



1 UNITED STATES OF AMERICA
2 NUCLEAR REGULATORY COMMISSION
3 Before the Atomic Safety and Licensing Board

4 _____X
5 In the Matter of: :
6 LONG ISLAND LIGHTING COMPANY : Docket No.
7 (Shcreham Nuclear Power Station, : 50-322-OL-3
8 Unit 1) :
9 -----X

10 Main Terminal,
11 LaGuardia Airport
12 New York, New York
13 Thursday, June 21, 1984

14 DEPOSITION of FRANZ F. FISCHINGER, called
15 for examination by counsel for SUFFOLK COUNTY in the
16 above-entitled action, pursuant to notice, the witness
17 having been duly sworn by DEBRA STEVENS, a shorthand
18 reporter and notary public for the State of New York, at
19 LaGuardia Airport, Main Terminal, Manhattan Room, at
20 8:50 a.m., the proceedings being taken down by Stenotype
21 by DEBRA STEVENS, and transcribed under her direction.
22

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COMPUTER-AIDED TRANSCRIPTION

1 Q Did you ever use Lloyds?

2 A Yes. I am a little familiar with
3 Lloyis. Yes.

4 Q Did you use Lloyds in performing or
5 comparing the calculations with respect to the Shoreham
6 diesels?

7 A In this case, we used the German code.

8 Q What's the name of the German code?

9 A Well, it's a code which is used in --
10 inside of the German companies and which is accepted by
11 most of the European companies.

12 Q What is the name of this code?

13 A It has no special name.

14 Q Just the German code?

15 A It's a German code. I can give you the
16 literature if you want.

17 Q So you did not use --

18 A It's published.

19 Q You did not use Lloyds?

20 A No.

21 Q Did you use ABS rules?

22 A No. I followed up what has been done

1 Shoreham diesel engines, is it fair to say that you
2 relied on the German code and not on any of the other
3 classification society codes?

4 A Not relied. This is not relying, but it
5 is just -- you ask me for side calculations, and I said
6 we did this. But our main task was to work through and
7 to arrive at a safe model of calculating. For instance,
8 a crank shaft at FAA. This was done by FAA. We
9 contributed some ideas. I think the final version of
10 it, the final results, we can back it up.

11 Q I'm just trying to understand. With
12 respect to the analysis calculations that you performed
13 for the Shoreham engines, did you use the German code
14 rather than Lloyds, ABS, DENA recommendations or any
15 other classification society code?

16 A Well, this is just routine. If we have
17 to design an engine or we have to assess an engine, by
18 routine, we have these codes and we do this.

19 Q I understand. You don't -- I just want
20 to make sure I understand your answer.

21 Your answer is that you used the German
22 code?

1 A Yes.

2 Q Under the German code, do the Shoreham
3 diesel engines satisfy the requirements of the German
4 code?

5 A It's just on the boundary. If you ask me
6 that way, if I would design a crank shaft in Germany for
7 this engine, it would be a little thicker.

8 Q A little thicker?

9 A Not only of this engine. Of others,
10 too. It is a fact that is known in the -- well, under
11 engine manufacturers, this is a more conservative code.
12 Maybe it will be given up one day.

13 Q I understand you think the German code is
14 more conservative than any other code.

15 A It's a fact.

16 Q Dr. Pischinger, with respect to your use
17 of the German code, was it just with respect to the
18 crank shafts, the replacement crank shafts?

19 A Well, this is one of the main topics.

20 Q I understand. My question is a little
21 broader. I want to make sure we were on the same wave
22 length. I asked if under the German code, the three

1 different engine practices throughout the world.

2 Q Your calculations under the German code
3 with respect to the replacement crank shafts at
4 Shoreham, were those calculations performed at
5 horsepower rating of 3500 kw?

6 A Yes.

7 Q Did you perform any calculations at the
8 3900 kw rating?

9 A Yes, but this needs some input which we
10 hadn't had in this case.

11 Q Let me ask you first --

12 A We estimated it.

13 Q With respect to your estimate at 3900 kw,
14 do the replacement crank shafts meet the German design
15 code?

16 A No continuous rating at 3900. It would
17 not be allowed.

18 Q It would not be allowed?

19 A No.

20 Q So, in other words, the code was not met?

21 A No. It was not met. Yes, it was not met.

22 Q At 3500 kw, that's where, u er your

1 calculations, the replacement crank shafts fall on the
2 boundary of satisfying the requirements of the German
3 code; is that correct?

4 A Yes.

5 Q Have you, since performing your calculation--

6 A I have to say, with regard to side
7 calculations, if I would have really designed the
8 change, then I would put a lot more work in it. It was
9 the first information we had from here, we did these
10 calculations, only some preliminary calculations.

