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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)
)
(Shoreham Nuclear Power Station,)
Unit 1))

Docket No. 50-322-OL

SUFFOLK COUNTY'S FILING CONCERNING
LITIGATION OF EMERGENCY DIESEL GENERATOR CONTENTIONS

I. INTRODUCTION

On February 22, 1984, this Board admitted into controversy the first paragraph of each of Suffolk County's Supplemental EDG Contentions I, II, and III (filed January 27, 1984) and ordered the County to submit this filing. See Tr. 21,611 et seq. In compliance with the February 22 bench order, as modified by this Board's orders of April 20 and May 4, 1984, this filing addresses the following matters: Part II restates and consolidates the admitted portions of Contentions I, II, and III (as suggested, but not required, by the Board) and identifies the items or instances which the County will rely upon to support the EDG Contentions, showing their applicability to the Shoreham EDGs and whether they evidence inadequate design, inadequate manufacturing, an undersized, over-rated

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engine, or a combination thereof; Part III addresses the elements of the DRQR relating to Shoreham which should be added to the litigation; and Part IV specifies information which the County will seek to obtain by subpoena from owner/operators of TDI diesels, which could not be obtained voluntarily.

II. RESTATEMENT OF CONTENTIONS; LISTING OF ITEMS AND INSTANCES SUPPORTING CONTENTIONS

In accordance with this Board's suggestion (see Tr. 21,636), Suffolk County proposes to consolidate and restate the admitted portions of EDG Contentions I, II, and III as follows.

* * *

EDG 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.

* * *

The items or instances listed below are relied upon by Suffolk County to support the EDG Contention. Their applicability to the Shoreham EDGs is indicated by the notation "Shoreham" if the particular item or instance specifically occurred with respect to one or more of the Shoreham EDGs, and by the notation "Common" if it occurred with respect to a part or component common to the Shoreham EDGs and the other specified TDI diesel engines. In each such case the commonality of parts or components has been established by the DRQR or the sworn testimony in depositions of representatives of TDI or Failure Analysis Associates ("FaAA"). Any other applicability or nexus to the EDGs is explained in the text. Finally, whether a particular item or instance is evidence of the EDG being over-rated and undersized, of a design deficiency, or of a manufacturing defect, is indicated by the symbols "O", "D", and "M", respectively.

1. Crankshafts

A. Shoreham. The original crankshafts in the EDGs were improperly designed, as accepted by LILCO and FaAA. D, O. Beyond this issue, the County does not intend to litigate the cause of the failures of the original crankshafts.

B(1). Shoreham. The replacement crankshafts are not adequately designed for operating at overload (3,900 kW) as required by FSAR Section 8.3.1.1.5 and their design is marginal for operation at full load (3,500 kW). Moreover, the replacement crankshafts will adversely affect and be affected by other engine systems, such as bearings and piston pressures. D, O. The shot-peening of the replacement crankshafts may be detrimental. M.

B(2). Common. Rafha Electricity Corp., DSR-48, SN 79003. Inadequate crankshaft oil passage plugs on a replacement design crankshaft damaged pistons. D, M.

2. Cylinder Blocks

A. Shoreham. Cracks have occurred in the cylinder liner landing area of all EDGs, and a large crack propagated through the front of EDG 103. O, D, M. Cracks have also been observed in the camshaft galley area of the blocks. O, D, M. The replacement cylinder block for EDG 103 is a new design which is unproven in DSR-48 diesels and has been inadequately tested. D.

B. Cylinder block cracking similar to that in the Shoreham EDGs has occurred on the following 15 cylinder blocks:

- (1) United States Steel Corp., DMRV-16-4, SN 75039 and 75040 (M.V. Edwin H. Gott). O, D, M.
- (2) State of Alaska, DMRV-16-4, SN 72033 and 72034 (M.V. Columbia). O, D, M.
- (3) Cordova Municipal Utility, DSR-46, SN 73028 or 70034. O, D, M.
- (4) Kodiak Electric Association, DSRV-12-4, SN 74083 and SN 74084. O, D, M.
- (5) Scenco Gizan (Saudi Arabia), DSRV-16-4, SN 77036. O, D, M.
- (6) City of Homestead, DSRV-20-4, SN 73029 and 73030. O, D, M.
- (7) Biehl Offshore Supply Co., DMR-46, SN 75013 or 75014 (M.V. Biehl Trader) and SN 75015 or 75016 (M.V. Biehl Traveler). O, D, M.

(8) Copper Valley Electric Association, DSR-46, SN 75011
or 75012. O, D, M.

(9) Falcon Shipping Group, DMRV-12-4, SN 78034 (M.V.
Pride of Texas) O, D, M.

(10) SURALCO Moengo Powerhouse (Surinam), DSR-46, SN
69026. O, D, M.

Mr. Mathews of TDI testified that cylinder blocks in the DSR-46 "have similar, if not identical, wall thicknesses, material sections, material properties and so forth" to the EDG blocks. The cylinder blocks in the RV-12 and RV-16 engines are "in many respects . . . identical or near identical" to the EDG blocks, but are "far from being a common part since the V engines use a crankcase or center frame in addition to the two cylinder blocks to make an equivalent piece to the cylinder block of the in-line engines." Deposition of Clinton S. Mathews, May 8, 1984, at 37-38.

3. Cylinder Heads

A. Shoreham. Three original cylinder heads were found to be cracked and leaking. O, D, M. All EDG cylinder heads were replaced with heads of the same basic design but allegedly better quality which FaAA claims exists in heads produced by TDI after 1980. To the extent LILCO and FaAA accept the inadequate design and/or manufacturing of the pre-1981 cylinder heads, those matters will not be litigated. Otherwise, very numerous instances of cracking of pre-1981 heads, not detailed herein, will be introduced. The replacement cylinder heads are of inadequate design and manufacturing quality to withstand satisfactorily thermal and mechanical loads during EDG operation. O, D, M.

B. Common. Cylinder heads produced since 1980 by TDI have experienced very high rejection rates in the factory prior to shipment, due to casting and other manufacturing defects. D, M.

C. Common. Cylinder heads in the following engines have experienced cracking or other defects after 1980. O, D, M. The County has been unable to ascertain which of these cylinder heads were manufactured after 1980.

(1) Falcon Shipping Group, SN 78036. One head cracked at inlet valve bridge and was unusable, and three heads had cracked exhaust valve seats. Ca. November, 1982. SN 78034. One head cracked between exhaust valves. Ca. December, 1983.

(2) U.S. Steel (M.V. Gott), SN 75039 and 75040. Three heads needed repair. Ca. August, 1983.

