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PREFACE:

The eighth Semi-Annual Operating Report is submitted in accordance with Section 6.6.1 of the H. B. Robinson Unit No. 2 Technical Specifications. The report relates plant operating experiences and pertinent information regarding operations during the period of January 1, 1974, to June 30, 1974.

SUMMARY:

The first four months of this six-month period constituted routine operations. Effort during that time was directed toward preparations and planning for the 1974 refueling outage. The final two month's of this reporting period involved the outage and refueling operations. Refer to Appendix I for a summary of the outage events. The following monthly summaries relate the activities which took place during the six-month period.

SECTION I

MONTHLY REPORTS

REPORT FOR JANUARY

Plant Operations

Plant load was reduced on three occasions this month to perform secondary system repairs. The repairs consisted of repacking "A" heater drain pump and replacing fuses in "A" condensate pump breaker.

One plant shutdown (15 HR 15 min) occurred on January 20 in order to repair overheating bus duct supports between B & C phases.

In addition to this, there were five trips and brief shutdowns. These are summarized in the monthly outage report. The plant achieved a maximum thermal output of 2200.0 mega watts on January 13 and 14.

Abnormal Occurrences

1. Following routine sampling and analysis of the Boron Injection Tank and the Boric Acid Storage Tanks on January 3, 1974, it was reported at approximately 1000 hours that the Boron concentration in the BIT was 17913 ppm and in "B" Boric Acid Storage Tank, 18023 ppm, which is below the minimum 20,000 ppm concentration required by the Plant Technical Specifications. "A" Boric Acid Storage Tank concentration was 20,650 ppm. Due to the inconsistency of the analysis, there was some doubt as to the validity of the results, however, the decision was made to place the Reactor in a Hot Shutdown condition until such time that it was proved that the BIT Boron concentration was above the minimum Technical Specification limits. At 1602 hours, a sample of the BIT indicated a concentration of 20,822 ppm and the instructions to retire the unit were temporarily rescinded. Subsequent samples proved this analysis to be correct, therefore, safe Reactor operation was assured and the unit maintained in service.

The line between the concentrates holding tank pumps and the Boric Acid Tanks had become plugged with solidified Boric Acid on December 31, 1973. It would appear that following the transfer of acid on December 31, 1973, that the line was not completely flushed, allowing a pocket of concentrated acid to solidify in the line.

The unsuccessful attempts to clear this line on January 2, 1974, allowed the concentration in "B" BAT to become diluted and led to the possible dilution of the BIT on January 3, 1974.

2. On Monday, January 14, the computer was taken out of service for replacement of a faulty core card. Repair work of this type requires that all entered constants be re-entered into the memory. This was accomplished by use of a special teletype tape called the "common tape". This tape had been punched on January 8, 1974, so it did not contain the new limits. Therefore, obsolete F(z) S(z) limits were entered and went unnoticed until Wednesday, January 16, 1974. These limits were exceeded in reactor operation during recovery from a load reduction on Tuesday, January 15.

Noting the amount of conservative margin incorporated into the limits, it is highly unlikely that any adverse effect was suffered by the fuel. A flux map was made on Monday, January 14. An analysis of this map that included corrections for power and included 3% additional decrease in the F_q^n limit to account for exceeding F(z) S(z) limits, proved that the limiting value for F_q^n was not exceeded.

3. On January 25 following a secondary system repair load was being increased on the unit when control rod H-8 (bank D, group 2) was observed to be 50 steps

below its bank at 1605 hours. Load increase was curtailed and preparations made to realign H-8 with its bank. When H-8 was stepped by itself an "Urgent Failure" alarm was received which would not reset from the RTGB. An "Urgent Failure" was found on the 1AC rod control cabinet. Further investigation revealed that the stationary gripper main power fuse for Control Bank C, Group 1 had blown. Since this failure inhibited normal operation of the control rods receiving power from this cabinet, more than one inoperable rod was present which violated Technical Specification 3.10.5.2. At this time the plant was at 88% power, and boration was initiated to place the plant in the hot shutdown condition. This failure did not inhibit normal rod insertion from a reactor trip. Voltage measurements were made in the rod control cobinet, and no abnormal conditions were found. At this time the affected group was placed on "DC hold" and the blown fuse replaced. The "DC hold" was turned off, and the affected bank test operated satisfactorily with no urgent failure. Boration was then terminated with the plant at 76% power. Alignment of H-8 was restarted and was completed satisfactorily with no urgent failure. Power was then increased as required by system load.

The three abnormal occurrences described above were duly reported per Technical Specification requirements.

CAROLINA POWER AND LIGHT COMPANY
H. B. ROBINSON STEAM ELECTRIC PLANT
UNIT NO. 2 January, 1974

I. Nuclear Generation

A.	Number of times the reactor was made critical.	5
B.	Gross thermal power generated (MWH).	1,506,432
C.	Hours Reactor Critical	726.08

II. Electrical Generation

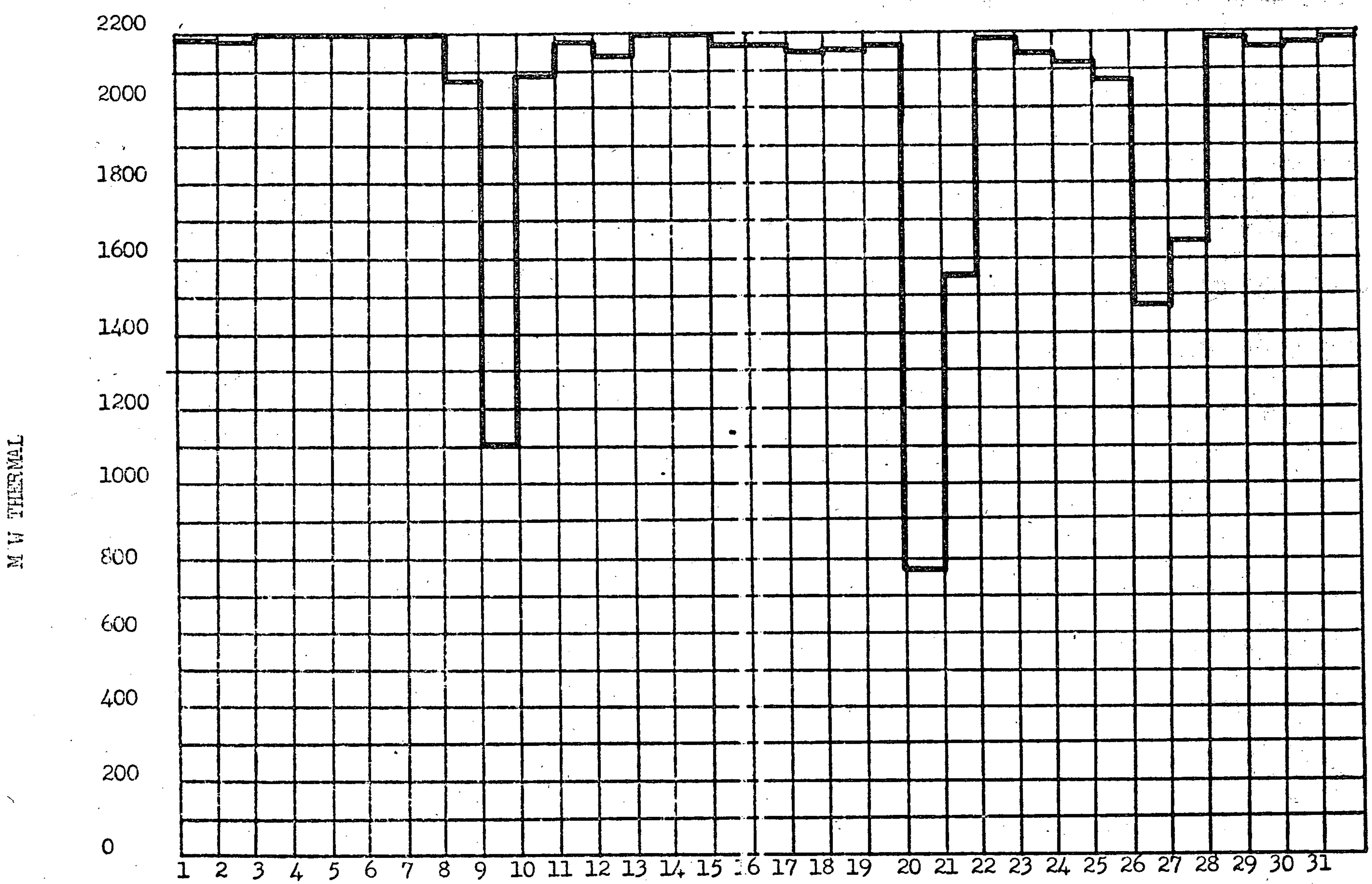
A.	Gross power generated (MWH).	497,692
B.	Net power generated (MWH).	473,729
C.	Length of time generator was on line (Hours).	719.62

III. Solid Radioactive Waste

A.	Total volume of solid waste shipped (Cubic Feet).	547
B.	Total estimated Radioactivity involved (Curies).	1.871

C. Disposition of materials shipped.

Date	Quantity (Ft^3)	Destination
1-11-74	547	Barnwell, S. C.



Month January 19 74

January
OUTAGE REPORT

NUMBER	DATE	TYPE	PLANT STATUS DURING SHUTDOWN	CAUSE	CORRECTIVE ACTION	DURATION
1	1-9-74	Trip	Hot Shutdown	High level in steam generator #1 while increasing load after weekly turbine valve test.	Established proper levels.	2 hr. 0 min.
2	1-9-74	Trip	Hot Shutdown	High level in steam generator #2 while recovering from previous trip.	Established proper levels.	1 hr. 29 min.
3	1-9-74	Trip	Hot Shutdown	High level in steam generator #2 while recovering from previous trip.	Established proper levels.	1 hr. 48 min.
4	1-20-74	Scheduled	Hot Shutdown	Repair bus ducts to reduce heating of supports between B and C phases. Repair secondary leaks.	Repair work completed	15 hr. 15 min.
5	1-26-74	Trip	Hot Shutdown	Reactor trip due to turbine trip. Turbine trip was caused by the voltage regulator failing when a fuse blew on "B" phase for the voltage regulator.	Replaced fuse	2 hr. 50 min.

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
Rod Position Indication System	None	N7 and J3 were out of calibration	High readings on N7 and J3	N7 and J3 were calibrated.
Spent Fuel Pit Cooling Pump Motor	None	Lack of lubricant around rear motor bearing	Excessive noise	The rear motor bearing was repacked
Waste Evaporator	None	Defective coil in eductor valve	Eductor valve inoperable	The coil was renewed.
Station Air Compressor	None	Defective airline to the temperature controller	Loss of temperature control	The airline was cut and a union installed.
Steam Generator Blowdown Valves	None	Limit switch on Valve V1-8C out of adjustment	Blowdown Valves would not stay open.	The limit switch was adjusted.
"A" Boric Acid Evaporator	None	Water in the level and vacuum transmitters	Transmitters were pegged low	The transmitters were disassembled and cleared of all water.
Pressurizer Pressure Transmitter - 445 (PT-445)	None	Defective Power Supply	Erratic Indications	The power supply was replaced.
Reactor Plant Makeup	None	Level Control-114-2X (LC-114-2X) had a defective coil	Erroneous reactor makeup water alarm	The coil was renewed.
"A" Instrument air dryer	None	Faulty bushing on fan shaft	Fan shaft was binding	The bushing was polished and lubricated.
"A" and "B" Boric Acid Tank Level Indicators	None	Sight glasses out of position on level indicators 106 & 108	Improper indications	The sight glasses were repositioned
Automatic Rod Control System	None	First stage turbine pressure transmitter PT-446 was defective	PT-446 failed high	The transmitter was replaced and the new one calibrated.

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
Axial Power Distribution Monitoring System (APDMS)	None	The power level bistable I & II and the Nuclear Instrumentation System (NIS) inputs to the Bistable were out of calibration.	APDMS Power level bistables would not denergize when power went below 92%	The bistable and the NIS inputs were calibrated.
"B" Service Water booster pump	None	Defective oil seal in the pump bearing housing	Excessive oil leakage	The defective oil seal was renewed.
Full Length Rod Control System	None	The liftcoil had a defective cable connector	Control Rod #48 would not move with other rods in its group.	The connector was repaired.
Flux Mapping System	None	Radial Lead Resistor "R8" was defective	Improper indication from "E" detector power supply.	The resistor "R-8" was renewed.
Full Length Rod Control	None	Stationary power fuse F6 for Group 2 rods in power cabinet/AC was blown	No rod movement	Fuse F6 was replaced.
"A" Instrument Air Dryer	None	Lack of Lubricant in the fan motor	Dryer inoperable	The fan motor was lubricated
NR43 Recorder	None	Defective filter capacitors in the No. 1 Servo Amplifier	Erratic indications	The filter capacitors were replaced.
Boric Acid Heat Trace	None	Defective relay switch on circuits No. 48 and No. 50. Defective cable in Circuit No. 67.	Erratic Alarms	The relay switch was replaced and a new heat trace cable was installed.
Primary Makeup System	None	Defective Coil in relay 114-2X	Erratic Alarm	The coil was replaced in relay 114-2X
"C" Loop Accumulator	None	Defective relay on Card No. 7 of the Lundell Annunciator	Hi/Lo Alarm would not clear	The defective relay was replaced.
Heat Tracing Annunciators	None	Missing spring on timing cam pawl of Recorder No. 3. Defective lock-in relays on Recorder No. 4.	Improper Indication on Recorder No. 3 Recorder No. 4 inoperable	A new spring was installed on Recorder No. 3. The relays were replaced in Recorder No. 4

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
"B" Charging Pump Leakoff System	None	LC 200A, LC200B, and LA 200 were out of calibration	"B" Pump on charging pump leakoff system operated continuously	LC 200A, LC 200B, and LA 200 were calibrated.
"A" and "B" Boric Acid Tanks	None	Level transmitters LT 106 and LT 108 were out of calibration	Tanks overflow at high alarm setpoint	LT 106 and LT 108 were calibrated.
Waste Evaporator Feed Tank Heater	None	Heater had a 480 volt ground	Failure of feed tank heater	The feed tank heater was replaced
Boric Acid Heat Tracing	None	Defective cable in the secondary circuit of Circuit No. 43	Failure of circuit	A new cable was installed.
No. 2 Steam Generator Feed Flow Flow Indicator (FI-487)	None	Flow Transmitter-487 was out of calibration	Improper indication	FT-487 was calibrated.
Rod Control	None	Power mismatch summator QM408K was out of calibration	Rods occasionally stepout with "T" ave and "T" ref equal	The summator (QM408K) was calibrated.
R-21 Radiation monitor vacuum pump	None	Defective vanes and bearings	Improper Operation	New vanes and bearings were installed
Flux Mapping System	None	Defective diode in "A" Detector	Improper Operation	The diode was renewed.
Flux Mapping System	None	Defective "S" Pen on J3 connector of Detector "C"	Inoperable light on ten pass selector switch for J10	The pen was repaired.
Auxiliary feed water pump discharge pressure gauge (PI-1424)	None	Defective pressure gauge	Reading 200 psi while pump not operating	The pressure gauge (PI-1424) was renewed.
No. 3 Steam Generator Level Control (LI-494)	None	LI-494 was out of calibration	Improper indication	LI-494 was calibrated

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
First stage pressure transmitter (PT-446)	None	Defective bourdon tube in PT-446.	PT 446 became erratic	PT-446 was replaced.
"B" Residual heat removal pump (BRHR Pump)	None	The magnetrol level switch out of adjustment.	Improper operation of "B" RHR Pump	The magnetrol level switch was adjusted.
"A" Gas Stripper	None	Defective diaphragm in valve CV-6	Excessive leakage	The diaphragm was replaced in Valve CV-6.
Boric Acid Heat Tracing	None	Damage heat trace cable in Circuit Z52	Circuit Z52 inoperable	The cable was renewed.
Flow Indicator 934 (FI-934 Boron Injection Tank Flow)	None	Insufficient heat trace cable	FI-934 would not respond to a change caused by Boric Acid solidifying in the sensing lines	A higher gauge cable was installed and the sensing lines were cleared of Boric Acid.
Radiation Monitors R-11 and R-12 Vacuum Pump	None	Defective vacuum pump	Unable to obtain sufficient flow	The vacuum pump for R-11 and R-12 was replaced.
Control Rod H-8	None	The Rod position indicator was out of calibration	Improper indication	The rod position indicator was calibrated.
Waste Evaporator	None	Defective diaphragm in the air operated isolation to level controller valve	Excessive Leakage	The diaphragm was replaced
Waste Evaporator	None	Diaphragm in the level control valve out of adjustment	Excessive Leakage	The diaphragm was adjusted to eliminate leakage.

REPORT FOR FEBRUARY

Plant Operations

Problems with "A" heater drain pump persisted during the month. Load was reduced on February 14 to repair a flange leak on the subject pump. The plant was retired for a brief period on February 24 to add individual balance lines to the condensate pumps (Refer to Modification No. 196 in Modifications to Facility Design section of this report). Two trips occurred during the month's operation and are summarized in the month's outage report. On February 6, 7, 8, and 12 a maximum thermal output of 2200 MW_t was achieved.

Abnormal Occurrences

1. On February 5 two I & C Technicians departed from the containment at 1533 hours and notified the control operator of their departure. The I&C Technicians did not verify if other personnel were in containment and did not lock the containment personnel hatch on departure.

   At 0933 hours, February 6, 1974, the personnel hatch was discovered unlocked, and reported to control operator. This constituted an abnormal occurrence as defined by Technical Specification 1.8.G, violation of Adminsitrative Procedure Paragraph 6.4.2.A and B.

2. At 0847 hours on February 6, 1974, the Control Operator observed that the green (stopped) indicating light on fan unit HVH-1 was not illuminated. The operator replaced all HVH-1 indicating lights at the RTGB without success. At 0850 hours the control operator's attempt to start HVH-1 was unsuccessful. This resulted in an abnormal occurrence as defined in Technical Specification 1.8.d. A and B containment spray pumps were then test operated satisfactorily as required by Technical Specification 3.3.2.2.a.

Instrumentation and control personnel investigated the failure and found a blown control power fuse. Further investigation revealed that a short in the control power circuit existed at the remote control station indicating light socket. The defective socket was removed for repair and fuses replaced. HVH-1 was satisfactorily test operated from the RTGB and its remote control station, and was returned to service at 1145 hours, February 6, 1974.

The two occurrences were reported per Technical Specification requirements.

Change in Key Supervisory Personnel

During this month the Administrative Supervisor position was vacated by M. Johnson who accepted a job in the Raleigh General Office. The Administrative Supervisor's responsibilities were assumed by J. G. Hammond who was previously a member of the plant engineering staff.

CAROLINA POWER AND LIGHT COMPANY
H. B. ROBINSON STEAM ELECTRIC PLANT
UNIT NO. 2 February, 1974

I. Nuclear Generation

A. Number of times the reactor was made critial. 2

B. Gross thermal power generated (MWH). 1,409,549

C. Hours Reactor critical 665.94

II. Electrical Generation

A. Gross power generated (MWH). 466,862

B. Net power generated (MWH). 445,034

C. Length of time generator was on line (Hours). 656.02

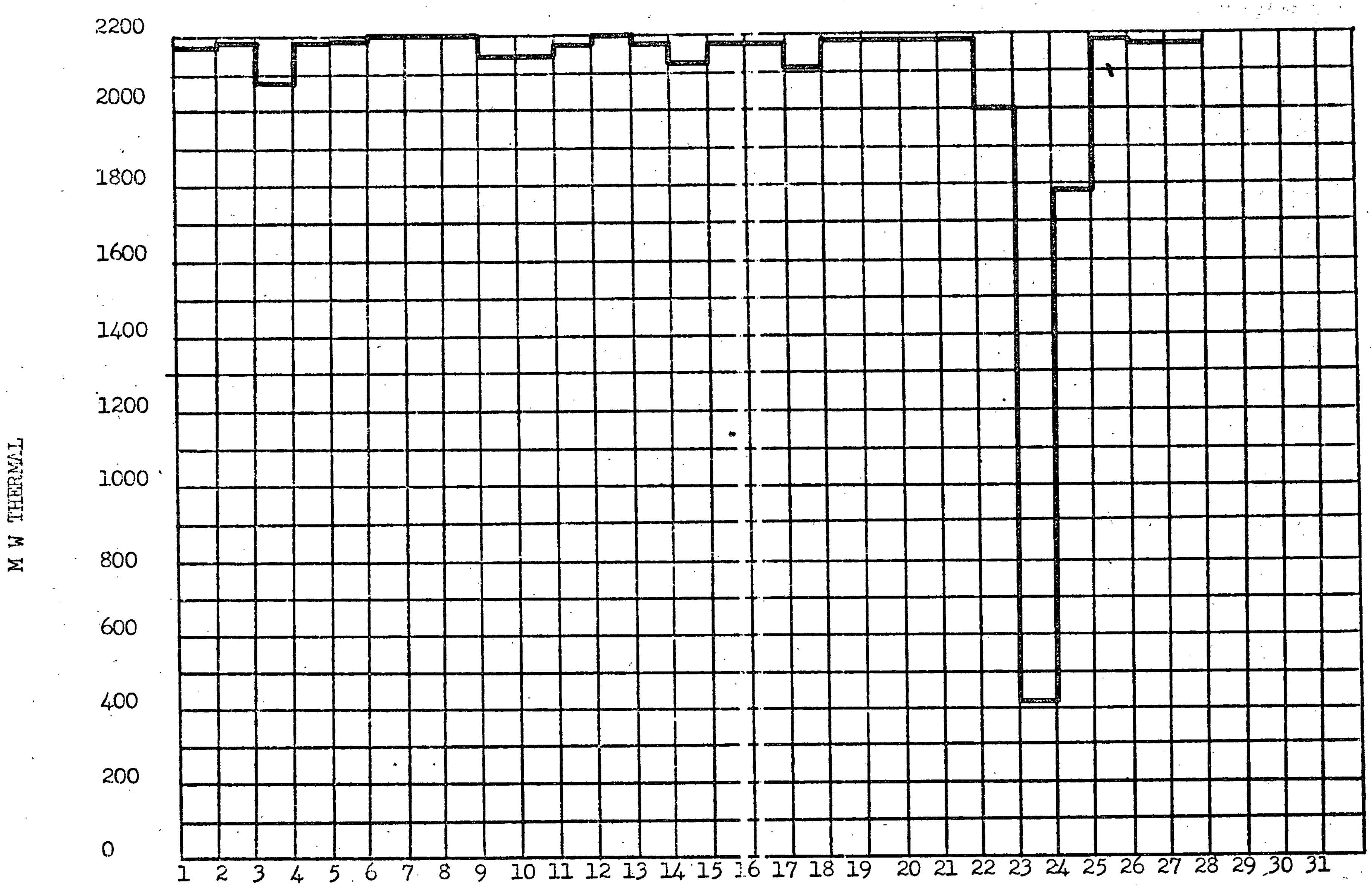
III. Solid Radioactive Waste

A. Total volume of solid waste shipped (Cubic Feet). 644

B. Total estimated Radioactivity involved (Curies). 657

C. Disposition of materials shipped.

Date	Quantity (Ft^3)	Destination
2-26-74	644	Barnwell, S. C.



Month February, 19 74

February

OUTAGE REPORT

NUMBER	DATE	TYPE	PLANT STATUS DURING SHUTDOWN	CAUSE	CORRECTIVE ACTION	DURATION
1	2-23-74	Trip	Critical at zero power	While shutting down for installing additional balance line to condensate pump received intermediate range trip due to large current caused by power produced in top of core.	Modification completed and verified trip setpoints via periodic test PT 1.1.	12 hr. 39 min.
2	2-24-74	Trip	Hot shutdown	When returning to power received steam flow feed flow mismatch when "C" main steam isolation valve was opened	Established proper flows	0 hr. 14 min
3	2-24-74	Manual Trip	Hot shutdown	Manually tripped to verify control rod E-11 bottom bistable operation	None	3 hr 6 min

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
Rod Position Indication System	None	Rod N-7 was out of adjustment	Rod N-7 was reading low	The rod N-7 was adjusted
Boric Acid Heat Tracing	None	Damaged leads in circuit P-30	Loss of heat tracing	The damaged leads were repaired
Radiation Monitor R-17	None	The series regulator transistor Q806 was defective	Improper indication from R-17	The transistor Q806 was renewed
Channel #2 of TROTS	None	Failure in the power supplycard	Overspeed alarm on Channel No. 2 would not reset	The power supplycard was renewed
Pressurizer Pressure Indicator PI-445	None	Pressure Transmitter 445 (PT445) was defective	PI-445 was giving erratic indication	PT 445 was replaced
Rod Control System	None	Fuses Fu-1 and Fu-2 were blown	The 1AC rod control power cabinet was in urgent failure	The fuses (Fu-1 and Fu-2) were replaced.
Radiation Monitor-20 (R-20) Vacuum Pump	None	Defective Bearings	Improper Operation	New bearings and vanes were installed.
Flow indicator 934 (FI-934) Boron Injection Tank Flow)	None	Indicator out of calibration	Erroneous Indications	The indicator (FI-934) was calibrated.
"A" Charging Pump	None	Defective secondary contacts in pump breaker	"A" charging pump would not start.	The contacts were repaired
"B" Main Steam Stop Valve	None	Excessive moisture in the open limit switch	Would not allow valve to return to the "open" position	The open limit switch was renewed
Radiation Monitoring System	None	The check source power wire was grounded	Radiation Monitor R-20 would blow fuse each time it was put in check source.	Corrected the ground in the power wire.

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
"A" Boric Acid Evaporator	None	Defective diaphragm in the distillate pump suction valve	Improper operation of the distillate pump	The diaphragm was replaced.
Chemical Volume Control System	None	The low pressure letdown Relief valve No. 203 was defective.	Excessive leakage	New internals were installed in Valve No. 203
Waste Evaporator	None	Defective plunger in Level Control Valve	LCV-1071A would not close completely	A new plunger was installed.
"A" Instrument Air Compressor	None	Defective gasket on the discharge flange	Excessive Leakage	A new gasket was installed.
Boric Acid Filter Pressure Gauges	None	Pressure indicators 113B PT113A and 113B) were out of calibration	Improper indication	PI's 113A and 113B were calibrated.
"B" Emergency Diesel	None	Blower discharge line elbow was cracked	Excess leakage	The crack was ground out and rewelded.
Waste Evaporator	None	The feed pump had defective bearings and impeller	Improper operation of feed pump	The bearings and impeller were replaced
Waste Evaporator	None	Level Control Valve - 1071B had a defective air solenoid	LCV-1071B failed to shift to denergized position allowing valve to vent to atmosphere	The air solenoid was replaced
"B" and "C" Component Cooling Pumps	None	The strainer delta pressure gauges were defective	Erroneous indications	The delta pressure gauges were replaced.
No. 2 Steam Generator Blowdown Valve (SG-1931A)	None	Defective solenoid vent	Air leakage from the solenoid vent	The solenoid vent was repaired

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
"B" Instrument Air Compressor	None	Defective In-board motor bearing	Excessive noise from bearing	The in-board motor bearing was renewed.
Rod Position Indication System RPI	None	The Signal Conditioning module had a zero-shift	The RPI System on Rod E-11 would not trip the rod bottom bistable	The signal conditioning module was zeroed.
Liquid Release Flow Indicator (FI 1064)	None	FI-1064 was out of calibration	Improper Indication	FI-1064 was calibrated
"A" Instrument Air Compressor	None	The load and unload pressure switch was out of adjustment.	Improper Operation	The load and unload pressure switch was adjusted.
Ventilation fan HVE 5B	None	Defective connection in wiring	Fan trips erraticly	The connection was repaired
"B" Gas Stripper	None	Valve CV-9 had a defective diaphragm	CV-9 would not fully open	A new diaphragm was installed
Steam Driven Feed Water Pump	None	The key on the shaft of valve V1-8C was wedged between top of valve yoke and packing valve	Valve V1-8C would not close properly	A new key was installed
Radiation Monitor R-21	None	The high and low flow pressure switches were out of calibration	High flow alarm would not reset	The high and low flow pressure switches were calibrated.
"B" Steam Generator blowdown isolation valve (FCV-1931A)	None	FCV-1931A had a defective solenoid valve	FCV-1931A was inoperable	A new solenoid valve was installed.
"B" Boric Acid Evaporator	None	Defective float valve inside the feed tank	Unable to obtain desired flow into evaporator	Float was repaired

REPORT FOR MARCH

Plant Operation

Few problems occurred during the month which limited the plant's availability. Load was reduced on March 24 to perform an electrical repair to a turbine valve. No other significant evolutions took place.

Abnormal Occurrences

At 1005 hours on March 20, 1974, "B" Boric Acid Transfer Pump breaker tripped due to thermal overload. The breaker was reset and the pump restarted at 1008 hours. Pump discharge pressure was checked and found abnormally low. The pump was secured and declared inoperable at 1008 hours.

The pump motor was checked electrically and found to be sound, therefore, it was apparent that the impeller had separated from the shaft or the shaft had broken.

The redundant pump was operable and the system capability was not impaired. Therefore, plant operation at full power was continued. The defective pump was replaced with a spare pump.

This occurence was reported per Technical Specifications requirements.

CAROLINA POWER AND LIGHT COMPANY
H. B. ROBINSON STEAM ELECTRIC PLANT
UNIT NO. 2 March , 1974

I. Nuclear Generation

A.	Number of times the reactor was made critial.	0
B.	Gross thermal power generated (MWH).	1,597,296
C.	Hours Reactor critical	744.00

II. Electrical Generation

A.	Gross power generated (MWH).	532,087
B.	Net power generated (MWH).	507,608
C.	Length of time generator was on line (Hours).	744

III. Solid Radioactive Waste

A.	Total volume of solid waste shipped (Cubic Feet).	0
B.	Total estimated Radioactivity involved (Curies).	0

C. Disposition of materials shipped.

Date	Quantity (Ft^3)	Destination
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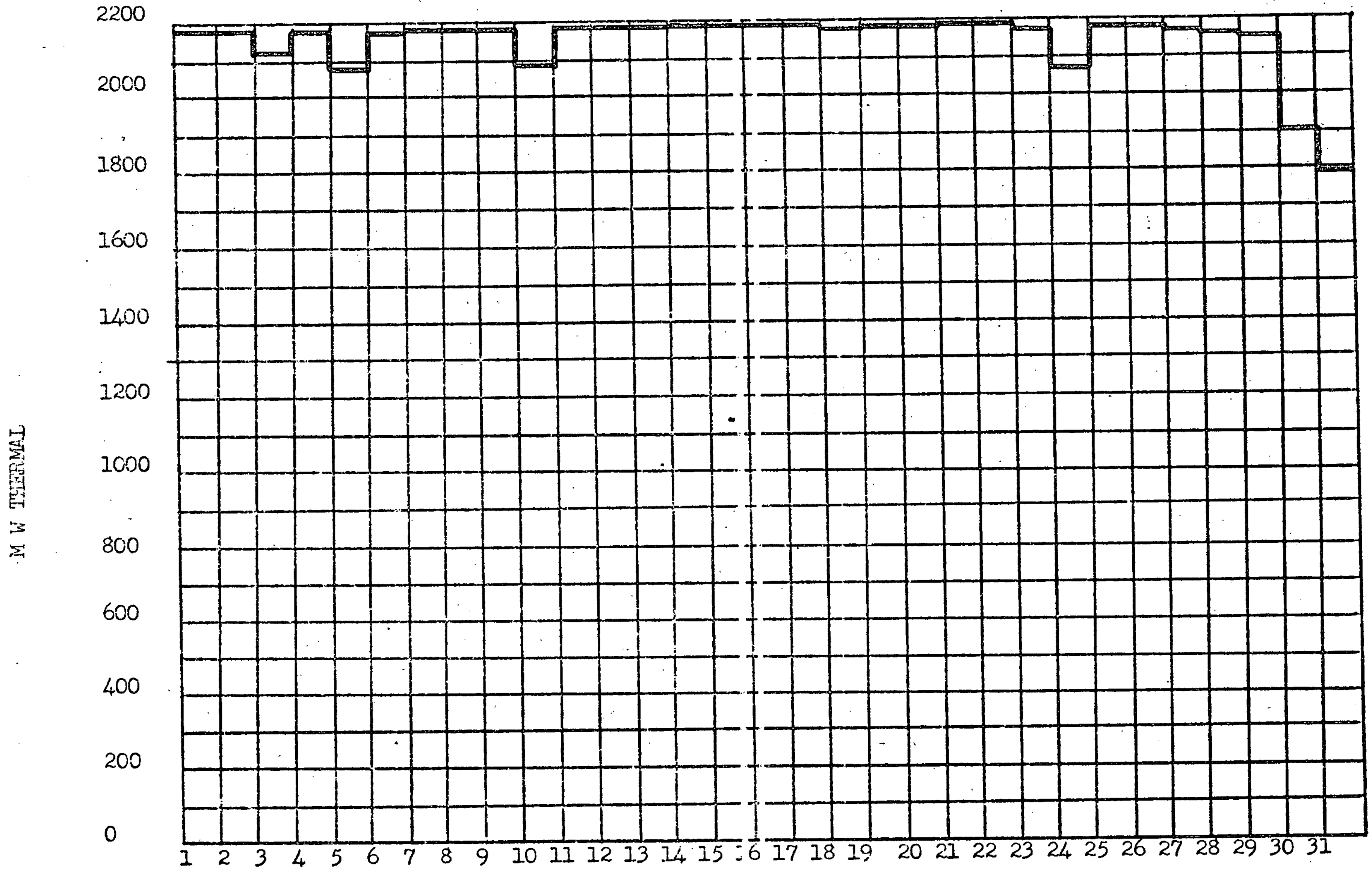


Month March. 1974

March
OUTAGE REPORT

NUMBER	DATE	TYPE	PLANT STATUS DURING SHUTDOWN	CAUSE	CORRECTIVE ACTION	DURATION
—	—	—	—	—	—	—

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
Boric Acid Heat Tracing	None	Defective cable in Circuit S-67	Failure of Circuit S-67	The defective section of cable was renewed.
Hagan Protection and Control	None	Protection Channel III signal comparator PC-457C (low pressure reactor trip) was out of calibration.	Trip setpoint shifted.	The comparator was calibrated
Boric Acid Heat Tracing	None	Defective lead on strip heater	Improper operation of Circuit No. E-3	Replaced the defective heater lead
Waste Evaporator	None	Defective diaphragm in Valve V-4	Excessive leakage	A new diaphragm was installed
Boric Acid Batch Tank	None	Defective diaphragm in isolation valve on discharge line	Restricting flow of Boric Acid solution	A new diaphragm was installed
Radiation Monitor R-21	None	Vacuum pump had a broken drive belt.	Pump inoperable	The drive belt was renewed.
Boric Acid Heat Tracing	None	Defective cable in Circuit No. 48	Loss of heat trace from Circuit No. 48	The cables were renewed.
Flow Indicator (FI-934 Boron Injection tank flow)	None	Boric Acid was solidified in the sensing lines around the isolation valve	Loss of sufficient flow	The sensing lines and the isolation valve were cleared of Boric Acid.
Nuclear Instrumentation System	None	Defective neon tubes (type NE-81)	Erratic Indications on the scaler timer	Seven neon tubes were replaced
Boron Injection Tank Pressure Transmitter (PT-934)	None	Defective flange gasket	Excessive leakage	The flange gasket was replaced
Heating and Ventilation System (HVE-2A)	None	Defective agastat relay in the low air flow circuit	Insufficient air flow	The agastat relay was renewed
"A" and "B" Boric Acid Storage Tank	None	The controllers for both Boric Acid Storage Tank were out of calibration	Improper operation of storage tank heaters	The controllers were calibrated

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
Boron Injection tank flow transmitter FT-934	None	Boric Acid was solidified in the sensing liner around the isolation valves	Loss of flow	The sensing lines were cleared of Boric Acid.
"B" Boric Acid Transfer Pump	None	Defective impeller	Pump inoperable	The "B" Boric Acid transfer pump was replaced.
Rod position indication system (RPI System)	None	Defective rod bottom bistable module and 23 CR relay on control rod F-12	The RPI System was giving a turbine runback signal with no apparent problems	The module and 23 CR relay were replaced.
Waste evaporator	None	Defective elbow in the level control bypass line	Excessive leakage	The elbow was replaced.
Radiation Monitor R-11	None	Pressure switch out of calibration	R-11 giving a high flow alarm	The pressure switch was calibrated.
Pressurizer Pressure Control	None	The heater control unit was out of calibration	Control heaters would not maintain normal pressurizer pressure	The heater control unit was calibrated.
"A" Motor Driven Auxiliary Feed Water Pump	None	Local control station damaged due to excessive moisture	Pump could not be stopped from local control station	The control station was dried.
Heat Trace Circuit No. 49	None	Defective Cable	Circuit No. 49 would not maintain temperature	The defective cable was renewed.
Heat trace circuit No. 67	None	Defective Thermocouple wire	Improper indication	The thermocouple wire was repaired
Waste Evaporator batch tank pump	None	Foreign matter lodged in cooling water line	Improper operation	The foreign matter was removed from the line.
Waste Evaporator Distillate Pump	None	Defective float valve in the distillate tank	Restricted flow to distillate pump	The float valve was replaced

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
Heat Trace Circuit No. 67	None	Defective cable	Loss of heat tracing from Circuit No. 67	The defective portion of the cable was renewed.
Boron Injection Tank Flow Transmitter (FI-934)	None	Defective Sensing Line	Excessive leakage	The sensing line was repaired
Waste Evaporator	None	Defective diaphragm in the eductor supply valve	Excessive leakage	The diaphragm was renewed.
"A" Boric Acid Evaporator	None	Defective pump impeller	Excessive vibration	The pump was replaced.
Reactor makeup deviation alarm	None	Defective deviation alarm relay	Erratic Alarms	The relay was replaced.

