

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of )

UNION ELECTRIC COMPANY )

(Callaway Plant, Unit 1) )

) Docket No. STN 50-483-OL  
)  
)

RESPONSE TO APPLICANT'S INTERROGATORIES AND  
REQUESTS FOR DOCUMENT PRODUCTION (Set. No. 1) TO  
JOINT INTERVENORS ON THEIR CONTENTION No. 1

Joint Intervenor submit the following Response to Applicant's Interrogatories and Requests for Document Production (Set. No. 1) to Joint Intervenor 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 Intervenor and will be made available for inspection and/or copying upon reasonable request. The answers provided below contain all of the information presently available to Joint Intervenor. Additional information that would be responsive to these interrogatories is presently being sought via Joint Intervenor's discovery to Union Electric and the NRC Staff. For all questions not answered Joint Intervenor have no responsive information. Where "not determined" is provided in response to questions dealing with identification of our witnesses, Joint Intervenor mean that at present we do not plan to call any witnesses. If Joint Intervenor determine that witnesses will be called their identities will be immediately disclosed to the Applicant and NRC Staff. Joint Intervenor are unable to answer many of the questions pertaining to Contention No. 2 because of the unavailability of the technical specifications, and the FES and SER.

1A-1. See Objection No. 1.

1A-2 Not determined.

1A-3. Not determined.

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- 1A-4. (1) NRC Report No. 50-483/77-05.  
(2) NRC Report No. 50-483/77-10.  
(3) DLVC-990 (letter December 3, 1976, Daniel to UE).  
(4) NCR 2-0270.  
(5) NRC Report No. 50-483/80-14; and attachments to 80-14:  
(a) ULNRC-349  
(b) ULNRC-354  
(c) ULNRC-361  
(d) Detailed Procedure for Test Program to Evaluate Welds on  
Anchor Rods and Studs to Embedded Plate, Revision 2  
(e) ULNRC-380  
(6) NRC Report No. 50-483/80-16.  
(7) NRC Report No. 50-483/78-01.  
(8) NRC 2-0831-C-B.  
(9) Letter Victor Stello to Kay Drey dated May 28, 1981.

1A-5. See response to No. 1A-4.

1A-6. (a) The reports concerning the problems with embedded plates do not contain this information. The NRC suggested that U.E. identify the location of each plate, determine what loads each plate must bear, and determine the consequences of plate failure upon the safe operation of the plant. U.E. did not act upon those suggestions.

(b) NRC Report No. 50-483/77-05.

NRC Report No. 50-483/77-10.

NRC Report No. 50-483/80-14;

and specifically, U.E. letters to NRC:

ULNRC-349, April 24, 1980, para. 17 and

ULNRC-354, May 23, 1980, para. 17.

(c) None.

(d) None.

1A-7. See 1A-6.

1A-8. See 1A-6.

1A-10. (a) ULNRC-349 (NRC questions) (attachment to NRC Report No. 50-483/80-14) - question #8 states: "Do we have evidence of multiple defects per embed? How many plates were involved in the 66 stud defects? Bechtel is to provide a list of plates which contain the 457 defective studs (including 66 failed studs) and determine how many plates had more than 1 defective or failed stud." ULNRC-354 (UE answers to NRC questions: attachment to #80-14) - response in #8: "There is evidence of multiple defects per embed; ten plates are in this category and they are shown in attachment "B". Embeds with defective studs (less than 360° weld) and failed studs are listed in Attachment "C"."

(b) See 1A-10(a) above.

(c) See Objection No. 1.

(d) Not determined.

1A-11. (a) NRC Report No. 50-483/80-14, p. 7 describes "Revision 9":

(1) Vertical leg of weld may be up to 1/16" smaller than that specified on drawings

(2) Unequal legs are permitted

(3) Weld profile and convexity requirements for these welds need not be imposed

(4) An undercut of up to 1/16" for 10% of weld length may be permitted. See also ULNRC-354.

(b) See 1A-11(a) above.

(c) See Objection No. 1.

(d) Not determined.

(e) See 1A-11(a) above.

(f) See 1A-11(a) above.

1A-12. (a) NRC Report No. 50-483/77-10, p. 8, states it is alleged that defective embeds were utilized prior to NRC inspection on June 7-9, 1977. After the issuance of a stop-work order, all embeds not already placed in concrete were reinspected and repaired as necessary. Apparently there was no inspection or testing of those already installed prior to this point. A probability study indicated that the already placed embeds were "very unlikely to fail." (Id. at 9). NRC Report No. 50-483/80-14, p. 5, states, "During the NRC inspection on June 10-12, 1980, a visual inspection of embedded plates installed in concrete prior to June 9, 1977 was performed. The manually embedded plates used to support the structural steel framing was substantially loaded by the floor slab dead loads with no sign of distress or indication of overstress. The machine welded embedded plates, some of which were loaded with support attachments and others not yet loaded, were observed to be fully intact with no sign of distress." Five load tests should have been performed in order to approximate the actual stress that these embeds must eventually bear. Also, if some of the machine-welded plates were not loaded, no valid basis existed for their evaluation. Only six out of 255 machine welded plates installed prior to June 9, 1977 were inspected. NRC Report No. 50-483/80-14, p. 4.

