

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of )

DUKE POWER COMPANY, et al. )

(Catawba Nuclear Station, )  
Units 1 and 2) )

Docket Nos. 50-413  
50-414

TESTIMONY OF J. E. CAVENDER, W. E. ROGERS, D. H. LLEWELLYN,  
AND L. R. BARNES REGARDING IN CAMERA  
WITNESS #2's ALLEGATIONS CONCERNING ACCURACY OF RADIOGRAPHS

1 Q. PLEASE STATE YOUR NAMES, YOUR BUSINESS ADDRESSES, AND  
2 PROFESSIONAL QUALIFICATIONS.

3 A. Mr. Cavender: My name is John E. Cavender. My business  
4 address is P.O. Box 33189, Charlotte, N. C. 28242. I am a  
5 Nondestructive Examination Examiner (NDE) Level III. My  
6 responsibilities include training and qualification of NDE personnel,  
7 the development and approval of NDE procedures, and the periodic  
8 review of NDE records. A copy of my professional qualifications is  
9 attached to Applicants' testimony addressing the Board's Question  
10 Concerning the Containment Spray System.

11

12 Mr. Rogers: My name is W. E. (Bill) Rogers. My business  
13 address is Catawba Nuclear Station, P. O. Box 223, Clover, S. C.  
14 29710. My current position is Welding Superintendent. I am  
15 responsible for Welding at Catawba. My department consist of  
16 approximately 550 employees. Prior assignments have included  
17 Welding General Foreman, Welding Foreman, Welding Inspector, and  
18 Welder with Duke Power. A copy of my professional qualifications

1 is attached to Applicants' testimony addressing In Camera Witness  
2 #2's Allegations Concerning Foreman Override.

3  
4 Mr. Llewellyn: My name is D. H. Llewellyn. My business address  
5 is Catawba Nuclear Station, P. O. Box 223, Clover, S. C. 29710.  
6 My present position is group leader of Technical Support - Welding.  
7 A copy of my professional qualifications is attached to Applicant's  
8 testimony addressing In Camera Witness #2's Allegations Concerning  
9 Foreman Override.

10  
11 Mr. Barnes: My name is L. R. Barnes. My business address is  
12 Catawba Nuclear Station, P. O. Box 223, Clover, S. C. 29710.  
13 My current position is Planning and Control Manager of construction  
14 at Catawba Nuclear Station. A copy of my professional  
15 qualifications is attached to Applicants' testimony addressing the  
16 Board's Question Concerning the Containment Spray System.

17  
18 Q. ARE YOU FAMILIAR WITH IN CAMERA WITNESS #2's ALLEGATION  
19 THAT RADIOGRAPHS WERE BEING INACCURATELY INTERPRETED  
20 AND THAT THIS COULD HAVE RESULTED IN UNACCEPTABLE  
21 DEFECTS IN WELDS?

22 A. Yes. We have reviewed his testimony. As support for his allegation  
23 the witness' major concerns include the following:

24 (1) Although he is "no radiographer", he states that in attempting  
25 to correct welds which radiographers have determined are  
26 deficient, at times he could not find the defect noted by the  
27 radiographer or would find a defect in a location in the weld

1           other than that noted. Also, he alleges that at times  
2           radiographs of corrected welds would point out defects not  
3           noted in the earlier radiographs.

4  
5           (2) The witness alleges that in early 1982, Mr. Pridmore (one of  
6           the "better welders" in Henry Best's crew) had informed him  
7           of a weld in the Unit 1 reactor building which had passed a  
8           radiograph inspection in 1980 and in early 1982 had been  
9           rejected by a visual welding inspector.

10  
11   Q.   HAVE YOU INVESTIGATED THE ALLEGATION?

12   A.   Yes. This investigation consisted of a review of relevant portions  
13       of records regarding this issue and discussions with Level I and II  
14       radiographers, welders, welder foremen, welder general foreman,  
15       and the welder superintendent.

16  
17   Q.   WHAT WAS THE RESULT OF YOUR INVESTIGATION?

18   A.   From our investigation, we determined that radiographers at the  
19       Catawba site are qualified to do their job, that adequate controls  
20       are in effect to assure that radiographs are accurately interpreted  
21       and that unacceptable weld defects are identified and repaired.  
22       Furthermore, to the best of our knowledge, there are no defective  
23       welds in the Catawba plant. Factors providing support for this  
24       determination include those noted below.

