Murray Selman
Vice President

Consolidated Edison Company of New York, Inc.
Indian Point Station
Broadway & Bleakley Avenue
Buchanan, NY 10511
Telephone (914) 737-8116

USNRC-DS

1987 OCT 17 A 10: 09

October 8, 1987

Re: Indian Point Unit No. 2
Docket No. 50-247

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: PWR Erosion-Corrosion Questionnaire (Revision)

By letter dated September 18, 1987, Con Edison responded to your July 20, 1987 request that we complete a PWR Erosion-Corrosion Questionnaire. That response, in part, provided information based upon the original design reactor power for Indian Point Unit 2 (IP-2) and does not reflect current IP-2 operations. The numbers currently submitted reflect our current license limit of 2758 MW thermal (core). Accordingly, a revised heat balance diagram is provided with revised values for items B.1, B.3, and B.5.

If you or your staff have any questions, please contact us.

Very truly yours,

Murray Selman

Attachments

cc: Mr. William Russell
Regional Administrator - Region I
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

Ms. Marylee M. Slosson
Project Directorate I-1
Division of Reactor Projects I/II
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 38
Buchanan, NY 10511

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ATTACHMENT I

PWR EROSION - CORROSION QUESTIONNAIRE

Consolidated Edison Company of New York, Inc.
Indian Point Unit No. 2
Docket No. 50-247
October 8, 1987

ENCLOSURE

PWR EROSION-CORROSION QUESTIONNAIRE
(Check or Circle All Applicable)

Utility Company: Consolidated Edison Unit Name: Indian Point 2 Maximum Dependable Cap. MWe 900 MWe Gross

Filled by: Branislav A. Raskovic Date: 09/02/87 Phone No. (914) 526-5365

In service: 1973 Water Treatment: AVT with ammonia, ~~morpholine~~, hydrazine.

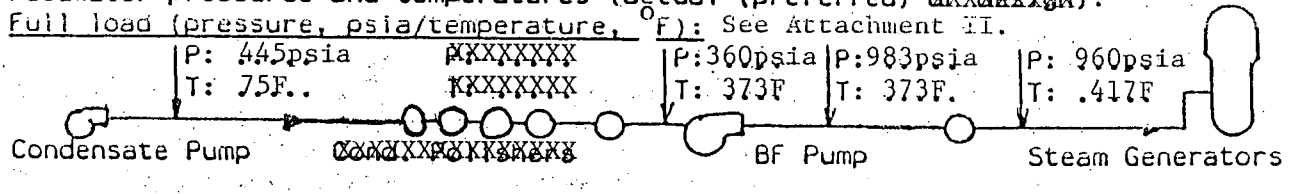
Condensate polishers: none, ~~cation, powdered, mixed bed, ...% of flow, ...~~
~~installed in 19..., operated at ... GPM, ...~~
Cooling water: ~~fresh, salt~~ brackish, ~~cooling tower~~.
Copper alloy condenser tubing: yes, ~~no~~. Copper alloy FW heater tubes: LP, ~~HP, none~~.
Boric acid used since: 1979 ; during: operation, ~~shutdown, ...~~.....

A. EROSION-CORROSION EXPERIENCE

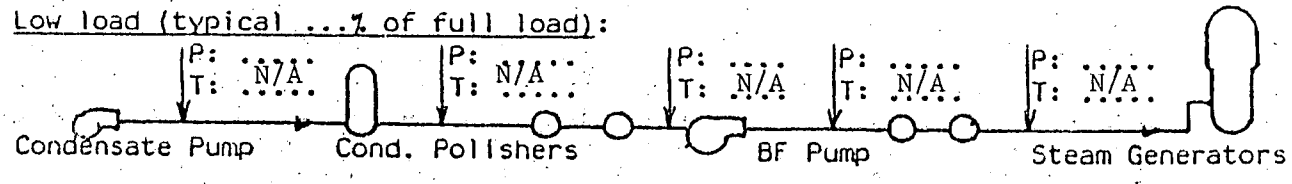
1. Erosion-Corrosion identified in wet steam piping: yes, ~~no~~.
2. Erosion-Corrosion of MSR ~~chevron~~ mesh: yes, ~~no~~.
   Chevron material: stainless steel, carbon steel, other .....N/A.....
3. Erosion-Corrosion of feedwater piping: ~~yes~~, no. Date found .....N/A.....
   Feedwater piping materials: ...See Attachment II.....
4. Erosion-Corrosion of: NONE. elbows, NONE. Ts, NONE. diffusers, NONE.. reducers, NONE valves, NONE orifices, NONE other components (specify).NONE.....
5. Erosion-Corrosion of J-Tubes: ~~yes~~, no.
6. Erosion-Corrosion of feedwater distribution ring: ~~yes~~, no.
7. Erosion-Corrosion of turbine: HP, LP; identify components: .See Attachment II..
8. Erosion-Corrosion of other cycle components (identify) .NONE.....
9. Feedwater temperature range where erosion-corrosion found: from .190 to .400. °F
10. Inspection frequency for feedwater piping ~18. months. Steam lines ~18. months.
11. Inspection methods used: ultrasonic thickness, ~~radiography~~, visual, ~~other~~.....

