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June 22, 1984

Thomas S. Moore, Esq., Chairman
Atomic Safety and Licensing
Appeal Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. W. Reed Johnson
Atomic Safety and Licensing
Appeal Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. John H. Buck
Atomic Safety and Licensing
Appeal Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

In the Matter of
PACIFIC GAS AND ELECTRIC COMPANY
(Diablo Canyon Nuclear Power Plant, Units 1 and 2)
Docket Nos. 50-275 OL and 50-323 OL

Dear Members of the Appeal Board:

In a letter dated April 13, 1984, the Staff advised the Appeal Board that it would consider the information that was submitted by Pacific Gas and Electric Company to the Appeal Board and the service list relating to the use of tube steel for construction of pipe supports at Diablo Canyon with radii of less than 2T.

Based upon the Staff's evaluation, it has been determined that the Diablo Canyon tube steel radii issue has been resolved and that the previous affidavit submitted by Mr. Samuel D. Reynolds remains unaffected.

Joseph Rutberg
Assistant Chief Hearing Counsel

Attachments:
1. Letter from W. Wade (E.G. & G.) to D. Kirsch (NRC)
   dated June 7, 1984, Same Subject
2. Memo from B. Wagner to D. Kirsch
   dated May 21, 1984, Same Subject
3. Memorandum for L. J. Chandler from T. W. Bishop
   dated June 13, 1984

cc: See page 2

D507

cc: w enclosures

John F. Wolf, Esq.
Elizabeth Apfelberg
Philip A. Crane, Jr., Esq.
Raye Fleming
Michael J. Strumwasser, Esq.
Joel R. Reynolds, Esq.
Mr. H. Daniel Nix
David S. Fleischaker, Esq.
John Marrs
Harry M. Willis
James O. Schuyler
Thomas H. Harris
Docketing and Service Section
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EG&G ENERGY MEASUREMENTS GROUP

San Ramon Operations

2801 OLD CROW CANYON ROAD, SAN RAMON, CA • TEL (415) 837-5381 • MAIL: BOX 204, SAN RAMON, CA 94583

In reply please refer to: WOW: 84-21

June 7, 1984

Mr. Dennis Kirsh
U.S. Nuclear Regulatory Commission
1450 Maria Lane, Suite 210
Walnut Creek, CA 94596

SUBJECT: DIABLO CANYON TUBE STEEL DESIGN VERIFICATION

REFERENCES:
1. Telecon; P. Morrill to W. Wade on 4/2/84.
2. PG&E letter No. DCL-84-083, from O. J. Shuyler to J. B. Martin dated 2/29/84.
3. EG&G letter report No. 84-18, from W. O. Wade to D. Kirsh dated 4/19/84.

Our effort to expedite the Special Report on tube steel verification (Reference 3) has resulted in a need for minor revisions and an opportunity to provide the additional information described below.

1.0 Paragraph 1 implied by misstatement that the "effective throat" of all flare-bevel-welds to the tubes was determined. In reality, this was not done. The effective throat referenced is, by AWS D1.1-82 definition (Par 2.3.1.4 and Table 2.3.1.4), "the effective throat thickness for flare groove welds when filled flush to the surface of the solid section of the bar shall be as shown in Table 2.3.1.4" (the table specifies a value of 5/16 R where R = radius of bar). It was therefore decided that if the inspections of the tubing corner radius of curvature, R, included verification that all associated flare-bevel groove welds were filled flush to the surface of the tubing, an effective throat for these welds could be determined from the value of the remaining variable, R, that was being measured. It was also being assumed that the alleger's intent was to question the strength of flare bevel groove welds if the actual value of R were to be found less than specified for the design. The data produced is considered sufficient to complete this evaluation.

2.0 The method of measurement described in paragraph 2 and illustrated in Figure 1 apparently requires additional explanation. The initial instructions (reference 1) did not include a preferred method of measurement and the method employed by the licensee for the data presented in reference 2 was not described. In addition, the American Tube Manufacturers Institute specification referenced by the licensee (reference 2) to establish the relationships between tube wall thickness, t, and the corner radius of curvature, R, could not be found. As a consequence, the licensee was asked to fabricate gages for the inspectors to perform an initial check of the tube corners to be followed

by the tangential measurements shown in Figure 1 (reference 3) in the event irregularities were encountered. The gages requested were to be similar to the one shown in Figure A2. Figure A1 shows what was provided and used since the schedule would not accommodate a delay for making more gages. Once the field work was underway it was evident that the majority of the material had corner irregularities and that the gaging step offered only qualitative results. Therefore, all of the tubing was examined using the tangential method to produce quantitative data suitable for almost any subsequent evaluation required by the staff.

