

WRBwrb

1 A (Witness Cimino) Yes, I do.

2 Q To the best of your knowledge, is that volume of  
3 testimony and exhibits true and correct?

4 A Yes, it is.

5 Q And do you adopt it as your own?

6 A I do.

7 Q Dr. Wachob, I would ask you the same question with  
8 regard to both the testimony and the exhibits.

9 JUDGE BRENNER: Mr. Stroupe, I wonder: maybe we  
10 could note in the record at this point that the exhibits  
11 are LILCO Diesel Exhibits C-27 through C-39.

12 MR. STROUPE: Exactly.

13 WITNESS WACHOB: Yes, I do have copies and I do  
14 adopt them as my opinion.

15 BY MR. STROUPE:

16 Q Dr. Wells, I would ask you the same two questions.

17 A (Witness Wells) I have copies of the testimony,  
18 and I do adopt it as my own.

19 Q Is it true and correct to the best of your  
20 knowledge?

21 A It is true and correct to the best of my  
22 knowledge.

23 Q Mr. Burrell, I would ask you the same question.

24 A (Witness Burrell) I also have copies, and I adopt  
25 them as my testimony.

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2 A The quality assurance process at Failure Analysis  
3 in general consists of qualified experts in the particular  
4 subject performing an independent review of the analysis and  
5 of the concluding statements in the reports.

6 If they are unable to document any numbers, any  
7 quantitative conclusions, then that information is deleted  
8 from the report in the process of our quality assurance  
9 review.

10 Q Can you identify the persons at FaAA who performed  
11 this review with respect to this particular portion of the  
12 April version of the report?

13 A With respect to the endurance stress range  
14 improvements, the fatigue numbers were reviewed by  
15 Mr. Robert Sire and, I believe, by Dr. Paul Johnston.

16 Q And can you describe their independent review for  
17 me?

18 A In general, the independent review would attempt  
19 to locate test data or documentation in the technical  
20 literature that would be a basis for comparing the  
21 properties of the original 13x11-inch crankshafts with those  
22 of the as-peened 13x12-inch crankshafts.

23 Q And did this review uncover any documents from the  
24 technical literature which would serve as a basis for that  
25 comparison?

A There are many documents in the technical

2 WRBpp

1                   Now let's turn to page 15. In the answer we  
2 referred to earlier, part of that answer is -- and I quote,  
3 "residual tensile stress which may occur below -- " and I  
4 would like to correct this, since that is really not part of  
5 your quote.

6                   Let me make a statement. The picture that I  
7 gather from your answer is that the surface is in  
8 compressive stress -- is that right? -- as a result of  
9 shot-peening?

10                  A     That's right. The surface and a depth of about  
11 thirty thousandths, thirty-five thousandths below surface.

12                  Q     But at depths deeper than the number you just  
13 quoted there may be tensile stresses; is that correct?

14                  A     That is correct. It's a fact. However, when one  
15 looks at the fact that we only have 35 -- 30, 35 thousandths  
16 on each side or, say, a total of 60 to 70 thousandths under  
17 compression, you have the rest of that 13 inches over which  
18 to distribute the offsetting tensiles. And therefore, they  
19 become very insignificant.

20                  Q     In the last statement were you thinking of the  
21 engine running or not running or what situation were you  
22 thinking of?

23                  A     Which last statement? About the subsurface  
24 tensiles being very low and insignificant. That's in a  
25 running condition

5 WRBpp 1 A (Witness Wachob) I believe that the idea is that the  
2 strength levels are met through the design of that  
3 crankshaft, and that this process provides an adequate  
4 product to do that.

5 You may have been able to pick another process  
6 that would have given you a little better, you may have been  
7 able to pick another process that would have given you a  
8 little worse.

9 But this is a quite adequate processing for this  
10 product.

11 Q That's the explanation, but you didn't answer my  
12 question.

13 I want the professional opinion of each of you as  
14 to whether from your point of view it would have been better  
15 in the first instance for TDI to have selected the process  
16 which Dr. Bush believes would have been a better process as  
17 an initial selection.

18 I understand all the work you've done on these  
19 crankshafts after they were made.

20 A (Witness Wells) My opinion is that far more  
21 important than the hot working processes is the question of  
22 the cleanliness and the qualities of the as-machined  
23 surface; that is to say, the cleanliness of the material  
24 throughout the ingot; initially this is where defects occur  
25 if they occur at all; primarily, though, the condition of  
26 the crankshaft at the outer surface.

3 WRBpp 1 in order to produce any mechanism for any type of corrosive  
2 action, since the only environment we know of in the  
3 crankcase in fact is, lubricating oil. And since the  
4 surfaces of the shaft are well polished and are not  
5 chemically active I personally would find no basis for this  
6 particular concern.

7 Dr. Wachob, I believe, has familiarity with the  
8 electrochemical aspects of this alleged problem.

9 A (Witness Wachob) I think it is well recognized  
10 in the literature that cold working -- therefore  
11 shot-peening in this instance -- shows no difference on the  
12 corrosion behavior to that of an annealed material.

13 So therefore putting these two areas -- the cold  
14 worked shot-peened area in conjunction with the normal  
15 crankshaft area -- does not produce sufficient driving  
16 energies to result in significant corrosion of either one.

17 And again, in agreement with Dr. Wells, the fact  
18 that you need a strong electrolyte there to cause most of  
19 these problems, if you had a significant difference in  
20 energy levels, that's needed.

21 We don't have that.

22 So I believe that the statement here is not  
23 correct.

24 Q Thank you.

25 That's all the questions I have.