(3) City of Falls City, SN 71013. "Many cylinder head failures," attributed by TDI to operators. Ca. December, 1981.

(4) City of Carrollton, SN 71015. All 16 cylinder heads were repaired at least once, and some were repaired twice. Ca. December, 1981.

(5) City of Belleville, SN 70041. Twenty heads have failed in service, with cracks in fire deck area, valve seat area, or exhaust port area. Failures were discovered when water found in cylinders during blow-out of engine before starting. Ca. December, 1981.

(6) State of Alaska, SN 72033 or 72034 (M.V. Columbia). 16 cylinder heads were defective. Ca. 1982.

(7) Marine Transport Lines (Sealift Mediterranean), SN 72002. 6 heads were cracked in intake or exhaust seats. Ca. October 1982.

(8) Rafha Electricity Corp., SN 79002. A cylinder head was cracked on top. Ca. July, 1981.

(9) Sceco Gizan, SN 77036 and 77041. Three heads found to leak under hydrostatic test. Ca. October, 1981.

4. Pistons

A. Shoreham. Twenty three TDI model AF piston skirts in all EDGs were found to be cracked. O, D, M. To the extent LILCO concurs that the model AF piston skirts were inadequately designed and/or manufactured, these matters will not be litigated by the County. Otherwise, the County will present numerous other instances of failures of and problems with models AF and AN piston skirts, not detailed herein.

B. Shoreham. All AF piston skirts in the EDGs were replaced with TDI model AE piston skirts. The replacement AE pistons are of inadequate design and manufacturing quality to satisfactorily withstand operating conditions. D, M. Further, the design of the model AE pistons in the EDGs was altered

prior to installation without compliance with the requirements of 10 C.F.R. Part 50, Appendix B. The model AE piston has been inadequately tested and is unproven.

C. Common. Apex Marine, SN 79023 (M.V. Baltimore). Oil leaked from a hole in the AE piston crown on the vessel's maiden voyage. TDI concluded that there were three holes in the crown, one of which passed through the wall and was a shrinkage hole. The crown was scrapped. M.

D. Common. U.S. Steel, SN 75039 or 75040 (M.V. Gott). Crack was found in piston crown two inches up the side of the crown to the top and one inch across the top. M.

5. Other Components. The number and significance of design and manufacturing defects that have occurred in the EDGs and their components, and in identical or similar TDI diesels and components common to the EDGs, is so extensive and pervasive that, taking into consideration the changes in components and parts of the EDGs and the DRQR program as to Shoreham, there can be no confidence that additional defects and failures will not occur and that the EDGs as modified will reliably perform their functions. In support of this proposition, the County will refer not only to manufacturing processes and

controls at TDI, but also to failures of, and to design deficiencies and manufacturing defects in, components of the EDGs and those common to other TDI diesels, as disclosed in Board Notifications, the TDI Owners' Group Program reports and documents and NRC Morning Reports and Inspection Reports. The County will also refer to the following instances concerning Shoreham and non-nuclear TDI diesels:

A. Connecting Rod Bearing Shells

(1) Shoreham. Four upper connecting rod bearings cracked (original 11" diameter connecting rods). D, M. In addition, one bearing on EDG 101 was fractured completely through. D, M. Casting discontinuities were found on 14 new 12" diameter bearings, resulting in rejection of 7 bearings as non-usable and in limiting use of 7 others for lower bearings only. M.

(2) Common. State of Alaska, SN 72033 or 72034 (M.V. Columbia). Numerous cracked and excessively worn bearings. D, M.

(3) Common. Perusahaan Umum Listrik Negara (Indonesia), SN 74004. Three bearing failures. M.

(4) Common. City of Homestead, SN 73029 and 73030. Over ten cracked, eroded or broken connecting rod bearings. D, M.

(5) Common. Copper Valley Electric Assn., SN 75012. Piece of bearing shell broken off. D, M.

B. Engine Bases

(1) U.S. Coast Guard, DSR-46, SN 72023. Failure of engine base at No. 5 main bearing saddle. O, D, M. Base is similar to that of EDG.

(2) Anamex Mining Co., DSRV-16-4, SN 73038. Failure and cracks in base. O, M. Base is somewhat similar to that of EDG.

(3) Common. Rafha Electricity Corp., DSR-48, SN 79003. Extensive cracking of engine base. O, D, M.

C. Cylinder Liners

(1) Shoreham. Cracks and pitting have been found in cylinder liners. O, D, M.

(2) Common. U.S. Steel, DMRV-16-4, SN 75039 and 75040 (M.V. Gott). Extensive wear patterns of liners required modifications in liners. Liners were out of round. O, D, M.

(3) Common. City of Princetol., DGSRV-16-4, SN 73042. Cracked liner from thermal stress. O, D, M.

(4) Common. City of St. Cloud, DGSRV-16-4, SN 77005. Liners disintegrated circumferentially. O, D, M.

(5) Common. Falcon Shipping Group, DMRV-12-4, SN 78034 (M.V. Pride of Texas). Cracks and scuffing were found in cylinder liners.

D. Connecting Rods

(1) Common. (11" eye). Copper Valley Electical Ass'n., DSR-46, SN 75011. Rod split down the center. O, D, M.

E. Cylinder Head Studs

(1) Shoreham. Cracked studs. D, M.

(2) Common. City of Homestead, DSRV-20-4, SN 73029 and 73030. Broken studs in both engines. D, M.

F. Turbochargers (Elliott G-90)

(1) Shoreham. Defective design of lubricating oil system required modification. D. Turbocharger thrust bearings failed or were near failure in all EDGs. D.

(2) Common. Taiwan Power Co. (Kuosheng), DSR-48, SN 75005, 75006, 75007, 75008. Turbochargers failed in three engines. O, D.

6. Over-rating and Undersizing of EDGs. In addition to the foregoing, the County will trace the development of the design of the EDGs to demonstrate that they are over-rated and undersized, and the DSR-48 engines were not sufficiently tested as prototypes on the test stand at TDI before being delivered to LILCO. Moreover, with their current modifications and changes in components, the EDGs are effectively new prototypes which have been inadequately tested and inspected.

III. TDI DIESEL GENERATORS OWNERS' GROUP PROGRAM PLAN

A broad pattern of deficiencies in critical engine components has become evident at Shoreham and at other nuclear and non-nuclear facilities employing TDI EDGs. These deficiencies stem from inadequacies in design, manufacture and quality control by TDI.^{1/} As a result, there can be no confidence

^{1/} "Order Requiring Diesel Generator Inspection," Grand Gulf Nuclear Station, Docket No. 50-416, May 22, 1984. (In particular, see Attachment 4 thereto).

regarding the reliability of the Shoreham EDGs.