3.0 The second sentence of paragraph 2 under Inspection Results should be amended by replacing the words "wall thickness" by the word radius. The radius of curvature is defined as the minimum value of R measured as shown in Figure 1. In addition minor revisions to the summarized results are necessary to account for the data revisions described below.

4.0 The data provided in Attachment 1 was double checked against the field notes taken by the three inspectors and the following amendments are necessary.

Item MO3 - t was <u>not</u> measured--delete 1/4 under t column

Item MO6 - Part number is 923-64

Item R24 - R value is 5/16

Item R27 - R value is 1/4

Item R30 - R value is 5/16 and the RATE IS 3

Item R31 - Part number is 54-55, t was not measured, R value is 7/16 and the RATE is 2

Item R33 - No. PCS is 3

Item R39 - t was not measured

Item R40 - RATE is 3

Item J65 - RATE is 3

Item J87 - t was not measured

5.0 Items R30, J58, J66, J69, J71, J80, and J84 in Attachment 1 were reinspected by a different inspector during the week of May 28, 1984, using the gage illustrated in Figure A2. The measurements taken verified the initial data.

W. O. WADE
MECHANICAL ENGINEERING DEPARTMENT

WOW:sh

Distribution

NRC	LLNL	EG&G/SRO
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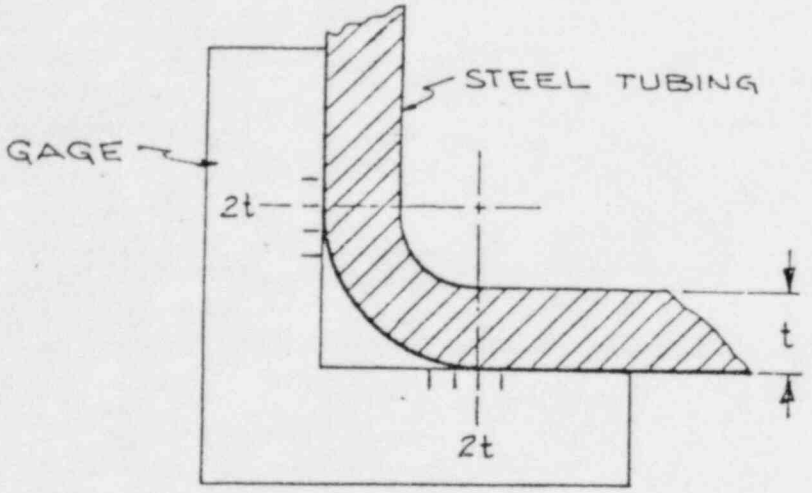
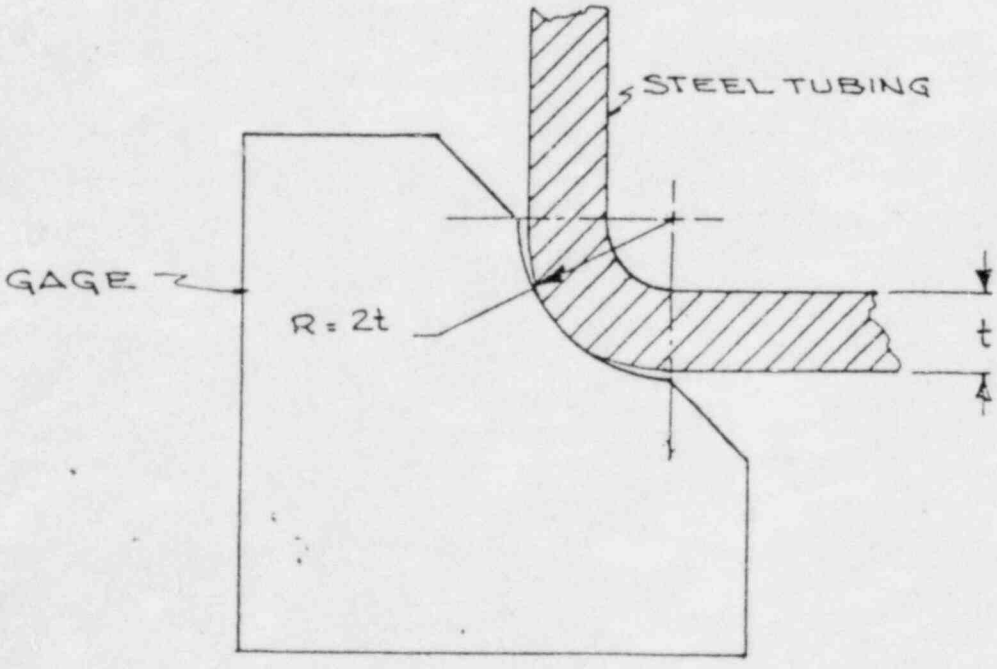


