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YANKEE NUCLEAR POWER STATION

OPERATION REPORT NO. 93

For the month of

September 1968

Submitted by

YANKEE ATOMIC ELECTRIC COMPANY

Boston

Massachusetts

October 18, 1968



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This report covers the operation of the Yankee Atomic Electric Company plant at Rowe, Massachusetts for the month of September, 1968.

At the beginning of the period plant load was 172 MWe. On September 18 at 0630 hours, No. 2 boiler feed pump motor failed during an increase in plant load. The pump stator and rotor were shipped off site for repairs. Plant operation was continued at a reduced load of approximately 160 MWe until September 26 when the refurbished motor was installed on the No. 2 pump.

During the period, main condenser tubes were cleaned using hydraulically driven metal scrapers. This technique removed a heavy accumulation of deposits not removed during previous cleanings with rubber plugs and/or wire brushes. The cleaning operation was very successful. A decrease of approximately 1.7" Hg in condenser back pressure resulted with an increase of 11 MWe in plant output.

Two shipments of spent fuel containing a total of eighteen Core VII assemblies were made on September 12 and September 21. These fuel shipments were the 24th and 25th in the series, bringing the number of elements shipped in the ten element cask to 235 and the total number of elements shipped to date to 251.

Prior to each shipment an IAEA inspector removed the seals from the spent fuel pit loading hatch; the hatch was resealed after the fuel cask was removed from the pit.

The monthly control rod exercise was successfully completed; however, control rod No. 17 again could not be withdrawn beyond the indicated position of 86 2/8". (See Operation Report No. 92 - August 1968).

Control rod groups B, C and D were removed out of step to 88 4/8 as part of the rod step wear program.

No plant shutdowns or reactor scrams occurred during the month of September, 1968.

Plant load reductions during the period were as follows:

September 2 (1025-2035) : Load reduction to 140 MWe due to electrical storm area.

September 4 (1150-1315) : Load reduction to 130 MWe for monthly turbine throttle valve test.

September 11 (1814-2100) : Load reduction to 140 MWe due to electrical storm in area.

September 16 (2045) - September 17 (0740): Load reduction to 70 MWe:
September 17 (2045) - September 18 (0645): condenser tube cleaning.
September 18 (2045) - September 19 (0933):

September 18 (1150-1410): Load reduction to 70 MWe: plug leaking tube in condenser east water box.

September 25 (1920-2109): Load reduction to 145 MWe due to electrical storm in area.

Plant Maintenance

The following is a list of pertinent maintenance items performed by the plant staff during the month of September, 1968.

1. New shaft sleeves were installed on No. 2 vapor container booster pump.
2. A new shaft and new inboard and outboard sleeves were installed in the No. 2 boiler feed pump.
3. Tubes in the main condenser east and west side water boxes were cleaned using hydraulically driven scraper.
4. No. 1 charging pump was repacked and the plungers were replaced.

Instrumentation and Control

The following is a list of pertinent instrumentation and control maintenance performed by the plant staff during the month of September, 1968.

1. Work was continued on modifications to the incore flux wire system.
2. Repairs were made on the air ejector inline radiation monitor.
3. An improved a.c. operated version of the proposed control rod position primary indication system was developed.

Reactor Plant Performance

The following parameters were determined by means of incore instrumentation:

Zircaloy assembly

509 MWt, 520.4 Tavg, Control rod group A @ 62 3/8; B.C.D @ 88 1/8, 723 ppm boron.

$F_Q = 1.79$

$F_H = 1.94$

Minimum DNBR = 4.2

Maximum outlet temperature = 569.5°F

Secondary Plant Performance

Feedwater heater terminal differences were as follows:

No. 1: 12.3°F;

No. 2: 11.1°F;

No. 3: 5.5°F

The condenser performance was as follows:

Before Cleaning:

170.4 MWe; 4.00" Hg B.P., 598.0 MWt, 64°F C.W. in,
86°F C.W. out, T.T.D. = 38.4°F, cleanliness factor: 53%.

After Cleaning:

181.5 MWe, 2.30" Hg B.P., 598.0 MWt, 64°F C.W. in,
86°F C.W. out, T.T.D. = 19.9°F, cleanliness factor: 97%.

Chemistry

On September 17 an increase in steam generator chloride concentration was detected after a portion of the main condenser tubes had been cleaned. Steam generator blowdown was increased and after one condenser tube leak was plugged, blowdown was reduced; chloride levels returned to normal values.