In response to these broad deficiencies, LILCO initiated the Shoreham Diesel Generator Recovery Program ("SDGRP"). This program, when completed, was intended to provide reasonable assurance that the Shoreham EDGs will perform reliably. The following were the four main elements of the SDGRP:

1. Disassembly/Inspection/Repair/Research of the Shoreham EDGs;
2. Failure Analyses and Corrective Actions for Crankshaft Failures and Other Identified EDG Problems;
3. Overall Design Review and Quality Revalidation (DRQR) of the Shoreham Diesel Generators;
4. Expanded Pre-operational Test Program.

Central to the SDGRP effort was the DRQR. The Shoreham DRQR was intended to address plant specific and generic concerns regarding the TDI EDGs and was aimed at establishing the reliability of the Shoreham EDGs through design analyses, inspections and additional corrective measures. 2/

2/ Letter, McCaffrey of LILCO to Denton of NRC, January 6, 1984, "Shoreham Diesel Generator Recovery Program Summary."

Subsequently, the TDI Diesel Generators Owners' Group Program Plan ("Owners' Group Program")^{3/} was issued by eleven U.S. nuclear utility owners, including LILCO, in order to address operational and regulatory issues relative to TDI EDGs. The Owners' Group Program, which apparently subsumed the SDGRP, has been instituted to assess the adequacy of the various TDI EDG configurations to perform their intended safety-related functions. The Owners' Group Program embodies three major efforts:

1. Resolution of 16 Known Generic Problem Areas (Phase I Program);
2. Design Review of Important Engine Components and Quality Revalidation ("DRQR") of Important Attributes for Selected Engine Components ("Phase II Program");
3. Expanded Engine Testing and Inspection.

The Owners' Group has designated lead engines for each of the types of TDI engines, with Shoreham designated as the lead R-48.

^{3/} Board Notification 84-051, March 12, 1984, "TDI Diesel Generators Owners' Group Program Plan," dated March 2, 1984.

An effectively functioning QA/QC program would normally provide assurance that the design and manufacture of the EDGs is in conformance with the criteria and commitments set forth in an applicant's PSAR and FSAR. In the case of the Shoreham EDGs, however, confidence has been seriously eroded by the existence of a broad pattern of significant design and manufacturing deficiencies. Hence, there can be no confidence that the Shoreham EDGs were designed and manufactured in accordance with stated criteria and commitments.

The after-the-fact investigation of the Shoreham EDGs conducted by LILCO and its subcontractors, including Failure Analysis Associates, as embodied in the Owners' Group Program, fails to provide an equivalent level of assurance as would have been achieved if TDI originally designed and manufactured the Shoreham EDGs adequately and under an effective QA/QC program. Thus, contrary to the requirements of GDC 17, there can be no confidence that the EDGs will operate reliably and with sufficient capacity and capability to adequately perform their required functions and that additional parts and components of the EDGs will not fail. The Owners' Group Program fails to demonstrate that the Shoreham EDGs are correctly designed and manufactured, as follows:

A. Deficiencies in Scope and Implementation of Owners' Group Program

1. Phases I and II address the design of individual components only, and not the interactions of components and systems in the engine as a whole. There is no analysis or report of total engine design. Also, no systematic methodology for the classification of the safety significance of EDG components (such as by a failure modes and effects analysis) was employed by the Owners' Group.

2. Phase I and II design reviews are incomplete in that the Phase I final reports in many cases do not demonstrate that the design reviews have considered all functional attributes and evaluations identified in the Task Descriptions, nor that all potential requirements have in fact been determined. In particular:

- (a) The Task Descriptions address only the particular form of past failures.
- (b) The Task Descriptions do not address the evolution of component designs, thereby inadequately assessing design changes.

- (c) Some functional attributes and evaluations listed on the Task Descriptions are not even discussed in the Reports.

3. Deficiencies in engine components experienced at non-nuclear facilities were not systematically obtained and assessed during Phase I and II reviews. Thus, the broad pattern of deficiencies in TDI engine components was not evaluated.

4. The individual inspections were inadequate to establish the quality of components in that:

- (a) The inspection commitments in the Owners' Group Program were poorly defined and acceptance criteria were often lacking.
- (b) The Owners' Group Program commitments do not adequately define the precise inspection scope and inspection techniques to be performed.
- (c) In the formulation of inspection procedures, the Owners' Group reviews have not taken into account manufacturing process deficiencies of TDI and its suppliers.

- (d) The inspections specified are not adequate to disclose latent defects.
- (e) Document reviews based on suspect and incomplete TDI records have been relied upon to substitute for actual physical inspections.
- (f) Inspections to be conducted at plant sites (Shoreham) after engine test and subsequent to continuing component failures have been inadequately specified in the Program Plan.
- (g) Inspections fail to utilize appropriate NDE techniques (for example, on cylinder heads), but instead rely heavily on simple visual inspection.
- (h) Inspection commitments are not assured for spare and maintenance parts, thereby providing the potential for quality degradation in the future.

5. The Owners' Group Program has not developed nor identified the need for precise criteria or standards for acceptability, reliability or operability in that:

- (a) It does not require demonstration that the engine and components will meet the FSAR or procurement load specification.
- (b) It does not consider lifetime performance requirements at full engine rating.
- (c) It does not document the possible use of special maintenance and inspection requirements as a substitute for acceptance standards.
- (d) The safety significance of TDI design and manufacturing product improvements which were deferred were not included in the assessment.

6. Sampling inspections relied upon in the Owners' Group Program were not appropriate, because the pattern of QA/QC deficiencies indicates there may be significant differences in the as-manufactured quality of EDG components. Further, even if sample inspections were appropriate, the Owners' Group Program failed to document or justify its sampling plan criteria.

7. The testing conducted was inadequate to establish the quality of the engine in that:

- (a) The Program does not satisfy the start-up qualification requirement of IEEE-387, which is necessary since the 1976 tests are no longer valid.
- (b) The duration and duty cycle (including definition of test load levels) of the testing program is inadequate to establish engine reliability.
- (c) The effects of ambient temperature and humidity variations were not adequately addressed by the Owners' Group testing program.
- (d) The Owners' Group Program failed to demonstrate environmental and seismic qualification as required by GDC 4, IEEE-323 and IEEE-344.

8. In the formulation of inspection procedures, the Owners' Group Program reviews have not taken into account the pattern of inspection deficiencies identified by the NRC's Vendor Inspection Program.