(b) See 1A-12(a) above.

(c) See Objection No. 1.

(d) Not determined.

(e) See 1A-12(a) above.

(f) See 1A-12(a) above.

(g) See 1A-12(a) above.

(h) Not determined.

1A-13. Unknown.

1A-14. (a) Yes. The quality assurance program should be adequate to provide confidence that all safety-related structures, systems and components will perform satisfactorily in service. Union Electric has failed to provide such confidence as indicated by the haphazard way in which construction difficulties were identified and resolved. See answers to preceding interrogatories.

- (b) See 1A-14(a) above.
- (c) See 1A-14(a) above.
- (d) See Objection No. 1.
- (e) Not determined.

1A-15. (a) Yes. See answers to preceding interrogatories.

- (b) See 1A-15(a) above.
- (c) See 1A-15(a) above.
- (d) See Objection No. 1.
- (e) Not determined.

1A-16. None exists except with respect to Kay Drey. See 1A-4 and Objection No. 2.

1A-17. See 1A-4.

1B-1. See Objection No. 1.

1B-2. Not determined.

1B-3. Not determined.

1B-4. (1) NRC Report No. 50-483/78-01.

(2) NRC Report No. 50-483/78-03.

(3) Letters: Kay Drey to Ernst Volgenau, April 20, 1978, and Volgenau's response, May 31, 1978.

(4) NRC Report No. 50-483/77-06.

1B-5. See Response to No. 1B-4.

1B-6 (a) We believe UE cannot demonstrate that this crack will not affect the safe operation of the plant. See NRC Report No. 50-483/77-06, pp. 20-21 (It was reported by UE by phone on May 10, 1977 that "an investigation had been initiated to determine the safety-related significance of the crack." The outcome of this investigation is not mentioned in the report.). Moreover, the failure to discover and inspect the crack in a timely manner evidences a failure of the quality assurance program.

(b) See 1B-6(a) above.

(c) See Objection No. 1.

(d) Not determined.

1B-7. (a) We believe UE cannot demonstrate that this crack will not affect the safe operation of the plant. Moreover, the fact that UE's quality assurance personnel overlooked the crack and allowed the next lift to be poured on top of it evidences a failure of the quality assurance program. See NRC Report Nos. 50-483/78-01 and 50-483/78-03.

(b) See 1B-7(a) above.

(c) See Objection No. 1.

(d) Not determined.

(e) See objection No. 1.

1B-8. (a) Concrete was poured over the crack without its being reported by quality assurance personnel. See NRC Report No. 50-483/78-01 and NCR 2-2081-CA.

(b) See 1B-8(a) above.

1B-9. (a) Yes. See answers to interrogatories 1A-14(a), (b) and (c), and 1B-4 through 1B-8.

(b) See 1B-9(a) above.

(c) See 1B-9(a) above.

1B-10. None exists except with respect to Kay Drey. See 1B-4 and Objection No. 2.

1B-11. See 1B-4.

1C-1. See Objection No. 1.

1C-2. Not determined.

1C-3. Not determined.

1C-4. (1) NRC Report No. 50-483/80-30.

(2) NRC Report No. 50-483/80-31.

(3) ULNRC-406: letter Bryan to Fiorelli

(4) NRC Report No. 50-483/77-04.

(5) NRC Report No. 50-483/77-06.

(6) CPPR-139.

(7) NRC Report No. 50-483/77-07.

(8) NRC Report No. 50-483/77-09.

(9) NRC Report No. 50-483/78-01.

(10) NRC Report No. 50-483/78-02.

(11) Letter James Keppler to Kay Drey, April 4, 1980.

(12) NRC Report No. 50-483/80-16.

1C-5. See 1C-4.

1C-6. (a) Yes.

