RELATED CORRESPONDENCE



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

| | | |
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| In the Matter of | ) | |
| | ) | |
| UNION ELECTRIC COMPANY | ) | Docket No. STN 50-483-OL |
| | ) | |
| (Callaway Plant, Unit 1) | ) | |



SUPPLEMENTAL RESPONSE TO APPLICANT'S INTERROGATORIES AND REQUESTS FOR DOCUMENT PRODUCTION (SET. NO. 2) TO JOINT INTERVENORS ON THEIR CONTENTION NO. 1

Joint Intervenors submit the following Supplemental Response to Applicant's Interrogatories and Requests for Document Production (Set No. 2) to Joint Intervenors on their Contention No. 1. All documents identified, unless otherwise indicated, are in the possession and/or control of Kenneth M. Chackes, Attorney for Joint Intervenors and will be made available for inspection and/or copying upon reasonable request.

1E-30. (a) The answer to this interrogatory is hereby supplemented by interlineation with the following addition at page 15, second full paragraph, after the phrase: "The welding procedure specifies a double-weld . . ."

ADD: "(Armco Steel Procedure No. 5, Revision 1)"

(b) The answer to this interrogatory is hereby supplemented by interlineation with the addition of the following to the documents listed:

> ASME Boiler and Pressure Vessel Code, 1977 Edition: (1) Section II: Specification SA-358, paragraphs 1,2 and 5; (2) Section III: (a) General Requirements, paragraphs NA-3767.3 and NA-4133.5; and (b) Subsection NC, paragraphs NC-2100 and NC-2561; and (3) Section IX: Introduction and Articles 1 and 2.

1E-37. See answer to 1E-38, below.

1E-38. (a) We have no knowledge of the "NRC Inspection and Enforcement Report No. 50-382/81-04" cited in the queston. However, reasonable doubt remains

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concerning excess ovality in the pipe piece cited in NCR No. 2SN-0496-P for the following reasons:

(1) "Ovality in pipe" was referred to as the "cause of nonconformance" in the NCR. Ovality would have to be severe to cause a minimum wall violation.

(2) Individual A reported a "flattening of the pipe at the weld." This condition was not accounted for in the NRC I&E Report No. 50-483/81-04.

(3) The maximum and minimum outside diameters were never determined on the pipe piece in question. Measurements taken in 4 planes while avoiding a reportedly flattened area do not determine the maximum and minimum outside wall.

(4) The pipe was determined to be acceptable by .0055 inches, a very small amount. (No margin of error was discussed in the report).

(5) Only one location on the pipe piece was examined.

(b) NRC I&E Report No. 50-483/81-04.

(c) Objected to.

(d) None.

1E-39. (a) The quality control methods used to ensure the structural integrity of SA-312 piping installed at Callaway are not able to detect significant percentages of centerline lack of penetration (CLP) weld defects. IE Bulletin No. 79-03A states, "It has been determined that conventional ultrasonic testing (UT) and radiographic testing (RT) techniques (as required by ASME Section III) are not adequate to detect centerline lack of weld penetration (CLP). Conventional radiography and UT examinations may detect the presence of CLP under special conditions, but neither can be considered reliable enough to detect CLP even when significant percentages exist." This statement is confirmed by Bechtel National, Inc. in a report entitled, "Report on Investigation of Weld Imperfections in ASME SA-312 Double Welded Austenitic Stainless

Steel Pipe for Compliance With NRC I&E Bulletin 79-03." Two of the report's conclusions read as follows:

> 1. Radiographic (RT) examinations cannot detet centerline lack-of-penetration (CLP) in double welded ASME SA-312 pipe when the two unfused plate edges are in intimate contact. When some discrete gap exists between the unfused faces, radiographic examination can detect CLP. The size of gap necessary in order to detect CLP by radiography has not been determined.
>
> 2. Conventional ultrasonic (UT) examination techniques cannot detect CLP in double welded ASME SA-312 pipe either when the two unfused plate edges are in intimate contact, or when there is a discrete gap between them.
>
> It was found in this investigation that conventional shear wave UT may indicate an acceptable weld in accordance with ASME Section III, even when the CLP exceeds 50 percent of the wall thickness.

Because of the inability of conventional NDE to detect significant amounts of CLP, the extent of the problem at Callaway remains unknown. However, substantial evidence indicates that CLP deffects are likely to exist at Callaway. Sixty-five or more spool pieces installed at Callaway contain SA-312 piping that was manufactured by Youngstown Welding and Engineering (YW&E) without adequate control of welding parameters resulting in known cases of CLP (See IE Bulletin 79-03 and UE letter ULNRC-314). The known cases are cited in the Bechtel report quoted above and involve 520 feet of pipe Pullman Power Products was fabricating into spool pieces. The Pullman pipe was manufactured by YW&E at about the same time the Callaway pipe was manufactured.

