

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report No. 50-483/81-04

License No. PR-139

Docket No. 50-483

Licensee: Union Electric Company
Post Office Box 149
St. Louis, MO 63166

Facility Name: Callaway Nuclear Plant, Unit 1

Investigation At: Callaway Site, Fulton, MO

Investigation Conducted: February 20, March 3-6, 23-27, 1981

Investigator:

J. E. Foster
J. E. Foster

June 18, 1981
(Date)

Inspectors:

W. J. Key
W. J. Key

June 17, 1981
(Date)

A. E. Konkelin, Sr.
A. E. Konkelin, Senior
Resident Inspector

June 18, 1981.
(Date)

Reviewed By:

G. Fiorelli
G. Fiorelli, Chief
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6/24/81
(Date)

J. Streeter
J. Streeter, Acting Director
Enforcement & Investigation Staff

June 25, 1981
(Date)

Investigation Summary: Investigation on February 20, March 3-6, 23-27, 1981,
(Report 50-483/81-04)

Areas Investigated: Special, unannounced reinvestigation of a previously investigated allegation relating to an accumulator discharge line pipe crack; review

of records, interviews of personnel, inspection of weldments, review of radiography. The investigation involved 88 investigation-hours by three NRC personnel onsite, and additional in-office review.

Results: In the areas investigated, one item of noncompliance was observed relative to radiographic examination. Nonconformances in the pipe piece in question had been identified and corrected as required. Examinations showed the pipe to be acceptable.

REASON FOR INVESTIGATION

During late 1979, NRC Region III (RIII) received an allegation concerning a crack in a vendor longitudinal weld on a discharge line associated with an accumulator tank at the Callaway site. This allegation was investigated in March and May 1980 and the results of that investigation are documented in Inspection and Enforcement Investigation Report No. 50-483/80-10 (Exhibit I).

By letter dated February 8, 1981, (Exhibit I') the allegor informed RIII of what he felt were deficiencies in the depth and scope of the above investigation. On the basis of the concerns expressed, a second investigation was initiated to review the initial investigation and to expand upon the matters previously investigated.

SUMMARY OF FACTS

The initial investigation was reviewed for scope, content and accuracy and compared to the expressed allegations.

Telephone contacts with the allegor, Individual A, were not electronically recorded during the initial investigation. The only records available were the original investigator's notes of the telephone contacts which indicated that the allegor's concerns were understood to be limited to a crack in a vendor seam weld, excessive weld "fall-through", and containment wall penetration closure plate weld configuration. A handwritten letter from Individual A dated April 19, 1980, (Exhibit III) is limited to a discussion of a "pipe crack" and "excessive fall-through".

The scope and content of the initial Investigation and Investigation Report No. 50-483/80-10 appeared to adequately address the allegations as understood by RIII with the exception of the penetration weld configuration concern. It was found that the weld configuration concern had been reviewed and the conclusion of that review (i.e., weld configuration was acceptable) was included in a draft letter transmitting Investigation Report No. 50-483/80-10 to Individual A. Due to an administrative oversight, the letter was not sent. A discussion of the weld configuration concern is included in this report by attachment of the draft transmittal letter which had been intended to be sent to Individual A.

Regarding accuracy, four errors in the report were identified but were judged to be insignificant.

Based on the information contained in the February 8, 1981, letter from the allegor, the present investigation was conducted with a wider scope than the previous investigation and included a review of all available quality documentation concerning the pipe piece in question. This included a review of the type of plate utilized, weld procedure records, vendor radiography, fabrication records, receipt records, Nonconformance Reports and vendor correspondence.

Visual inspection of the weld was performed, measurements of pipe ovality were taken, the weld was re-radiographed, and the radiographic film was evaluated by an NRC Level III radiograph interpreter.

Review of vendor radiographs indicated that one approximately four inch area of the pipe piece (the area of the alleged pipe crack) should have received further vendor review and possibly re-work to remove excess weld reinforcement. The Region III interpreter concluded that the radiographic record indicated that this area of the pipe piece contained a defect that should have resulted in rejection of the area for failure to meet American Society of Mechanical Engineers (ASME) Code criteria. This was considered an item of noncompliance with NRC requirements.

It was found that a site QC inspector had preserved detailed photographs taken of the weld in question prior to the dispositioning of a Deficiency Report which required removal of excess weld reinforcement. The pictures clearly indicate two overlap areas or "fissures" in the excess weld reinforcement which might appear as a "pipe crack". No crack was evident in the pipe material itself, and the area where the weld reinforcement was removed successfully passed a liquid penetrant exam.

Site actions and the ultimate disposition of two related Nonconformance Reports were acceptable. A review of a Nonconformance Report concerning the original excess weld reinforcement condition indicated that the Architect-Engineer (Bechtel) had incorrectly interpreted applicable Code requirements relating to which Section of the Code was applicable and returned the report without disposition. However, the defect was removed via a site-initiated Deficiency Report. The visual inspections, measurements, and radiographic review of the pipe performed during this investigation indicate that the pipe piece presently meets all ASME Code requirements and is acceptable.

DETAILS

1. Personnel Contacted

Union Electric

- M. Doyne, General Superintendent, Callaway Construction
- H. Hess, Consultant, QA
- *S. Hogan, QA Assistant Engineer
- *J. Laux, Supervisory Engineer, QA Construction
- *R. Powers, Superintendent, Site QA
- *W. Weber, Manager, Nuclear Construction

Daniel International Corporation

- *A. Arnold, Project Quality Manager
- P. Bohnert, QC Technician, Level III
- D. Council, Technical Services
- H. Dameron, QC Inspector
- E. Fluet, Radiographer
- T. Massey,
- J. Prince, Foreman
- *H. Starr, Project Manager
- *D. Stites, Project QC Manager
- W. Sykora, Assistant Project Manager

Bechtel Power Corporation (Bechtel)

- H. Borda, Project Engineer, Plant Design
- N. Cherish, Site Plant Design Liason
- B. Lulla, Group Supervisor, Piping and Valves

Hartford Steam Boiler Insurance Company

- H. Potter, Authorized Nuclear Inspector

Individuals

Individual A

Also contacted were other licensee and contractor personnel, including craftsmen, QA/QC, technical and engineering staff members.

*Attended site exit interview March 27, 1981

2. Scope and Chronology

The investigation focused on the acceptability of the manufacturer's seam welding on a section of piping included as part of the discharge line for

discharge line for accumulator tank TEP01A. Included were reviews of fabrication procedures, design documents, quality documentation (including manufacturer seam radiographs), nonconformance reports, inspections of the in-place spool piece, and interpretation of a current seam weld radiograph. Measurements of pipe ovality were also made.

A partial chronology of the manufacture of the pipe piece, site identification of deficiencies and corrective actions, and initial and present NRC investigation efforts are included as Exhibit V. This report is essentially in chronological order of occurrence.

3. Introduction

The emergency core cooling system (ECCS) is designed to cool the reactor core during accident conditions. Major components of the ECCS include the accumulators, refueling water storage tank, boron injection tank, boron injection surge tank, residual heat removal (RHR) pumps, centrifugal charging pumps, safety injection pumps, boron injection recirculation pumps, RHR heat exchangers, and assorted piping and valves. The accumulators are pressure vessels partially filled with borated water and pressurized with nitrogen gas during plant operation. There are four accumulator tanks, each with a discharge path to a reactor cold leg (part of the reactor coolant system). During normal operation, each accumulator is isolated from the reactor coolant system (RCS) by two check valves. The design is such that a drop in RCS pressure below accumulator pressure opens the check valves and borated water in the accumulator tank is then forced into the RCS by nitrogen pressure. As indicated in the Callaway Final Safety Analysis Report, Section 6.3, the system is designed so that a minimum of three accumulators insures adequate core cooling in the event of a design basis accident.

Accumulator tanks and discharge piping are required to meet American Society of Mechanical Engineers (ASME) Section III, Class 2 requirements (1974 Edition with Winter 1974 Addenda). As the piping is exposed to different pressures and temperatures along its length (due to the location of isolating valves) several different pressure classes of piping are involved. The spool piece in question, S002, is Bechtel Class BCB piping (Pressure class B, Material Class C, Code Class B = ASME III, Class 2). Design pressure and temperature for this piece are 2485 psi, and 150 degrees F, and normal operating parameters are approximately 700 psi and 150 degrees F. The pipe is 10 inch schedule 140 stainless steel with a nominal 1 inch wall thickness. Dimensions for such pipe are 10.75 inch outer diameter and 8.75 inch inner diameter.

During manufacture, installation and usage of nuclear safety-related piping, various Codes and Standards are applicable. These Codes cover design, materials, fabrication, installation, inspection, and repair. The following Codes and Standards apply to spool piece S002 (as well as other Standards referenced in those listed):

American Society For Testing and Materials
(ASTM) A-240 (Plate material)

ASME, SA-358 (1974) (Pipe manufacture, weld process, inspection,
material, tests, dimensions)

ASME, SA-540 (General requirements)

ASME Section III Class 2, NC (Materials)

ASME Section III, Class 2 (Components)

ASME Section XI, (In-service inspection requirements)

4. Pipe Manufacture

It should be noted that spool piece S002 is comprised of four pipe pieces. This report addresses the pipe piece questioned, No. 5P, Heat No. 24942. Other pieces were manufactured by a different manufacturer.

The original purchase order for the spool piece was issued May 15, 1975, and specified that the piece meet the requirements in Bechtel Specification 10466-M-201A (Q), "Design Specification for Shop-fabricated Piping to ASME Section III."

The original pipe piece was manufactured (plate bent and seam welded) at ARMO Steel Corporation, Advanced Materials Division, during late 1977. Stainless steel type 304 in the form of ASTM specification SA-240 plate and Weld Procedure No. 5, Revision 1, were utilized. Weld Procedure No. 5 is a submerged arc welding (SAW), double-weld, full automatic weld procedure. In this procedure, the inner pipe diameter weld is made first, consisting of one pass, the seam is then backgouged, examined, and welded with one or more weld passes. The entire seam weld (20 feet) was radiographed during September 15-16, 1977.

The manufactured pipe was sold to Guyon Alloys Incorporated and subsequently sold to the Dravo Corporation, Pipe Fabrication Division (Dravo). At Dravo the original pipe was cut and one of the pieces, approximately four feet eight inches in length, was used by Dravo in the fabrication of spool piece S002. The piece is adjacent to the location of field weld F004. This piece was designated by Dravo as No. 5P. Circumferential welds were performed by Dravo to manufacture the completed spool piece. An inservice weld preparation was performed by counterboring the end of piece 5P to the requirements of MS-6, "End Preparation Data," because field weld F004 requires periodic inservice inspection.

5. Discovery of Nonconformances

The spool piece was received on site and the receipt inspection detected no shipping damage.

It is not clear who initially identified deficiencies related to the pipe thickness at the counterbored area and vendor seam weld reinforcement overlap. Apparently, craft personnel called these deficiencies to the attention of Quality Control (QC) personnel in late April 1979 prior to spool piece fit-up. Daniel QC Inspector B. Diggs indicated that it appeared that the counterbore was off-center, and that seam weld deficiencies were called to his attention by welder whose identity he did not know. This was in accordance with site procedure (AP-VII-02) which states "Nonconformances/Deficiencies may be identified by any project personnel observing a nonconforming condition".

An ultrasonic examination of the counterbored area was performed on April 26, 1979. This examination showed minimum wall violations involving approximately a quadrant of the pipe. A Nonconformance Report (NCR 2SN-0496-P) covering this condition was originated on April 27, 1979.

An inspection of the vendor seam weld indicated overlap and excessive weld reinforcement height in one area. A Nonconformance Report (NCR 2SN-0501-P) was originated to document this condition on April 30, 1979. From discussion with the originating inspector, the height of the reinforcement referred to in the Nonconformance Report pertains to the area of excess reinforcement only. Photographs were made of the excessive weld reinforcement area and they show overlap and two fissures which could appear to be "pipe cracks". "Hold" tags were placed on field weld F004 pending disposition of the two Nonconformance Reports.

6. Disposition of Nonconformances

The Nonconformance Report (NCR 2SN-0496-P) documenting the minimum wall violation was dispositioned by Bechtel as "use-as-is." The basis for that conclusion was a calculation utilizing design conditions which derived minimum wall thickness for the pipe class and pipe diameter.

RIII representatives discussed this calculation and its basis with Bechtel Engineers B. Lulla and H. Borda via telecon on March 6, 1981. Minimum wall had been calculated as described in ASME Section III Division 1, Subsection NC (Class 2), Article NC-3640, "Pressure Design of Piping Products". Bechtel personnel advised that two calculations had been performed, one using design temperature and pressure of 2485 psi and 200 degrees F (normal expected pressure and temperature are approximately 700 psi and 150 degrees F) and one using 2485 psi and 650 degrees F (assumes upstream valve leakage from the reactor coolant system, thus increasing line temperature). The first calculation yielded a calculated minimum wall of 0.711 inches. The second, and most conservative calculation, indicated a minimum calculated wall of 0.795 inches.

The actual measured minimum wall thickness was 0.814 inches and was therefore acceptable. The disposition of the NCR appears to be both acceptable and conservative.

The Nonconformance Report (NCR 2SN-0501-P) documenting overlap and excessive reinforcement was also sent to Bechtel for disposition. By letter dated June 1, 1979, the report was returned by Bechtel to the Callaway site without disposition. The reason for this action was a conclusion that the observed conditions did not "fall under NCR category". It should be noted that to return a Nonconformance Report without disposition is not equivalent to a disposition to "use-as-is". Such a response can indicate that (1) the NCR is in error, or (2) disposition by other means such as a Deficiency Report is more proper.

The June 1, 1979, Bechtel letter addresses both observed nonconforming conditions, excessive weld reinforcement and overlap (See Exhibit B of Investigation Report No. 50-483/80-10). The paragraph regarding reinforcement height requirements appears to be incorrect in that it references sections of ASME III, whereas Paragraph 5.2.3 of material specification ASME SA-358 should have been identified as the applicable specification for a vendor weld, allowing 1/8 inch of reinforcement.

The paragraph in the June 1, 1979, Bechtel letter regarding overlap contains an incorrect observation that material specification ASME SA-358 references ASME Section III, Paragraph UW-51 (b). SA-358 references ASME Section I, Paragraph PW-51. The reference to ASME Section VIII is likewise in error as Section VIII does not pertain to the piping covered by Section III. However, the wording of both Sections is virtually identical (the Code often duplicates Sections) and neither refers to "overlap" as a rejectable condition for radiography. This error is not considered significant. What was significant was the apparent acceptance of overlap as a weld condition.

Discussion with Bechtel personnel involved with review of the nonconformance indicated that they felt that ASME Section III was the governing Code, superseding aspects of ASME Section II and material specification SA-358. As the weld in question is a vendor longitudinal seam weld, this conclusion is incorrect. The relevant Code for such vendor (pipe manufacturer) welds is SA-358. ASME Section III is relevant for welds made by the spool vendor and field welds made during installation.

