Operation Report for October 1969

1. GENERAL

Modification to the existing 13.8 KV bus work in the Saxton Steam Generating Station to provide an alternate source of power for the SNEC 1000 KVA transformer was completed. Normal source of power for the 1000 KVA transformer is 13.8 KV bus 1B; with this modification, loss of power on bus 1B will automatically initiate a transfer to the alternate bus to maintain the 1000 KVA transformer energized.

On October 29, repairs to the reactor vessel head instrumentation port, N-7, were initiated. The tube support extension was cut off and the teleflex thimbles and a new tube support extension welded in place. Repairs were still in progress at the end of this report period.

The monthly test of the safety injection and recirculation system was conducted on October 21. During the test, number two recirculation pump failed to start on a low water level signal (RWST/LIC-2) from the refueling water storage tank. The trouble was traced to a set of contacts in the level control unit (RWST/L1C-2). The contacts were adjusted and the test repeated satisfactorily.

Recirculation is initiated by redundant low water level signals (RWST/LIC-1 and RWST/L1C-2) from the refueling water storage tank. However, during the test, the redundant circuits are tested separately. Under normal conditions, either low level signals will start both pumps.

2. REACTOR OPERATIONS

At the beginning of this report period a heat-up of the primary system was in progress to test the reactor vessel head instrumentation port N-7 repair. On October 3, the primary system was again cooled down to install the cap on the N-7 port because of continued leakage. The cap was installed to permit start-up training while the design and fabrication of the repair hardware was in progress.

On October 5, a hot leak test was performed in order to test the repairs done to the N-2 flux thimble. During the hot leak test, a leak developed through the N-11 instrument port conoseal. The primary system was again cooled down and the conoseal gaskets replaced on the N-11 instrument port.

Heat-up of the primary system was initiated on October 10 and completed on October 12. Control rod drop times were measured on October 13 after five complete heat-up and cooldown cycles. Reactor operator training start-ups were conducted on October 14 and October 15. On October 16 the primary system was again cooled down in order to repack the pressurizer spray valve.

Heat-up of the primary system was initiated on October 18 and completed on the nineteenth. The period from October 20 thru October 28 was used for reactor operator training for SNEC trainees and Westinghouse customer trainees.

On October 28, the reactor power was increased to 0.5 MWt and a flux map made to verify data taken during the zero power testing and the effect of incore detectors.

On October 29, the primary coolant system cooldown was initiated to make repairs to the reactor vessel head instrumentation port, N-7.

During the month a total of twenty-two (22) full start-ups and fifty-one (51) recoveries were made for training purposes.

3. EXPERIMENTAL PROGRAM

On October 28, a flux map was plotted with the reactor at 0.5 MWt to determine the effect of the detectors on core power distribution.

4. OPERATIONAL TESTS

The SNEC fire and evacuation alarms were tested satisfactorily on October 3, 10, 17, 24 and 31.

The monthly test of the radiation monitoring system was conducted on October 3.

The monthly test of the safety injection system and the recirculation system was completed on October 21.

5. MAINTENANCE

The principal items of mechanical maintenance during the month included installing new conoseal gaskets on reactor vessel head instrumentation port N-11; installing new insulation on the safety injection system piping outside the containment vessel; processing seven drums of evaporator bottoms; repacking the waste facility sump pump; installing new steam traps on the containment vessel supply air handler; lapping the seat on chem-shim inlet valve, HIC-27V and the shutdown cooling system isolation valve, HIC-29V; repacking the pressurizer spray valve, PRC-2V; installing new trim in the regenerative heat exchanger relief valve, V-53, and setting the lift pressure; replacing a rupture disc on the containment vessel discharge tank; installing a new section of pipe in the RWDF auxiliary steam header drain line; installing eight absolute filters in the containment vessel operating area air handler; installing a new elbow on the make-up purification system acid flow meter; installing new belts on the containment vessel radiation monitor vacuum pump, MVC-1, 2 and 11; installing the conoseal cap on reactor vessel instrumentation port, N-7; replacing a valve on the evaporator chemical feed tank; repairing the steam tracing on the boric acid piping to the refueling water storage tank; and installing a new valve on the evaporator feed line.