(b) Joint Intervenors will be better able to determine which 10 CFR

Part 50 Appendix B Quality Assurance Criteria were not followed upon receipt of documents requested from the NRC and Applicant. We are presently aware of the following: Voids were attributed to inadequate vibration of concrete mix, which should have been controlled. See NRC Report No. 50-483/77-06; CPPR-139. The design of the base mat may have called for an overcongestion of reinforcing steel, contrary to Criterion III of Appendix B and to General Design Criterion I of Appendix A of Part 50. The vibrating was not accomplished in accordance with prescribed procedures, contrary to Criterion V of Appendix B. The concrete pour was not monitored properly,

contrary to the monitoring instructions and procedures, contrary to Criterion X of Appendix B. Soniscope examination of a sample of only 25% resulted in the conclusion that honeycombing "probably" does not occur elsewhere. See NRC Report No. 50-483/77-07. This may be contrary to Criterion X of Appendix B. Repair work was in progress before the NCR covering same was approved, and grout was being used without prior testing due to discrepancy in specifications. See NRC Report No. 50-483/77-07, page 3. This appears to be contrary to Criteria V & X, and possibly others.

(c) See IC-6(b) above and IC-4.

(d) See Objection No. 1.

(e) Not determined.

IC-7. (a) Yes. We believe UE is unable to demonstrate that the honeycombing in the tendon access gallery will not affect the safe operation of the plant. See NRC Report No. 50-483/80-16, page 2.

(b) See IC-7(a) above.

(c) See IC-7(a) above, IC-4, and IC-6.

(d) See Objection No. 1.

(e) Not determined.

IC-8. (a) Yes.

(b) When information documenting the known extent of imperfections in the dome (4 areas) was sent to Quality Assurance and construction engineering groups, engineers in each group regarded the matter as routine and did not pass the information to superiors. See NRC Report 50-483/80-30, page 3; NCR No. 25N-2790-C. It later became apparent that the imperfections were hardly routine; three additional areas were found for which no plausible explanation was available, there was no adequate assurance that the honeycombing was limited to the initial areas found, and the Region III team "concluded that it is necessary to resolutely establish. . . the extent of the imperfections. . ." See Report No. 80-30, page 5.



(c) See IC-8(b) above and IC-4.

(d) See Objection No. 1.

(e) Not determined.

IC-9. (a) Yes. We believe UE is unable to demonstrate that the honeycombing in the dome will not affect the safe operation of the plant.

(b) According to NRC Regulatory Guide 1.35, the dome is a part of the "boundary designed to contain radioactive materials." Faults in the concrete of the dome could easily compromise this function, allowing radioactive materials to escape to the environment. Moreover, according to NRC Report No. 50-483/80-30, there is no plausible explanation for some of the voids, and their extent is uncertain, there is a significant doubt concerning the safety of the dome

(c) See IC-9(b) above, IC-8 and IC-4.

(d) See Objection No. 1.

(e) Not determined.

IC-10. Unknown.

IC-11. (a) Will be produced.

(b) Non exists except with respect to Kay Drey. See IC-4 and Objection No. 2.

IC-12. See response to IC-4.

ID-1. See Objection No. 1.

ID-2. Not determined.

ID-3. Not determined.

ID-4. (a) Letter Kay Drey to Thomas Eagleton and John Danforth, December 6, 1977.

(b) NRC Report No. 50-483/77-11.

(c) Letter Kay Drey to James Keppler, January 12, 1978.

(d) NRC Report No. 50-483/77-10.

- (e) NRC Report No. 50-483/78-01.
- (f) SNUPPS letter February 13, 1978 - Petrick to Case (NRC).
- (g) Letter Kay Drey to Ernst Volgenau April 20, 1978.
- (h) Letter from Olin Parr (NRC) - August 11, 1978.

1D-5. See 1D-4.

1D-6. (a) Yes.

(b) The very fact that requirements for concrete cover were either ignored or grossly misunderstood indicates a failure of the quality assurance program. Even after the NRC indicated to the Applicant that the NRC's interpretation of the requirements must prevail, numerous instances of failure to meet the requirements were found. See NRC Report Nos. 50-483/77-11, pages 9-11; and 50-483/78-01, pages 9-10.

(c) See 1D-6(b) above.

(d) See Objection No. 1.

(e) Not determined.

1D-7. (a) Yes.

(b) We believe U.E. is unable to demonstrate that the failure to adhere to concrete coverage requirements will not affect the safe operation of the plant. See 1D-6(b).

(c) See 1D-6(b).

(d) See Objection No. 1.

(e) Not determined.

1D-8. None exists except with respect to Kay Drey. See 1D-4 and Objection No. 2.

1D-9. See 1D-4.

1E-1. See Objection No. 1.

1E-2. Not determined.

1E-3. Not determined.

1E-4. See following responses to 1E.

1E-5. See following responses to 1E.