Tangential Gaging Method

Figure A1



Radial Gaging Method

Figure A2

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION V
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CALIFORNIA 94596

MAY 21 1984

MEMORANDUM FOR: D. Kirsch, Chief, Reactor Projects Branch K

FROM: B. Wagner, Reactor Inspector

THRU: H. Canter, Chief, Engineering Section

SUBJECT: TUBE STEEL RADII MEASUREMENTS

re: DCAF Allegations 92/93

Between May 14 and May 17, 1984, I performed an inspection on the licensee's methods of tube steel radii measurement. I contacted a Bechtel and a PG&E employee during my examination of the measurement techniques.

Eleven pieces of tube steel varying in size from 3x2x1/4 to 6x6x3/8 were examined using the tangent point method and a circle template or radius gage method. Seven of the eleven samples had a perimeter of 14 inches or less. In all cases, I was looking for radii to be greater than or equal to 2t where t is the thickness of the material. In no case did I find radii less than 2t.

It is my engineering judgement that the tangent point method is not as reliable, as accurate or acceptable as the other method.

The most effective method is the template or radius gage method in which the gage is fit to the exterior band at the tube steel, thereby accurately determining the radii. This method most accurately matches the curvature of the outside bend. Also, the radius gage most effectively subtracts the effect of the imperfect corner radii that exist due to the rolling process by which the tube steel is manufactured.

In conclusion, I feel the best method of radii measurement is the template or radius gage method because of its accuracy and repeatability. Using this method on eleven samples of various perimeter tube steel used at Diablo Canyon, none were found to be less than 2t.

W J Wagner

B. Wagner
Reactor Inspector

cc: H. Canter
DCAF 92/93

TUBE STEEL MEASUREMENTS

LOC	UNIT	DESCRIPTION	PART NO.	SIZE	ITEM NO.	MEASURED RADIUS TPM[1]	MEASURED RADIUS TEMPLATE[2]	MEASURED RADIUS GAGE[3]	R = 2t REQMTS
Aux Bldg	2	Pipe Hanger	47-125R	3x3x1/4	(a)	11/32 15/32	—	≥ 1/2	1/2
				3x3x1/4	(b)	14/32 12/32	—	≥ 1/2	
Aux Bldg	2	Hanger (Snubber Support)	413-142 SL	6x6x3/8	(a)	30/32 3/4	—	—	3/4
				4x4x1/4	(b)	1/2 14/32	—	≥ 1/2	1/2
				4x4x1/4	(c)	1/2 14/32	—	> 1/2	1/2
Aux Bldg	2	Pipe Hanger	ISO No. 2-9-1	3x2x1/4	(a)	12/32 14/32	—	≥ 1/2	1/2
				3x2x1/4	(b)	14/32 11/32	—	≥ 1/2	1/2
Aux Bldg	2	Pipe Support	948-68	4x4x1/4	(a)	17/32 15/32	—	≥ 1/2	1/2
				3x3x1/4	(b)	1/2 15/32		≥ 1/2	1/2

TUBE STEEL MEASUREMENTS (continued)

LOC	UNIT	DESCRIPTION	PART NO.	SIZE	ITEM NO.	MEASURED RADIUS			R = 2t REQMTS
						TPM[1]	TEMPLATE[2]	GAGE[3]	
Aux Bldg	2	Pullman Materials Storage	P.O. No. 14817	3x3x1/4	(a)	12/32 14/32	1/2	1/2	1/2
			P.O. No. 11727	3x3x3/8	(b)	1/2 15/16	3/4	--	3/4

NOTES

(1) Tangent Point Method
(2) Circle Template
(3) Starrett No. 167 Radius Gages Range 1/32 to 1/2 Inch Radii

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION V
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CALIFORNIA 94596

June 13, 1984

MEMORANDUM FOR: L. J. Chandler, Special Litigation Counsel

FROM: T. W. Bishop, Director, Division of Reactor Safety and Projects, Region V

SUBJECT: TUBE STEEL RADII MEASUREMENTS

The attached material provides evidence that the Diablo Canyon tube steel radii issue has been resolved. The attached information leads the staff to conclude that the previous affidavit submitted by Mr. Samuel D. Reynolds remains unaffected.

D. F. Kirsch
for T. W. Bishop, Director
Division of Reactor Safety
and Projects, Region V

Attachments:
1. Letter from W. Wade (E.G.&G) to D. Kirsch (NRC) dated June 7, 1984, Same Subject
2. Memo from B. Wagner to D. Kirsch dated May 21, 1984, Same Subject

cc: Diablo Canyon Allegation File 92/93
H. Canter, RV