11 You cannot -- you should note this. You
12 cannot take this as a final statement here.

13 Q Did you ever perform the final calculations
14 under the German code for the replacement crank shafts?

15 A No.

16 Q Why not?

17 A Because we pursued this way which is a
18 little more elaborate and takes into account -- it
19 takes into account the situation in Shoreham.

20 It's a unique situation. You have failures
21 of three cranks shafts after a given time, and this is
22 a unique situation to use the knowledge of these

1 weightier crank shaft?

2 MR. STROUPE: You asked a minimum, I believe.

3 Q Am I misstating what you told me earlier?

4 A Maybe according to the German codes the
5 shape of the crank shaft would be a little different,
6 but it would still be 13-by-11.

7 Q 13-by-12?

8 A 13-by-12. We are tricking ourselves with
9 these figures.

10 Q Would it be a heavier crank shaft under the
11 German code that you'd want to see?

12 A Not heavier.

13 Q When you say the shape would be different,
14 how would the shape be different?

15 A Well, the German crank shafts usually have
16 -- it's due to the special code -- a little thicker
17 webs. It means even smaller bearings.

18 Q Now, the replacement crank shafts were
19 designed by TDI; is that correct? Do you know?

20 A Yes. They have been existing for several
21 times before they were now installed in the Shoreham
22 plant.

1 I think we just talked on this topic.

2 Q Can you tell me what was the Tn value you
3 used?

4 A You mean the tangential force?

5 Q Yes.

6 A I do not know it by heart.

7 Q Do you know if the values were supplied to
8 you or FEV by the Failure Analysis Associates or by TDI?

9 A What I can tell you is that values which are
10 used in the report, final report by FAA, values which
11 are very reasonable, which we can back up.

12 Q You used the values which were in the crank
13 shaft report? Is that what you're saying?

14 A I do not know if at that moment -- because
15 we did these side calculations, preliminary side
16 calculations at an earlier stage.

17 So, in this stage we used some estimates.

18 Q Did you use any German Tn values?

19 A Well, if you are designing an engine,
20 complete new design, and you have no measured values,
21 the only possibility is to make guesses.

22 And there are some rules for such guesses.

1 is very important to change over to a series 3 oil, a
2 better quality oil, which helps to prevent buildup of
3 carbon.

4 Q Dr. Pischinger, is it fair to say that these
5 areas regarding fretting of the piston skirt and
6 scuffing of the piston rings and any recommendations
7 which you or Failure Analysis Associates might have in
8 this regard, will be set forth in some later report?

9 A Yes.

10 Q When do you expect the release of that
11 report?

12 A I think very soon.

13 Q Dr. Pischinger, let me just make sure I have
14 an understanding which is correct.

15 During depositions, other depositions in
16 this case, some individuals have noted that
17 preliminarily you concluded, that the cyclic stress for
18 the replacement crank shafts were too high.

19 A What stresses?

20 Q The cyclic stresses.

21 A Cyclic?

22 Q Cyclic stresses.

1 A Well, probably somebody referred to my
2 preliminary investigation due to the German --

3 Q Under the German code?

4 A -- code.

5 Q This is an area I believe we talked about
6 earlier today.

7 A Yes.

8 Q What you told me is that you have not
9 performed any final calculations in this regard?

10 A No.

11 Q Is it still your conclusion, Dr. Pischinger,
12 that under the German code, the cyclic stresses for the
13 replacement crank shafts are too high?

14 A Yes, if I regard it as a new design. But
15 the situation here is completely different. You have
16 here a designed crank shaft, the 11-by-13, which showed
17 clearly pronounced failure at a time which can be
18 affixed very exactly. This gives you a base for a much
19 securer calculation of a new crank shaft.

20 You usually do not have this base if you
21 design a new engine. Then you have to take a
22 conservative approach.

1 Q Are you saying design codes are only useful
2 when there is a new design?

3 A I wouldn't say only, but I say are used for
4 a new design. That's the main purpose. The main
5 purpose for a new design where you have no tests, no
6 strain gauge measures, nothing.

7 Q Are you saying, Dr. Fischinger, that when
8 you have an engine which has operating experience, the
9 operating experience of the engine proves more useful
10 data than a designed code?

11 A Of course. The most accurate way of
12 assessing design is to measure the physical design and
13 practice.

14 Q Does the operating history of the
15 Transamerica Delaval R-48 engine provide you comfort
16 with respect to reliability and adequacy of the engine?

17 A We discussed this also with TDI people and
18 we got a list of generator, diesel generator sets all
19 over the world. Also figures on running hours of these
20 sets.

21 There are certain, rather broad background
22 for this type of crank shaft and this type of engine.