REPORT FOR APRIL

Plant Operation

On two occasions the plant load was reduced due to excessive heating of the "C" phase generator bus duct. Temporary repairs were made on April 6. The problem was eventually corrected during the 1974 refueling outage.

Two turbine runbacks occurred during the month's operation. During a periodic test on April 16 control rod J-5 dropped 36 inches and the load was reduced to 488 MWe. Load was again reduced to 366 MWe on the following day by a "Rod Bottom" bistable at Position D-10. However, investigation revealed that the rod had not dropped. A poor electrical connection at the containment penetration was found to be the source of the problem. The degraded connection was caused by a worker in the area disturbing the electrical cable tray. These control rod problems were investigated during the 1974 refueling at which time all electrical connections were checked and the circuits meggered satisfactorily.

Abnormal Occurrences

1. At approximately 0850 hours on April 6, 1974, a high temperature alarm was received on "A" Boric Acid Transfer Pump, initiated by Heat Trace Recorder No. 1. The Auxiliary Operator on duty immediately checked the pump and found it stopped. The pump breaker was checked and found normal, therefore, it was determined that the pump had tripped due to thermal overload. Current readings indicated abnormally low, therefore, a broken shaft or impeller separation was suspected. The pump was secured and declared inoperable at 0907 hours.

"B" Boric Acid Transfer Pump was operable, therefore, plant operation at power was continued.

Inspection revealed that the pump failed due to a broken shaft at the impeller keyway. The defective pump was replaced with a new unit.

2. At 0610 on April 11, 1974, Heat Trace Circuit No. 2 decreased to an alarm condition. Investigation revealed that leg "F" of the primary circuit was open and grounded. Circuit No. 2 covers the piping from Boric Acid Transfer Pump "A", Suction Valve No. 338 to Discharge Valve No. 332. Leg "F" is on the Discharge Pressure Transmitter.

New cable was installed in Leg "F" and the circuit was declared operable at 1400 hours.

The secondary circuit remained operable, therefore, no safety hazard existed.

Both occurrences were duly reported as required by Technical Specifications.

CAROLINA POWER AND LIGHT COMPANY
H. B. ROBINSON STEAM ELECTRIC PLANT
UNIT NO. 2 April , 1974

I. Nuclear Generation

A.	Number of times the reactor was made critial.	0
B.	Gross thermal power generated (MWH).	1,539,067
C.	Hours Reactor critical	720.00

II. Electrical Generation

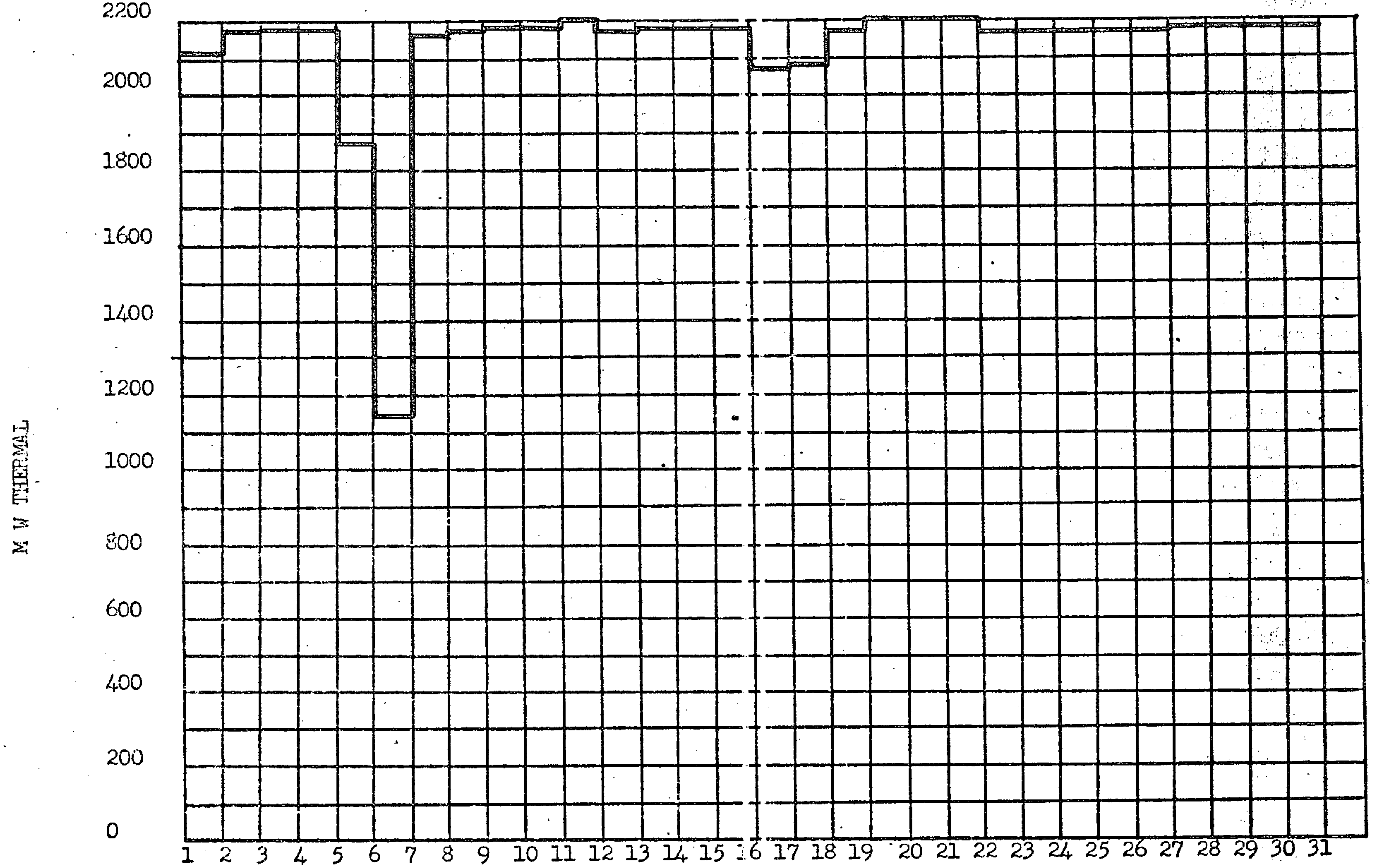
A.	Gross power generated (MWH).	504,040
B.	Net power generated (MWH).	480,464
C.	Length of time generator was on line (Hours).	720

III. Solid Radioactive Waste

A.	Total volume of solid waste shipped (Cubic Feet).	622
B.	Total estimated Radioactivity involved (Curies).	.241

C. Disposition of materials shipped.

Date	Quantity (Ft^3)	Destination
4-18-74	622	Barnwell, S. C.



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April
OUTAGE REPORT

NUMBER	DATE	TYPE	PLANT STATUS DURING SHUTDOWN	CAUSE	CORRECTIVE ACTION	DURATION
—	—	—	—	—	—	—

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
Boric Acid Heat Tracing Circuit No. 49	None	Defective wire at the terminal on the strip heater	Improper operation of Circuit No. 49	The heater was rewired
Steam Generator Blowdown Valve (FCV-1932A)	None	Defective Solenoid	FCV-1932A inoperable	The solenoid was renewed
Rod Position Indication System	None	Signal cable for rod D-10 had been unplugged	Improper indication	A jumper was placed in the rod bottom circuit for rod D 10 to prevent further problems until a more complete repair could be made.
Heat Trace Circuit No. 2	None	"F" leg of Circuit No. 2 was defective	Circuit No. 2 would not maintain temperature	"F" leg was replaced.
Chemical Volume Control System	None	The high level alarm switch on "A" Monitor Tank was out of calibration	High Level Alarm activated at wrong level	The high level alarm switch was calibrated.
Waste Evaporator Distillate Pump	None	Defective diaphragm on the distillate pump suction valve	Evaporator would not maintain vacuum	The diaphragm was renewed.
"A" Boric Acid Transfer pump	None	Shaft Failure	Pump inoperative	The pump was replaced.
Rod Control System	None	Defective Relay Input Card No. 20	Rod with drawer alarm activated and would not clear	The relay card was repaired.
Chemical Volume Control System (Valve CVCS-398B)	None	Defective diaphragm on valve CVCS-398B.	Improper operation	The diaphragm was replaced.
"C" Charging Pump	None	Defective gasket between the plunger cylinder and pump head.	Excessive leakage	The gasket was renewed.
Waste Evaporator Feedtank Heaters	None	Heater has a 480 Volt ground	Failure of heater	The heater was renewed.

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
Waste Disposal System	None	Level indicator LI-42 and alarm pressure switch LC1012A on the waste condensate tank were out of calibration	Erroneous high level alarm	LI-42 and LC1012A were calibrated.
"B" Waste Gas Compressor	None	Defective Solenoid	Moisture separator dump valve inoperable	The solenoid was repaired
"C" Phase Primary Bus Ducts	None	Expansion joints failed due to excessive current	Failure of flexible straps on "C" Phase Bus Duct	The straps were replaced by aluminum which was fitted around the expansion joint and welded on both ends to the flanges.
Residual Heat Removal (RHR) Pit Motors	None	Melted outer jacket on a flexible conduit caused by a fire between the pipe alley and the RHR Pit.	No damage to pumps or loss of capability	The damage was repaired and the motors test operated.
"A" Boric Acid" Evaporator	None	Defective diaphragm in the vacuum breaker valve	Unable to draw a vacuum	The diaphragm was renewed
Level Transmitter (LT-461 Pressurizer Level)	None	LT-461 Out of adjustment	Improper Indication	LT-461 was adjusted.
Pressurizer Pressure Transmitter (PT-445 Pressurizer Pressure)	None	PT-445 out of adjustment	Improper Indication	PT-445 was adjusted.
Flow Indicator (FI-122A Charging Flow)	None	Flow Transmitter FT-122A was out of adjustment	Improper Indication	The transmitter was adjusted
"A" Reed Pump Recirculation Valve	None	Defect in line near recirculation valve	Excessive leakage	The line was rewelded.
"A" Instrument Air Dryer	None	Lack of Lubrication	Failure of cooling fan	The fan was cleaned and lubricated

MAINTENANCE April, 1974

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
Nuclear Instrumentation Recorder NR-45	None	NR-45 was out of adjustment	Improper Reading	NR-45 was adjusted.
"B" Boric Acid Storage Tank Level Alarm Circuit	None	Defective Hagan Comparator	High Alarm would not clear	The comparator was repaired.
Pressurizer Pressure Comparator PC-457C	None	Defective Comparator	PC457C Setpoint was shifting	A new comparator was installed
Service Air Compressor	None	Defective weld on the cooling water line.	Excessive leakage	The cooling water line was rewelded.
Waste Evaporator	None	Defective coil in the solenoid valve of valve VA-4	Improper Operation	The defective coil was replaced

REPORT FOR MAY

Plant Operation

The plant was available on only five days this month. It was shutdown on May 6 for the scheduled refueling outage. The outage work continued into the month of June. Refer to Appendix I of this report for details of the outage events.

Abnormal Occurrences

At 1700 on May 10, 1974, water leaking from the line of the removed Steam Driven Feedwater Pump Discharge Valve V2-14A was checked and found to be clean. A recheck at 0130 on May 11th showed the water to be contaminated and running into the storm drain. Initial efforts to terminate the release consisted of attempting to isolate the feedwater line by closing FW-8A (Feedwater Stop Check Valve).

Attempts to close this large valve proved unsuccessful. A drum was then placed beneath the leak at 0500, May 11th, terminating the release. A flange was then fabricated and placed over the line where Valve V2-14A had been removed.

The contaminated water entered the plant drainage ditch which empties into Black Creek immediately below Robinson Impoundment. Flow from the impoundment was 5.45E4 gallons per minute during the incident. The drainage ditch flow was 600 gallons per minute, with a resultant dilution of 91. Therefore, no limits were exceeded in Black Creek. No significant exposure to the general public resulted from this incident.

This release is reportable to the AEC as a violation of 10 CFR 20, Appendix B, due to violating the maximum permissible concentration of I-131 in unrestricted areas. The 10 CFR 20, Appendix B, limit is 3E-7 uCi/ml. Iodine-131 measured in the drainage ditch was 7.79 E-6 uCi/ml, twenty-six times the allowable concentration. In addition, the release is a violation of Technical Specifications 3.9.1.4 (release shall be diluted by at least one circulating water pump).

The incident described above was reported per Technical Specifications requirements.

CAROLINA POWER AND LIGHT COMPANY
H. B. ROBINSON STEAM ELECTRIC PLANT
UNIT NO. 2 May, 1974

I. Nuclear Generation

A. Number of times the reactor was made critial. — 0

B. Gross thermal power generated (MWH). — 237,864

C. Hours Reactor critical — 122.08

II. Electrical Generation

A. Gross power generated (MWH). — 75,410

B. Net power generated (MWH). — 68,429

C. Length of time generator was on line (Hours). — 121.48

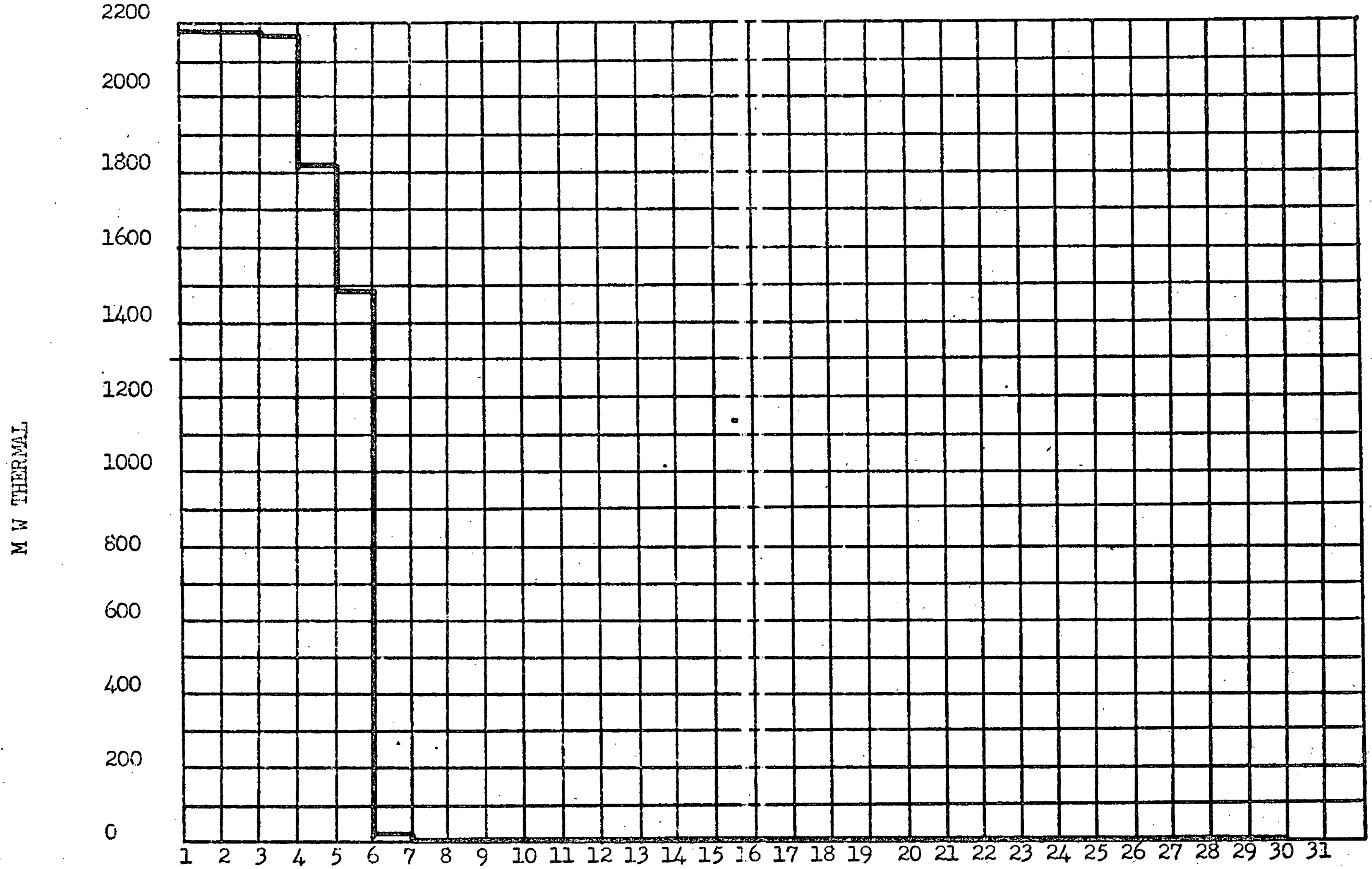
III. Solid Radioactive Waste

A. Total volume of solid waste shipped (Cubic Feet) — 564

B. Total estimated Radioactivity involved (Curies). — 68.53

C. Disposition of materials shipped.

Date	Quantity (Ft^3)	Destination
5-3-74	30	Barnwell, S. C.
5-30-74	534	Barnwell, S. C.



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OUTAGE REPORT

May

NUMBER	DATE	TYPE	PLANT STATUS DURING SHUTDOWN	CAUSE	CORRECTIVE ACTION	DURATION
1	5-6-74	Scheduled	Cold shutdown with refueling boron concentration	Refuel the reactor and general plant maintenance	Refueling and maintenance completed	1234 hr. 38 min.

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
Nuclear Instrumentation System (NIS) Channel 36 Start-up-rate	None	NM403 Amplifier out of calibration	Erroneous Indications	The NM403 Amplifier was calibrated
Flow Indicator 934 (FI-934 Boron Injection Tank Flow Meter)	None	Defective bellows assembly	Failure of flow indication	A new bellows assembly was installed.
"B" Boric Acid Transfer Pump	None	480 Volt Ground (lead pulled off motor to breaker connection)	Failure of pump motor	The ground was repaired
"B" Boric Acid Evaporator Distillate Pump	None	Defective air solenoid on the discharge valve	Loss of flow	The discharge valve was rebuilt
Radiation Monitor 21 (R-21) Vacuum Pump	None	Defective Vanes and bearings	Failure of Vacuum Pump	New vanes and bearings were installed
Flow Transmitter (FT-605 Residual Heat Removal Flow)	None	FI-605 out of calibration	Improper Indication	Transmitter was calibrated
Flow Indicator (FI-1007 Waste Evaporator Feed Flow)	None	Foreign matter in flow transmitter	Did not indicate flow	FT-1007 was removed and cleaned.
Burnable Poison Rod Assembly Tool Air Regulator (BPRA)	None	The BPRA Air Regulator out of adjustment and gauge out of calibration	Could not obtain desired pressure	The BPRA Air Regulator was adjusted and the gauge was calibrated.
Isolation Valve Seal Water System (IVSWS) Flow Meter 1921	None	Defective flow meter	Excessive leakage	The flow meter was repaired.
"B" Boric Acid Storage Tank	None	Defective Feed Pump	Pump Inoperable	The feed pump was renewed.
"A" Boric Acid Evaporator	None	Defective diaphragm in the feed pump discharge valve	The valve would not open	A new diaphragm was installed

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
Waste Evaporator	None	Defective Evaporator Feed Pump	Failure of pump	The evaporator feed pump was renewed.
Resistance Temperature Detector (RTD) (TE-431C)	None	Defective loop three "T" cold RTD TE431C	Loss of Temperature Dectection	The defective RTD was replaced
Component Cooling Water Valve-716A (CCW-716A)	None	Foreign material in the limit switches of valve (CCW-716A)	Improper Indication	The limit switches were removed and cleaned.
Reactor Trip Breaker "B"	None	This breaker failed periodic test in Dec., 1973, and was repaired at that time	Preventive Action	The breaker was renewed as a precautionary measure
480 Volt Breakers for Safeguard Equipment	None	Incorrect sizing of the over-current trip assemblies	Preventive Action	The overcurrent trip assemblies were renewed on both Containment Spray Pumps
Rod Control	None	Defective motor on F-6 Part Length Rod Control Drive	Improper Operation	The defective motor was replaced.
"C" Reactor Coolant Pump	None	Annual inspection revealed slightly worn shaft seals	Preventive Action	New shaft seals were installed
"A" Safety Injection Pump	None	Inspection revealed defective pump shaft bearings and seals	Preventive Action	New shaft bearings and seals were installed.
Steam Generator Wide Range Level Recorder (LR-477)	None	Defective capillary tube and pen spring in LR-477	Improper Indication	The capillary tube and the pen spring were replaced
"B" Monitor Tank Level Alarm	None	High level alarm out of calibration	Erratic Alarms	The "B" Monitor Tank High Level Alarm was calibrated.
"B" Steam Driven Auxiliary Feed Water Pump Discharge Pressure Indicator (PI-1421B)	None	PI-1421B was out of calibration	Improper Indication	The PI-1421B was calibrated.

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
"B" Steam Driven Auxiliary Feed Water Pump Discharge Pressure Indicator (PI-1421B)	None	PI-1421B was out of calibration	Improper indication	The PI-1421B was calibrated.
Radiation Monitor (R-4)	None	Defective local meter on R-4 Radiation Monitor	Improper Indication	The local meter was renewed

REPORT FOR JUNE

Plant Operations

The refueling outage began on May 6 and continued into June. The plant startup testing commenced on June 19, and all zero power physics testing was completed by June 26. The generator was then synchronized on June 26. Full power operation was not resumed until July 2.

Abnormal Occurrences

No abnormal occurrences took place during the month's operation.

CAROLINA POWER AND LIGHT COMPANY
H. B. ROBINSON STEAM ELECTRIC PLANT
UNIT NO. 2 June , 1974

I. Nuclear Generation

A. Number of times the reactor was made critial. 2

B. Gross thermal power generated (MWH). 125,088

C. Hours Reactor critical 143.70

II. Electrical Generation

A. Gross power generated (MWH). 37,352

B. Net power generated (MWH). 30,195

C. Length of time generator was on line (Hours). 107.88

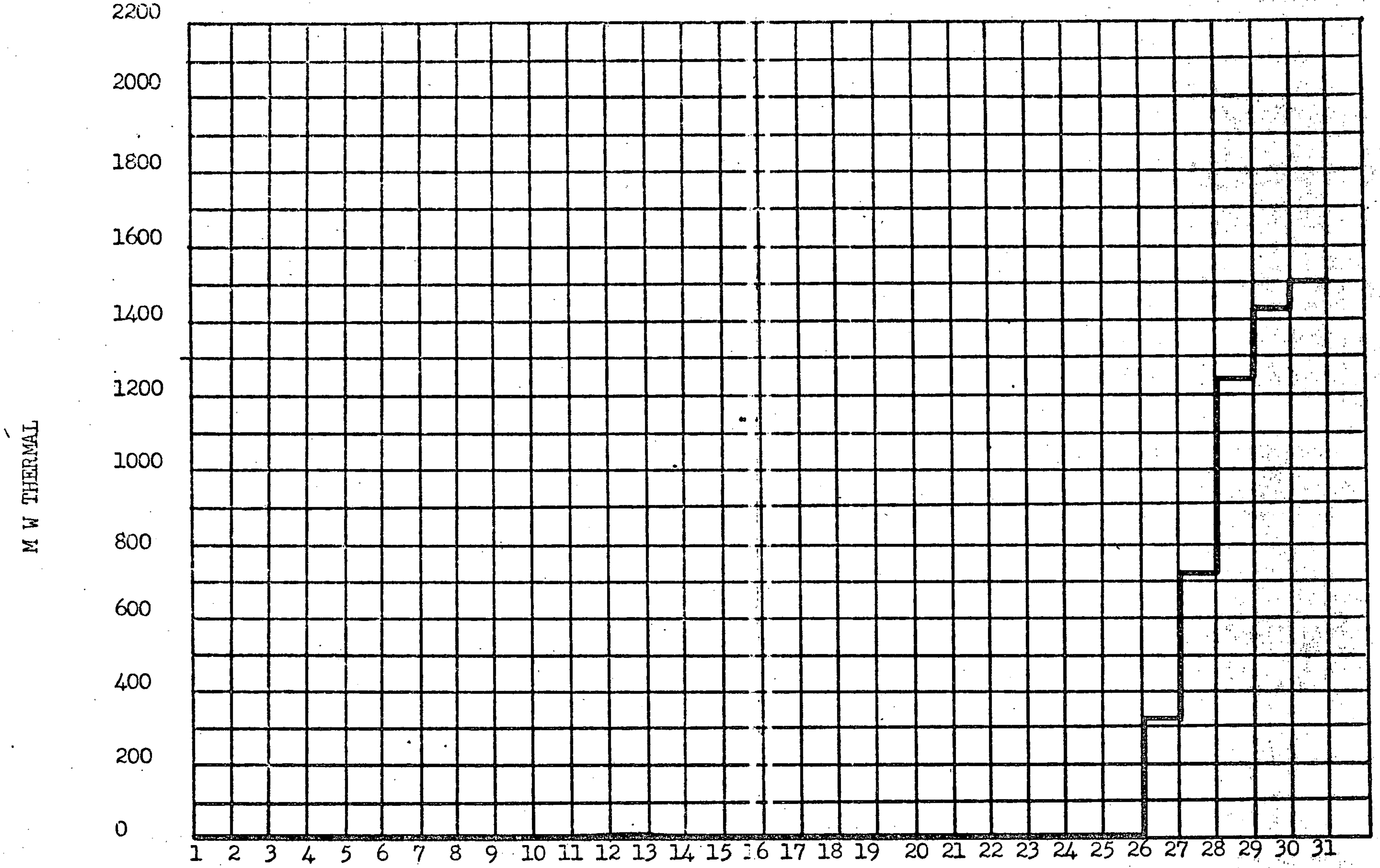
III. Solid Radioactive Waste

A. Total volume of solid waste shipped (Cubic Feet) 3,689

B. Total estimated Radioactivity involved (Curies). 14.95

C. Disposition of materials shipped.

Date	Quantity (Ft^3)	Destination
6-5-74	527	Barnwell, S. C.
6-10-74	110	Ditto
6-12-74	110	Ditto
6-13-74	110	Ditto
6-17-74	586	Ditto
6-18-74	527	Ditto
6-20-74	542	Ditto
6-26-74	624	Ditto
6-27-74	553	Ditto



Month June. 19 74

June

OUTAGE REPORT

NUMBER	DATE	TYPE	PLANT STATUS DURING SHUTDOWN	CAUSE	CORRECTIVE ACTION	DURATION
—	—	—	—	—	—	—

MAINTENANCE June, 1974

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
Manipulator Crane	None	Defective Silicone Control Recitifier (SCR) in the motor controls, current limiting resistor LR-1, and fuses on "A" and "C" phases	Manipulator crane inoperable	New SCR current limiting resistor and fuses were installed.
"D" Service Water Pump	None	Defective bearings in the pump motor	Excessive pump vibration	The bearings were replaced
R-21 Radiation Monitor	None	Vacuum pump had defective vanes and shaft bearings	Vacuum Pump failed	New vanes and bearings were installed.
Incore Thermocouple Junction Boxes	None	Controls on junction boxes out of adjustment	Improper Indication	The controls on the boxes were adjusted.
Residual Heat Removal (RHR) Outlet Valve 759B	None	Defective operator motor on RHR outlet Valve 759B	Motor was inoperable	The operator motor was rewound
Waste Evaporator Valve SV-1	None	Defective coil in Valve SV-1	Valve SV-1 was inoperable	A new coil was installed
Nuclear Instrumentation System	None	Defective level amplifier NM105	Improper Indication on N-31	Level Amplifier NM105 was replaced.
Chemical Volume Control System Valve 365A	None	Defective diaphragm in valve 365A	Excessive leakage	The diaphragm was renewed
"A" Main Steam Isolation Valve	None	Defective Limit Switch	Valve would not return to open position	The Limit Switch was repaired.
Radiation Monitor R-20 Vacuum Pump	None	Defective pump vanes and bearings	Pump Inoperative	The vanes and bearings were replaced.
"A" Boric Acid Evaporator Feed Tank Pump	None	Defective Feed Pump	Feed Tank Pump Inoperable	The feed tank pump was replaced
"A" Diesel Outboard Air Start Solenoid	None	The plungers in the pilots of two diesel starting solenoid valves were defective	Excessive Air leakage	The solenoid valves were replaced.

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
"B" Emergency Diesel	None	Defective plunger in start solenoid valve	Excessive Air leakage	The defective plunger was replaced.
"B" Safety Injection Pump	None	Pump disassembled for inspection. Revealed defective shaft shaft bearing, impeller seals, and outside shaft seals.	Preventive Action	All defective parts were renewed.
"C" Safety Injection Pump	None	Pump disassembled for inspection. Revealed defective impeller seals, outside shaft seals, and shaft bearings	Preventive Action	All defective parts were renewed.
"A" Reactor Coolant Pump (RCP "A")	None	RCP "A" was disassembled for annual inspection which revealed a defective No. 3 shaft seal.	Preventive Action	A new No. 3 seal assembly was installed.
Flux Mapping System	None	"D" Detector was defective	"D" detector inoperable	A new detector was installed
Pressurizer Safety Valves	None	The three safety valves were removed for inspection. The valves were in good condition.	Preventive Action	The valves were reassembled and installed.
Boric Acid Heat Trace Alarm Panel for recorders No. 1, No. 2, and No. 5	None	Defective switch in the alarm panel	Improper Operation	The switch was renewed.
"B" Reactor Coolant Pump (RCP "B")	None	RCP "B" was disassembled for annual inspection which revealed a defective No. 3 seal	Preventive Action	A new No. 3 seal assembly was installed.
Volume Control Tank Level Control (LC-112)	None	Defective filter capacitor in the power supply	Improper Level Control	A new capacitor was installed
"B" Safety Injection Pump	None	Discharge Pressure Gauge out of calibration and the face cover was missing.	Improper indication.	The gauge was calibrated and a new face cover was installed.

EQUIPMENT	EFFECT ON SAFE OPERATION	MALFUNCTION		CORRECTIVE/PREVENTIVE ACTION
		CAUSE	RESULTS	
Containment Vessel Cable Penetrations	None	All cable penetrations with pin connectors were checked for tightness	Preventive Action	Several connectors were found loose and were tightened
"A" Reactor Coolant Pump Lift Pump	None	One set of the stator leads were not taped.	Improper Operation. 480 V Ground	The stator leads were taped.
"B" Accumulator Pressure Indicators (PI925 and PI927)	None	PI925 and PI927 were out of adjustment	Improper Indication	PI925 and PI927 were adjusted.

SECTION 2

SURVEILLANCE TESTS AND INSPECTIONS

SURVEILLANCE TESTS AND INSPECTIONS

Periodic Tests

P.T. 1.1 Nuclear Instrumentation Source Range, Intermediate Range and Power Range

This weekly interval (while Reactor is shutdown) test is to verify proper operation of the source range bistable action related to alarm and level trip and to satisfy a requirement of the Technical Specification, Table 4.1.1, Item 3. On May 15, 1974, it was noted that N-32, which services the Source Range, was found to be deviating from the allowable range. It was accordingly calibrated and placed back into service.

P.T. 1.4 Nuclear Instrumentation Comparator Channel

This bi-weekly interval (while Reactor is operating) test is to verify alarm upon power range channel deviation of 2% of full power. On January 2, 1974, it was noted that Detector N-42, which services the power range detector, was found to be deviating from the allowable range. It was accordingly calibrated and placed back into service. This test was rerun on 1-3-74 and Detector N-42 was found to be in satisfactory condition.

P.T. 8 Reactor Coolant System Leakage Evaluation

This daily test is performed to evaluate RCS leakage and to satisfy Technical Specification 4.1.1, Table 4.1-3, Item 9. On May 2, 1974, it was noted that Valve RC 559C, Loop "C" RTD Bypass Isolation Valve, was leaking in excess of the allowable 1 GPM. This was evaluated and safe Reactor operation was assured. The refueling outage was scheduled for May 6, 1974, and therefore, it was decided to keep the system in operation. This condition existed through May 6, 1974. The Reactor was then shutdown and the system was cooled down for refueling.

P.T. 12.1 Radiation Monitoring System

This daily test is to verify the operability and response of the Radiation Monitoring System as required by Technical Specification Table 4.1-1, Line 19. On April 26, 1974, it was noted that Radiation Monitor R-8, which services drumming room, was noted to be out of service for repairs. This condition existed through May 1, 1974, when it was repaired and returned to service.

P.T. 12.2 Radiation Monitoring System

This bi-weekly test is utilized to verify the operability and automatic function of the radiation monitors. On March 22, 1974, it was noted that the pumps serving R-21 (Fuel Handling Building Upper Level) were not providing normal flow of 8 CFM. The pumps' low flow was resulting in a continuous low flow alarm. It was also noted on April 4, 1974, and on May 3, 1974, that the same low flow problem was being experienced. The low flow at this monitor is being investigated. On May 30, 1974, it was noted that the vacuum pump which services R-21 was out of service. Parts for this pump are on order.

P.T. 17 Turbine Bearing Oil System and E-H Control System Hydraulic Components Test

This weekly test is to verify proper performance of EH and lube oil system components and to check automatic start functions of EH pumps and lube oil pumps. On March 24, 1974, it was noted that the idle pump, "B" pump, that services the EH System was starting at a lower pressure than initially set. This was also noted on June 30, 1974. The setpoints were adjusted to correct the condition. On June 27, 1974, it was noted that a turning gear lube oil pump was starting at a lower pressure than its specified setpoint. The setpoint was adjusted.

REFUELING PERIODIC TESTS, CYCLE II/III

During the Cycle II/III refueling interval, tests were performed on vital plant systems that cannot be tested during power operations. All tests were completed and approved. The following is a list of the tests performed and their final status:

PT-2.1 Safety Injection Test

All components were verified to operate properly.

PT-2.3 Accumulator Check Valve Back Leakage

All components were verified to operate properly.

PT-2.4 Hot and Cold Leg Check Valve Backleakage

All components were verified to operate properly.

*PT-2.5 Accumulator Check Valve Operability

All components were verified to operate properly.

*PT-2.6 Isolation Valve Seal Water

All components were verified to operate properly. Boron deposits caused excessive leakage around some valves, but was later removed and the leakage reduced to within limits.

*PT-3.1 Containment Spray System

All components were verified to operate properly.

*PT-4.0 Service Water System

All components were verified to operate properly. Service Water Booster Pump B had a shutoff head of 168 feet, this is 16 feet higher than allowed by the acceptance criteria. A slightly faster than normal pump speed accounts for the higher shutoff head. Since the shutoff head is only slightly higher and does not represent a decrease in performance, it is not considered to be a problem. The test was approved on 6-11-74.

*PT-6.1 Underfrequency Test

All components were verified to operate properly.

PT-7.2 Boric Acid Blend System

All components were verified to operate properly.

PT-13 Emergency Control Station Test

All components were verified to operate properly.

*PT-15.1 Turbine Trip Logic Channel Testing

One annunciator did not operate properly and will be repaired. This does not inhibit the proper functioning of the system.

*PT-16.2 Containment Sensitive Leakrate Test

The system leakage was determined to be within allowed limits. A new supply line for air had to be run to a seam weld pressurization manifold after its supply line failed. These lines are for test purposes only.

*PT-16.3 Pressure Test Of Containment Isolation Valve

All components were verified to operate properly.

PT-18 CVCS Monitor and Holdup Tanks and Reactor Coolant Drain Tank

All components were verified to operate properly.