The Bechtel report did not correlate the Pullman pipe with other pipe (over 26,000 feet) also welded without adequate control of welding parameters. Without a substantiated correlation between the Pullman pipe and other pipe, conclusions concerning the other pipe's safety cannot be drawn from the Bechtel report. CLP in the other pipe, which includes Callaway piping, may be more or less than the Pullman pipe.

The Bechtel report gives the impression that 26 percent CLP is the greatest amount contained in the 520 foot Pullman sample by citing 26 percent CLP as the "worst case." However, the examination of the Pullman pipe was limited in a manner that allowed potentially greater amounts of CLP to remain undetected. The only method described in the Bechtel report to accurately determine a percentage of CLP was the etching method of examination, which was used on 71 cross sections. All but two of the cross sections were the ends of pipe cut for fabrication into spool pieces. Some of these cross sections may represent approximately the same location on a length of pipe prior to cutting. If a pipe is cut and examined on both sides of the same cut, essentially the same cross section is examined twice. Duplications such as these may reduce considerably the area represented by the 71 reported cross sections.

Examination of the burst test sample taken from the 520 feet of production pipe showed that, "CLP varied along the length of the weld at the failed area, but averged 15 percent of the wall thickness." (Bechtel report, page 14). This finding indicates that CLP is not a consistent defect. Some of the burst sample did not fail and may not have contained CLP, while other areas exceeded 15 percent. A cross sectional view is therefore not representative of a given length of pipe with CLP defects. A cross section may reveal little or no CLP but a few feet away the CLP could exceed the critical limit.

The limited area of pipe examined by cross sectional etching and the inconsistent nature of CLP defects indicates insufficient data to draw conclusions concerning percentage amounts of CLP in the Pullman sample.

(b) Bechtel National, Inc., "Report on Investigation of Weld Imperfections in ASME SA-312 Double Welded Austenitic Stainless Steel Pipe for Compliance With NRC I&E Bulletin 79-03," June, 1979.

Youngstown Welding and Engineering, "ASME SA-312 Pipe Manufactured by YW&E Co. Prior to Mid-November, 1978," April 30, 1979.

IE Bulletins 79-03 and 79-03A.

Union Electric letter, ULNRC-314, to NRC Region III, dated May 11, 1979.

(c) Objected to.

(d) None.

1E-40. (a) The recommendations in the Bechtel report seek to give an assurance of integrity and quality in place of ASME Code NDE requirements that are deficient. IE Bulletin No. 79-03A states, "Based upon the above and previous findings during inspections at Youngstown it has been determined that the Youngstown Welding andd Engineering Company did comply with the ASME Code requirements, but that the Code NDE requirements are deficient." The Code NDE requirements referred to here are located in the ASME Code, Section III, Subsection NB, Subsubarticle NB-2550 and Subsection NC, Subsubarticle NC-2550. Subsubarticle NB-2550 concerns Class 1 material and Subsubarticle NC-2550 concerns Class 2 material, and both deal with the examination of welded (without filler metal) tubular products such as pipe made in accordance with SA-312 and fittings made in accordance with SA-403. NC-2551(b) states that the welds in SA-312 pipe and SA-403 fittings, "shall be examined by one of the methods of (1) through (4) below:

(1) ultrasonic examination

(2) eddy current examination

(3) magnetic particle or liquid penetrant examination on all external surfaces and accessible internal surfaces

(4) radiographic examination."

The purpose of having different levels of ASME Code specifications is to "provide assurance of structural integrity and quality commensurate with the relative importance assigned to the individual items" (NA-2120). Class 1 and Class 2 items have the highest and second highest relative importance, yet obviously significant

defects could and did go undected when examined by the specifications set forth in NB-2550 and NC-2550. (See IE Bulletins 79-03 and 79-03A). Rejectable centerline lack of penetration defects could not be detected reliably by the conventional ultrasonic and radiograhpic methods specified in the ASME Code. With the ultrasonic (UT) method of examination the defects could exceed 50 percent of the wall thickness of a pipe and remain undetected. The purpose of the Code was not fulfilled by the examination requirements the Code specified.

At Youngstown Welding and Engineering over 26,000 feet of SA-312 stainless steel pipe had been produced without adequate control of welding parameters and was determined acceptable on the basis of defective ASME Code specifications. Some of this pipe is now installed at Callaway.

Bechtel National Inc. investigated the CLP defects in SA-312 pipe on a generic basis. Information on CLP was gathered, a fracture analysis was conducted and a report was issued. The recommendations of the Bechtel report furnished a deus ex machina for all of the SA-312 pipe that was suspect in quality because of inadequate control of welding parameters and deficient ASME Code requirements.