The major items of electrical and instrument maintenance included repairing the solu bridge for the caustic mix tank; replacing vacuum tubes in the water treatment conductivity recorder; replacing the solenoid valve on the instrument air supply to the No. 1 anion unit automatic shut-off valve; repairing the chart drive on the site anemometer recorder; cleaning contacts in the rod control circuit of rods 2 and 5; rewiring the instrument air dryer heater elements; calibration of the steam generator blowdown monitor, RIC-5; repairing the RWDF mixing fan motor; replacing the carbon vanes in the evaporator room particulate monitor vacuum pump; replacing the solenoid valve on HIC-27V instrument air supply; checking the specific gravity of the station batteries; replatinizing a water treatment conductivity cell; connecting the failed fuel monitor system to the vital bus and installing an alarm; repairing the contacts on the number one charging pump pressure gage alarm circuit; and completing the installation of the alternate power supply from the 13.8 KV bus No. 2 to the SNEC 1000 KVA transformer.

6. CHEMISTRY

The main coolant boron concentration was reduced to 466 ppm on October 3 during the boration of a new mixed bed resin in the purification system demineralizer (boric acid). On October 27 the boron concentration was increased to 901 ppm in order to reproduce the control rod configuration for the 0.5 MWt flux map. The primary coolant conductivity reached a high of 92 umhos on October 20 due to the addition of hydrazine for oxygen removal. A summary of the analyses performed on the primary coolant is contained in the following table:

Primary Coolant	Minimum	Maximum
pH at 25°C	6.60	7.35
Conductivity, umhos	14.9	92.0
Boron, ppm	466	901
Chlorides, ppm	< 0.005	< 0.005
Oxygen, ppm	< 0.005	0.015
Lithium, ppm	0.00	0.03
Crud, ppb (one determination)	63	
Gross Beta-Gamma (15 Min. Degassed) uc/cc	1.64×10^{-2}	5.65×10^{-2}
Tritium, uc/cc	8.69×10^{-4}	1.66×10^{-3}

Analysis of the component cooling water is as follows:

pH	Conductivity, umhos	CrO_4, ppm	Activity, uc/cc
8.72	841	345	6.60×10^{-6}

Analysis of RWST water and storage well water is as follows:

	RWST	Storage Well
pH	4.98	5.09
Conductivity, umhos	5.10	6.12
Boron, ppm	1624	1880
Activity-Beta-Gamma, uc/cc	4.03×10^{-4}	9.77×10^{-4}
Tritium, uc/cc	9.59×10^{-3}	1.07×10^{-2}

7. RADIATION AND WASTE DISPOSAL

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

Location	Radiation Reading
C&A Building	
Waste Drum (baling machine)	0.5 mrem/hr beta-gamma
Charging Pump (contact with chamber)	17.5 mrem/hr beta-gamma
Sample Room (door of sample panel)	1.1 mrem/hr beta-gamma
Chemical Lab Hot Sink (1" from drain)	0.95 mrem/hr beta-gamma
RWDF	
Evaporator (under bottom)	15 mrem/hr beta-gamma
Evaporator (contact outside upper level)	6 mrem/hr beta-gamma
Drum Storage Area (at HRA fence)	0.75 mrem/hr beta-gamma
C.V.	
Primary Compartment (general upper level)	100 mrem/hr beta-gamma
Primary Compartment (contact M.C. pump volute)	380 mrem/hr beta-gamma
Primary Compartment (S.G. bottom)	275 mrem/hr beta-gamma
Primary Compartment (Pressurizer bottom)	120 mrem/hr beta-gamma
Primary Compartment (general lower Level)	80 mrem/hr beta-gamma
Primary Compartment (Regen. HX)	475 mrem/hr beta-gamma
Primary Compartment (Non-Regen. HX)	37 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)	55 mrem/hr beta-gamma
Auxiliary Equipment Compartment (general lower level)	2.5 mrem/hr beta-gamma
Reactor Deck (water level at grating)	75 mrem/hr beta-gamma
Reactor Deck (instrument ports)	230 mrem/hr beta-gamma
Reactor Deck (waist level)	55 mrem/hr beta-gamma
Reactor Deck (storage well railing)	50 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 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	6620 d/m/smear beta-gamma
Charging Pump Chamber	<10 d/m/smear alpha
Charging Room Floor	380 d/m/smear beta-gamma
Sample Room Sink	8190 d/m/smear beta-gamma
Sample Room Sink	< 10 d/m/smear alpha
Sample Room Floor	480 d/m/smear beta-gamma