Bechtel personnel stated that excess weld reinforcement height was not considered a significant nonconformance since it can be relatively easily removed by grinding if necessary. They also noted that reinforcement height interpretation difference (ASME III vs SA-358) was 1/16 inch.

The review performed during this investigation indicated that the weld reinforcement defect, if uncorrected, would have been an unacceptable condition. While, as detailed later in this report, the nonconforming condition was corrected prior to installation of the spool piece, it is of concern that the Architect-Engineer's failure to disposition the Nonconformance Report reflected a misinterpretation of Code requirements.

Daniel International procedure AP-VII-02 details "Nonconformance Control Reporting". Section III provides functions for both Nonconformance Reports (NCRs or NRs) and Deficiency Reports (DRs). NCRs are intended to be used to document material deficiencies that are dispositioned as "use-as-is" or "repair", and DRs are intended to be used to document deficiencies dispositioned as "rework" or "reject". DRs may be "used to initiate correction of either suspected or actual deficiencies in supplier material or equipment", and "nonconforming items shall be dispositioned as "rework" when the applicable specification provides for correction" of the nonconformance.

Appendix I of procedure AP-VII-02, page 1, defines "repair" as:

"A disposition which is imposed when it can be established that a nonconforming characteristic can be restored to a condition such that the capability of the item to function reliably and safely is unimpaired even though that item still may not conform to the original requirement."

"Rework" is defined as:

"A disposition which is imposed when it can be established that a nonconforming item or activity can be made to be fully conform to a prior specified requirement."

From discussions with site QC personnel, they had not been in favor of the Bechtel response to NCR 2SN-0501-P and were dissatisfied with the reasons provided in the June 1, 1979, letter returning the nonconformance without disposition. They stated that several discussions with Bechtel personnel followed this letter.

On September 6, 1979, the NCR was superseded by DR 2SD-0699-P (See Exhibit B of Investigation Report No. 50-483/80-10). While the description of the nonconformance differs slightly from that in the superseded NCR, the same conditions are described. Both the NCR and DR originally had photographs of the original weld condition attached. The photographs did not copy well and were not included in the file copy. According to file documentation, excess reinforcement was removed from the weld on November 5, 1979, and the DR was closed. Weld reinforcement was ground as far back into the pipe as practical (approximately 1 1/2 feet), removing the area of excess reinforcement, and the remaining reinforcement was considered acceptable.

7. Review of Original Contacts With Alleger

RIII was originally contacted and provided with allegations related to the spool piece on or about October 11, 1979. Notes of telephone contact, referral memos, and letters to and responses from Individual A were reviewed. Discussions were held with the investigators who took part in these contacts.

RIII Investigator James McCarten was the original contact with Individual A. His notes indicate that Individual A, then working at the Wolf Creek

construction site, discussed concerns related to both the Wolf Creek and Callaway sites.

By memo dated November 9, 1979, Mr. McCarten documented this conversation, and concerns related to Wolf Creek construction were referred to NRC Region IV which has jurisdiction over Wolf Creek construction. The portion of the memo pertinent to Callaway concerns is as follows:

"The allegor then went on to state that he had previously worked for Daniels Construction Company at the Callaway Missouri Nuclear Plant Site and while working at the site he detected a 3/4 inch crack in a weld located near a valve in a 15 foot long section of 10 inch stainless steel pipe that ran from under an accumulator tank. He advised the pipe is located on the east side of the tank near the elbow of the pipe as the pipe runs toward the reactor vessel. The allegor related he informed his supervisor regarding the crack in the weld but the supervisor was of the opinion that the welds had already been accepted, and he was reluctant to go back and inform the quality assurance personnel of the defect in the weld. The allegor did state a "hold" tag was place on the pipe for a short period of time but it was later removed."

Since the allegations, even if substantiated, did not indicate an immediate threat to the public and since there was no concern about perishability of evidence, the investigation was performed after other priority investigations. The investigation was subsequently assigned to Investigator R. Burton.

The initial investigation was begun without the benefit of contact with Individual A because efforts to contact him were unsuccessful. The exact weld alleged to be deficient was not known. Following repeated attempts, Mr. Burton was able to inform Individual A he wished to contact him. Individual A telephoned Burton on April 11, 1980, at approximately 2:30 p.m. Notes of the telephone contact indicate Individual A discussed "pipe cracks" on an inside seam weld, and attempted to describe the exact location of the pipe and seam weld. Individual A also stated that he felt the pipe was "distorted at the seam" apparently from too much heat during the welding process. In addition, he stated that Mr. Potter, the Authorized Nuclear Inspector (ANI), had looked at the weld radiographs for the seam weld in question. Individual A named two other people who would be knowledgeable of the "pipe crack".

During the telephone conversation, Individual A also questioned the weld configuration utilized for containment liner penetration closure welds, indicating that the welder performing root passes had some difficulty performing the welds. In addition, concerns were expressed over welds in the turbine building (non-safety related areas).

Following the discussion, Mr. Burton mailed Individual A a drawing (piping isometric) of two accumulator tank discharge lines and requested that he indicate the location of the alleged crack (See Exhibit IV). Individ-

ual A marked and returned the isometric drawing which was received at RIII on April 19, 1980. Attached was a handwritten note (Exhibit III) describing the location and condition he believed to exist. The note and diagram are in error as to the present orientation of the longitudinal seam weld. It is located at approximately the 11 o'clock position as one faces into the spool piece at field weld F004. During a later discussion with Individual A, he indicated that he had observed the spool piece prior to installation and the spool piece was in a different position at that time.

All of the notes of telephone contacts and written communications appear to indicate that the central concern originally expressed dealt with a crack in the seam weld on spool piece S002.

8. Review of Previous Investigation Report

IE Investigation Report No. 50-483/80-10 was reviewed and discussed with the investigator. The investigation focused on what was perceived as the only allegation expressed; namely the existence of a 3/4 inch crack in an accumulator discharge line.

Four minor errors in the report were identified during this review as follows:

- a. The allegor is characterized as presently being a welder at the Callaway site. By his statement, he left the Callaway site sometime in August 1979.
- b. The "15 welds" section is mischaracterized. The piping isometric included as Exhibit A shows the 15 welds counted. The isometric does not include pipe manufacturer seam welds (this is standard practice) which were also visually inspected (outside surfaces).
- c. The date noted for NCR 2SN-0501-P, May 5, 1979, is in error. The ANI review took place on May 5, 1979, but the NCR indicates it was initiated on April 30, 1979.
- d. The date noted for the initial contact with Individual A may be in error. Investigator McCarten's notes indicate October 15, 1979, as the contact date.

None of the above errors are viewed as having any significance to the alleged "pipe crack" which was the focus of the report. Initial visual inspections of the two accumulator lines were made due to lack of information as to the specific location of the alleged pipe crack. Interviews were held with those individuals alleged to be knowledgeable.

As noted in the initial report, when the specific location of the weld alleged to be cracked was determined, the area was tested by liquid penetrant examination, an accepted test for a surface crack. No such crack was indicated. The liquid penetrant examination was documented

both in the original investigation report and in IE Inspection Report No. 50-483/80-15 (Exhibit VI).

9. Letter to Individual A

On July 15, 1980, a letter was drafted to transmit the original investigation report to Individual A and discuss the review of containment liner penetration closure weld configuration (Exhibit VII). Due to an administrative oversight, this letter was not sent.

10. Contact With Representative Fiegenbaum

On January 23, 1981, information was received to indicate that Missouri State Representative Robert Fiegenbaum (Chairman, House Energy Committee) had been contacted by an individual who indicated that unacceptable piping was present at the Callaway construction site. On January 28, 1981, Investigator G. Phillip contacted Representative Fiegenbaum and was advised that the alleege had been asked to document his allegations and send them in a letter to RIII.

11. Letter From Individual A

By letter dated February 8, 1981, Individual A indicated that the extent of his concerns had been misunderstood by the NRC and he felt the original investigation of his concerns was inadequate (Exhibit II).

This letter indicates the following concerns:

- a. An improper weld procedure had been utilized on accumulator piping.
- b. The pipe is unacceptably out-of-round.
- c. The acceptance of a minimal wall violation was improper (contrary to Code Requirements).
- d. The pipe seam weld is cracked.
- e. The pipe seam weld reinforcement is higher than allowed by the applicable Code.
- f. The pipe is unacceptable due to the above noted defects.

The letter contained comments critical of the original investigation and a total of forty-eight questions. By letter dated February 26, 1981, RIII advised Individual A that his concerns would be addressed and answers provided to the questions he had asked (Exhibit VIII). The response to individual A's letter is attached as Exhibit IX.

12. Review of Nonconformances

A review of Nonconformance Reports related to the pipe piece in question was performed as previously detailed in Paragraph 6 of this report. These reports and their dispositions appeared acceptable except as noted.

A portion of each of the related nonconformance dispositions indicated that the vendor would be notified by Bechtel of the observed deficiency. RIII personnel were advised the documentation of such notification was not available at site and this is considered an unresolved item (483/81-04-01).

13. Discussion With ANI

On March 6, 1981, a discussion was held with Mr. Howard Potter, Authorized Nuclear Inspector (Hartford Boiler Insurance Company). He stated that he was unaware of any uncorrected nonconformances on spool piece S002, and he had been on DR and NCR concurrences for ASME Code acceptability review.

He stated that he had not reviewed the vendor seam weld radiographs for the pipe piece in question, nor for any other vendor weld at the Callaway site.

14. Review of Vendor Radiographs

On March 6, 1981, file radiographs for the vendor seam weld were examined by NRC Inspector W. Key, a Level III radiograph interpreter.

The vendor radiographs covered all twenty feet of the original pipe and were considered acceptable with one exception. At film markers 13-14 an area of excess reinforcement was evident. This area was not at the pipe end (later cutting and fabrication placed this area at the end of spool piece S002).

Three photographs of the internal weld condition prior to grinding were still available in a QC inspector's file. These three photographs clearly show excessive weld reinforcement and overlap, with two fissures or cracks in the excess reinforcement (Exhibit X). These three photographs were compared to the vendor seam weld radiographs and matched exactly. This was the area noted on NCR 2SN-0501-P.

The reader sheet for the vendor radiograph indicated "wash out" at film markers 13-14 and probable undercut. The reader had marked the defects as acceptable and approved the radiographs. No note as to additional inspection was included with the reader sheet.

The condition at film markers 13-14 appears to be a rejectable condition. The NRC inspector identified apparent incomplete fusion and excess weld reinforcement. It is possible that the additional weld reinforcement

could have masked weld defects at these points. Apparently, those who subsequently reviewed the radiographs agreed with the interpretation of the original reader.

Improper acceptance of the radiographic record was considered as an item of noncompliance with 10 CFR 50 Appendix B, Criterion IX, "Control of Special Processes" (483/81-04-02).

15. Re-Radiograph of Pipe Section

The excess weld reinforcement reflected in NCR 2SN-0501-P (later DR 2SD-0699-P), the three photographs, and the vendor radiograph had been removed as previously noted. Licensee inspection personnel, observed by the NRC Resident Inspector, had visually inspected the weld area and a liquid penetrant test had shown no surface defects in the area.

From discussions with the licensee and their consultant, it was determined that a radiograph of the weld area in its present condition would aid in answering any questions as to its present acceptability. On the morning of March 20, 1981, the weld was radiographed, and each step of the radiography was witnessed by the RIII investigator. The resulting radiographs were interpreted by Daniel International personnel and RIII inspector W. Key and were determined to be acceptable. Licensee personnel advised that the radiographs would be documented, reviewed for ASME Code acceptability, placed into the vendor seam weld radiograph file for the weld in question, and referenced in that file.

16. Pipe Diameter Measurements

Visual inspection of spool piece S002 and the pipe piece in question (5P) did not indicate any noticeable ovality.

On March 6, 1981, RIII personnel made outside diameter measurements at a location approximately 14 inches away from field weld F004 on spool piece S002. These were rough measurements made utilizing a non-direct reading caliper and tape rule. Measurements in three planes yielded the following diameters:

10 21/32 = 10.656 inches
10 24/32 = 10.750 inches
10 25/32 = 10.781 inches (Made on seam weld)

Maximum outside diameter variation (maximum diameter minus minimum diameter) was therefore approximately 0.125 inches. However, the measurement technique was not considered sufficiently accurate for such a conclusion, and one measurement was made on the seam weld itself. Following interpretation of various sections of the ASME Code it was determined that the outside diameter measurement on the pipe seam weld was inappropriate due to the inclusion of allowable weld reinforcement (allowable reinforcement is 1/8 inch or 0.125 inches).

A second set of measurements were taken at the same location by licensee personnel on April 14, 1981, using a more accurate technique and four planes of examination. These measurements were witnessed by the RIII Senior Resident Inspector. The resulting measurements were as follows:

- 10.758 inches (made adjacent to seam weld)
- 10.753 inches
- 10.678 inches
- 10.666 inches

Maximum outside diameter variation was therefore approximately 0.0920 inches.

Material Specification ASME SA-358, Class I (1974), allows an outside diameter variation of 1%. As the pipe is 10 inch schedule 140 pipe, it has a standard outside diameter of 10.75 inches, and a variation of 0.1075 inches would be allowable per SA-358. The ovality of the pipe was considered acceptable.

Field weld F004 to valve 8956A was successfully fit-up and completed, a further indication of acceptable ovality.

17. Concerns Expressed

This section summarizes the findings related to the six concerns outlined in paragraph No. 11 of this report.

- a. Concern: An unacceptable weld procedure was utilized.

Findings: Review of the ARMCO seam weld procedure utilized, weld procedure No. 5, Revision 1, indicates it is an acceptable procedure for double welding of the metal and thickness involved. The weld procedure involves welding the inner diameter seam first, utilizing one pass, and then backgouging and welding the outer diameter seam with one or more passes of weld material. The configuration of the completed weld visually resembles a single weld in that the inner diameter weld is less wide than the outer diameter weld (See Paragraph 4).

- b. Concern: The pipe is substantially out-of-round.

Findings: Visual inspections and measurements of the pipe show acceptable ovality. The comment on excessive ovality apparently came from reading NCR 2SN-0496-P regarding a minimum wall violation. Differences in the range indicated (0.092 inches) are not normally measureable by simple observation on a pipe whose outside diameter is 10.75 inches. In the "Cause of Nonconformance and Action to Prevent Recurrence" on the NCR, the QC inspector stated (in part) "ovality in pipe not recognized by vendor prior to machining counter-bore". This was the inspector's conclusion, and appears to be at

least partially valid. However, as shown by the ultrasonic examination report attached to the NCR, it also appears that the counterbore centerline may have been off-center by some .030 inches (estimated).

The QC inspector made no notation or NCR to indicate that pipe ovality was unacceptable, but indicated his conclusion that it had played a part in the minimum wall violation (See Paragraph 16).

- c. Concern: Acceptance of the minimum wall violation was improper (contrary to Code requirements).

