

Operational Report for April 19691. GENERAL

The scheduled plant outage which was begun on October 18, 1968, was continued throughout this report period. The major effort was devoted to installing and checking out the in-core nuclear instrumentation channels and loading Core III into the reactor. On April 18, the loading of the 21 core III main fuel assemblies, the nine " " assemblies, and six control rods and followers was completed. Seven non-fuel test rods were also inserted in the removable rod positions of the 9x9 assemblies. A diagram of Santox Core III is attached.

On April 25, the upper core support barrel was installed in the reactor and the instrument frame lowered into position. On April 28, the reactor vessel head was installed on the reactor. Control rod drop times were determined for the six control rods at ambient temperature and no flow. The measured drop times were between 767 and 859 milliseconds. In October 1965, after installation of Core II, comparable rod drop tests were conducted and the measured times were between 761 and 858 milliseconds.

On April 29, a 1/K plot versus core power was run to determine the shutdown margin. The shutdown margin was determined to be greater than 16% which is the calculated shutdown margin for 1 rod bank worth.

Reactor vessel head bolt installation was begun on April 29 and was in progress at the end of the month.

Two material irradiation capsule assemblies installed in the reactor in October 1965 were removed from dummy fuel assembly positions A-4 and C-6 for shipment off site.

2. OPERATIONAL TESTS

The SNEC fire and evacuation alarms were tested April 4, 11, 18 and 25.

The monthly test of the radiation monitoring system was completed on April 4.

3. MAINTENANCE

The principal items of mechanical maintenance during the month included cleaning the control room air conditioner coolers; repairing the containment vessel crane universal joint; installing a new river water line to the instrument air cooler; cleaning the water jacket on the instrument air compressor and repacking the compressor piston; replacing a section of pipe in the hotwell vent line; repairing the high radiation area fence around the waste drum storage area; processing eleven drums of evaporator waste; painting the sample room panel; parkerizing and electro-filming the reactor vessel stud bolts and acorn nuts; replacing the control and auxiliary building air handler prefilters; and repairing the RWDF roof drain.

The major items of electrical and instrument maintenance included fabricating two watertight cans for the refueling in-core nuclear instrumentation; checking the specific gravity of the station service batteries; calibrating and installing the in-core nuclear instrumentation; replacing electronic tubes in the RWDF sump pump controller; installing a 500 W heater in the nuclear instrumentation junction box; installing hinges and a gasket on the nuclear instrumentation junction box; rebuilding and installing a motor on the RWDF evaporator room mixing fan; cleaning and repairing the river water pressure regulator; installing a new conductivity probe in the make-up purification caustic tank; repairing the high voltage power supply on the count room spectrometer; replacing the RTD in the number three spent resin storage tank; cleaning the RWDF evaporator hotwell dump solenoid valve; repairing the limit switch on the evaporator bottoms drain valve; repairing the effluent monitor, RIC-6, preamp circuit; replacing a relay in site particulate monitor, RIC-8, alarm unit; repairing the flow alarm switch on the site particulate monitor, RIC-8; installing instrument air, steam and electrical service for Parkerizing the reactor vessel head bolts; repairing the latching mechanism on the E 2/H breaker and the battery charger breaker; installing a new photomultiplier tube in RWDF effluent monitor, RIC-6; replacing three potentiometers in nuclear instrumentation source range B; installing a new filter and cleaning air pressure controller on the instrument air compressor; and checking the calibration of the RWDF effluent monitor, RIC-6, and the site particulate monitor, RIC-8; calibrating the letdown flow control valve, LRC-21V, and the pressurizer level controller, LIC-2.

4. CHEMISTRY

The main coolant system was in a cold shutdown condition throughout the entire month for the loading of Core III. Boron concentrations ranged from 1625 ppm to 1652 ppm during refueling. A summary of analyses performed on the main coolant is given in the table below.

<u>Main Coolant - Storage Well Samples</u>	<u>Minimum</u>	<u>Maximum</u>
pH at 25°C	4.68	5.70
Conductivity, umhos	5.36	9.86
Boron, ppm	1625	1652
Chlorides, ppm	<0.005	<0.005
Gross Beta-Gamma (15 min. degassed) uc/cc	2.08×10^{-3}	7.01×10^{-3}
Tritium, uc/cc	8.39×10^{-3}	8.68×10^{-3}

On April 22, the mixed-bed resins in the storage well demineralizer were replaced. The decontamination factors on the new resin ranged from 8.8 to 10.4.

