SAXTON NUCLEAR EXPERIMENTAL CORPORATION

Operations Report for June 1968

1. REACTOR OPERATIONS

At the beginning of this report period the reactor was maintained in a hot shutdown condition until completion of AEC senior operator license examinations for two SNEC employees on June 5. A scheduled cooldown of the main coolant system was initiated on June 5 for maintenance and changing of test fuel subassemblies. Filling and venting of the main coolant system was initiated on June 25, heat-up of the main coolant system commenced on June 28 and was completed on June 29.

2. GENERAL

The period from June 10 thru June 15 was devoted primarily to maintenance of the main coolant system. The period from June 17 thru June 20 was devoted to handling test subassemblies. The fuel changes made are as follows: The reactivity oscillator was removed from core position N-2 and the plutonium subassembly was removed from core position N-1 and both placed in storage. The pH test subassembly was transferred from core position N-3 to N-2. Two single rods were removed from the burnable poison subassembly and replaced by two new internally pressurized fuel rods and the subassembly returned to core position N-5. Two irradiated PuO_2-UO_2 single rods were installed in the overpower test subassembly and the subassembly transferred to core position N-1 in preparation for the forthcoming over power test. Four internally pressurized fuel rods were installed in subassembly 503-4-25 and the subassembly transferred to core position N-3.

The core subassembly status as of June 30 is as follows:

N-1 2x2 Over Power Test Assembly, 503-4-30, containing two PuO_2-UO_2 rods 503-15-1 and 503-15-3

N-2 pH Test Subassembly, 503-4-28

N-3 3x3 Subassembly, 503-4-25, containing removable rods #715, #716, #717 and #718

N-4 STP Loop Dummy

N-5 Burnable Poison Subassembly, 503-4-29, containing removable rods #719, #720, #1 and #2

Nine rods from an unirradiated subassembly were returned to Westinghouse Atomic Power Division.

3. EXPERIMENTAL PROGRAM

During the month, approval was received from the AEC for Change Number 30, "Irradiation of Highly Pressurized Zircaloy Clad Creep Test Fuel Rods" and Change Number 31, "Irradiation of an Overpower Test 2x2 Subassembly".

Test procedure, 309.7.1, "Reactor Operation During the Overpower Test" was reviewed and approved.

Three experimental systems for the prompt detection of fuel failure were installed to permit continuous monitoring of the main coolant.

1. The first system consists of two ionization chambers, one on the reactor inlet pipe and one on the reactor outlet pipe for monitoring gross gamma radiation.

2. The second system utilizes a G-M tube for monitoring the gross gamma activity after delaying the sample for N-16 decay.

3. The third system utilizes a BF_3 neutron detector and monitors the main coolant for delayed neutrons.

4. OPERATIONAL TESTS

The SNEC fire and evacuation alarms were tested on June 7, 14, 21 and 28. A plant evacuation drill was conducted on June 27.

The monthly test of the radiation monitoring system was completed on June 3.

5. MAINTENANCE

The principal items of mechanical maintenance for the month included work on the control room air conditioner compressor; preparing the reactor vessel head for fuel handling; lapping the seat on the chem shim inlet valve, HIC-27; and the purification system stop valve, HIC-23; replacing the silica gel and the molecular sieve in the instrument air dryers and the vapoilsorb in the oil removers; lapping the seat and disc on charging pump suction relief valves, V-362 and V-363; installing new seats and discs in the charging pump discharge relief valves, V-221 and V-228; installing unions on the discharge piping of the charging pump relief valves for future maintenance; repairing the pressurizer vent line spool piece; installing a new seat and disc on the regenerative heat exchanger relief valve, V-53; lapping the ring joint flanges on the steam generator safety valves, V-1046 and V-1047; lapping the ring joint flange on the regenerative heat exchanger piping; installing a new rupture disc in the steam generator safety valve discharge piping; retightening the main coolant pump flange bolts, and lapping the seat and disc on the pressurizer safety valve, V-372.