PT-18.1 Waste Sump Tanks and Pumps

All components operated properly with the exception of the chemical drain tank pump whose level control shutoff occurred 3% below setpoint. This will be corrected.

*PT-20.3 Station Battery Load Test

This test is performed at refueling intervals every 5 years. The battery system was verified as operating properly.

*PT-23.2 Emergency Diesel Auto Start on Loss of Power and Safety Injection

This system was verified to operate as designed. Initial testing resulted in "A" diesel starting approximately 2 seconds slower than the required start time of 50 seconds. After repair work was completed, it started within the required time.

PT-23.3 Diesel Generators Emergency Field Flashing and Manual Closure of Generators Main Breakers

All components were verified to operate properly.

*PT-24 Fans and Associated Charcoal and Absolute Filters

All fans were verified to operate at required flow rates and all filter efficiencies were adequate.

*PT-25.1 Pressurizer Safety Valve Testing

All valves were verified to operate properly.

*PT-25.2 Main Steam Safety Valve Test

All valves were verified to operate properly.

*PT-25.3 Steam Generator Isolation Valves

All valves were verified to operate properly.

*PT-26 Fuel Handling Equipment Interlock and Operation Test

All equipment was verified to operate properly.

PT-27 Post Accident Hydrogen Venting and Containment Sampling System

This test was performed in conjunction with depressurization following the containment air test. The components were verified to operate properly.

*PT-29 Radiation Monitoring System

All radiation monitors covered by this test were verified to meet the acceptance criteria.

*PT-30 Reactor Control and Protection Instrumentation Channel Calibration and Testing

The reactor protection and control instrumentation was calibrated and verified to meet the calibration data.

PT-31 Inspection of Hydraulic Shock Suppressors

The shock suppressors were inspected, repaired, and fluid added as necessary. Five suppressors were low on fluid and had to be refilled. Four were on the secondary side and one inside containment on a charging line.

PT-32 Steam Generator Differential Pressure Test

Primary to secondary leakage was found to be nondetectable.

*These tests are required to be performed at the refueling interval per Technical Specifications.

CYCLE 3 STARTUP TESTS

Cycle 3 startup tests commenced on June 19, 1974, with the Rod Drive Mechanism Timing Test. This test was completed with no exceptions. Heatup commenced during the 0800-1600 shift on June 21, 1974. Cold rod drops were performed at $200^{o}F$ and 400 psig on June 21, 1974. Rod N7 was tested ten (10) times to insure its operability after replacement of its drive shaft and rod control cluster (RCC) assembly. All rods were verified to drop within the allowed time.

Heatup continued until hot shutdown conditions were achieved on June 23, 1974, during the day shift. Hot rod drops started immediately after all the initial conditions were met. All rod drop times were within the allowed time. Rod Position Indication (RPI) Testing and calibration were also completed at hot shutdown conditions.

Startup physics test CPL-R-6.1, (Initial Criticality), was started at 1353 hours on June 24, 1974. The reactor achieved criticality for the first time during Cycle 3 at 2147 hours on June 24, 1974, with the RCS boron at approximately 1317 ppm boron and all rods out of the core. This was later adjusted to 1302 ppm of boron and 182 steps on Control Bank D.

All zero power physics tests were completed by day shift on June 26, 1974. No problems were encountered during the testing with either the equipment or the procedures. Plant Nuclear Safety Committee approval was required of the zero power flux map due to slight deviations from the predicted values of F Delta H in three assemblies.

Power escalation tests commenced on June 26, 1974, with the unit being synchronized at 1207 hours. Flux maps run during power escalation tests verified that the radial tilts were less than 1% and all peaking factors were within limits. Full power was achieved during night shift on July 2, 1974.

The following is a list of the startup tests and their final status:

R-4.10.2 Control Rod Drop Test

All drop times were within limit. Test results have been approved.

R-4.11 Rod Position Indication

The RPI system was calibrated and tested to verify its operability. The test results have been approved.

R-5.9.1 Rod Drive Mechanism Timing Test

All components were verified to operate properly. The test results have been approved.

R-6.0 Startup Sequence

This procedure outlines the use of all of the following tests. This procedure has been approved as completed.

R-6.1 Initial Criticality

All parts of this test were completed as required by CPL-R-6.0. The test results have been approved.

R-6.2 Design Check Tests

All parts of this test were completed as required by CPL-R-6.0. The test results have been approved.

R-6.3 Boron Dilution

Acceptable individual control bank worths were obtained by this test as required by CPL-R-6.0. The test results have been approved.

R-6.4 Boron Addition

Acceptable overlap worths were obtained by this test as required by CPL-R-6.0. The test results have been approved.

R-9.1 Operational Alignment of Nuclear Instrumentation

All NIS calibrations required by this test have been performed. The test results have been approved.

R-9.2 Operational Alignment of Process Temperature Instrumentation

All systems were verified to be calibrated correctly. The test results have been approved.

R-9.3 Thermal Power Measurement

All parts of this test have been completed as required by CPL-R-6.0. The test results have been approved.

R-9.4 Power Distribution Maps

All flux maps required by CPL-R-6.0 were performed according to this procedure. The test results have been approved.

CONTAINMENT INTEGRATED LEAK RATE TEST (ILRT) AND STRUCTURAL INTEGRITY TEST (SIT)

In accordance with the H. B. Robinson Technical Specification requirements, the ILRT and SIT were performed in order to measure reactor containment building leakage at the peak calculated pressure of 42 psig, to establish a reference for subsequent periodic integrated leak rate tests at a reduced pressure of 21 psig, and to reconfirm the containment structural integrity.

The test was performed as a joint venture with CP&L, Gilbert Associates, and Brewer Engineering Laboratories. The reactor containment building was pressurized at a rate of 3 psi per hour. Building temperature was maintained at approximately 95°F. Pressure, temperature, recirculation unit motor current and compressor operation were monitored hourly.

The leak rate test was conducted at two pressure plateaus, 21 and 42 psig, with a plateau at 14 psig for visual internal inspection. At 14 psig no leaks were found.

A minimum of four hours elapsed between stabilization of reactor containment building pressure and data retrieval. During this period, and for the duration of the 24 hour leak rate and 12 hour supplemental test at each pressure level (21 and 42 psig), service water flow to the ventilating fans was varied to maintain average internal containment temperature within ± .2°F.

During each test the following occurred half hourly:

a. Each of 6 dewcell temperatures was recorded and converted to water vapor pressure.

b. Each of 23 RTD temperatures was recorded and averaged.

c. Each of the 2 pressure gauge readings was recorded and averaged.

d. Pressure was corrected to obtain partial pressure of air and the weight of reactor building air was calculated. This weight was plotted along with the temperature.

The structural displacements and strains were measured at 0, 14, 21.1, 35, 42.2 and 0 psig by using direct current displacement transducers (DCDT's), strain gages, jig transits and scales, and invar tapes. The displacements and strains were checked for credibility and against the acceptance criteria at each pressure plateau before moving to the next pressure plateau. Visual inspections were made to check for gross or unusual deformations.

Results of the tests are as follows:

ILRT

Leakage Rate, Percent Per Day

L_t = max. allowable leak rate at 21 psig = 0.057

0.75 L_t = max. allowable measured leak rate at 21 psig = 0.042

L_{tm}, at 95.3°F (based on mass plot) = measured leak rate at 21 psig = 0.029

L_a = max. allowable leak rate at 42 psig = 0.080

0.75 L_a = allowable measured leak rate at 42 psig = 0.060

L_{am}, at 95.8°F (based on mass plot) = measured leak rate at 42 psig = 0.015

SIT

Crack patterns and widths, observed and measured during the structural integrity retest, compared well with data from the initial SIT. Crack widths were about the same. Generally the crack width range was from less than 0.005 inch to approximately 0.010 inch.

Radial and vertical displacement data from the structural integrity retest showed general agreement with the initial SIT data and was within the limits of the acceptance criteria except for one radial measurement point, LC4. This point exceeded the acceptance criteria limits by 34 percent at 42 psig. However, if data for point LC4 is viewed with respect to all data for azimuth C, it appears to fit into the displacement curve. The same type of displacement curve was also observed at azimuth D.

Measured displacements and crack widths at design pressure indicated no significant difference from the measured values obtained during the structural integrity test of 1970 and satisfied the acceptance criteria. Thus, the continued structural integrity of the reactor containment building was demonstrated.

A detailed report enumerating methods of measurement, data accumulated, and evaluation of results shall be submitted as required by Technical Specification requirements. This brief summary only highlights the tests that were performed.

CONTAINMENT LINER BULGE INSPECTION

During the outage an effort was made to determine the integrity of the containment liner and to establish a program of surveillance using the base line data obtained during this inspection.

The inspection revealed bulges were present in the liner. One of these locations, covering an area of approximately 7' by 14', was chosen for a detailed study. The insulation covering the liner was removed and it was found to be deformed toward the center of the containment approximately 2.5 inches from the theoretical curvature.

There was a void area between the liner and the concrete as determined by the sound of tapping the area with a hammer.

On May 28, 1974, an Ebasco engineer, who was the original designer of the liner, examined the liner bulges and agreed with our concern for the safety of the liner. A detailed investigation was initiated which is outlined below.

1. The liner was ultrasonically tested by Automation Industries to locate the studs securing it to the containment wall. The studs are on 16" centers which is more conservative than the original design which calls for 20" centers.

2. Further UT of the studs revealed indications at 4¼" to 4½" in all but three studs which had indications at 2". Since the studs in this area are 4" long, it was concluded that all but three studs were unbroken.

3. Tapping with a hammer and using the hammer as an impact pendulum revealed that all the studs in the void area (even those with the 2" indication by UT) appeared to be solid.

4. Field tests led to the tentative conclusion that a pressure in excess of 75 psig would be required to push a stud surrounded by a deep void through the liner. Field tests also tentatively showed that the 42 psig pressure would cause a bump in the liner at a stud point surrounded by a deep void. Since there are no small bumps in the liner, it was concluded that the void was shallow and no danger existed of a liner rupture caused by a stud during a LOCA.

5. The Q.A. files refer to bulges in containment of the same magnitude and in the same general area. The files and people present during construction also mentioned void areas. These and other factors have led to the conclusion that the bulges are "as-built".

6. The engineering evaluation was performed by Ebasco. Their computer analysis led to the conclusion that although the liner is weakened by the bulge, it is safe for operation even if two adjacent studs are assumed broken. No corrective action is recommended.

7. The liner bulge has been instrumented with strain gages by Brewer Engineering Laboratories and will be observed frequently during the containment heat-up and periodically thereafter. The purpose of the strain gages is to determine if the bulge is a passive as-built bulge as assumed; if not, to determine the growth rate and possible causes of the bulge.

If the bulge is an as-built condition, it is concluded that the liner is safe for continued operation. If the bulge is active it will require further investigation and analysis to determine its cause and its continued safety. Therefore, the liner will be monitored visually and with strain gages during the next operating cycle.

VALVE MINIMUM WALL THICKNESS INSPECTION

Ultrasonic examination of selected valves for the Minimum Valve Wall Verification Program was performed by Nuclear Services Corporation during the 1974 Refueling Outage. Sixteen valves were checked for thin wall indications. This inspection and the inspection done during the 1973 refueling outage completed the commitments for on-site examination of the different valve types.* Valve 875B had one indication below minimum allowed. This valve and those that could be below minimum due to instrument error are presently being justified by an engineering evaluation as recommended by Mr. W. D. Kelley of the AEC. Final resolution and auditing by the AEC is planned for the end of September, 1974.

*Thirty-nine of the seventy listed valves have been ultrasonically tested including at least one of each size and type of valve. Those valves not actually measured are being justified on the basis of data obtained from ultrasonic measurements of that valve type.

INSERVICE INSPECTION

Conam Inspection, Inc., under contract to Westinghouse, performed the 1974 Refueling Outage Inservice Inspection utilizing Westinghouse procedures and calibration tests. The areas inspected were as specified by the Technical Specifications and in accordance with Section XI of the A.S.M.E. Code. No major discrepancies were noted.

The inspection included 117 inches of the closure head to flange weld, steam generator nozzle to safe end welds, regenerative heat exchangers, reactor coolant pump flange bolting, and supports and hangers. Several loose threaded rods and U-bolts noted in the inspection were corrected during followup action.

In accordance with Directorate of Regulatory Operations Bulletin No. 74-3, "Failure of Structural or Seismic Support Bolts on Class I Components", an inspection of support bolts was performed during the 1974 refueling outage as part of the Inservice Inspection. Several suspect bolts were discovered by the Inspectors, but tightening of these bolts and then hammer tapping revealed they were sound. One bolt on "B" steam generator upper support is missing. A design analysis indicates this does not jeopardize the support integrity.

SECTION 3

MODIFICATIONS TO FACILITY DESIGN

MODIFICATIONS TO FACILITY DESIGN

Modification & Setpoint No. 183

A 480 Volt, 3 phase line was run from MCC #2 to Unit 2 cable spread room. Voltage was stepped down to 120 volts, 3 phase at that point. This modification supplies a 3 phase power source in Unit 2 cable spread room for calibration purposes.

Modification No. 184

This modification provided for the installation of microwave terminal equipment in Unit No. 1 cable spread room (located in Unit No. 2 Auxiliary Building) and installation of parabolic dish antenna on top of Unit 2 elevator shaft. This installation is required for the Robinson-Darlington County Electric Plant 230 KV tie line and for protective relaying between Robinson and Darlington.

Modification No. 186

This modification changed the existing summator boxes PM466B and PM447B to summator boxes with limits and set the lower limit at 1.08 volts. This prevents the turbine first stage pressure loops from being pulled below zero due to vacuum on the condenser with the stop valves closed.

Modification No. 187

This modification involves the primary water storage tank and condensate storage tank level transmitters. Vent and drain taps were installed on each level transmitter for the primary water Storage Tank and Condensate Storage Tank to permit calibration of the transmitters. The existing transmitters cannot be calibrated without being removed from the tanks. The vent and drain taps allow for in-place calibration.

Modification No. 188

Involved in this modification is the Liquid Waste Disposal System (WDS). The WDS flow transmitter FT-1064 range was changed from 0-30 GPM to 0-100 GPM. By expanding the range of the flowmeters, release rates greater than 30 GPM can be measured.

Modification No. 189

This modification involved a change in the Safety Injection System. There was an addition of pressure gage on safety injection pump balance line for Pumps A, B, and C. The addition of these pressure gages provide an additional parameter in determination of pump performance. It therefore, becomes a diagnostic tool in detecting sources of pump deficiencies.

1-74 to
6-74

Modification No. 190

This setpoint revision involves the first stage pressure steam break protection. The modification implements new "high steam flow" setpoint as per Westinghouse recommendations and eliminates the possibility of spurious safety injection actuations during plant start-ups or unloading due to the narrow margin between steam flow and the steam flow setpoint at zero load.

Modification No. 193

The Main Steam Isolation Valves are involved in this modification. This modification adjusted the length of the switch actuating arm as per Schutte & Koerting Company recommendations. This prevents the valve from slamming shut during test, thus protects the valve seat from damage.

Setpoint Revision No. 194

The alarm setpoint on Loop 3 spray line low temperature alarm (TI-452) was changed from 500°F to 475°F. This spray line has been cooler than Loop 2 and results in Annunciator A-3-31 actuating sporadically. No safety hazard exists as a result of this change, and the alarm becomes a more meaningful indicator.

Modification No. 196

This modification involves the Condensate Pump Vent lines. "A" and "B" pump vents were separated and piped to the condenser. This modification is intended to prevent erosion of pump impeller and end bell due to cavitation problems.

Modification No. 199

A recirculation line was added to flow indication FI-934 which serves the boron injection tank. The line provides a method of flushing solidified boric acid out of flow indicator FI-934 sensing lines and chambers which frequently becomes clogged by solidified boric acid residue.

Modification No. 200

Setpoint Revision 200 involves the Rod Insertion Limit Alarms and updates rod insertion limits as per Technical Specifications, Sections 3.10.1.3 and 3.10.1.4. It also allows extra margin for controlling transients.

Setpoint Revision No. 206

"A" and "B" Boric Acid Storage Tanks Low Level Alarms were changed from 39% to 42%. This will alert the operator of a potential minimum volume in a Boric Acid Storage Tank if only one tank is in service.

Modification No. 207

A Solenoid Valve was added to the air supply line in the fuel transfer system control panel. This provides a method of stopping the conveyor car in the event of a rupture or break in the air line to the transfer system conveyor car drive motor without physically shutting off the air supply.

Modification No. 209

The charging pumps leakoff collecting tank vent was rerouted from the vent header to the ventilation duct in the pipe alley. The vent header pressure on the collecting tank prevented the tank inlet line check-valve from opening. The new arrangement eliminates this problem.

Modification No. 210

This change involves the Nuclear Instrumentation System and replaces the 5 amp instrument power and control power MDA-5 Slow-Blow fuses in all drawers of the NIS with MTH-5 fast-acting fuses. The normal load on the NIS bistables is considerably less than the designed current. With the previously installed fuses it was possible to short the secondary winding of the bistable transformer without blowing the fuses.

Modification No. 211

The Nuclear Instrumentation System is involved in this change. This is for the addition of a 0.1 uf capacitor to the source range high voltage circuit so that the high voltage power supply will restore upon reactor power letdown to P6. During plant operation, the source high voltage is turned on and off in conjunction with the intermediate range permissive P6. Occasionally it was found that the high voltage power supply did not restore upon power letdown to P6.

Modification No. 212

The Main Steam Pressure Transmitters are involved in this change. A jet impingement shield was installed to protect these transmitters. This installation is the result of a high energy line evaluation wherein postulated ruptures to the adjacent lines posed a threat to the transmitter's integrity.

Modification No. 213

This modification involves the installation of a 2" line, a thermocouple well and metering valve. This change was made to piping installed for the containment integrated leak rate test (ILRT) such that instrumentation could be installed for the ILRT retest conducted during 1974 refueling outage.

Modification No. 215

This is a modification to the Containment Pressurization System used for the ILRT. The controller of inlet pressure control valve was set to remain fully open until setpoint is reached to permit maximum rate of pressurizing containment for the 42 psig test.

Modification No. 217

This modification involves HVE-15A, HVE-1A & 1B. It consisted in the addition of hour meters to the fans in order to obtain integrated air flow time through these carbon banks. This is to be used for determining test dates for the filter carbon samples.

Modification No. 221

This modification involves the Chemical and Volume Control System charging pumps. The discharge relief valve connection to the pump suction was deleted. A short stub of pipe was left on the suction line so that a suction accumulator may be added in the future if needed. The relief valve now discharges to the seal water heat exchanger and returns to the volume control tank.

This change eliminates a source of back leakage to the pumps' suction and is intended to alleviate cavitation and air binding problems which have plagued the pumps.

Modification No. 222

The Auxiliary Steam Supply from turbine extraction steam was changed from L.P. heater 4A to turbine extraction line on L.P. heater 5A. This provides a higher inlet steam pressure for the auxiliary steam system which is required for efficient operation of the boric acid and waste evaporators.

Modification No. 223

A vacuum/pressure gauge was installed on suction line of "B" boric acid transfer pump. It will be used to monitor "B" boric acid pump suction pressure for possible causes of shaft failure.

Modification No. 225 and No. 257

This modification concerns the reinstallation of the four atmospheric steam dump valves which were removed for refurbishment during the 1973 refueling. The valves were modified by the addition of flanged connections and "quick-change" internal trim. The four 12" condenser dump valves were replaced with five 8" valves and piping changed according. Control components were modified on both valve systems. This change is intended to improve operability, reliability, and safety of the steam dump system.

Modification No. 229

The turbine supervisory controls and indicators were relocated from the Hagan Room to the RTGB on the panel above the turbine eccentricity monitors. The relocation of the controls will allow the control operator access to the controls without having to leave the control room.

Modification No. 232

Seismic pipe support AP-1 was removed and pipe whip restraint P-8 was modified to function as a seismic restraint. Support AP-1 was damaged by normal thermal expansion of main steam line"A". Restraint P-8 now performs a dual function as pipe whip and seismic restraint.

Modification No. 233

Steam Generator "B" Blow Down line was modified by the addition of a pipe tap and isolation valve. The addition of this flow path provides a means for discharging water and sludge during steam generator sludge lancing which was performed during the 1974 refueling outage.

Modification No. 234

This System Modification involves the pressurizer safety and relief header. It provided for the addition of a hydraulic shock and sway suppressor assembly for pressurizer safety and relief header. A re-evaluation of the static and dynamic forces on the pressurizer safety and relief header indicated the need for a hydraulic shock and sway suppressor at this point.

Modification No. 235

Modification No. 235 involves the Turbine Stop Valves. The turbine stop valves were modified to eliminate the deposit buildup on the stop valve stems. The deposit buildup has caused valve operation to be sluggish at times, and in one

Modification No. 235 (Continued)

instance has prevented the left valve from closing under trip conditions. The change consisted of installation of new shafts and bushing and modifying the bearing end covers, valve arms, and servo-support housings.

Modification No. 236

The Analog Instrumentation System was rewired by jumpering the pole of all Comparator Output Switches that were not in series with the bistable switching element. This is to insure that any possible short between the Comparator triac and the protection logic relays will be detected by on-line or periodic tests.

Modification No. 237

The component involved in this change is Containment Penetration P-67. This is a temporary modification and consisted of opening the pipe on either side of Penetration P-67 in Sleeve S-25. Opening this penetration provided a path for use in the steam generator sludge lancing evolution. The penetration was resealed prior to return to power.

Modification No. 241

An anti-rotation pin was installed in the Main Steam Isolation Valves. The disc of the Main Steam Isolation Valve was free to rotate. This rotation caused a change in the relative position of the seating surface which could result in leakage. To alleviate the problem the subject pins were installed.

Modification No. 242

This modification is for the penetration pressurization system. Weld channel air supply was changed from Manifold No. 1 to Manifold No. 12. The original supply line which is embedded in concrete was leaking. This change eliminated the leaking section.

Modification No. 244

This change involves the Emergency Diesel Generator. Steel fuel supply tubes were installed to replace the existing synthetic hoses. They were replaced because the existing synthetic hoses require frequent inspection for leaks and cracking and replacement on an annual basis. Thus the reliability of the fuel system is improved.

Modification No. 245

This involves the Feedwater Pipe Thermal-Seismic Restraint. Added to this system were two new "shoes" to Thermal-Seismic restraint AP-3 at Point 20. An

Modification No. 245 (Continued)

inspection of existing pipe restraints revealed that the vertical restraints at Point 20 had not been installed as required by original design.

Modification No. 247

This is for the addition of relays in Control Circuitry for Vacuum relief and pressure relief valves for the Containment Vacuum Relief and pressure Relief System. These were installed to prevent opening of vacuum relief and pressure relief valves upon loss of penetration pressurization air.

Modification No. 248

This modification is for the L.P. Turbine Bearings oil Lift System. The L.P. Turbine bearings were drilled and tied in with the generator bearing oil lift system. The existing generator oil lift system was also upgraded. The L.P. turbine bearing oil system was inadequate when the unit was on turning gear in that the bearing oil film was too thin to prevent journal to bearing contact.

Modification No. 250

This modification involves the Containment Penetration P-67, and made this penetration readily available in the event a penetration is required for access to the containment interior during cold shutdown operations. This contingency would be at times of maintenance or refueling operations.

Modification No. 251

The HVE-15A Humidity Control System is involved in this modification. A heater system was installed for controlling the amount of humidity entering the HVE-15A charcoal filter bank. This was performed to stay within limits of a Technical Specification requiring that humidity entering the HVE-15A Carbon bank be maintained at $\leq$ 70% relative humidity during fuel handling in the spent fuel building.

Modification No. 252

This modification consisted of the replacement of safety injection system accumulator relief valve discharge nozzles with a straight piping section (the existing nozzles were in an elbow configuration) and the addition of an orifice in the piping to the valves. This change reduces the reaction forces on the associated piping and prevents possible valve damage due to water hammer effects. The change was a result of a study of stresses involved with relief valves and identified these valves and piping as a potential problem area.

Modification No. 253

This modification involves the Containment (CV) Spray System. (C.V. Spray). It eliminates the two-minute time delay on NaOH addition to C.V. Spray and the operator capability to defeat NaOH addition to the C.V. Spray. This change is conservative with respect to safety analyses. It reduces the site boundary doses under loss of coolant accident conditions. It was accomplished due to requirements for uprating the plant to 2300 MW_t.

Modification No. 254

Additional lighting was installed at the Turbine Canopy and between the two low pressure turbine sections. Lighting was required for maintenance and for safety purposes.

Modification No. 255

Reactor Protection System Axial Offset Limits were changed to conform to new Technical Specification requirements for Cycle III operation. The limits are now -17% and +12%

Modification No. 258

This change involves the installation of a controller on Valve No. PRV 1985 to regulate Aux. Steam Pressure at 80 psig for station uses on the Aux. Steam System.

SECTION 4

CHANGES TO OPERATING PROCEDURES

CHANGES IN OPERATING PROCEDURES

The Following Procedure Changes Were Issued During The Past Six Months

Change Number	Procedure Number	Description of Change
580	PLS-3	Changed Set Point Alarm on Loop 3 Spray Line From 500°F to 475°F
581	Administrative Instructions	Additional Abnormal Occurrence Definitions added to Technical Specifications were added to AI.
582	OP-17 Main Steam and Reheat Steam	Additional Precaution added to prevent water slugging.
583	Emergency Plan and Procedures	Changes due to departmental name changes
584	Standing Order No. 4	Change made in radiation monitor (R-7) alarm setting so that personnel might be warned when flux mapping is in progress.
585	Control Rod Drop Test CPL-R-4.10.2	Update test in accordance with Westinghouse memo CPS-73-165 of October 25, 1973.
586	OP-34 Waste Disposal Liquid	Incorporated new sections to cover transfering liquid waste within plant
587	PT-9.2 Unit No. 1 Fire Pumps and Fire System valves for Unit No. 1 and 2	Split PT into two separate PT's, one to cover Unit 1 and 2 and Fire System valves (PT 9.4) and the other to cover the inspection of fire extinguishers and equipment (PT 9.4)

Change Number	Procedure Number	Description of Change
588	PT-22 Auxiliary Feed-water System	Changes made to assure steam driven auxiliary feedwater pump turbine is preheated and supply line drained.
589	Standing Order No. 4	Change Radiation Monitor Alarm (R-7) to 200 MR/HR due to continuous alarm at 50 - 100 MR/HR
593	Radiation Control and Protection Manual	To make manual and health physics procedure No. 4 compatible.
594	OP-16A Condensate and Feedwater System	To correct name of valves to more clearly indicate function
595	PLS-2	Changed maximum Reactor Vessel heatup and cooldown rate from 100°F to 50°F.
596	Auxiliary Feed-water Pumps and valve alignment test.	Reissued test to make instruction more specific in areas of purpose, conditions and instruction.
597	Radiation Control and Protection Manual	Change points out responsibility of supervisor in controlling exposure of his subordinates.
598	Standing Order No. 4	Changed component cooling radiation monitor setting from 5×10^{-5} to 4×10^{-5} uCi/cc

Change Number	Procedure Number	Description of Change
600	Administrative Instructions	Replace "Modification and Set Point Revision Completion Form" Revision 3 with Revision 4 to reflect approval for installation prior to CNSC review.
601	Radiation Control and Protection Manual HP-20	To Bring manual into compliance with 10 CFR 49 in regard to shipment of radioactive materials
602	PT-7.1 Boric Acid Blender Control, Valve and Pump Operation	To correct valve numbers
606	PT 5.1 TAVG and Delta T Protection	Changed to make voltage values consistent with TAVE alarm setpoint of 579°F in lieu of existing setting of 575°F
609	OP 34 Waste Disposal-Liquid	To reference Standing Order No. 4 in regard to radiation monitor settings.
610	OP 34 G2 Waste Disposal-Liquid	To correct valve numbers and to clarify tanks utilized in transfer of liquid from monitor tanks to holdup tanks.
611	AP-1 Malfunction of Reactor Control System	Change indicates action to be taken regarding misaligned control rod.

Change Number	Procedure Number	Description of Change
612	Annunciator Procedures	Revise entire manual to reflect present annuciator configurations
613	PT 23.3 Diesel Generators Emergency Field Flashing and Manual Closure of Generator Main Breakers	To incorporate manual closing of the emergency diesel generators main breakers.
614	Administrative Instructions	To indicate Administrative Supervisor's responsibilities, to provide new approval forms and to indicate monthly review summary to be sent for CNSC review.
615	Procedure For Packing New Fuel Assembly For Return to Vendor	Return of new fuel assembly damaged during unloading process
617	Curve Book	Reissued Plant Operating Curve Book for clarity of curves.
618	OP-28-2A CVCS Purification System	To correct position of the valve switch for volume control tank/demineralizer diversion valve 143
619	Administrative Instructions	To add volume 18 "Fuel Follow Procedures" to AI.

Change Number	Procedure Number	Description of Change
620	Standing Order No. 4	To specify frequency RMS-11 is to be checked and indicate justification of contaminated waste release limits
622	OP-28-2 CVCS Purification System	Requirement was added to determine boron concentration in demineralizers prior to placing them in service so as to identify any differences of concentration with RCS.
623	Administrative Instructions	To clarify key control and containment security procedures.
624	Administrative Instructions	To include details of operator training program.
625	GP-1B General Operating Procedures	Provides for checking of bistables in lieu of running PT 1.1 (source and intermediate range alarms, permissives, and Trips)
626	PT 5.1 TAVG and Delta T Protection	To correct error in voltage calculation.
627	PT 5.7 Steam Generator Pressure Protection	To correct number for panel alarms
628	Steam Generator Pressure Test 1900 PSI	Entire procedure rewritten and assigned as PT 32.

Change Number	Procedure Number	Description of Change
629	PT 7.1 Boric Acid Blender Control, Valve and Pump Operation	To correct designation of valve FCV 113B, blender flow to charging pump suction
630	Administrative Instruction	To describe new Abnormal Occurrence Report format and incorporate plant operating experience report.
631	Fuel Follow Procedures	Added parts FF-2 and FF-3 regarding axial oscillation and radial tilts.
632	Curve Book	Add new curves, inherent radial tilts vs. axial offset.
633	Fuel Follow Procedure, FF-1	Changed format and updated to clarify instruction
634	Special Fuel Assembly Handling Procedures	New procedures for handling new fuel
635	Special Exxon Pressure Drop Test on Westinghouse Fuel	New procedure
636	OP 28-2A CVCS Purification System	To allow operators better control of evolutions regarding purification lineups

Change Number	Procedure Number	Description of Change
637	Maintenance Instruction No. 6 Calibration Procedures	Entire instruction rewritten to clarify calibration instruction
638	Emergency Plan and Procedures	Clarified instructions for operators and and Shiftforeman in the event of an emergency
639	Health Physics Procedure 7	Organizational change
640	Health Physics Procedure 8	Organizational change and error in spelling
642	OP 28-2B CVCS Purification System	New procedure check-off sheet
643	OP 28-2C CVCS Purification System	New procedure check-off sheet
644	Special Nuclear Material Accountability	Complete revision of procedure
645	CPL-R-4.10.2 Control Rod Drop Test	Updated to clarify method and means of recording rod drop times

Change Number	Procedure Number	Description of Change
646	PLS-3	Change low alarm on Boric Acid Tanks from 30% to 42%
647	Curve Book	Replace Boric Acid Tank curve with new curve
648	Annunciator Book	Update level alarms on Boric Acid Tank as per PLS-3
649	Annunciator Book	Update level alarms on Boric Acid Tank as per PLS-3
650	Emergency Instruction 9	Steps were added to prevent overflowing steam generator flash tank.
652	OP 33A Boron Recycle Process	New procedure
654	Special BPRA Handling Procedure	New procedure for inserting burnable Poison rod assemblies in new fuel in new fuel storage areas.
655	Curve Book	To bring all curves up to date.
657	Special Fuel Handling Procedure	New procedure for handling of fuel rod container to be used in Gadolinia fuel rod storage.
659	Maintenance Instruction No. 9 Control of Measuring Devices and Test Equipment	New procedure

Change Number	Procedure Number	Description of Change
660	P 2.4 Hot and Cold Leg Valves Backleakage	Changes made to incorporate field changes of last refueling
661	PT 2.5 Accumulator Check Valve Operability	Same as change No. 660
662	PT 16.2 Containment Sensitive Leakrate Test	New procedure to calculate leakage in standard cubic feet of air into PT
664	PT 18.0 CVCS Monitor and Holdup Tanks and Reactor Coolant Drain Tank	Same as change No. 660
665	PT 16.3 Pressure Test of Containment Isolation Valve	Same as change No. 660
666	PT 7.2 Boric Acid Blend System	Same as change No. 660

Change Number	Procedure Number	Description of Change
667	PT 27 Post Accident Hydrogen and Containment Sampling System	Acceptance criteria was more clearly defined
669	PT 4.0 Service Water System	Same as change No. 660
671	PT 8.2 Primary to Secondary Leakage Evaluation	Increased authorized effective full power hours from 7000 EFPH to 7500 EFPH
672	PT 2.6 Isolation Valve Seal Water	Valve lineups changed based on updated drawings
673	PT 25.2 Main Steam Safety Valve System	Same as change No. 660
674	PT 20.3 Station Battery Test	New procedure
675	PT 2.2 Safety Injection System Component Test	To add adjusted level to computation of pump discharge pressure
676	PT 26 Fuel Handling Equipment Interlock and Operation Test	Provided for use of dummy fuel assembly in checkout of system and clarified procedure

Change Number	Procedure Number	Description of Change
678	PT 26 Fuel Handling Equipment Interlock and Operation Test	Delete steps that were for initial fuel loading only
679	Health Physics Procedure 22 Plant Cooldown, Degasification, and Depressurization	New procedure
683	PT 29 Radiation Monitoring System	Changed to make use of accumulated data
684	PT 23.2 Emergency Diesel Auto Start on Loss of Power and Safety Injection Emergency Diesel Trips Defeat	Same as change No. 660
686	Fuel Follow Procedure No. 4 Flux Mapping Procedure	New procedure
687	PT 3.1 Containment Spray System	Same as change No. 660
688	FT-6 Transfer of New Fuel to Spent Fuel Pit	New procedure to refueling manual replacing RF-7

Change Number	Procedure Number	Description of Change
689	Addendum to FT-6 Transfer of new Fuel to Spent Fuel Pit	Addition for movement of fuel for Regions 5 and 6
690	Health Physics Procedure 24, RP-3	New Procedure
691	Health Physics Procedure 25, RP-4 Spent Fuel Building Access Control During Refueling	New procedure
692	PT 7.3 and 7.4 Boric Acid Heat Tracing Operability	To replace PT 7.0 so that system can be checked daily by Maintenance and Boric Acid Tanks rodded out weekly.
694	Radiation Control and Protection Manual	Organizational change
697	Radiation Control and Protection Manual CP-1 Chemistry Results	Provided procedure for reporting chemistry results.
698	PT 2.1 Safety Injection Test	Same as change No. 660
700	Continuing Quality Assurance Manual	Up dated to reflect Westinghouse control of renewal equipment procedures and documentation
701	PT 2.5 Accumulator Check Valve Operability	Change level 20% - 33% to 24% - 38% to comply with the new normal accumulator levels.