Findings: Pipe ordered to "nominal wall" includes a manufacturing tolerance above minimum wall requirements (desired by design) of 12.5%. Nuclear practice is to add a considerable safety factor to the above by designing systems to accommodate pressures which are not expected to occur. When, through manufacturing tolerances or error, the minimum wall thickness for a pipe is violated, it can be evaluated for acceptability to Code and design conditions. In inservice inspection weld preparation areas (which are counterbored) minimum wall violations can take place due to the counterbore wall reduction.



Minimum wall calculations utilized to disposition NCR 2SN-0496-P appear to meet Code requirements and were acceptable, as detailed earlier in this report (See Paragraph 6).

- d. Concern: The pipe seam weld is cracked.

Findings: None of the visual nor nondestructive examinations conducted indicated that the seam weld on pipe piece No. 5P contains a crack anywhere along its length. Photographs of the weld condition adjacent to field weld F004 prior to grinding indicate an overlap condition and two fissures which could be mistaken for a pipe crack by a welder. The overlap has been removed by grinding and the weld surface now appears well blended with the adjacent pipe metal (See Paragraph 8).

- e. Concern: Seam weld reinforcement is higher than allowed.

Findings: Seam weld reinforcement was measured and found to be acceptable. The original NCR dealt with weld seam reinforcement height only in the limited area adjacent to field weld F004.

- f. Concern: The pipe is unacceptable due to the above defects.

Findings: As noted above, this is not a correct conclusion. The pipe appears acceptable in its present condition.

18. Overview

The weld condition of the small section of the original pipe was considered acceptable by the ARMC0 radiographer and subsequent radiography reviewers. Spool piece S002 was fabricated and sent to the Call-way site.

A craftsman called the weld condition to the attention of a Quality Control inspector and Nonconformance Reports were written.

There was prolonged discussion on how to document and properly disposition the nonconforming condition, but corrective actions were taken and documented. The pipe has been examined and found to be acceptable in its present condition.

19. Contact With Alleger

Individual A was contacted by telephone on April 20, 1981. He expressed dissatisfaction with the initial NRC investigation of his allegations, and the fact that RIII had failed to provide him with a copy of the investigation report. He stated that his central concerns were that the pipe was out-of-round, and that the seam weld reinforcement on spool piece S002 (5P) was higher than allowed by SA-358. He expressed dissatisfaction with NRC actions to that date.

During additional telephone discussion on April 22, 1981, Individual A indicated that he had reviewed Callaway-related documents in the Public Document Room. Among the documents he reviewed were Inspection and Enforcement Bulletins 79-03 and 79-03A. These deal with defects identified in longitudinal seam welds in SA-312 fusion welded piping manufactured by Youngstown Welding and Engineering Company (and others). These defects were first identified in late 1978. He stated these reports had led him to incorrectly believe the accumulator pipe was manufactured by Youngstown Welding and Engineering Company.

20. Bulletins 79-03 and 79-03A

The NRC required certain actions by licensee in response to Bulletins 79-03 and 79-03A (Exhibits XI and XII).

Representatives of the Standardized Nuclear Unit Power Plant System (SNUPPS) Group and Union Electric responded to Bulletins 79-03 and 79-03A by letters dated May 11, 1979, November 26, 1980, August 20, 1980, and January 26, 1981.

21. Concern Related To Bulletin 70-03A

During telephone discussion Individual A stated that he believed Bulletin 79-03A (required action No. 3) imposed mandatory etching of all safety-related pipes manufactured according to SA-312, and he had not found any indication this had been accomplished by SNUPPS facilities.

A review of documentation related to Bulletin 79-03A indicated that by memo dated April 8, 1980, (Exhibit XIII) the Director of the Division of Reactor Construction Inspection provided clarification of aspects of Bulletin 79-03A. Item 3 (etching of SA-312 pipes) applied "only to those components subject to design stress greater than 85% of the Code allowable stress".

Responses from Union Electric and SNUPPS indicated that no SA-312 piping was in use or scheduled to be used in which stresses exceeding 85% of the Code allowable had been identified at their facilities. Therefore, etching would not be required by Bulletin 79-03A.

As some of the comments included in Individual A's letter of February 8, 1981, and later telephone conversation appear to connect the accumulator line pipe with IE Bulletins 79-03 and 79-03A, it should be noted that SA-358 and SA-312 pipes are not similar. The welding process, wall thickness and other important aspects differ considerably.

22. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. An unresolved item disclosed during this investigation is discussed in Paragraph 12.

23. Exit Interview

An exit interview was held with site personnel on March 27, 1981.

24. Licensing Contentions

The joint intervenors in the Callaway licensing proceeding submitted two contentions which relate to this report. On March 6, 1981, Ms. Kay Drey and the Crawdad Alliance submitted a petition to intervene which included contentions on the accumulator pipe piece and SA-312 pipe acceptability. This petition was amended on March 24, 1981.

On May 5, 1981, the Joint Intervenors submitted their first set of Interrogatories to the NRC Staff under the discovery process. Question No. 81, Part A through W, duplicates the questions posed by Individual A in his letter of February 8, 1981.

25. Media Contacts

Several contacts were received concerning this investigation from media personnel who had been contacted by Individual A.

Attachments:

- Exhibit I, I&E Investigation Rpt. No. 50-483/80-10
- Exhibit II, Ltr of complaint dtd 2/8/81
- Exhibit III, Handwritten note by Ind. A dtd 4/19/80
- Exhibit IV, Ltr to Ind. A dtd 4/11/81
- Exhibit V, Partial chronology
- Exhibit VI, Page 4 of IE Inspection Rpt. No. 50-483/80-15
- Exhibit VII, Drft ltr of transmittal to Ind. A dtd 7/15/80
- Exhibit VIII, Ltr to Ind A dtd 2/26/81
- Exhibit IX, Ltr to Ind. A
- Exhibit X, Photographs of seam weld at field weld F004
- Exhibit XI, IE Bulletin No. 79-03
- Exhibit XII, IE Bulletin No. 79-03A
- Exhibit XIII, NRC memo dtd 4/9/80



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

JUN 10 1980

Docket No. 50-483

Union Electric Company
ATTN: Mr. John K. Bryan
Vice President - Nuclear
Post Office Box 149
St. Louis, MO 63166

Gentlemen:

This refers to the investigation conducted by Messrs. R. M. Burton and W. A. Hansen of this office on March 26-27, and May 2, 1980, of activities at the Callaway Nuclear Plant, Unit 1, authorized by NRC Construction Permit No. CPPR-139 and to the discussion of our findings with Mr. W. H. Weber, Manager, Nuclear Construction and others of his staff at the conclusion of this investigation.

The investigation related to allegations which are identified in the enclosed copy of our investigation report.

No items of noncompliance with NRC requirements were identified during the course of this investigation.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room, except as follows. If this report contains information that you or your contractors believe to be proprietary, you must apply in writing to this office, within twenty days of your receipt of this letter, to withhold such information from public disclosure. The application must include a full statement of the reasons for which the information is considered proprietary, and should be prepared so that proprietary information identified in the application is contained in an enclosure to the application.

JUN 10 1980

We will gladly discuss any questions you have concerning this investigation.

Sincerely,

James G. Keppler
Director

Enclosure: IE Investigation
Report No. 50-483/80-10

cc w/encl:

Mr. W. H. Weber, Manager
Nuclear Construction

Central Files

Reproduction Unit NRC 20b

PDR

Local PDR

NSIC

TIC

Regions I & IV

Ms. K. Drey

Mr. Ronald Fluegge, Utility
Division, Missouri Public
Service Commission

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report No. 50-483/80-10

Docket No. 50-483

License No. CPPR-139

Licensee: Union Electric Company
Post Office Box 149
St. Louis, MO 63166

Facility Name: Callaway Nuclear Plant, Unit 1

Dates of Investigation: March 26-27, and May 2, 1980

Investigation At: Callaway Site, Fulton, MO

Investigator:

Robert M. Burton
Robert M. Burton
Investigator

6/6/80
(Date)

RC Knop for
William A. Hansen
Resident Inspector

6/9/80
(Date)

Reviewed By:

Charles E. Norelids
Charles E. Norelids
Assistant to the Director

6/6/80
(Date)

RC Knop
R. C. Knop, Chief
Project Section 1

6/9/80
(Date)

Investigation Summary: Investigation on March 26-27, and May 2, 1980
(Report No. 50-483/80-10)

Areas Investigated: Investigation was conducted into an allegation of the detection of a weld crack in a section of stainless steel pipe leading from an accumulator tank. Twenty-one manhours were spent on the investigation involving one inspector and one investigator.

Results: The allegation was not substantiated. No items of noncompliance were identified.

REASON FOR INVESTIGATION

On October 11, 1979, the Region III office received a phone call from a Daniel's Construction Company employee at the Callaway Nuclear Plant. He alleged that he had detected a crack in a stainless steel pipe weld in the vicinity of the accumulator tank. He further stated that he informed his supervisor of the weld crack, however the supervisor was reluctant to report it to quality assurance personnel.

SUMMARY OF FACTS

On October 11, 1979, an allegation was received by phone from a person requesting that his identity be kept confidential. This alleged stated he was a welder at the Callaway Nuclear Plant, and while employed there had detected a three quarter inch crack in a weld located near a valve in a fifteen foot long section of stainless steel pipe running from under an accumulator tank. He further stated that he informed his supervisor of the crack, however his supervisor was reluctant to inform quality assurance personnel, because he was of the opinion the weld had already been accepted.

On March 26 and 27, 1980, an on-site investigation of the allegation was conducted. During the course of the investigation it was determined that there were a total of fifteen welds encompassed in the area described by the alleged. Visual inspections of the fifteen welds were conducted independently by both the NRC resident inspector and a Daniel International Quality Control inspector. There were no visible cracks detected in any of the welds inspected. Two foremen, who were determined to be in charge of welding operations during the course of the welds' completion, were questioned as to their receiving any reports of a weld crack in the accumulator tank area. They both responded to the effect that they did not recall any of the company's employees ever reporting a weld crack to either of them.

Subsequent contact from reporters of the Witchita Eagle revealed they had been in contact with the alleged. Through their efforts, the alleged again contacted the NRC and provided a more detailed description of the weld crack both orally, and by indicating the location on an isometric drawing of the accumulator tank area which was mailed to the alleged and returned to the NRC. This description of the location indicated that the crack was on the inside of the pipe on a longitudinal seam weld, rather than on an outside surface weld as originally suspected.

A Deficiency Report and a related Noncompliance Report were secured for the location described by the alleged. These documents showed a repair of a weld overlap at the described location was made by grinding an area of excess reinforcement and poor fusion in November, 1979.

On May 2, 1980, a liquid penetrant test was conducted on the area of that repair and no cracks were detected. The excess reinforcement ("fall through") was also measured and found to be within ASME welding code tolerances.

No items of noncompliance were identified during the conduct of this investigation.

DETAILS

1. Personnel Contacted

Union Electric Company

M. I. Doyne, General Superintendent, Callaway Construction
F. D. Field, Manager, Quality Assurance
J. V. Laux, Assistant Engineer, Quality Assurance
R. L. Powers, Supervising Engineer, Quality Assurance
W. H. Weber, Manager, Nuclear Construction

Daniel International (Contractor)

J. R. Cook, Manager, Quality Control
J. A. Holland, Manager, Project Quality Assurance
T. W. Linder, Piping Foreman
J. D. Prince, Pipe Fitters' General Foreman
H. J. Starr, Project Manager
W. L. Sykora, Assistant Project Manager

The inspector and investigator also contacted and interviewed other licensee and contractor personnel, including craftsmen, QA/QC, technical and engineering staff members.

2. Introduction

On October 11, 1979 the Region III office received by phone, an allegation from a welder at the Callaway Nuclear Plant. He alleged that he had detected a crack in a stainless steel pipe weld in the vicinity of the accumulator tank. He further stated that he informed his supervisor of the weld crack, however, the supervisor was reluctant to report it to quality assurance personnel.

Prior to the initiation of the on-site investigation on March 26-27, 1980, efforts to recontact the alleger in an attempt to secure a more accurate location of the alleged weld crack were unsuccessful.

3. Allegation

The alleger stated he had detected a three-quarter inch crack in a weld located near a valve in a fifteen foot long section of ten-inch stainless steel pipe that ran from under an accumulator tank. He further stated that he informed his supervisor of the crack, however, his supervisor was reluctant to inform quality assurance personnel because he was of the opinion the weld had already been accepted.

Finding - An on-site investigation was made on March 26 and 27, 1980. Based on the description of the location of the weld crack supplied by the alleger, it was determined from the piping isometric drawings that a total of 15 welds (both vendor and field welds) were encompassed.

(Exhibit A - Location of Welds Inspected). (Field welds may be described as those welds made on-site by Daniel International welders in the process of fitting and installing pipe. Vendor welds are those welds made in the assembly of the pipe, (either longitudinal or circumferential) by a supplier prior to its delivery to the plant site).

Weld Control Records (F101's) were examined for each field weld made by Daniel International welders to verify that all finished welds had been accepted after radiographic testing, or appropriate repairs made. The stainless steel pipe welds involved, being Class 2 pipe welds, required radiographic testing prior to acceptance.

For welds requiring repair, related Nonconformance Reports (NCR's) were examined to determine which welds were repaired and for what reason. Of the 15 welds involved, three had been repaired. The NCR's for these three welds showed each repair was made because of internal weld defects, rather than external weld defects (i.e., surface crack in weld). Based on these records, the possibility of the alleged weld crack (in the field welds only), being repaired between the time of the allegation and the time of the investigation was eliminated.

Visual inspections of the 15 welds were subsequently made by the NRC Resident Inspector (using a low power magnifying glass), and by a certified Daniel International Quality Control inspector (visually unassisted). These inspections were conducted in a manner which allowed each inspector to conduct a separate and independent inspection of each weld involved. During the course of these inspections, no visible cracks were detected in any of the welds (field or vendor).

It was further ascertained that two foremen were in charge of welding operations in the "15 weld" accumulator tank area during the course of the welds' completion. J. D. Prince was in charge of welding operations from January 6, 1979 to August 6, 1979. T. W. Linder was in charge subsequent to August 6, 1979. On March 27, 1979, both J. D. Prince and T. W. Linder were interviewed as to whether either of them had ever received a report of a weld crack in the "15 weld" accumulator tank area. Both responded to the effect that neither could recall any such weld crack ever being reported, or ever existing.

On April 8, 1980, the NRC Resident Inspector was contacted by Gary Hayden, a reporter for the Wichita Eagle. Hayden informed Hansen that he and another reporter, Julie Charlip, had been in contact with a person who made an allegation concerning the detection of a crack in a stainless steel pipe weld at the Callaway Nuclear Plant. The description supplied by their source was consistent with the one received by the NRC on October 11, 1979, except that the crack was described as "in a seam weld on the inside of a stainless steel pipe" running from an accumulator tank.

Both Hayden and Charlip were contacted by telephone and they verified this allegation. They declined to disclose the identity of their source, but stated their source would be requested to contact the NRC.