B. Lack of Independence

The Owners' Group Program is not independent and has been conducted under extensive conflicts of interest. It has been

performed under the direction and control of LILCO, with the pervasive involvement of LILCO personnel, and with LILCO's paid consultants, who are advocating the licensing of Shoreham with TDI diesels before the Board at the same time they are directing and performing the purportedly "independent" review.^{4/} The design and quality review participants, as well as the review procedure protocol, are not sufficiently independent from cost and schedule pressures in that:

^{4/} The NRC Staff has indicated that the basis for its approval of TDI diesels is the successful completion of a specified program proposed to be carried out by the TDI Owners' Group. On February 2, 1984, Dr. Carl H. Berlinger of the NRC Staff wrote to Mr. J. P. McGaughy, chairman of the Owners' Group, setting forth the Staff's understanding of the Owners' Group Program to be:

- (1) An independent design verification . . . ; [and]
- (2) An independent verification of the as-manufactured quality of these parts for each engine
(Emphasis added).

Subsequently, after Suffolk County complained to the Staff that the Owners' Group Program was not "independent," Mr. Harold Denton explained that the Staff requirement only meant that the DRQR was "separate from any previous TDI quality assurance program." Letter dated April 3, 1984, from Mr. Denton to counsel for Suffolk County. Also see Criterion I of Appendix B regarding the requirements for independence from cost and schedule pressures.

1. The Owners' Group Program is being performed by organizations which have a direct and immediate financial interest in the outcome of the program: the very utilities (and their paid consultants) which have purchased and/or installed TDI diesels at their nuclear plants. These utilities stand to lose tens of millions of dollars if defects and safety problems are found in the TDI diesels. LILCO has stated in its latest Annual Report that it may face bankruptcy if the EDGs are not found qualified for service at Shoreham. Thus LILCO and the other utilities in the Owners' Group confront an absolute conflict of interest which compromises public safety and any meaningful standard of independence.

2. In the review of the R-48 engines installed at Shoreham, LILCO has taken the principal role in carrying out the Owners' Group Program. Much of the analysis and testing in the Program was performed on LILCO's own TDI diesels and at the Shoreham plant, and the directors and principal managers of the Program have been LILCO employees and LILCO paid consultants. For example:

- (a) The Technical Program Director for the Owners' Group DRQR was LILCO's Mr. William Museler, Director of the

company's Office of Nuclear, who has testified for LILCO in the NRC licensing proceedings and advocated the operation of Shoreham.

- (b) Mr. Museler's Assistant Director for overall supervision of the DRQR was LILCO's Mr. M. Milligan.
- (c) The Program Manager of the DRQR was LILCO's Mr. C. K. Seaman.
- (d) The Design Group Chairman of the DRQR was LILCO's paid consultant, Mr. G. W. Rogers of Failure Analysis Associates ("FaAA"). FaAA is LILCO's chief consultant on TDI diesel matters in the ASLB licensing proceeding.
- (e) The Component Selection Chairman of the DRQR was LILCO's paid consultant, John C. Kammeyer, an employee of LILCO's engineering contractor, Stone & Webster Engineering Corporation. Mr. Kammeyer had advocated LILCO's position in the ASLB licensing proceedings.
- (f) The Quality Group Chairman of the DRQR was LILCO's paid consultant, R. J. Najuch, also of LILCO's contractor, Stone & Webster.

(g) All of the Task Leaders of the DRQR were employees of LILCO's paid consultants, Stone & Webster or FaAA. A chart, prepared by the Owners' Group itself and submitted as Figures 1 and 2 of Appendix 2 to Board Notification 84-051, demonstrates that for all intents and purposes the entire Owners' Group Program has been dominated and executed by LILCO and its own paid consultants.

3. A key FaAA engineer was formerly employed in the management of TDI.

4. The protocol for information exchange between LILCO and the Owners' Group reviewers resulted in inscrutable information exchanges due to the lack of organizational independence.^{5/}

^{5/} The Licensing Board in LBP-83-81 (Comanche Peak Station, Units 1 and 2, Docket No. 50-445 and 50-446, December 28, 1983) urged in part that an independent design review be conducted with the following characteristic regarding organizational independence:

During the conduct of the review there should be no undocumented oral discussions between applicant and the reviewing organization concerning findings. See, e.g., Teledyne Engineering Services, Technical Report Tr-5633, Executive Summary of Final Report: Independent Design Review for the Shoreham Nuclear Power Station (June 30, 1983) at 2. The reviewing organization should obtain all its information from: observations of documents or hardware; written

(Footnote cont'd next page)

5. The NRC Staff, directly and/or through its contractors, is currently reviewing the scope and substance of the Owners' Group Program. Such a Staff review, even if it were to include carefully monitoring the Program and evaluating its results, does not cure the pervasive conflict of interest of LILCO, the other utilities in the TDI Owners' Group, and the individuals who are directing and carrying out the Owners' Group Program.

In summary, any Program for analyzing the design and quality of the TDI EDGs must be controlled, directed, and performed by a truly independent organization and by neutral, objective personnel who have neither a real nor apparent stake in the outcome. The Shoreham review fails to satisfy the preceding independence criteria.

C. Key Elements of Program Are Incomplete

The Owners' Group Program is incomplete for Shoreham in a number of significant aspects, and thus, the Program is presently not available for evaluation and assessment by the NRC,

(Footnote cont'd from previous page)

answers to written questions; or transcribed conferences open to all parties.

New York State, or the County. Accordingly, it is premature to commence the litigation of the EDG contention until these critical matters are completed and reviewed by all parties and their consultants. Important areas unavailable for review include the following:

1. Not all Phase I activities have been completed in that:

- (a) Cylinder block and liner report is not issued.
- (b) Existing reports do not fully address all issues in Task Descriptions.
- (c) NRC review, and that of its consultants, is ongoing and is incomplete. Indeed, at the May 24, 1984 Owners' Group meeting, the NRC Program Manager promised that a draft would not be furnished until mid-June documenting the NRC consultants' comments on the adequacy of the scope (not the results) of the Phase I program.
- (d) As of May 31, 1984, the Staff had no preliminary or other views regarding the adequacy of the DRQR or of TDI EDGs based upon the Owners Group Program.

2. The Owners' Group Program has not issued reports for Phase II regarding the DRQR and is not scheduled to do so until the first of July. Thus, documentation of the design and quality of important EDG components is not yet available for evaluation.

3. Shoreham engine testing and inspection have not yet been completed in that:

(a) Post-operational inspections are incomplete.

(b) New cylinder block testing program is not defined.

4. Procedures for increased special engine maintenance, inspection, and surveillance activities, including crack indications monitoring relied upon by the Owners' Group, have not yet been issued.