B. PIPING DESIGN

1. Maximum feedwater flow velocity 17.26 feet/second. (See Attachment II)
2. No. of feed pumps operating at 100% load ..2...., second pump On at .40..% load.
3. Maximum flow velocity when only 1 pump is operating 27.6 feet/second.
4. No. of feedwater piping components: ..207.. elbows, .28... Ts, ..0... diffusers, ...13. reducers, ..52.. valves, ...2.. orifices,
   ..... other components (specify) .See Attachment II.....
5. Maximum flow velocity in wet steam piping ...235..... feet/second.
6. Feedwater pressures and temperatures (actual (preferred) ~~max~~):
   Full load (pressure, psia/temperature, °F): See Attachment II.



Low load (typical ...% of full load):



Please attach copies of the heat balance diagrams for your actual full load and typical low load. See Attachment III.

C. FEEDWATER AND CONDENSATE CHEMISTRY

1. Please complete the attached Table. N.A. represents "Not Available."
2. Feedwater chemistry history (average or typical values, final feedwater):

Year of oper.:	1st	1975 ~~1974~~	1976	1979 ~~1978~~	1980	1982	1983	1985	1986	1987
pH of FW maximum	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
See Attach. II minimum	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
average	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
pH of condensate										
maximum	N.A.	9.3	9.1	9.2	9.2	9.3	9.1	9.2	9.2	9.2
minimum	N.A.	7.4	6.6	7.2	7.1	7.0	7.0	6.6	7.1	7.6
average	N.A.	8.7	8.8	8.7	8.7	8.7	8.8	8.9	8.9	9.0
DO, ppb maximum	N.A.	7.0	25	20	55	10	20	10	15	10
minimum	N.A.	0.0	0.25	0.0	0.0	0.05	1.0	2	2	2
average	N.A.	2.0	1.0	0.25	0.5	2.0	4.0	4	8	4
Cat. Cond. uS/cm	N.A.	0.3	0.25	0.6	1.0	0.8	0.9	0.8	0.4	0.25
Spec. Cond. uS/cm	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	4.0	4.3	4.0
NH_3, ppb	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
N_2H_4, ppb	N.A.	10	10	15	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Boron, ppb	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Air Inleakage, SCFM	N.A.	N.A.	N.A.	15	20	4	7	11	9	4

Please send any water chemistry summary reports and data.

3. Chemical additions

3.1 Ammonia: typical concentration in feedwater 356 ppb; added at Condensate Pump Discharge
3.2 Hydrazine: typical concentration in feedwater 15 ppb; added at Turbine Hood Sprays
3.3 Boric acid: typical concentration in feedwater 400 ppb as B; added at individual S.G. feedwater lines.

D. MATERIALS

1. Feedwater piping - list ASTM or other specification numbers See Attachment II

2. Wet steam piping: See Attachment II

3. Attach results of chemical analysis by you or pipe vendors.

Not available.

ATTACHMENT II

COMMENTS/CLARIFICATION OF SELECTED
QUESTIONNAIRE RESPONSES

Consolidated Edison Company of New York, Inc.
Indian Point Unit No. 2
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Section	Comment
A.1	Under wet steam piping, we include: a. cross-under piping b. extraction steam piping c. heater drains and vents d. MSR drains
A.2	Mesh material is stainless steel with carbon steel supports.
A.3	ASTM A-106 Grade B and C ASTM A-155 EFW Grade KC-70 Class 1 ASTM A-335 Grade P-22 (MBFP recirculation only) Our feedwater system boundary starts at the Main Boiler Feedwater Pumps (MBFPs) and consists of piping downstream of those two pumps. Our condensate system boundary starts at the condensate pumps and consists of the discharge piping to the suction of the MBFPs, and the Heater Drain Tank Pumps (HDTPs) discharge piping to the suction of the MBFPs.
A.6	We have not inspected the distribution ring.
A.7	a. first stage blades b. nozzle block partitions c. No. 2 blade ring fit d. horizontal joint
A.10	The feedwater piping is inspected on a refueling outage schedule.
B.1	At the 20" MBFP discharge.
B.3	One Main Boiler Feed Pump at 80% load.
B.4	a. four leading edge flowmeters b. four flow nozzles c. one straightening vane
B.6	We are a based-loaded station and therefore there is no typical low load condition. In addition, condensate pump temperature ultimately depends on river water temperature (seasonal variations). The values given were based on data collected March 11, 1987. We do not have a condensate polisher. We have five FW heaters downstream of the condensate pump discharge and one FW heater downstream of the MBFP discharge.

