50-29
5-20-70

Regulatory File Cy

YANKEE NUCLEAR POWER STATION

OPERATION REPORT NO. 112

For the Month of

April 1970

Submitted by

YANKEE ATOMIC ELECTRIC COMPANY

Westboro Massachusetts

May 20, 1970

Plant Shutdowns

Shutdown No. 107-8-70: 4/10/70, plant trip due to false signal from failed safe No. 4 loop low flow transmitter.

Plant Maintenance

The following is a list of major plant maintenance items performed by the plant staff during the month of April, 1970.

1. The No's. 1 and 2 plungers were replaced in No. 3 charging pump.

2. The two dryers and the after cooler for the No. 2 control air compressor were replaced.

Instrumentation and Control

The following is a list of pertinent instrumentation and control maintenance items performed by the plant staff during the month of April, 1970.

1. The neutron detectors, which were removed from thimbles No. 1 and No. 5 during the most previous report period, were refurbished.

2. The No. 4 main coolant loop flow transmitter LVDT was replaced.

Reactor Plant Performance

The following parameters were determined by means of incore instrumentation:

586 MWt; 526.3 Tavg; Control Rod Group A @ 84", B,C,D, @ 88"; 376 ppm boron.

$F_Q = 2.0$

$F_{\Delta H} = 2.1$

Minimum DNBR = 3.38

Maximum Outlet Temperature = 592.6°F

Secondary Plant Performance

Feedwater heater terminal differences were as follows:

No. 1 = 4.44°F No. 2 = 12.16°F No. 3 = 6.23°F

The Condenser performance was as follows:

185.8 MWe; 0.98" Hg. B.P.; 587.0 MWt; 56.6°F C.W. in; TTD = 21.37°F; Cleanliness factor = 98.19%.

This report covers the operation of the Yankee Atomic Electric Company at Rowe, Massachusetts for the month of April, 1970.

During the period plant load varied between 184.5 MWe and 186.0 MWe as the circulating water inlet temperature fluctuated between 39°F and 35°F.

One, unscheduled, plant shutdown occurred during the period, initiated by a reactor scram and subsequent turbine trip at 0258 hours on April 10. Further discussion of this shutdown is presented as Abnormal Occurrence No. 70-1, this report.

The fourth Core VIII vapor container air leakage surveillance period continued through the report period. Leakage during the period was normal.

Plant Abnormal Occurrences

Abnormal Occurrence No. 70-1 "Plant Trip".

On April 10, 1970 the plant was operating at a power level of 586 MWt when the reactor scrammed; the turbine tripped; and the 115 KV oil circuit breakers opened. The appropriate operator action of holding No. 2 and No. 3 main coolant pumps on the generator until it coasted down to 58 cycles, was followed.

A survey of plant instrumentation confirmed that the reactor scram occurred prior to the plant trip. The primary scram sequence panel indicated a main coolant low flow signal. The No. 4 main coolant loop flow indication was found to have decreased to the low flow reactor scram setpoint, verifying the origin of the scram signal. Since other loop parameters were normal, the No. 4 main coolant pump was maintained in service.

Subsequent inspection in No. 4 main coolant loop revealed a failure of the main coolant flow signal transmitter transformer caused by moisture leaking from the transmitter low pressure vent. The No. 4 loop was removed from service.

The plant was returned to power under three loop operating conditions. The reactor was brought critical and the turbine generator was phased on line at 0717 hours; and the plant was loaded to 450 MWt.

Repair was made of the No. 4 loop flow transmitter vent valve; the loop flow signal transmitter transformer was replaced and calibrated; and No. 4 loop was returned to service. Loading of the plant to full power was completed at 1635 hours.

Plant Load Reductions

April 17-18 (1200 - 0045): Load reduction to 127 MWe for repacking of heater drain tank No. 1 and No. 2 pumps; and replacement of lower motor guide bearing in the No. 2 pump.

Chemistry

The main coolant boron concentration was decreased from 428 ppm to 361 ppm during the period to compensate for core depletion. The average main coolant pH was 6.15.

The main coolant average gross beta-gamma activity was 1.04×10^{-1} uc/ml. The main coolant crud level averaged 0.02 ppm, except that following the plant trip on April 10 a maximum value of 3.65 ppm was recorded. Analysis on April 13 showed that normal purification had reduced the level to the above indicated average value.

The main coolant tritium concentration, which had been reduced to 0.34 uc/ml at the end of the previous report period due to dilution, increased to 1.98 uc/ml at the end of the current report period.

The average iodine-131 specific activity was 3.50×10^{-5} uc/ml and the iodine 131/133 atomic ratio was 0.51 indicating the absence of detectable fuel defects.

A representative crud sample for the month, collected on April 15, had the following radiochemical analyses: dpm/mg crud.

Cr-51	Mn-54	Fe-59
1.52×10^{7}	3.70×10^{6}	7.20×10^{6}
Co-58	**Co-60**	**Ag-110M**
2.96×10^{7}	7.11×10^{6}	6.76×10^{5}

A main coolant gas sample collected on April 22, had the following radiochemical analyses: uc/cc gas

Xe-133	Xe-135	Ar-41
5.09×10^{-3}	5.81×10^{-3}	1.01

Health and Safety

One shipment of 56 drums of low level waste, containing a total activity of 109.5 mc, was made during the period.