Change Number	Procedure Number	Description of Change
702	TP 1-3-74 Integrated Leak Rate Test (ILRT)	Issued test instruction for ILRT accomplishment during refueling outage
703	TP 2-3-74 Reactor Containment Structure Pressure Test	Issued test instructions for structural retest to be accomplished during refueling outage.
704	PT 30 Reactor Control and Protection Instrumentation Channel Calibrations and Testing	Changes made to provide a more accurate listing of modules and delete items which are not applicable to PT
705	TP 1-3-74 Integrated Leak Rate Test	Changed to allow added flexibility in getting the test started without compromising safety.
706	PT 25.2 Main Steam Safety Valve Test	Change made so that nitrogen might be used to perform test
707	TP 4-3-74 Reactor Containment Liner Surveillance	Test issued to inspect containment liner for bulges and for verification of integrity.
708	TP 1-3-74 Integrated Leak Rate Test	Change made so that HVH could be run with flow orfices in place, without tripping
709	TP 1-3-74 Integrated Leak Rate Test	To make sure that all modifications revert to proper configuration after test
710	Addendum to FT-6 Transfer of New Fuel to Spent Fuel Pit	Spent fuel rack E4 discovered to be damaged. There by precluding its use in the fuel shuffle procedure.
712	Addendum to FT-10 Fuel Assembly and Core Component Movement	New procedure covering fuel cycle III fuel shuffle

Change Number	Procedure Number	Description of Change
713	PT 31 Inspection of Hydraulic Shock Suppressors	Inspection procedure for Determining shock suppressor condition in response to RO Bulletins 73-3 and 73-4
714	Special Procedure For QA Activities during Refueling Outage No. III	Procedure provides QA surveillance for outage activities
715	PT 1.0 Overall Refueling Interval Test	Items deleted because they were for initial refueling only and new PT's added to list
717	TP 5-8-74 Containment Vessel Apex Vertical Measurement Procedure	Issued special precedure for conducting vertical measurements for structural test
718	Emergency Plan and Procedures	Organizational change and addition of telephone number
720	CPL-R-6.0,6.1,6.2,6.3.1, 6.3.2, 9.3 and 9.4 Startup Tests	Changed for clarification and condensation
721	Refueling Manual	Deleted sound power communication for polar crane operator because it was not feasible
722	PT 18 CVCS Holdup Tanks	To incorporate field changes and clarify instruction
723	Process Specification Number 4 Training, Examination, and certification of NDT Personnal	New instruction to formalize non-destructive testing program
724	Visual Inspection of Cranes and Fuel Handling Equipment	Additional Inspections specified for fuel handling equipment

Change Number	Procedure Number	Description of Change
725	TP 5-12-74 Containment Vessel Apex Vertical Measurement, using Optical Level	Provision of an additional means for conducting vertical measurement for structural test
726	Eddy Current Inspection Program	Procedure issued for steam generator tube Inspection
727	Steam Generator Explosive Plug and U-Bend Tube Removal	These Procedures required for steam generator repair and for removal of defective tube for use in laboratory analysis
728	10 Year Inservice Inspection Program (Including Procedures)	Procedures delineate requirements for compliance with ASME boiler and pressure vessel code Section XI
730	Special Procedure for Inspection of Support Bolts on Class 1 Components	Provides instruction for inspection of support bolting in response to RO Bulletin 74-3
731	Steam Generator Secondary Hydrostatic Test	Allow the secondary side of any steam generator to be Hydro tested with this procedure
732	PT 25.1 Pressurizer Safety Valve Testing	Allows use of nitrogen bottles for gas supply to the test stand
733	PT 3.1 Containment Spray Test	Clarification of bistable identification
734	Health Physics Procedure 24, RP-3	Establishes positive control levels for reading TLD's
735	Pneuma-seal Installation and Removal	Procedure provides instruction for installing inflatable seal for sealing of Reactor Cavity for refueling operations.

Change Number	Procedure Number	Description of Change
736	PT 23.3 Diesel Generators Emergency Field Flashing and Manual Closing of Generators Main Breakers	Delete steps not required due to equipment cleared for maintenance
737	Incore Thinble Removal and Replacement Procedure	New procedure for removal of defective Thimbles and repair of flux mapping system
738	Ultrasonic Valve Wall Thickness Measurement	Procedure for verification of reactor coolant boundary valve wall thicknesses
739	Radiation Control and Protection Manual	To set forth a method for the setting of personnel monitor alarms
740	PT 2.1 Safety Injection Test	Change valve position due to orifice being installed for test flow purposes
742	OP 40 Component Cooling	Addition of procedure for emergency cooling of spent fuel pit heat exchanger
743	OP 40 Component Cooling	Added provision for valve check offs for recently installed valves for emergency cooling of spent fuel pit heat exchanger
745	Safety Injection Flow Test	Spedal test for determination of pump performance.
746	Procedure for Measuring Control Rod Drive Shaft Bow	Delineates means of measuring drive shaft bow to determine condition of shafts removed during 1973 refueling
748	Refueling Manual	To make method of determination of 0.05 mCi/ml limit clear

Change Number	Procedure Number	Description of Change
749	Special Procedure for Insertion of Thimble Plugs	Instructions provided for replacing damaged thimble plugs
750	Special Procedure for Steam Generator secondary Side Sludge Cleaning	Provides for cleaning operation in an effort to remove sludge accumulated on top of steam generator tube sheet
752	Gadolinia Rod Removal and replacement Procedure	Instructions for removal of Gadolinia rods from four test fuel assemblies
753	Refueling Manual FT-10 Fuel Assembly and Core Component Movement	Changed fuel movement sequence and clarified handling of inserts for Gadolinia Fuel Assemblies
754	Refueling Manual	Requirement added to maintain log of relative humidity in containment and spent fuel building
756	ISI-17 Visual Examination of cladding patches in closure head	Changed to provide compatibility with inservice inspection requirements
757	ISI-18 Liquid Penetrant Inspection Procedure for Reactor Vessel closure Head Cladding Patches	Changed to provide compatibility with inservice inspection requirements
758	CV Integrity Check off For Sludge Removal in Steam Generators	To insure CV integrity during sludge removal
759	Refueling Manual	Provided instructions to implement requirement that spent fuel movement shall not be accomplished unless relative humidity in fuel handling areas is $\leq$ 70%

Change Number	Procedure Number	Description of Change
762	Safety Injection System Flow Test	Temporary change to close valve, change cancelled after test was completed
763	Refueling Manual	Changed requirement for refueling cavity water level to provide for more flexible operation
764	Special Procedure for Measuring Drive Shaft Bow 1974 outage	To incorporate the use of plumb and string to measure drive shaft bow of shafts stored in upper internals
765	Radiation Control and Protection Manual	To more precisely define how contamination is detected on the "Sweeping" pads.
766	Radiation Control and Protection Manual	To make clear as to how .05 mCi/ml is measured.
767	Refueling Manual	Changes made to fuel shuffle.
768	Ditto	Ditto
769	Ditto	Ditto
770	Ditto	Ditto
771	Ditto	Ditto
772	Ditto	Ditto
773	Ditto	Ditto
774	Ditto	Ditto
775	Ditto	Ditto
776	Ditto	Ditto

Change Number	Procedure Number	Description of Change
777	Health Physics Procedure 1	To delineate methods and points surveyed and use of a teletector
778	Refueling Manual	Changes made to insure no binding between the CRDM guide tubes and the RCC drive shafts
779	Flow measurements of Ventillation System	New procedure
780	Refueling Manual	Changes made to fuel shuffle
781	Ditto	Ditto
783	Reactor Upper Internals Inspection	Provided inspection instructions for upper internals to verify integrity following retention of control rod in internals when lifting internals package
785	Special Procedure for Inspection of Steam Generator Support Structures	Instruction for bolt inspection in response to RO Bulletin 74-3
786	Eddy Current Inspection Program	Expanded inspection to encompass 100% inspection of all 3 steam generators
789	PT 26 Refueling Interlocks	To clarify switch position for spent fuel moveable bridge by pass
790	Special Procedure for Unlatching RCC in position N-7 Upper Internals in storage position	Procedure was utilized to remove control rod that was inadvertently retained in upper internals and subsequently damaged
791	PT 28.2 Seismic Recorder Calibration (Semi-Annually)	Change damping resistance from 50 OHMS to 40 OHMS

Change Number	Procedure Number	Description of Change
793	OP 13-C Heating and Ventilation	Update check off sheet due to modification addition of humidity control system
794	Refueling Manual	To verify damper positions of fuel handling ventilation system
797	Special Procedure to delineate operator training Program	New procedure
798	Special Procedure to Delineate Radiation Indoctrination Program	New procedure
799	Special Procedure for lifting upper internal package, TV Inspection and unlatching of RCC in position N-7	Instruction for inspections and removal of control rod inadvertently retained in upper internals
800	Special Procedure for Boroscope Inspection of Guide Tube Position N-7	Verification of guide tube integrity following inadvertent retention of control rod in upper internals
801	Refueling Manual	Changes made to fuel shuffle
802	Ditto	Ditto
803	Ditto	Ditto
804	Ditto	Ditto
805	Ditto	Ditto
806	Ditto	Ditto
808	Ditto	Ditto

Change Number	Procedure Number	Description of Change
809	Refueling Manual	Included emergency stop blocks for polar crane to preclude collisions with manipulator crane
810	Procedure for N-7 Rod Drive shaft inspection	Verification of control rod drive shaft integrity
811	Health Physics Procedure 3	To delineate areas of daily samples and explain calibration and decontamination of instruments
812	Special Procedure for Insertion of Spare RCC in New Fuel Assembly	Procedure for replacement of control rod damaged during refueling
814	Refueling Manual	Changes made to fuel shuffle
816	PT 24 Fans and Associated Charcoal and Absolute Filters	Updated test to include latest Technical Specification requirements for filter testing
818	PT 15.1 Turbine Trip Logic Channel Testing	Updated PT incorporating previous experience in order to condense and clarify the procedure
819	General Operating Procedures	Revision of entire GP-1 for clarity of instruction
821	Health Physics Procedure 7	To specify when a special radiation work permit is required and who may approve it
822	PT 26 Refueling Interlocks	Added a step to avoid misaligning fuel Transfer Carriage
826	Special Procedure for Removal and Disposal of Thimble Plugs and RCC in Containment Refueling Cavity	Procedure for disposal of damaged fuel assembly inserts

Change Number	Procedure Number	Description of Change
827	Special Test For Analog Protection Instrumentation System Modification Number 236	Test to verify operation of the system following modification
828	PLS1	Changes reflect the revised steam dump flow capabilities following replacement of four 12" valves with five 8" valves
829	Administrative Instructions	Specify personnel that may authorize deviation from established procedures
830	PT 20.3 Station Battery Load Test	Change undervoltage alarm from 125 volts to 123 volts
831	Annunciator Book	Change undervoltage alarm from 125 volts to 123 volts
833	OP 17-1 Steam Generator Blowdown	New procedure for recirculation and draining of steam generators
834	OP 17-1B Steam Generator Blowdown	Addition of new procedure to recirculate steam generators
835	OP 17-1C Steam Generator Blowdown	Addition of new procedure to drain and/or release steam generators
836	Special Procedure for Removal of BPRA 12P67 from fuel element D35, reorient fuel element D35 and reinsert BPRA 12P67 in this fuel element	Instructions required due to improper orientation of fuel assembly in storage rack

Change Number	Procedure Change	Description of Change
837	Special Procedure for Transferring and Installing Driveshaft Number 606	Procedure provides instruction for installing replacement driveshaft
838	Special Procedure for Retreiving Nuts form fuel Assemblies D-40 and D-18	Instructions for removal of foreign objects dropped into core during refueling
839	PT 2.6 Isolation Valve Seal Water System	Changed to provide more flexibility in lining up system to suit plant conditions
841	Special Procedure for verification of operability of RCC-49 in position N-7	Test procedure for checking operability of new control rod used to replace the rod inadvertently retained in upper internals
842	Steam Generator Tube Removal Procedures	Procedure for removal of tube section for lab analysis

Change Number	Procedure Number	Description of Change
843	Curve Book	To update the Curve Book for Cycle 3 Fuel Operations
844	P.T. 2.6 Isolation Valve Seal Water Test	Corrected normal system pressure from 54 psig to 46 psig
845	O.P. 45 Isolation Valve Seal Water System	Changes made to reflect the need to prevent the communication of high and low pressure lines
847	Refueling Manual	Change to Fuel Shuffle
848	Ditto	Ditto
849	Ditto	Ditto
850	Ditto	Ditto
851	Ditto	Ditto
851A	Ditto	Ditto
851B	Ditto	Ditto
851C	Ditto	Ditto
852	Ditto	Ditto
853	Ditto	Ditto
854	Ditto	Ditto
855	Ditto	Ditto
856	Ditto	Ditto

Change Number	Procedure Number	Description of Change
858 & 862	Steam Dump Pre-operational Test 1	Operational Test to verify performance of modified steam dump system
859	Special procedure "for continuous blow-down during heat up following 1974 refueling outage."	New Procedure
864	Special procedure charging pump piping flush procedure	Flush required following modification of pump relief valve discharge line
865	Special Procedure charging pump piping hydrostatic procedure	Test following pump relief valve discharge line modification
866	Health Physics Procedure 12 Steam Generator Work	Procedure revised to specify detailed health physics procedures for work in steam generators
868	General Operating Procedure (GP-1E)	Added Penetration 67 to integrity check-off list. Penetration was made accessable per plant modification

Change Number	Procedure Number	Description of Change
869	Standing Order Number 5 Seismic Disturbances	Added requirement to place plant in hot shutdown following indicated accelerations of 0.1 (horizontal) or 0.067g (vertical)
870	Emergency Instruction 1	Requirement added to provide sodium hydroxide addition anytime containment spray is actuated.
871	O.P. 28 and 28A charging and volume control system	Changes made due to modification of charging pump relief line.
872	O.P. 10A demineralizer water system	Delete valves that are covered under another system.
873	O.P. 37A pressurizer relief tank control	Changed primary water to pressurizer relief tank valve position from open to closed.
874	Refueling Manual	Added refueling checkoff of penetration 67 which was made accessible by addition of pipe cap
875	O.P. 12A auxiliary heating system	Change valve position from open to open/closed to provide flexibility for seasonal operation
876	O.P. 14A auxiliary feedwater system	Valves used for chemical feed added to valve list.
877	O.P. 17-1A steam generator blowdown system	Added valve installed for sludge lancing to system checkoff sheet.
878	O.P. 18A secondary chemical feed system	Valves added to system per chemical addition modification were added to checkoff list.
879	O.P. 19 gland seal steam and drain	Second gland steam exhaust fan added to system.
880	O.P. 20A heater drains and vents system	Two moisture separator reheater drain tanks added to system.
881	O.P. 40A component cooling system	Change valve position from closed to open/closed to provide valve position option on valves CC-748 A, B, and CC-749 A, B.

Change Number	Procedure Number	Description of Change
882	O.P.-42A Safety Injection and spray	Changed nitrogen header isolation valve SI-855 from open to closed. To preclude excessive loss of nitroge
883	O.P. 28A Charging and Volume Control	Correct position of CVC-T CV-143 due to system modification
884	O.P. 6A service water system	Correct name of valve to clarify function
885	Special logic test of breaker 52/29B	New test
886	Loop thermal expansion data sheet	Additional points added to data sheet.
887	General operating procedure (GP-1E)	To insure that automatic valves are operable and that manual valves are closed.
888	Health Physics Procedure 26 Radiation Control and Test Technician Training	New Procedure
890	Safety Injection System (S.D-4)	Changed diagram to reflect addition of sodium hydroxide injection system
891	Special logic test of breaker 52/29B	Bus E-1 energized so that test might be completed.
892	O.P. 17A Main and Reheat Steam System	Changes made due to modification of system.

Change Number	Procedure Number	Description of Change
894	CPL-R-6.0 startup sequence	To obtain ΔT and tave before boron endpoint
898	P.T. 26 Refueling Interlocks	To aid in the checkout of the RCC change fixture and to avoid the reoccurrence of a dropped rod.
901	Emergency Instruction I	Change will allow the recirculation and spray operation to be established solely from the control room as long as the SI pumps are available.
902	Liner Bulge strain monitoring program	Procedure for monitoring liner bulge detected during outage inspection
904	Minimum Equipment List	Penetration pressurization flow chang from 1.36 SCFM to 1.29 SCFM as per 1974 refueling P.T. 16.2.
905	Steam Dump Pre-operational test No. 1	To permit valve trip timing tests to be done with plant between 25% and 55% power
913	Safety Injection System Mod. 253 Test	New test to verify operation of containment spray NaOH additive valves.
915	O.P. 27A incore instrumentation	Changes made due to new valves added to system
916	Curve Book	Updated radiation monitor curves following calibration.
917	General Operating Procedure (GP-1E)	Correct valve position and operation
918	Abnormal Procedure -1	Changed to reflect new Technical Specification requirements regarding action to be taken with a misaligned control rod and/or quadrant tilt in excess of 2%.
920	O.P. 18 Secondary Chemical Addition	Changes due to new valves and piping.
921	General Operating Procedure (GP-1A)	Corrected valve operation designation.
923	General Operating Procedure (GP-1E)	Added valves to check off sheet.

Change Number	Procedure Number	Description of Change
924	P.T. 15.2 Turbine Valve and trip functional test	Changes made due to modification of system
925	O.P. 23B reactor control and protection	Changed to reflect addition of new steam dump valve 1324 B-3.
926	O.P. 42A Safety Injection and Containment Spray	Specified accumulator isolation valve position during plant heatup
927	CPL-R-6.0 Startup Sequence	Changed total worth of C&D bank control rods from +5% to +10%.
929	O.P. 33A Boron Recycle Process	Change made to clarify valve line up.
930	Health Physics Procedure 9	To reflect recent changes in AEC reporting requirements
933	O.P. 48C Refueling Water Pump Operation	Change valve position from closed to open so spent fuel pit might be filled.
936	P.T. 15.1 Turbine Trip Logic Channel Testing	Added annunciators which are to verified.
938	PLS-1	Added new heat flux hot channel factor requirements

NOTE: The majority of the procedure changes listed above are incorporated as a part of the Plant Operating Manual. The eighteen volumes of this manual are referred to via the abbreviations noted below.

Volume 1 - Administrative Instructions (AI)

Volume 2 - System Descriptions (SD)

Volume 3 - Operating Procedures (OP)

Volume 4 - Overall Plant Operating Procedures (GP)

Volume 5 - Abnormal Procedures (AP)

Volume 6 - Emergency Instructions (EI)

Volume 7 - Precautions, Limitations and Set Points (PLS)

Volume 8 - Radiation Control and Protection (HP)

Volume 9 - Fuel Handling Procedures (FT)

Volume 10 - Periodic Tests (PT)

Volume 11 - Continuing Quality Assurance Program

Volume 12 - Maintenance Instructions (MI)

Volume 13 - Emergency Plant and Procedures

Volume 14 - Special Nuclear Material Accountability

Volume 15 - Tank Capacity and Reactor Operations Curves

Volume 16 - Annunciator Procedures

Volume 17 - Industrial Security

Volume 18 - Fuel Follow Procedures (FF)

SECTION 5

PERFORMANCE CHARACTERISTICS

CYCLE II FUEL PERFORMANCE

Core Status at End of Life: Toward the end of Cycle 2, it became apparent that the plant would shutdown with around 30 ppm boron remaining at full power. In an effort to fully utilize the remaining fuel, a request was made to the Atomic Energy Commission to extend our burnup limit based on actual operating data. This request was approved and our burnup limit was extended from 7000 EFPH to 7500 EFPH. The unit was on the line until May 6, 1974, when it was shutdown for refueling. At end of life, Cycle 2 had completed 7482.64 EFPH. Fuel consumption at EOL was:

Region 2 ---------------------- 100%

Region 3 ---------------------- 100%

Region 4 ---------------------- 38%

Fuel Densification

The abundance of blips, areas of high thermal flux density, was used as an indication of fuel densification. As the fuel pellets densify, they separate allowing a longer path for neutron thermalization.

At the beginning of Cycle 2, there were 0.6 blips per monitored assembly. At mid-point in Cycle 2, there were 1.4 blips per monitored assembly. The data became more erratic toward the end of Cycle 2 with the number of blips per monitored assembly approaching 2.0.

Increased iodine activity during the last 2500 MWD/MTU of burnup indicated some fuel clad failure. This tended to agree with a slight increase in the size and number of blips discovered.

CYCLE III FUEL PERFORMANCE

Criticality on Cycle 3 fuel was achieved at 2147 hours on June 24, 1974. Beginning of life flux maps indicated radial tilts less than 1%, well within limits. All peaking factors are within limits. Full power was achieved on July 2, 1974, with no blips present on the flux traces.

SECTION 6

WASTE MANAGEMENT, DOSIMETRY, CHEMISTRY AND ENVIRONMENTAL PROGRAMS

REPORT OF RADIOACTIVE EFFLUENTS

Facility H. B. Robinson #2 Year 1974

I. LIQUID RELEASES

	Units	January	February	March	April	May	June
1. Gross Radioactivity (B,γ)							
a) Total release	Curies	9.07E-02	1.98E-01	8.20E-01	1.22E00	3.54E-01	1.26E-01
b) Average concentration released	uCi/ml	6.17E-09	7.98E-09	1.25E-08	1.86E-08	1.59E-08	2.34E-08
c) Maximum concentration released	uCi/ml	1.25E-08	1.39E-08	1.60E-08	2.06E-08	8.79E-08	5.52E-08
2. Tritium							
a) Total release	Curies	7.28E01	4.49E01	3.50E01	4.88E01	1.98E01	2.87E00
b) Average concentration released	uCi/ml	4.95E-06	1.83E-06	5.33E-07	7.46E-07	8.88E-07	5.33E-07
3. Dissolved noble gases							
a) Total release	Curies	8.86E-02	5.54E-02	7.58E-02	1.20E-01	6.69E-02	3.82E-03
b) Average concentration released	uCi/ml	6.02E-09	2.26E-09	1.15E-09	1.83E-09	3.00E-09	7.10E-10
4. Gross Alpha Radioactivity							
a) Total release	Curies	0	0	0	0	0	0
b) Average concentration released	uCi/ml	0±4.42E-06	0±4.11E-06	0±5.68E-06	0±6.41E-06	0±8.21E-06	0±4.31E-06
5. Volume of liquid waste to discharge canal	liters	6.93E05	4.56E06	2.70E06	2.71E06	3.07E06	4.68E05
6. Volume of dilution water	liters	1.47E10	2.45E10	6.56E10	6.54E10	2.23E10	5.38E09
7. Isotopes Released	Curies						
Ba+La-140		0	3.40E-05	9.74E-04	5.19E-04	1.01E-03	8.85E-04
Sr-89		0	7.30E-04	8.40E-05	9.80E-05	2.05E-04	6.70E-05
I-131		9.16E-04	5.50E-02	1.98E-01	4.72E-01	9.32E-02	2.11E-03
Xe-133		8.77E-02	5.44E-02	3.57E-02	9.49E-02	6.04E-02	1.87E-03
Xe-135		9.16E-04	1.02E-03	4.02E-02	2.54E-02	7.02E-03	1.91E-03
Cs-137		0	4.01E-03	3.58E-02	3.13E-02	3.03E-02	1.68E-02
Cs-134		0	2.21E-03	2.34E-02	3.61E-02	3.27E-02	1.43E-02
Co-60		1.19E-02	9.94E-03	2.35E-02	1.64E-02	2.95E-02	5.96E-02
Co-58		2.84E-02	1.93E-02	3.52E-02	1.97E-02	6.53E-02	3.77E-02
Cr-51		0	0	0	0	0	0
Mn-54		2.65E-03	2.11E-03	4.80E-04	7.87E-03	5.74E-03	2.09E-03
Zn-65		0	0	0	7.39E-04	0	0
Sr-90		0	3.70E-04	6.80E-05	8.40E-05	1.81E-04	5.74E-05
Others (specify)							
8. Percent of technical specification limit for total activity released	Tritium Gross %	22.4% 11.3%	15.3% 26.8%	10.7% 101.7%	15.5% 156%	6.08% 43.9%	.91% 16.2%

II. AIRBORNE RELEASES

	Units	January	February	March	April	May	June
1. Total noble gases	Curies	2.87E01	1.22E02	1.05E03	4.82E02	3.56E02	9.71E01
2. Total halogens	Curies	6.67E-03	1.76E-03	1.66E-03	1.54E-03	2.57E-02	8.31E-03
3. Total particulate gross radioactivity (β,γ)	Curies	6.52E-04	6.92E-06	1.12E-04	7.53E-04	8.13E-05	1.51E-05
4. Total tritium	Curies	4.18E-02	6.29E-02	5.83E-01	3.27E00	2.51E01	1.29E00
5. Total particulate gross alpha radioactivity	Curies	0	0	0	0	0	0
6. Maximum noble gas release rate	uCi/sec	1.21E04	4.20E03	1.58E04	6.96E03	5.91E03	1.49E03
7. Percent of applicable limit for:							
a. noble gases	%	.07%	.34%	2.61%	1.24%	.886%	.250%
b. halogens	%	30.0%	8.00%	5.20%	4.90%	125%	44.9%
c. particulates	%	3.41%	.04%	.586%	4.06%	.425%	.082%
8. Isotope released:	Curies						
Particulates							
Cs-137		0	0	0	0	0	0
Ba-La-140		0	0	0	8.50E-05	0	0
Sr-90		0	0	0	0	0	0
Cs-134		7.27E-08	1.90E-07	5.90E-06	1.09E-05	3.45E-06	0
Sr-89		0	0	0	0	0	0
Halogens							
I-131		5.74E-03	1.38E-03	9.92E-04	9.09E-04	2.39E-02	8.29E-03
I-133		7.61E-04	2.51E-04	4.07E-04	4.30E-04	1.58E-03	1.35E-05
I-135		1.67E-04	1.23E-04	2.55E-04	2.04E-04	1.99E-04	0
Gases							
Kr-85		0	0	0	0	0	0
Xe-133		2.75E01	1.20E02	1.04E03	4.76E02	3.53E02	9.65E01
Kr-88		0	0	0	0	0	0
Kr-87		0	0	0	0	0	0
Kr-85m		0	0	1.98E-02	0	0	0
Xe-138		0	0	0	0	0	0
Xe-135m		0	0	6.94 E-01	0	0	0
Xe-135		1.19E-01	1.62E00	5.35E00	2.63E01	3.00E00	8.50E-01
Ar-41		0	0	3.19E00	0	0	0
Others as appropriate (specify)							
Co-58		1.43E-04	3.22E-06	5.30E-06	5.08E-04	4.18E-05	2.72E-06
Particulates Co-60		5.87E-05	2.66E-06	4.38E-05	1.39E-04	3.26E-05	1.14E-05
MN-54		4.71E-08	8.53E-07	9.00E-06	1.09E-05	3.45E-06	0

ATTACHMENT NO. 1

OTHER RADIONUCLIDES RELEASED IN LIQUID RELEASES (CURIES)

March		April		May	
I-133	5.68E-01	I-133	1.75E00	I-133	7.47E-03

2.3 ci

The section discussing Environmental Sampling and Its Results are furnished under the cover "Environmental Monitoring Report" January 1, 1974 - June 30, 1974.

RECORDED WHOLEBODY EXPOSURES FOR FIRST SIX MONTHS, 1974

Licensee Reporting (Name & Address)
Carolina Power and Light Co. H.B. Robinson SEG Plant
P.O.Box 790 Hartsville, South Carolina 29550

License No.
DPR--23

Dose Ranges* (rem)	Number of Individuals in Each Range	
No Measurable Exposure	405	666
Measurable Exposure Less Than .100	261	
.100 - .250	68	127
.250 - .500	59	
.500 - .750	43	93
.750 - 1.0	50	
1.0 - 2.0	151	246
2.0 - 3.0	95	
3.0 - 4.0	1	2
4.0 - 5.0	1	
5.0 - 6.0	0	
6.0 - 7.0	0	
7.0 - 8.0	0	
8.0 - 9.0	0	
9.0 - 10.0	0	
10.0 - 11.0	0	
11.0 - 12.0	0	
12.0 +	0	

Total number of individuals reported 1134

The above information is submitted for the total number of individuals for whom personnel monitoring was (check one)

- [ ] ~~required~~ under 10 CFR 20.202(a) or 10 CFR 34.33(a) during the calendar year.
- [X] ~~provided~~ during the first two quarters, 1974

*Individual values exactly equal to the values separating exposure ranges shall be reported in the higher range.

Exposures $\geq$ 500 mRem; job classifications

Plant Surveillance & Insp.	1
Routine Plant Maint.	2
Special Plant Maint.	3
Routine Refuel Op.	229
S/G Maint.	106

Month January

	Maximum	Minimum	Average	
Gross Coolant Radioactivity	7.93E-1	2.53E-1	4.28E-1	uCi/ml
Suspended Solids	Non Detectable			ppm
Gross Tritium	1.82E-1	5.48E-2	1.15E-1	uCi/ml
I-131	2.27E-2	3.74E-3	9.68E-3	uCi/ml
Ratio I-131/I-133	1.30	0.326	0.578	
Hydrogen	37	23	29.9	cc/kg
Lithium	1.75	0.50	1.00	ppm
Boron-10	374	244	290	ppm
Oxygen-16	0	0	0	ppb
Chlorides	60	0.00	12.7	ppb
pH	7.35	6.40	7.04	

Month February

	Maximum	Minimum	Average	
Gross Coolant Radioactivity	5.71E-1	7.97E-2	4.25E-1	uCi/ml
Suspended Solids	Non Detected			ppm
Gross Tritium	1.39E-1	4.93E-2	1.03E-1	uCi/ml
I-131	1.47E-2	9.82E-4	6.07E-3	uCi/ml
Ratio I-131/I-133	0.630	0.264	0.364	
Hydrogen	40.0	16.5	31.45	cc/kg
Lithium	1.70	0.60	1.12	ppm
Boron-10	241	171	208	ppm
Oxygen-16	0	0	0	ppb
Chlorides	90	0	17.1	ppb
pH	7.65	6.95	7.31	

Month March

	Maximum	Minimum	Average	
Gross Coolant Radioactivity	0.577	0.367	0.476	uCi/ml
Suspended Solids	0.227	0.227	0.227	ppm
Gross Tritium	1.38E-1	6.59E-2	9.85E-2	uCi/ml
I-131	1.73E-2	8.10E-3	1.30E-2	uCi/ml
Ratio I-131/I-133	0.564	0.358	0.449	
Hydrogen	37.0	23.0	31.32	cc/kg
Lithium	1.50	0.55	0.977	ppm
Boron-10	169	91	132	ppm
Oxygen-16	10.0	0	.077	ppb
Chlorides	60	0	6.54	ppb
pH	7.80	7.20	7.43	

Month April

	Maximum	Minimum	Average	
Gross Coolant Radioactivity	0.864	0.254	0.669	uCi/ml
Suspended Solids	Non Detectable			ppm
Gross Tritium	1.26E-1	3.74E-2	7.81E-2	uCi/ml
I-131	3.28E-2	1.37E-2	2.48 E-2	uCi/ml
Ratio I-131/I-133	0.585	0.402	0.475	
Hydrogen	41.0	24.0	30.2	cc/kg
Lithium	1.80	0.250	0.954	ppm
Boron-10	129.5	17.0	55.5	ppm
Oxygen-16	0	0	0	ppb
Chlorides	90	0	7.31	ppb
pH	8.80	7.40	7.95	

Month May *

	Maximum	Minimum	Average		
Gross Coolant Radioactivity	0.791	7.71E-3	0.336	uCi/ml	
Suspended Solids		Not Performed		ppm	
Gross Tritium	5.11E-3	5.88E-2	2.81E-2	uCi/ml	
I-131	8.91E-1	2.01E-3	2.29E-1	uCi/ml	
Ratio I-131/I-133		Not Performed			
Hydrogen	29.9	28.0	29.1	cc/kg	**
Lithium	0.60	0.25	0.425	ppm	**
Boron-10	2210	10	1759	ppm	
Oxygen-16	0	0	0	ppb	**
Chlorides	60	20	35	ppb	**
pH	8.4	7.6	8.15		**

* Reactor in Refueling Outage

** During Operating Period

Month June*

	Maximum	Minimum	Average		
Gross Coolant Radioactivity	1.17E-1	1.64E-3	3.19E-2	uCi/ml	
Suspended Solids		Not Performed		ppm	
Gross Tritium	2.99E-2	2.29E-3	8.20E-3	uCi/ml	
I-131	5.71E-4	6.02E-5	3.67E-4	uCi/ml	
Ratio I-131/I-133	No I-133 Detectable				
Hydrogen	15.0	14.5	14.8	cc/kg	**
Lithium	1.60	0.95	1.28	ppm	**
Boron-10	2438	993	1979	ppm	
Oxygen-16	0	0	0	ppb	**
Chlorides	20	10	15	ppb	**
pH	6.2	5.7	5.98		**

* Reactor in Refueling Outage

** During Operating Period

APPENDIX I

REFUELING OUTAGE REPORT

H. B. ROBINSON UNIT NO. 2

1974 Refueling

Outage Report

Complied by:

R. E. Morgan
Nuclear Generation Specialist

TABLE OF CONTENTS

Introduction

The 1974 H. B. Robinson refueling outage was sheduled for approximately five and one half weeks beginning on May 4, 1974. Major work to be accomplished consisted of replacing two-thirds of the core with new fuel and T.V. inspection of the other third for determination of fuel conditions and location of the source of a broken grid strap found in "C" steam generator in the November, 1973 steam generator outage; inspection and repair of steam generators, reactor coolant pumps, one steam generator feedwater pump, H. P. turbine, one L. P. turbine, main generator, emergency diesel generators, heater drain pumps, condensate pumps and one service water pump; calibration of instrumentation and control components and numerous miscellaneous items.

The following work items are mentioned generally but not in detail. Comprehensive reports can be found in separate attachments.

1. Turbine - generators
2. Inservice Inspection
3. Steam generator (Eddy current inspection, sludge lancing, tube pulling and plugging.)
4. Reactor coolant pumps and motors.
5. Steam dump valve modification.

The actual work spanned 50 days, exceeding the original schedule by 16 days. Details of work accomplished are related in the following sections.

Chronological Summary of Events

No. 2 Unit was rescheduled to come off the line after the load peak on Friday evening, May 3, 1974. The shutdown was delayed until 0129 hours, Monday, May 6 due to reduced system capacity (Roxboro Unit 1 was off the line and Roxboro Unit 3 was at reduced capability).

During this waiting period the following jobs were initiated: Turbine Gantry and containment polar crane were checked out by Whiting representative. The cranes were declared operable and a list of preventative maintenance items was given to the maintenance foreman. "2A" heater drain pump was disassembled for inspection and repair. "2A" condensate pump was disassembled for inspection and repair. An inspection of refurbished valves received for atmospheric steam dump installation revealed cracks in the stellite seats of two. Subsequent inspection by valve representative resulted in returning these two valves to Houston for refurbishment of seating areas. Installation of orifice plates in containment HVH units began in preparation for the containment integrated leak rate test (ILRT).

Monday, May 6

After shutdown on May 6 the following jobs were immediately initiated. Main steam safety valves were set, by Crosby Valve representative. Fuel transfer equipment alignment and checkout was accomplished by Stearns Roger and Dwight Foote representative. Hot rod drops and other refueling shutdown Periodic Test requiring hot shutdown conditions were completed. New fuel movement to the spent fuel pit began and some difficulty was encountered in operation of the spent fuel handling tool.

Primary system cooldown began at 1910 hours May 6, 1974.

Tuesday, May 7

On Tuesday, May 7, 1974 inspection was completed on "A" condensate pump and pump reinstalled and run satisfactorily. "B" condensate pump was then disassembled for inspection and repair. Maintenance personnel began stripping reactor head. Disassembly of "B" heater drain pump also began. Scaffolding placement inside containment and other preaprations continued for the ILRT. Work continued on new fuel movement. More difficulty was encountered in spent fueling handling tool. It was removed from pit and alignment pins polished to remove burrs. Crosby valve representative began work on Moisture Separator Reheater (MSR) safety valves. Turbine began "chattering" on turning gear and was stopped. It was then rotated 180° at one hour intervals.

Wednesday, May 8

On Wednesday May 8, 1974 turbine disassembly and disassembly of "A" and "B" S.I. pumps began. All work inside containment was terminated and pressurization for ILRT began at 1409 hours. A pressure of 14 psig was obtained at 2000 hours and held for structural integrity test (SIT).

Thursday, May 9

Work on Thursday, May 9, 1974 consisted of the following: 21 psig was obtained in the containment vessel for the first phase of the ILRT. Removal of #2 L.P. turbine outer shell was completed and work commenced on removal of L.P. bearing covers. A small amount of contamination was found in the turbine seals due to the primary to secondary leak in "A" steam generator. Proper H.P. precautions were taken for contamination control, and work continued. The humidity control system for the spent fuel pit was completed. Operational difficulties continued with the spent fuel handling tool. The tool was again removed from the spent fuel pit, pins removed and taken to the "hot" machine shop. The pins were turned down from 0.860 - 0.845", tool reassembled and fuel movement continued. Problems on turbine repair included brake failure on the gantry crane and insufficient bolt heating capability for removal of H.P. shell bolts. (208 vs 240V power supply).

Friday, May 10

Work accomplished on Friday, May 10, 1974 consisted of continuation of essentially all of above mentioned jobs including feedwater heaters 3A and 4A tube leaks repairs. Metric Constructors began installation of new steam dump valves on the condenser and fabrication of pipe whip protective shields for the steam pressure transmitters. The 12 hour ILRT began at 1531 hours. The burnable poison rod assembly (BPRA) tool was checked, and two combs failed to operate properly. Repairs were made May 14.

