) developing and implementing a Task Action Plan which defines the staff's activities to resolve this generic issue, and (2) coordinating the research activities of National Laboratories that will be assigned to evaluate the sub-tasks identified in the action plan.

From June 1979 to March 1981 I was the Task Manager of Unresolved Safety Issue A-24, "Environmental Qualification of Safety-Related Electrical Equipment," Division of Unresolved Safety Issues, Program Office of NRR. I was the principle author and coordinator of NUREG-0588 which developed the interim staff position on environmental qualification of safety-related electrical equipment.

From August 1973 to June 1979 I was a senior reactor engineer in the Instrumentation and Control Systems Branch. I performed operating license reviews of the Davis Besse Unit 1 and the Arkansas Nuclear One, Unit #2 instrumentation and control system designs and the instrumentation and control system reviews of the Construction Permit applications for the Greenwood Units 1 and 2 and the Bellefonte Units.

I have a Bachelor of Science degree (1965) in Electrical Engineering from the State University of New York at Buffalo (formerly the University of Buffalo).

From June 1965 to August 1973 I served as the Instrumentation and Control Systems Engineer for the Bailey Meter Company (subsidiary of the Babcock and Wilcox Company). I was assigned as systems start-up engineer for

instrumentation and control systems for large and medium size electric generating stations (1000 MW to 160 MW), both in the United States and overseas. My duties included supervising the commissioning and the tuning of the automatic control systems for minimum and maximum load varying operations for nuclear as well as fossil fuel type plants.

I am also a past member of the IEEE Standards Committee Working Group (1978 - 1979) on Environmental Qualifications of Safety Related Equipment, and participated in lectures and panel discussions (1980 - 1981) in IEEE sponsored continuing education programs on safety-related systems qualification.

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