Waste disposal liquid releases totalled 90,580 gallons containing 0.06 mc of gross beta-gamma activity and 239.38 curies of tritium. Gaseous releases during the period totalled 714 mc of gross beta-gamma activity. Secondary water discharged totalled 428,166 gallons containing 0.265 mc of gross beta-gamma activity and 3.01 curies of tritium.

Radiation exposure doses for Yankee plant personnel, as measured by film badge, for the month of April 1970 were as follows:

Average accumulated exposure dose: 128 mrem

Maximum accumulated exposure dose: 780 mrem

Operations

Attached is a summary of plant operating statistics and a plot of daily average load for the month of April, 1970.

YANKEE ATOMIC ELECTRIC COMPANY - OPERATING SUMMARY

April 1970

ELECTRICAL		MONTH	YEAR	TO DATE
Gross Generation	KWH	131,262,000	480,744,900	10,696,403,400
Sta. Service (While Gen. Incl. Losses)	KWH	7,696,631	28,446,077	698,450,941
Net Output	KWH	123,565,319	452,298,823	9,997,952,459
Station Service	%	5.86	5.92	6.53
Sta. Service (While Not Gen. Incl. Losses)	KWH	29,721	901,966	29,809,895
Ave. Gen. For Month (719)	KW	182,562	-	-
Ave. Gen. Running (714.68)	KW	183,665	-	-

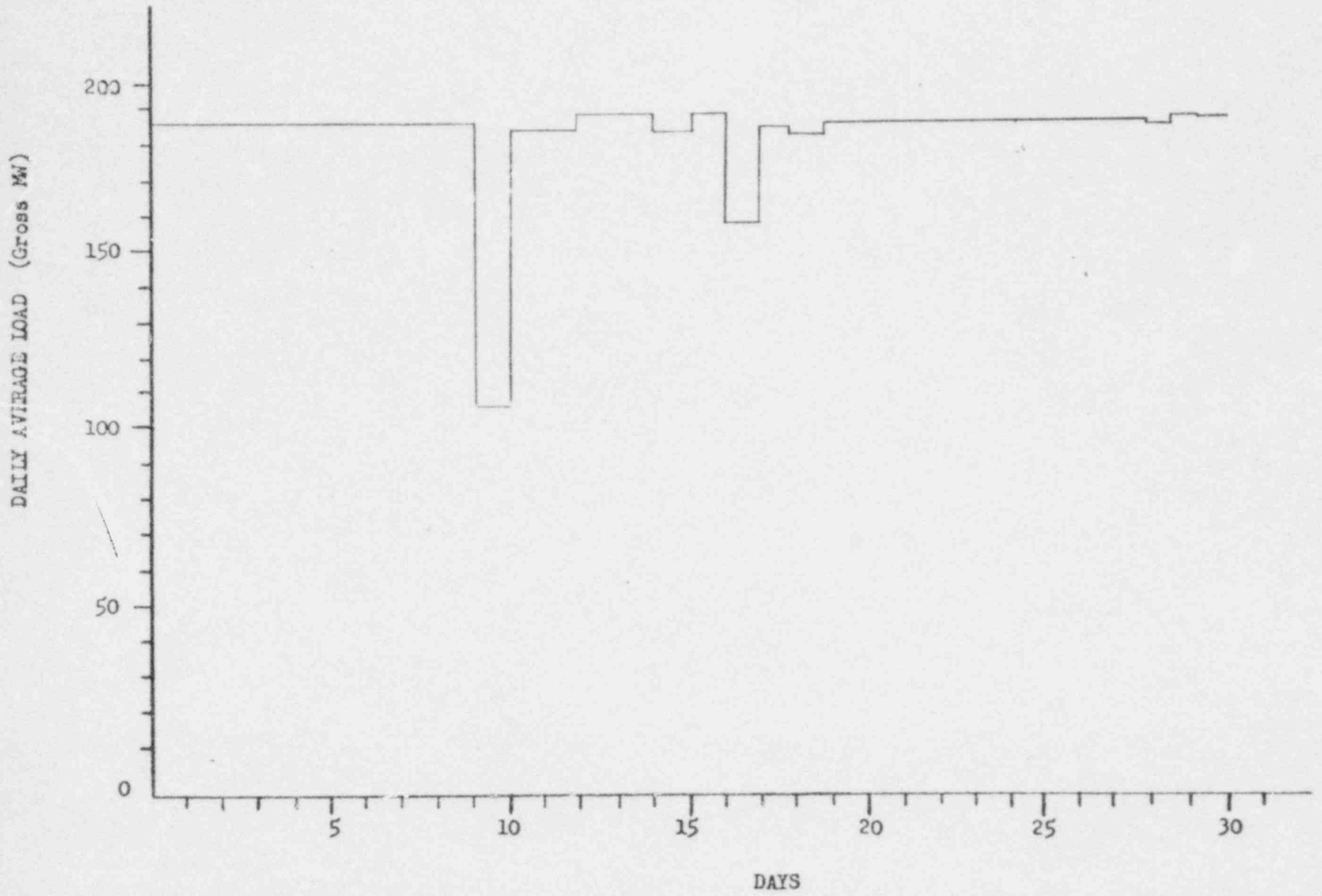
PLANT PERFORMANCE				
Net Plant Efficiency	%	29.79	29.75	28.47
Net Plant Heat Rate	BTu/KWH	11,456	11,471	11,987
Plant Capacity Factor	%	96.14	88.01	75.16
Reactor Plant Availability	%	99.65	90.53	84.09