C.1/C.2	We do not sample feedwater pH. Dissolved oxygen has always been sampled at the high pressure feedwater heater outlet and at the discharge of the condensate pumps.
D.1	ASTM A-106 Grade B and C ASTM A-155 EFW Grade KC-70 Class 1 ASTM A-335 Grade P-22 (MBFP recirculation only)
D.2	ASTM A-285 Grade C ASTM A-312 Grade 304H

ATTACHMENT III

HEAT BALANCE DIAGRAM

Consolidated Edison Company of New York, Inc.
Indian Point Unit No. 2
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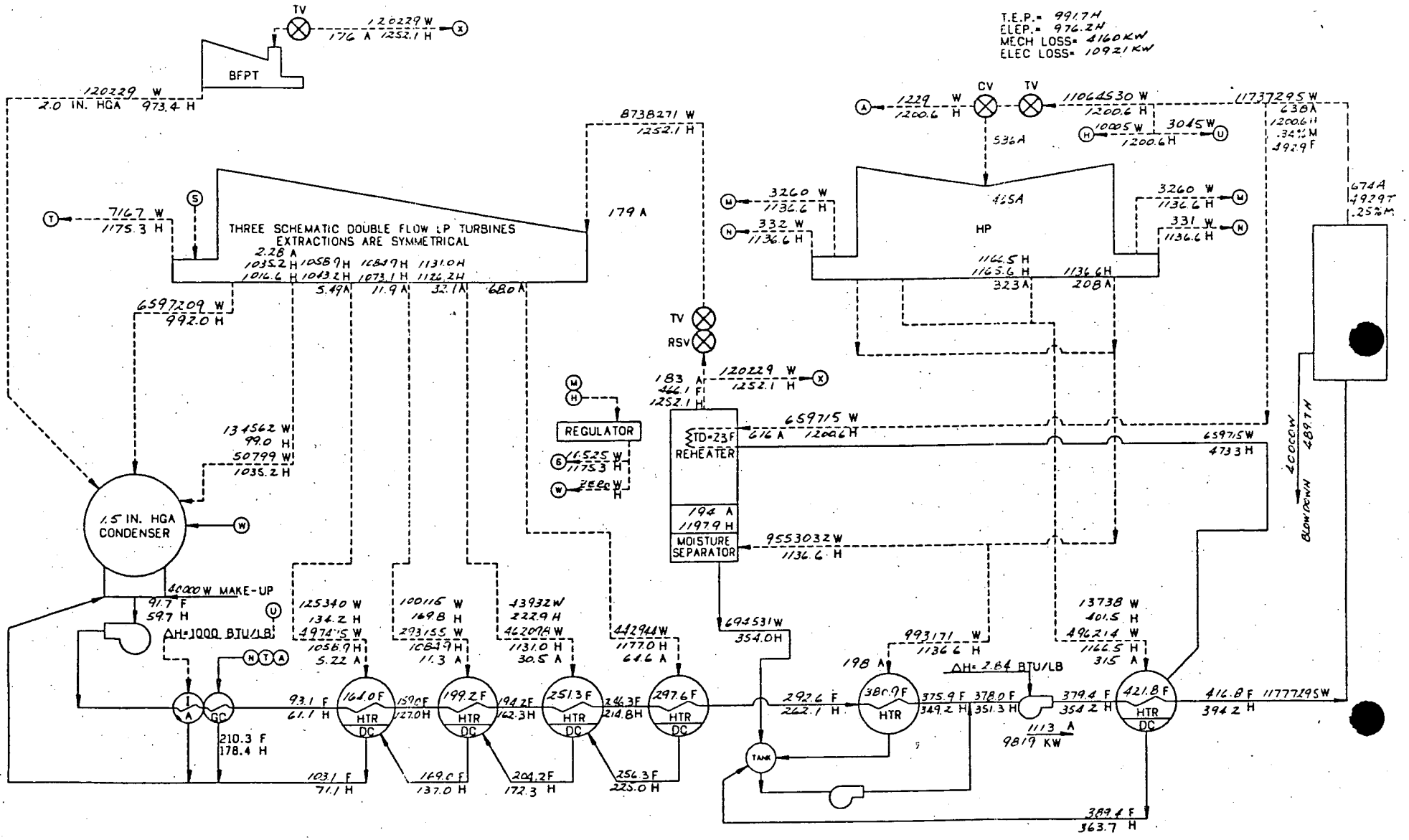
CALCULATION BASED ON LOCUS OF VALVE POINTS

T.E.P.= 991.7 H
ELEP.= 976.2 H
MECH LOSS= 4160 KW
ELEC LOSS= 10921 KW



NET HEAT RATE $\frac{11737295(1200.6-394.2)}{897264}$ = 10549 BTU/KWHR

TURBINE-GENERATOR

1021793 KW
730 PSIA 507.8 F- 1.5 IN HGA
TC6F- 45 INCH
1125600 KVA- 0.90 PF- 75 PSIG H_2

LEGEND

FLOW=W=LB/HR
PRESSURE=A=PSIA
ENTHALPY=H=BTU/LB
TEMPERATURE=F=°F

WESTINGHOUSE ELECTRIC CORPORATION	897264 KW	NET LOAD HEAT BALANCE	2775 MWT	SINGLE VALVE	4/23/87 CJK	A8836-7102

S.Z.7166.01.01