5. RADIATION AND WASTE DISPOSAL

Radiation surveying consisted of routine plant surveys, the containment vessel, and materials shipments. The following maximum radiation readings were taken:

<u>Location</u>	<u>Radiation Reading</u>
<u>C&A Building</u>	
Waste Drum (baling machine)	1.2 mrem/hr beta-gamma
Charging Pump (contact with chamber)	37 mrem/hr beta-gamma
Sample Room (door of sample panel)	1.5 mrem/hr beta-gamma
<u>RWDF</u>	
Evaporator (under bottom)	21 mrem/hr beta-gamma
Evaporator (contact outside upper level)	5 mrem/hr beta-gamma
Drum Storage Area (at HRA fence)	1.4 mrem/hr beta-gamma
<u>C.V.</u>	
Primary Compartment (general upper level)	80 mrem/hr beta-gamma
Primary Compartment (contact M.C. pump volute)	230 mrem/hr beta-gamma
Primary Compartment (S.C. bottom)	150 mrem/hr beta-gamma
Primary Compartment (pressurizer bottom)	100 mrem/hr beta-gamma
Primary Compartment (general lower level)	55 mrem/hr beta-gamma
Primary Compartment (Regen. HX)	500 mrem/hr beta-gamma
Primary Compartment (Non-Regen. HX)	40 mrem/hr beta-gamma
Auxiliary Equipment Compartment (S.C.H.X.)	8 mrem/hr beta-gamma
Auxiliary Equipment Compartment (D.T. top)	10 mrem/hr beta-gamma
Auxiliary Equipment Compartment (D.T. bottom)	36 mrem/hr beta-gamma
Auxiliary Equipment Compartment (General lower level)	4 mrem/hr beta-gamma
Reactor Deck (instrument ports)	460 mrem/hr beta-gamma

Contamination surveying consisted of routine plant site surveys, surveys of materials shipped, tools, equipment and the containment vessel. 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:

<u>Location</u>	<u>Contamination Reading</u>
<u>C&A Building</u>	
Charging Pump Chamber	5162 d/m/smear beta-gamma
Charging Pump Chamber	<10 d/m/smear alpha
Charging Room Floor	2820 d/m/smear beta-gamma
Sample Room Sink	874800 d/m/smear beta-gamma
Sample Room Sink	<10 d/m/smear alpha
Sample Room Floor	901 d/m/smear beta-gamma
Chemical Lab Hot Sink	15000 d/m/smear beta-gamma
Chemical Lab Hot Sink	<10 d/m/smear alpha

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<u>Location</u>	<u>Contamination Reading</u>
<u>RWDF</u>	
Pump Room Floor	4090 d/m/smear beta-gamma
Shipping Room Floor	<100 d/m/smear beta-gamma
<u>C.V.</u>	
Operating Deck	1840 d/m/smear beta-gamma
Operating Deck	< 10 d/m/smear alpha
Reactor Deck (head)	11700 d/m/smear beta-gamma
Reactor Deck (head)	< 10 d/m/smear alpha
Primary Compartment (grating)	430 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 April, 1969, were as follows:

<u>Effluent Type</u>	<u>(Curie) Activity This Month</u>	<u>(Curie) Activity Year to Date</u>	<u>(Curie) Activity Last Twelve Months</u>
Liquid	0.000966	0.002894	0.009189
Tritium	0.214280	0.321941	4.041007
Air, Xe	0.000108	0.040116	6.967132
Air, I-131	0.000000	0.000000	0.000321
Air, M.F.P.	0.000001	0.000401	0.069671

Twenty (20) barrels of waste were drummed for temporary storage. No drums were shipped from the site.

Radiation exposure for all SNEC personnel as measured by film badges for the month of March, 1969, were a maximum of 1040 mrem with an average of 165.58 mrem.

Radiation exposure for all visiting personnel as measured by film badges for the month of March, 1969, 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 March, 1969, was 125.19 mrem.

SAXTON NUCLEAR EXPERIMENTAL CORPORATION

OPERATING STATISTICS

MONTH April YEAR 1969

<u>NUCLEAR</u>	<u>UNIT</u>	<u>MONTH</u>	<u>YEAR</u>	<u>TO DATE</u>
TIMES CRITICAL	NO.	0	0	823
HOURS CRITICAL	HRS.	0	0	22,948.49
TIMES SCRAMMED (MANUAL)	NO.	0	0	449
* TIMES SCRAMMED (INADVERTANT)	NO.	0	0	42
THERMAL POWER GENERATION	MWH	0	0	429,077.53
AVERAGE BURNUP (Pu Region)	MWD/MTU	0	0	18,029.03
CONTROL ROD POSITIONS AT END OF MONTH AT EQUILIBRIUM POWER OF <u>0</u> Mwt				
MAIN COOLANT BORON <u>1627</u> PPM				

RODS OUT - INCHES

NO. 1 <u>0</u>	NO. 2 <u>0</u>	NO. 3 <u>0</u>
NO. 4 <u>0</u>	NO. 5 <u>0</u>	NO. 6 <u>0</u>

