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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

NRC STAFF RESPONSE TO LICENSING
BOARD ORDER OF APRIL 9, 1985

On April 9, 1985, the Licensing Board issued an Order raising certain questions involving the relationship between Part 73 and the offsite release limits of 10 CFR § 100.11. The Staff herein responds to the Board's questions.

1(a)

In this question, the Board inquired whether the present record would support findings on the magnitude of offsite releases likely to be associated with the most serious credible low power LOCA at Shoreham. The present record contains neither a quantification of offsite releases associated with a large break LOCA at Shoreham occurring during low power operation nor an assessment of how credible an event such a design basis LOCA is at low power. All the record indicates is that the limits of 10 CFR §50.46(b) (including the maximum peak cladding temperature of 2200° F) would not be reached in the event of a LOCA if AC power were restored within 55 minutes. See Initial Decision, 20 NRC 1343, 1363-67. If the

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peak cladding temperature stays within the Section 50.46(b) limits, no fission products will be released from the fuel and there will be no significant offsite releases. The record is silent as to what releases could occur if AC power is not restored within 55 minutes and the peak cladding temperature exceeds the Section 50.46(b) limits.

1(b)

The Board asks whether a LOCA at low power could lead to offsite releases in excess of those identified in 10 CFR §100.11. As indicated in the answer to Question 1(a), if AC power is restored within 55 minutes, releases will certainly not exceed Part 100 limits. To assist in the preparation of this response, the Staff asked Brookhaven National Labs (BNL) to calculate fuel temperatures in a BWR similar to Shoreham for the case of a large-break LOCA at 5% power with no restoration of AC power. BNL assumed that the plant would operate at 5% power for one year before the event. Using the MARCH code, BNL estimates that it could take about six hours for the fuel cladding temperature to reach 2200°F. This number exceeds the 55 minute figure used at the Part 50 exemption hearing because the MARCH calculation, although conservative, is not as conservative for low power operation as the 10 CFR Part 50, Appendix K model used during the earlier hearing. The Staff and BNL do not have any specific consequence calculations for this event (LOCA with no AC power restoration) at Shoreham, but do have some estimates for other light water reactors, both PWR's and BWR's. It is the Staff's and BNL's judgment that an unmitigated large break LOCA at 5% power operation would likely not result in offsite doses exceeding the Part 100 limits. Rough estimates of doses at the site boundary are approximately 1 Rem whole body. A more definitive response using specific data for Shoreham could not be provided in the time available; such a response would require a more complex computer model and would take several months to develop.

1(c)

This question asks whether a knowledgeable saboteur could intentionally increase the levels of offsite radiation that would otherwise be associated with an accidental LOCA. The Staff believes the conservative answer to this question is yes. However, the Staff has not performed any analysis to quantify this response; in other words, we do not know how significant the incremental releases associated with any acts of sabotage would be.

1(d)

This question asks whether Part 73 should have any application to low power operation if Questions 1(b) and 1(c) are answered in the negative, offsite exposures associated with a low power LOCA are unlikely to exceed Part 100 exposure limits, and an adequate onsite emergency plan is in place to protect plant employees. In the first place, the Staff does not believe at this time that Questions 1(b) and 1(c) can be answered in the negative. One additional point needs to be made. The release limits in Part 100 affect the siting of nuclear plants; there is nothing in either Part 100 or Part 73 which establishes any connection between the limits in Part 100 and Part 73. Part 73 defines "radiological sabotage" as any act which could "directly or indirectly endanger the public health and safety by exposure to radiation." 10 CFR §73.2(p). Part 73 is designed to provide protection against acts of radiological sabotage; there is nothing in the Commission's regulations which indicates that Part 73 is automatically satisfied if offsite releases do not exceed Part 100 limits. This is not to say that the limits in Part 100 can not be used as guidance in determining whether an act of sabotage could "directly or indirectly endanger the public health and safety." It does mean, however, that caution must be used in attempting to apply the Part 100 limits to Part 73 compliance.

1(e)

This question asks if Part 73 is literally applicable to low power operation. The answer is yes. 10 CFR §73.55 specifically states: "Each licensee who is authorized ... to operate a nuclear power reactor pursuant to Part 50 of this chapter shall comply with the requirements of paragraphs (b), (d), (f), (g), and (h) of this section ..." Since low power operation involves operation of a nuclear power plant pursuant to Part 50, Part 73 requirements are applicable.

(2)

In this question, the Board assumes that a low power LOCA would result in some offsite releases, but in levels less than those that would follow a LOCA at full power. Under those circumstances, the Board wants to know whether reductions in safeguards measures for low power operation could be justified. The Staff believes there are two separate issues involved here. The nature of low power operation could well result in a determination that certain equipment need not be protected at low power. In other words, if protection of a piece of equipment does not provide any meaningful incremental protection to the public at a particular power level, that piece of equipment would not need to be considered "vital" and would not need to be protected as such at that power level. However, once a determination is made that protection of a piece of equipment does meaningfully add to the protection of the public against acts of radiological sabotage, the equipment must be treated as vital. In the Staff's view, this would mean that the equipment would have to comply with the provisions of Section 73.55 (b)-(h) or receive an equivalent level of protection. The Board seems to be asking whether "vital" equipment could be protected at a level less than called for in Section 73.55(b)-(h) if the risks of sabotage at low power are not insignificant, but are nonetheless less than at full power. The Staff questions whether such a regulatory scheme is sanctioned by Part 73. Furthermore, such a scheme could provide significant problems in application; the Staff has not developed any guidelines to determine what level of protection (less than that specified in §73.55) would be acceptable for low power operation. The Staff has historically interpreted Part 73 as mandating that, once a determination has been made that a piece of equipment must be protected as vital (at a certain power level of operation), the level of protection that must be provided for that piece of equipment is the level set forth in Section 73.55(b)-(h) or its equivalent. The Staff continues to believe this is the proper way of applying Part 73; if protection of a piece of equipment is required by the regulations, the Staff believes that piece of equipment should be protected in a manner providing high assurance that the equipment will not be the successful target of attempted radiological sabotage.

Respectfully submitted,

Robert G. Perlis
Counsel for NRC Staff

Dated at Bethesda, Maryland
this 15th day of April, 1985

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-OL-4
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CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF RESPONSE TO LICENSING BOARD ORDER OF APRIL 9, 1985" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class or, as indicated by an asterisk, through deposit in the Nuclear Regulatory Commission's internal mail system, or as indicated by a double asterisk, by telecopy or hand delivery, this 15th day of April, 1985.

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