On April 11, 1980, a phone call was received from Hayden's source who identified himself as being the same person who made the Callaway weld crack allegation to the NRC on October 11, 1979. He furnished a description of the crack indicating it was in a seam weld on the inside of a stainless steel pipe running from Accumulator Tank Tepo 1A. The alleged agreed to mark the location of the crack on a copy of the isometric drawing and return it to the NRC. A copy was mailed to him for that purpose on April 11, 1980.

On April 14, 1980, the NRC Resident Inspector obtained a NCR dated May 5, 1979 and a subsequent DR (Deficiency Report) dated September 6, 1979 for the pipe fitting the alleged's description and location. (Exhibit B - Deficiency and Nonconformance Reports). The DR showed a repair had been made (an area of excess reinforcement and poor fusion was removed by grinding), to a defect referred to as a weld overlap (a condition which has been known to be visually interpreted as a crack, since it has a similar appearance). This repair was made in the longitudinal seam weld of the S002 piping at weld F004 on November 5, 1979.

On April 23, 1980, the isometric drawing was received by the NRC from the alleged with the location of the weld crack indicated. (Exhibit C - Isometric Drawing marked by alleged). A letter from the alleged transmitting the drawing, stated the crack was approximately 4 to 6 inches from weld F004 in the S002 piping, and there appeared to be an excessive amount of "fall through" in the seam weld from the 45 degree pipe elbow to weld F004.

Subsequent visual examination by the NRC Resident Inspector revealed that the grinding repair indicated on the Deficiency Report had been performed in the area of the alleged weld crack beginning at the end of the pipe at weld F004 (which had not yet been completed) and extending approximately 14 inches inward. On May 2, 1980, the NRC Resident Inspector observed while a Daniel Quality Control Inspector performed a liquid penetrant test on the area of repair. No cracks were detected by the NRC Inspector or the Quality Control Inspector. The remaining reinforcement ("fall through") in the pipe was measured and found to be within ASME welding code tolerances.

Management Discussion

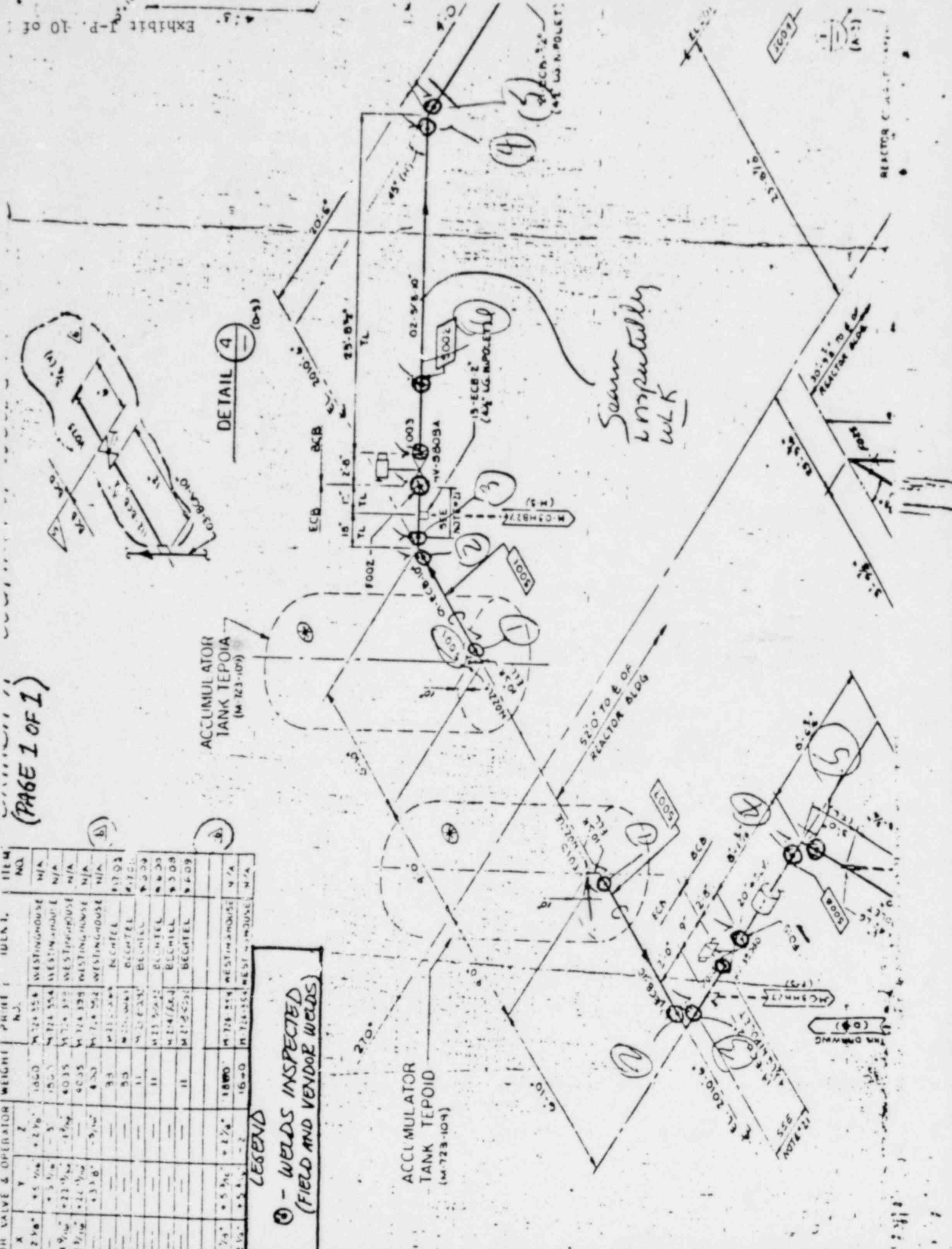
At the completion of the investigation the findings were discussed with F. D. Field, Manager UE Quality Assurance, J. V. Laux, Assistant Engineer UE Quality Assurance, W. H. Weber, UE Manager of Nuclear Construction, J. R. Cook, DI Quality Control Manager, J. A. Holland, DI Project Quality Assurance, H. J. Starr, DI Project Manager, and W. L. Sykora, DI Assistant Project Manager.

They were advised no items of noncompliance were identified during this investigation.

(PAGE 1 OF 1)

W	Y	Z	WEIGHT	PRIME NO.	IDEN. L.	ITEM NO.
2.50	4.5 3/16	2.76	1800	M 724 358	WESTINGHOUSE	N/A
1.9 1/2	3 3/16	3	1500	M 724 354	WESTINGHOUSE	N/A
2 1/2	2.2 1/2	1.9 1/2	4035	M 724 372	WESTINGHOUSE	N/A
2 1/2	2.1 1/2	1.9 1/2	4035	M 724 379	WESTINGHOUSE	N/A
2 1/2	2.3 1/2	2.1 1/2	4035	M 724 384	WESTINGHOUSE	N/A
			33	M 724 388	BECHTEL	87-02
			53	M 724 391	BECHTEL	87-02
			11	M 724 392	BECHTEL	87-09
			11	M 724 393	BECHTEL	87-09
			11	M 724 394	BECHTEL	87-09
2.75	5 3/16	2.76	1800	M 724 354	WESTINGHOUSE	N/A
2.50	5 3/16	2	1500	M 724 358	WESTINGHOUSE	N/A

LEGEND
 (C) - WELDS INSPECTED (FIELD AND VENDOR WELDS)



REACTOR C...

1009

(A-1)

Seam Inspectably W/LK

DETAIL 4 (0-3)

ACCUMULATOR TANK TEPEIA (M-123-107)

ACCUMULATOR TANK TEPEID (M-723-104)

52.0' TO E OF REACTOR ALDQ

THE DRAWING

(A-1)

M 724 372

1009

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Written as a result of
the NCR -

24

Form CP-477 (10-78) DEFICIENCY REPORT Page 1 of 1
 No. 2-SN-0501-P
 Date 09-06-79
 UAC/LSO FSMD-M03-EP01
 SPEC/Proc ASME Sec. II, Part C, Spec. SA-358
 \$ NS Reactor Building PURCHASE ORDER/TRAVELER NO. 2-EP01

DESCRIPTION: The reinforcement of the vendor's longitudinal weld on Spool #2-EP-01-S002 at Weld #2-EP-01-W004 is not fused uniformly (See Attachment A NCR 2-SN-0501-P) into the plate surface as required by Material Spec. SA-358, Para. 5.2.3. Also, the inside reinforcement is 3/16" (1/8" is the maximum allowed per the above para.)
 Action Taken to Control Deficiency: *Visual & Testing*
 Hold Tags 1 of 1 attached. *The DR is per NCR # 2SN-0501-P*

ORIGINATOR *R. Jones* DATE *9/6/79* QCE *W. B. Jones* DATE *9-6-79*

DISPOSITION & JUSTIFICATION
 Remove excessive reinforcement of *Weld* & area of poor fusion by grinding (Remove 1/16" from reinforcement & blend area of poor fusion into surrounding area). inspection. REMARK
 Cause of Deficiency and Action to Prevent Recurrence: *QC perform visual inspection.*
 Pipe was received on site with referenced defects, by copy of this DR REJECT
 Bechtel to notify vendor of deficiency.

E. Steingard PROJECT DISCIPLINE ENGINEER *9-20-79*
 AUTHORIZED INSPECTOR *W. B. Jones* DATE *9/6/79*
 ROUTE TO (FOR CORRECTIVE ACTION): *THERCOS*

POTENTIAL 50-550/PART 21
 Yes No
 SITE APPROVAL TITLE DATE

ACTION TAKEN:
See Attach. "A"
HOLD TAGS REMOVED AND DESTROYED.
Work Completed Per Disposition
 RESPONSIBLE SUPERVISOR *[Signature]* DATE *11-15-79*

INSPECTION
 REMARK SATISFACTORY UNSAT. REJECT
 Q.C. INSPECTOR *W. D. Damsch* DATE *11-15-79*
 DISCIPLINE Q.C. ENGINEER *E. Steingard* DATE *11-19-79*

DISPOSITION:	APPROVED BY:	DATE:	REMARKS:

Form CP-6P (Rev. 10-78)
NONCONFORMANCE REPORT (NCR)

2:20 p.m.
MKS
HAI-1

Project Name/Number CALLAWAY/7186	Action Aqd By 5/17/79	Hold Tag 1 of 1	Q X	NCR Number 25N-0496-
--------------------------------------	--------------------------	--------------------	--------	-------------------------

Identification of Area and Item
Reactor Building, SNUPPS Unit #2
Spool No. 2-EP-01-S002

Traveler No. - 03EP01(Q)

Controlling Documents

Bechtel Specification 10466-M-201A (Q), Revision 11
Bechtel Specification 10466-MS-6 (Q), Revision 5

Description of Nonconformance

Counterbored end of spool 2-EP-01-S002 at Weld No. 2-EP-01-F004 under minimum wall requirements per MS-6. See attached U.T. Report ATTACHMENT "A"

"TESTING"

Originator <i>R. L. Powers</i>	Date 4-27-79
Inspector <i>L. W. G. I.</i>	Date 4/27

Recommended Disposition & Basis for Recommendation:

Use as is - Bechtel to determine that min. wall of 0.814" will meet design criterias and function of system will be maintained.

- Rework
- Repair
- Use As Is
- Reject

Cause of Nonperformance and Action to Prevent Recurrence:

Ovality in pipe not recognized by vendor prior to machining counterbore, thereby resulting in min wall violation. Vendor to be notified by Bechtel to prevent recurrence. No DIC action required.

W. J. ...
AUTHORIZED NUCLEAR INSPEC

Action Taken to Control Nonconformance:

Attach Q.C. Hold Tag.

POTENTIAL 50.55(e)/PART 21
YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>

James L. ... 4-30-79

... 5-1-79

Route to:
For Corrective Action C. Plans

Signature	Date
<i>...</i>	<i>...</i>

Statement of Completed Action:

Disposition "use as is." Hold tag removed and destroyed

... 5/31/79

... 5-31-79

Distribution:	J. L. Turdera	D. F. Schnell	N. A. Peurick
	R. L. Powers	W. H. Weber	F. D. Field
	J. A. Holland	C. J. Plows	Wolf Creek

EXHIBIT B
(PAGE 3 OF 10)

CP-68-1 (Rev. 8-78)
 NONCONFORMANCE REPORT (NCR)

Project Name/Number CALLAWAY/T186	Action #/Date 5-17-79	Contract #/Date X	Job #/Date 1-P
--------------------------------------	--------------------------	----------------------	-------------------

Disposition: Impact Statement Included Yes No
 Disposition Revised as Follows: Approved as is

Approved - use as is. The calculated minimum wall thickness for
 10" BCB (the diameter & pipe class for spool 2-EP-01-3002) is .705 inches.

Documents to be Revised:

None

N. goel	PE/PD	5-16-79	NA
A/E Approval	Title	Date	SNLPPS or Utility Approval

<u>DISTRIBUTION:</u>		
----------------------	--	--

EXHIBIT
 B
 (PAGE 4 OF 10)

LOCATION
 Reactor Bldg., Snopps Unit

OWN NO. OR ID
 M-05EP01 (Q)

BASE MAT'L. I.D. NO./S
 2-EP-01-5002

TYPE OF INSPECTION
 THICKNESS

INSPECTION STANDARD
 ASME SECT. V
 Art. 5

UT EQUIPMENT
 WQ-04B

TRANSDUCER SN
 8424

TESTING FREQ.
 5 MHz

REFERENCE STD
 T-1914
 SNT 3152 # 8

SIZE / THICKNESS
 27 EP 22000
 .600" - 1.00"
 1.100" - 1.500"

WELD NO.
 N/A

COUPLANT
 ERGSEN XL

BATCH NO.
 C1577XL

TRANSFER COLL. NO.
 00

SCANNING METHOD
 MANUAL

THICKNESS GAGE DIA.
 N/A

WELD NO.
 10"

WELD NO.	ACC	REJ

SKETCH TECHNIQUE USED. SHOW DEFECT LOCATION AND REMAINING THICKNESS (IF APPLICABLE). (USE ADDITIONAL SHEETS AS REQUIRED) THICKNESS AND DIMENSIONS OF DEFECTS AT WELD # 2-EP-01-FOOT (SEE SKETCH BELOW)



FOR THICKNESS ONLY

MIN. THICKNESS REQUIRED .874" ACCEPT

MIN. THICKNESS RECORDED .814" REJECT

DEFECT CODE

C - CRACKS IF - INCOMPLETE FUSION S - SLAG

P - POROSITY LA - LAMINATION

EXAMINATION PERFORMED BY /
 SYSTEMA LEVEL
 [Signature]

EXAMINATION INTERPRETED BY /
 SYSTEMA LEVEL
 [Signature]

NO. 474

NONCONFORMANCE REPORT

Project No. 7100118

GALVESTON/7106

Location

Project Description

Disposition Deviated on Callout

*Approved - this
minimum
(the diameter of
2-EP-01-500L)*

Remarks on the Defect

None

NP

PEP

SM

EXHIBIT
B
PAGE 6 OF 10

NONCONFORMANCE REPORT (NCR)

Page 1 of 2

Project Name/Number CALLAWAY/7186	Date 5/17/79	Hold Tag 1 of 1	X	NCR Number 251-0501-
--------------------------------------	-----------------	--------------------	---	-------------------------

Reactor Building, SNUPPS Unit #2 'PIPING'
Spool No. 2-EP-01-S002

FS-M-DM-
Traveler No. - 03EP01 (

Applicable Documents

ASME Section II, Winter '74 Edition (SA358)
Bechtel Specification 10466-M-201A, Revision 11

Description of Nonconformance

Visual inspection of vendor longitudinal weld on spool #2-EP-01-S002 at weld number 2-EP-01-F004 indicates rejectable defects (overlap) of the inside surface. Also, inside reinforcement is 3/16" (1/8" maximum required by ASME Section II).

