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August 28, 1979

United States Nuclear Regulatory Commission
Attention: Boyce H. Grier, Director
Region I
631 Park Avenue
King of Prussia, Pennsylvania 19406

Reference: Beaver Valley Power Station, Unit No. 1
Docket No. 50-334
License No. DPR-66
Response To IE Bulletin 79-17

Dear Mr. Grier:

We have reviewed IE Bulletin 79-17 concerning systems or portions of safety related stainless steel piping systems which contain stagnated oxygenated borated water. At Beaver Valley Power Station, these systems include the Residual Heat Removal System, Containment Depressurization Systems, Safety Injection System, and the Fuel Pool Cooling System.

A detailed listing of the stagnated oxygenated borated lines for each of the systems is included in Tables I through V of Attachment I. The tables identify three types of stagnant lines, i.e. 1) Emergency Core Cooling Lines (ECCS), stagnant; 2) ECCS lines, stagnant but flushed approximately once per month; and 3) Safety-Related, non-ECCS lines, stagnant. The tables also list the Beaver Valley Power Station flow diagrams, the specific pipe line numbers, the number of welds in each line, and the preservice and inservice inspections that were performed on each line.

As requested by the Bulletin, a discussion of the Preservice and Inservice Inspection programs, the Chemistry Controls and Hydrotests of the systems with stagnated lines have been included as Attachments I, II and III, respectively.

Since preservice and/or inservice inspections have not been performed on some of the stagnated lines, the station is developing a sample inspection program to meet the requirements of Item 2 of the Bulletin.

If you have any questions regarding this response, please contact my office.

Very truly yours,

C. N. Dunn
Vice President, Operations

Attachments

cc: United States Nuclear Regulatory Commission
Director, Division of Operating Reactors
Office of Inspection and Enforcement
Washington, D. C. 20555

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DUQUESNE LIGHT COMPANY
Beaver Valley Power Station
Unit No. 1

ATTACHMENT I to
RESPONSE TO IE BULLETIN 79-17

Inservice And Preservice Inspection

During September of 1978, Inservice Inspection (ISI) was performed by Westinghouse in accordance with the requirements of the ASME Code, Section XI, the 1974 Edition up to and including the summer addenda of 1975. At that time, specific welds in portions of piping systems containing stagnant, oxygenated borated water were inspected. The number of welds inspected in each system was based on the sampling plan established by Westinghouse in accordance with the ASME Section XI requirements. Non-Destructive Testing (NDT) in the ISI program included visual, surface (Liquid Penetrant - PT) and Volumetric (Ultrasonic - UT) examinations. Testing equipment, procedures and personnel were provided by Westinghouse and were part of their qualified program.

Two (2) systems that are identified as containing stagnant, oxygenated boric acid environments were subjected to the ISI evaluation during 1978, i.e. the Residual Heat Removal (RHR) and Safety Injection System (SIS). As a rule, all butt welds 2 inches and larger, that were selected as part of the sampling plan, were both visually and UT inspected. However, on two (2) different welds, the surface contour was such that a meaningful UT could not be obtained and these welds received a PT as well as a visual inspection. Also, socket welds on 2 inch lines were visually and PT inspected while lines less than 2 inches received no ISI evaluation. Tables I, III and IV (which follow this attachment) provide a breakdown of plant systems and specific line numbers, as well as the number of welds inspected during the initial phase of the ISI program for the aforementioned two systems. It should be noted that no reportable UT or PT indications were detected in either the RHR or SIS systems.

Concerning acceptance criteria for ISI, our July 24, 1978 transmittal to the Commission stated:

> "Standards for examination evaluations as included in the 1974 Edition of Section XI with Addenda through the Summer, 1975, are incomplete and "Acceptance Standards for Flaw Indications" as given in Article IWB-3000 of the 1977 Edition of Section XI will be utilized."

This was the guideline used for acceptance of flaw indications during the September, 1978 ISI program.

Preservice inspection was performed by Westinghouse from March, 1975 through October, 1975. Non-Destructive Testing (visually, PT and UT) was conducted in accordance with the FSAR and ASME Code Section XI, the 1971 Edition including the Winter and Summer addenda of 1971. All 2 inch and larger butt welds were UT and visually inspected while 2 inch socket welds were PT and visually inspected with no preservice on lines less than 1 inch. Tables I, III and IV provide a breakdown of plant systems and specific line numbers as well as the total number of welds in each line that were preservice inspected.