IV. ADDITIONAL INFORMATION

In its February 22 bench order, the Board prohibited the County from conducting formal discovery from customers of TDI, although informal requests for voluntary information were allowed. Tr. 21,623-24. The County chose not to attempt to contact TDI customers until it completed its review of the some

30,000 plus documents obtained from TDI, many regarding customer service records. This review was continuing in early May 1984. In the process of this review, the County obtained a list of all owners of TDI R-4 and RV-4 diesels.

On May 8, 1984, the County learned in the deposition of Clinton S. Mathews, vice president and general manager of TDI's Engine and Compressor Division, that TDI had written "to the owners of R-4 and RV-4 series engines and told them they might be contacted by attorneys." Mathews Deposition at 101. Mr. Mathews did not recall what else the letters said. On May 11, during the deposition of Maurice H. Lowrey of TDI, counsel for the County requested immediate production of those letters.^{6/} TDI refused to produce them immediately, and the County's counsel requested the NRC Staff to obtain such letters and furnish them to the County. The Staff made such a request, but did not agree to supply copies of such letters to the County. See Lowrey Deposition at 90-92 (Attachment 1 hereto). The

^{6/} Counsel for Suffolk County stated, in part, that "we believe that there may be a potential effect which would chill or dissuade TDI diesel owners from communicating potentially important safety information concerning the diesels to Suffolk County or to the Nuclear Regulatory Commission." Lowrey Deposition at 91.

County has to date not received copies of the letters TDI sent to its customers.

Subsequently, the State of New York, in coordination with Suffolk County, requested information on TDI diesel problems from TDI diesel owners in non-nuclear applications. To date responses have been received from only four of the over 70 owners to whom the request was sent. Counsel for the County has also telephoned or attempted unsuccessfully to telephone the TDI diesel owners in the United States listed in sections 2.B(1)-(4) and (6)-(8), section 3.C(1)-(7), and sections 4.C and D. of Part II above, to ascertain whether such owners will voluntarily supply information as to those matters. For the most part, these responses have been inconclusive; they have ranged from a willingness to furnish some information (but not necessarily a willingness to be deposed) to a reluctance to get involved, to no decision yet.

Accordingly, depending upon further developments and informal discussions, Suffolk County may want to subpoena documents and take depositions from the following:

1. As to the nature and extent and details of cylinder block cracking similar to that in the Shoreham EDGs, the owners listed in section 2.B(1)-(4) and (6)-(8) of Part II.

2. As to the possible cracking of cylinder heads manufactured after 1980, the owners listed in section 3.C(2)-(7) of Part I.

3. As to defects in piston crowns, the owners listed in sections 4.C and D of Part II.

Information on these particular matters goes directly to the specific instances listed in Part II with respect to three major components of the EDGs, and is not merely cumulative in value. The County is not seeking to subpoena information on other TDI diesel components, as set forth in section 5 of Part II, because the purpose of section 5, inter alia, is to demonstrate the pervasive nature of deficiencies in design and quality, such that more information would be cumulative of that already obtained.

If and to the extent responses from the TDI diesel owners contacted by New York State disclose important matters with respect to the replacement crankshafts, cylinder block cracking, cylinder heads, AE pistons, or the over-rating of the Shoreham EDGs, the County will promptly bring such matters to the attention of the Board and parties to add to the items listed in Part II.

A special problem exists with respect to obtaining additional information on the replacement crankshafts and cylinder heads from Rafha Electricity Corp. in Saudi Arabia, on cylinder blocks from SURALCO in Surinam, and on cylinder blocks and cylinder heads from Sceco Gizan in Saudi Arabia. The County may seek to subpoena such information, but the force and effect of a Board subpoena in Saudi Arabia or Surinam questionable. A far easier and probably more effective approach would be for the NRC Staff to request this information.

Suffolk County is surprised at the modest effort made by the Staff to secure information on the operating history of TDI diesels. The Staff did not request to review TDI's customer service files, did not participate (though invited) in the County's review of such TDI files in Oakland to identify relevant documents, and has not reviewed the TDI documents obtained by the County (though invited to do so by the County).^{7/} Moreover, Dr. Berlinger of the Staff stated in his deposition on May 22, 1984, that the Staff did not intend to seek operating history information from TDI owners of diesels in non-nuclear

^{7/} See letter dated April 16, 1984, from counsel for Suffolk County to counsel for the Staff (Attachment 2 hereto). The Staff never responded to this letter.

installations. Dr. Berlinger believed that records for non-nuclear stationary TDI diesels would probably be too sketchy to be useful, but he admitted that he had not requested any such records.^{8/} The Staff's consultants testified in a deposition on May 23 that marine diesel experience would be useful information, but that Pacific Northwest Laboratory (the Staff's contractor) is not directly obtaining information on TDI diesel problems in marine and other non-nuclear applications.^{9/}

On May 30, 1984, Suffolk County formally requested the Staff to request TDI owners to supply operating history information on TDI diesels, and especially on the 16 significant component problems. See Attachment 5 hereto. The County has received no reply to that request.

V. CONCLUSION

Suffolk County hereby requests this Board to (i) accept the consolidation and restatement of the EDG contentions, as set forth in Part II hereof, (ii) accept the particularization

^{8/} See Berlinger Deposition at 64-71 (Attachment 3 hereto).

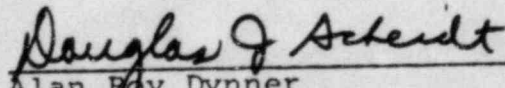
^{9/} See deposition of Henriken, Kirkwood, Laity and Louzecky at 98-100 (Attachment 4 hereto).

of matters, as set forth in Part II hereof, (iii) add to the EDG litigation the matters concerning the TDI Owners' Group Program, as detailed in Part III hereof, (iv) defer the filing of testimony and commencement of EDG litigation until completion and an opportunity for review of the matters specified in section C of Part III hereof, and (v) permit the County to obtain additional information, and encourage the Staff to obtain additional information, as discussed in Part IV hereof.