"VISUAL"

Handwritten: K. J. ... cut WOCs 4-30-
L. W. ... 4/30

Bechtel Disposition & Basis for Recommendation

~~USE AS IS - BECTHEL TO PROVIDE BASIS FOR RECOMMENDATION.~~

Handwritten: Bechtel to provide disposition and basis for
REMOIVE EXCESSIVE OVERLAP
(SEE ATTACHMENT 'A') BY GRINDING, RELOMMEND
USING REINFORCEMENT AS IS.

- Review
- Repair
- ...
- Reject

Cause of Nonconformance and Action to Prevent Recurrence

BECTHEL TO PROVIDE CAUSE OF NON-CONFORMANCE
& ACTION TO PREVENT RECURRENCE.

See * *Handwritten:* ...
AUTHORIZED NUCLEAR INSPEC

Action Taken to Control Nonconformance

Q.C. HOLD TAG ATTACHED

* Prior to implementation of Bechtel Disposition, rout NCR to ANI for written concurrence of disposition.

Handwritten: 5-8-9-79 ...

POTENTIAL 50.55(e)/PART 21
YES NO

Handwritten: ... 5-1-79

Route to:
For Corrective Action C. Plans

Handwritten: ... 5-2-79
... 5/31

Statement of Disposition Action

Handwritten: See Attachment A ...
This NCR is superseded by DR # 2SD-06974P per Bechtel
... (Attachment B) which states this is an NCR ...

Handwritten: ... 9-6-79

Handwritten: ... 9-6-79

J. L. Turdera	D. F. Schnell	N. A. Petrick
R. L. Powers	W. H. Weber	F. D. Field
A. A. Holland	C. J. Flows	WOLF CROOK

Exhibit I
Page 17 of 21
EXHIBIT B
(PAGE 7 OF 10)

Bechtel Power Corporation

Engineers-Constructors

15740 Shady Grove Road
Gaithersburg, Maryland 20760
301-945 2700

Mr. Nicholas A. Petrick
Executive Director, SNUPPS
5 Choke Cherry Road
Rockville, Maryland 20850

JUN 1 1979

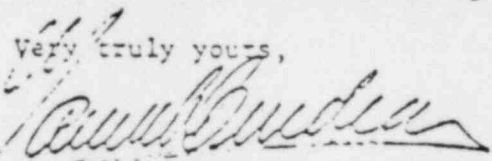
BLSE 71901 File: M-201A
Bechtel Job Number 10466
SNUPPS Project
NCR 2SN-0501-P

Dear Mr. Petrick:

The subject NCR is being returned without disposition for the following reasons:

- a) The subject pipe is 10" sched. 140 SA 358 double welded 1" nom. wall stainless steel. ASME Section III paragraph NC4426.2 permits a maximum reinforcement of 3/16" separately to both the inside and outside surface of the joint for 1" wall double welded butt points.
- b) The SA-358 material specification references the ASME Code, Section III, paragraph UW-51(b) for acceptance criteria of welds examined by radiography. The defect described in this NCR as "overlap" is not listed as a rejectable defect in paragraph UW-51(b) of Section VIII of the ASME Code.
- c) Per telephone discussion between Mr. C. R. Gardner of Daniel, Mr. Hector Borda, Mr. B. Lulla and Mr. Ron Walker of Bechtel, it was agreed that the pipe meets the code requirement and does not fall under NCR category.

Very truly yours,


J. L. Turdera
Project Engineering Manager

BL:js
Enclosure

cc: J. Lee Sippel, w/1
D. W. Capone, w/3
J. R. Jorgensen, w/3
J. A. Bailey, w/3
M. M. DeLong, w/1
H. J. Starr, w/1
S. J. Seiken, w/1

EXHIBIT B
(PAGE 8 OF 10)

Exhibit I
Page 18 of 21

photos in any of
package copy is
not copy.

CALLAWAY/7186

Hold Time
1 of 1

Disposition: Impact statement incl.
 Disposition Revised as follows:

Documents to be Revised:

EXHIBIT
B
(PAGE 10 OF
10)

Mr. Gerald Phillip
United States Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Mr. Phillip:

After reading NRC Report No. 50-483/80-10 in mid-December 1980, I realized that my phone calls to the Region III office had failed to communicate my concerns about pipe installed at the Callaway Nuclear Power Plant. I also realized that I needed to write the Region III office and express those concerns again. I would now like to restate the information I tried to convey over the phone and comment on the report.

In May of 1979 I saw a substandard piece of pipe installed in a safety-related system at the Callaway Nuclear Power Plant. The pipe was part of a prefabricated spool piece, in a line of pipe that ran from an accumulator tank to the primary cooling loop. This was a part of the Emergency Core Cooling System. The pipe was substantially out-of-round, machined below the minimum wall and had rejectable weld defects on the inside of a longitudinal seam weld. I believed that all of these problems were caused by an improper welding procedure used in manufacturing the pipe. The weld appeared to be a single welded butt joint in which the root pass had fallen through. By fall through I mean that the internal weld bead drooped down or protruded into the pipe an excessive amount and did not fuse uniformly into the plate surface. Succeeding filler passes over the root pass had caused the pipe to distort, flattening the pipe at the weld and giving it an oval shape. The combination of the fall through (a stress raising condition), and the distortion, made the pipe susceptible to cracking, and this was evidenced by a 3/4 in. long crack. The crack was visible from the open end of the spool piece where a check valve was to be installed.

From 13 years experience in welding I believed these were rejectable defects, especially when the pipe was being installed as a Class II safety-related component in the Emergency Core Cooling System of a nuclear power plant.

In May of 1979 I reported the defects to a reactor area Quality Control Inspector and my immediate supervisor. The pipe had

a hold tag placed on it for the minimum wall violation and several persons came from the office to look at the pipe.

I talked to several credible and responsible persons about the pipe. (I gave their names and positions to the Region III office in the phone calls of October 11, 1979 and April 11, 1980.) According to my understanding, from conversations with these persons, several factors were involved in the decision-making process. They are as follows:

- 1) The pipe had been approved for installation by Union Electric and had passed through the quality assurance programs of the pipe's manufacturer (known simply as "Youngstown") and the fabricator of the spool piece (Dravo).
- 2) The Daniel International Corporation was not responsible or liable for longitudinal seam welds in pipe. Their concern with the pipe was the edge preparation of the weld they were responsible for making.
- 3) The pipes manufacturer had millions of dollars worth of pipe of questionable quality, some of which was installed, or going to be installed at Callaway.
- 4) Replacing any pipe would be costly for everyone and cause scheduling delays.
- 5) The argument was made that the defects I saw would not affect the function of the pipe; that the crack, or cracks if there were more, were on the internal surface and would not grow in size.

I left Callaway before a final decision was made, and I assumed that the problems with this piece of pipe would be resolved within the limits of the American Society of Mechanical Engineers code.

Several months after I left Callaway I heard that the pipe in question was approved for installation "as is". I was surprised by this and called the NRC Region III office to express my concern.

The NRC investigated and wrote Report No. 50-483/80-10. The report did not seem to address my concerns but instead it seemed to obfuscate the deficiencies, especially as they relate to the ASME code. The ASME code is an essential instrument used to ensure the safety of nuclear power plants. If the standards of the ASME code are ignored or misapplied we are inviting a disaster.

SUMMARY OF COMMENTS ON THE NRC REPORT

I called the NRC Region III office to express concern over a substandard piece of pipe I saw being installed in the Emergency Core Cooling System at the Callaway Nuclear Power Plant. The NRC investigated and wrote a report which concluded that, "The allegation was not substantiated. No items of noncompliance were identified." In arriving at this conclusion the NRC appeared careless and negligent in several areas of their investigation.

The NRC report made erroneous, misleading or incomplete statements which were as follows:

- 1) The report limited my concern to one 3/4 in. crack and did not state very completely the substance of what I expressed over the phone.
- 2) The report misquoted me in saying that my "supervisor was reluctant to inform quality assurance personnel".
- 3) The NRC did not examine all the welds the report implied they examined in the March 26 and 27, 1980 investigation.

The NRC accepted, without much scrutiny, statements and documents from the involved companies. Instances of this are as follows:

- 1) A letter from Mr. Turdera, Bechtel's Project Engineering Manager was the basis for downgrading a nonconformance report to a deficiency report. The letter ignored applicable paragraphs of the ASME code and misapplied other paragraphs of the ASME code.
- 2) The NRC accepted the downward recalculation of a safety-related minimum wall specification without substantiating whether or not the recalculation complied with the requirements of the ASME code.

In the documents presented with the report, possible code violations were indicated which the NRC did not investigate.

- 1) A deficiency report, Exhibit B page 1, referenced ASME Section II SA358 para. 5.2.3. Violations of this paragraph were never investigated.
- 2) A reference to ovality in the pipe was made in a non-conformance report, Exhibit B page 3. This could be a violation of SA 358 para. 15.1.2, but this was never investigated.

The report did not supply information relevant to the investigation.

- 1) The statement (page 6) that, "the remaining reinforcement in the pipe was measured and found to be within ASME welding code tolerances", was not documented. No inspection report of this measurement was included in the exhibits.
- 2) The names of the spool piece vendor and pipe manufacturer were not included in the report.

The NRC overlooked vital documented evidence.

- 1) The radiographs (X-ray pictures) of the weld in question were not examined.

DETAILED COMMENTS AND QUESTIONS

I would now like to comment on particular sections of the report and ask specific questions. I would like the NRC to answer these questions in written form and send me a copy. :

Allegation, page 4

†
This paragraph states my concern over one 3/4 in. crack but neglects to mention the fall through, (referred to in the report as "overlap" and excess reinforcement), the distortion of the pipe, the minimum wall violation, and the possible existence of other substandard pipe. I would not have called the NRC over one isolated crack, which could easily be ground out. The condition of the pipe that caused the crack, indicated an improper welding procedure and that concerned me. The fact that the quality assurance programs at two different companies had apparently failed, concerned me. Even though some of these items were indirectly addressed in the exhibits, I believe they should have been included in the allegation section. I did attempt to communicate these items over the phone in the October 11, 1979 and April 11, 1980 calls.

I do not recall ever saying my supervisor was reluctant to inform quality assurance personnel. My statements referred to the company, as a whole, being reluctant to acknowledge the existence of the defects, not my immediate supervisor.

Questions

- 1) Were the phone calls I made to the Region III office on October 11, 1979 and April 11, 1980 electronically recorded?
- 2) If they were recorded may I listen to them or have a transcript?
- 3) May I have a copy of the notes taken by Mr. Burton, Mr. McCartney or others who listened in on the calls?

Finding, page 4

In the first paragraph of this section, the report states; "that a total of 15 welds (both vendor and field welds) were encompassed". Vendor welds are defined on page 5 thusly; "Vendor welds are those welds made in the assembly of the pipe (either longitudinal or circumferential)". The welds marked and numbered on Exhibit A involve four spool pieces, i.e. S 001, S. 002, S 007, and S 008. These four pieces were the subject of the NRC investigation on March 26 and 27, 1980. From Exhibit A we can count 26 welds - 6 field welds, 11 circumferential factory welds, and 9 longitudinal factory welds. The report gives the impression that all of the relevant welds from the piping isometric drawing were encompassed, including longitudinal welds. This was not so.

Questions

- 1) Why were only 15 welds inspected?
- 2) Exactly which welds were inspected and which were omitted in the inspections made on March 26 and 27, 1960.
- 3) Specifically, what efforts were made to contact me concerning the exact location of the crack?

Also on Exhibit A is a hand written note with a line drawn to S 002 and it says; "Seam inspected by WLK".

Questions

- 1) Who is WLK?
- 2) When did he make the seam weld inspection?
- 3) Did he look into the end of S 002 and examine the inside of the seam weld?

Finding, page 6

In the third paragraph of page 6 the report cites a Nonconformance Report and a Deficiency Report. I presume these to be page 7 and page 1 of Exhibit B. The descriptions of the deficiencies and nonconformances agree in citing excess reinforcement, but they disagree in how they describe another defect. The NCR calls the defect "overlap" and the DR states that, "the vendor's longitudinal weld... is not fused uniformly into the plate surface as required by Material Spec. SA 358, Para. 5.2.3".

Questions

- 1) Is the NCR and the DR talking about the same defect?
- 2) Would "overlap" be a violation of Material Spec. SA 358, Para. 5.2.3?

Exhibit B, pages 7 and 8

NCR No. 2SN-0501-P was downgraded to a DR based on a letter from Mr. J.L. Turdera, Bechtel's Project Engineering Manager. In paragraph (a) of his letter Mr. Turdera deals with the maximum allowable reinforcement and cites ASME Section III but ignores ASME Section II, listed as a "Controlling Document" in the NCR. Concerning maximum reinforcement, Section II SA 358 para. 5.2.3 states; "The joint shall be reinforced at the center of the weld on each side of the plate by at least 1/16 in. (1.6mm) but not more than 1/8 in. (3.2mm)".

Questions

- 1) Why did Mr. Turdera ignore Section II in his discussion

of maximum reinforcement when it was listed in the "Controlling Documents"?

- 2) Why didn't the NRC Resident Inspector question this when he received these documents on April 14, 1980?
- 3) In the investigation that occurred on March 26 and 27, 1980, why didn't the investigators have these documents then, since they involved the pipe in question?

Exhibit B, page 8

In paragraph (a), Mr. Turdera cites ASME Section III para. NC 4426.2. Article NC 4000 from which this is taken is titled Fabrication and Installation and is not a material specification. Section III para. NC 2561, Required Examination, states; "pipe made in accordance with... SA 358... shall be treated as material". This would make Section II SA 358 the basic controlling document governing longitudinal seam welds in SA 358 pipe. Both the NCR (Exhibit B page 7) and the DR (Exhibit B page 1) agree in this and cite Section II SA 358.

Questions

- 1) Was Mr. Turdera correct in citing NC 4426.2?
- 2) If yes, will you please give code references?