The major items of electrical and instrument maintenance for the month included checking the specific gravity of the station service batteries; rebuilding an air regulator on the deaerator steam supply valve, V-1010, and calibrating the controller; repairing the count room liquid scintillation counter scaler; repairing the vacuum pump in site particulate monitor, RIC-8; cleaning the coarse and fine rod position selector switch contacts; meggering the main coolant pump, variable frequency generator and motor and the two safety injection pump motor windings; calibration of the main coolant system pressure controller, PRC-2, calibration of the steam generator, main steam and feedwater pressure indicators; installing a new heater in the instrument air dryers; meggering the nuclear instrumentation cables and detectors; installing an intercom paging phone in the training room; repairing the high level G-M scaler in the count room; replacing the carbon vanes in the charging room alpha monitor vacuum pump; installing new tubing and solenoid valves on the safety injection system automatic valves, FIC-22V and FIC-23V; calibration of the steam and feedwater flow instrumentation; installing new resin in the fission product detector resin columns in RIC-10; and sampling and analyzing the 1000 KVA transformer oil.

6. CHEMISTRY

The main coolant system was maintained for hot shutdown conditions at the beginning of the month. On June 6 the boron concentration was increased to 473 ppm and the hydrogen concentration reduced to less than 5 cc kg of water in preparation for cold shutdown of the reactor. Chemical specifications were maintained for cold shutdown conditions until June 27. Boron concentration ranged from 211 ppm at hot shutdown to 1825 ppm after flooding the storage well for changing subassemblies. Hydrazine was added on June 27 for oxygen removal prior to heat-up of the main coolant system.

A summary of the analyses performed on main coolant samples taken during the month is contained in the following table:

Main Coolant System	Minimum	Maximum
pH at 25°C	5.43	6.62
Conductivity, umhos	2.22	9.75
Boron, ppm	211	1825
Chlorides, ppm	0.005	0.055
Oxygen, ppm (Hot)	0.005	0.015
Hydrogen, cc/kg H_2O at STP	3	56
Gross Beta-Gamma (15 Min. Degassed) uc/cc	1.65×10^{-2}	5.23×10^{-1}
Tritium, uc/cc	1.18×10^{-2}	1.02×10^{-1}

A component cooling sample analyzed on June 25 showed the pH to be 8.12 and the chromate concentration to be 310 ppm. The gross beta-gamma activity was 2.71×10^{-6} uc/cc. One hundred fifty grams of potassium dichromate and eighty grams of potassium hydroxide were added to the system.

The analysis of the storage well water and the refueling water storage tank are contained in the following table:

Analysis	Storage Well	RWST
pH	5.53	5.49
Conductivity	9.25	8.65
Chlorides, ppm	0.060	0.045
Boron, ppm	1879	1859
Gross Beta-Gamma, uc/cc	5.87×10^{-3}	6.18×10^{-3}

7. RADIATION AND WASTE DISPOSAL

Radiation surveying consisted of routine plant surveys, C.V. during shutdown and materials shipments. The following maximum radiation readings were taken:

Location	Radiation Reading
C&A Building	
Waste Drum (baling machine)	0.6 mrem/hr beta-gamma
Charging Pump (contact with chamber)	19 mrem/hr beta-gamma
Sample Room (door of sample panel)	5.0 mrem/hr beta-gamma
Chemical Lab Hot Sink (1" from drain)	0.5 mrem/hr beta-gamma
RWDF	
Evaporator (under bottom)	70 mrem/hr beta-gamma
Evaporator (contact outside upper level)	35 mrem/hr beta-gamma
Drum Storage Area (at RRA fence)	1.5 mrem/hr beta-gamma
C.V.	
Primary Compartment (general upper level)	80 mrem/hr beta-gamma
Primary Compartment (contact M.C. pump volute)	210 mrem/hr beta-gamma
Primary Compartment (S.G. bottom)	150 mrem/hr beta-gamma
Primary Compartment (pressurizer bottom)	50 mrem/hr beta-gamma
Primary Compartment (general lower level)	35 mrem/hr beta-gamma
Primary Compartment (Regen. HX)	170 mrem/hr beta-gamma
Primary Compartment (Non-Regen. HX)	17 mrem/hr beta-gamma
Auxiliary Equipment Compt. (S.C.H.X.)	8 mrem/hr beta-gamma
Auxiliary Equipment Compt. (D.T. top)	6 mrem/hr beta-gamma
Auxiliary Equipment Compt. (D.T. bottom)	33 mrem/hr beta-gamma
Auxiliary Equipment Compt. (general lower level)	3 mrem/hr beta-gamma
Reactor Deck (water level at grating)	20 mrem/hr beta-gamma
Reactor Deck (instrument ports)	210 mrem/hr beta-gamma
Reactor Deck (waist level)	50 mrem/hr beta-gamma
Reactor Deck (storage well railing)	20 mrem/hr beta-gamma