Respectfully submitted,

Martin Bradley Ashare
Suffolk County Department of Law
Veterans Memorial Highway
Hauppauge, New York 11788

KIRKPATRICK, LOCKHART, HILL,
CHRISTOPHER & PHILLIPS



Alan Roy Dynner

Lawrence Coe Lanpher
Douglas J. Scheidt
1900 M Street, N.W.
Washington, D.C. 20036

June 11, 1984

Attorneys for Suffolk County

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

---oO---

In the matter of)
LONG ISLAND LIGHTING COMPANY,)
(Shoreham Nuclear Power)
Station, Unit 1))
-----)

DOCKET NO. 50-332-OL

COPY

DEPOSITION OF MAURICE H. LOWREY

May 10, 1984

REPORTED BY:
JOAN MARIE COLUMBINI, CSR NO. 5435

TOOKER & ANTZ
CERTIFIED SHORTHAND REPORTERS
681 MARKET STREET, SUITE 925
SAN FRANCISCO, CALIFORNIA 94105
415/392-0650



1 MR. DYNNER: I am not abusing the witness.
2 You have abused the counsel today.

3 MR. SMITH: I am sorry you feel that way. I
4 don't think I have.

5 MR. DYNNER: Mr. Lowrey are you still the TDI
6 liason representative in the DRQR?

7 A. To the best of my knowledge, I am.

8 Q. Do you intend to return to the Shoreham site in
9 that capacity?

10 A. I do, sir.

11 Q. Do you know how long you will continue serving
12 in that capacity?

13 A. No, I do not know.

14 Q. During the time that you have served in this
15 capacity, are you being paid by Delaval?

16 A. Yes.

17 Q. Is Delaval receiving any remuneration from the
18 TDI Owners Group in connection with its participation in
19 the DRQR, to your knowledge?

20 A. I don't know.

21 Q. Mr. Lowrey, are you aware of a number of
22 letters which Delaval sent to its customers of R4 and RV4
23 series engines concerning the possible attempts of
24 Suffolk County to gain information about Delaval diesel
25 engines?

26 A. Please say again, sir.

27 MR. DYNNER: Read the question again, please?

28 (Record read.)

1 THE WITNESS: No, sir. I am not aware of such
2 letters.

3 MR. DYNNER: Q. Mr. Lowrey, have you read the
4 deposition transcript of Mr. Clint Mathews that was taken
5 earlier this week?

6 A. I have glanced at it, sir. I have not studied
7 it.

8 MR. DYNNER: Counsel, Mr. Smith, I am going to
9 request that you produce immediately copies of all of the
10 letters which Mr. Mathews stated during his deposition
11 that Delaval sent to the owners of R4 and RV4 series
12 engines concerning possible attempts that they might be
13 contacted by attorneys for Suffolk County with respect to
14 the Delaval diesel engines.

15 MR. SMITH: I will take your request under
16 advisement. I don't see any reason why they should be
17 produced immediately or in fact at all. What possible
18 bearing do they have on the EDG contention.

19 MR. DYNNER: I am asking for immediate
20 production of those documents because whatever the extent
21 of those letters may have been, and Mr. Mathews stated he
22 didn't recall what the letters said, we believe that
23 there may be a potential effect which would chill or
24 dissuade TDI diesel owners from communicating potentially
25 important safety information concerning the diesels to
26 Suffolk County or to the Nuclear Regulatory Commission.

27 As you may know, in some cases it is very
28 likely that Delaval is the supplier of spare parts to its

1 customers or other services, and we believe regardless of
2 whatever the intent may have been for those letters that
3 they may well have that chilling effect.

4 MR. SMITH: With that explanation I think it is
5 clear they are completely irrelevant. I will take your
6 request under advisement. I will certainly not produce
7 them immediately.

8 MR. DYNNER: In the room I see present Mr.
9 Richard Goddard, who is an attorney for the staff of the
10 Nuclear Regulatory Commission. Mr. Goddard, I am going
11 to formally request that the Nuclear Regulatory
12 Commission request that those letters be made available
13 forthwith to the NRC and that copies of them be furnished
14 to Suffolk County.

15 MR. GODDARD: With reference to your request,
16 Mr. Dynner, the NRC staff will now on the record request
17 all such letters, together with any records of telephone
18 conversations or other communications between Mr. Mathews
19 or any other employee of TDI and TDI customers with
20 regard to communications with attorneys or other
21 information regarding R series engines to Suffolk County,
22 to the NRC or to other interested parties.

23 NRC staff will not comment at this time as to
24 whether or not we will make such documents available to
25 Suffolk County. They will be made available to the
26 office of investigations of NRC.

27 MR. DYNNER: Q. Mr. Lowrey, I have only a few
28 more questions.

KIRKPATRICK, LOCKHART, HILL, CHRISTOPHER & PHILLIPS

ATTACHMENT 2

A PARTNERSHIP INCLUDING A PROFESSIONAL CORPORATION

1900 M STREET, N. W.

WASHINGTON, D. C. 20036

TELEPHONE (202) 452-7000
CABLE KIPPHI
TELEX 440209 KIPH UI
WRITER'S DIRECT DIAL NUMBER
202/452-7044

IN PITTSBURGH
KIRKPATRICK, LOCKHART, JOHNSON & HUTCHINSON
1500 OLIVER BUILDING
PITTSBURGH, PENNSYLVANIA 15222
(412) 355-6500

April 16, 1984

(BY TELECOPIER)

Bernard M. Bordenick, Esq.
U.S. Nuclear Regulatory Commission
8th Floor, Room 8704
7735 Old Georgetown Road
Bethesda, Maryland 20814

Dear Bernie:

I refer to your letter of April 12, 1984 requesting that Suffolk County forward to you on behalf of the NRC Staff "copies of all calculations and analyses, test data, and any other information or documents concerning various components of the TDI diesel generators not heretofore provided to the NRC staff by the County." You further note that you are especially interested in documents and calculations which form the bases of the County's supplemental EDG contentions which were admitted into controversy in this case on February 22, 1984.

Please note that the calculations and other documents which support and form the bases for the County's EDG contentions are set forth in Suffolk County's Response to LILCO's Request for Production of Documents, March 20, 1984, which was filed with the Board and served on the NRC Staff. An update of the document discovery situations is included in the Joint Objections of Suffolk County and the State of New York to Board's Oral Order of February 22, 1984, and Request for Revision Thereof ("Joint Objections"), filed with the Board on April 10, 1984 and served upon the NRC Staff by hand delivery.

The Joint Objections states:

The County's consultants have not been able to review and analyze the relevant documents and drawings necessary for them to reach final conclusions on the issues in controversy. The County has committed to LILCO's counsel to notify them when such conclusions are reached, so that LILCO may meaningfully depose the County's consultants. However, because

Bernard M. Bordenick, Esq.

April 16, 1984

Page 2

literally thousands of documents remain to be received and analyzed, we cannot yet predict when this will occur.

Joint Objections at 7-8. It should therefore be obvious that the County's consultants have not prepared any final reports, analyses or calculations with respect to their preliminary opinions. Those preliminary opinions have not yet been reduced to written reports, analyses or calculations except to the extent referred to in Suffolk County's Response to LILCO's Request for Production of Documents.