Saturday, May 11

Contamination was found in the feedwater lines on Saturday, May 11, 1974; a valve removed for repair inadvertently spilled contaminated water to the storm drain. This was duly reported as an abnormal occurrence. Work began on disassembly of "A" heater drain pump. Repairs were completed on "4B" feedwater leaks. ILRT proceeded on schedule.

Sunday, May 12

On this day the removal of No. 2 L.P. turbine rotor was completed. Other turbine work progressed well. "A" Boric Acid storage tank was opened and inspected. First chargeable injury of outage occurred when a mechanic stuck a nail through his shoe into his foot. No lost time resulted.

Monday, May 13

Turbine work progressed to removal of No. 1 L.P. rotor. "A" safety injection pump rotating assembly was placed back in the casing but would not rotate.

"B" safety injection pump was discovered to have a cracked 8th stage impeller. Plans were made to send this stage back to Worthington for repair. New fuel movement to spent fuel pit was completed. Turbine stub shaft and four L.P. bearings were shipped to Lester, Pennsylvania shop for modification for oil lift system. Depressurization of containment began at 0930 hours and preparation for resumption of work inside the containment proceeded.

Tuesday, May 14

The reactor coolant system was drained on May 14, 1974, and work began inside containment. Stearns Roger equipment representative resumed work on manipulator crane. Metric began removing scaffolding used during ILRT. "B" condensate pump was set in place and mechanics began making up coupling. Byron Jackson representative left site. Westinghouse eddy current crews arrived on site and began preparing for inspection of "A" steam generator. "A" safety injection pump rotor was removed again due to internal rubbing when manually rotated. Head stripping (removal of ventialation ducts, insulation, & missile -shield) was completed and preparations made for relaxation of studs.

Wednesday, May 15

"A" steam generator level began increasing on the morning of Wednesday, May 15 indicating tube leakage in this generator had increased, possibly due to cooling. The head eductor was placed in service, and head bolt detensioning began. One stud lifting hoist required new cable prior to use. "A" steam generator primary manways were removed and a secondary hydrostatic test revealed a tube leak in column 34 row 32. "A" station battery test, Refueling PT 20.3, was completed. All three pressurizer safety valves were removed for shop testing and pressurizer cubicle cover set back in place.

Thursday, May 16

"C" steam generator was drained down on the secondary side, and primary and secondary manway covers removed for tube removal operation. Stud relaxing progressed with slight problems with one tensioner. Electrical cable shorted and was replaced. All studs were relaxed and ready for removal by midnight. Spare RCC was dropped in dummy fuel element from RCC change fixture when gripper cable failed during alignment and checkout of fuel handling equipment, PT 26. Westinghouse inspected the RCC visually and no damage was noted. However, later recommendations were to order another spare RCC. Two RCC's were placed on order. New cable was ordered from Dwight Foote and arrived on site Saturday, May 18. The RCC Change fixture was then repaired and checked out satisfactorily. "C" Reactor coolant pump motor was removed and pump disassembly began. Eddy current inspection began on "A" steam generator and eighty (80) tubes checked at 100 and 400 KHZ.

Friday, May 17

General work items progressed satisfactorily. "C" RCP motor flywheel cover was removed in preparation for ultrasonic inspection. Stearns Roger and Dwight Foote completed alignment of manipulator crane frame and began fuel conveyor modification to prevent conveyor drive actuating on loss of air supply. The seal table was prepared for cavity flooding with low pressure seals installed. Four incore thimbles were to be replaced with dry thimbles for future use with B & W fixed incore detectors. "A" and "C" S.I. pump work was completed with the final coupling of "C" pump. New under water light assemblies were completed. Final mounting in the cavity was held up due to crane usage conflict. All but two head studs were removed from the cavity today.

Saturday, May 18

Turbine work items progressed in a routine manner. Governor valve reassembly was completed,L.P. 2 sandblasting completed and work began on cleaning L.P. 1. Two head guide studs were installed for eventual removal of head. Pressurizer safety valves were removed to the hot shop and prepared for checkout and any necessary repair. "C" reactor coolant pump work progressing fairly well. Motor repairs and checkout was completed today. Reactor cavity sand plugs were pulled and prepped for new gaskets. Seal area around reactor vessel (cavity wall) was found to be nonconforming to drawings and extensive surface preparation was required prior to installation of inflatable seal. Spare gaskets were located in stock room should pneuma seal not work. However, upon installation and inflation on May 20, seal conformed to surface and sealed properly. Part length conoseals were removed from the head and 3 instrument port conoseals removed.

Sunday, May 19

"A"safety injection pump was successfully run. The last of sand plug gaskets were installed. There was a delay due to one bolt being wrung off and had to be drilled out. Westinghouse completed eddy current of the hot leg of "A" steam generator. "C" reactor coolant pump motor was reinstalled with the flywheel dust cover removed. All work on this pump was completed except UT of flywheel and hookup of the cooling water lines.

Monday, May 20

Fuel transfer equipment checkout was completed by Stearns Rogers representative. Part length rods were disconnected after problems experienced with position F-6. Motor on F-6 finally quit completely and replacement motor installed. Westinghouse T.V. inspection equipment arrived on site and movement into spent fuel pit began. The flywheel dust cover was removed from "B" reactor coolant pump for ultrasonic inspection (UT) and lower bearing oil reservoir was drained on "C" reactor coolant pump due to an oil leak. Westinghouse motor representative was called back for repair of this leak. UT of "C" reactor coolant pump flywheel was completed and preparations were made to UT "B" flywheel. Cleanup of reactor side of the cavity began for eventual head lift and flooding. Westinghouse completed eddy current of "A" steam generator and primary manways were installed. (A complete steam generator repair report is covered under a separate section of this report). Westinghouse sludge level eddy current indicated levels of sludge 3-4 inches deep and greater in some areas on the tube sheet. Preparations were made for sludge lance operations to remove this accumulation.

Tuesday, May 21

Colt Industries representatives arrived on site and began work on the diesel generator. Pacific pump representative arrived and began preparation for disassembly of "B" S.G. feedwater pump. The last part length rod was unlatched at 0950 hours. Lower cavity was drained for final cleaning. It had been partially flooded for checkout of fuel transfer system. Reactor head "O" rings were laid out on the storage pad for head removal and "O" ring installation. Westinghouse experienced difficulty in removal of tube in "C" steam generator. One fixture was broken in the attempt. Decision was made to terminate work, close the generator and prepare to flood the cavity. Closeup of "C" steam generator was delayed due to metal shavings found in the loop. A portable pump was obtained and all shavings removed by the morning of the 22nd; the "pie-shaped" concrete blocks were removed to gain access to the head storage area, and the head lifting rig installed.

Wednesday, May 22

"A" and "B" reactor coolant pump motors were prepared for removal. All equipment was removed from "C" steam generator and manways were reinstalled. Primary water level was raised and reactor head lifted at 1548 hours. It was placed on storage pad on the evening shift; Westinghouse personnel completed control rod driveshaft bow evaluation at 2030 hours with shafts E-5, F-8, M-6, H-8, H-6 and P-10 indicating worst bows. Westinghouse recommends care in reinstallation of head due to these bows, but no apparent restriction in rod drop time or normal operability should result. Commencement of flooding the reactor cavity began at 2205 hours. Aborted the flooding attempt at 2242 hours due to leaks in "A" and "B" cold leg and "B" hot leg sand plugs.

Thursday, May 23

After repeated flooding and tightening of sand plug covers, RTV was applied to the sand plug and Nuclear instrument covers and the fifth flooding was successful. Inflatable seal indicated little or no leakage during this transition. Work began on installation of cavity filtration system. A man was sent to Cleveland, Ohio to pick up a special pump for this application. New fuel pins were transferred from the new fuel building to spent fuel Position L-5 for eventual replacement of sixteen (16) gadolinia rodlets. Hand hole covers were removed from secondary sides of "A" and "B" steam generators in preparation for sludge lancing.

Friday, May 24

Friday "A" heater drain pump was removed for repairs. Unlatching of full length control rods began at 0400 hours and was completed by 1041 hours. Positions L-7, N-7, E-5, and K-8 required repeated attempts prior to unlatching.

Upper internal package was removed at 1530 hours and set on storage pad at 1620 hours. Stearns Roger representative then began indexing of manipulator crane over the core. Underwater T.V. equipment was required for manipulator indexing due to poor water clarity.

Saturday, May 25

Stearns Roger representative completed indexing of the manipulator crane and fuel movement began at 0318 hours. Fuel element D-49 was removed from the core to the RCC change fixture. In movement, the underwater T.V. cables became entangled in the fixture. Lights and cameras fell into the cavity. Lights were retrieved but camera was not due to water clarity. The spare camera was rigged up to continue operation. Thimble plug in fuel element E22 was bent in step lg and tied off to cavity wall by a nylon rope. A new thimble plug, (98) was placed in this fuel element and the fuel shuffle continued. LP 1 and 2 turbine bearings were returned from Lester, Pennsylvania after modification and No. 3 and 4 bearings were installed by midnight.

Sunday, May 26

Reinstallation of LP-1 rotor was completed, and work began on installation of No. 5 and 6 bearings. Removed moisture separator reheater manways and began leak check and repairs. Fuel element B-4 in position N-7 was found to be missing its RCC. Later investigation revealed RCC was still attached to the control rod drive shaft in position N-7 and lay underneath the upper internal package. This did not restrict fuel transfer in any manner. Fuel transfer was held up several times due to high humidity.

Monday, May 27

Westinghouse began the gadolinia rodlet removal and had removed 3 of 4 rodlets in fuel element D49 when their tool broke. Arrangements were made with Turkey Point to borrow an RCC. An engineer from Fla. Power brought this RCC. The cracked SI pump stage piece that was sent back to Worthington was returned and Worthington representatives were recalled for installation. Work began on reassembly of the main steam stop valves and disassembly of the power operated relief valves. Lancing of "C" steam generator was completed at 1800 hours.

Tuesday, May 28

Pacific Pump representative completed reassembly of "B" steam generator feed water pump except retainer for outboard end which was damaged upon disassembly. Another nut was ordered. Westinghouse completed removal of sixteen gadolinia rodlets from fuel elements D49, D50, D51, and D52. Four unirriadated U235 rodlets were replaced in each of these fuel elements.

Schutte-Koerting recommends a locking anti rotation pin on each main steam stop valve and preparations began for installation. Water clarity in the refueling cavity improved considerably. However, the spent fuel pit clairty has deteriorated due to stopping the coolant pump, which incorporates the purification loop. Refueling check out of fans and filter indicated too low a flow on HVE 1A and 1B resulting in an abnormal occurrence. Fan dampers were adjusted to obtain proper flow, and fuel movement progressed. Control rod R-48 was removed from the dummy element and an unsuccessful attempt made to decontaminate it for return to Westinghouse in Columbia for inspection and evaluation. New turbine replacement blades for LP-2 were found to be wrong size. These blades were removed and Westinghouse is obtaining proper blades for replacement. H. P. turbine rotor was set into place. Colt Industries representative began installation of metallic fuel lines on "A" diesel generator per plant mod No. 244. This replaces the synthetic fuel lines that required frequent inspection for cracks and leakage.

Wednesday, May 29

Westinghouse assembled equipment and personnel to inspect upper internal package and N-7 guide tube for possible damage. New procedures were written for removal of drive shaft N-7 and disposal of RCC. Sludge lancing of "A" steam generator was completed. "A" diesel generators was test operated and was up to voltage and speed in 8½ seconds. A new RCC was received from Turkey Point and placed in the new fuel building. However, one new RCC we ordered came in May 31 and utilization of FP&L's RCC was not necessary It was returned to them. Source range detector N-31 became erratic and the fuel shuffle was delayed due to high flux at shutdown alarms. I and C determined problem to be in ground loop and fuel movement progressed.

Thursday, May 30

Fuel shuffle progressing slowly. N-31 erractic due to thunder storm and humidity in spent fuel pit caused delays. During these delays a couple of unsuccessful attempts were made in an effort to disconnect N-7 control rod drive shaft. Upper internal package was then lifted and drive shaft disconnected at 2045 hours. RCC was then snared and pulled aside to clear all refueling equipment. Crosby Valve representative continued to work moisture separator reheater and pressurizer safety valves. Pressurizer safety valves were leaking and lapping operation began. The power operated relief valves have cuts in the body to bonnet surfaces. Blueing and lapping of these surfaces began. Burnable poison rod assemblies were "shuffled" in the spent fuel pit while the RCC unlatching progressed inside the containment. The BPRA 's for the gadolinia rodded fuel elements were found to be unique in that our tool would not handle them.

Saturday, June 1

"2A" feedwater regulator valve was removed for inspection with no anomolies noted. The broken piece of grid strap that was found in "C" steam generator in Novemeber 1973 was identified to come from C-08 fuel element via fuel inspection in the spent fuel pit. Positive identification was determined by the mating edges. Westinghouse boroscope inspection of N-7 guide tube revealed no more than superficial scratches. Rod drop times will be repeated and drag force checks made when internals are placed back into the vessel. Fuel shuffle resumed after BPRA shuffle.

Sunday, June 2

Westinghouse representative arrived and began modification to the BPRA tool. Fuel shuffle was terminated during this period due to spent fuel pit roof removal for tool disassembly. Worthington pump representative began reassembly of "B" safety injection pump. Turbine work was progressing well.

Monday, June 3

Delay in fuel shuffle due to galling of spent fuel handling tool. Tool was pulled up, alignment pins polished and a sheared roll pin replaced. Delay also due to burned out power cord to manipulator crane. I and C repaired this and fuel movement continued. Westinghouse evaluation of control rod drive shaft in position N-7 indicates scratch and gouge marks on gripper. They recommended replacement. Decision was made to use control rod drive shaft No. 568 that was removed during last refueling. "B" safety injection pump repairs progressed slowly. Stainless steel snap rings were not available on site and were shipped in from Worthington.

Tuesday, June 4

Problems still on "B" safety injection pump. One impeller galled on shaft. Disassembly was begun. New RCC-49 was inserted into fuel element F19 in preparation for movement in the shuffle. Another delay in fuel movement due to slack cable in the spent fuel pit side upender becoming entangled in the upender frame. With long handled tools the cable was disengaged from the frame and realigned to sheaves and fuel movement continued. Problems still being encountered with P.O.R.V. body work. Unable to get a true surface without a boring bar. These surfaces were hand worked which is a slow process. Crosby representative completed work on the pressurizer safety valves and all leak tested satisfactorily.

Wednesday, June 5

Continuing problems on "B" safety injection pump. Shaft was damaged in attempt to remove galled impeller resulting in reassembly of rotating elements on a new shaft. "D" service water pump upper bearing was removed due to vibration being greater than other three pumps. Clearances were reduced in bearing and pump test operated satisfactorily. An attempt was made to clear "B" RHR heat exchanger for installation of rubber straps to reduce tube vibration. This job could not be performed due to component cooling valves seat leakage. The spent fuel handling tool failed due to a broken unlatching rod. Investigation revealed a broken coupling pin in the rod. A new coupling pin was fabricated and installed, and a new rod pin was installed in the tool handle to prevent rotation.

Thursday, June 6

Fuel element D-35 in spent fuel pit position H-13 was found to be 90° out of orientation. BPRA was placed in fuel element assuming proper orientation. This resulted in BPRA oriented wrong in fuel assembly and prevented engagement of the assembly with the spent fuel handling tool. This BPRA was snared with a nylon rope and inserted into the dummy fuel element in the new fuel elevator. It was then removed from the dummy fuel element with the BPRA tool and inserted into fuel assembly D-35 properly oriented. Westinghouse completed cutting the tube from "C" steam generator. Tube was sent to Pittsburgh for evaluation. Main generator Hi-pot test failed today and dehumidification equipment was set up for another try tomorrow. New problems arose with the manipulator crane. A blown thyristor and no replacement on site held up fuel movement for several hours. A thyristor from the polar crane was found to be compatible and was installed. During this period the spent fuel pit roof was removed and the BPRA tool was re-assembled with the modified hub. It was checked on the standard and special BPRA assemblies and worked perfectly. Test of "A" emergency diesel revealed it would not assume full load in required 50 seconds. Therefore, Colt Industries representative returned to investigate. Two injectors were found with trash in them and servo booster, previously cleaned, was replaced with a new one. The diesel then was test operated satisfactorily. "B" safety injection pump was completed. New retainer nut for "B" steam generator feedwater pump arrived but threads were wrong. Pacific pumps shipped new nut on June 7.

Friday, June 7

Fuel shuffle commenced again at 0043 hours and progressed to thimble replacement steps at 0700 hours. In an effort to remove incore thimbles, two nuts from the tool worked loose and dropped into the core. Nuts were located early Saturday, June 8 and retrieved on that evening shift.

Saturday, June 8

Completed removal of incore thimbles. Began fuel shuffle again and discovered water in RHR pit. Water was determined to be from a leaking HVH unit tube bundle. This water was pumped down to avoid possibility of flooding the RHR pump motors.

Sunday, June 9

The fuel shuffle was completed at 0027 hours. The core was mapped to verify fuel assembly positions and upper internal package was installed at 0629 hours. Preparations for further steam generator eddy current inspection began. The broken RCC-12 from Position N-7 was cut up and placed in a trash basket along with two bent thimble plugs, prior to draining of cavity. This basket was moved to the spent fuel pit for storage. Full length rods were relatched, cavity water level lowered, head lowered, and cavity filtration system disassembled. Several control rod drive shafts required physical alignment during head lowering operations. Head lowering was stopped approximately six feet above the vessel flange awaiting safety injection flow test. Reassembly of "B" steam generator feed pump also began on this day.

Monday, June 10

Reactor head was set on vessel flange at 0400 hours and reactor coolant system drained to 75" below the flange. A, B, and C steam generator primary manways were opened, and Westinghouse began eddy current inspection in A and B and pulled a tube in C. Clean-up crews in the reactor cavity decontaminated walls as water level was lowered. R.T.V. applied around sandplug covers read approximately 3R on contact resulting in short stay time during cleanup. A and B reactor coolant pump motors were removed, and pump work commenced.

Tuesday, June 11

Main generator High-Pot test was successful. HP and LP 1 alignment checks were made. LP 2 was waiting frequency check of blades and shot peening prior to setting. I and C completed resistance readings on part length rod drive motors. Inspection of A and B reactor coolant pump motors began. After approximately 30 hours of decontamination effort all the R.T.V. was removed from the cavity, and radiation levels reduced to 100 mr per hour. Head stud installation then began.

Wednesday, June 13

A new gasket was installed on Valve 310B body to eliminate leakage. Nominal 100% eddy current of steam generators A and B was completed. Steam Generator C lacks approximately 100 tubes to complete inspection. Part length rods were relatched in approximately seven hours. Work continued on major jobs.

Friday, June 14

"B" reactor coolant pump motor was set and coupling alignment completed. Commenced conoseal installation. Pressurized "A" steam generator secondary side to two hundred psig. Leaking tube was discovered in Row 4, Column 91. Westinghouse personnel commenced steam generator tube plugging on evening shift.

Saturday, June 15

Steam generator tube plugging was completed at 0920 hours. Opened containment up to maintenance personnel at 1130 hours for continuation of jobs. Conoseal installation progressing slowly. Completed work on "A" feedwater regualtor valve and tightening of all PORV's. Began reassembly of turbine stop valves. A leaking tube was detected in "A" steam generator upon secondary hydro-static test. Westinghouse plans to complete explosive plugging tonight.

Sunday, June 16

Westinghouse explosive plugged tube in "A" and welded plug in "C" steam generators. Hydro test revealed no leaks. Completed conoseal installation and "B" steam generator feedwater pump reassembly. Work began on reassembly of pressurizer safety valves. A and C steam generator primary manway covers were installed. "A" reactor coolant pump motor was set and alignment and coupling begun. General disassembly of miscellaneous scaffolds proceeded and containment cleanup began. Reassembly of head insulation and duct work commenced.

Monday, June 17

PORV's were discovered to be leaking by seat on secondary hydro. Seating surfaces were blued and lapping to a true surface began. New MSR drain tank level control valves arrived on site and installation begun. Turbine startup panel modification progressed slowly. Reactor coolant pumps work was completed.

Tuesday, June 18

Installation of head duct work was completed. Pressurizer safety valves were installed and pressurizer missle shield set in place. The primary system was filled and pressurized to 400 psig. Valve 555C on "C" loop RTD bypass line began leaking and was repacked. A, B, and C reactor coolant pumps were run and system vented. Turbine alignment continued along with stop valve modifications.

Wednesday, June 19

Reactor missle shield and pressurizer cover installation was completed. No. 1 seal on C reactor coolant pump stuck open. Reactor coolant system was depressurized and Westinghouse representative recalled for repair. PORV lapping was completed. Blueing indicated a good seating surface. Reassembly of B heater drain pump was completed with repairs to a broken cooling water line and motor oil leak. Initial stroking of the steam dump valves indicated excessive closure times on atmospheric dumps. A volume booster was installed in the system and test operation was then satisfactory. Calcoid urinine was injected into the main condenser and tube leaks detected using a "black light". Several tubes were plugged.

Thursday, June 20

"C" reactor coolant pump motor was pulled, seals disassembled and No. 1 seal found to be wiped. Installation on new seal commenced. Main generator air test was satisfactorily completed.

Friday, June 21

"C" reactor coolant pump repairs were completed, system filled and vented and heatup initiated. Cold rod drops were completed. Modification No. 252 was completed on the safety injection accumulators. Work began on turbine oil and oil lift system checkout. Purging of main generator with CO_2, installation of H. P. Turbine enclosure, tightening of bearing covers, turbine lift pump guard piping were included in final buttoning up of the turbine generator.

Saturday, June 22

Reactor coolant system heatup was contined to 425°F and 2235 psig. The steam generator ΔP test was run (PT-32) at 1910 psi with satisfactory results. Problems were encountered with the turbine bearing oil lift system. Motor current was excessive until Westinghouse reduced lift pressure to 1300 psig. System then operated properly. Main generator CO_2 purge was completed and hydrogen addition initiated.

Sunday, June 23

"4B" Feedwater heater tube repairs were made and heater closed. Minor leaks developed in the seal table room due to pressurization of the reactor coolant system. They were repaired with no problems. Leaks also developed on "B" RTD bypass line requiring repacking of Valve 555C. The atmospheric steam dump valves were test operated with steam pressure successfully. System heatup, hot rod drops (PT 10.4.2) and PT 8.0 were completed. Plant Modification No. 247 that prevents opening of the containment pressure and vacuum relief valves upon loss of PPS air was also completed. RPI calibrations were commenced by I and C.

Monday, June 24

Reactor coolant system 2335 psig hydro was completed. Main steam isolation valves were test operated. Reactor coolant system brought to 547°F and reactor taken critical at 2147 hours. A boron concentration 1317 ppm was required with all rods full out. Commencement of low power physic tests proceeded. I and C completed checkout of turbine startup panel.

Tuesday, June 25

Low power physics tests continued. Inspection of Region 2 and 3 fuel assemblies began in the spent fuel pit. Westinghouse personnel also began gamma scanning gadolinia rodlets in the spent fuel pit. Reactor was shutdown to zero and realigned master cycler. Reactor was then brought back critical.

Wednesday, June 26

Low power physics tests and steam dump test were completed. Reactor power escalation began and generator was synchronized with the grid at 1207 hours.

LIST OF WORK ACCOMPLISHED DURING OUTAGE

Pressurizer

a. Removed, inspected, and tested safety valves.

b. Installed two hydraulic snubbers on relief lines.

Structures

a. Repaired steam and feedwater seismic restraints inside containment.

b. Fabricated whip shields for steam pressure transmitters.

c. Crane checkout and inspection.

d. Installed miscellaneous steel support for steam dump modification.

e. Installed miscellaneous structure for ILRT.

f. General cleanup and painting of containment floor.

Reactor Coolant System

a. Reactor coolant pump maintenance.

b. Replaced two RTD's.

c. Installed eductor.

d. Installed cavity filtration system.

e. Replaced one control rod drive shaft.

f. Replaced one RCC.

Incore System

a. Removed and replaced 4 incore thimbles for future use with B & W fixed incore detectors.

Safety Injection System

a. S.I. Pump maintenance

b. Containment spray defeat modification

c. Accumulator relief valve "tees" and orifices installed (Mod. 252)

Emergency Diesels

a. Inspected diesels and generators

b. Installed metallic fuel lines

c. Installed new booster relay on "A"

Steam Generators

a. Eddy Current Inspect Tubes

b. Plug tubes in A, B, and C

c. Pull tubes in "C"

Refueling System

a. Aligned manipulator crane and indexed.

b. Modified conveyor system

c. Modified BPRA tool hub and freed air cylinders.

d. Repaired RCC change fixture cable.

e. Modified spent fuel handling tool guide pins.

f. Fabricated trash baskets.

g. Fabricated new hoses for rod drive shaft unlatching tool.

Component Cooling System

a. Tied in for emergency cooling to the SFP heat exchanger.

Chemical and Volume Control System

a. Modified charging pump vents.

b. Inspected boric acid storage tanks.

c. Repaired 310B leakage.

Service Water System

a. Adjusted clearance on "D" pump motor bearings.

Turbine Generator

a. Repaired H.P. horizontal joint.

b. Modified stub shaft for two keyways

c. Modified stop valves

d. Modified lift system to include turbine.

e. Lashing wires on LP-1 repaired

f. Replaced 25 defective blades in LP-2

g. Inspection of control and reheat stop and intercept valves completed.

h. Welded cracks in shell side of MSR's and plugged tubes in tube side.

i. Inspected and cleaned lube oil reservoir

j. Replaced bent vapor extractor shaft.

k. Repaired eccentricity pickup

l. Repaired gen. cold gas alarm pickup

m. Cleaned and inspected E.H. oil system

n. Repaired broken strands in generator. (See generator report) High-Pot Test completed.

Main Steam

a. Installed new plugs in PORV's and reworked valve body seating surfaces

b. Inspected and repaired all safety valves.

c. Reinstalled atmospheric dump valves.

d. Inspected, modified and repaired isolation and stop check valves.

e. Completed MSR Drain Modification

f. Completed steam dump modification

g. Repaired and modified seismic restraints.

Feedwater System

a. Inspected and repaired B steam generator feedwater pump.

b. Inspected all feedwater regulating valves.

c. Plugged feedwater heater tube leaks.

d. Repaired leaking valve bodies on Auxiliary feedwater discharge.

e. Fabricated and installed whip shields adjacent to steam flow transmitters.

f. Repaired manual isolation valves on feed regulator bypass line.

Condensate System

a. Overhauled heater drain pumps and suction casing.

b. Repaired condensate pumps.

c. Leak checked and plugged condenser tubes. (Inspected condenser and hotwell)

Auxiliary Steam System

a. Repiped auxiliary steam supply to No. 5 extraction.

Miscellaneous Secondary Side Work

a. Retubed condenser vacuum pumps.

b. Relocated E. H. accumulator pressure guages.

c. Repacked and replaced miscellaneous valves.

d. Rewound 2A vacuum pump motor and reinstalled.

e. Completed chemical feed modification.

f. Installed check valves in individual seal water supplies to the heater drain pumps.

Miscellaneous Electrical Work

a. Inspected and meggered MCC's

b. Relocated Turbine controls.

c. Fabricated and installed new underwater lights.

d. Install humidity control system heaters for Spent Fuel Pit.

e. Set up underwater T.V. equipment.

f. Installed new part length control rod drive motor.

PERIODIC TESTS PERFORMED

P.T. NO.	TITLE
2.1	Safety Injection and Emergency Diesel Test
2.3	Accumulator Check Valve Leakage
2.4	Hot and Cold Leg Check Valves Backleakage
2.5	Accumulator Check Valve Operability
2.6	Isolation Valve Seal Water
3.1	Containment Spray System
4.0	Service Water System
6.1	4 K.V. Buss Under Frequency
7.2	Boric Acid Blending
13.0	Emergency Control Station Test
15.1	Turbine Trip Setpoints
16.2	Containment Vessel SLRT
16.3	Isolation Valve Test
18.0	CVCS, Monitor and Holdup Tank Test
18.1	WASTE Sump Tank and Pumps
4.10.2 (Formerly 21.1)	Control Rod Drop Test
23.2	Emergency Diesel Auto Start with S.I.
23.3	Emergency Diesel Field Flash
24.0	HVAC Fans and Filters
25.1	Pressurizer Safety Valves
25.2	Main Steam Safety Valves
25.3	Main Steam Stop Valve Test
26.0	Refueling System Interlocks
27.0	Post Accident Hydrogen Ventilating System

PERIODIC TESTS PERFORMED (Continued)

P.T. NO.	TITLE
29.0	Radiation Monitoring System
30.0	Instrument and Control Calibration
31.0	Inspection of Hydraulic Shock Suppressors
32.0	Steam Generator Pressure Test

Calibration of Instrumentation and Control Equipment as designated under P.T. 30, encompasses the following.

TITLE	PROCEDURE NO.
Reactor Coolant Temperature, Overpower-Overtemperature Delta "T" Protection	1-1
Reactor Coolant Temperature, Wide Range "T" Hot and "T" Cold Indication	1-2
Reactor Coolant Temperature, "T" Average Control	1-3
Reactor Coolant Flow	2
Pressurizer Water Level Channel 459	3-1
Pressurizer Water Level Channel 460	3-2
Pressurizer Water Level Channel 461	3-3
Pressurizer Water Level Channel 462	3-4
Pressurizer Pressure Control Channel 444	4-0
Pressurizer Pressure Protection Channel 455, 456 & 457	4-1
Pressurizer Pressure Control Channel 445	4-2
Steam Generator Wide Range Level	8-1
Steam Generator Narrow Range Level	8-2
Steam Generator Level (Feedwater Flow)	8-3
Steam Generator Level (Steam Flow)	8-4
Steam Generator Level (Feedwater Valve Control)	8-5
Charging Flow	9
Boric Acid Tank Level	10
Refueling Water Storage Tank Level	11
Volume Control Tank Level Channel 115	13

TITLE	PROCEDURE NO.
Volume Control Tank Level Channel 112	13-1
Containment Pressure	14
Accumulator Level	17-1
Accumulator Pressure	17-2
Steam Generator Pressure Channel 466, 475, 485 & 495	18-1
Steam Generator Pressure Channel 464, 476, 486 & 496	18-2
Steam Generator Pressure Channel 468, 474, 484 & 494	18-3
Turbine First Stage Pressure Channel 446 & 447	19-0
Residual Heat Removal Flow	34-0

MISCELLANEOUS TESTS

1. Steam Dump Operability

2. Turbine Oil Lift System

3. Control Rod Drop and Drage Force Test on RCC Position N-7

4. Primary System Hydro Test

INSPECTIONS PERFORMED

I. FUEL INSPECTION

1. Extent of Inspection

A. Binocular and T.V. inspection of all Region 4 fuel and certain Region 2 and 3 assemblies.

RESULTS:

No anomolies or failures were noted in Region 4 fuel with only a minimal amount of bowing. It was concluded that all Region 4 fuel was fully capable of Cycle 3 operation.

B. Location of fuel element with portion of missing grid strap

RESULTS:

Assembly was identified as C-08. The sixth grid from the bottom of the assembly had two pieces missing that matched the two pieces found in "C" steam generator, November, 1973.

The assemblies adjacent to C-08 on the damaged corner during cycle 2 were B-06, C-43, and B-52. No Region 4 fuel assemblies were involved.

C. Bent nozzle springs in Region 4 fuel assemblies D19, D44, and D53 were noted. No assembly had more than one spring bent, therefore, adequate hold down pressure is retained in the other three to secure the fuel element against the lower core plate.

II. R.C.C. INSPECTION

1. Seven RCC's were inspected for cracks, wear, dents and braze joint conditions. These assemblies were selected based on core location and operating history.

RESULTS:

All are in good condition. No cracks, unusual wear patterns or other anomalies were noted. RCC's inspected were: R-5, R-6, R-16, R-22, R-35, R-41, and R-47.

III. UPPER INTERNAL PACKAGE INSPECTION (GUIDE TUBE N-7 POSITION)

1. T.V. and boroscope inspection.

   RESULTS:

   Some contact marks observed in the lower portion of the guide tube but no visible damage. Recommendations were to replace the control rod drive shaft, which was done.

IV. CONTROL ROD DRIVE SHAFT BOW EVALUATION

1. Inspection of 4 spare drive shafts stored on the operating deck.

   RESULTS:

   All four exceed manufacturing specs. However, two were declared as suitable spares and reused as required. These two were No.'s 606 and 568.

2. Inspection of all control rod drive shafts while standing free in the upper internal package.

   RESULTS:

   Of all drive shafts, six (6) exceeded manufacturing specs. These were in locations E-5, F-8, H-6, M-6 and P-10. Of these six, E-5 was considered to be the worst case indicating mechanical inteference could exist when setting the head back on the reactor vessel (this proved to be true later as head was being lowered). However, local physical alignment as head was lowered proved no problem. Subsequent rod drop test also proved no interference with normal operation exists.

NOTE: As a result of the above inspections the control rod drive shaft in Position N-7 was replaced by spare drive shaft No. 568.

MODIFICATIONS DURING THE OUTAGE

NO.	TITLE
189	S.I. Pump Balance Line Pressure Gauges
193	Main Steam Isolation Valve Limit Switches
210	Nuclear Instrumentation Slow Blow Fuse Replacement
211	Nuclear Instrumentation 0.1 uf Capacitor Addition to Source Range
212	Jet Impingement Shield for the Steam Pressure Transmitters
213	ILRT Instrumentation Line Addition
215	ILRT Special Mod. for Pressurization of Containment
217	Hour Meters for Fans HVE 15A, HVE 1A, and HVE 1B for Carbon Filter Operation Elapsed Time
221	Charging Pump Relief Valve Rerouting.
222	Auxiliary Steam Supply Moved from 4A to 5A Heater Extraction Line
225 & 257	Steam Dump System
228	Spent Fuel Handling Tool Alignment Pins
229	Relocated Turbine Controls
232	Seismic Restraint Modification
233	Steam Generator Sludge Removal Path
234	Pressurizer Safety and Relief Header Hydraulic Shock Suppressor
235	Turbine Stop Valves Modified to Eliminate Deposit Buildup
237	Temporary Usage of C.V. Penetration P-67 for Steam Generation Sludge Lancing
241	Anti-Rotation Pins in Main Steam Isolation Valve Disc
242	Replaces Leaking PPS Air Supply Line
244	Emergency Diesel Generator Steel Fuel Supply Lines

245 New "Shoes" Added to Feedwater Line Seismic Restraints

247 Prevents Opening of C.V. Vacuum and Pressure Relief Valves Upon Loss of PPS Air Pressure

248 LP Turbine Bearing Oil Lift

251 Spent Fuel Pit Humidity Control

252 Accumulator Safety Valve Orifices and Nozzles to Reduce Reaction Forces

253 Eliminates 2 Minute Time Delay on C.V. Spray NaOH Addition and NaOH Addition Defeat

FILE: 2-D1-d

ATTACHMENT 1

TURBINE - GENERATOR OUTAGE REPORT

UNIT NO. 2

CAROLINA POWER AND LIGHT COMPANY

H. B. ROBINSON STEAM ELECTRIC PLANT

May 6, 1974 - June 22, 1974

Written and Compiled By: Bob Lee
Engineering Technician

General Information

On May 6, 1974, the unit was removed from service for the scheduled inspection, and non-destruct testing (N.D.T.) of the turbines. The work done included a crawl through inspection and minor repair of the generator; reworking of the H. P. Turbine horizontal joint; the turbine lube oil reservoir was inspected, and repairs were made to the bucket strainer; the turbine governor valves were dismantled, and inspected; the stop valves were modified to Westinghouse specifications, in order to eliminate sticking of valves; the MSR's (moisture separator reheaters) were inspected, and minor modifications were made. The unit was rolled on turning gear on June 22, 1974, with startup on June 26, 1974. Primary system work was completed on this date.

H. P. Turbine

On May 6, 1974, work was begun on dismantling the H. P. Turbine for inspection. There was little indication of erosion, and the general condition of the blading was good. The No. 2 blade ring fit, governor end top and bottom half cylinder was steam cut behind monel sealing strip. Steam entered the No. 2 blade ring fit through small holes at the outer diameter of monel strip, and exited at inner diameter of strip. The parent metal was honey-combed behind the strip. The holes were ground out, and welded with stainless steel.

The H. P. Turbine horizontal joint leak was repaired. The top and bottom halves, left side generator end, were steam cut. The cut areas were welded, and the entire joint resurfaced. The work was performed by Mr. Wes Richards, Westinghouse Engineer. The cylinder halves were assembled, and checks were made with feeler gauges. Openings of .000 to .004 were found in gland area, and exhaust end. The readings were taken with no bolts tightened. Six bolts were tightened on each corner, and the readings were .000.