NUCLEAR		MONTH	CORE VIII	TOTAL
Hours Critical	HRS	716.50	5,034.53	70,854.31
Times Scrammed		1	2	60
Burnup				
Core Average	MWD/MTU	831.76	5,808.76	-
Region Average	MWD/MTU			
A (INNER)		764.60	5,283.99	25,214.89
B (MIDDLE)		947.27	6,668.72	18,704.78
C (OUTER)		723.48	4,982.51	4,982.51
D (ZIRCALOY)		-	-	-

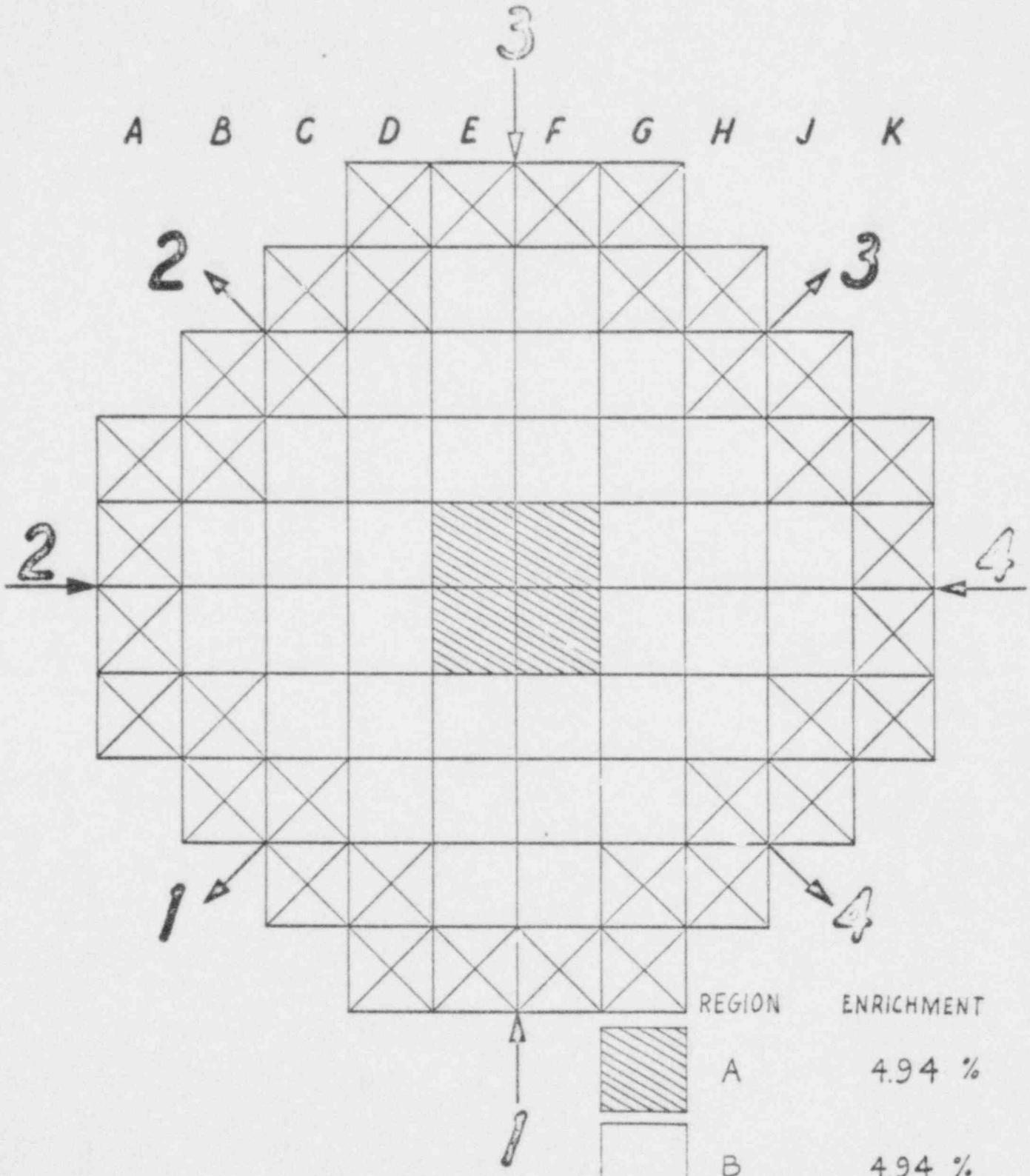
DAILY AVERAGE LOAD

for

April 1970



CORE VIII



FORM RE-6