25           1. There are three levels of radiography certification, i.e.,  
26           Level I inspectors (assist in making radiographs), Level  
27           II inspectors (may make radiographs on their own and

1           may interpret them if assigned to an interpreter's  
2           position) and Level III examiners (may also perform  
3           functions including administering qualification exams).  
4           The Level I radiographers at the Catawba site are  
5           certified only after an extensive and thorough period of  
6           instruction (on the average about 6 months) culminating  
7           in a comprehensive written and practical examination  
8           during which they must prove their abilities. To be  
9           selected as a candidate for Level II testing and  
10          certification, the Level I radiographer must train for a  
11          minimum of nine additional months during which time his  
12          work is checked to assure that he is completely qualified  
13          and that he has sound, basic interpretive skills. The  
14          Level II certification is awarded only after another very  
15          extensive written and practical exams (e.g., the practical  
16          exam lasts about 2 days). Even after certification, the  
17          Level II radiographers must still undergo an  
18          "apprenticeship" before being considered to fill an  
19          interpreter's position at Duke. (No Level II QC  
20          interpreters at Catawba have had less than 3 years  
21          experience, and no Level II QA interpreters at Catawba  
22          have had less than 8 years experience.) Further, even  
23          after being assigned an interpreter's position, the work  
24          of the Level II radiographer (like all other certified  
25          radiographers assigned radiographer positions) is  
26          reviewed at least annually and every three years he must  
27          undergo a recertification. In short, the radiographers at

1           Catawba are well-trained and highly skilled employees  
2           whose proficiency is continuously reconfirmed. JEC.

3  
4           2. QA Procedure M-4 paragraph 4.7 requires that every  
5           radiograph be reviewed and evaluated by a certified NDE  
6           Level II Inspector. Procedure NDE-10 paragraph 18  
7           requires that the inspector verify that the radiograph is  
8           properly exposed and has adequate coverage for  
9           interpretation, and that he interprets the radiograph to  
10          identify any indications of weld defects which would be  
11          rejectable under ASME III NB-5320 or NC-5320, as  
12          appropriate, for the weld. In addition, QA Procedure  
13          NDE-10 Paragraph 17.2 requires that a separate Level II  
14          inspector check the interpretations of the first inspector  
15          for accuracy. If it is determined that a rejectable defect  
16          exists, QA Procedure M-4 requires that the weld be  
17          rejected until corrections are made and the weld is again  
18          radiographed and accepted by two certified Level II  
19          Inspectors. This rejection cycle will continue until  
20          acceptance is achieved. After total acceptance by two  
21          certified NDE Level II film interpreters, procedure M-4  
22          paragraph 4.11 requires that ASME Code weld records be  
23          made available for review by the Authorized Nuclear  
24          Inspector. If he should find a rejectable defect, the  
25          entire cycle begins again. In addition, the Level III  
26          inspector periodically reviews the work of the two  
27          interpreters. Significantly, In Camera Witness #2 has not  
28          identified any weld which is defective or any specific weld

1 which he questions. In short, procedures require  
2 thorough and independent review of all radiographs by at  
3 least two qualified inspectors and periodic checks of these  
4 reviews by a third Level III Inspector and the Authorized  
5 Nuclear Inspector. JEC, LRB.

- 6  
7 3. With regard to In Camera Witness #2's concerns regarding  
8 not finding defects or finding defects in locations other  
9 than that identified by the Level II radiography  
10 reviewers, there are several possible explanations for  
11 this. First, when a welder cuts into a weld using an air  
12 arc to remove an identified defect, he quite likely will  
13 remove the metal so quickly that some defects may be  
14 removed before he sees them. When blending out a  
15 smooth repair area, he might also come across a small  
16 area of porosity or slag that he might consider to be a  
17 defect, but because of its size may be acceptable under  
18 the Code. JEC, WER, ~~DHL~~