Beaver Valley Power Station, Unit No. 1
Docket No. 50-334
Response To IE Bulletin 79-17
ATTACHMENT I DUQUESNE LIGHT COMPANY
Beaver Valley Power Station

TABLE I

RM38A - Flow Diagram Of Residual Heat Removal System

Line No.	Preservice	No. Of Welds Inspected (Total)	Inservice	No. Of Welds
14"-RH-1-1502-Q1	Yes	13/13		
14"-RH-2-602-Q2				
14"-RH-18-602-Q2			Yes	2
12"-RH-6-602-Q2			Yes	3
12"-RH-9-602-Q2				
12"-RH-12-602-Q2			Yes	2
10"-RH-4-602-Q2			Yes	1
10"-RH-5-602-Q2			Yes	2 (one 8" weld on 10" x 8" Reducer)
10"-RH-7-602-Q2				
10"-RH-8-602-Q2				
10"-RH-10-602-Q2				
10"-RH-19-602-Q2				
10"-RH-23-1502-Q1	Yes	6/6	Yes	1
10"-RH-24-1502-Q1	Yes	8/8		
10"-RH-17-602-Q2			Yes	1
6"-RH-14-152-Q2			Yes	1
4"-RH-25-152-Q2				
2"-RH-3-602-Q2				
2"-RH-26-602-Q2				
1 1/2"-RH-11-602-Q2				

NOTE: All lines listed above are identified as being stagnant, ECCS.

For the Preservice and Inservice Inspection columns, if no information appears, no inspections were performed.

TABLE II

RM35A - Flow Diagram For Containment Depressurization System

Line No.	Key
1 1/2"-QS-7-152	II
2"-FC-37-152-Q3	III
4"-QS-6-153B-Q3	II
4"-QS-34-152	II
4"-QS-35-152	II
10"-QS-3-153B-Q3	I
10"-QS-4-153B-Q3	I
12"-QS-1-153B-Q3	II
12"-QS-2-153B-Q3	II
6"-FC-3-152	III
6"-RS-29-153B-Q2*	I
6"-RS-30-153B-Q2*	I

KEY: I - ECCS, stagnant
II - ECCS, periodic flush (approximately once per month)
III - Non-ECCS lines, stagnant

* = Hydrotested; see Attachment III.

NOTE: For the Preservice and Inservice Inspection columns, if no information appears, no inspections were performed.

TABLE III

RM41A - Flow Diagram For Safety Injection System, Sheet 1

Line No.	Key	Preservice	No. Of Welds Inspected (Total)	Inservice	No. Of Welds
2"-SI-36-153W-Q2*	II				
2"-SI-37-153W-Q2*	II				
3"-SI-31-153W-Q3	II				
3"-SI-35-152-Q3	II				
3"-SI-56-1503-Q2*	I				
3"-SI-57-1503-Q1	I				
3"-SI-57-1503-Q2	I				
3"-SI-60-1503-Q2*	I				
3"-SI-81-1503-Q1*	I				
3"-SI-130-1503-Q1	I	Yes	14/14		
3"-SI-133-1503-Q2*	I				
3"-SI-134-1503-Q1	I	Yes	13/13		
3"-SI-140-1503-Q1	I				
3"-SI-141-1503-Q2	I				
3"-SI-145-153W-Q3	II				
4"-SI-75-1503-Q2*	I				
4"-SI-128-1503-Q2	I				
6"-SI-33-1502-Q1	I				
6"-SI-34-1502-Q1	I				
6"-SI-40-153W-Q2*	I				
6"-SI-44-153W-Q2*	I				
8"-SI-2-153W-Q3	II				
10"-SI-16-153W-Q2*	I				
10"-SI-18-1502-Q1	I				
10"-SI-26-153W-Q2*	I				
10"-SI-27-153W-Q2	I				
10"-SI-28-1502-Q1	I				
10"-SI-15-1502-Q1	I				
10"-SI-17-153W-Q2*	I				

* = Hydrotested; see Attachment III.

KEY: I - ECCS lines, stagnant

II - ECCS lines, periodic flush (approximately once per month)

NOTE: For the Preservice and Inservice Inspection columns, if no information appears, no inspections were performed.

Beaver Valley Power Station, Unit No. 1
Docket No. 50-334
Response To IE Bulletin 79-17
ATTACHMENT I

DUQUESNE LIGHT COMPANY
Beaver Valley Power Station

TABLE III

RM41A - Flow Diagram For Safety Injection System, Sheet 2

Line No.	Key	No. Of Welds Preservice	Inspected (Total)	Inservice	No. Of Welds
12"-SI-1-153W-Q3	II				
12"-SI-5-153A-Q2	II				
12"-SI-6-153A-Q2	II				
12"-SI-7-153A-Q2	I				
12"-SI-8-153A-Q2	I				

* = Hydrotested; see Attachment III.

