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Re: Long Island Lighting Company;
Shoreham Nuclear Power Station,
Unit 1; Docket No. 50-322-OL

Gentlemen:

Pursuant to the Board's Order of July 5, 1984, we are filing herewith the revised admitted Shoreham Emergency Diesel Generator Contention. This document has been reviewed and approved by the parties. With respect to item 1.(c) on page 2, counsel for LILCO notified us that it believes the oil passage plugs at Rafha are of a different design than those at Shoreham. TDI is forwarding supporting documentation to LILCO. If those documents, after review by the County, substantiate the position that the oil passage plugs are of a materially different design, the County will agree that item 1.(c) should be deleted.

The County has voluntarily withdrawn the portion of Contention item 4 dealing with the modification of the piston skirts at Shoreham, because the County's experts cannot be sure that the alteration adversely affects the piston skirts. However, this matter may be referred to in testimony to the extent it is relevant to the admitted contentions. See Tr. 21,888-89.

Very truly yours,

Alan Roy Dynner

ARD/dk
Enclosure
cc: Service List

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SHOREHAM EMERGENCY DIESEL GENERATOR CONTENTION

Contrary to the requirements of GDC 17, the emergency diesel generators at Shoreham ("EDGs") manufactured by Transamerica Delaval, Inc. ("TDI") will not operate reliably and adequately perform their required functions because the EDGs are over-rated and undersized, improperly designed, and not satisfactorily manufactured. There can be no reasonable assurance that the EDGs will perform satisfactorily in service and that such operation will not result in failures of other parts or components of the EDGs due to the over-rating or insufficient size of the EDGs or design or manufacturing deficiencies. The EDGs must therefore be replaced with engines of greater size and capacity, not designed or manufactured by TDI. [Suffolk County's Filing Concerning Litigation of Emergency Diesel Generator Contentions, June 11, 1984 ("June 11 Filing") at 2; Tr. 21,891]

BECAUSE:

1.(a) The replacement crankshafts at Shoreham are not adequately designed for operating at full load (3500 kW) or overload (3900 kW), as required by FSAR Section 8.3.1.1.5, because they do not meet the standards of the American Bureau of Shipping, Lloyd's Register of Shipping, or the International Association of Classification Societies. In addition, the replacement crankshafts are not adequately designed for operating at overload, and their design is marginal for operating at full load, under the German criteria used by F.E.V. [Tr. 21,878-79]

(b) The shot peening of the replacement crankshafts was not properly done as set forth by the Franklin Research Institute report, Evaluation of Diesel Generator Failure at Shoreham Unit 1, April 6, 1984, and the shot peening may have caused stress nucleation sites. The presence of nucleation sites may not be ascertainable due to the second shot peening of the crankshafts. [Tr. 21880]

(c) The crankshaft oil passage plugs on the replacement crankshafts are inadequate, as evidenced by the failure of the same design plugs on a TDI DSR-48 engine owned by Rafha Electricity Corp., which damaged the pistons of that engine. [June 11 Filing at 4; Tr. 21,881-82]

2. Cracks have occurred in the cylinder blocks of all EDGs, and a large crack propagated through the front of EDG 103. Cracks have also been observed in the camshaft galley area of the blocks. The replacement cylinder block for EDG 103 is a new design which is unproven in DSR-48 diesels and has been inadequately tested. [Tr. 21,882-83]

3. The replacement cylinder heads on the Shoreham EDGs are of inadequate design and manufacturing quality to withstand satisfactorily thermal and mechanical loads during EDG operation, in that:

(a) the techniques under which the replacement cylinder heads were produced have not solved the problems which caused the cracking of the original cylinder heads on the Shoreham EDGs;

(b) the "barring over" surveillance procedure to which LILCO has committed will not identify all cracks then existing in the replacement cylinder heads (due to symptomatic water leakage);

(c) the nature of the cracking problem and stresses exacerbating the cracks are such that there can be no assurance that no new cracks will be formed during cold shutdown of the EDGs;

(d) there can be no assurance that cracks in the replacement cylinder heads and concomitant water leakage occurring during cold shutdown of the EDGs (which would not be detected by the barring-over procedure) would not sufficiently impair rapid start-up and operation of the EDGs such that they would not perform their required function;

(e) there can be no assurance that cracks in the replacement cylinder heads occurring during operation of the EDGs would not prevent the EDGs from performing their required function;

(f) variations in the dimensions of the firedeck and water deck of the replacement cylinder heads create inadequate cooling, where too thick, and inadequate resistance to mechanical loads, where too thin, and create stress risers at their boundaries;

(g) the design of the replacement cylinder head is such that stresses are induced due to non-uniform bolt spacing and the different lengths of the bolts;

(h) the replacement cylinder head design does not provide for adequate cooling of the exhaust valves;

(i) at least one replacement cylinder head at Shoreham has an indication;

(j) the design of the replacement cylinder heads provides inadequate cooling water for the exhaust side of the head; and

(k) the replacement cylinder heads at Shoreham were inadequately inspected after operation, because:

(1) a liquid penetrant test was done on the exhaust and intake valve seats and firedeck area between the exhaust valves on only 9 of the 24 cylinder heads, and such tests were done after only 100 hours of full power operation;

(2) ultrasonic testing was done on the firedeck areas of only 12 cylinder heads;

(3) visual inspections were performed on the valve seat areas of only 32 of the 98 valves, and on only 7 firedecks of the 24 cylinder heads for indications of surface damage. [Suffolk County's Motion for Reconsideration of Portions of Board's July 5 EDG Order, at 1-3, as granted in part and modified (in subparagraph (j)) by order of the Board during a teleconference of the parties on July 11, 1984]

4. All AF piston skirts in the EDGs were replaced with TDI model AE piston skirts. The replacement AE pistons are of inade-

quate design and manufacturing quality to satisfactorily withstand operating conditions, because:

(a) the FaAA report conclusion that cracks may occur but will not propagate improperly depends on a fracture mechanics analysis of an ideal situation which is not valid for the actual conditions which may be experienced by the Shoreham diesels,

(b) excessive side thrust load, which could lead to catastrophic failure, has not been considered adequately, and

(c) the analysis does not adequately consider that the tin-plated design of the pistons could lead to scoring causing excessive gas blow-by, and thereby causing a failure of proper operation. [Tr. 21,886-88]