The orifice drain between No. 1 and No. 2 blade ring at cross-under pipe generator end was badly eroded and leaking. The orifice drain was cut out at both ends. The drain at governor end was in good condition. The pipe appeared to be carbon steel. The entire drain line was replaced with pipe of 1¼% chrome, 1½% moly.

The following is a list of components inspected by Westinghouse N.D.T. Engineer, Mr. Bob Arrington: the rotor, blade rings, and horizontal joint bolts and studs. The above components were found to be in satisfactory condition at the time of inspection.

H. P. Turbine (Cont'd)

Upon reassembly of H. P. Turbine, the horizontal joint was coated with copalite in areas where leakage had occurred. Linseed oil was used on other areas of joint.

Stub Shaft

The stub shaft was removed and sent to Westinghouse shops in Lester, Pa. Testing and modifications recommended by Westinghouse were done. Upon reassembly of the stub shaft, new oil seal rings were installed, and hand-fitted to .005" groove clearance, and from .006" to .007" in diameter.

L. P. 1 Turbine

The condition of this turbine was very good. There were some steam leakage across the joint, between the 3rd and 4th stages, and between the 5th and 6th stages. There was not enough joint erosion to cause concern at this time. A close inspection should be made at next outage, and make repairs as necessary.

The L. P. 1 rotor was in good condition with only four minor defects found. The defects are as follows: There were cracks in 9th stage T. E. outside lashing wires, Blades #32 - 33 and #37 - 38. 9th stage generator end outside lashing wire Blades # 38 - 39, and center lashing on Blade #57 - 58. Frequency tests were run on Blade Rows L-1 and L-4 with readings being within limits as specified by Westinghouse. The lashing wires were repaired by grinding, and rewelding.

L. P. 2 Turbine

The general condition of Turbine LP-2 was poor. There were numerous cracks in stationary blading, and rotor blades. There were five groups of blades (25 blades) that could not be repaired. These blades were replaced. The remaining defective blades were repaired by Westinghouse personnel. Loctite was applied to the blade roots on Rows L-1 and L-4 in preparation for frequency testing. Four groups were not acceptable after the first test. Loctite was again applied, and test results were satisfactory.

The 7th stage stationary blading had nine cracked blades. Repairs were made by Mr. Wes Richards of Westinghouse. The stationary blades are now considered to be in good condition despite the number of blades requiring repair. The turbine was reassembled, and clearances recorded.

Bearing and Lift Pump System

The turbine bearings were in good condition with only minor scoring noted in LP-1, and LP-2 bearings. The bearings were cleaned with bearing scrapers. These bearings were modified for oil lift system at this time. This work was done by Westinghouse in Lester, Pa. The lift pump piping was fabricated from 3/4" stainless steel tubing, and run in 2" carbon steel protective casing. A modification kit furnished by Westinghouse, was installed in lift pump to boost the capacity. Upon start-up of this system, several motor overload trips were experienced. With the flow control valve set at 1750 lbs. as directed by Westinghouse, a check showed the motor pulling 26 amps. The motor is rated at 18.7 amps. The flow control valves were lowered to 1300 lbs., and motor amperage dropped to 19. A minimum of 1100 pounds of lift pump pressure is required to satisfactorily operate this system. A larger lift pump motor will be required to operate this system at pressure recommended by Westinghouse.

Upon reassembly the thrust bearing clearance was set at .011.

Couplings

The couplings were in good condition. There was no work required.

Valves

The stop valves were dismantled for inspection and modification. When unit was shutdown, the left stop valve stuck in open position. The valve disc appeared to be in good condition. The modifications as recommended by Westinghouse were requested by Carolina Power & Light Company to eliminate deposit buildup on valve stems causing the valves to stick during tests, and shut down operation. The modifications consisted mainly of larger shafts, and bushings. This work was done at plant site with machine work being done by Superior Machine Co. of Florence.

The L H valve was assembled and the following conditions, and reading noted:

1. Shafts seated against bushings
2. Clearance between disc arm, and bushings is .045" to .050"
3. With main valve seated a .002" feeler could not be started under seat.

The R. H. Valve was assembled, and the following conditions, and readings were noted:

1. Shaft seated against bushings
2. Clearance between disc arms and bushings is tapered. This clearance is .040" to .070" on both ends. This could effect the operation of valve.
3. With main valve seated a .002" feeler could not be started under seat.

It was noted that the surface on shaft seat was chipped off in some areas. After lapping there was a continuous hairline seating surface.

Valves (Cont'd)

If this surface continues to chip, this seat could possibly leak.

The control valves were dismantled, and found to be in very good condition. Some minor machine work may be required on back seats at next outage.

Reheat and Intercept Valves were inspected and found in good condition. The only work required on these valves were external adjustments to prevent valve flapper from hitting center bar in valve.

Moisture Separator Reheaters

The MSR's were inspected by Mr. John Englehard, and the following recommendations were made. Rewelding of all broken welds with E-7018 low hydrogen rods, addition of 2" stainless steel pipe stiffeness at inlet and outlet of steam chute, recladding eroded areas with 304 stainless steel rod and repair to impingement shield at cross under inlet of 2A MSR. A mesh pad was also installed in 2A MSR. Floor plates for access were rewelded.

The tube side of all four MSR's were checked for leaks. The tubes that were found leaking were plugged. New sealing diaphragms were welded in, and manhole covers installed.

Lube Oil System

The reservoir was drained and inspected. There was a considerable amount of sludge in the tank that had to be cleared. In addition, the fine mesh in the basket strainer was about 75% destroyed. Fine mesh 120 from stack was used to repair the strainer.

The stand pipe for the magnatrol float switch had become disengaged and was lying in the tank. This was replaced and secured.

Lube Oil System (Cont'd)

In the past, the vapor extractor has been subject to excessive vibration which caused numerous bearing and fan failures. The foundation of the vapor extractor was beefed up with angle iron in an effort to get the natural frequency of the motor and the foundation to be the same. This is felt to have been accomplished as there is little or no vibration in the unit now.

The loop seal vapor extractor was reinforced in the same manner as the main oil vapor extractor. The loop seal drain line was installed on suction and discharge line to fan. This line was apparently left off during construction.

Condensers

The condensers were inspected on the shell side and found to be in good condition. Some trash and other foreign matter was found in the hot well. The condensers were filled with a mixture of water and a "calcoid urinine" solution, in order that a "black light" could be used to check for tube leaks. Several leaks were found in the tubes. The plugging of these tubes was the only work that was required in the condensers.

EH Oil System

The main work on the system consisted of removing the EH enclosure and cleaning the unit. All of the fittings were checked. Several fittings were found to be loose and leaking. It was discovered that some of the fittings in the system were made of brass. Since brass fittings do not meet pressure requirements, they were replaced with stainless steel fittings.

Mr. Fred Ewing, Westinghouse Controls Engineer, made the necessary

EH Oil System (Cont'd)

adjustments to the controls. The control valve opening sequence was changed to the following: Numbers 1 and 2 opening together; Number 3 opening; and Number 4 opening last.

Cross-Over Piping

An inspection was made of the cross-over piping and the sections. The piping was in generally good condition, although minor cracking was noted in the tee section baffles. Repairs were made by grinding out the old welds and rewelding the baffles.

Generator

Mr. Mitchell Lukin, Westinghouse Engineer, performed a crawl through inspection of the generator. The following conditions were found:

1. Fourteen strands at the outer transposition connected to the top coil No. 28 were found to be broken.
2. Several "T" pieces and a number of diamond spacers were loose.
3. Several resistor wires were broken.
4. Many pads between the bottom coils and the outer support ring were dusting.
5. Approximately half of the outer transpositions were dusting, six of them very bad.
6. The strand bonding to the vent stacks was cracked in several places.
7. A coating of oil covered the lower portion of the winding.

Repairs made on the above conditions are as follows:

1. All dust and foreign matter was removed from the end windings.
2. All broken strands were repaired by brazing an additional piece and remaking solder joints. The soldering was done with irons.

Generator (Cont'd)

3. Additional dacron was inserted between blocks and coils to tighten three strain blocks.

4. All loose "T" pieces and diamond spacers were refitted with dacron padding.

5. All broken resistors were either resoldered or replaced.

6. Dacron was removed from all of the outer transpositions and refitted with greater compression.

7. The dusting pads between the bottom coils and the outer support rings were refitted.

8. Strands were bonded to the vent stacks with epoxy resin. Clamps were placed where necessary.

9. Epoxy resin was applied to all mating surfaces.

10. The windings were repainted.

Tests were run on the generator. The final Hi-pot Testing was done by Mr. Manny Frutos, Westinghouse Engineer.

ATTACHMENT 2

REACTOR COOLANT PUMP MAINTENANCE

During May, 1974 Outage

May 5 - June 26, 1974

Written and Compiled By:

J. Parks
Engineering Aide

History of Reactor Coolant Pump Maintenance

The initial problems with the Reactor Coolant Pumps at H. B. Robinson Unit Number 2 occurred on March 14, 1971. Reactor coolant pumps "A" and "C" were damaged when seal flow was lost during a March 14, 1971 turbine-generator trip. Reactor coolant pump "A" (RCP"A") shaft, impeller, and coupling were sent to Westinghouse in Cheswick, Pennsylvania for balancing. The shaft was replaced due to being damaged by dropping. After completion of all maintenance, the Reactor Coolant System (RCS) was pressurized and seal flow was established with no difficulty. Following repairs, the pumps' vibration was measured via the permanently installed vibrometers and recorded as follows:

RCP"A"	Point No 1 - 0.48 mils Point No 2 - 0.22 mils
RCP"B"	Point No 3 - 0.12 mils Point No 4 - 0.22 mils
RCP"C"	Point No 5 - 0.20 mils Point No 6 - 0.13 mils

All other Reactor Coolant Pump (RCP) maintenance was performed during the March 1973 Refueling Outage. During that time (March 16 - May 9) each of the three RCP's was disassembled for inspection and necessary repairs or adjustments. New number 2 and number 3 seals were installed and the parallelism, concentricity, and vibration checks were made and corrected where necessary. On May 9, during plant heat up, inspection indicated excessive leakage at the number 2 seals on RCP's "A" and "C". Adjustments on RCP"A" were made without difficulty.

However it was necessary to uncouple RCP"C" to accomplish the work.

The next major maintenance involving the reactor coolant pumps was to be performed during the scheduled 1974 refueling outage. The following is a description of the work performed at that time.

Introduction

This report relates the events of the Reactor Coolant Pump (RCP) inspection and repair during the 1974 refueling outage at H. B. Robinson Unit Number 2. The work involves repairs to three Westinhouse Reactor Coolant Pumps, model number V11001-B1. The model V11001-B1 is a verticle, single stage, centrifugal shaft seal pump. The reader is referred to the enclosed figure number 1 for an isometric view of this type pump. All part numbers refer to figure number 2.

Initial Stages of Outage and Inspection

The 1974 Refueling Outage Reactor Coolant pump inspection and repairs were performed via the combined efforts of Carolina Power and Light (CP&L) and Westinghouse Electric Corporation, Electro-Mechanical Division.

On May 15, CP&L Instrumentation and Control Technicians completed disconnection of electrical wiring to RCP"C".
The motor and motor stand (PC NO-10) of RCP"C" were removed and placed on the operating deck on May 16. At this time the fly wheel cover was removed from the motor. The flywheel was to be ultrasonically tested later.

On May 17 the removal, cleanup, and inspection of the "C" RCP seals was completed. Inspection of the number 3 seal (PC No.-20) revealed that the seal nose height was .029/.040 inches. The number 2 seal (PC No.-26) was in very good condition. The nose height of this seal was .090/.085 inches. The number 1 seal (PC No.-30) was in good condition, however the seal was very tight on the seal insert and jacking screws were necessary for removal.
The number 1 seal insert was badly fretted.

On May 18, the new seals and inserts were assembled and made ready for installation. The original number 1 seal insert and a new number 3 seal and runner were installed. The hardware kit for the number 2 seal contained only the new style double delta back-up ring. A new "L" shaped ring was installed together with all new "O" rings. When installing the number 3 seal ring, it was found to be very tight in entering the housing. A new "O" ring was installed and the number 3 seal ring was pulled down with cap bolts.

The coupling (PC No.-12) was then installed achieving an advance of .048 inches. The motor support was then lowered into position and torqued.

A swing check of "C" RCP motor was performed with the following acceptable results achieved after adjustment of the lower guide bearings:

"C" RCP Motor	N. S. - .018 inches
	E. W. - .017 inches

Retaining ring movement was checked and then the shaft was centered to within .003 inches and each bearing was set with a .004" clearance. The vertical travel of the shaft was checked revealing a movement of .024 inches. The movement of the shaft when the high lift pump was started was .0025 inches. This data is acceptable for vertical movement of the shaft.

Inspection of the pawls of the anti-reverse system was performed on

May 19. The pawls were removed and inspected with no signs of excessive wear. They were then installed with special attention to ascertain their free and correct movement. There was slight evidence of oil leakage in the flywheel seal and ratchet plate area. Careful inspection of these areas indicated that the oil came from the oil vapor overflow pipes which is a normal occurence. The lower guide bearing oil pot showed signs of excessive leakage and new gaskets were installed. There was still evidence of slight oil leakage in this area on "C" RCP motor.

On May 20, the anti-reverse shock absorbers were checked for correct action and worked correctly.

The flywheel of RCP"C" motor was visually and ultrasonically checked for excessive wear and discontinuities in the flywheel metal. The inspection did not reveal any signs of such defects.

Reactor Coolant Pump "C" motor was positioned on the motor stand. The initial parallelism and concentricity checks revealed some misalignment. A .016 inch shim was necessary to obain acceptable parallelism readings. The following are the results of the final parallelism and concentricity checks.

Parallelism of RCP"C"

N. - 1.049

S. - 1.049

E. - 1.050

W. - 1.495

Concentricity of RCP"C"

N - .0000

S - .0000

E - .0000

W - .0000

The motor was finally coupled to the pump and the motor bolts were torqued to 1000 ft-lbs.

On May 21, the oil was drained from the lower oil pot of "C" RCP. The flywheel cover was placed on the motor.

Disconnection of "A" and "B" RCP's was performed on May 22.

In order to proceed with other critical path outage work it was decided to suspend work on the pumps and proceed with flooding the refueling cavity on May 23. Work on the reactor coolant pumps was thus halted until the loops were again drained on June 9.

Prior to the draining of the loops work was resumed on "C" RCP on June 4. The lower oil pot was disassembled to find the cause of an oil leak.

The oil pot and standpipe gaskets were replaced and 25 gallons of oil were added to the motor.

On June 10, the motors and motor stands of reactor coolant pumps "A" and "B" were removed. All seals were removed from both pumps and placed in separate areas for ease of identification, cleaning, and inspection.

A swing check of the shaft of "B" RCP was completed with the results listed below:

RCP"B" Motor	N-S - .019 inches
	E W - .018 inches

Adjustment of the lower guide bearings were necessary to achieve the above swing check. The retaining ring was first checked for movement and then the shaft was centered to within .003 inches and the bearing was set with a .004 inch clearance. The vertical movement of the shaft was .016 inches. The lift of the shaft when the high lift pump was started was .003 inches. All seals in RCP"B" were in good condition. The number 1 seal insert together with all new "O" rings were installed. The seal housing was then placed on the pump shaft.

On June 11, the seals of RCP"A" were inspected. The number 3 seal was the only seal that was found fretted. The number 3 seal runner was also worn excessively. The nose height of the number 3 seal was .072/.083. These replacement parts together with all new "O" rings were installed on the seal housing.

A swing check of RCP"A" motor shaft was performed.

In order to achieve acceptable swing check data, it was necessary to adjust the lower guide bearing. First, the retaining ring was checked for movement and then shaft was centered to within .003 inches and the bearing was set with a .004 inch clearance.

Swing check of RCP"A" motor

N. S. - .024 inches

E. W. - .030 inches

The vertical movement of the shaft was .024 inches and the lift of the shaft when the lift pump was started was .0025 inches.

Inspection of the pawls in the anti-reverse system of RCP's "A" and "B" revealed that the pawls were in good condition. The ultrasonic and visual inspections of the flywheels of both motors indicated that the flywheels were not damaged.
There was evidence of oil leakage in the flywheel seal and ratchet plate area in both motors. The oil came from the oil vapor overflow. The lower guide bearing oil pots also showed signs of leaking and new gaskets were installed on both oil pots. Each of the anti-reverse shock absorbers on RCP's "A" and "B" were checked for correct action. All of the shock absorbers worked properly.

On June 12, the seal housing of "A" RCP was placed on the pump shaft. The motor stands for both "A" and "B" were lowered into position and the bolts torqued. Both couplings were installed achieving an advance of .0483 inches on RCP "B" and .053 on RCP "A".

On June 13, the motor work on "B" RCP was completed and the motor was lowered into position on the pump.

On June 14, the motor shaft was centered and the acceptable parallelism data was achieved.

Oil for the motors of RCP's "A" and "B" was moved into containment on June 15. The oil was drained from "B" and 25 gallons of new oil was installed.

Work on "A" RCP motor was completed on June 16. The motor was placed on the pump. After the concentricity and parallelism checks were made and corrected, the oil in "A" was drained and refilled with new oil. This completed the scheduled reactor coolant pump maintenance of the 1974 Refueling Outage.

On June 18, system venting was completed. When "A" RCP was started, the number 1 seal leak off flow from "C" RCP went off scale on the high side which was indicative of a seal hanging open or the surface being "wiped". The pump was stopped to investigate the problem. The pump was started and stopped with no decrease in seal leak off flow therefore as high flow is not damaging to a pump, it was decided to run the pump for several hours in hopes that the seal might close up (if it was hung open). This did not correct the problem.

On June 19, the reactor coolant system was depressurized for dissassembly of "C" RCP. The motor and coupling were removed.

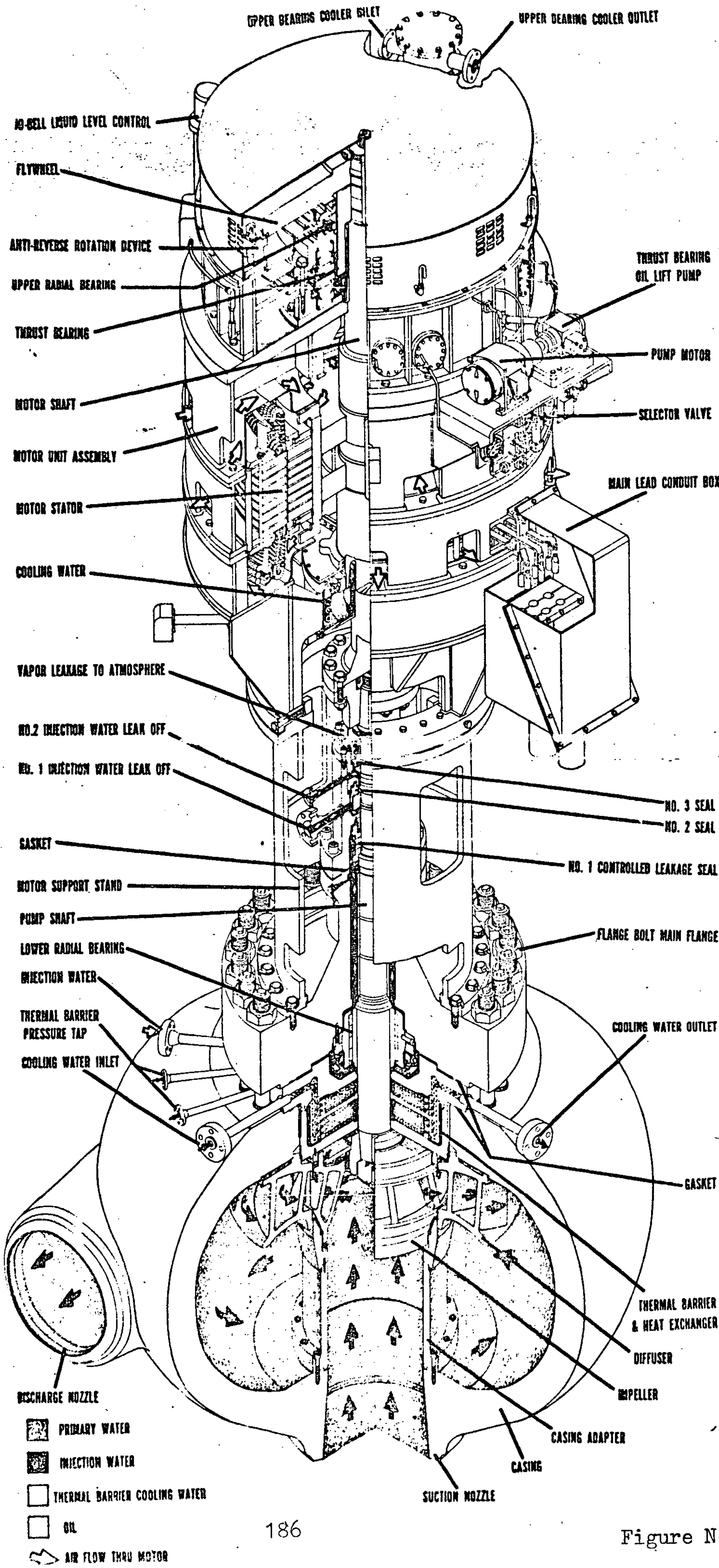
On June 20, inspection of the number 2 and number 3 seals and runners revealed that they were still in good condition. The number 1 seal and runner were badly worn and were replaced. The coupling was installed with an advance of .053 inches. All motor to pump alignment was completed, and all bolts were torqued. This repair successfully established adequate leak off flow thus concluding all work on the reactor coolant pumps.

Chronological Sequence of Events

May 15	Electrically disconnected RCP"C"
May 16	removed and placed motor of "C"RCP on operating deck. Began removal of seals. Removed flywheel cover from motor.
May 17	Inspected the seals.
May 18	New seals were installed. Swing check of "C" RCP motor performed.
May 19	Inspection of anti-reverse system. Repair of lower oil pot leak.
May 20	Inspection of "C" RCP flywheel. Motor installed and alignment completed.
May 21	Oil drained from "C" RCP. Flywheel cover placed on motor.
May 22	Electrically disconnected "A" and "B" RCP's.
May 23-June 9	Loops flooded for refueling operations.
June 4	Final repair of "C" RCP lower oil pot leak.

June 10	RCP's "A" and "B" motors removed. Swing check of "B" RCP motor. New seals installed and placed on pump shaft.
June 11	Inspection of "A" RCP seals. New seals assembled and installed. Swing check of "A" RCP motor performed. Inspection of anti-reverse system on "A" and "B" RCP. Inspection of "A" and "B" RCP flywheels. Lower oil pot leaks repaired on "A" and "B" RCP's.
June 12	"A" and "B" RCP motor stands and couplings installed.
June 13	"B" RCP motor installed.
June 14	Alignment of "B" RCP.
June 15	Oil for "A" and "B" RCP's moved into containment. Oil changed in "B" motor.
June 16	"A" RCP motor installed. Alignment of motor. Oil changed in "A" RCP.
June 17	Clean up. Fabricate shipping boxes for seals.
June 18	Loss of number 1 seal leak off on RCP "C".

June 19	RCP "C" motor and coupling removed.
June 20	Inspection of seals. Replacement of damaged parts. Motor installed and alignment completed.



UPPER BEARING COOLER INLET
UPPER BEARING COOLER OUTLET
NO-BELL LIQUID LEVEL CONTROL
FLYWHEEL
ANTI-REVERSE ROTATION DEVICE
UPPER RADIAL BEARING
THRUST BEARING
THRUST BEARING OIL LIFT PUMP
PUMP MOTOR
MOTOR SHAFT
SELECTOR VALVE
MOTOR UNIT ASSEMBLY
MAIN LEAD CONDUIT BOX
MOTOR STATOR
COOLING WATER
VAPOR LEAKAGE TO ATMOSPHERE
NO.2 INJECTION WATER LEAK OFF
NO. 1 INJECTION WATER LEAK OFF
NO. 3 SEAL
NO. 2 SEAL
GASKET
NO. 1 CONTROLLED LEAKAGE SEAL
MOTOR SUPPORT STAND
PUMP SHAFT
FLANGE BOLT MAIN FLANGE
LOWER RADIAL BEARING
INJECTION WATER
THERMAL BARRIER PRESSURE TAP
COOLING WATER OUTLET
COOLING WATER INLET
GASKET
THERMAL BARRIER & HEAT EXCHANGER
DIFFUSER
IMPELLER
DISCHARGE NOZZLE
CASING ADAPTER
CASING
SUCTION NOZZLE
PRIMARY WATER
INJECTION WATER
THERMAL BARRIER COOLING WATER
OIL
AIR FLOW THRU MOTOR

Figure No. 1

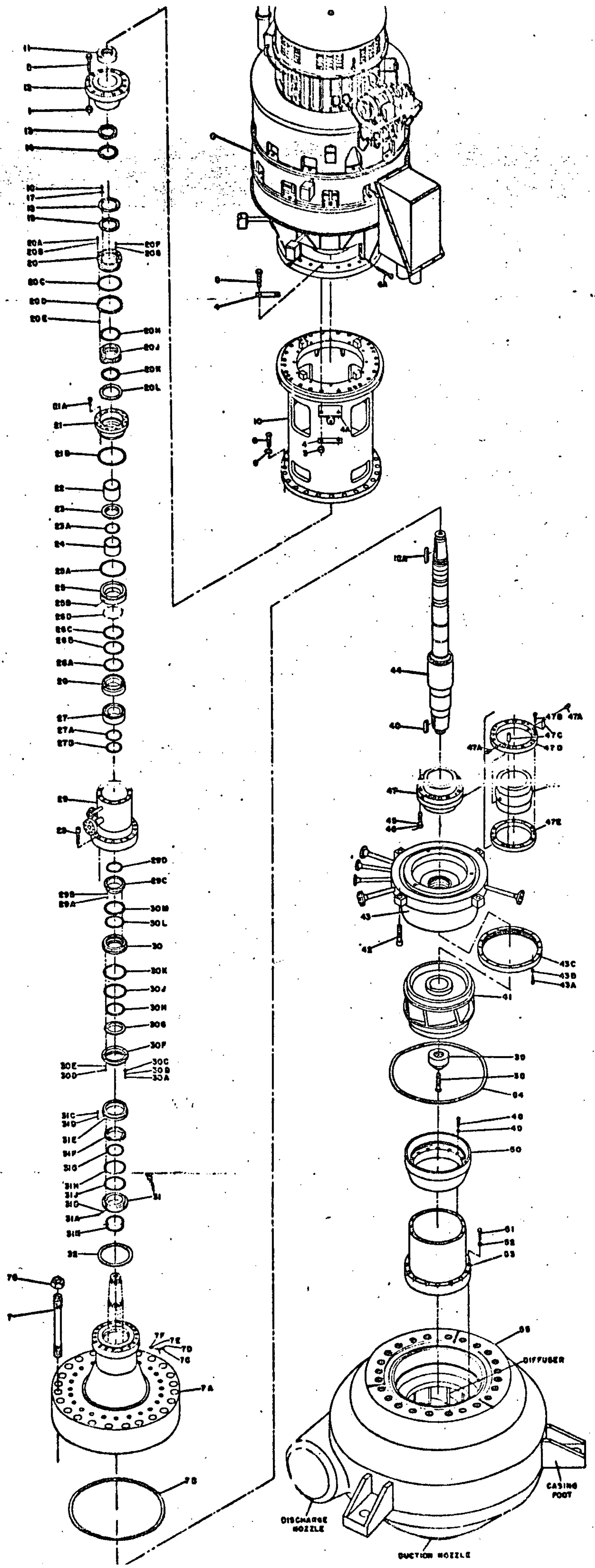


Figure No. 2

1. Hex Nut
2. Hex Head Bolt
3. Hex Nut
4. Lockplate

4A. Vibration Pickup
5. Hex Head Bolt
6. Motor
6A. Jacking Screw

7. Flange Stud
7A. Main Flange
7B. Flexitallic Gasket
7C. Lockwire

7D. Seal Bolt
7E. Backup Ring
7F. O-Ring
7G. Flange Stud

8. Hex Head Bolt
9. Pantleg Washer
10. Motor Support Stand
11. Coupling Nut

12. Coupling
12A. Coupling Key
13. Locknut
14. Lockwasher

15.
16. Hex Head Bolt
17. Lockplate
18. Splash Guard Retainer

19. Splash Guard
20. No. 3 Seal Ring
20A. Socket Head Cap Screw
20B. Locking Cup

20C. O-Ring
20D. Special Shims
20E. Spring
20F. Socket Head Cap Screw

20G. Locking Cup
20H. O-Ring
20J. Bellows Holder
20K. Wafer Guide Ring

20L. Wafer Assembly
21. Ring Clamp
21A. Socket Head Cap Screw
21B. O-Ring

22. No. 3 Spacer
23. No. 3 Seal Collar
23A. O-Ring
24. No. 2 Seal Spacer

25. No. 2 Seal Housing
25A. O-Ring
25B. Socket Heat Cap Screw
26. No. 2 Seal Ring

26A. Secondary Seal
26B. O-Ring
26C. Retaining Ring
26D. Retaining Wire

27. No. 2 Runner
27A. O-Ring
27B. O-Ring
28. Socket Head Cap Screw

29. Seal Housing Assembly
29A. Socket Head Cap Screw
29B. Locking Cup
29C. Insert

29D. O-Ring
30. No. 1 Seal Ring Assembly
30A. Socket Head Cap Screw
30B. Locking Cup

30C. Stop
30D. Socket Head Cap Screw
30E. Locking Cup
30F. Hydrostatic Clamp Ring

30G. Aluminum Oxide Faceplate
30H. O-Ring
30J. O-Ring
30K. O-Ring

30L. O-Ring
30M. Double Delta Channel Seal
31. No. 1 Runner Assembler
31A. Locking Screw

31B. Locking Cup
31C. Socket Head Cap Screw
31D. Locking Cup
31E. Hydrostatic Clamp Ring

31F. Aluminum Oxide Faceplate
31G. O-Ring
31H. O-Ring
31J. O-Ring

31K. O-Ring
32. Flexitallic Gasket
38. Hex Head Bolt
39. Impeller Nut

40. Impeller Key
41. Impeller
42. Socket Head Cap Screw
43. Thermal Barrier

43A. Socket Head Cap Screw
43B. Locking Cup
43C. Thermal Barrier Labyrinth Seal
44. Rotor Shaft

45. Lockwire
46. Hex Head Bolt
47. Radial Bearing Cartridge Assembly
47A. Cartridge Pin

47B. Socket Head Cap Screw
47C. Dowel Pin
47D. Upper Housing Half
47E. Lower Housing Half

47F. Cartridge
48. Socket Head Cap Screw
49. Locking Cup
50. Diffuser Adapter

51. Socket Head Cap Screw
52. Locking Cup
53. Casing Adapter
54. Casing

Table No. 1

CAROLINA POWER AND LIGHT COMPANY

H. B. ROBINSON STEAM ELECTRIC PLANT

Hartsville, South Carolina

STEAM GENERATOR INSPECTION AND REPAIR

1974 Refueling Outage

Unit No. 2

May 6, 1974 - June 26, 1974

Written and Compiled by: Jim Millen, Engineering Technician

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INTRODUCTION

This report relates the events of a steam generator inspection and repair during the 1974 refueling outage of the H. B. Robinson Unit No. 2. The inspection involves three 44 series Westinghouse Vertical Steam Generators, Serial Nos. 16A6081-1 (SG "A") 16A6081-3 (SG "B") and 16A6081-2 (SG "C"). The reader is referred to enclosed Figure 12 for schematic drawing of this type generator. The generators are of the U tube bundle design consisting of 3260 tubes of 0.875 inch outside diameter and 0.050 inch wall thickness. The tube plate material is ASME-SA-336 Mn Moly Steel, clad on the primary side with inconel. The tubes are composed of Ni Cr Fe Alloy, inconel ASME-SB-163-61T.

This report contains figures and tables pertinent to the inspection and work, and these are enclosed at the end of the report. Reference to the tube location is given by row and column numbers. Column numbers start at the nozzle side of the generator and number toward the manway side. The row numbers begin at the channel head divider plate and proceed outward. Exact tube locations are indicated in the enclosed figures.

SECTION I

History of Steam Generator Leakage

The inception of steam generator problems at H. B. Robinson Unit No. 2 occurred on June 11, 1971. At that time cladding failure was visually and ultrasonically detected in steam generator "A" (SG "A") and steam generator ("C"). Cladding repair ensued, and the two generators were returned to service on August 16, 1971. This repair work was described in the "Steam Generator Tube Plate Cladding Repair" report of September 27, 1971. This report was included as an appendix to the H. B. Robinson Unit No. 2 Routine Operating Report No. 2.

The next indication of steam generator leakage occurred on October 25, 1971. At the time, an alarm was received on the radiation monitoring system steam generator blowdown line, Channel R-19. Steam generator "A" was found to be the source of activity. The indicated leakage rate was approximately one GPH with a gross iodine activity in the secondary system of 2.32×10^{-5} µCi/cc determined twelve hours after the leakage was detected. At that time the cause of this primary to secondary leakage was unknown. In that the source of the leakage had been identified as steam generator "A" and the magnitude of the leakage was within the requirements of Section 3.1.5 of the H. B. Robinson Technical Specifications, plant operation was continued with leakage being monitored daily. These conditions prevailed through the next six months. On May 7, 1972, the unit was shutdown for repair of a pressurizer spray valve.

During the subsequent primary system leak test which followed repairs on May 13, the liquid level in steam generator "A" was observed to increase slightly. On conclusion of the test, E.C.S. Pressure was reduced, and the level ceased to increase. Normal plant heatup was then begun on May 14, while limiting the blowdown from SG "A" to a minimum. When normal operating temperature and pressure were reached, a primary leak rate test was performed. The results of this test revealed leakage in excess of the H. B. Robinson Technical Specification requirement. Consequently, the plant was returned to a cold shutdown condition. Repairs followed and the generator was returned to service on June 10, 1972. This repair work was described in the "Steam Generator Repair Unit No. 2 May 13, 1972 - June 5, 1972" report of July, 1972.

To help prevent recurrence of tube leaks, steam generator chemistry was changed based on Westinghouse recommendations. Major changes were an increase in the phosphate specification, daily measurement of sodium/phosphate ratio, and use of Continuous Chemical addition and blowdown.

A full inspection program was completed on all three steam generators during the 1973 refueling outage. This inspection and repair work is described in the "Steam Generator Inspection and Repair, 1973 Refueling Outage, Unit No. 2, March 16, 1973 - May 5, 1973" report.

The next indication of steam generator leakage occurred on November 22, 1973. At the time, an alarm was received on radiation monitor R-15, Condenser air ejector exhaust. Another alarm was received on the radiation monitoring system steam generator blowdown line, Channel R-19. Steam generator "C" was found to be the source of activity. The indicated leakage rate was approximately 4 GPM. It was thus determined that steam generator leakage was in excess of the maximum allowable leakage specified in Figure 3.1-4 of the Technical Specifications for the H. B. Robinson Unit No. 2. The unit was shutdown and repairs ensued. The unit was returned to service on December 3, 1973. This repair work was described in the "Steam Generator Inspection and Repair Report, 1973 Steam Generator Outage, Unit No. 2, November 27, 1973 - December 3, 1973" report.

SECTION II

Steam Generator Inspection and Repairs

The 1974 refueling outage steam generator inspection was performed by Westinghouse personnel. Westinghouse subcontracted workers from the A & M Company to aid in setup of equipment inside the steam generators. The inspection included essentially a 100% eddy current inspection in all three generators and a sludge lancing of all three generators. The repair included a tube pulling operation in SG "C" and explosive tube plugging in all three steam generators.

The eddy current inspection was performed by remote control devices. Testing equipment was located in an area outside the polar crane wall to keep exposure to personnel at a minimum. As each tube was inspected the results were monitored on an oscilloscope and recorded on tape recordings for location and on graph for later analysis. The generators were checked at a test frequency of 400 KHZ for indications of tube defects and were also checked at a test frequency of 25 KHZ to show the amount of sludge buildup on the tube sheet. The results of the 25 KHZ inspections can be found on Figure 5 - 8, and Table 1 through 5. The results of the 400 KHZ inspections can be found on Figure 1 through 4 and Tables 6 through 9.