Key: I - ECCS lines, stagnant

II - ECCS lines, periodic flush (approximately once per month)

NOTE: For the Preservice and Inservice Inspection columns, if no information appears, no inspections were performed.

DUQUESNE LIGHT COMPANY
Beaver Valley Power Station

TABLE IV

RM41B - Flow Diagram For Safety Injection System, Sheet 1

Line No.	Preservice	No. Of Welds Inspected (Total)	Inservice	No. Of Welds Inspected
2"-SI-21-1502-Q1	Yes	5/5	Yes	4
2"-SI-22-1502-Q1*	Yes	19/19		
2"-SI-23-1502-Q1	Yes	11/11		
2"-SI-83-1502-Q1	Yes	2/2	Yes	2
2"-SI-84-1503-Q1				
2"-SI-85-1502-Q1	Yes	2/2		
2"-SI-86-1503-Q1				
2"-SI-87-1502-Q1	Yes	2/2		
2"-SI-102-1503-Q1	Yes	12/12		
2"-SI-104-1503-Q1	Yes	10/10		
2"-SI-106-1503-Q1	Yes	14/14		
2"-SI-82-1503-Q1				
3"-SI-81-1503-Q1				
3"-SI-130-1503-Q1	Yes	14/14		
3"-SI-134-1503-Q1	Yes	13/13		
3"-SI-140-1503-Q1				
6"-SI-19-1502-Q1				
6"-SI-20-1502-Q1	Yes	27/27	Yes	6
6"-SI-29-1502-Q1	Yes	22/22		
6"-SI-30-1502-Q1	Yes	20/20		
6"-SI-32-1502-Q1				
6"-SI-33-1502-Q1				
6"-SI-34-1502-Q1				
6"-SI-72-1502-Q1	Yes	16/16	Yes	5
6"-SI-73-1502-Q1	Yes	20/20		
6"-SI-74-1502-Q1	Yes	23/23		
12"-SI-101-1502-Q1	Yes	28/28		

* = Hydrotested; see Attachment III.

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NOTE: All lines listed above are identified as being stagnant, ECCS.

For the Preservice and Inservice Inspection columns, if no information appears, no inspections were performed.

DUQUESNE LIGHT COMPANY
Beaver Valley Power Station

TABLE IV

RM41B - Flow Diagram For Safety Injection System, Sheet 2

Line No.	Preservice	No. Of Welds Inspected (Total)	Inservice	No. Of Welds Inspected
12"-SI-108-602-Q2				
12"-SI-110-602-Q2				
12"-SI-111-1502-Q1	Yes	22/22		
12"-SI-120-602-Q2				
12"-SI-121-1502-Q1	Yes	23/23	Yes	6

* = Hydrotested; see Attachment III.

NOTE: All lines listed above are identified as being stagnant, ECCS.

For the Preservice and Inservice Inspection columns, if no information appears, no inspections were performed.

Beaver Valley Power Station, Unit No. 1
Docket No. 50-334
Response To IE Bulletin 79-17
ATTACHMENT I

DUQUESNE LIGHT COMPANY
Beaver Valley Power Station

TABLE V

RM31A - Fuel Pool Cooling

Line No.
2"-FC-37-152-Q3
6"-FC-2-152-Q3
6"-FC-4-152-Q3
6"-FC-5-152-Q3
6"-FC-8-152-Q3
6"-FC-9-152-Q3
6"-FC-31-152-Q3
10"-FC-1-152-Q3

NOTE: All the above lines are identified as stagnant, non-ECCS.

For the Preservice and Inservice Inspection columns, if no information appears, no inspections were performed.

DUQUESNE LIGHT COMPANY
Beaver Valley Power Station
Unit No. 1

ATTACHMENT II to
RESPONSE TO IE BULLETIN 79-17

Chemistry Control Of Stagnated, Oxygenated, Borated Systems

The following provides a brief description of the chemistry controls and samplings that are performed on the systems which contain the stagnant lines. The stagnant lines, as such, are not sampled; however, several of the tanks in the systems are sampled and this information is summarized below:

1. Residual Heat Removal (RHR) System

The RHR system is only sampled when the system is in operation. Chemistry controls are maintained on F^- (sampled 3 times per week, less than .15 ppm) and Cl^- (sampled 3 times per week, less than .15 ppm). Conductivity, pH, and boron concentrations are monitored daily. Lithium concentration is monitored 3 times per week and is normally maintained between 0.7 ppm and 2.2 ppm. The oxygen concentration is monitored 3 times per week but is only controlled just prior to reactor heatup when hydrazine treatment is used to maintain the oxygen level at less than 0.1 ppm.