As I indicated to you on the telephone, the County has received a large number of documents from LILCO, although such documents constitute a partial response to the County's request for discovery. It would seem appropriate for the Staff to request LILCO to furnish to the Staff whatever documents LILCO has supplied to the County, rather than make your document request to the County. Nevertheless, we will be prepared to permit representatives of the Staff to review documents obtained during discovery by the County, at a mutually convenient time in our offices. You will recall that previously we have had NRC Staff representatives come to our offices to review other documents obtained by the County in the discovery process in this case.

As noted in the Joint Objections, however, there remain many thousands of documents which the County identified as relevant at TDI, and which have not yet been provided to the County. Last Friday we received an initial, relatively small number of documents from TDI. As you know, five lawyers and consultants of Suffolk County spent March 22 and 23 at TDI's facility in Oakland, California going through many files and identifying thousands of documents relevant to this case. The NRC Staff had been notified of this visit and was invited to participate, but declined to do so. On Friday morning, March 23, while in California, I was notified that Carl Berlinger had telephoned me. I immediately returned his call. During that telephone conversation I told Mr. Berlinger that in the course of our review of the TDI files made available, we were finding very large numbers of relevant documents, including material information on the firing pressure in the cylinders of TDI diesels, and case histories of cracked components in similar TDI diesels.

I strongly suggested to Mr. Berlinger that he and/or members of the NRC Staff immediately make arrangements to review the TDI files, pointing out to him that the Staff should not rely on the documents selected by the County. Specifically, I told Mr. Ber-

Bernard M. Bordenick, Esq.

April 16, 1984

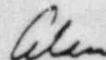
Page 3

linger that there seemed to be important information concerning TDI V-16 diesels which, while not necessarily relevant to the Shoreham case (where common components may not be involved), would be relevant to the Staff's review of diesel adequacy at other nuclear installations. Mr. Berlinger answered that he did not have the time to participate in this discovery.

While it does seem to me a rather circuitous route for the Staff to take in proceeding with discovery, we will invite the Staff's representatives to review and inspect copies of the TDI documents when we receive them. I have no doubt that the Staff will find the many thousands of documents which we identified at TDI to be extremely relevant and perhaps critical to the determination of the issues set forth in the County's EDG contentions.

Please telephone me if you are interested in pursuing this matter. To the extent that the Staff reviews TDI documents at our offices at a mutually convenient time, and determines that it desires copies of documents, we must insist that any copying must not interfere with the County's review of documents and preparation of its case for the hearing. Of course, any charges in connection with copying of documents will be to the account of the NRC Staff.

Sincerely yours,



Alan Roy Dynner

ARD/dk

cc: Richard J. Goddard, Esq.
T. S. Ellis, Esq.
Fabian Palomino, Esq.
Carl Berlinger
Ralph Caruso

OFFICIAL TRANSCRIPT PROCEEDINGS BEFORE

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-3
)
(Shoreham Nuclear Power Station)
)
Unit 1))

DEPOSITION OF WILLIAM E. FOSTER, P.E.,

and

CARL H. BERLINGER

Hauppauge, New York

Tuesday, May 22, 1984



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110 FIRST STREET N.W.

1 maybe I ought to get on the next plane and come out and
2 go through the records, because you were finding out a
3 lot of very interesting information.

4 When I asked what that specific
5 information might be that would be of great interest to
6 me, you really couldn't identify anything over the
7 phone. But I have been -- I have been a very busy man
8 since I've been assigned this task, and I really have
9 not had the time to go out to TDI to go through their
10 entire record.

11 Q Dr. Berlinger, have you, other than your
12 communication with Mr. Molina, have you requested any
13 information concerning the operating history of Delaval
14 Engines from any other owners of Delaval Engines in
15 non-nuclear service?

16 WITNESS BERLINGER: We have received some
17 information from the state of Alaska, but specifically,
18 I have not and I do not intend to request information in
19 the marine area of application, primarily on the basis
20 of the recommendation by the diesel consultants who I
21 have retained.

22 They feel that many of the problems

1 associated with marine application were these diesels,
2 or any other diesels, are very closely related to the
3 type of service that is seen in marine application,
4 which is different from nuclear service and also is
5 different on the basis of the type of fuel that's used.

6 And primarily based on their
7 recommendation, I am not going out and soliciting
8 operating experience data of any -- to any great extent
9 with regard to marine applications.

10 Q How about nuclear stationary applications?

11 WITNESS BERLINGER: Some of that
12 information has been obtained, but a limited amount of
13 information. I have not specifically gone out and
14 requested it.

15 Q Do you know how many Delaval Engines
16 there are in non-nuclear stationary applications?

17 WITNESS BERLINGER: In simple terms,
18 many. I have requested the information, or information
19 pertaining to non-nuclear station installations of TDI
20 Engines from TDI. That information has still not been
21 received.

22 One of the explanations I got for it

1 taking so long in identifying the particular engines and
2 their specific locations is the fact that some of these
3 engines were shipped overseas.

4 One example cited was to Saudi Arabia. I
5 think there might have been several hundred that were
6 sold to Saudi Arabia. I'm not sure of the exact numbers.

7 But after they are received, TDI doesn't
8 know where they are installed, so they really can't give
9 me a lot of information about them. They're having
10 difficulty trying to put this information together. But
11 I would have expected to have received it by now.

12 Q Why are you relying so heavily on Delaval
13 to obtain this information?

14 WITNESS BERLINGER: The type of
15 information I requested was the class of engine in what
16 is called the 4 series, the series 4 line, and their
17 specific location.

18 In other words, the rating and the
19 location.

20 Q I have a document which I will give you
21 later on which contains information --

22 WITNESS BERLINGER: Can I look at that?

1 Q Sure.

2 WITNESS BERLINGER: I know I'm not
3 allowed to ask questions, but where did you get it?

4 Q As you know, Dr. Berlinger, I told you we
5 received many thousands of documents in the course of
6 discovery from Delaval. We're in the process of going
7 through those documents. This is one that we obtained.
8 We will make a copy available to you after the
9 deposition.

10 WITNESS BERLINGER: Very good.

11 One of the -- one of the points I think
12 should be brought out with regard to -- call it
13 non-nuclear TDI applications -- is the fact that much of
14 the information pertinent to the operation of those
15 engines just is not available, especially with regard to
16 -- or if you compare it to the type of information
17 that's required to be kept for nuclear service
18 applications.

19 For instance, if I found out that there
20 was an engine located in Oshkosh, if it was a
21 non-nuclear installation, the chances are that much of
22 the operating experience information -- there are no

1 records kept. And the conditions for which that engine
2 are operated are not closely controlled.