1E-6. (a) SA 312 piping, manufactured by Youngstown Welding and Engineering prior to mid-November 1979, is used extensively in Callaway's Residual Heat Removal System - a high energy Class 2 safety-related system associated with the reactor coolant pressure boundary. This pipe was the subject of IE Bulletin 79-03, in which the following statement was made, "It was determined that the apparent cause of the identified defects was inadequate control of welding parameters. . ."

Some SA 358 piping contains poor fusion and excess inside reinforcement (see Deficiency Report 2SD-0699-P). Although the cause of these defects has not been investigated, inadequate control of parameters is a possible cause.

(b) IE Bulletin 79-03; DR 2SD-0699-P; letter to Region III from UE, ULNRC-314 dated May 11, 1979; and SNUPPS FSAR Fig. 5.4-7

(c) See Objection No. 1.

(d) Not determined.

1E-7. (a) IE 79-03 makes the following statement concerning SA 312 pipe similar to that installed at Callaway, "Pullman then performed ultrasonic examination of the full length of the longitudinal welds and discovered indications exceeding the acceptance criteria of ASME Section III."

Deficiency Report 2SD-0699-P states, "The reinforcement of the vendor's longitudinal weld. . . is not fused uniformly. . . into the plate surface as required by Material Spec. SA358, para. 5.2.3. Also the inside reinforcement is 3/16" (1/8" is the maximum allowed per the above para.).

(b) IE Bulletin 79-03 and DR 2SD-0699-P

(c) See Objection No. 1.

(d) Not determined.

1E-8. (a) The acceptance of the SA 358 pipe cited in DR 2SD-0699-P is partially based on a letter from J.L. Turdera, Bechtel's Project Engineering Manager, to N.A. Petrick, SNUPPS' Executive Director, dated June 1, 1979. In reason (a) the letter erroneously cites ASME Section III paragraph NC 4426.2 which is not applicable as a material specification. It also ignores ASME Section II, SA 358 which is applicable to the pipe in question. In reason (b) the letter cites UW-51(b) of Section VIII which does not apply to nuclear construction. Reason (b) also ignores Section II SA 358 in its discussion of "overlap" or non-uniform fusion into the plate surface. See IE Report No. 50-483/81-04, page 9, second and third paragraphs).

The evaluation and acceptance of SA 312 piping with centerline lack of penetration is based on a letter from SNUPPS to Region I, NRC, dated October 5, 1979 and a June 1979 Bechtel report enclosed with the letter. The Bechtel report does not substantiate the statement on page 2 that, "All of the mechanical property requirements of ASME SA 312 were met with CLP up to 26 percent." ASME Section II, SA 312 paragraph 10 lists three required mechanical tests to determine acceptable mechanical properties. They are a transverse or longitudinal tension test, a flattening test, and a hydrostatic test. The Bechtel report gives extensive test data for tension and hydrostatic tests but omits the flattening test required by SA 312 paragraph 10.2. In the SNUPPS letter to Region I, dated October 5, 1979, the following statement is made: "All piping systems containing Youngstown materials are to be analyzed and, as suggested by Bechtel, those systems subject to design hoop stresses of less than 85 percent of ASME Code allowables will be installed without restriction. This 85 percent value is cited in the enclosed Bechtel report and is based upon ASME Section III, Division 1 allowable stress values for austenitic stainless steels. Specifically, Note 3 to Table I-7.2 of Appendix I of the Code, which is applicable to all grades of stainless steel within the SA-312 material specification, provides a series of 'efficiency factors' for longitudinally welded pipe. The efficiency factors are percentages of the stress values

and depend upon the type of longitudinal weld joint. For welds without filler metal pipe of the SA-312 type, the efficiency factor is 85 percent when no volumetric examination of the longitudinal weld is performed." Note 3 to Table I-7.2 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

The SNUPPS letter states that, "the efficiency factor is 85 percent when no volumetric examination of the longitudinal weld is performed." This statement is not substantiated by Note 3 to Table I-7.2.

Note 3 establishes weld efficiency factors for Class 2 and Class 3 piping. Class 2 piping must meet examination requirements of ASME Section III, NC 2500. SA 312 piping must meet the requirements of subparagraph NC 2551 (b) which reads: "Welded (without filler metal) tubular products such as pipe made in accordance with SA-240, SA-312, SA-333, and SA-334 and fittings made in accordance with SA-403 shall be examined in accordance with the requirements of the material specification and, in addition, the welds 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

Note 3 provides a weld efficiency factor of 1.00 for Class 2 SA-312 piping examined by the ultrasonic or eddy current method. The other two methods of examination would have an efficiency factor of .85. Note 3 does not mention volumetric examination and even requires a .85 efficiency factor for Class 2 SA-312 piping volumetrically examined by the radiographic method. A .85 efficiency factor does not negate the examination requirements of NC 2551 (b). Note 3 does not justify installing Class 2 SA-312 piping with potentially rejectable defects because the design stress is within an 85% efficiency factor as claimed in the SNUPPS letter.