Location	Contamination Level
C&A Building (Cont'd)	
Chemical Lab Hot Sink	1800 d/m/smear beta-gamma
Chemical Lab Hot Sink	< 10 d/m/smear alpha
RWDF	
Pump Room Floor	10100 d/m/smear beta-gamma
Shipping Room Floor	< 100 d/m/smear beta-gamma
C.V.	
Operating Deck	2165 d/m/smear beta-gamma
Operating Deck	< 10 d/m/smear alpha
Reactor Deck (head)	51910 d/m/smear beta-gamma
Reactor Deck (head)	< 10 d/m/smear alpha
Reactor Deck (grating)	49300 d/m/smear beta-gamma
Reactor Deck (grating)	< 10 d/m/smear alpha
Primary Compartment (grating)	18333 d/m/smear beta-gamma
Primary Compartment (grating)	< 10 d/m/smear alpha
Letdown Valve	61000 d/m/smear beta-gamma

Liquid and gaseous effluents from the SNEC site for the month of October 1969 were as follows:

Effluent Type	(Curie) Activity This Month	(Curie) Activity Year to Date	(Curie) Activity Last Twelve Months
Liquid	0.001891	0.006718	0.007829
Tritium	0.055642	0.862103	2.546016
Air, Xe	0.068777	0.497996	0.499827
Air, I-131	0.000000	0.000000	0.000000
Air, M.F.P.	0.000687	0.004979	0.004998

No 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 September 1969 were a maximum of 260 mrem with an average of 21.3 mrem.

Radiation exposure for all visiting personnel as measured by film badges for the month of September 1969 were a maximum of 46 mrem with an average of 2.0 mrem.

The average radiation exposure for all personnel as measured by film badges for the month of September 1969 was 18.0 mrem.

SAXTON NUCLEAR EXPERIMENTAL CORPORATION

OPERATING STATISTICS

MONTH OCTOBER YEAR 1969

NUCLEAR	UNIT	MONTH	YEAR	TO DATE
TIMES CRITICAL	NO.	73	350	1,173
HOURS CRITICAL	HRS.	35.63	213.31	23,161.80
TIMES SCRAMMED (MANUAL)	NO.	21	114	563
* TIMES SCRAMMED (INADVERTANT)	NO.	0	4	46
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 0 MWt

MAIN COOLANT BORON 651 PPM

RODS OUT - INCHES

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

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

ELECTRICAL	UNIT	MONTH	YEAR	TO DATE
GROSS GENERATION	MWH	0	0	73,529.3
STATION SERVICE	MWH	242.98	1,604.99	16,778.39
STATION SERVICE	%	0	0	22.82
AVG. PLANT EFFICIENCY - MWH(e)/MWH(t)	%	0	0	17.14
AVG. GENERATION RUNNING (0 HRS)	KW	0	0	3,461.11
PLANT LOAD FACTOR - (AVG. GEN. FOR MONTH/MAX. LOAD)	%	0	0	17.63

AUXILIARY STEAM SUPPLY - NUCLEAR

STEAM SUPPLIED BY REACTOR	HRS.	0	0	19,259.74
RWDF EVAPORATOR OPERATION	HRS.	343.95	1,839.28	9,254.14

* REMARKS: _____

SAXTON NUCLEAR EXPERIMENTAL CORPORATION

DAILY AVERAGE POWER LEVELS FOR OCTOBER, 1969

--- INTERMITTENT OPERATION —— CONTINUOUS OPERATION