Exhibit B page 8 paragraph (a) states that, "ASME Section III paragraph NC 4426.2 permits a maximum reinforcement of 3/16"... for 1" double welded butt joints". The pipe used in spool No. 2-EP-01-S002, by visual appearance, was single welded. (SA 358 para. 1.3, the 1977 edition, shows that the pipe can be either single or double welded.) Paragraph NC 4426.2 gives a maximum inside reinforcement of 5/32" for 1" single welded butt joints. If the pipe in question was single welded it would not meet this requirement.

Questions

- 1) Was the pipe in 2-EP-01-S002 single or double welded?
- 2) What documents verify this?

In paragraph (b), of Exhibit B page 8, the letter states; "The SA 358 material specification references the ASME Code, Section III, paragraph UW-51(b)". I have not found such a reference in SA 358. The letter also cites; "paragraph UW-51(b) of Section VIII of the ASME Code". This reference also appears to be an error.

Question

- 1) Do these references exist?

Exhibit B, page 8, paragraph (b) deals with "overlap", a defect detected by visual examination. Acceptance criteria of welds examined by radiography is the wrong place to look in the ASME code for a defect found by visual examination. In Welding Inspection, a book published by the American Welding Society, the following statement is made; "Overlap is the condition in which weld metal protrudes beyond the bond line at the toe of a weld. The condition tends to produce notches that are dangerous, due to the resultant concentration of stress under load." ASME Section II SA 358 para. 5.2.3 states; "The contour of the reinforcement should be reasonably smooth and free from irregularities. The deposited metal shall be fused uniformly into the plate surface." Overlap violates this paragraph.

Questions

- 1) Why didn't Mr. Turdera deal with "overlap" as a violation of Section II SA 358 para. 5.2.3?

Exhibit B, page 8, paragraph (b) mentions acceptance criteria for welds examined by radiography. The longitudinal seam welds in spool piece 2-EP-01-S002 were radiographed. The radiography should have been done according to Section V, Article 2, para. T-221.2 which states; "The weld ripples or weld surface irregularities on both the inside (where accessible) and outside shall be removed by any suitable process to such a degree that the resulting radiographic image due to any irregularities cannot mask or be confused with the image of any discontinuity." Overlap is a surface irregularity that can mask or be confused with the image of a discontinuity. The overlap was accessible prior to the fabrication of the spool piece. This ASME code paragraph seems to have been violated.

Questions

- 1) Why wasn't the overlap removed prior to fabricating the spool piece?
- 2) How were the radiographs of the longitudinal welds in spool No. 2-EP-01-S002 correctly read and accepted with weld overlap?

In paragraph (c) of Exhibit B, page 8, several persons listed there, "agreed that the pipe meets the code requirements and does not fall under NCR category".

Questions

- 1) Did they base their decision on the information given in paragraphs (a) and (b)?
- 2) If not what did they base their decision on?

- 3) Did any of these individuals read the NCR and consider the requirements of Section II SA 358?
- 4) Was this letter a basis for the NRC report saying that, "no items of noncompliance were identified"?
- 5) Are there cases where ASME code violations in Class II piping do not fall under the NCR category? If yes please explain.

Finding page 6

The fifth paragraph states; "The remaining reinforcement (fall through) in the pipe was measured and found to be within ASME welding code tolerences."

Questions

- 1) What examination method was used in making this measurement?
- 2) At what intervals and over what length of the pipe were these measurements made?
- 3) Was the reinforcement measured back to the 45 degree elbow?
- 4) Was an inspection report used to document the measurements?
- 5) Is the inspection report available?
- 6) What section and paragraph of the ASME code was used to establish the allowable amount of reinforcement?

Exhibit B, page 3

This page is an NCR describing a minimum wall violation. The cause of the nonconformance is given as, "ovality in pipe". ASME Section II SA 358 para. 15.1 states; "Permissible Variations - The dimensions at any point in a length of pipe shall not exceed the following:" and 15.1.2 states; "Out-of-roundness - Difference between major and minor outside diameter 1 percent."

Questions

- 1) After the ovality was noticed was the pipe checked for conformance to SA 358 para. 15.1.2?
- 2) Was this measurement documented?
- 3) At what intervals was it measured?
- 4) Did the pipe conform to SA 358 para. 15.1.2?

Exhibit B, pages 3 and 5

Page 5 is an Inspection Report to determine the wall thickness of the edge preparation. It lists the ASME code as the controlling code and as the inspection standard. The NCR, page 3, does not list the ASME code as a controlling document.

Questions

- 1) Should the NCR, Exhibit B, page 3, list the ASME code as a controlling document?
- 2) Do Bechtel specifications take precedence over ASME specifications?

Exhibit B, pages 3 and 5

On page 3 under the heading, "Recommended Disposition and Basis for Recommendation" is the statement, "Bechtel to determine that min. wall of .814 will meet design criterias": and on page 4, Exhibit B, the statement is made that, "the calculated minimum wall thickness for 10" BCB... is .795".

Questions

- 1) What design criteria were used to determine this minimum wall?
- 2) What paragraphs of Section III were used in this determination?
- 3) What paragraphs of Section III were used in recalculating the minimum wall?

General Comments

Nowhere in the report is the vendor of the spool piece named, nor is the manufacturer of the pipe. Their work was investigated in the NRC report. It seems fitting that they should be named.

Questions

- 1) Who was the spool piece vendor?
- 2) Who supplied the pipe to the vendor?
- 3) When was the pipe manufactured?

Even though the area of the crack was ground smooth, radiographs existed which could have shown the existence of a crack prior to grinding, or they could have shown an abrupt density change (overlap) which could mask a crack. No mention was made in the report of these radiographs and presumably they were not checked.

Questions

- 1) Were the radiographs of the longitudinal welds in spool No. 2-EP-01-S002 checked by the NRC?
- 2) If they were what were their findings?

It took the NRC over five months to investigate my allegations. In many cases defects could become inaccessible in that amount of time.

Questions

- 1) When were Daniel International, Union Electric, Bechtel, and SHUPPS first notified, formally or informally, of my allegations.

Everything said in this letter is true to the best of my knowledge and belief.

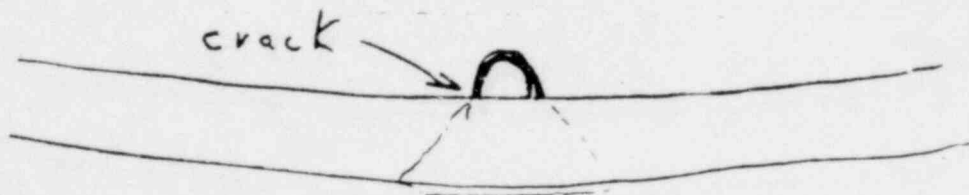
Sincerely,

April 19, 1980

Dear Mr Burton,

The seam weld with the crack is located in S 002 and is approximately 4" to 6" from F 004. The edge preparation for F 004 violated the minimum wall requirements and I believe an NCR tag was placed on it. By looking back into the pipe with a flash light it appeared that there was an excessive amount of fall through in the seam weld from the 45° elbow to F 004.

The seam is placed on the bottom of the pipe and a cross sectional view would look as shown here.



Because of the fall through I doubt that it would show up clearly with radiograph.

Sincerely

APR 23 1980



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

April 11, 1980

Dear Mr.

Per our conversation on April 11, 1980, enclosed is a drawing of the accumulator tank area at Callaway. Please indicate the seam weld involved and return the drawing in the enclosed envelope. Again I would like to thank you for your cooperation in this matter.

Sincerely,

RB
4/11/80
Robert Burton
Investigator

Enclosure: as stated

CALLAWAY ACCUMULATOR LINE SPOOL PIECE S002

PARTIAL CHRONOLOGY

8/17/77 Certificate of compliance date, ARMCO, Huston

9/15/77 Radiography date, ARMCO (Pipe completed)

4/26/79 UT test of weld preparation area, .814 lowest wall measurement

4/27/79 NCR 2SN-0496-P, minimum wall violation

4/30/79 NCR 2SN-0501-P, overlap on longitudinal weld (B. Diggs, originator)

5/79 Individual "A" states he advised a QC inspector of "crack" (approximate)

5/5/79 Date noted in first report, in error. Date of ANI concurrence on 2SN-0501-P

5/16/79 Disposition of NCR 2SN-0946-P, use-as-is, reduced wall acceptable

5/31/79 Last date, 2SN-0496-P, hold tag removed.

6/1/79 Turdera letter re: NCR 2SN-0501-P, "not fall under NCR category"

8/79 Linder is foreman of accumulator piping area welding

8/79 Individual "A" leaves work at the Callaway site

9/6/79 DR 2SD-0699-P initiated (overlap), NCR 2SN-0501-P superseded

10/11. 9 Phone call from Individual "A", Callaway and Wolf Creek concerns

11/5/79 Grinding of seam weld per 2SD-0699-P, removal of excess weld reinforcement

11/9/79 Memo to File (McCarten) documents call of 10/11/79

11/15/79 2SD-0699-P signed as completed (grinding completed and inspected)

11/19/79 Final signature date on 2SD-0699-P

3/24-25/80 Attempts to call Individual "A", no success

3/26-27/80 Investigation on site at Callaway (initial investigation)

3/27/80 Linder interviewed, meeting with licensee representatives.

4/8/80 Phone call from G. Hayden, Wichita Eagle

4/9/80 Phone call attempt, no success

4/11/80 Telephone contact with Individual "A", send isometric to "A" for marking

4/14/80 Hansen (RI) pulls NCRs/DRs related to accumulator line welding

4/16/80 Hansen interviews QC inspector Dameron

4/19/80 Handwritten note from Individual "A", marked isometric drawing with weld

4/23/80 Above letter and isometric drawing received at RIII

5/2/80 Hansen (RI) witnesses LP test of ground area on seam weld identified

6/10/80 Initial Investigation Report issued, attachments omitted

6/17/80 Attachments to Investigation Report sent out.

7/11/80 Kay Drey letter to RIII, questions regarding Investigation Report

8/29/80 Response to Kay Drey letter sent

1/2/81 Receive information Representative Feigenbaum has been contacted

1/23/81 G. Phillip attempts to call Feigenbaum, no success

1/27/81 G. Phillip contacts Feigenbaum, discusses contact with allegor

1/28/81 G. Phillip contacts Feigenbaum, he advises allegor will write to Region III

2/8/81 Date of 11 page letter of complaint to G. Phillip, Region III

2/17-20/81 J. Foster on site at Callaway

2/26/81 Letter sent to Individual "A" advising we will review expanded concerns

3/3-6/81 J. Foster onsite at Callaway

3/23-27/81 J. Foster on site at Callaway

3/24/81 Prehearing conference (Contentions include the spool piece)

(7) High Pressure Coolant Injection

2EM-03-F013

- (a) For each of these welds, one or more of the following fabrication activities was observed. Handling and protection of piping and partially completed welds was satisfactory. Purge gas was correctly used. The joint fit-up dimensions were within procedural requirements and the weld area was free of any grease or particles of tools such as grinders, brushes, and files were properly color coded for use on stainless steel. Welders were certified as qualified for the procedure specified to be used for welding the pipe joint.
- (b) During the reporting period, the inspector observed the liquid penetrant test of the longitudinal seam weld in spool S002 near joint F004 shown on Drawing M03EP-01 Revision 6. The weld had been ground smooth as part of the disposition of Deficiency Report 2SD-0699-P in November 19. The results of the test indicated that there was no crack within the test area. The test area consisted of the weld, the metal extended from the face of the pipe back into the pipe for approximately 12 inches. The liquid penetrant technique used to perform the examination was satisfactory.
- (c) During the reporting period, the inspector observed the radiographic test of an incore instrument joint. The radiation protection techniques were satisfactory.

No items of noncompliance or deviations were identified.

5. Material Storage

During the reporting period the storage areas for reinforcing steel and other steel material, and electrical cable was observed. The steel material was orderly and placed on wood beams off the ground. The electrical cable spools were stored off the ground and cable ends were taped and protected from moisture.

It was noted that much of the cable is manufactured by Rockbestos Company. Based on reports that some Rockbestos electrical cable has been spliced, the licensee was requested to determine if splices might also exist in cable that has been purchased and installed at Callaway. This is an unresolved item. (483/80-15-01)

No items of noncompliance or deviations were identified.

Draft
Burton/qg
7/15/80

Dear Mr.

Enclosed is a copy of a report of an investigation conducted on March 26-27, and May 2, 1980 of activities at the Callaway Nuclear Plant, Unit 1, authorized by NRC Construction Permit No. CPPR-139.

In reference to the concerns you expressed about possible electrical arc damage to one of the heaters on the feed water line inside the turbine building and possible improper fit-up methods of related heater piping; it has been determined that these areas are not safety related and therefore not under the jurisdiction of the NRC. These concerns however have been brought to the attention of Union Electric representatives by the NRC Resident Inspector at Callaway.

In reference to the concerns you expressed about the quality of welds on sections of the containment wall, where root passes had been made; this matter has been reviewed by the NRC Resident Inspector. It is recognized that the weld is difficult, however the procedure has been qualified and it meets the code requirements. The nondestructive testing prescribed by the code to determine the soundness of the weld is required to be performed on each weld, thereby assuring its acceptability. As you know, periodic inspections are conducted to monitor compliance with NRC requirements.

Should you have any questions concerning this investigation, we will be pleased to discuss them with you. Again I would like to express my appreciation for your assistance in this matter.

Sincerely,

Robert M. Burton

Investigation Specialist

FEB 26 1981

Dear Mr.

This is to acknowledge receipt of your letter dated February 8, 1981. As indicated in our Investigation Report No. 50-483/80-10, it was our understanding that your concern was limited to a weld crack detected in a section of stainless steel pipe leading from an accumulator tank. It is unfortunate that an apparent miscommunication occurred regarding the extent of your concerns.

We will carefully review the information contained in your letter and conduct an investigation to address those questions for which we do not have a response. Upon completion of the investigation, we will provide you a copy of our report. We will also provide responses to each of the questions you have raised.

Sincerely,

G. A. Phillip

Exhibit VIII
Page 1 of 1



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

Mr...

Dear Mr.

Enclosed is a copy of NRC Inspection and Enforcement Investigation Report No. 50-483/81-04 which documents an expanded investigation into the quality of a section of accumulator discharge piping at the Callaway Nuclear Power Plant. I apologize for our oversight in not sending you a copy of the initial investigation report.

This investigation was initiated in response to the letter of concern you sent to Region III on February 8, 1981, which indicated that we had not fully understood and investigated your concerns in the earlier investigation. I trust that the enclosed report is more responsive to your concerns.

As you requested, a response to each question in your February 8, 1981, letter is contained in an enclosure to this letter. The report itself contains additional detailed information on many of the questions.

Should you have any additional questions regarding the information contained in the report or the conduct of our investigation into this matter, please feel free to contact this office.

Sincerely,

A handwritten signature in cursive script, appearing to read "J. F. Streeter".

J. F. Streeter, Acting Director
Enforcement and Investigation Staff

Enclosures:

1. IE Investigation Report
No. 50-483/81-04
2. Responses to questions

RESPONSES TO QUESTIONS

1. Question: Were the telephone calls I made to the Region III office on October 11, 1979, and April 11, 1980, electronically recorded?

