Central File

**AMERICAN ELECTRIC POWER** *Service Corporation*

AEP

*2 Broadway, New York, N. Y. 10004*
*(212) 440-9000*

*JOHN E. DOLAN*
*Vice Chairman*
*Engineering and Construction*
*(212) 440-8200*

September 6, 1979
AEP:NRC:00255

Donald C. Cook Nuclear Plant Unit Nos. 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
Response to IE Bulletin 79-17

Mr. J. G. Keppler, Regional Director
U.S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Mr. Keppler:

This letter responds to your letter dated July 26, 1979 which transmitted to us IE Bulletin 79-17 entitled "Pipe Cracks in Stagnant Borated Water Systems at PWR Plants." As required by this Bulletin, we have conducted a review of safety-related stainless steel piping systems and have identified those portions of systems which contain stagnant borated water and have tabulated these portions of systems in Attachment 1. The list presented in our response dated April 15, 1977 to IE Circular 76-06 has been expanded to include minor branch connections and bypass loops which are appendages to these safety-related systems.

Response to Item 1(a) of IE Bulletin No. 79-17

The non-destructive examination (NDE) plan for the D. C. Cook Nuclear Plant Units 1 and 2 is in accordance with the ASME Code Section XI which requires NDE for only the Class 1 portions of the identified piping lines.

Preservice NDE was performed in October 1974 and December 1977 for Units 1 and 2, respectively. Scheduled inservice inspections for Unit 1 were performed in January 1977 and April 1979. The first inservice inspection (ISI) for Unit 2 is scheduled for November 1979. Tables 1 and 2 of Attachment 2 show the extent of the preservice and inservice NDE inspections for each Unit.

7910 030 118

SEP 11 1979

A02

NDE procedures for ultrasonic and visual examinations used in the 1977 and 1979 ISI's were issued by Southwest Research Institute (SWRI). The 1977 ISI procedures met the requirements of the 1971 Edition of ASME Code Section XI with Addenda through Winter 1971, and the 1979 ISI procedures were written in accordance with the 1974 Edition of the ASME Code Section XI with Addenda through Summer 1975. The information requested concerning the NDE procedures, procedure qualifications and acceptance criteria is given in Attachment 3 of this response.

No indications were observed during examination of piping systems containing stagnant borated water which resulted from other than geometric configurations of the weld joints.

In response to IE Circular 76-06, hydrostatic leak tests were conducted in Unit 1 in September 1977 on those piping lines identified in note 1 of Attachment 1. These tests were conducted in accordance with the 1974 Edition of ASME Code Section XI with Addenda through Summer 1975. The results of these tests are acceptable. These tests have been scheduled to be performed on Unit 2 as part of our ISI program.

Response to Item 1(b) of IE Bulletin No. 79-17

The portions of piping systems identified in Attachment 1 are part of or are appendages of systems in which water chemistry is monitored and controls are maintained. The results of sampling these systems have been acceptable. Attachment 4 to this letter provides a summary of typical water chemistry data taken in the Boric Acid Storage Tanks (BAST), the Boron Injection Tanks (BIT), the Residual Heat Removal (RHR) systems and the Demineralized Water System.

Response to Item 1(c) of IE Bulletin No. 79-17

The preservice NDE included visual, surface and volumetric examinations of ASME Code Class 1 components in accordance with the 1971 Edition of ASME Code Section XI with Addenda through Winter 1971. The acceptance criteria were per Article IS-311 of that Code Edition.

Response to Item 1(d) of IE Bulletin No. 79-17

A review of plant records for both Units 1 and 2 shows no evidence of work done to repair cracking in the piping lines identified in Attachment 1.

Very truly yours,

John E. Dolan
Vice Chairman

JED:clb
attachments

cc: (attached)

cc: Norman C. Moseley - NRC
R. C. Callen
G. Charnoff
D. V. Shaller - Bridgman
R. S. Hunter
R. W. Jurgensen

The portions of safety-related piping systems in the Cook Nuclear Plant containing Boric Acid solution which come under the criteria of not being frequently flushed or containing non-flowing liquids are:

1) Accumulator to Reactor Coolant System Cold Leg.
2) Boron Injection Tank to Reactor Coolant System.
3) Refueling Water Storage Tank to CVCS.
4) RHR Valves ICM 305 & 306 to Pumps.
5) RHR Pump Suction to Containment Spray Pump Suction.
6) Spray Additive Tank to Containment Sprays.
7) Crosstie Safety Injection to CVCS.
8) Crosstie RHR to CVCS.
9) RHR to Containment Spray Valves IMO 330 & 331.
10) Safety Injection to Reactor Coolant System Cold Leg.
11) Safety Injection to Reactor Coolant System Hot Leg.
12) RHR to Reactor Coolant System Cold Leg.
13) RHR to Reactor Coolant System Hot Leg.
14) Blender Makeup to Refueling Water Storage Tank (RWST).
15) Refueling Water Storage Tank to Purification Pump.
16) Purification Filter to RWST.
17) ECCS Check Valve Leakage Testing Lines.
18) RHR return to RWST.
19) Crosstie RHR to SI.
20) Charging Pump Discharge to Boron Injection Tank.
21) RHR Hot Leg return.
22) RHR Cold Leg Cooldown line.