<u>ELECTRICAL</u>	<u>UNIT</u>	<u>MONTH</u>	<u>YEAR</u>	<u>TO DATE</u>
GROSS GENERATION	MWH	0	0	73,529.3
STATION SERVICE	MWH	87.95	352.13	15,525.52
STATION SERVICE	%	0	0	21.11
AVG. PLANT EFFICIENCY - MWH(e)/MWH(t)	%	0	0	17.14
AVG. GENERATION RUNNING (<u>0</u> HRS)	KW	0	0	3,461.11
PLANT LOAD FACTOR - (AVG. GEN. FOR MONTH/MAX. LOAD)	%	0	0	18.89

AUXILIARY STEAM SUPPLY - NUCLEAR

STEAM SUPPLIED BY REACTOR	HRS.	0	0	19,259.14
RWDF EVAPORATOR OPERATION	HRS.	149.95	537.79	7,952.65

* REMARKS: _____

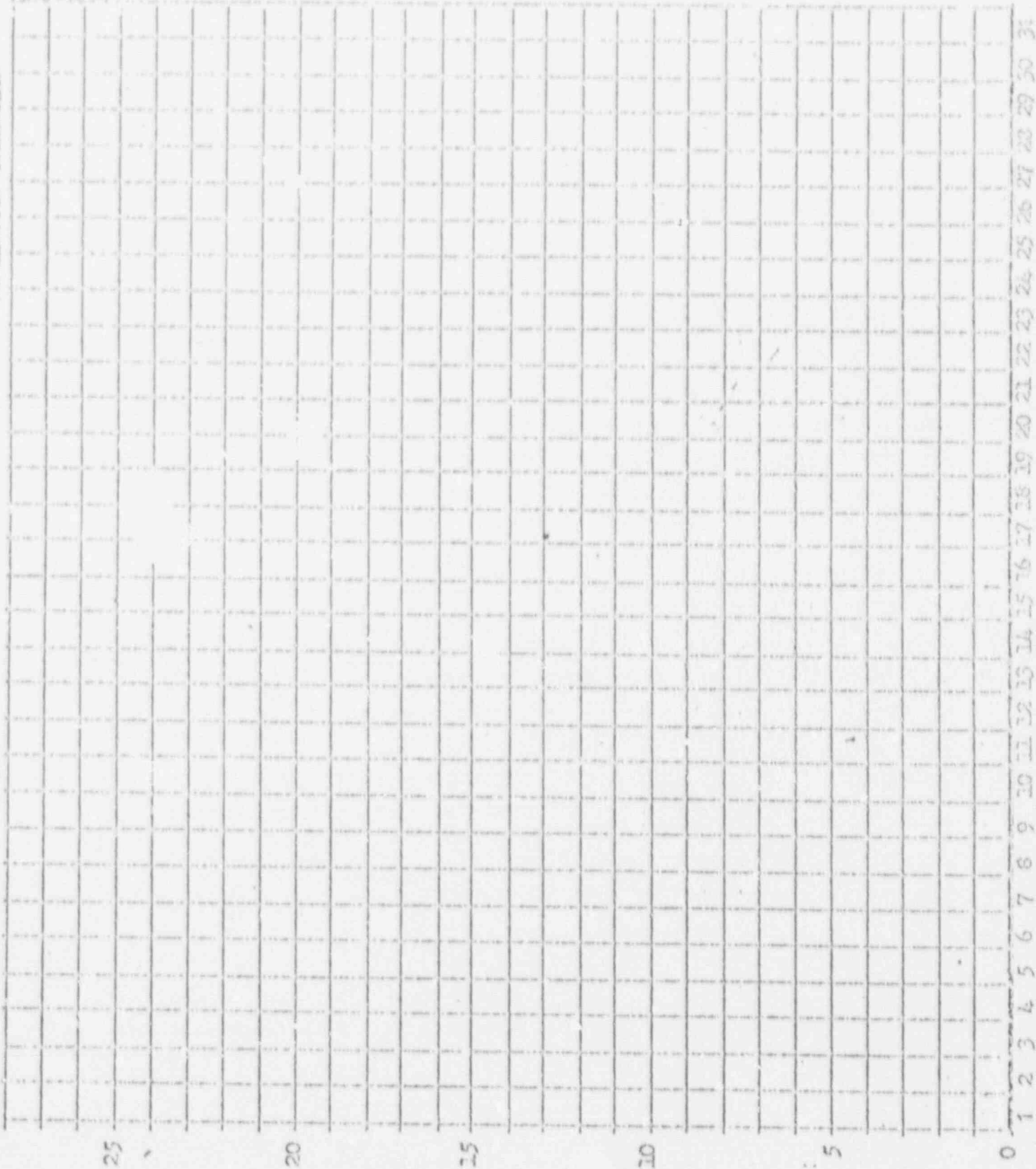
AVARAGE REMOVED POWER - MI

(UPPER CURVE)

DAILY AVERAGE POWER LINE FOR APRIL 1963

--- INTERMITTENT OPERATION

--- CONTINUOUS OPERATION



AVARAGE REMOVED POWER - MI

(UPPER CURVE)