The main coolant boron concentration was decreased from 784 ppm to 658 ppm during the period to compensate for normal core depletion. Average main coolant pH was 5.2

Coolant average gross beta-gamma activity and crud level were 8.4×10^{-2} $\mu\text{C}/\text{ml}$ and 0.06 ppm, respectively. The main coolant tritium specific activity averaged 4.36 $\mu\text{C}/\text{ml}$ during the month. Iodine-131 specific activity was 2.4×10^{-5} $\mu\text{C}/\text{ml}$ and the iodine 131/133 atomic ratio was 0.81, indicating the absence of detectable fuel defects.

A representative crud sample for the month, collected on September 9, had the following radiochemical analyses: dpm/mg crud

Cr-51 ⁶ 2.44×10^6	Mn-54 ⁵ 3.34×10^5	Fe-59 ⁵ 7.13×10^5
Co-58 ⁵ 7.84×10^5	Co-60 ⁵ 3.12×10^5	Ag-110M ₄ 6.23×10^4

A main coolant gas sample collected on September 16 had the following radiochemical analyses: $\mu\text{C}/\text{cc}$ gas

Xe-133 ⁻² 1.46×10^{-2}	Xe-135 ⁻² 1.63×10^{-2}	Ar-41 ⁻² 8.92×10^{-2}
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Health and Safety

Waste disposal liquid releases totaling 15,150 gallons contained 0.005 mc of gross beta-gamma activity and 47.7 curies of tritium. Gaseous releases during this period were 75.5 mc of gross beta-gamma activity. Secondary plant water discharged was 287,841 gallons and contained a total of 0.017 mc of gross beta-gamma activity and 1.24 curies of tritium.

Two shipments of spent fuel containing a total activity of 29.71 megacuries was made during the period.

Radiation exposure doses for Yankee plant personnel, as measured by film badge, for the month of September, 1968 were as follows:

Average accumulated exposure dose: 55 mrem.

Maximum accumulated exposure dose: 734 mrem.