23) RHR Heat Exchanger (East & West) Outlet to Cold Leg Cooldown line.

24) RHR Pump Discharge Crosstie.

25) Boron Injection Tank bypass.

26) Test Line to Spray Additive Tank.

27) RHR Heat Exchanger Outlet Crosstie.

28) Alternate RCP Seal Injection.

29) RCP Seal Filter bypass.

Notes:

1) Piping systems 1 through 19 were hydrostatically leak-tested in Unit 1 during September 1977.

2) Modifications were made to system 16 in Unit 2. This system is no longer stagnant.

DONALD C. COOK NUCLEAR PLANT
UNITS 1 & 2
Response to IE Bulletin 79-17

AEP: NRC: 00255
Attachment 2

TABLE 1

LIST OF COOK-1 CLASS 1 PIPING CIRCUMFERENTIAL WELDS IN PORTIONS OF SYSTEMS CONTAINING STAGNANT BORATED WATER

| ITEM* | DESCRIPTION | SIZE | NO. OF WELD EXAMS PSI 3/73-10/74 (VT/UT) | NO. OF WELD EXAMS ISI 1977 (VT/UT) | NO. OF WELD EXAMS ISI 1979 (UT) |
|---|---|---|---|---|---|
| 11 | ECCS-RHR (LHSI) to Hot Leg | 8"D. .812"T<br>6"D. .718"T | 6<br>90 | 0<br>7 | 0<br>7 |
| 12 | RHR to RCS Cold Leg | 8"D. .812"T | 7 | 0 | 0 |
| 1 | ECCS-SIS (Accum. Inj.) Cold Legs | 10"D. 1.000"T | 111 | 10 | 11 |
| 10 | ECCS-RHR (LHSI) Cold Leg | 6"D. .718"T | 5 | 0 | 0 |
| 2 | B.I.T. to RCS | 1-1/2"D. Socket Welds | 102 (VT/PT) | 9 (VT/PT) | 8 (PT) |
| 21 | RHR Hot Leg Return | 14"D. 1.406"T | 9 | 2 | 2 |

*REFERENCE TO ITEMS - ATTACHMENT 1

# TABLE 1

## COOK - 1 PIPING CIRCUMFERENTIAL WELD LIST -(CONTINUED)

NOTES:

1. Listing Includes Circ. Welds Only.
2. All Areas Listed Are Within R.C.P.B., Safety Class 1, Unit 1.
3. Areas Listed Are Applicable To Items 1.A and 1.C of I.E. Bulletn 79-17.
4. PSI Examinations In Accordance With ASME XI 71W71.
5. No Reportable UT Or PT Indications. VT Revealed ARC Strikes and Gouges Which Were Repaired/Resolved.

TABLE 2

LIST OF COOK-2 CLASS 1 PIPING CIRCUMFERENTIAL WELDS IN PORTIONS OF SYSTEMS CONTAINING STAGNANT BORATED WATER

| ITEM* | DESCRIPTION | SIZE | NO. OF WELD EXAMS PSI 5/77-10/77 (VT/UT) |
|---|---|---|---|
| 11 | ECCS-RHR (LHSI) to Hot Leg | 8" D. .812" T.<br>6" D. .718" T. | 22<br>69 |
| 12 | RHR to RCS Cold Leg | 8" D. .812" T. | 8 |
| 1 | ECCS-SIS (Accum. Inj.) to Cold Legs | 10" D. 1.000" T. | 91 |
| 10 | ECCS-RHR (LHSI) to Cold Legs | 6" D. .718" T. | 25 |
| 2 | B.I.T. to RCS | 1-1/2"D. Socket Welds | 123(VT/PT) |
| 21 | RHR Hot Leg Return | 14" D. 1.406" T. | 21 |

NOTES:

1. Listing Includes Circ. Welds Only.
2. All Areas Listed Are within R.C.P.B., Safety Class 1, Unit.2.
3. Areas Listed Are Applicable To Items 1.A and 1.C of I. E. Bulletin 79-17.
4. PSI Examinations In Accordance With ASME XI-71W71.
5. No Reportable UT Or PT Indications. VT Revealed Arc Strikes And Gouges Which Were Repaired/Resolved.