19  
20 Second, the actual process of radiographing and  
21 providing the welder information on any identifiable defect  
22 will, in many cases, result in a shift in the observed  
23 location of the defect. To explain, when a defect is  
24 identified on a radiograph, the interpreter prepares, on a  
25 piece of translucent plastic, a tracing of the radiograph  
26 showing the location and nature of the rejectable defect  
27 by referencing it to location numbers around the  
28 circumference of the weld. Prior to repairing the weld,

1 the welder should align the location numbers on the  
2 tracing to the corresponding locations on the weld which  
3 were marked during radiography. Failure to carefully  
4 and accurately align the location numbers and weld  
5 configuration can result in improperly marking the defect  
6 location on the weld, i.e., shifting of the defect. In  
7 addition, the geometrical relationship between the source  
8 used in radiography, the defect, and the film can result  
9 in the defect location on the tracing being displaced from  
10 the actual defect location on the weld circumference. In  
11 any event, the allegations that defects pointed out by  
12 radiographs may not be found by the welder, or may not  
13 be found in the precise locations noted, provides no basis  
14 for concluding that rejectable defects in welds are not  
15 being identified and corrected. The witness has not  
16 pointed out any welds where this is the case. (It should  
17 be noted that we raised this issue with many other  
18 welders at Catawba and they stated that this was not an  
19 area of concern). In any event, because radiographs of  
20 areas of weld repair are done on not only the area of  
21 concern but also on the two adjacent areas, any rejectable  
22 defects not corrected in the initial repair effort will be  
23 identified in the subsequent radiograph. While this could  
24 lead to a greater expenditure of Duke resources, it is not  
25 a situation affecting plant safety. JEC, WER, DHL.

- 26  
27 4. With regard to In Camera Witness #2's concern that new  
28 radiographs of welds which had previously been corrected

1 reflected defects in areas which were not repaired, there  
2 are several possible explanations. First, the new  
3 radiograph may have been made using more sensitive film  
4 than was used originally. (The Code requires that film  
5 have a certain minimum sensitivity, but we sometimes use  
6 more sensitive film to aid the interpreter to evaluate  
7 borderline indications.) This is completely in accordance  
8 with the Code and is not indicative of faulty  
9 interpretation of the initial radiograph or rejectable  
10 "defects" slipping by the process. JEC.

11  
12 A second possible explanation regarding "new" defects in  
13 reradiographed welds is the practice of opening a small  
14 hole through the weld on the opposite side from the  
15 repair area so that the interior side of the repair can be  
16 observed during welding in order to avoid root defects.  
17 This "viewing port" must be rewelded, and its area  
18 reradiographed to assure no defects are present. This  
19 appears to be the situation that the In Camera Witness #2  
20 is referring to on Tr. 291. JEC, WER.

21  
22 A third possible explanation regarding "new" defects in  
23 reradiographed welds is that if a defect is repaired near  
24 a location marker; not only is the area in which the  
25 repair was made reradiographed, but also the adjacent  
26 area in order to assure complete coverage. This different  
27 radiograph geometry could detect a previously undetected  
28 indication. Because of Duke's conservative policy this

1 new indication would receive appropriate attention. JEC,  
2 WER.

3  
4 The significant point regarding this concern is that while  
5 more welder time may be needed to repair defects in areas  
6 where originally no defects were noted, or defects which  
7 "suddenly" appear in locations other than where they  
8 were reported, in neither case is the interpretative skill  
9 of the reviewer called into question or the final adequacy  
10 of the weld at issue. It should be noted that we asked  
11 many welders at Catawba if they had a concern similar to  
12 the witness and in no case did any respond that they  
13 did. JEC, WER.

- 14  
15 5. With regard to In Camera Witness #2's concerns regarding  
16 the rejected weld of Mr. Pridmore (identified as  
17 INC56-8), this incident was documented on nonconforming  
18 item report 12549. The report and subsequent discussions  
19 revealed that the NDE Level III Inspector had evaluated  
20 this weld and determined that the radiograph was  
21 accurately interpreted and that the weld was acceptable.  
22 However, in that there was some disagreement (~~of which~~  
23 ~~this Board has already heard testimony~~) regarding the  
24 weld, Duke chose the conservative approach and took  
25 appropriate action. Specifically, some additional grinding  
26 was done on the weld, it was reinspected and  
27 reradiographed and determined to meet requirements of  
28 ASME III NC-4424(e). JEC, DHL, LRB.