Recommendtion 1.1 states, "Piping systems subject to design stress of less than 85 percent of allowable stresses need not be examined." Virtually all nuclear piping systems are designed with stresses of less than 85 percent of the maximum allowed by the ASME Code and are therefore exempt from any further examination and assurance of structural integrity and quality. The 85 percent criterion recommended by Bechtel is a substitute for the assurances thought to be present in NC-2550 but found to be missing. The 85 percent criterion is not discussed in the Bechtel report but is explained in a SNUPPS letter (SLNRC 79-16, dated October 5, 1979) to the NRC Region I Director. The letter explains that the 85 percent criterion is derived from Note 3 to Table I-7.2 of Appendix I of the ASME Code, Section III. The letter states, "For welds without filler metal pipe of the SA-312 type, the efficiency factor is 85

percent when no volumetric exmination of the longitudinal weld is performed." Note 3 reads as follows:

> "These S values do not include a longitudinal weld efficiency factor. For materials welded without filler metal, ultrasonic examination in accordance with NC-2550 or eddy current examination in accordance with NC-2550 shall provide a longitudinal weld efficiency factor of 1.00. Materials (welded with filler metal) meeting the requirements of NC-2560 shall receive a longitudinal weld efficiency factor of 1.00. Other longitudinal weld efficiency factors shall be in accordance with the following:

| Type of Joint | Efficiency Factor |
|---|---|
| Single Butt Weld | 0.80 |
| Butt, without Filler Metal | 0.85 |
| Double Butt Weld | 0.90 |
| Single or Double Butt Weld with Radiography | 1.00 |

Note 3 does not state as claimed by SNUPPS that, "the efficiency factor is 85 percent when no volumetric examination of the longitudinal weld is performed." Note 3 refers to NC-2550 and provides for pipe tested by the UT and ET methods an efficiency factor of 1.00. Pipe examined by one of the other two methods in NC-2550 and pipe in the ND-2550 classification have an efficiency factor of .85 or 85 percent.

Table I-7.2 concerns design allowable stress values and Note 3 relates design values to examination specifications so that allowable stress values are determined or limited by an examination specification. The SNUPPS letter attempts to turn this relationship around, so that the design stress determines or removes an examination requirement. This is a perverse interpretation of Note 3 that is not substantiated by the wording of Note 3 or good sense.

An 85 percent efficiency factor reduces the allowable stress by 15 percent. However, the defect allowed by this reduction may exceed 50 percent of the wall thickness and likewise may reduce the strengh of the pipe by more than 50 percent.

Note 3 is not applicable to Class 1 material. While Class 1 specifications are cited in the Bechtel report, the recommendation 1.1 does not differentiate between classifications. This appears contrary to NA-2120.

Note 3 places great confidence in the UT and ET methods of examination by providing an efficiency factor of 1.00 for materials examined by those methods. That confidence now appears to have been falsely placed.

It seems that Note 3 is being used by SNUPPS and Bechtel to circumvent the examination requirements of NC-2550 which are deficient. In so doing they are obstructing a genuine assurance of integrity from being implemented.

Recommendations 1.2 and 2 in the Bechtel report recommend a 30 percent maximum size for CLP defects. If a defect this size were detected by any of the examination methods listed in NC-2550 the pipe would be rejected. A 30 percent criterion for CLP is not consistent with the defect sizes considered significant by NC-2550.

The recommendations of the Bechtel report are based on a fracture analysis which did not consider the effects of service induced fatigue. NC-2160 states, "It is the responsibility of the Owner to select material suitable for the conditions stated in the Design Specifications (NA-3250) with specific attention being given to the effects of service conditions upon the property of the material." The Bechtel report does not seem to be in compliance with this requirement.

(b) All documents cited in answer 1E-39(b).

ASME Boiler and Pressure Vessel Code (1977 ed.) Section III.

SNUPPS letter SLNRC 79-16, dated October 5, 1979, from Petrick to Grier.

(c) Objected to.

(d) None.

1E-41. See 1E-42(a), below.

1E-42. (a) The Bechtel report (Report on Investigation of Weld Imperfections in ASME SA-312 . . .June, 1979) made a statement that was not substantiated in the report. That statement is, "All of the mechanical property requirements of ASME SA-312 were met with CLP up to 26 percent." The mechanical property requirements for ASME SA-312 are found in Section II SA-312, para. 10. Mechanical Tests Required. Para. 10.1 is titled, "Transverse or Longitudinal Tension Test." Para. 10.2 is titled, "Flattening Test." Para. 10.3 is titled, "Hydrostatic Test." The Bechtel report does not present or cite any information on flattening tests conducted on SA-312 pipe with up to 26 percent CLP. Without this information the report's statement, cited above, is unsubstantiated.