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Contamination surveying consisted of routine plant site surveys, surveys of materials shipped, tools, equipment and C.V. during shutdown. The clean areas were within the "Clean Area" limits. The controlled area was generally within the "Clean Area" limits. The controlled area was cleaned frequently to keep and/or to return it to the "Clean Area" limits. The exclusion areas were cleaned periodically to minimize the amount of smearable contamination. The following contamination levels were observed:

Location	Contamination Reading
C&A Building	
Charging Pump Chamber	2468 d/m/smear beta-gamma
Charging Pump Chamber	< 10 d/m/smear alpha
Charging Room Floor	1768 d/m/smear beta-gamma
Sample Room Sink	27218 d/m/smear beta-gamma
Sample Room Sink	< 10 d/m/smear alpha
Sample Room Floor	2228 d/m/smear beta-gamma
Chemical Lab Hot Sink	31668 d/m/smear beta-gamma
Chemical Lab Hot Sink	< 10 d/m/smear alpha
R.W.D.F.	
Pump Room Floor	1740 d/m/smear beta-gamma
Shipping Room Floor	450 d/m/smear beta-gamma
C.V.	
Operating Deck	11400 d/m/smear beta-gamma
Operating Deck	< 10 d/m/smear alpha
Reactor Deck (head)	18740 d/m/smear beta-gamma
Reactor Deck (head)	< 10 d/m/smear alpha
Reactor Deck (grating)	19150 d/m/smear beta-gamma
Reactor Deck (grating)	< 10 d/m/smear alpha
Primary Compartment (grating)	3830 d/m/smear beta-gamma
Primary Compartment (grating)	< 10 d/m/smear alpha

Liquid and gaseous effluents from the SNEC site for the month of June 1968 were as follows:

Effluent Type	(Curie) Activity This Month	(Curie) Activity Year to Date	(Curie) Activity Last Twelve Months
Liquid	0.000453	0.003184	0.010813
Tritium	1.378342	4.038990	5.494919
Air, Xe	0.741070	15.793931	26.632464
Air, I-131	0.000000	0.000321	0.001972
Air, M.F.P.	0.007410	0.157939	0.266324

No barrels of waste were drummed for temporary storage. Fifteen (15) drums were shipped from the site.

Radiation exposure for all SNEC personnel as measured by film badges for the month of May 1968 were a maximum of 70 mrem with an average of 11.6 mrem.

Radiation exposure for all visiting personnel as measured by film badges for the month of May 1968 were a maximum of 0 mrem with an average of 0 mrem.

The average radiation exposure for all personnel as measured by film badges for the month of May 1968 was 9.95 mrem.

SAXTON NUCLEAR EXPERIMENTAL CORPORATION

OPERATING STATISTICS

MONTH JUNE YEAR 1968

NUCLEAR	UNIT	MONTH	YEAR	TO DATE
TIMES CRITICAL	NO.	4	105	647
HOURS CRITICAL	HRS.	1.9	1,117.56	21,690.56
TIMES SCRAMMED (MANUAL)	NO.	2	41	368
* TIMES SCRAMMED (INADVERTANT)	NO.	0	6	39
THERMAL POWER GENERATION	MWH	0	26,456.36	404,426.29
AVERAGE BURNUP	MWD/MTU	0	2,159.55	15,993.78