Answer: By NRC policy, telephone calls are not electronically recorded without advisement and consent of the parties involved. Your telephone calls were not electronically recorded.
2. Question: If they were recorded may I listen to them or have a transcript?

Answer: See answer to Question 1.
3. Question: May I have a copy of the notes taken by Mr. Burton, Mr. McCartney or others who listened in on the calls?

Answer: The investigators referred to are R. Burton and J. McCarten. By NRC policy, an Investigator's notes are his property unless entered into an official file. As the notes are often brief phrases meant to jog the memory of the individual, there is a high probability that interpretation of notes without the individual present would result in erroneous conclusions. However, the investigators agreed to provide their notes which are attached (Individual A's name has been deleted).
4. Question: Why were only 15 welds inspected?

Answer: As noted in Investigation Report 50-483/81-04, the characterization of "15 welds" was in error. The reference was to a piping isometric which did not include longitudinal seam welds. Seam welds were also inspected.
5. Question: Exactly which welds were inspected and which were omitted in the inspections made on March 26 and 27, 1980?

Answer: All external surfaces of completed welds on the two accumulator discharge lines, an isometric of which is Exhibit A of IE Report No. 50-473/80-10, including the seam welds, were visually inspected. The isometric indicates this consisted of three field welds, 11 circumferential welds, and 15 longitudinal welds. Only two accumulator lines had been completed at the time. These inspections were made due to lack of an exact location of the weld in question and were of the external weld surfaces due to lack of specific information. The number of welds inspected is immaterial as the wrong welds were inspected.
6. Question: Specifically, what efforts were made to contact me concerning the exact location of the crack?

Answer: The investigator's log notes four telephone call attempts on March 24, 1980, one on March 25, 1980, one April 9, 1980, and one call

to employees of the Wichita Eagle newspaper. You are aware of your first call on or about October 11, 1979, the call you made on April 11, 1980, the letter to you with an attached piping isometric, and your handwritten note to us which accompanied the marked isometric utilized to locate the weld.

7. Question: Who is WLK?

Answer: WLK are the initials of a Level II Daniel Quality Control inspector, Wayne L. King, who was assigned to visually inspect the welds on the two accumulator discharge lines, along with NRC Resident Inspector William Hansen. During the present investigation, we reviewed this inspector's certifications and found them to be acceptable.

8. Question: When did he make the seam weld inspection?

Answer: March 27, 1980.

9. Question: Did he look into the end of S002 and examine the inside of the seam weld?

Answer: Inside seam welds were not inspected until receipt of information identifying the weld at F004.

10. Question: Is the NCR and the DR talking about the same defect?

Answer: Both reports document the same reinforcement deficiency. The NCR identified it as overlap; the DR called it poor fusion. Both terms can apply to similar situations, depending on the judgement of the inspector. Until an overlap is removed, it cannot be ascertained if there is actually a crack. In this case, when the area of overlap/poor fusion was removed there was no crack.

11. Question: Would "overlap" be a violation of Material Spec. SA 358, Para. 5.2.3?

Answer: Photographs of the original weld contour at the location near field weld F004 show "irregularities" and the metal is not "fused uniformly". This would be a violation of SA 358, Para. 5.2.3.

12. Question: Why did Mr. Turdera ignore Section II in his discussion of maximum reinforcement when it (Section II) was listed in the "Controlling Documents"?

Answer: As detailed in the Investigation Report, Paragraph 6, it is not apparent that any requirement was "ignored". Mr. Turdera was not available for interview, but discussion with Bechtel personnel indicated that they considered ASME III as the governing code. Our position is that that is incorrect as the weld was a manufacturer weld.

13. Question: Why didn't the NRC Resident Inspector question this (Turdera letter) when he received these documents on April 14, 1980?

Answer: During the initial investigation, the principal importance of the IR and DR referenced was in locating the pipe weld in question. Also, the referenced defect had been removed per the disposition of the DR. There was no reason to question the interpretations contained in Mr. Turdera's letter as it was not a significant point. The significant point was that the deficiency was identified, documented, and corrected prior to installation.

14. Question: In the investigation that occurred on March 26 and 27, 1980, why didn't the investigators have these documents then, since they involved the pipe in question?

Answer: As previously noted in the original report and in the present report, the location of the pipe or weld in question was not clear on those dates due to inadequate information. From the information available at that time, it was presumed that the "pipe crack" would be visually evident and on an external surface. Related nonconformance reports were not believed important at that time.

15. Question: Was Mr. Turdera correct in citing NC 4426.2?

Answer: Our position is that the ASME SA-358 (the material specification) was the relevant requirement, rather than NC 4426.2. The principal difference between these two Code references in the area of weld reinforcement is that SA-358 allows 1/8" maximum reinforcement whereas NC 4426.2 allows 3/16".

16. Question: If yes, will you please give code reference?

Answer: Although we do not believe it was the correct Code reference, the section Mr. Turdera quoted was: American Society of Mechanical Engineers, ASME Boiler and Pressure Vessel Code, Section III, Division I, "Nuclear Power Plant Components", Subsection NC, "Class 2 Components", Paragraph NC-4426, "Reinforcement of Welds", Subparagraph NC-4426.2, "Thickness of Weld Reinforcement for Piping".

17. Question: Was the pipe in 2-EP-01-S002 single or double welded?

Answer: Double welded utilizing an automatic submerged arc welding process.

18. Question: What documents verify this?

Answer: Manufacturer documents, including the weld procedure sheets, weld procedure qualification documents, and radiographic reader sheets.

19. Question: Do these references (UW-51b) exist?

Answer: UW-51(b) is found in ASME Section VIII as indicated in the letter signed by Mr. Turdera. As noted in the investigation report, Section VIII does not apply to the pipe in question. However, PW-51 which is the correct reference from SA-358 is found in the ASME Code Section I and has wording providing the same requirements and criteria.

20. Question: Why didn't Turdera deal with "overlap" as a violation of Section II SA 358, para 5.2.3?

Answer: Mr. Turdera was not available for interview, but he apparently assumed it was an acceptable defect based on applicable nondestructive examination requirements.

21. Question: Why wasn't the overlap removed prior to fabricating the spool piece?

Answer: According to documents available, it was considered an acceptable defect, based on accepted radiographs. The Code allows for acceptance of certain indications, and acceptance/rejection can be an individual judgement factor.

22. Question: How were the radiographs of the longitudinal welds in spool No. 2-EP-01-S002 correctly read and accepted with weld overlap?

Answer: As noted in the Investigation Report, our position is that the section of the radiographic film for an area near field weld F004 should have been rejected. The area in question was approximately four inches long, not the entire seam weld as suggested. The remainder of the radiography was acceptable.

23. Question: Did they base their decision on the information given in paragraphs (a) and (b)?

Answer: The information contained in the letter was apparently part of the conclusion that the nonconformance was not appropriate for an NCR. The letter is brief, and apparently summarizes discussions.

24. Question: If not, what did they base their decision on?

Answer: As detailed in the Investigation Report, Paragraph 6, additional guidance was contained in the procedure for dispositioning nonconformances.

25. Question: Did any of these individuals read the NCR and consider the requirements of Section II SA 358?

Answer: The individuals read the NCR, as that was the information discussed. See answer to Question 12.

26. Question: Was this letter a basis for the NRC report saying that, "no items of noncompliance were identified"?

Answer: The basis for the statement was that the defect had been removed under the QC program and there was no pipe crack as alleged.

27. Question: Are there cases where ASME Code violations in Class II piping do not fall under the NCR category? If yes, please explain.

Answer: Yes. Under the provisions of site procedures, nonconformances can also be dispositioned by way of a Deficiency Report. From the NRC viewpoint, it is not significant which method documents and disposition a nonconformance as long as the nonconformance is documented and dispositioned properly (including an engineering review where necessary). In practice, items dispositioned via an NCR are usually significant items which require engineering reviews.

28. Question: What examination method was used in making this measurement?

Answer: Visual inspection and comparison with an object known to be exactly 1/8".

29. Question: At what intervals and over what length of the pipe were these measurements made?

Answer: Visual inspection was performed by the Resident Inspector (and by QC Inspector Dameron on November 5, 1979, according to the DR) on the weld reinforcement just beyond the area where the excessive weld reinforcement had been removed. The size of weld reinforcement (height, width, contour) on the rest of the seam weld was uniform and appeared to meet Code requirements (SA-358, 1974). NRC Inspector W. Key also visually inspected the weld.

30. Question: Was the reinforcement measured back to the 45 degree elbow?

Answer: The seam weld was visible back to the 45 degree elbow and appeared uniform for the length of the piece in question; however, it was not measured for the entire length.

31. Question: Was an inspection report used to document the measurements?

Answer: A separate site report would have been expected only if the measurements had indicated a nonconformance. The initial Investigation Report was used to convey the results of NRC measurements.

32. Question: Is the inspection report available?

Answer: See answer to Question 31.

33. Question: What section and paragraph of the ASME Code was used to establish the allowable amount of reinforcement?

Answer: See answer to Question 15.

34. Question: After the ovality was noticed was the pipe checked for conformance to SA 358 para. 15.1.2?

Answer: Ovality of pipe was thought to be the cause of the observed minimum wall violation, and was not observed as a nonconformance. Some ovality is acceptable as provided by the material specification. Minimum wall violations at a counterbored area can be caused by (1) mislocation of the counterbore centerline, (2) excessive counterbore, (3) ovality of the pipe, or (4) a combination of any of the three. We did not locate records to indicate that the pipe was checked for ovality after the NCR was issued. The pipe has since been measured and found acceptable as documented in the attached investigation report.

35. Question: Was this measurement documented?

Answer: See answer to Question 34.

36. Question: At what intervals was it measured?

Answer: See answer to Question 34. We selected one representative point for our measurements as no interval was specified by Code. Specification SA-358 does not specify the measurement method, but other sections of the Code (NC-4221.3 for example) indicate such measurements should not be made on a weld seam.

37. Question: Did the pipe conform to SA-358 paragraph 15.12?

Answer: See answer to Question 34.

38. Question: Should the NCR, Exhibit B, page 3, list the ASME Code as a "controlling document"?

Answer: It is not necessary since the Bechtel specification contains references to the ASME Code.

39. Question: Do Bechtel specifications take precedence over ASME specifications?

Answer: Only when their requirements are more stringent than those of the ASME Code as provided in Bechtel Specification No. 10466-M-201A, Section 3.3.

40. Question: What design criteria were used to determine this minimum wall?

Answer: American Society of Mechanical Engineers, ASME Boiler and Pressure Vessel Code, Section III, Division I, "Nuclear Power Plant Components", Subsection NC, "Class 2 Components", Subarticle NC-3640,

"Pressure Design of Piping Products", Paragraph NC-3641, "Straight Pipe", Subparagraph NC-3641.1, "Straight Pipe Under Internal Pressure". Values for temperature and pressure were taken from the EP piping class summary.

41. Question: What paragraphs of Section III were used in this determination?
Answer: See answer to Question 40.
42. Question: What paragraphs of Section III were used in recalculating the minimum wall?
Answer: See answer to Question 40.
43. Question: Who was the spool piece vendor?
Answer: Dravo Corporation, Pipe Fabrication Division.
44. Question: Who supplied the pipe to the vendor?
Answer: Guyon Alloys supplied the pipe to Dravo which had been purchased from Armco, Incorporated, Advanced Materials Division, the manufacturer of the pipe.
45. Question: When was the pipe manufactured?
Answer: The pipe was manufactured by Armco approximately September 1977 (radiography was performed September 15-16, 1977).
46. Question: Were the radiographs of the longitudinal welds in spool No. 2-EP-01-S002 checked by the NRC?
Answer: These radiographs were not examined during the initial investigation. They were interpreted as a part of the present investigation.
47. Question: If they were, what were their findings?
Answer: Findings are detailed in the investigation report. With the exception of an area approximately four inches long, all of the radiographs of the pipe piece in question were acceptable. For the four inch area, it is our position that this area should have been rejected based on the original radiographs.
48. Question: When were Daniel International, Union Electric, Bechtel, and SNUPPS first notified, formally or informally, of my allegations?
Answer: Union Electric and Daniel International personnel were first advised of allegations concerning a "pipe crack" on March 26, 1980. The identity of the informant was not provided. NRC did not inform Bechtel or SNUPPS of the allegations, although their personnel were contacted during the investigations to secure technical information.

1500
10/5/74
10/5/74
10/5/74

work
→ follow up your
→ work off
Creek

Parish =
slim

part of creek floor -

part - looking of
full body

level - welds
stopped

open left
side welds -

on welder MO -
duty well

100 leads
in
defects
and metal
welds
Burlington Kansas -
RT
ch

12/19/74
12/19/74
6/13/74

defect - not loady fit full
battery -

wells - are on lines flat -
spout full foot -

lines plants -

attn QA not being inspect
in safety well

just 2 wells -
but not following
procedure -

inform -
- general foreman
- welling general foreman on water

sut cover
not
attached
to shaver -
told me I was wrong to
me to go ahead and make
wells -

Chet Oberg - began IV contact

5/12/81
10/11/81
3/81

board crack - already found
at board except -
yet crack the structure
- worn to 75%
- not NRC

ah for Glen

inspected shell film -
welds super - James valve - near -
got rapped 2 accumulators tanks
full film tank worn - under -
on steam weld tank -
tin was east entrance - on east part of tank
is new valve - by top of tank
valve - along side chest
crack at end of tank -
tin 15 ft - long -
elbow at end - to reactor -
sharp point - chest valve
welds -
weld at neck -

crack
well
below

→ Tool Room

→ line runs from the north end of the
N. tank. Plant north
Valve right out of tank

As you go thru the
crack ^{visible} Weld at the

NCR - because minimum wall

Inside ^{pipe} seam weld about 4" in diam.

Jamie Linder - had spoken to him about crack

Howard Patter - ANI - had looked up the film +
saw the crack - attitude displayed was it
wasn't Daniel's problem cause it was already brought

Crack was about $\frac{3}{4}$ " long

Pipe was distorted at the seam - looked like
too much heat

< Dravell pipe, manufactured by Youngstown >

→ Howard Dameron - lead inspector in DC - spoke to him + Dr. called it to several peoples' attention.

Quit at time hold tag was still on. -- 8/79

(walkway)
Passage way between walls.

→ located on inside of secondary shield wall. there's a check valve

RT

ADDRESS
MO.

Containment wall welds on penetration
Root passes

Penetrations on the containment wall.

Closure plate to penetration

N11BA7

Bevel on one side and flat surface + proper root pass couldn't be made.

bore scope from AX BD.

Used different configuration from one in procedure
 D.D. justified by saying anything on drawing is
 O.K.

No one doing root passes was satisfied

< Turbine bld. >

Feed-water line, there are 4 heaters.

On one of the heaters, electric pre-heat blankets
 burned out + arced hole into one of the
 heater tank.

