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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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Before the Atomic Safety and Licensing Board

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OFFICE OF SECRETARY
NUCLEAR REGULATORY COMMISSION

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

Docket No. 50-322 (OL)

LILCO'S RESPONSE TO
SUFFOLK COUNTY'S MOTION TO STRIKE

By motion dated January 22, 1985, Suffolk County has moved to strike portions of LILCO's additional testimony concerning crankshafts and cylinder blocks. LILCO disagrees and here sets forth its reasons.

I. Cylinder Block Testimony

Suffolk County seeks to strike four portions of LILCO's additional cylinder block testimony. One portion concerns an alleged mischaracterization of the stipulation on cam gallery cracks. The remaining three portions are treated as a group by the County. In the County's view, these three portions should be stricken because they concern cumulative damage calculations based on "a refined determination of stresses from the (preconfirmatory test) strain gauge testing." So viewed, asserts the County, these portions represent an "attempt to supplement the

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record on issues that are already closed, in this case the adequacy of the blocks at 3500/3900 KW" Suffolk County is incorrect on all counts as is demonstrated below for each portion.

A. Page 9, Answer 9, Second Paragraph

The County's argument for striking this portion of the testimony wholly misses the mark. In the first place, the cumulative damage calculations referred to in the answer's second paragraph are not based on and have nothing whatever to do with, "a refined determination of stresses from the strain gauge testing." Rather, they are the cumulative damage calculations already in evidence and testified to at length. Moreover, contrary to the County's assertion, the reference to these calculations in this context is not an effort to supplement the record on "the adequacy of the blocks at 3500/3900 KW." Rather, the calculations are part of LILCO's basis for concluding that the blocks are adequate at 3300 KW and that no further testing is needed. As such, it is directly responsive to one of SC's newly admitted contentions. A review of the context amply illustrates this.

Question 9, which appears on page 8, is

Should the replacement block have been tested for 745 hours at or above 3300 KW to confirm its adequacy for nuclear service?

This question is a paraphrase of, and responds directly to, County contention (c)(i), which the Board ordered litigated in the reopened block proceeding. Given this, the question is undeniably relevant.

So, too, is the entire answer, including the second paragraph which the County attacks here. In the first paragraph (not attacked here), Mr. Youngling and Dr. Rau state, in direct response to the question, that it was not necessary to subject the EDG 103 replacement block to the entire 745 hours of testing to demonstrate its suitability for nuclear service. Two reasons are given. First, Dr. Rau and Mr. Youngling point out in the first paragraph that the 745 hour confirmatory test was performed primarily to evaluate the adequacy of the replacement crankshaft. Still in the first paragraph, Dr. Rau and Mr. Youngling testified that operation of the EDG 103 replacement block for more than 849 hours, of which more than 577 hours were at or above 3300 KW, confirmed their previous opinion, based on the extensive testing of the R-5 engine, that the replacement block is both proven and adequately tested.

The second paragraph, here attacked by the County, refers to the cumulative damage calculations as yet another reason further testing is unnecessary. Dr. Rau states that since the replacement block had not developed any ligament cracks after more than 577 hours of operation at or above 3300 KW, further testing was unnecessary because prior cumulative damage analyses demonstrated that any ligament cracks that might hypothetically be assumed to develop would not impair the operation of the engine.^{1/}

In sum, this reference to cumulative damage calculations, contrary to SC's claims, is not based on a refined determination of strain gauge stresses, is not directed to the adequacy of the blocks at 3500/3900 KW, and imposes no undue burden on the County. This reference to prior cumulative damage calculations is admissible because it responds directly to one of the County's newly admitted contentions.

^{1/} Pertinent, too, in this context is the following directive in the Board's January 18, 1985 order, at page 2.

As is generally the case, any necessary further testimony on reopened and supplemented issues shall make use of the existing record to the extent possible.

B. Page 3, Answer 3.2, Third Sentence

This portion of the testimony the County seeks to strike reads as follows:

Further, cumulative damage analysis shows that, if a postulated LOOP/LOCA occurs, the EDGs will perform their intended function with greater margin at the qualified load than at the higher loads previously analyzed.

The reference here is to cumulative damage analysis at 3300 KW performed by FaAA since the last hearings. Suffolk County contends, inter alia, that this testimony is outside the "permissible scope of evidence contemplated by the Board's December 4, 1984 order." Suffolk County motion, page 1. While the Board's December 4 order does not specifically mention cumulative damage analyses at 3300 KW, it seems apparent that the Board's purpose in granting the reopening was to permit LILCO an opportunity to show that the blocks will perform their intended function at 3300 KW. LILCO's reference in the testimony on page 3 to cumulative damage analysis at 3300 KW responds to this purpose.

Quite apart from this, it is important to note that the County's recent additional testimony regarding the cylinder block criticizes LILCO for not having undertaken a detailed

crack propagation analysis to ascertain the mechanics and rate of crack propagation. Testimony of Dale G. Bridenbaugh dated January 25, 1985, page 2. LILCO's cumulative damage analysis at 3300 KW in fact does just this. The County seems to want to have it both ways -- to preclude LILCO from using its 3300 KW analysis and to criticize LILCO for not doing or presenting such an analysis. This is manifestly unfair. The appropriate resolution is to admit the testimony and permit SC to cross examine to see whether any criticisms of the analysis are warranted.