SECTION III

Initial SG Inspection Effort

The first eddy current inspection began on May 16 and continued through May 22. On May 22 the manway covers were replaced and the loops were flooded for refueling. During the time the generators were open, the following work was performed: SG "A" was hydrostatically tested in order to identify the leaking tube. Tube R42-C34 was found to be leaking two inches above the sixth tube support. This tube was explosively plugged following fuel movement operations on June 15. Eddy current testing was initiated and a large percent of the tubes were inspected. In SG "C" the explosive plug was removed from Tube R-43-C33 in preparation for later removal of the tube section. Also a portion of "C" tubes were eddy current tested. Steam generator "B" was not opened at this time.

SECTION IV

Sludge Lancing Operations

On May 21, an attempt was made to remove the sludge from the secondary side of all three steam generators. This attempt was based on a proposal by Westinghouse Nuclear Services Division. The procedure employed involved injecting water at a high pressure (approximately 2000 psi) into the steam generator through one of the secondary side hand holes and on top of the tube sheet. It was intended that the high pressure water would loosen the sludge and move it around so it could be pumped out. The water/sludge mixture was pumped out of the opposite side hand hole and discharged from containment. The chronological sequence of events for the sludge lance operation can be found on Page 305.

There were no significant radiation control problems. The filters themselves were reading less than 10 mr/hr (SG water at approximately 1×10^{-4} µC/ml) and the readings taken inside the secondary side hand holes were approximately 200 mr/hr. The main reason for these relatively low readings was that all three steam generators were filled and drained twice prior to starting this evolution.

Approximately 25,000 gallons of primary water was used in SG's "B" and "C" and 12,000 gallons in "A". The reason for only half as much water was used in "A" is that only one secondary side hand hole was accessible with the equipment used. (i.e., one of SG "A" hand holes is approximately 12" from the polar crane wall.)

Although the above figures represent the amount of water pumped with the High Pressure (HP) pump, they are not representative of how much water was actually flushed through the SG because significant amounts of water were bypassed so the HP pump would not have to be shut down when lancing was not in operation. The initial lancing was attempted with a suction manifold that went around the periphery of the tube bundle; however, it was made of Tygon tubing and kept collapsing due to pump suction pressure. Therefore, the standard Westinghouse suction manifold that fits in the center of the tube bundle had to be used.

Because of outage time concideration, eddy current measurements at 25 KHZ were made of the sludge levels only in SG "A" and "C" prior to lancing. These measurements were done most extensively in SG "A", the idea being that "A" could serve as a nominal SG (Historically SG "A" has exhibited the most significant tube problems), and the data from SG "C" could serve as backup data.

After lancing, 25 KHZ measurements were made in all three SG's. The details of these measurements are shown on Tables 1 through 5. Based on these figures and tables the following observations are made.

1. In general, it appears that lancing was at best only moderately successful.
2. Apparently the sludge was effectively removed to a point somewhere between Rows 7 and 14, but further into the tube bundle the sludge appears to have remained essentially as it was before lancing or at best to have just been moved around.

SECTION V

Final SG Inspection & Repairs

On June 4 the manway covers were removed from the secondary side of SG "C" and tube R43-C33 was removed from the secondary side. This tube was selected for removal from the Loop "C" steam generator inspection program of November, 1973. This tube was explosively plugged in November because of a leak above the sixth tube support.

The tube was severed about one inch above the sixth support and again four inches below the top anti vibration bar on the inlet side of the tube bundle. The tube was removed in accordance with U-Bend Tube removal procedure OPTP-WPZ017 Rev #1.

All tube sections were identified, packaged, and shipped to Westinghouse Research and Development Center, Pittsburgh, Pennsylvania for analysis.

The primary side of the tube (R43-C33) was closed by manually welding an inconel plug in the hole in the tubesheet from which the explosive plug had been removed. The plugging was accomplished in accordance with procedure OPTP-WPZ-017 and process specification NPT23.

On June 10 the manway covers were removed from the primary sides of SG "A", "B", and "C", and eddy current inspection was begun in SG "A" & "B". In SG "C" a section of Tube R34-C36 was removed to the second support on the inlet side. The tube was removed in accordance with series 44 steam generator tube removal procedure MRS 2-3-3 Gen. 1 Rev. 2. Tube R34-C36 was selected for pulling based on the eddy current testing program of May, 1974.

All sections of the tube were marked, packaged and shipped to Westinghouse Research & Development Center, Pittsburgh, Pa. for analysis.

System restoration was accomplished by explosively plugging the tube sheet hole from which the tube had been removed as per the requirements of process specification NPT33 and NPT33 addendum No. 1.

The explosive plug was manually welded to the tube sheet cladding in accordance with the requirements of process specification NPT23.

SECTION VI

Tube Plugging Operation & Hydrostatic Test

On June 14 all tubes in S.G. "A", "B", and "C" with a defect of 50 Percent or greater were explosively plugged. The plugging was performed by Westinghouse personnel and was in accordance with Westinghouse Procedure NPt-33. Peter L. Ruddle of Westinghouse supervised this operation. A total of 31 tubes were plugged.

On June 15 a secondary leak test was performed on S.G. "A". "B", and "C". The secondary side was pressurized to 800 psig for the test. Personnel of the Carolina Power and Light Company witnessed these tests and inspected the tubesheet for indications of leakage around the plugs and other tubes. S.G. "B" and "C" were found to be in good condition but S.G. "A" had one leaking tube, R-4C-91. S.G. "A" was drained and Tube R4-C91 was explosively plugged. S.G. "A" again was pressurized to 800 psig and was found to be in good condition. A cleanliness inspection was made in all steam generators by CP & L personnel. The steam generators were accepted by CP & L and the manway covers were replaced on June 16.

SECTION VII

Bolt Fragment

On May 16, the manway covers were removed from the inlet side of SG "A" and when the manway was lowered, a bolt fragment was found in the manway diaphragm. The bolt fragment consisted of a 3 inch long piece of material that was 5/8 inches in diameter. The head of the bolt had been severed from the bolt fragment by what appeared to be a saw cutting action. Approximately two inches of the fragment was threaded with eleven threads per inch (a standard coarse thread for 5/8 inch dia.). The threads were badly abraided or missing in a number of areas and appeared to have been clamped in a vise. Thr fragment was activated to a radiation level of 2.5 roengtens indicating that it was exposed to the nuclear core or high flux region of the reactor vessel in vicinity of the core, prior to being deposited in the steam generator. The material was determined to be non-magnetic and presumably is a variety of stainless steel.

Since the shank of the bolt fragment was the same diameter as the threaded portion and the fabrication techniques used for reactor internals bolts causes the shank to be less than the major diameter of the thread, the fragment does not appear to be from the reactor internals. Furthermore, a review of the possible bolts from the reactor coolant pumps was made, and samples of the most probable bolts were obtained from Westinghouse EMD. It has been confirmed by comparison with the fragment removed from the steam generator, that the fragment is of a different type than those used in the pumps.

With respect to the absence of battering of the bolt fragment and the steam generator tube sheet, it is believed that the fragment dropped into the manway well when it was first carried into the channel head by the coolant flow. This is a low flow area, and it is felt that the coolant velocity in this immediate area was not sufficient to move the bolt fragment any further.

SECTION VIII

Missing Carpenters Rule

During the U-Bend tube removal in "C" steam generator, a six foot folding carpenters rule was taken into the secondary side of the unit. When all equipment was removed from the unit, the carpenters rule was not accounted for. The rule was last seen when it was untied from its safety line and placed on the deck plate which is located just below the secondary manway.

If the rule fell through a swirl vane, it should have come to rest on top of the tube bundle above the top support plate. If it fell between the deck plate and the barrel, the rule would have lodged on the down-comer restricter plate. Both areas were carefully searched, but the rule was not recovered.

Conservatively, it was assumed that the rule remains in the steam generator; therefore, an analysis was performed on a similar rule produced by the same manufacturer. Westinghouse conducted the analysis and found the rule to be constructed of wood (maple-56 grams), brass coated steel hinges (46 grams) and an epoxy paint (7 to 10 grams). Westinghouse, after consulting with Chemistry operations and Tampa Division, concluded that steam generator performance and integrity would not be affected. Considering the types and amount of material, the effect of leaving the rule in the steam generator was inconsequential. The wood would be reduced to pulp in the high temperature environment and be discharged with sludge through the blowdown system. The hinges are primarily steel, which is similar to the material from which the internals are made. They would remain inside the unit but not impair heat transfer capability.

SECTION IX

Health Physics Aspects of Inspection

All the work involved in steam generator inspection was conducted in a radiation controlled area within the reactor containment. The health physics operation was administered by H. B. Robinson personnel and by Eberline personnel. The radiation levels on the primary side were relatively high. See the enclosed tables 14, 15, & 16 for a listing of these levels. The major time consuming work was the installation of eddy current equipment and the manually welding of plugs in the channel head. This work accounted for the most of the exposure received by personnel working on the steam generators. The radiation levels were relatively low on the secondary side and exposure was low for work in that area. See Table 13 for listing of these levels. Respirators were required for personnel entering the primary side. This was due to loose contamination within the channel head. Two pairs of anti-contamination coveralls and shoe covers were required to enter the channel head. The outer pair were removed at the generator to prevent the spread of contamination in the general area.

TABLE I

25 KHZ EDDY CURRENT TEST RESULTS

"A" SG INLET

* Not Inspected

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
7	13	*	0	—
7	14	0	*	—
7	15	½"	½"	0
7	17	1"	1"	0
7	19	2"	1½"	-½"
7	23	3"	3"	0
7	25	3"	3"	0
7	29	2"	2½"	+½"
7	31	2"	3"	+1"
7	33	2"	3"	+1"
7	35	2"	3"	+1"
7	37	2½"	3"	+½"
7	39	3"	3"	0
7	49	*	3"	—
7	51	3"	2½"	-½"
7	53	3"	3½"	+½"
7	55	3"	3"	0
7	57	1½"	2½"	+1"
7	59	0	2½"	+2½"
7	61	1"	3"	+2"
7	63	0	2½"	+2½"
7	65	1½"	3"	+1½"

TABLE I (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
7	67	1"	2½"	+1½"
7	69	0	1½"	+1½"
7	71	0	½"	+½"
7	73	1"	1"	0
7	75	0	1½"	+1½"
7	77	0	1"	+1"
7	79	0	½"	+½"
14	13	*	0	—
14	14	0	*	—
14	15	0	0	0
14	17	0	½"	+½"
14	19	0	1½"	+1½"
14	21	1"	3"	+2"
14	23	1½"	3"	+1½"
14	25	3"	3½"	+½"
14	27	3"	3½"	+½"
14	29	3½"	4"	+½"
14	31	4"	4½"	+½"
14	33	4½"	4"	-½
14	35	5½"	5"	-½
14	37	6"	4½	-1½

TABLE I (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
14	39	6"	4	-2
14	41	5½"	3	-2½
14	43	4"	3½	-½
14	44	4"	*	___
14	45	*	4	___
14	46	4½"	*	___
14	47	*	6"	___
14	48	6"	*	___
14	49	*	6"	___
14	50	6"	*	___
14	53	4"	6"	+2
14	55	1½"	3"	+1½"
14	57	2½"	4"	+1½"
14	59	3½"	4½"	+1"
14	61	3½"	5"	+1½"
14	63	4"	5"	+1"
14	65	4"	4"	0
14	67	4"	3½"	-½"
14	69	3½"	4"	+½"
14	71	3"	3"	0

TABLE 1 (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
14	73	2½"	3"	+½"
14	75	3"	2½"	-½"
14	77	2"	1"	-1"
14	79	1"	1"	0
21	13	*	0	___
21	14	0	*	___
21	15	0	½"	+½"
21	17	0	½"	+½"
21	19	0	½"	+½"
21	21	0	½"	+½"
21	23	0	1"	+1"
21	25	½	2½"	+2"
21	27	2"	3"	+1"
21	29	3"	3"	0
21	31	*	2½"	___
21	33	1"	1"	0
21	35	1"	1½"	+½"
21	37	3"	3"	0
21	39	4½"	3"	-1½"
21	41	4"	3½"	-½"
21	43	4"	4"	0

TABLE 1 (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
21	45	6"	4"	-2"
21	47	4"	6½"	+2½"
21	49	3"	6"	+3"
21	51	4"	3½"	-½"
21	53	3"	3½"	+½"
21	55	3½"	5½"	+2"
21	57	3"	4"	+1"
21	59	3"	3½"	+½"
21	61	3"	3½"	+½"
21	63	2"	3"	+1"
21	65	2"	3"	+1"
21	67	1½"	3"	+1½"
21	69	1"	1½"	+½"
21	71	0	½"	+½"
21	73	0	0	0
21	75	0	0	0
21	77	0	0	0
21	79	0	0	0
26	47	*	3"	—
28	13	*	0	—
28	14	0	*	—

TABLE 1 (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
28	15	0	0	0
28	17	0	0	0
28	19	0	0	0
28	21	0	0	0
28	23	0	½"	+½"
28	25	0	½"	+½"
28	27	0	1"	1"
28	29	0	1½"	1½"
28	31	0	1"	1"
28	33	0	½"	½"
28	35	1"	1"	0
28	37	3"	1"	-2"
28	39	3"	1½"	-1½"
28	41	3"	1½"	-1½"
28	43	3"	1½"	-1½"
28	45	1½"	2½"	+1"
28	47	3"	*	—
28	49	3"	3½"	+½"
28	51	3½"	3½"	0
28	53	3½"	4"	+½"
28	55	3"	3½"	+½"

TABLE 1 (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
28	57	2"	3"	+1"
28	59	2"	2"	0
28	61	1"	1½"	+½"
28	63	0	1"	+1"
28	65	0	0	0
28	67	0	0	0
28	69	0	0	0
28	71	0	0	0
28	73	0	0	0
28	75	0	0	0
28	77	0	0	0
28	79	0	0	0
41	32	0	*	—
41	33	0	*	—
41	34	0	*	—
41	35	0	*	—
41	36	0	*	—
41	37	0	*	—
41	38	0	*	—
42	32	0	*	—

TABLE 1 (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
42	33	0	*	___
42	34	0	*	___
42	35	0	*	___
42	36	0	*	___
42	37	0	*	___
42	38	0	*	___
43	32	0	*	___
43	33	0	*	___
43	34	0	*	___
43	35	0	*	___
43	36	0	*	___
43	37	0	*	___
43	38	0	*	___
44	37	0	*	___
44	38	0	*	___

TABLE 2

25 KHZ EDDY CURRENT TEST RESULTS

"A" SG OUTLET

*Not Inspected

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
7	15	3	*	
7	17	4	*	
7	19	5½	*	
7	23	6	*	
7	25	5½	*	
7	29	6	*	
7	31	5½	*	
7	33	4½	*	
7	35	6	*	
7	37	6	*	
7	39	7	*	
7	51	6½	*	
7	53	7½	*	
7	55	7½	*	
7	57	6	*	
7	59	7	*	
7	61	7	*	

TABLE 2 (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
7	63	7	*	
7	65	6½	*	
7	67	6	*	
7	69	6	*	
7	71	7	*	
7	73	6	*	
7	75	5½	*	
7	77	3	*	
7	79	0	*	
14	15	0	*	
14	17	2"	*	
14	19	3"	*	
14	21	5"	*	
14	23	6"	*	
14	25	7"	*	
14	27	7½"	*	
14	29	7½"	*	
14	31	7"	*	
14	33	5"	*	
14	35	5½"	*	
14	37	5½"	*	

TABLE 2 (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
14	39	6"	*	
14	41	5"	*	
14	41	5½"	*	
14	51	4	*	
14	53	4	*	
14	55	6	*	
14	57	5	*	
14	59	5½	*	
14	61	5½	*	
14	63	5½	*	
14	65	6	*	
14	67	6½	*	
14	69	6½	*	
14	71	6	*	
14	73	4	*	
14	75	1½	*	
14	77	0	*	
14	79	0	*	
21	15	0	*	

TABLE 2 (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
21	17	0	*	
21	19	0	*	
21	21	1"	*	
21	23	1½"	*	
21	25	3½"	*	
21	27	4½"	*	
21	29	5½"	*	
21	31	6"	*	
21	33	6"	*	
21	35	7"	*	
21	37	7"	*	
21	39	6"	*	
21	41	5½"	*	
21	43	5"	*	
21	51	6"	*	
21	53	6½"	*	
21	55	6½"	*	
21	57	6½"	*	
21	59	7"	*	
21	61	7½"	*	

TABLE 2 (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
21	63	8"	*	
21	65	7"	*	
21	67	6"	*	
21	69	5"	*	
21	71	1"	*	
21	73	0"	*	
21	75	0	*	
21	77	0	*	
21	79	0	*	
28	15	0	*	
28	17	0	*	
28	19	0	*	
28	21	0	*	
28	25	0	*	
28	27	0	*	
28	29	0	*	
28	31	½"	*	
28	33	2½"	*	
28	35	3"	*	
28	37	4"	*	
28	39	4"	*	

TABLE 2 (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
28	41	3½"	*	
28	43	4½"	*	
28	51	4"	*	
28	53	5"	*	
28	55	4½"	*	
28	57	5"	*	
28	59	3"	*	
28	61	2½"	*	
28	63	0	*	
28	65	0	*	
28	67	1"	*	
28	69	0	*	
28	71	0	*	
28	73	0	*	
28	75	0	*	
28	77	0	*	
28	79	0	*	

TABLE 3

25 KHZ EDDY CURRENT TEST RESULTS

"B" SG INLET

*Not Inspected

ROW	COLUMN	PRE-LANCE 5-74 HEIGHT OF DEPOSIT	POST-LANCE 6-74 HEIGHT OF DEPOSIT	DIFF.
7	13	*	0	
7	15	*	0	
7	17	*	0	
7	19	*	½"	
7	21	*	½"	
7	23	*	1"	
7	25	*	1½"	
7	27	*	½"	
7	29	*	0	
7	47	*	1"	
7	49	*	1½"	
7	51	*	½"	
7	53	*	½"	
7	55	*	½"	
7	57	*	½"	
7	59	*	½"	
7	61	*	½"	
14	13	*	0	

TABLE 3 (Continued)

ROW	COLUMN	PRE-LANCE 5-74 HEIGHT OF DEPOSIT	POST-LANCE 6-74 HEIGHT OF DEPOSIT	DIFF.
14	15	*	0	
14	17	*	0	
14	19	*	0	
14	21	*	0	
14	23	*	0	
14	25	*	1"	
14	27	*	1½"	
14	29	*	2"	
14	47	*	7½"	
14	49	*	8½"	
14	51	*	4½"	
14	53	*	3 1/8"	
14	55	*	3"	
14	57	*	3"	
14	59	*	3"	
14	61	*	3"	
21	13	*	0	
21	14	*	0	
21	16	*	0	
21	17	*	0	

TABLE 3 (Continued)

ROW	COLUMN	PRELANCE 5-74 HEIGHT OF DEPOSIT	POST-LANCE 6-74 HEIGHT OF DEPOSIT	DIFF.
21	18	*	0	
21	19	*	0	
21	20	*	0	
21	21	*	0	
21	22	*	0	
21	23	*	0	
21	24	*	0	
21	25	*	½"	
21	26	*	½"	
21	27	*	½"	
21	28	*	½"	
21	29	*	1"	
21	30	*	2"	
21	47	*	4½"	
21	49	*	4½"	
21	51	*	4"	
21	53	*	3½"	
21	55	*	3"	
21	57	*	2½"	
21	59	*	1½"	
21	61	*	1½"	

TABLE 4

25 KHZ EDDY CURRENT TEST RESULTS

"C" SG INLET

*Not Inspected

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
7	13	*	0	—
7	15	*	0	—
7	17	*	0	—
7	19	*	½"	—
7	21	*	½"	—
7	23	*	3"	—
7	25	*	3"	—
7	27	*	2½"	—
7	29	2½"	1"	—
7	35	½"	*	—
7	41	0	*	—
7	47	*	1"	—
7	49	*	1"	—
7	51	½"	½"	0
7	53	*	0	—
7	55	*	0	—
7	57	0	0	—
7	59	*	0	—
7	61	*	½"	—
7	63	2½"	½"	-2
14	13	*	0	—
14	15	*	0	—
14	17	*	0	—
14	19	*	½"	—

TABLE 4 (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
14	21	*	½"	—
14	23	1	1"	0
14	25	*	1½"	—
14	27	*	2½"	—
14	29	4½"	2½"	-2
14	35	6"	*	—
14	41	7½"	*	—
14	47	*	5½"	—
14	49	*	3"	—
14	51	3"	2"	-1
14	53	*	1½"	—
14	55	*	1"	—
14	57	2½"	1½"	-1
14	59	*	1"	—
14	61	*	1½"	—
14	63	2½"	1"	-1½
21	17	*	0	—
21	19	*	0	—
21	21	*	0	—
21	23	*	0	—
21	25	*	½"	—
21	27	*	1"	—
21	29	2½"	1½"	-1
21	35	2½"	*	—
21	41	1½"	*	—

TABLE 4 (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
21	47	*	4	—
21	49	*	4"	—
21	51	4"	3½"	-½
21	53	*	1½"	—
21	55	*	0	—
21	57	1"	½"	-½
21	59	*	0	—
21	61	*	0	—
21	63	1"	0	-1
28	13	*	0	—
28	15	*	0	—
28	17	*	0	—
28	19	*	0	—
28	21	*	0	—
28	23	*	0	—
28	25	*	0	—
28	27	*	0	—
28	29	0	0	0
28	35	0	*	—
28	41	1½"	*	—
28	47	*	0	—
28	49	*	0	—
28	51	1½	½	-1
28	53	*	½	—
28	55	*	½	—
28	57	0	0	0

TABLE 4 (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
28	59	*	0	—
28	61	*	0	—
28	63	0	0	—

TABLE 5

25 KHZ EDDY CURRENT TEST RESULTS

"C" SG OUTLET

* Not Inspected

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
7	29	5"	*	
7	35	5"	*	
7	41	6"	*	
7	51	4½"	*	
7	57	6"	*	
7	63	5"	*	
14	29	6"	*	
14	35	6"	*	
14	41	5"	*	
14	51	4½"	*	
14	57	4½"	*	
14	63	6"	*	
21	29	4½"	*	
21	35	5"	*	
21	41	4½"	*	
21	51	4"	*	
21	57	6"	*	
21	63	4"	*	
28	29	0	*	

TABLE 5 (Continued)

ROW	COLUMN	5-74 HEIGHT OF DEPOSIT	6-74 HEIGHT OF DEPOSIT	DIFF.
28	35	½"	*	
28	41	0	*	
28	51	1"	*	
28	57	½"	*	
28	63	0	*	

TABLE 6

EDDY CURRENT TEST RESULTS

STEAM GENERATOR "A" INLET TEST FREQUENCY: 400 KHZ

ROW	COLUMN	% DEFECT	LOCATION
2	20	< 20	Top of Tube Sheet
3	20	< 20	Top of Tube Sheet
3	21	20	Top of Tube Sheet
4	19	< 20	1" above Tube Sheet
4	20	< 20	½" above Tube Sheet
4	23	< 20	1" above Tube Sheet
4	24	< 20	½" above Tube Sheet
5	18	< 20	1" above Tube Sheet
5	19	< 20	1" above Tube Sheet
5	20	< 20	½" above Tube Sheet
5	24	< 20	1" above Tube Sheet
5	28	< 20	1" above Tube Sheet
5	54	< 20	1" above Tube Sheet
6	12	< 20	45" above Tube Sheet
6	17	< 20	½" above Tube Sheet
6	18	< 20	1" above Tube Sheet
6	23	< 20	1" above Tube Sheet
6	24	< 20	1" above Tube Sheet
6	25	< 20	2" above Tube Sheet
6	26	< 20	2" above Tube Sheet
6	27	< 20	½" above Tube Sheet
6	28	< 20	2" above Tube Sheet
6	29	< 20	1" above Tube Sheet
6	30	26	1" above Tube Sheet
6	35	26	1" above Tube Sheet
6	37	< 20	1" above Tube Sheet

TABLE 6 (continued)
"A" INLET

ROW	COLUMN	% DEFECT	LOCATION
6	39	< 20	1" above Tube Sheet
6	41	< 20	1" above Tube Sheet
6	42	< 20	½" above Tube Sheet
6	43	< 20	½" above Tube Sheet
6	45	< 20	1" above Tube Sheet
6	46	< 20	1" above Tube Sheet
6	47	< 20	1" above Tube Sheet
6	49	< 20	2" above Tube Sheet
6	54	< 20	2" above Tube Sheet
6	67	< 20	½" above Tube Sheet
7	15	< 20	½" above Tube Sheet
7	16	< 20	½" above Tube Sheet
7	19	< 20	1" above Tube Sheet
7	22	40	1" above Tube Sheet
7	24	20	1" above Tube Sheet
7	31	< 20	1" above Tube Sheet
7	32	< 20	1" above Tube Sheet
7	33	< 20	1" above Tube Sheet
7	34	< 20	1" above Tube Sheet
7	40	58	1" above Tube Sheet
7	42	< 20	1" above Tube Sheet
7	48	< 20	1" above Tube Sheet
7	50	< 20	½" above Tube Sheet
7	66	< 20	Top of Tube Sheet
8	15	< 20	½" above Tube Sheet
8	16	< 20	½" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
8	18	<20	½" above Tube Sheet
8	22	50	1" above Tube Sheet
8	24	<20	½" above Tube Sheet
8	27	<20	½" above Tube Sheet
8	28	50	2" above Tube Sheet
8	33	<20	1" above Tube Sheet
8	34	<20	1½" above Tube Sheet
8	35	<20	1" above Tube Sheet
8	40	38	1" above Tube Sheet
8	41	40	Top of Tube Sheet
8	43	40	1" above Tube Sheet
8	46	<20	½" above Tube Sheet
8	47	<20	1" above Tube Sheet
8	57	<20	1" above Tube Sheet
8	58	<20	1" above Tube Sheet
8	59	<20	1" above Tube Sheet
8	60	<20	1" above Tube Sheet
8	61	<20	½" above Tube Sheet
8	65	<20	1" above Tube Sheet
8	66	<20	1" above Tube Sheet
8	67	<20	½" above Tube Sheet
9	16	<20	½" above Tube Sheet
9	19	<20	½" above Tube Sheet
9	20	<20	1" above Tube Sheet
9	22	<20	1" above Tube Sheet
9	24	<20	½" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
9	25	< 20	1" above Tube Sheet
9	26	< 20	½" above Tube Sheet
9	27	20	½" above Tube Sheet
9	29	< 20	½" above Tube Sheet
9	30	< 20	1" above Tube Sheet
9	33	< 20	1" above Tube Sheet
9	35	< 20	1" above Tube Sheet
9	36	20	1" above Tube Sheet
9	37	< 20	1" above Tube Sheet
9	43	42	1" above Tube Sheet
9	46	< 20	½" above Tube Sheet
9	51	< 20	1" above Tube Sheet
9	52	< 20	1" above Tube Sheet
9	55	< 20	1" above Tube Sheet
9	56	< 20	1" above Tube Sheet
9	57	< 20	1" above Tube Sheet
9	58	< 20	1" above Tube Sheet
9	59	< 20	1" above Tube Sheet
9	60	< 20	1" above Tube Sheet
9	61	< 20	1" above Tube Sheet
9	62	< 20	1" above Tube Sheet
9	64	< 20	1" above Tube Sheet
9	65	< 20	1" above Tube Sheet
9	66	< 20	1" above Tube Sheet
9	67	< 20	½" above Tube Sheet
10	23	< 20	1" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
10	24	< 20	1" above Tube Sheet
10	25	< 20	1" above Tube Sheet
10	26	< 20	1" above Tube Sheet
10	27	< 20	1" above Tube Sheet
10	30	< 20	1" above Tube Sheet
10	31	< 20	1½" above Tube Sheet
10	33	< 20	1" above Tube Sheet
10	34	< 20	2" above Tube Sheet
10	51	< 20	1" above Tube Sheet
10	52	< 20	1" above Tube Sheet
10	55	< 20	1" above Tube Sheet
10	56	< 20	1" above Tube Sheet
10	58	< 20	1" above Tube Sheet
10	60	< 20	1" above Tube Sheet
10	61	< 20	1" above Tube Sheet
10	64	< 20	1" above Tube Sheet
10	65	< 20	1" above Tube Sheet
10	67	< 20	1" above Tube Sheet
11	22	28	½" above Tube Sheet
11	23	< 20	1" above Tube Sheet
11	24	< 20	1" above Tube Sheet
11	25	< 20	1" above Tube Sheet
11	26	< 20	2" above Tube Sheet
11	27	< 20	2" above Tube Sheet
11	28	< 20	1" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
11	29	< 20	½" above Tube Sheet
11	30	< 20	1" above Tube Sheet
11	31	< 20	1" above Tube Sheet
11	44	< 20	½" above Tube Sheet
11	52	< 20	1" above Tube Sheet
11	53	< 20	1" above Tube Sheet
11	54	< 20	1" above Tube Sheet
11	56	< 20	1" above Tube Sheet
11	57	< 20	1" above Tube Sheet
11	58	< 20	1" above Tube Sheet
11	59	< 20	1" above Tube Sheet
11	60	< 20	1" above Tube Sheet
11	61	< 20	½" above Tube Sheet
11	62	< 20	½" above Tube Sheet
11	63	< 20	2" above Tube Sheet
11	64	< 20	2" above Tube Sheet
11	65	< 20	2" above Tube Sheet
11	66	< 20	2" above Tube Sheet
11	67	20	1" above Tube Sheet
12	21	< 20	½" above Tube Sheet
12	22	< 20	1" above Tube Sheet
12	23	28	1" above Tube Sheet
12	24	< 20	1" above Tube Sheet
12	25	< 20	1" above Tube Sheet
12	26	< 20	1" above Tube Sheet
12	27	< 20	1" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
12	28	<20	1" above Tube Sheet
12	29	<20	1" above Tube Sheet
12	30	<20	1" above Tube Sheet
12	31	24	1" above Tube Sheet
12	32	24	1" above Tube Sheet
12	33	<20	1" above Tube Sheet
12	34	<20	1" above Tube Sheet
12	43	24	Top of Tube Sheet
12	44	26	Top of Tube Sheet
12	50	<20	½" above Tube Sheet
12	51	<20	½" above Tube Sheet
12	52	<20	½" above Tube Sheet
12	53	<20	½" above Tube Sheet
12	56	<20	1" above Tube Sheet
12	57	<20	1" above Tube Sheet
12	59	<20	1" above Tube Sheet
12	60	<20	½" above Tube Sheet
12	61	<20	1" above Tube Sheet
12	62	<20	1" above Tube Sheet
12	63	<20	2" above Tube Sheet
12	64	<20	2" above Tube Sheet
12	65	<20	2" above Tube Sheet
12	66	28	3" above Tube Sheet
13	21	<20	½" above Tube Sheet
13	22	<20	½" above Tube Sheet
13	23	<20	1" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
13	24	<20	1" above Tube Sheet
13	25	<20	1" above Tube Sheet
13	26	<20	1" above Tube Sheet
13	27	<20	1" above Tube Sheet
13	28	<20	1" above Tube Sheet
13	29	<20	1" above Tube Sheet
13	30	<20	1" above Tube Sheet
13	31	27	1" above Tube Sheet
13	32	23	1" above Tube Sheet
13	33	25	1" above Tube Sheet
13	34	<20	1" above Tube Sheet
13	35	25	1" above Tube Sheet
13	36	26	1" above Tube Sheet
13	37	<20	1" above Tube Sheet
13	43	<20	½" above Tube Sheet
13	52	<20	½" above Tube Sheet
13	53	<20	½" above Tube Sheet
13	54	<20	½" above Tube Sheet
13	55	<20	½" above Tube Sheet
13	56	<20	½" above Tube Sheet
13	57	<20	½" above Tube Sheet
13	58	<20	½" above Tube Sheet
13	59	<20	½" above Tube Sheet
13	60	<20	½" above Tube Sheet
13	61	<20	½" above Tube Sheet
13	62	<20	1" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
13	63	<20	3" above Tube Sheet
13	64	<20	2" above Tube Sheet
13	65	<20	2" above Tube Sheet
13	66	<20	2" above Tube Sheet
14	21	<20	½" above Tube Sheet
14	22	<20	½" above Tube Sheet
14	25	<20	1" above Tube Sheet
14	26	<20	1" above Tube Sheet
14	27	22	1" above Tube Sheet
14	28	<20	1" above Tube Sheet
14	29	24	1" above Tube Sheet
14	30	23	1" above Tube Sheet
14	31	<20	2" above Tube Sheet
14	32	<20	2" above Tube Sheet
14	33	24	1" above Tube Sheet
14	34	<20	2" above Tube Sheet
14	38	<20	1" above Tube Sheet
14	39	<20	1" above Tube Sheet
14	46	<20	½" above Tube Sheet
14	47	<20	½" above Tube Sheet
14	48	<20	½" above Tube Sheet
14	51	<20	½" above Tube Sheet
14	52	<20	½" above Tube Sheet
14	53	<20	½" above Tube Sheet
14	54	<20	½" above Tube Sheet
14	55	<20	½" above Tube Sheet
14	56	<20	½" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
14	57	< 20	½" above Tube Sheet
14	58	< 20	1" above Tube Sheet
14	59	< 20	1" above Tube Sheet
14	60	< 20	1" above Tube Sheet
14	61	< 20	1" above Tube Sheet
14	62	< 20	1" above Tube Sheet
14	63	< 20	1" above Tube Sheet
14	64	< 20	1" above Tube Sheet
14	65	< 20	1" above Tube Sheet
14	66	< 20	1" above Tube Sheet
14	67	< 20	1" above Tube Sheet
14	69	< 20	2" above Tube Sheet
15	21	< 20	½" above Tube Sheet
15	22	< 20	½" above Tube Sheet
15	24	< 20	1" above Tube Sheet
15	25	< 20	1" above Tube Sheet
15	26	< 20	1" above Tube Sheet
15	27	< 20	1" above Tube Sheet
15	28	< 20	1" above Tube Sheet
15	29	< 20	1" above Tube Sheet
15	30	< 20	1" above Tube Sheet
15	31	24	1" above Tube Sheet
15	32	< 20	1½" above Tube Sheet
15	33	< 20	1" above Tube Sheet
15	34	< 20	1" above Tube Sheet
15	36	20	1" above Tube Sheet
15	37	25	1" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
15	39	24	1" above Tube Sheet
15	40	< 20	1" above Tube Sheet
15	45	< 20	1" above Tube Sheet
15	48	< 20	1" above Tube Sheet
15	51	< 20	1" above Tube Sheet
15	52	< 20	1" above Tube Sheet
15	54	< 20	1" above Tube Sheet
15	55	< 20	½" above Tube Sheet
15	56	< 20	½" above Tube Sheet
15	57	< 20	1" above Tube Sheet
15	58	< 20	1" above Tube Sheet
15	59	< 20	½" above Tube Sheet
15	60	< 20	1" above Tube Sheet
15	61	< 20	1" above Tube Sheet
15	62	< 20	1" above Tube Sheet
15	63	< 20	3" above Tube Sheet
15	64	< 20	2" above Tube Sheet
15	65	< 20	2" above Tube Sheet
15	66	< 20	1" above Tube Sheet
16	25	< 20	1" above Tube Sheet
16	26	< 20	1" above Tube Sheet
16	27	< 20	1" above Tube Sheet
16	28	< 20	1" above Tube Sheet
16	29	< 20	1" above Tube Sheet
16	30	< 20	1" above Tube Sheet
16	36	28	2" above Tube Sheet