By making the statement that "all of the mechanical property requirements were met . . .," the authors of the report indicate that meeting "all of the mechanical property requirements . . ." was of some importance in their opinion. We concur with that opinion.

The Certified Material Test Reports produced by the Applicant pursuant to Joint Intervenors' Document Request No. 50 were not complete and did not contain any of the Certified Material Test Reports for the SA-312 pipe contained in the 65 spool pieces listed in the attachment to Union Electric letter ULNRC-314 dated May 11, 1979.

The Bechtel report purports to investigate the CLP problem on a generic basis. Pipe proposed for use in Class 2 systems should meet the requirements of the material specification (See ASME Section III, NC-2550). In this case the material specification requires a flattening test. The Bechtel report recommends that pipe "with up to 30 percent CLP be accepted." In that case, it is appropriate that pipe with up to 30 percent CLP should meet the mechanical test requirements of the material specification as is required by NC-2550.

We contend that the ASME Code should be complied with to the degree that acceptable indications of weld imperfections are also in compliance with the appropriate material specification.

We contend that the Bechtel report was remiss in not establishing the compliance of recommended criterion of acceptance with material specifications.

(b) "Report on Investigation of Weld Imperfections in ASME SA-312 Double Welded Austenitic Stainless Steel Pipe for Complaince with NRC I&E Bulletin 79-03," Bechtel National, Inc. (June, 1979).

ASME Boiler and Pressure Vessel Code, 1977 ed., Section II SA-312, SA-530, and Section III, NC-2550.

(c) Objected to.

(d) None.

1E-43. See 1E-44(a), below.

1E-44. (a) Many factors will affect the mechanical properties of SA-312 piping in the RHR. Those factors include the effects of radiation, corrosion, through-thickness thermal gradients, LOCA, and steam hammer, to name a few. ASME Section III NC-2160 states, "It is the responsibility of the Owner, to select material suitable for the conditions stated in the Design Specifications (NA-3250) with specific attention being given to the effects of service conditions upon the property of the material."

Welded SA-312 pipe, suspet in the quality of the welds, needs its suitability established for the conditions stated in the Design Specifications, with specific attention being given to the effects of service conditions upon the property of the material. As this applies the RHR System Guideline 1.139 should be considered.

(b) Union Electric letter ULNRC-314, May 11, 1979

ASME Boiler and Pressure Vessel Code, 1977 ed., Section III, NC-2160

Bechtel Report (cited in 1E-42(b)).

Guideline 1.139

(c) Objected to.

(d) None.

1E-45. See 1E-46, below.

1E-46. (a) We do not have detailed information in answer to this question.

(b) (1) Peteson, N.L., Harkness, S.D., Editors: Radiation Damage in Metals, Papers presented at a seminar of the American Society of Metals, November, 1975.

(2) International Atomic Energy Agency: Radiation Damage in Reactor Material, Vol. I, Proceedings of a symposium, June, 1969, Vienna

(3) Bullington, Douglas S.; Crawford, James H. Jr., Authors: Radiation Damage in Solids, Princeton University Press, 1961.

(c) Objected to.

(d) None.

1E-47. See answer to 1E-39, above.

1E-48. (a) See answer to 1E-39(a), above.

(b) See answer to 1E-39(b), above.

(c) Objected to.

(d). None.

Kenneth M. Chackes, attorney for Joint Intervenors Coalition for the Environment, St. Louis Region; Missourians for Safe Energy; and Crawdad Alliance, and authorized as their agent for the purpose of answering the above interrogatories, hereby states to the best of his knowledge, information and belief that the responses provided above are true and contain such information as is presently available to Joint Intervenors.

Kenneth M.Chackes

Subscribed and sworn to before me this 17th day of September, 1981.

Notary Public

My Commission Expires: 10/16/82

CHACKES AND HOARE

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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| In the Matter of | ) | |
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| UNION ELECTRIC COMPANY | ) | Docket No. STN 50-483-OL |
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| (Callaway Plant, Unit 1) | ) | |

CERTIFICATE OF SERVICE

I hereby certify that copies of the Supplemental Response to Applicant's Interrogatories and Requests for Document Production (Set No. 2) to Joint Intervenors on their Contention No. 1 have been served on the following by deposit in the United States mail this 17th day of September, 1981.

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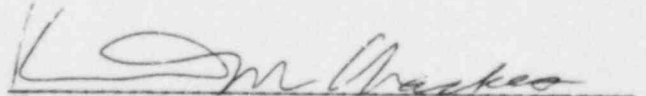

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