(b) ASME Section II and Section III; SNUPPS to Region I letter dated October 5, 1979.

(c) See Objection No. 1.

(d) Not determined.

(e) See IE-8(a) above.

IE-9 (a) The safety of the pipe listed below remains in question and demands further investigation:

(1) The structural integrity of SA-312 piping, manufactured by Youngstown Welding and Engineering prior to mid-November 1979, and now installed in Callaway's Residual Heat Removal System has not been established. The following items need further investigation:

a) The SA-312 piping in question was manufactured without adequate control of welding parameters and some of that pipe is known to contain undetectable amounts of centerline lack of penetration (see IE Bulletin No. 79-03 and 79-03A). The extent of CLP defects in Callaway's SA-312 has not been determined. Undetected CLP can exceed 50% of the wall thickness (June 1979, Bechtel

report, page 3, Conclusion 2). As the CLP increases beyond 26% the ultimate strength drops below the minimum required (Ibid. Conclusion 4). The Bechtel report states that the critical defect size is approximately 60% (ibid. Abstract page iii).

The total sample of production pipe evaluated in the Bechtel study came from the pipe set aside by Pullman Power Products (ibid. page 20). No attempt was made in the Bechtel report to statistically determine iff the Pullman pipe was a typical sample of the pipe produced prior to mid-November 1979. Also no attempt was made to determine the maximum amount of CLP that could have inadvertently been produced using the welding parameters in effect prior to mid-November 1979. The Bechtel report gives no indication of the extent of CLP defects at nuclear plants as Callaway. CLP at Callaway may exceed the 26% "worst case" cited in the Bechtel report, or it may even equal or exceed the 60% critical defect size.

- b) The Bechtel report did not substantiate whether or not SA-312 pipe with up to 26% CLP would pass the flattening test required by ASME Section II, SA-312, para. 10.2. If pipe with CLP cannot meet the material specification, it is not suited for use in Class 2 or Class 3 systems. (ASME Section III, paragraphs NC 2551 (a) and ND 2551).
- c) The ASME Code, Section III, recognizes different levels of importance with the function of different items and



provides a choice of rules that provide assurance of structural integrity and quality commensurate with the relative importance assigned to the individual items of the nuclear power plant. Callaway's RHR system is rated as a Class 2 system and is subject to the requirements of Subsection NC. Using the standards of NC 2550, rejectable amounts of CLP can go undetected if a discrete gap is not present between the unfused faces of the joint. The assurance of structural integrity once thought to be provided by NC 2550 is no longer present.

The recommendations given in the Bechtel report, page 4, seek to give a substitute assurance of integrity and quality that is not consistent with Section III and may be considered perverse to Section III. Recommendation 1.1 is discussed in the answer to question 1E-8(a). The etch test recommended in 1.2 and 2 has no established standard in Section III or Section V. Recommendations concerning deficiencies in the ASME Code properly belong to an appropriate ASME Code Committee.

- d) The Bechtel report investigates CLP in SA-312 on a generic basis and develops data on the mechanical properties of plate and pipe containing CLP. However, the report failed to include some factors relevant to the mechanical properties of the pipe in actual service. Those factors are as follows:



- (1) The pipe and plate used in testing were nominal size materials. SA-312 pipe in service may have the nominal wall reduced by 12.5%. This can be done in counter boring for a weld edge preparation or in removing surface defects. In pipe containing CLP a reduction from the nominal wall thickness to the minimum wall thickness would remove a higher percentage of sound weld metal than would normally be anticipated. For example, a pipe with 50% CLP would have 25% of the sound weld metal removed with a 12.5% reduction in the nominal wall.
  - (2) In a post-accident condition the RHR system may contain highly radioactive reactor coolant and may be required to maintain long-term heat removal capability (see Regulatory Guide 1.139). The Bechtel report did not discuss the effects of post-accident irradiation upon the mechanical properties of SA-312 piping containing centerline lack of penetration. The results given in the report are dependent on the ductile nature of austenitic stainless steel, any loss of ductility due to irradiation would subsequently affect the mechanical properties of the pipe.
- e) The June 1979 Bechtel report, page 5, states, "The Youngstown welding procedure specification had indicated a wide range of variables and that the selection of specific welding machine settings was (until recently)

made by the welding operator. Inappropriate selection of welding parameters could have resulted in CLP and/or porosity in the weld." The Aptech report (Appendix 1 to the above Bechtel report) states, in section 1.1, "It has been found that a wide range of welding parameters were used in past fabrication of the type of pipe in question, and the CLP defects are thought to have been caused in part by misaligned weld arcs."