Operations

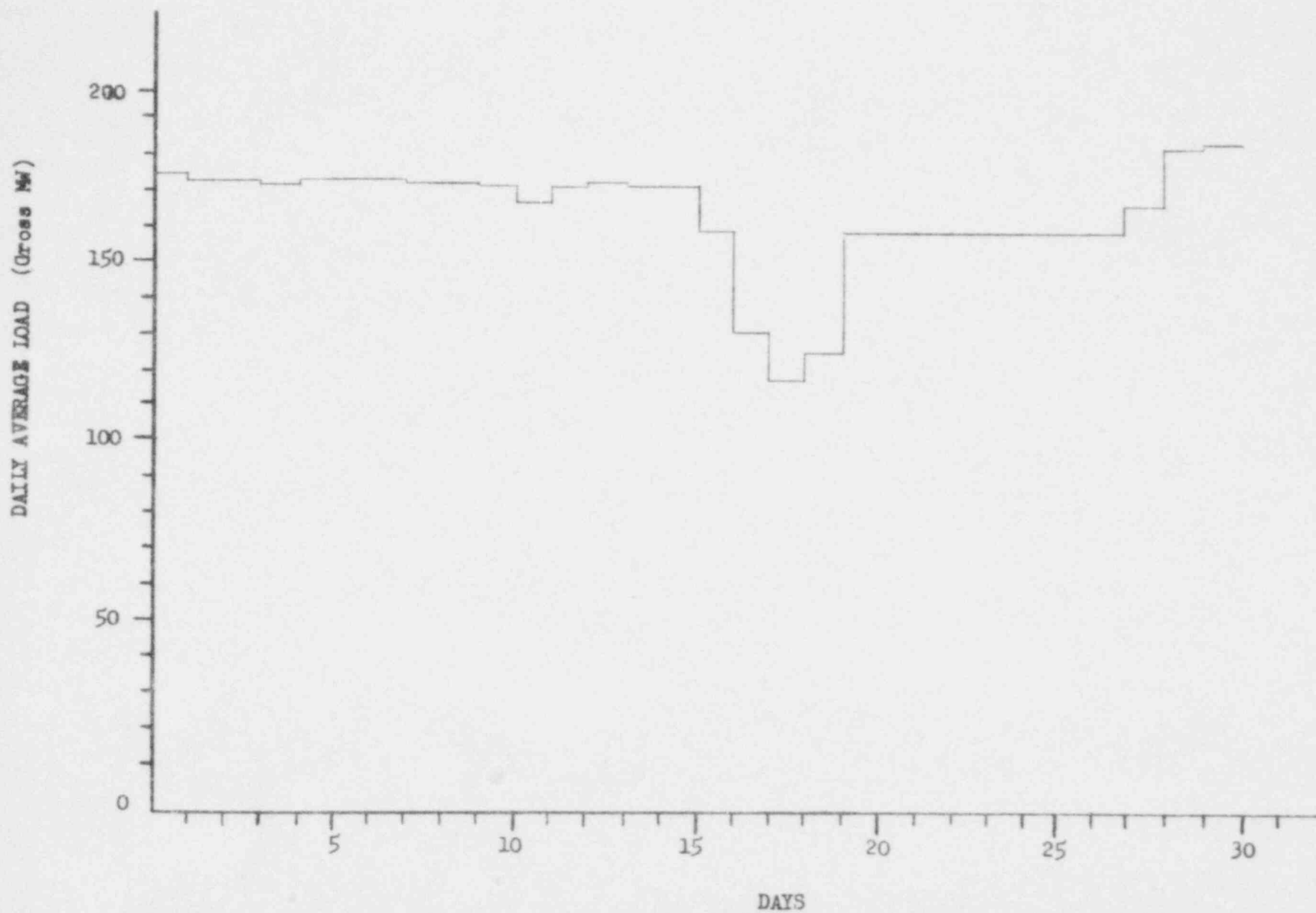
During the period, Emergency Instruction 505 D3, Complete Loss of Control Air, was issued; Emergency Instruction, 505 B1:2, Emergency Shutdown from Power, was revised and reissued.

Attached is a summary of plant operating statistics and a plot of daily load for the month of September, 1968.

YANKEE ATOMIC ELECTRIC COMPANY

DAILY AVERAGE LOAD

for
September 1968



YANKEE ATOMIC ELECTRIC COMPANY - OPERATING SUMMARY

SEPTEMBER 1968

ELECTRICAL

		<u>MONTH</u>	<u>YEAR</u>	<u>TO DATE</u>
Gross Generation	KWH	117,612,600	915,143,400	8,626,028,000
Sta. Service (While Gen. Incl. Losses)	KWH	7,651,340	59,291,623	571,958,556
Net Output	KWH	109,961,260	855,851,777	8,054,069,444
Station Service	%	6.51	6.48	6.63
Sta. Service (While Not Gen. Incl. Losses)	KWH	0	1,171,231	25,976,758
Ave. Gen. For Month (720.00)	KW	163,351	- -	- -
Ave. Gen. Running (720.00)	KW	163,351	- -	- -

PLANT PERFORMANCE

Net Plant Efficiency	%	27.43	27.89	28.34
Net Plant Heat Rate	BTu/KWH	12,442	12,236	12,042
Plant Operating Factor	%	92.81	77.79	72.97
Reactor Plant Availability	%	100.00	85.97	83.63

NUCLEAR

		<u>MONTH</u>	<u>CORE VII</u>	<u>TOTAL</u>
Hours Critical	HRS	720.00	3681.31	58,788.73
Times Scrammed		0	0	55
Burnup				
Core Average	MWD/MTU	808.52	4280.14	- -
Region Average	MWD/MTU			
A (INNER)		792.862	4318.705	22,172.97
B (MIDDLE)		939.051	5022.488	15,009.91
C (OUTER)		662.679	3430.136	3430.14
D (ZIRCALOY)		820.022	4381.730	4381.73

YANKEE - ROWE CORE VII