3 So, it's difficulty, if not pointless in
4 most cases, to look into failures for which there is an
5 inadequate data base describing the circumstances under
6 which those failures occurred, because it really does
7 not give you enough information to evaluate the cause of
8 some of those problems. And it does give you more
9 information and more paper to look at, but the value of
10 that information is questionable.

11 Q Dr. Berlinger, I'm confused. how can
12 you, on what basis can you say that the data would be
13 inadequate when you haven't even attempted to obtain
14 that data?

15 WITNESS BERLINGER: What I said was that
16 the information or the records that I would be
17 interested in finding out or learning of are not
18 routinely kept by any industry other than the nuclear
19 industry.

20 Q Let me take an example. If a crank shaft
21 were to break at a stationary non-nuclear power plant,
22 are you suggesting that there would not be useful data

1 concerning the conditions under which that crank shaft
2 broke?

3 WITNESS BERLINGER: Most likely, that is
4 true. But I --

5 Q Most likely, what is true? I'm sorry --

6 WITNESS BERLINGER: It is true that the
7 data would not be sufficient for me to determine what
8 caused the failure.

9 Q What data would you need to determine
10 what caused the failure?

11 MR. STRCUPE: Objection to the form of
12 the question.

13 WITNESS BERLINGER: Not being an expert
14 in crank shaft analysis, I can't tell you specifically
15 what data would be necessary. But I can characterize
16 the fact that if an engine is installed somewhere in the
17 desert in Saudi Arabia, I don't really know whether or
18 not it is covered or in a building or susceptible to
19 environmental conditions or using heavy oil or diesel
20 oil.

21 This is the type of information which you
22 might be able to get to give you a partial indication

1 in some cases as to what may have led to a failure. But
2 let's say the measurements taken at some of these
3 installations are not the type of measurements that
4 would be taken at a nuclear plant.

5 For example, many of these installations,
6 they turn on the engine and they leave and there is no
7 one on-site specifically monitoring the operation of
8 that engine unless it shuts down for some reason.

9 It's the type of operation that I'm
10 looking -- that I'm trying to characterize for you which
11 is not specifically identifiable by me.

12 I can't tell you exactly what information
13 is or is not readily available, but I can characterize
14 it from -- not from my personal experience but from what
15 I have gathered from discussions with people who have
16 been all over the world looking into diesel problems --
17 that it's very difficult sometimes to determine the root
18 cause of problems because of insufficient information.

19 Q So you don't know, for example, what kind
20 of records on Delaval Engine failures or defects are
21 kept by the Rafha Electricity Corporation in Saudi
22 Arabia, do you?

1 WITNESS BERLINGER: No.

2 Q Dr. Berlinger, who told you that useful
3 data is generally unavailable from stationary
4 non-nuclear plants?

5 WITNESS BERLINGER: I can't give you a
6 specific name of an individual. It just came up during
7 discussions with people at NRC and at our contractor
8 shop and their consultants. I can't give you a specific
9 name.

10 Q What contractor do you mean? Pacific
11 Northwest?

12 WITNESS BERLINGER: Yes. Pacific
13 Northwest.

14 To give you a clearer indication -- and I
15 think you'll have an opportunity tomorrow, in
16 discussions with our consultants -- I think you will
17 find from their comments that they do not feel that
18 marine application is necessarily applicable in the
19 assessment of nuclear application problems. There is
20 not necessarily a one-to-one relationship as far as
21 those operating experiences are concerned.

22 But I'll let them address it.

OFFICIAL TRANSCRIPT PROCEEDINGS BEFORE

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-3
)
(Shoreham Nuclear Power Station)
)
Unit 1))

DEPOSITION OF

ADAM HENRIKSEN, B. J. KIRKWOOD, WALTER LAITY and PAUL J. LOUZECKY

Hauppauge, New York

Wednesday, May 23, 1984

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1 captain knows what he's doing he won't try to do that.
2 It's only if he has made a little error in judgment he
3 may apply the full power awful fast. Mostly they try to
4 go a little more gently on it.

5 Q When you said it takes a little more time
6 to get up to the start--

7 WITNESS HENRIKSEN: Deliberately take a
8 little more time to go up.

9 Q Are you talking about terms of 30 seconds
10 more or ten minutes more?

11 WITNESS HENRIKSEN: Well, I have under
12 test procedures at sea trials, I have been required to
13 do it in the shortest possible time, which would
14 approximate what you're doing on a fast start. But that
15 might be a large requirement. You don't normally do the
16 because you almost tear the engine right off the
17 foundation if you have a powerful engine.

18 Q Does anyone else have any comments on
19 that issue?

20 (No response.)

21 Q In considering the adequacy of the design
22 and operability and reliability of the Delaval diesel

1 engines for nuclear service, do you believe that it is
2 relevant to obtain operating history experience from
3 marine application Delaval diesels that use No. 2 diesel
4 fuel?

5 WITNESS HENRIKSEN: Not necessarily.

6 Q Under what conditions do you think it
7 would be relevant?

8 WITNESS HENRIKSEN: If they were running
9 at the same speed at full load, which would mean, in
10 marine application, full load--it would be applicable.
11 But if they are running at reduced load--which also
12 would be reduced speed, reduced BMEP--it would not be
13 applicable, because if you run at reduced load in a
14 nuclear, you would still be at the same speed. So you
15 would be talking about totally different conditions.

16 Q If a marine engine were running at a
17 lower load but nevertheless suffered cracks in certain
18 components, would that be useful information for you to
19 have?

20 WITNESS HENRIKSEN: Yes.

21 Q Is PNL doing anything to assure that it
22 is kept apprised of component experience; that is to

1 say, cracking or other damage or defects that have been
2 occurring in Delaval engines on an ongoing basis?

3 WITNESS LAITY: We are kept apprised on
4 an ongoing basis for the Delaval engines in nuclear
5 service. We don't have a direct line of information on
6 Delaval engines in general.

7 So, if an engine suffers a problem, for
8 example, at sea or in a stationary application, we don't
9 necessarily get that information sent to us directly.

10 Q For example, has PNL been made aware of
11 the difficulty experienced in two of the shoreham
12 engines in getting up to 3900 kw during testing?

13 WITNESS LAITY: Yes.

14 Q Have you been asked to analyze or find
15 the cause of that problem?

16 WITNESS LAITY: No, we haven't.

17 Q Do you expect to have to review somebody
18 else's work in determining the cause of that problem?

19 WITNESS LAITY: If we're asked to. At
20 this time, we have not been.

21 Q Has PNL or any of its consultants had any
22 direct contact with Delaval concerning the Delaval