10 CFR Part 50, Appendix B, Criterion V, states, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished."

Concerning Criterion V, Kenneth Lish, in his book, Nuclear Power Plant Systems and Equipment, states, "This criterion requires that no activity affecting quality be accomplished in an impromptu manner."

The selection of welding machine settings and/or alignment of the welding arc are clearly activities affecting the quality of SA-312 pipe and should have been prescribed and accomplished by instructions or procedures prior to mid-November 1979.

- (2) The structural integrity has not been established for other fusion welded materials, similar to SA-312 that may contain significant CLP defects. IE 79-03A states that, "the Code NDE requirements are deficient." This statement refers to the inability of conventional ultrasonic testing and radiographic testing to detect significant percentages of centerline lack of weld penetration. IE 79-03A further states that, "This problem is generic to all welded SA-312/A-312 material." However, the same welding process and NDE requirements are used for their material specifications; specifically, SA-249, SA-334, and SA-403. If any of these materials are used in safety-related systems at Callaway their structural integrity is suspect.
- (3) NRC Report No. 50-483/81-04 discusses defects found in an accumulator tank discharge line located in the containment building. The defects were in the longitudinal seam weld of a 10", sch. 140, SA-358 pipe. Three photographs of the defects "clearly show excess weld reinforcement and overlap, with two fissures or cracks in the excess reinforcement." (NRC Report No. 50-483/81-04, page 14). Vendor radiographs also indicated that the defects failed to meet ASME Code criteria but were not rejected (ibid. page 4). Even though the defective area has been ground and no visible defects remain, the structural integrity of the pipe has not been fully investigated or established.

None of the available documents indicate the cause of the defects and their possible consequences. The weld is a

double welded butt weld made with the submerged arc welding process. The appearance of the inside weld indicates that the original inside weld was melted through by a pass made from the outside. If this had occurred the weld metal would have been contaminated by the air inside the pipe. The consequences of this possible contamination upon the mechanical properties of the pipe needs further investigation.

The weld defects reported in NRC Report No. 50-483/81-04 were discovered by craft personnel, even though it is not the responsibility or obligation of craft personnel to identify nonconformances or deficiencies. Defects of a similar nature may exist in other safety-related SA-358 pipe and remain unidentified.

- (4) The Quality Assurance Program of Applicant Union Electric Company and its designees has failed to assure the quality and structural integrity of piping materials and prefabricated assemblies used in the construction of safety-related systems at the Callaway Plant, contrary to 10 CFR Part 50, Appendix B. Without adherence to Appendix B, the quality of all safety-related piping remains in question and demands further investigation. Some examples of apparent violations of Appendix B are listed below:

- (a) Contrary to Criterion IX, radiographs with unacceptable imperfections were judged acceptable. This occurred in an accumulator discharge line, manufactured to material specification ASME SA-358 and is documented in an NRC, Region III, Notice

of Violation, dated 6-25-81, and signed by James G. Keppler.

- (b) Contrary to Criterion IX, radiographs with unacceptable imperfections were judged acceptable. This case occurred in 32 safety-related piping formations manufactured by Gulf & Western, Paola, Kansas. "Failure of the welds in certain of these preassemblies could significantly degrade the functionability of critical systems to the extent that safe shutdown capability is compromised." The above quote and further details are found in the Final Report on Gulf & Western Preassembled Formations, Bechtel Power Corp., November 28, 1979.
- (c) Contrary to Criterion VII, Bechtel and Code Authorized Nuclear Inspector functions failed to insure the proper functioning of the Gulf & Western quality assurance program. Also, examination of the pipe formations upon delivery at Callaway failed to identify "visible weld discrepancies involving incomplete fusion, surface porosity, and improper weld profile." (ibid.). Some of the formations were installed at Callaway without the visible defects being identified. Concern over the defects was first indicated at the Wolf Creek Site.
- (d) Contrary to Criteria V and IX, automatic welding machining settings and/or alignment of the welding

are were not prescribed by instructions or procedures in the seam welding of SA-312 pipe manufactured by Youngstown Welding and Engineering. The pipe is now installed in the residual heat removal system, a Class 2 system associated with the primary pressure boundary and located in the Auxiliary Building and Containment Building.

(b) See IE-9(a) above, and IE Bulletin No. 79-03; IE Bulletin 79-03A; Report on Investigation of Weld Imperfections in ASME SA-312 Double Welded Austenitic Stainless Steel Pipe for Compliance With NRC I and E Bulletin 79-03, Bechtel, June 1979; ASME Code Section III; NRC Report No. 50-483/81-04; NRC Region III, Notice of Violation, dated 6-25-81; and 10 CFR Part 50, Appendix B.