Data Summary:

- pH (dependent on boron and lithium concentration): typical 4.0 - 7.0
- Conductivity (dependent on boron, pH, Li and oxygen): less than 40 µmho
- Boron (as indicated by Operations): usually less than 2000 ppm
- Oxygen: Saturated
- Flourides: less than .02 ppm
- Chlorides: less than .05 ppm
- Lithium: 0.7 ppm - 2.2 ppm

2. Refueling Water Storage Tank (RWST)

The RWST is monitored weekly for boron (2000 - 2100 ppm) and once every two weeks for te following species: pH (4.0 - 4.7); conductivity, Cl^- (less than .15 ppm); F^- (less than .15 ppm); and sodium. Sodium inleakage from the Quench Spray Chemical Addition Tank [QS-TK-2] results in pH higher than the normal band and the tank is recirculated through the fuel pool ion exchanger to control the sodium levels after inleakage has been found. The tank is vented to the atmosphere and is, therefore, oxygen-saturated.

Data Summary:

- pH: 4.0 - 4.7, but during sodium inleakage, as high as 5.50
- Boron: 2000 - 2100 ppm
- Conductivity: less than 10 µmho
- F^-: less than 0.02 ppm
- Cl^-: less than 0.05 ppm
- Sodium: Values as high as 1.2 ppm have been found
- Oxygen: Saturated

DUQUESNE LIGHT COMPANY
Beaver Valley Power Station
Unit No. 1

ATTACHMENT II to
RESPONSE TO IE BULLETIN 79-17

Chemistry Control Of Stagnated, Oxygenated, Borated Systems (continued)

3. Safety Injection Accumulators

The accumulators are monitored at least once per month for boron concentration (1900 - 2100 ppm). Since they are refilled from the RWST, it is felt that the RWST chemistry is typical of the accumulator chemistry. Prior to the spring of 1979, there was no upper limit on the boron. The highest boron recorded was 2180 ppm. A 600 psi nitrogen blanket is maintained on the accumulators; therefore, no additional oxygen other than that already present from the RWST can enter the solution.

No chemistry data other than boron concentration exists for the accumulators.

4. Boron Injection Tank

The Boron Injection Tank (BIT) is monitored weekly for boron (20,000 - 22,500 ppm) and chlorides. Detectable chloride (.05 ppm) has yet to be found in the BIT. Since the tank is normally vented, it is assumed to be oxygen-saturated.

5. Boric Acid Storage Tanks

The three Boric Acid Storage Tanks [CH-TK-1A], [CH-TK-1B], and [BR-TK-7] are monitored weekly for boron (7000-7700 ppm), Cl^- (less than 0.15 ppm) and F^- (less than 0.15 ppm). The tanks are vented to the atmosphere, so they are assumed to be oxygen-saturated. Flourides have never been detected (less than 0.02 ppm) however chlorides have occassionally been as high as 0.1 ppm.

6. Fuel Pool Cooling System

No sampling is performed on the fuel pool cooling system since the system is not presently in use.

DUQUESNE LIGHT COMPANY
Beaver Valley Power Station
Unit No. 1

ATTACHMENT III to
RESPONSE TO IE BULLETIN 79-17

Hydrostatic Tests Of Stagnant, Oxygenated, Borated Systems

The piping systems at the Beaver Valley Power Station were installed and hydrostatically tested to the requirements of ANSI B.31.1, i.e. 150% of design pressure. Initial hydrotests were performed on all system Q piping during plant construction, prior to power operation (no boric acid in piping at the time). Hydrotests subsequent to power operation were a result of either repair welding and/or component replacement. To date, only several small sections of the stagnated piping have undergone an additional hydrostatic test. The specific lines which were subjected to the additional hydro are shown in Tables I through Table V of Attachment I to this response. The stagnated piping exposed to the additional hydro was within the hydro boundary of the repair weld or component replacement. Only those welds involved in the specific repair were NDT evaluated. The remainder of the original system welds within the hydro boundary were not NDT evaluated.