C. Page 13, Answer 15

This question and answer concern the additional cumulative damage analyses performed by FaAA since the conclusion of the previous hearings. These analyses do employ a refined determination of stresses from the original EDG 103 strain gauge testing. The pertinent calculations were reflected in the final generic block report issued and distributed to the Board and parties in December, 1984. Calculations were performed at 3300 KW and at the previous loads which permits a valid comparison to be made. This type of comparison was anticipated by the Board in ruling on LILCO's motion to reopen the record. See Tr. 26,924. Since the calculations show

that there is greater margin at 3300 KW than at 3500 KW, testimony concerning the calculations is pertinent to the issue at hand -- the adequacy of the blocks at 3300 KW.

D. Page 17, Answer 18

Here SC claims LILCO has mischaracterized the stipulation on cam gallery cracks. This objection is unfounded and trivial.

Specifically, Suffolk County objects to the phrase on page 17 which provides:

. . . the parties have stipulated that the oxide layer was formed at high temperatures at the time of the casting process and that the layer was not due to fretting corrosion or graphitic corrosion.

The County asserts that the answer should be phrased that the evidence "indicates" that the oxide layer was formed at high temperatures, etc.

Similarly, the County objects to the sentence on page 17 which states:

. . . the parties have stipulated that the evidence justifies the conclusion that the cracks in the cam gallery areas of EDG 101 and 102 formed during the casting process, and that this supports

the conclusion that the cam gallery cracks in the EDGs 101 and 102 did not propagate during or as a result of EDG operation.

The County argues that the testimony should read that "the parties have stipulated that the evidence 'indicates' that the cracks in the cam gallery areas "

LILCO cannot see what earthly difference this makes. There is surely nothing to be misled about and, in any event, the stipulation was attached to LILCO's testimony as Exhibit B-67. Moreover, there is, so far as LILCO knows, no dispute between the parties regarding the Stipulation or its effect. The County has stipulated that it "does not seek to disqualify the use of the blocks of the EDGs 101 and 102 and the new block of EDG 103 on the basis of the existence of cam gallery cracks." Clearly, the County and the State of New York would not have so stipulated if they did not believe that the x-ray crystallography established that the oxide layer formed at high temperatures during the time of the casting process and that these layers were not due to fretting or graphitic corrosion.

The County's Motion to Strike merely plays word games. Whether "indicates," "demonstrates," "means," or "supports the conclusion" is used, the bottom line is that the County

stipulated, based on the x-ray test results, that the oxide layer formed at high temperatures during the time of the casting process, that these layers were not due to fretting or graphitic corrosion, and that the cracks have not propagated during or as a result of EDG operation. If the County now intends to argue to the contrary with respect to any of these points, then LILCO is surprised and has been seriously misled in this process.

In summary, nothing in SC's Motion to Strike requires that this answer be stricken or revised.

II. Crankshaft Testimony

A. Page 4, Answer 8

SC seeks to strike those portions of Answer 8 on page 4 that refer to "new safety factor calculations (at 3500 KW) under the Kritzer-Stahl criteria using a lower UTS" (ultimate tensile strength). Presumably, the County is specifically referring to two portions of that answer, (i) the third sentence and (ii) a derivative phrase in the last sentence. These are as follows.

Third sentence:

The actual safety margin at 3500 KW is 1.248, based on a UTS of 700 Newtons per square millimeter, while it is 1.239 based on a UTS of 695 Newtons per square millimeter.

Last sentence with phrase underscored:

Thus, as one can see, the safety factor is essentially the same for each respective load regardless of whether one utilizes 695 or 700 Newtons per square millimeter for the ultimate tensile strength.

First, contrary to SC's suggestion, there is nothing new in the third sentence. In the previous hearing, Dr. Pischinger testified on cross-examination by the Staff that the safety margin at 3500 KW using a UTS of 700 Newtons per square centimeter is 1.247. Tr. 22,993, 23,004. Dr. Pischinger also testified that using a UTS of 695 would make a difference of less than one percent or .8% less. See, e.g., Tr. 22,993. Finally, Dr. Pischinger further testified that using the lower UTS made no significant difference. Id. The only difference between the third sentence of Answer 8 and his previous testimony is that the actual figure is given rather than just the percentage difference. The factor of 1.239 is easily and approximately obtained using the percentage difference. By no stretch of the imagination, then, does the addition of the safety factor figure impose any burden.

More importantly, this evidence relating to 3500 KW is directly responsive to SC's newly admitted qualified load contention, and therefore should not be stricken. In paragraphs (a)(i), (ii), (iii) and (iv) of the contention (and in its testimony, too), the County asserts that intermittent and cyclic loads or operator errors may result in diesel generator loads above 3300 KW. The purpose of a portion of Dr. Pischinger's additional testimony (including Answer 8) is to establish that in his opinion any alleged excursions over 3300 KW postulated by the County would not adversely affect the crankshaft even if they were to occur.^{2/} One of Dr. Pischinger's stated bases for this conclusion is his previous testimony that the crankshafts are adequate at 3500 KW and have unlimited life at that load level with a safety factor of 1.248 at a UTS of 700 and a safety factor approximately .8% less at a UTS of 695.

In summary, there is nothing new in Dr. Pischinger's reference in Answer 8 to 3500 KW safety factors. Moreover, no portions of Answer 8 should be stricken because the answer is a predicate for Dr. Pischinger's testimony that, in turn, is

^{2/} See, e.g., Answers 25, 26 and 27, Additional Crankshaft Testimony of Franz F. Pischinger, Duane P. Johnson and Milford H. Schuster, pages 11-13.

directly responsive to portions of SC's newly admitted load contention.

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(Shoreham Nuclear Power Station, Unit 1)
Docket No. 50-322-OL-4 (Low Power)

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