CONTROL ROD POSITIONS AT END OF MONTH AT EQUILIBRIUM POWER OF 0 MWt

MAIN COOLANT BORON 1100 PPM

RODS OUT - INCHES

NO. 1 0 NO. 2 10 NO. 3 0

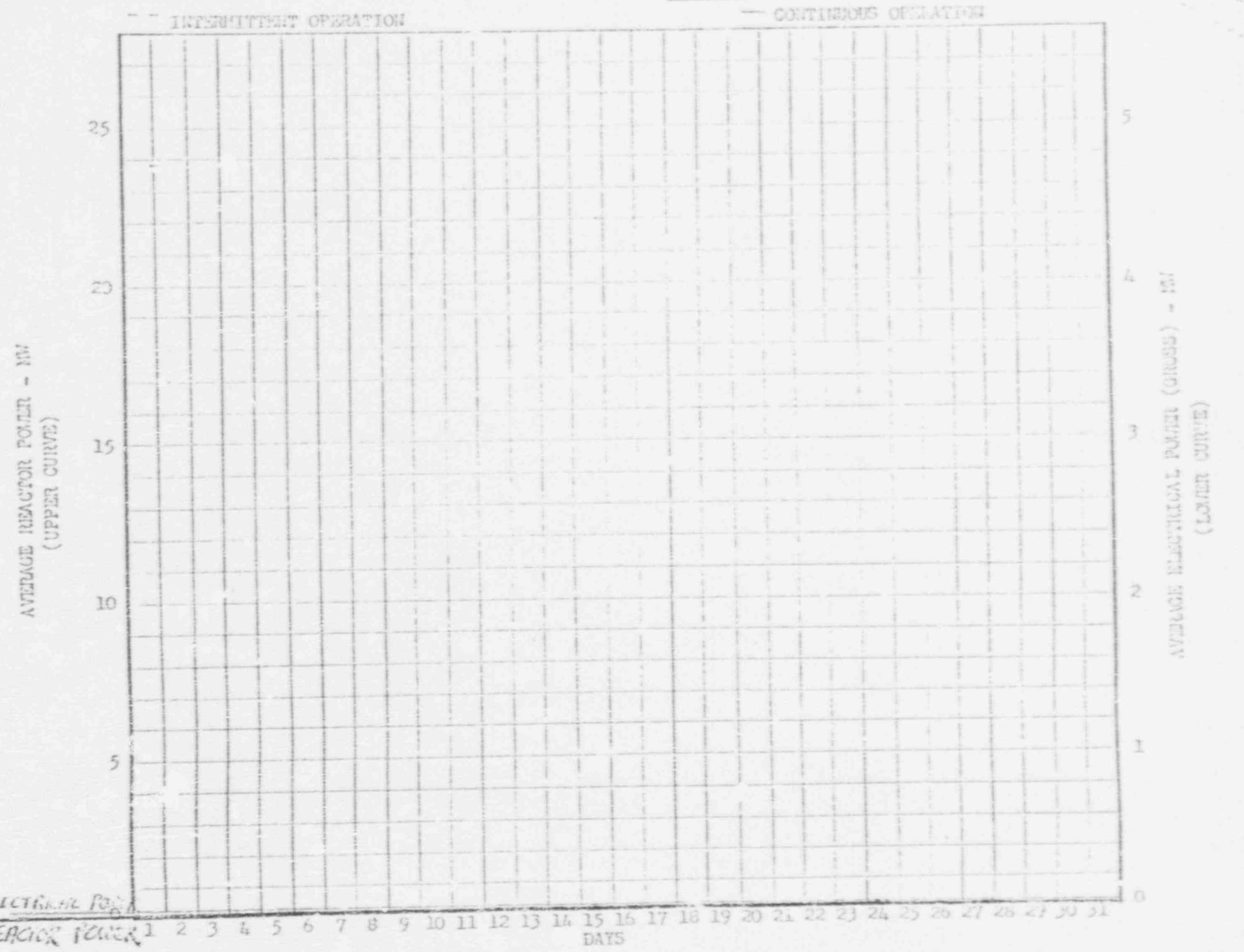
NO. 4 0 NO. 5 10 NO. 6 0

ELECTRICAL	UNIT	MONTH	YEAR	TO DATE
GROSS GENERATION	MWH	0	4,862.00	68,138.50
STATION SERVICE	MWH	140.34	1,675.91	13,891.81
STATION SERVICE	%	0	34.47	20.39
AVG. PLANT EFFICIENCY - MWH(s)/MWH(t)	%	0	18.38	16.85
AVG. GENERATION RUNNING (0 HRS)	KW	0	4,730.90	3,441.13
PLANT LOAD FACTOR - (AVG. GEN. FOR MONTH/MAX. LOAD)	%	0	17.67	19.86
AUXILIARY STEAM SUPPLY - NUCLEAR				
STEAM SUPPLIED BY REACTOR	HRS.	0	1,069.47	18,220.56
RWDF EVAPORATOR OPERATION	HRS.	81.25	364.51	6,822.91

* REMARKS: _____

SAXTON NUCLEAR EXPERIMENTAL CORPORATION

DAILY AVERAGE POWER LEVELS FOR JUNE 1968



ELECTRICAL POWER

REACTOR POWER