4 heaters, nozzle on top, 2 heaters at the
 higher elevation, building West, on top side
 of the nozzle

Wasn't repaired because there was no procedure,
 to stress relieve the whole vessel, so someone
 said

Lee Jones - dept.
 gen. foreman.

Also on some of the heaters, - upper
 heater on the east side - in order to make fit
 packed it 5" with 2 50 ton jack while heater
 already had critical pipe attached

Shot some acceptable welds + stress them

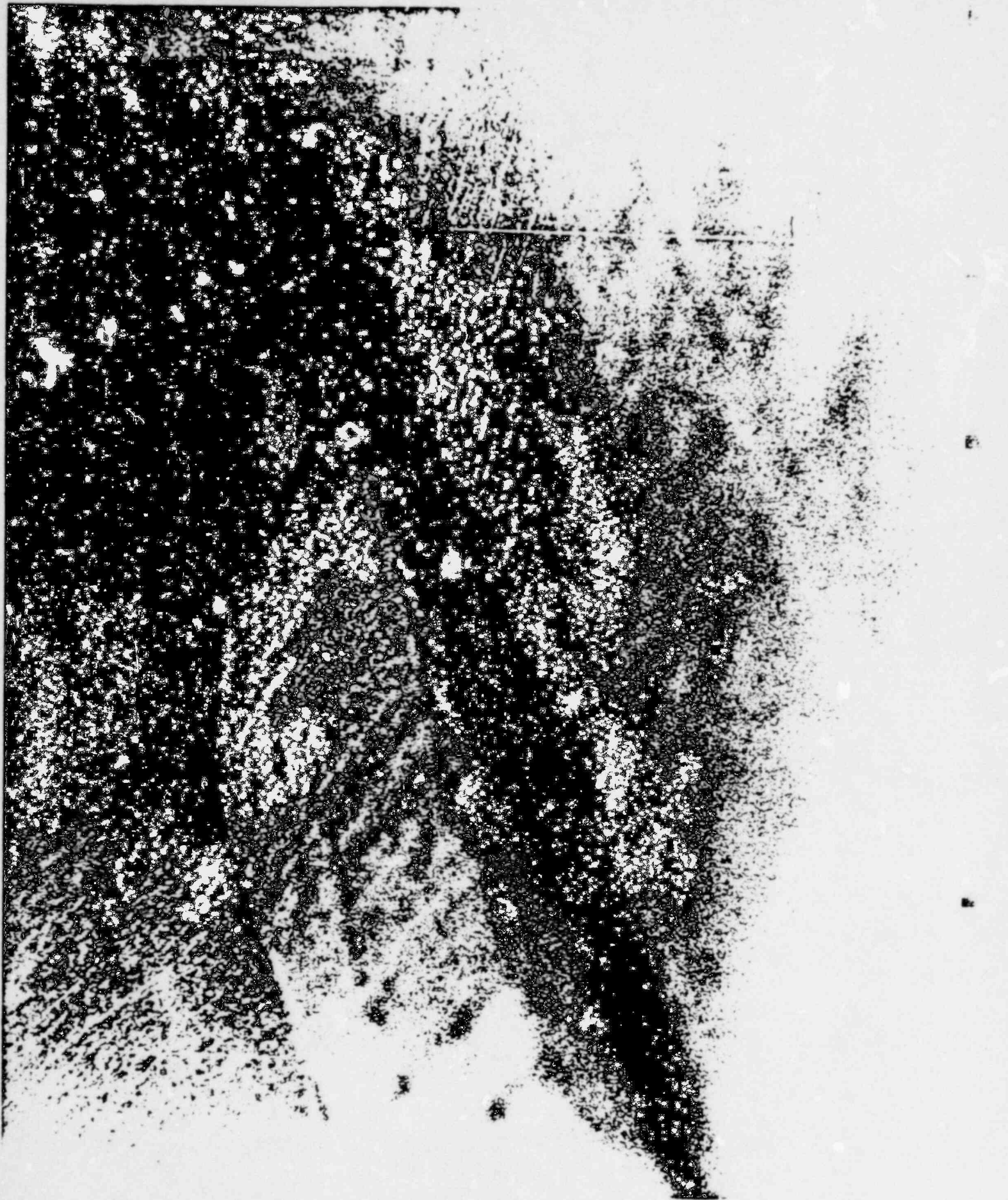
Had pipe attached to heaters + jacked them
up (in those cases welds were already
shot + accepted)

()

wife home at day
evenings after 8.

NCR'S







79-03

790316013

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

March 12, 1979

IE Bulletin No. 79-03

LONGITUDINAL WELD DEFECTS IN ASME SA-312 TYPE 304 STAINLESS STEEL
PIPE SPOOLS MANUFACTURED BY YOUNGSTOWN WELDING AND ENGINEERING COMPANY

Description of Circumstances:

On September 27, 1978, the Arizona Public Service Company reported that defects had been discovered in longitudinal welds in ASME Section III class 2 pipe supplied for the Palo Verde Nuclear Generating Station (PVNGS). On November 17, 1978, the Southern California Edison Company reported similar defects in pipe supplied for the San Onofre Nuclear Generating Station, Units 2 and 3.

Pullman Power Products of Los Angeles, California supplies safety-related fabricated piping spools of various diameters for the PVNGS. The defects were discovered by Pullman in ASME SA-312 type 304 stainless steel pipe supplied to Pullman by Youngstown Welding and Engineering Company of Youngstown, Ohio. The pipe is manufactured by rolling plate into cylinders and then fusion welding the longitudinal seam without filler metal.

Pullman discovered defects in the longitudinal welds while radiographing their circumferential shop welds. Further radiographic examination of the longitudinal welds revealed rejectable porosity and lack of fusion.

Pullman then performed ultrasonic examination of the full length of the longitudinal welds and discovered indications exceeding the acceptance criteria of ASME Section III. Further ultrasonic examination revealed indications in other piping subassemblies where pipe was supplied by Youngstown. Two indications verified by radiography were identified as porosity and measured 0.350 inch by 0.125 inch in one case and 0.300 inch by 0.125 inch in another case in pipe with a nominal wall thickness of 0.375 inch.

The additional examinations revealed that of 103 spools and four pipe supports shipped to PVNGS, 44 spools and one pipe support were found to contain ultrasonic indications exceeding those permitted by the ASME Code. Of 65 partially fabricated piping spools, 30 were found to be similarly defective. The acceptance criteria for the pipe supplied by Youngstown includes 100 percent ultrasonic examination of the longitudinal

1 of 3

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welds in accordance with ASME Section III. The documentation provided with the pipe indicated that the required ultrasonic examination had been performed by Youngstown but the rejectable indications were not identified.

A special inspection was performed at Youngstown by NRC inspectors during the week of January 22, 1979. It was determined that the apparent cause of the identified defects was inadequate control of welding parameters although no specific ASME Code violations could be identified. Youngstown has recently hired a consultant to reevaluate the fusion welding parameters and revised their welding procedures to provide better control of welding current, voltage and travel speed for all material thickness ranges.

Ultrasonic examinations of the pipe welds were performed by a subcontractor to Youngstown. The reason why this subcontractor's ultrasonic testing did not detect indications exceeding ASME Code acceptance criteria was not determined. The piping was known to have been tested in the heat treated condition, prior to the removal of surface oxides. However, a comparison of attenuation of the pipe in as heat treated vs. heat treated and pickled condition did not reveal a discernible difference.

The NRC inspectors could not determine a definite time period during which the welding and ultrasonic testing problems are thought to have existed. All type 304 or 316 SA 312 pipe manufactured before mid-November, 1978 may have been shipped in similar condition. As a large supplier, Youngstown is known to have supplied piping for nuclear applications to the Dravo Corporation, Chicago Bridge and Iron, Flowline Corporation and ITT Grinnell Industrial Piping Inc. In addition, piping was also supplied to material warehousing operations including Albert Pipe Supply, Guyon Alloys Inc., and Allegheny Ludlum Steel Corporation which may have eventually been used in safety-related nuclear applications.

Action to be taken by the Licensees and Permit Holders:

For all power reactor facilities with an operating license or a construction permit:

1. Determine whether ASME SA-312, type 304 or other welded (without filler metal) pipe manufactured by Youngstown Welding and Engineering Company is in use or planned for use in safety-related systems at your facility.

March 12, 1979

2. For those safety-related systems where the subject piping is in use or planned for use, identify the application of the piping including system, pipe location, pipe size and design pressure/temperature requirements.
3. Develop a program for volumetric examination of the longitudinal welds including acceptance criteria for the piping identified in Item 2 above. Describe planned corrective actions if acceptance criteria are not met. If a sampling program is utilized explain the basis for the sample size.
4. For facilities with an operating license, a report of the above actions, including the date(s) when they will be completed shall be submitted within 30 days of receipt of this Bulletin.
5. For facilities with a construction permit, a report of the above actions, including the date(s) when they will be completed shall be submitted within 60 days of receipt of this Bulletin.

Reports should be submitted to the Director of the appropriate NRC Regional Office and a copy should be forwarded to the NRC Office of Inspection and Enforcement, Division of Reactor Construction Inspection, Washington, D.C., 20555.

Approved by GAO, B180225 (R0072); clearance expires 7-31-80. Approval was given under a blanket clearance specifically for identified generic problems.

IE Bulletin No. 79-03
Longitudinal Weld Defects in ASME SA-312 Type 304 Stainless Steel
Pipe Spools Manufactured by Youngstown Welding and Engineering Company

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79-03 A

SSINS No: 6820
Accession No.:
8002280644

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

April 4, 1980

IE Bulletin No. 79-03A

LONGITUDINAL WELD DEFECTS IN ASME SA-312, TYPE 304 STAINLESS STEEL PIPE

Description of Circumstances:

IE Bulletin No. 79-03 required the licensee to determine if ASME SA-312, Type 304 pipe manufactured by Youngstown Welding and Engineering Company is in use or planned for use in safety-related systems. Since the issuance of IE Bulletin 79-03 on March 12, 1979, subsequent findings indicate additional information and clarification is needed to resolve the SA-312 issue.

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.

Based upon the above and previous findings during inspections at Youngstown it has been determined that the Youngstown Welding and Engineering Company did comply with the ASME Code requirements, but that the Code NDE requirements are deficient. Consequently any manufacturers' SA-312, Type 300 Series, austenitic stainless steel fusion welds may contain undetected CLP. This problem is generic to all welded SA-312/A-312 material and is not restricted to material manufactured by the Youngstown Welding and Engineering Company.

The NRC has verified that the CLP condition also exists in the SA-312 and/or A-312 fusion welded pipe manufactured by ARBICO's Advanced Materials Division, the SWEPSCO Tube Corporation and Crucible's Trent Tube Division. These companies are known to have supplied SA-312 and/or A-312 material for nuclear application and are now included within the scope of this Bulletin.

Several Licensee's responses to the IE Bulletin 79-03 were inadequate. The responses were inadequate because they were based on the purchase order NDE requirements rather than the information requested in the Bulletin. An actual example of an inadequate response was as follows: Radiography of a circumferential weld seam revealed CLP in the longitudinal seam of a section of SWEPSCO fusion welded pipe. The licensee did not believe the case was reportable if the original NDE requirements for the SWEPSCO pipe did not require volumetric examination.

This CLP problem is considered by the NRC to be a significant deficiency which requires extensive evaluation and could result in repair or replacement of pipe and/or fittings.

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The information requested in this revised Bulletin is to be provided without regard to the purchase order NDE requirements or any subsequent NDE performed for or by the licensee. The information requests in this Bulletin supersede the requests for information in the IE Bulletin 79-03.

The NRC staff position on this issue and any other case where defects or deficiencies are discovered in safety-related components is as follows: Regardless of the circumstances under which potential deficiencies or potential defects in safety-related components are discovered the matter shall be identified, evaluated, dispositioned, documented and reported in strict accordance with the appropriate Federal Regulations. Although the ASME Code rules and requirements may be used when appropriate to evaluate defects or deficiencies and to justify and accept the existence of a defect or deficiencies, the Code can not be used as justification for not reporting the defect, deficiency and circumstances to the NRC when that defect or deficiency has been identified by the NRC as a potential generic problem. When the licensee, his agent or vendor discovers a defect or deficiency that may be a generic problem or a significant loss deficiency a conservative position shall be adopted regarding the reporting of the situation to the NRC.

For those power reactor facilities that have the subject pipe installed the action identified in this Bulletin is limited to identifying the specific applications and providing information related to the structural integrity of the piping components. Additional guidance related to NDE's and/or precautionary or corrective actions will be provided in a later Bulletin revision if necessary.

Revised action to be taken by Licensees and Permit Holders:

For all power reactor facilities with an operating license or a construction permit:

1. Determine whether SA-312 or A-312, Type 300 Series fusion welded pipe is in use or planned for use in safety-related systems subject to design stresses greater than 85 percent of the Code allowable stresses. For the purpose of this check the actual wall thickness of the piping products will be considered adequate if the code requirements for pressure design of the piping products are satisfied using 85 percent of the maximum allowable stress at the design temperature.
2. For those piping components using greater than 85 percent of the allowable stresses identify the application of the piping including the system, pipe location, pipe size, pipe configuration (elbow, tee), design pressure/temperature requirements and the manufacturer.
3. For those facilities under construction and where access permits, the ends of all safety-related SA-312 and A-312 fusion welds should be etched to determine if CLP exists. Identify the manufacturer and the degree of CLP as a percentage of the pipe wall thickness.

4. For facilities with an operating license, a report of the above information shall be submitted within 120 days of receipt of this Bulletin.
5. For facilities with a construction permit, a report of the above information shall be submitted within 120 days of receipt of this Bulletin.

Reports should be submitted to the Director of the appropriate NRC Regional Office and a copy should be forwarded to the NRC Office of Inspection and Enforcement, Division of Reactor Construction Inspection, Washington, D.C. 20555.

Approved by GAO, B180225 (R0072); clearance expires 7/31/80. Approval was given under a blanket clearance specifically for identified generic problems.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

APR 9 1980

MEMORANDUM FOR: B. H. Grier, Director, RI
J. P. O'Reilly, Director, RII
J. G. Keppler, Director, RIII
K. V. Seyfrit, Director, RIV
R. H. Engelken, Director, RV

FROM: Harold D. Thornburg, Director, Division of Reactor Construction
Inspection, IE

SUBJECT: INTERPRETATION OF IE BULLETIN 79-03A

Several questions have been raised regarding Bulletin 79-03A. We are not planning to revise the Bulletin, but we are providing the following interpretations so that all Regions respond with a consistent answer if the same questions are asked by licensees.


1. Does the Bulletin also apply to SA 312 pipe welded from one side?

Since you can not produce centerline lack of penetration (CLP) welding from one side, the Bulletin does not apply.

2. Does Item 3 on page 2 apply to all safety-related SA 312 fusion welds or just those in components subject to design stresses greater than 85 percent of the Code allowable stresses?

Item 3 applies only to those components subject to design stresses greater than 85 percent of the Code allowable stresses.

If you find other clarifications are necessary please advise.


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