(c) See Objection No. 1.

(d) Not determined.

1E-10. See Objection No. 1.

1E-11. (a) For out-of-round and minimum wall violation see Nonconformance Report 2SN-0496-P, out-of-round is here described as "ovality in pipe." For rejectable weld defects see IE Report No. 50-483/81-04.

(b) Nonconformance Report 2SN-0496-P, and IE Report No. 50-483/81-04.

(c) See Objection No. 1.

(d) Not determined.

1E-12. (a) Yes.

(b) Notice of Violation from NRC Region III, dated 6-25-81 cites 10 CFR Part 50, Appendix B, Criterion IX and concerns radiographs with unacceptable

imperfections that were judged acceptable. IE Report No. 50-483/81-04 details and documents this failure in the quality assurance program.

- (c) See 1E-12(b) above.
- (d) See Objection No. 1.
- (e) Not determined.

1E-13. (a) Yes.

(b) The safety of the pipe in question (IE Report No. 50-483/81-04) has not been established. The appearance of the inside weld indicates that the original inside weld was melted through by a pass made from the outside. If this had occurred the weld metal would have been contaminated by the air inside the pipe. The consequences of this possible contamination upon the mechanical properties of the pipe needs further investigation. Defects of a similar nature may exist in other safety-related SA-358 pipe and remain undetected.

- (c) IE Report No. 50-483/81-04.
- (d) See Objection No. 1.
- (e) Not determined.

1E-14. (a) The SA-312 pipe in question was manufactured without control of activities that affected quality, i.e. control of welding parameters. This pipe is the subject of IE Bulletin 79-03 and 79-03A. A letter from Union Electric to NRC Region III, dated May 11, 1979, lists the pipe spools prefabricated for use at Callaway, containing Youngstown pipe. The letter indicates that some spools had been installed at the time of writing. A letter from SNUPPS to NRC Region I, dated October 5, 1979, states, "Fabrication and installation of Youngstown pipe spools is currently proceeding."

- (b) See 1E-14(a) above.
- (c) See Objection No. 1.
- (d) Not determined.

1E-15. (a) See answer to question 1E-8(a) from paragraph (2) to the end of the answer, and the answer to question 1E-9(a) paragraph (1) subparagraphs (b) and (c).

(b) ASME Code Sections II and III; SNUPPS to Region I letter, dated October 5, 1979; IE Bulletin No. 79-03 and 79-03A; 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, Bechtel, June, 1979.

(c) See Objection No. 1.

(d) Not determined.

1E-16. (a) Yes.

(b) See answers to question 1E-9(a) paragraph (1) subparagraph (e) and paragraph (4) subparagraph (d).

(c) 10 CFR Part 50, Appendix B; Bechtel, June, 1979, 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.

(d) See Objection No. 1.

(e) Not determined.

1E-17. (a) Yes.

(b) The safety of SA 312 piping installed as part of the Residual Heat Removal (RHR) system located in the Containment and Auxiliary buildings at the Callaway Plant has not been established. The pipe was manufactured without control of welding parameters affecting the quality and structural integrity of the pipe. This resulted in known and documented centerline lack of penetration defects, rejectable by the standards of the ASME Code (as per IE Bulletin 79-03). A substitute standard recommended by Bechtel was adopted by the NRC and used as a basis to accept defects of uncertain size and significance. If these CLP defects exceed 26 percent of the wall thickness, the minimum ultimate tensile strength is violated. If the defect size exceeds 60 percent, the critical limit is surpassed. The CLP defect sizes in Callaway



SA-312 piping are not known. The Bechtel report does not determine the maximum defect size possible using the uncontrolled parameters in effect during the manufacture of the SA-312 pipe now installed. The Bechtel report did not analyze the effects caused by reducing the nominal wall thickness to the minimum wall thickness upon the mechanical properties of SA-312 pipe containing CLP defects. (See Answer to Question 1E-9(a)). Also, the Bechtel report did not analyze the effects of post-accident irradiation upon the mechanical properties of SA 312 piping containing CLP defects. The RHR system is used as an essential part of a normal plant shutdown and will contain primary coolant. It also functions as part of the Emerging Core Cooling System and may be called upon in an accident situation. It also has functions related to spent fuel storage. Failure of the welds in the RHR system could jeopardize the safe shutdown capacity of the plant and cause undue risk to the health and safety of the public.

- (c) (1) IE Bulletins 79-03 and 79-03A.
- (2) Bechtel report of June 1979.
- (3) SNUPPS-FSAR.
- (4) Lish, K., Nuclear Power Plant Systems and Equipment, N.Y., Industrial Press 1972.
- (d) See Objection No. 1.
- (e) Not determined.