* REFERENCE TO ITEMS - ATTACHMENT NO. 1

## DESCRIPTION & QUALIFICATION OF NDE PROCEDURES

Ultrasonic (UT) examinations were performed in accordance with SWRI Procedure No. 600-3, "Manual Ultrasonic Examination of Pressure Piping Welds." Revision No. 25 of this procedure was used in 1977 and Revision 52 was used in 1979. In both cases the examinations consisted of attenuation and thickness measurements upstream and downstream of the weld. Longitudinal wave scans for laminations were performed prior to shear wave scans over the volume to be examined by shear wave. Both 45 and 60 degree shear waves ($\pm$ 2 degrees) were directed from both sides, perpendicularly to the weld, to include a volume of one wall thickness of base metal. Where examination from one side of the weld was not feasible, a longitudinal wave examination was performed on the volume not covered by shear wave. The shear wave scan was made at a 45 degree angle clockwise and counter-clockwise from the weld surface in all cases. The shear wave search unit utilized a 1/2" round or 1/2" x 1/2", 1.5 MHz transducer. The scanning technique required a 10 percent minimum coverage overlap at a six inches per second maximum rate. Scanning was performed at two times the calibrated reference level sensitivity. All UT indications of an amplitude greater than or equal to 50% of the distance amplitude correction curve (DAC) were recorded. Any indications, irrespective of amplitude, suspected by the examiner to have originated from other than geometric reflectors were recorded and investigated. All indications greater than or equal to 100% of DAC and those suspected by the examiner to have originated from other than geometric reflectors were investigated to the extent necessary to determine the reflector's shape, size, identity and location. The acceptance criteria specified in all NDE procedures are in accordance with Article IS-311 (for the 1977 ISI) or Article IWA-3000 (for the 1979 ISI).

The SWRI NDE procedures used were qualified in accordance with SWRI Operating Procedure No. IX-FE-107. Procedure 600-3, Revision 25, was qualified by code reference (1971 Edition of ASME Code Section XI, III, and V with Addenda through Winter 1971), by calibration, and by detection of confirmed flaws. Procedure 600-3 Revision 52 was qualified by code reference (1974 Edition of the ASME Code Section XI, III, and V with Addenda through Summer 1975), by calibration, and by similarity to Revision 25.

# TYPICAL ANALYTICAL DATA

## "N" BAST

| BORON | $Cl^-$ |
|---|---|
| 22175 | ≤1.0 PPM |
| 21425 | |
| 21962 | |
| 21630 | |
| 21470 | |
| 21443 | |
| 21896 | |
| 21507 | |
| 20758 | |
| 21077 | <1.0 PPM |
| 21539 | |

## "M" BAST

| BORON | $Cl^-$ |
|---|---|
| 21285 | ≤1.0 PPM |
| 21235 | |
| 21062 | |
| 20828 | |
| 21026 | |
| 20630 | |
| 21726 | |
| 21387 | |
| 21314 | |
| 21290 | <1.0 PPM |
| 21178 | |

## "S" BAST

| BORON | $Cl^-$ |
|---|---|
| 20776 | ≤1.0 PPM |
| 20806 | |
| 20934 | |
| 20717 | |
| 20618 | |
| 20416 | |
| 21428 | |
| 20586 | |
| 20458 | |
| 20097 | ≤1.0 PPM |
| 20684 | |

## UNIT 1 BIT

| BORON | $Cl^-$ |
|---|---|
| 21709 | ≤1.0 PPM |
| 21536 | |
| 21405 | |
| 21264 | |
| 21064 | |
| 21215 | |
| 21199 | |
| 20931 | |
| 21013 | |
| 21199 | ≤1.0 PPM |
| 21254 | |

## UNIT 2 BIT

| BORON | $Cl^-$ |
|---|---|
| 20691 | ≤1.0 PPM |
| 20754 | |
| 20762 | |
| 20667 | |
| 20959 | |
| 20672 | |
| 21218 | |
| 21914 | |
| 21958 | |
| 21105 | ≤1.0 PPM |
| 21070 | |

## DEMINERALIZED WATER

| pH | $Cl^-$ | $F^-$ | $O_2$ (ppb) | Boron |
|---|---|---|---|---|
| 6.60 | ≤.05 PPM | ≤0.05 PPM | 15 ppb | not run |
| 7.80 | | | 10 | |
| 7.20 | | | 10 | |
| 7.70 | | | 10 | |
| 7.80 | | | 10 | |
| 7.95 | | | 10 | |
| 7.80 | | | 10 | |
| 6.95 | | | 10 | |
| 7.20 | | | 10 | |
| 6.85 | | | 10 | |
| 7.39 | | | 10.5 | |

| RHR UNIT 1 | | | | RHR UNIT 2 | | | |
|---|---|---|---|---|---|---|---|
| pH | $Cl^-$ | $F^-$ | Boron | pH | $Cl^-$ | $F^-$ | Boron |
| 5.80 | ≤0.05 PPM | ≤0.05 PPM | 2151 | 6.6 | ≤0.05 PPM | ≤0.05 PPM | 978 |
| 5.60 | | | 2157 | 6.6 | | | 980 |
| 5.80 | | | 2149 | 6.6 | | | 981 |
| 5.57 | | | 2144 | 6.55 | | | 978 |
| 5.6 | | | 2115 | 6.70 | | | 968 |
| 5.85 | | | 2154 | 6.78 | | | 977 |
| 5.60 | | | 2152 | 6.60 | | | 966 |
| 5.8 | | | 2152 | 6.80 | | | 981 |
| 5.6 | | | 2115 | 6.50 | | | 964 |
| 5.6 | ≤0.05 PPM | ≤0.05 PPM | 2142 | 6.68 | ≤0.05 PPM | ≤0.05 PPM | 952 |
| 5.68 | | | 2143 | 6.64 | | | 973 |