1E-18. None exists except with respect to Kay Drey. See Objection No. 2.

1E-19. See 1E responses above.

1F-1. See Objection No. 1.

1F-2. Not determined.

1F-3. Not determined.

1F-4. See 1F-6 through 1F-9 below.

1F-5. See 1F-4.

1F-6. (a) See Bechtel's "Final Report on Gulf & Western Preassembled Formations for Callaway Plant Unit No. 1 (Union Electric) and Wolf Creek (Kansas Gas and Electric)", dated November 28, 1979. In Section 1.0 the report states, "this report is being issued due to rejectable indications found in welds in preassembled piping formations manufactured by Gulf & Western (G&W), Paola, Kansas. The scope of this report includes preassembled formations fabricated, delivered, and in some cases, installed at Union Electric's Callaway Unit 1".

(b) See 1F-6(a) above.

(c) See Objection No. 1.

(d) Not determined.

1F-7. (a) In the above cited Bechtel report, Section 2.0 states that, "the radiographs for 31 welds were found to be unacceptable due to improper radiographic technique." The answer to 1F-6(a) substantiates that some formations had been installed.

(b) See 1F-7(a) above.

(c) See Objection No. 1.

(d) Not determined.

1F-8. (a) Yes.

(b) See answers to question 1E-9(a) paragraph (4) subparagraphs (b) and (c).

(c) Above cited Bechtel report and 10 CFR Part 50, Appendix B.

(d) See Objection No. 1.

(e) Not determined.

1F-9. (a) Yes

(b) Bechtel's report, Section 4.0, states, "Failure of the welds in certain of the preassemblies could significantly degrade the functionability of critical systems to the extent that safe shutdown capability is compromised." Gross deficiencies in the

quality assurance program, as shown in the Bechtel report on Gulf & Western piping formations, could have occurred with other contractors and remain unidentified.

- (c) See 1F-6(a).
- (d) See Objection No. 1.
- (e) Not determined.

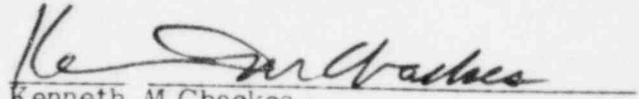
1F-10. None exists except with respect to Kay Drey. See Objection No. 2.

1F-11. See documents cited in 1F responses above.

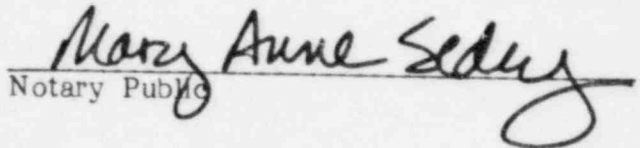
General Interrogatories

- A. See Objection No. 1.
- B. No Answer Required.
- C. See Objection No. 1.
- D. No Answer Required.
- E. Joint Intervenors have no such documents in their possession and/or control.

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.

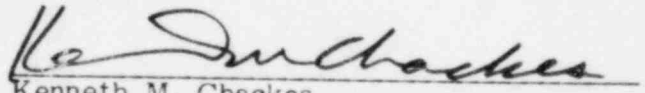
  
Kenneth M. Chackes

Subscribed and sworn to before me this 10<sup>th</sup> day of July, 1981.

  
Notary Public

My Commission Expires: 5-18-82

CHACKES AND HOARE

  
Kenneth M. Chackes  
Attorneys for Joint Intervenors  
314 North Broadway  
St. Louis, MO 63102  
314/241-7961

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

CERTIFICATE OF SERVICE

I hereby certify that copies of the Response to Applicant's Interrogatories and Requests for Document Production (Set No. 1) to Joint Intervenors on Their Contention No. 1 have been served on the following by deposit in the United States mail this 10 day of July, 1981.

James P. Gleason, Esq., Chairman  
Atomic Safety and Licensing Board  
513 Gilmore Drive  
Silver Spring, MD 20901

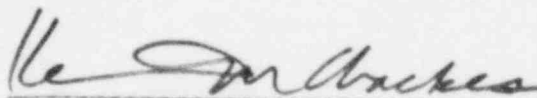
Mr. Glenn O. Bright  
Atomic Safety and Licensing Board Panel  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dr. Jerry R. Kline  
Atomic Safety and Licensing Board Panel  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Thomas A. Baxter, Esq.  
Shaw, Pittman, Potts & Trowbridge  
1800 M Street, N.W.  
Washington, D.C. 20036

Docketing and Service Section  
Office of the Secretary  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Roy P. Lessy, Jr., Esq.  
Office of the Executive Legal Director  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555



Kenneth M. Chackes  
CHACKES AND HOARE