Table 6 (continued

ROW	COLUMN	% DEFECT	LOCATION
16	37	< 20	2" above Tube Sheet
16	38	< 20	2" above Tube Sheet
16	39	< 20	2" above Tube Sheet
16	46	< 20	1" above Tube Sheet
16	47	< 20	2" above Tube Sheet
16	48	< 20	2" above Tube Sheet
16	51	< 20	1" above Tube Sheet
16	52	< 20	1" above Tube Sheet
16	53	< 20	1" above Tube Sheet
16	54	< 20	1" above Tube Sheet
16	55	< 20	1" above Tube Sheet
16	56	< 20	1" above Tube Sheet
16	57	< 20	½" above Tube Sheet
16	58	26	½" above Tube Sheet
16	60	< 20	1" above Tube Sheet
16	61	< 20	2" above Tube Sheet
16	62	< 20	1" above Tube Sheet
16	63	< 20	3" above Tube Sheet
16	64	< 20	2" above Tube Sheet
16	65	< 20	1" above Tube Sheet
16	66	32	1" above Tube Sheet
17	26	< 20	3" above Tube Sheet
17	28	< 20	1" above Tube Sheet
17	29	< 20	½" above Tube Sheet
17	30	< 20	1" above Tube Sheet
17	31	< 20	2" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
17	38	< 20	1" above Tube Sheet
17	39	< 20	1" above Tube Sheet
17	42	< 20	2" above Tube Sheet
17	46	< 20	6" above Tube Sheet
17	47	< 20	2" above Tube Sheet
17	48	< 20	3" above Tube Sheet
17	51	< 20	3" above Tube Sheet
17	52	< 20	3" above Tube Sheet
17	53	< 20	3" above Tube Sheet
17	54	< 20	2" above Tube Sheet
17	55	< 20	3" above Tube Sheet
17	56	< 20	1" above Tube Sheet
17	57	< 20	1" above Tube Sheet
17	58	< 20	1" above Tube Sheet
17	59	< 20	1" above Tube Sheet
17	60	< 20	1" above Tube Sheet
17	61	< 20	1" above Tube Sheet
17	62	< 20	1" above Tube Sheet
17	63	< 20	3" above Tube Sheet
17	64	< 20	2" above Tube Sheet
17	65	< 20	1" above Tube Sheet
17	66	26	1" above Tube Sheet
18	26	< 20	2" above Tube Sheet
18	28	< 20	½" above Tube Sheet
18	30	< 20	½" above Tube Sheet
18	34	32	1" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
18	35	40	½" above Tube Sheet
18	36	< 20	1" above Tube Sheet
18	38	< 20	1" above Tube Sheet
18	39	< 20	1" above Tube Sheet
18	40	< 20	1" above Tube Sheet
18	41	< 20	1" above Tube Sheet
18	45	< 20	2" above Tube Sheet
18	47	< 20	2" above Tube Sheet
18	49	< 20	6" above Tube Sheet
18	51	< 20	3" above Tube Sheet
18	52	< 20	1" above Tube Sheet
18	53	< 20	1" above Tube Sheet
18	54	< 20	1" above Tube Sheet
18	57	< 20	3" above Tube Sheet
18	58	< 20	3" above Tube Sheet
18	59	< 20	2" above Tube Sheet
18	60	< 20	2" above Tube Sheet
18	61	< 20	2" above Tube Sheet
18	62	< 20	2" above Tube Sheet
18	63	< 20	2" above Tube Sheet
18	64	< 20	2" above Tube Sheet
18	65	< 20	1" above Tube Sheet
18	66	< 20	2" above Tube Sheet
19	28	< 20	½" above Tube Sheet
19	29	< 20	2" above Tube Sheet
19	31	< 20	2" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
19	34	< 20	½" above Tube Sheet
19	35	< 20	½" above Tube Sheet
19	36	< 20	½" above Tube Sheet
19	38	< 20	1" above Tube Sheet
19	40	< 20	1" above Tube Sheet
19	41	< 20	2" above Tube Sheet
19	49	< 20	1" above Tube Sheet
19	50	< 20	1" above Tube Sheet
19	52	< 20	2" above Tube Sheet
19	53	< 20	2" above Tube Sheet
19	54	< 20	2" above Tube Sheet
19	55	< 20	3" above Tube Sheet
19	57	< 20	3" above Tube Sheet
19	58	< 20	3" above Tube Sheet
19	59	< 20	2" above Tube Sheet
19	60	< 20	3" above Tube Sheet
19	61	< 20	3" above Tube Sheet
19	62	< 20	2" above Tube Sheet
19	63	< 20	3" above Tube Sheet
19	64	< 20	2" above Tube Sheet
19	65	< 20	1" above Tube Sheet
19	66	< 20	1" above Tube Sheet
20	35	24	½" above Tube Sheet
20	36	< 20	½" above Tube Sheet
20	38	< 20	1" above Tube Sheet
20	39	< 20	2" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
20	42	< 20	2" above Tube Sheet
20	43	40	3" above Tube Sheet
20	51	< 20	1" above Tube Sheet
20	52	< 20	2" above Tube Sheet
20	53	< 20	2" above Tube Sheet
20	54	< 20	2" above Tube Sheet
20	55	< 20	1" above Tube Sheet
20	57	< 20	2" above Tube Sheet
20	58	< 20	2" above Tube Sheet
20	59	< 20	2" above Tube Sheet
20	60	< 20	2" above Tube Sheet
20	61	< 20	2" above Tube Sheet
20	62	< 20	2" above Tube Sheet
20	63	< 20	2" above Tube Sheet
20	65	< 20	1" above Tube Sheet
20	66	< 20	1" above Tube Sheet
21	41	< 20	½" above Tube Sheet
21	45	< 20	1" above Tube Sheet
21	46	< 20	3" above Tube Sheet
21	48	< 20	1" above Tube Sheet
21	53	< 20	2" above Tube Sheet
21	54	< 20	2" above Tube Sheet
21	55	< 20	2" above Tube Sheet
21	56	< 20	2" above Tube Sheet
21	59	< 20	2" above Tube Sheet
21	60	24	2" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
21	61	37	2" above Tube Sheet
21	62	28	2" above Tube Sheet
21	63	< 20	1" above Tube Sheet
21	65	< 20	1" above Tube Sheet
21	66	< 20	1" above Tube Sheet
22	20	< 20	9" above Tube Sheet
22	28	< 20	½" above Tube Sheet
22	29	< 20	½" above Tube Sheet
22	30	< 20	½" above Tube Sheet
22	35	28	1" above Tube Sheet
22	40	< 20	2" above Tube Sheet
22	41	< 20	½" above Tube Sheet
22	44	< 20	1" above Tube Sheet
22	45	< 20	1" above Tube Sheet
22	47	< 20	2" above Tube Sheet
22	49	< 20	2" above Tube Sheet
22	55	< 20	2" above Tube Sheet
22	56	< 20	2" above Tube Sheet
22	57	< 20	2" above Tube Sheet
22	58	< 20	2" above Tube Sheet
22	62	< 20	1" above Tube Sheet
22	63	< 20	1" above Tube Sheet
23	29	< 20	½" above Tube Sheet
23	34	< 20	½" above Tube Sheet
23	35	< 20	½" above Tube Sheet
23	36	25	1" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
23	42	20	1" above Tube Sheet
23	43	20	1" above Tube Sheet
23	44	< 20	1" above Tube Sheet
23	47	< 20	1" above Tube Sheet
23	50	< 20	1" above Tube Sheet
23	51	< 20	1" above Tube Sheet
23	54	< 20	1" above Tube Sheet
23	56	< 20	2" above Tube Sheet
23	57	< 20	1" above Tube Sheet
23	58	< 20	2" above Tube Sheet
23	59	< 20	1" above Tube Sheet
23	63	< 20	2" above Tube Sheet
24	41	< 20	1" above Tube Sheet
24	42	< 20	1" above Tube Sheet
24	43	< 20	1" above Tube Sheet
24	44	< 20	1" above Tube Sheet
24	45	< 20	½" above Tube Sheet
24	46	< 20	1" above Tube Sheet
24	49	< 20	2" above Tube Sheet
24	50	< 20	1" above Tube Sheet
24	51	< 20	1" above Tube Sheet
24	52	< 20	1" above Tube Sheet
24	53	< 20	1" above Tube Sheet
24	54	< 20	1" above Tube Sheet
24	55	< 20	2" above Tube Sheet
24	56	< 20	1" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
24	57	< 20	2" above Tube Sheet
24	58	< 20	2" above Tube Sheet
24	59	25	2" above Tube Sheet
24	60	< 20	1" above Tube Sheet
24	61	< 20	1" above Tube Sheet
24	62	< 20	1" above Tube Sheet
24	63	< 20	2" above Tube Sheet
24	64	28	2" above Tube Sheet
25	35	< 20	1" above Tube Sheet
25	40	< 20	½" above Tube Sheet
25	41	< 20	1" above Tube Sheet
25	42	< 20	½" above Tube Sheet
25	43	< 20	½" above Tube Sheet
25	44	< 20	½" above Tube Sheet
25	50	< 20	½" above Tube Sheet
25	51	< 20	2" above Tube Sheet
25	52	< 20	1" above Tube Sheet
25	53	< 20	1" above Tube Sheet
25	54	< 20	1" above Tube Sheet
25	55	< 20	1" above Tube Sheet
25	56	< 20	1" above Tube Sheet
25	57	< 20	1" above Tube Sheet
25	58	< 20	1" above Tube Sheet
25	59	< 20	1" above Tube Sheet
25	60	< 20	1" above Tube Sheet
25	61	< 20	1" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
25	62	23	1" above Tube Sheet
25	63	< 20	2" above Tube Sheet
26	35	< 20	1" above Tube Sheet
26	36	< 20	2" above Tube Sheet
26	41	< 20	½" above Tube Sheet
26	43	< 20	½" above Tube Sheet
26	49	< 20	½" above Tube Sheet
26	51	< 20	1" above Tube Sheet
26	53	< 20	1" above Tube Sheet
26	54	< 20	1" above Tube Sheet
26	55	< 20	1" above Tube Sheet
27	37	< 20	½" above Tube Sheet
27	53	35	2½" above Tube Sheet
27	54	< 20	1" above Tube Sheet
28	36	< 20	½" above Tube Sheet
28	37	< 20	½" above Tube Sheet
28	38	< 20	½" above Tube Sheet
28	46	46	1" above Tube Sheet
28	52	90	2" above Tube Sheet
28	53	< 20	2" above Tube Sheet
28	54	< 20	1" above Tube Sheet
28	55	< 20	1" above Tube Sheet
28	56	< 20	1" above Tube Sheet
28	57	< 20	1" above Tube Sheet
29	45	< 20	½" above Tube Sheet
29	46	< 20	½" above Tube Sheet
29	47	< 20	½" above Tube Sheet

Table 6 (continued)

ROW	COLUMN	% DEFECT	LOCATION
29	48	20	1" above Tube Sheet
29	52	< 20	½" above Tube Sheet
29	53	< 20	1" above Tube Sheet
29	54	< 20	1" above Tube Sheet
29	55	< 20	1" above Tube Sheet
29	56	< 20	1" above Tube Sheet
30	46	< 20	½" above Tube Sheet
30	48	35	½" above Tube Sheet
30	49	66	Top of Tube Sheet
30	51	< 20	2" above Tube Sheet
30	52	< 20	2" above Tube Sheet
30	53	< 20	2" above Tube Sheet
30	54	< 20	1" above Tube Sheet
30	55	< 20	2" above Tube Sheet
31	45	< 20	½" above Tube Sheet
31	49	< 20	½" above Tube Sheet
31	51	< 20	1" above Tube Sheet
31	52	26	1" above Tube Sheet
31	53	33	1½" above Tube Sheet
31	54	< 20	2" above Tube Sheet
32	49	< 20	½" above Tube Sheet
32	51	22	1" above Tube Sheet
32	52	22	2" above Tube Sheet
32	54	< 20	1" above Tube Sheet
42	34	Leaker	2" above 6th Tube Support
43	33	88	2" above 6th Tube Support

TABLE 6 (continued)

EDDY CURRENT TEST RESULTS

SITE: CP&L — STEAM GENERATOR: A INLET

TEST FREQUENCY: 400KHZ — DATE: JUNE 1974

ROW	COLUMN	% DEFECT	LOCATION
12	67	34	1" above T-S
13	67	<20	1" above T-S
14	67	<20	1" above T-S
15	67	26	2" above T-S
16	67	20	1" above T-S
17	67	25	1" above T-S
18	67	23	1" above T-S
22	67	23	2" above T-S
18	68	30	1/2" above T-S
17	68	<20	1" above T-S
16	68	39	1" above T-S
15	68	32	1" above T-S
14	68	<20	2" above T-S
13	68	<20	2" above T-S
12	68	<20	2" above T-S
11	68	37	2" above T-S
10	68	<20	2" above T-S
9	68	<20	1" above T-S
8	69	<20	1" above T-S
9	69	<20	1" above T-S
10	69	<20	2" above T-S
11	69	<20	2" above T-S
12	69	20	2" above T-S
13	69	20	2" above T-S
14	69	<20	2" above T-S
15	69	<20	1" above T-S
17	69	<20	1" above T-S
15	70	<20	1" above T-S
14	70	<20	1" above T-S

TABLE 6 (continued)

EDDY CURRENT TEST RESULTS

SITE: CP&L

STEAM GENERATOR: A INLET

TEST FREQUENCY: 400KHZ

DATE: JUNE 1974

ROW	COLUMN	% DEFECT	LOCATION
13	70	< 20	1" above T-S
12	70	< 20	1" above T-S
11	70	< 20	1" above T-S
10	70	< 20	1" above T-S
9	70	< 20	1" above T-S
8	70	< 20	1" above T-S
10	71	< 20	1" above T-S
12	71	< 20	1" above T-S
13	71	< 20	1" above T-S
12	72	< 20	1" above T-S
7	73	< 20	1" above T-S
8	73	< 20	1" above T-S
10	73	< 20	1" above T-S
14	73	< 20	2" above T-S
14	74	< 20	2" above T-S
11	74	< 20	1" above T-S
8	74	< 20	1" above T-S
12	75	< 20	1" above T-S
14	75	< 20	1" above T-S
14	76	< 20	1" above T-S
12	76	< 20	1" above T-S
12	77	< 20	1" above T-S
9	78	< 20	1/2" above T-S
25	63	< 20	1/2" above T-S
4	91	leaker	above #6 support-during startup

TABLE 7

EDDY CURRENT TEST RESULTS

STEAM GEN. "A" OUTLET TEST FREQUENCY 400 KHZ

ROW	COLUMN	% DEFECT	LOCATION
5	28	< 20	2" above Tube Sheet
5	29	< 20	2" above Tube Sheet
5	30	< 20	2" above Tube Sheet
5	31	< 20	2" above Tube Sheet
5	32	< 20	2" above Tube Sheet
5	33	< 20	2" above Tube Sheet
5	34	< 20	2" above Tube Sheet
5	35	< 20	2" above Tube Sheet
5	36	< 20	2" above Tube Sheet
5	37	< 20	3" above Tube Sheet
5	38	< 20	3" above Tube Sheet
5	39	< 20	2" above Tube Sheet
5	40	< 20	2" above Tube Sheet
5	42	< 20	2" above Tube Sheet
5	43	< 20	2" above Tube Sheet
6	28	< 20	2" above Tube Sheet
6	29	< 20	2" above Tube Sheet
6	30	< 20	2" above Tube Sheet
6	31	< 20	2" above Tube Sheet
6	32	< 20	2" above Tube Sheet
6	33	< 20	2" above Tube Sheet
6	34	< 20	2" above Tube Sheet
6	35	< 20	2" above Tube Sheet
6	36	< 20	2" above Tube Sheet

TABLE 7 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
6	37	< 20	3" above Tube Sheet
6	38	< 20	2" above Tube Sheet
6	40	< 20	2" above Tube Sheet
6	41	< 20	2" above Tube Sheet
6	42	< 20	2" above Tube Sheet
6	43	< 20	2" above Tube Sheet
7	29	< 20	2" above Tube Sheet
7	30	< 20	2" above Tube Sheet
7	31	< 20	2" above Tube Sheet
7	32	< 20	2" above Tube Sheet
7	33	< 20	2" above Tube Sheet
7	34	< 20	2" above Tube Sheet
7	35	< 20	2" above Tube Sheet
7	36	< 20	2" above Tube Sheet
7	37	< 20	2" above Tube Sheet
7	38	< 20	2" above Tube Sheet
7	39	< 20	2" above Tube Sheet
7	40	< 20	3" above Tube Sheet
7	42	< 20	2" above Tube Sheet
8	28	< 20	2" above Tube Sheet
8	32	< 20	2" above Tube Sheet
8	33	< 20	2" above Tube Sheet
8	34	< 20	2" above Tube Sheet
8	35	< 20	2" above Tube Sheet
8	36	< 20	3" above Tube Sheet

TABLE 7 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
8	37	< 20	2" above Tube Sheet
8	38	< 20	2" above Tube Sheet
8	39	< 20	2" above Tube Sheet
8	40	< 20	3" above Tube Sheet
8	41	< 20	2" above Tube Sheet
8	43	< 20	2" above Tube Sheet
9	28	< 20	2" above Tube Sheet
9	29	< 20	1" above Tube Sheet
9	30	< 20	2" above Tube Sheet
9	31	< 20	2" above Tube Sheet
9	32	< 20	2" above Tube Sheet
9	33	< 20	1" above Tube Sheet
9	34	< 20	1" above Tube Sheet
9	35	< 20	2" above Tube Sheet
9	36	< 20	2" above Tube Sheet
9	37	< 20	1" above Tube Sheet
9	38	< 20	1" above Tube Sheet
9	39	< 20	2" above Tube Sheet
9	40	< 20	1" above Tube Sheet
9	41	< 20	2" above Tube Sheet
9	42	< 20	2" above Tube Sheet
9	43	< 20	2" above Tube Sheet
10	28	< 20	2" above Tube Sheet
10	30	< 20	2" above Tube Sheet
10	31	< 20	2" above Tube Sheet
10	32	< 20	2" above Tube Sheet

TABLE 7 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
10	33	< 20	2" above Tube Sheet
10	34	< 20	2" above Tube Sheet
10	35	< 20	1" above Tube Sheet
10	36	< 20	2" above Tube Sheet
10	37	< 20	2" above Tube Sheet
10	38	< 20	2" above Tube Sheet
10	39	< 20	2" above Tube Sheet
10	40	< 20	1" above Tube Sheet
10	41	< 20	2" above Tube Sheet
10	43	< 20	1" above Tube Sheet
11	28	< 20	2" above Tube Sheet
11	31	< 20	2" above Tube Sheet
11	32	< 20	2" above Tube Sheet
11	33	< 20	2" above Tube Sheet
11	34	< 20	2" above Tube Sheet
11	35	< 20	2" above Tube Sheet
11	36	< 20	2" above Tube Sheet
11	37	< 20	2" above Tube Sheet
11	38	< 20	2" above Tube Sheet
11	39	< 20	2" above Tube Sheet
11	40	< 20	2" above Tube Sheet
11	41	< 20	2" above Tube Sheet
11	42	< 20	2" above Tube Sheet
11	43	< 20	2" above Tube Sheet
12	28	< 20	2" above Tube Sheet
12	29	< 20	2" above Tube Sheet
12	30	< 20	2" above Tube Sheet

TABLE 7 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
12	31	< 20	2" above Tube Sheet
12	32	< 20	2" above Tube Sheet
12	33	< 20	2" above Tube Sheet
12	34	< 20	2" above Tube Sheet
12	35	< 20	2" above Tube Sheet
12	36	< 20	2" above Tube Sheet
12	37	< 20	2" above Tube Sheet
12	38	< 20	2" above Tube Sheet
12	39	< 20	2" above Tube Sheet
12	40	< 20	2" above Tube Sheet
12	41	< 20	2" above Tube Sheet
12	42	< 20	2" above Tube Sheet
12	43	< 20	2" above Tube Sheet
13	28	< 20	2" above Tube Sheet
13	29	< 20	2" above Tube Sheet
13	30	< 20	2" above Tube Sheet
13	31	< 20	2" above Tube Sheet
13	32	< 20	2" above Tube Sheet
13	33	< 20	2" above Tube Sheet
13	34	< 20	2" above Tube Sheet
13	35	< 20	2" above Tube Sheet
13	36	< 20	2" above Tube Sheet
13	37	< 20	3" above Tube Sheet
13	38	< 20	2" above Tube Sheet
13	39	< 20	2" above Tube Sheet
13	40	< 20	3" above Tube Sheet
13	41	< 20	3" above Tube Sheet

TABLE 7 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
13	42	< 20	3" above Tube Sheet
13	43	< 20	3" above Tube Sheet
14	28	< 20	2" above Tube Sheet
14	29	< 20	2" above Tube Sheet
14	30	< 20	2" above Tube Sheet
14	31	< 20	1" above Tube Sheet
14	33	< 20	2" above Tube Sheet
14	34	< 20	2" above Tube Sheet
14	35	< 20	2" above Tube Sheet
14	36	< 20	2" above Tube Sheet
14	37	< 20	2" above Tube Sheet
14	38	< 20	3" above Tube Sheet
14	39	< 20	2" above Tube Sheet
14	40	< 20	3" above Tube Sheet
14	41	< 20	3" above Tube Sheet
14	42	< 20	2" above Tube Sheet
14	43	< 20	3" above Tube Sheet
15	28	< 20	2" above Tube Sheet
15	29	< 20	1" above Tube Sheet
15	31	< 20	2" above Tube Sheet
15	34	< 20	2" above Tube Sheet
15	35	< 20	2" above Tube Sheet
15	36	< 20	2" above Tube Sheet
15	37	< 20	2" above Tube Sheet
15	38	< 20	2" above Tube Sheet
15	39	< 20	3" above Tube Sheet

TABLE 7 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
14	41	< 20	3" above Tube Sheet
14	42	< 20	2" above Tube Sheet
14	43	< 20	3" above Tube Sheet
15	28	< 20	2" above Tube Sheet
15	29	< 20	1" above Tube Sheet
15	31	< 20	2" above Tube Sheet
15	34	< 20	2" above Tube Sheet
15	35	< 20	2" above Tube Sheet
15	36	< 20	2" above Tube Sheet
15	37	< 20	2" above Tube Sheet
15	38	< 20	2" above Tube Sheet
15	39	< 20	3" above Tube Sheet
15	40	< 20	2" above Tube Sheet
16	32	< 20	2" above Tube Sheet
16	35	< 20	2" above Tube Sheet
16	36	< 20	2" above Tube Sheet
16	37	< 20	2" above Tube Sheet
16	38	< 20	2" above Tube Sheet
16	39	< 20	2" above Tube Sheet
16	41	< 20	2" above Tube Sheet
16	42	< 20	2" above Tube Sheet
16	43	< 20	2" above Tube Sheet
17	31	< 20	2" above Tube Sheet
17	34	< 20	3" above Tube Sheet
17	35	< 20	3" above Tube Sheet
17	36	< 20	2" above Tube Sheet

TABLE 7 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
17	37	< 20	2" above Tube Sheet
17	38	< 20	2" above Tube Sheet
17	39	< 20	3" above Tube Sheet
17	40	< 20	3" above Tube Sheet
17	41	< 20	3" above Tube Sheet
17	42	< 20	3" above Tube Sheet
17	43	< 20	3" above Tube Sheet
18	28	< 20	3" above Tube Sheet
18	32	< 20	3" above Tube Sheet
18	35	< 20	3" above Tube Sheet
18	36	< 20	3" above Tube Sheet
18	37	< 20	3" above Tube Sheet
18	38	< 20	3" above Tube Sheet
18	39	< 20	3" above Tube Sheet
18	40	< 20	3" above Tube Sheet
18	41	< 20	3" above Tube Sheet
18	42	< 20	3" above Tube Sheet
18	43	< 20	3" above Tube Sheet
19	28	< 20	3" above Tube Sheet
19	29	< 20	3" above Tube Sheet
19	30	< 20	3" above Tube Sheet
19	32	< 20	3" above Tube Sheet
19	33	< 20	3" above Tube Sheet
19	34	< 20	3" above Tube Sheet
19	35	< 20	3" above Tube Sheet
19	36	< 20	2" above Tube Sheet

TABLE 7 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
19	37	< 20	3" above Tube Sheet
19	41	< 20	3" above Tube Sheet
19	42	< 20	3" above Tube Sheet
20	28	< 20	2" above Tube Sheet
20	29	< 20	3" above Tube Sheet
20	30	< 20	3" above Tube Sheet
20	31	< 20	3" above Tube Sheet
20	32	< 20	3" above Tube Sheet
20	33	< 20	3" above Tube Sheet
20	34	< 20	3" above Tube Sheet
20	35	< 20	3" above Tube Sheet
20	36	< 20	3" above Tube Sheet
20	37	< 20	3" above Tube Sheet
20	38	< 20	3" above Tube Sheet
20	39	< 20	3" above Tube Sheet
20	40	< 20	3" above Tube Sheet
20	41	< 20	3" above Tube Sheet
20	42	< 20	3" above Tube Sheet
20	43	< 20	3" above Tube Sheet
21	30	< 20	1" above Tube Sheet
21	31	< 20	2" above Tube Sheet
21	32	< 20	3" above Tube Sheet
21	33	< 20	3" above Tube Sheet
21	34	< 20	3" above Tube Sheet
21	35	< 20	3" above Tube Sheet
21	36	< 20	3" above Tube Sheet

TABLE 7 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
21	37	< 20	3" above Tube Sheet
21	38	< 20	1" above Tube Sheet
21	39	< 20	3" above Tube Sheet
21	40	< 20	3" above Tube Sheet
21	41	< 20	3" above Tube Sheet
21	42	< 20	3" above Tube Sheet
21	43	< 20	3" above Tube Sheet
22	29	< 20	1" above Tube Sheet
22	30	< 20	1" above Tube Sheet
22	31	< 20	3" above Tube Sheet
22	32	< 20	3" above Tube Sheet
22	34	< 20	3" above Tube Sheet
22	35	< 20	3" above Tube Sheet
22	36	< 20	3" above Tube Sheet
22	37	< 20	3" above Tube Sheet
22	38	< 20	2" above Tube Sheet
22	39	< 20	2" above Tube Sheet
22	40	< 20	3" above Tube Sheet
22	41	< 20	2" above Tube Sheet
22	42	< 20	2" above Tube Sheet
22	43	< 20	2" above Tube Sheet
23	30	< 20	1" above Tube Sheet
23	31	< 20	1" above Tube Sheet
23	32	< 20	1" above Tube Sheet
23	33	< 20	1" above Tube Sheet
23	35	< 20	2" above Tube Sheet
23	38	< 20	2" above Tube Sheet

TABLE 7 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
23	39	< 20	3" above Tube Sheet
23	40	< 20	2" above Tube Sheet
23	41	< 20	2" above Tube Sheet
23	42	< 20	2" above Tube Sheet
23	43	< 20	1" above Tube Sheet
24	28	< 20	½" above Tube Sheet
24	31	< 20	1" above Tube Sheet
24	32	< 20	1" above Tube Sheet
24	33	< 20	1" above Tube Sheet
24	36	< 20	2" above Tube Sheet
24	37	< 20	2" above Tube Sheet
24	38	< 20	2" above Tube Sheet
24	39	< 20	2" above Tube Sheet
24	41	< 20	2" above Tube Sheet
24	42	< 20	1" above Tube Sheet
24	43	< 20	2" above Tube Sheet
25	36	< 20	2" above Tube Sheet
25	37	< 20	3" above Tube Sheet
25	38	< 20	3" above Tube Sheet
25	39	< 20	2" above Tube Sheet
25	40	< 20	2" above Tube Sheet
25	41	< 20	2" above Tube Sheet
25	42	< 20	2" above Tube Sheet
26	34	< 20	½" above Tube Sheet
26	36	< 20	½" above Tube Sheet
26	37	< 20	½" above Tube Sheet
26	38	< 20	½" above Tube Sheet

TABLE 7 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
26	39	< 20	½" above Tube Sheet
26	41	< 20	½" above Tube Sheet
26	43	< 20	2" above Tube Sheet
27	43	< 20	2" above Tube Sheet
28	43	< 20	1" above Tube Sheet

TABLE 8

EDDY CURRENT TEST RESULTS

STEAM GEN. "B" INLET TEST FREQUENCY 400 KHZ

ROW	COLUMN	% DEFECT	LOCATION
2	3	45	7" above Tube Sheet
3	24	24	1½" above Tube Sheet
4	49	51	½" above Tube Sheet
5	25	< 20	½" above Tube Sheet
5	47	24	½" above Tube Sheet
5	48	48	½" above Tube Sheet
5	49	50	½" above Tube Sheet
5	50	55	Top of Tube Sheet
6	47	< 20	½" above Tube Sheet
6	48	36	½" above Tube Sheet
6	49	44	½" above Tube Sheet
6	50	32	½" above Tube Sheet
8	50	54	½" above Tube Sheet
8	67	31	½" above Tube Sheet
9	20	31	½" above Tube Sheet
9	49	< 20	1" above Tube Sheet
9	50	30	½" above Tube Sheet
9	51	< 20	Top of Tube Sheet
9	52	< 20	½" above Tube Sheet
9	53	49	½" above Tube Sheet
9	54	56	½" above Tube Sheet
9	55	24	½" above Tube Sheet
9	66	< 20	1" above Tube Sheet
10	49	45	½" above Tube Sheet

TABLE 8 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
10	50	40	½" above Tube Sheet
10	51	53	½" above Tube Sheet
10	52	73	Top of Tube Sheet
10	53	38	½" above Tube Sheet
10	54	40	½" above Tube Sheet
10	55	34	½" above Tube Sheet
10	90	60	½" above First Tube Support
11	22	28	½" above Tube Sheet
11	23	< 20	½" above Tube Sheet
11	27	< 20	½" above Tube Sheet
11	49	31	1" above Tube Sheet
11	50	< 20	½" above Tube Sheet
11	51	53	½" above Tube Sheet
11	52	46	Top of Tube Sheet
11	53	43	½" above Tube Sheet
11	54	34	½" above Tube Sheet
11	55	24	½" above Tube Sheet
11	56	32	½" above Tube Sheet
11	57	60	Top of Tube Sheet
11	58	50	Top of Tube Sheet
11	59	55	½" above Tube Sheet
11	60	< 20	½" above Tube Sheet
12	23	25	½" above Tube Sheet
12	25	< 20	2" above Tube Sheet

TABLE 8 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
12	26	< 20	½" above Tube Sheet
12	27	< 20	½" above Tube Sheet
12	51	24	3" above Tube Sheet
12	52	21	½" above Tube Sheet
12	53	< 20	2" above Tube Sheet
12	55	24	½" above Tube Sheet
12	56	24	½" above Tube Sheet
12	57	50	Top of Tube Sheet
12	58	55	Top of Tube Sheet
12	59	44	Top of Tube Sheet
12	60	< 20	½"
12	66	< 20	½"
12	67	< 20	½"
13	21	35	½"
13	25	< 20	½"
13	57	66	Top of Tube Sheet
13	58	52	Top of Tube Sheet
13	59	37	½"
13	63	32	½"
13	64	23	½"
13	65	< 20	½"
13	66	< 20	½"
13	67	< 20	½"
14	25	25	½"
14	26	< 20	1"
14	57	28	½"

TABLE 8 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
14	61	< 20	½"
14	62	20	Top of Tube Sheet
14	63	41	½" above Tube Sheet
14	64	35	½"
14	65	20	½" above Tube Sheet
14	66	< 20	½"
15	52	< 20	1"
15	59	< 20	½"
15	61	< 20	½"
15	62	20	Top of Tube Sheet
15	63	< 20	½" above Tube Sheet
15	64	< 20	½" above Tube Sheet
15	64	< 20	½"
15	65	< 20	½"
15	68	< 20	½"
16	50	< 20	6"
16	59	32	½"
16	60	< 20	½"
16	61	< 20	½"
16	62	34	½"
16	63	26	½"
16	67	< 20	½"
17	52	< 20	3"
17	59	< 20	½"
17	60	< 20	½"
17	61	< 20	½"

TABLE 8 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
17	63	< 20	½"
17	67	25	½"
18	49	< 20	3"
18	51	< 20	3"
18	52	< 20	2"
18	53	< 20	1" above Tube Sheet
18	55	< 20	3"
18	59	< 20	½"
18	60	< 20	½"
18	61	< 20	½"
18	63	30	½"
18	64	< 20	½"
18	65	< 20	½"
18	66	26	½"
18	67	< 20	½"
19	59	< 20	½"
19	60	< 20	½"
19	61	< 20	½"
19	64	22	½"
19	65	< 20	½"
19	66	< 20	½"
20	28	< 20	½"
20	49	24	2"
20	51	28	3"
20	55	20	1"
20	59	< 20	½"
20	60	< 20	½"

TABLE 8 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
20	63	< 20	½"
20	64	22	½"
20	65	26	½"
21	47	< 20	2"
21	48	36	2" above Tube Sheet
21	49	< 20	½"
21	55	22	½"
21	59	< 20	½"
21	60	< 20	½"
21	61	32	½"
21	62	20	½"
21	63	22	½"
21	65	26	½"
21	66	26	½"
22	26	25	½"
22	59	< 20	½"
22	61	32	½"
22	62	60	Top of Tube Sheet
22	63	25	½"
23	26	44	½"
23	27	32	½"
23	60	25	1"
23	61	30	½"
23	62	< 20	½"
23	63	< 20	½"
24	44	< 20	½"
24	56	24	½"
24	59	30	1"

TABLE 8 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
24	60	< 20	½"
24	61	24	½"
25	28	< 20	1" above Tube Sheet
25	29	< 20	½"
25	43	< 20	½"
25	44	< 20	½"
25	49	48	½"
25	54	28	½"
25	55	24	½"
25	56	20	½"
25	58	24	½"
26	29	20	½"
26	30	25	½"
26	35	< 20	Top of Tube Sheet
26	36	< 20	Top of Tube Sheet
26	48	< 20	½" above Tube Sheet
26	49	< 20	½"
26	50	24	½"
26	51	28	½"
26	52	< 20	½"
26	54	31	½"
26	55	38	½"
27	34	< 20	½"
27	35	< 20	½"
27	50	20	½"
27	51	< 20	½"
27	53	< 20	½"

TABLE 8 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
28	38	20	½"
28	39	< 20	½"
28	41	< 20	2"
28	43	< 20	½"
28	50	20	½"
28	51	34	½"
28	53	< 20	½"
28	54	< 20	½"
29	38	20	½"
29	39	20	½"
29	50	< 20	½"
29	51	38	½"
29	52	< 20	½"
29	53	< 20	½"
29	54	< 20	½"
30	40	< 20	Top of Tube Sheet
30	41	< 20	Top of Tube Sheet
30	52	20	½"
30	53	42	½"
31	40	< 20	½"
31	41	< 20	½"
31	54	< 20	2"

TABLE 8 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
14	68	<20	1/2" above Tube Sheet
9	69	<20	at top of Tube Sheet
14	69	39	1/2" above Tube Sheet
15	69	36	1/2" above Tube Sheet
16	69	46	1/2" above Tube Sheet
17	69	39	1/2" above Tube Sheet
16	70	65	1/2" above Tube Sheet
15	70	46	1/2" above Tube Sheet
14	70	30	1/2" above Tube Sheet
12	70	<20	1/2" above Tube Sheet
9	70	<20	1/2" above Tube Sheet
8	70	<20	1/2" above Tube Sheet
7	70	<20	at top of Tube Sheet
7	71	<20	at top of Tube Sheet
8	71	<20	at top of Tube Sheet
9	71	24	at top of Tube Sheet
9	72	<20	1/2" above Tube Sheet
8	72	<20	1/2" above Tube Sheet
7	72	<20	1/2" above Tube Sheet
13	74	32	1" above Tube Sheet
12	74	55	at top of Tube Sheet
8	74	<20	1/2" above Tube Sheet
7	74	<20	1/2" above Tube Sheet
7	75	<20	1/2" above Tube Sheet
10	77	<20	1/2" above Tube Sheet
4	45	26	at top of Tube Sheet
4	46	<20	at top of Tube Sheet
5	46	<20	1/2" above Tube Sheet
5	45	34	1/2" above Tube Sheet

TABLE 8 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
17	35	< 20	1" above Tube Sheet
17	33	< 20	1/2" above Tube Sheet
17	32	< 20	1/2" above Tube Sheet
18	31	< 20	1/2" above Tube Sheet
18	32	< 20	1/2" above Tube Sheet
18	33	< 20	1/2" above Tube Sheet
18	34	< 20	1" above Tube Sheet
18	35	< 20	1" above Tube Sheet
18	37	< 20	1/2" above Tube Sheet
18	38	< 20	1" above Tube Sheet
19	41	< 20	2" above Tube Sheet
19	38	< 20	2" above Tube Sheet
19	36	< 20	1" above Tube Sheet
19	35	< 20	1/2" above Tube Sheet
19	34	< 20	1/2" above Tube Sheet
19	33	< 20	1/2" above Tube Sheet
19	32	< 20	1/2" above Tube Sheet
20	31	< 20	1/2" above Tube Sheet
20	32	< 20	1/2" above Tube Sheet
20	33	< 20	1/2" above Tube Sheet
20	37	< 20	1" above Tube Sheet
20	39	< 20	3" above Tube Sheet
20	43	75	1/2" above Tube Sheet
21	45	< 20	2" above Tube Sheet
21	39	30	1" above Tube Sheet
21	33	20	1/2" above Tube Sheet
22	32	< 20	1/2" above Tube Sheet
22	42	< 20	1/2" above Tube Sheet
24	42	32	1" above Tube Sheet

TABLE 8 Continued

ROW	COLUMN	% DEFECT	LOCATION
6	45	< 20	1/2" above Tube Sheet
8	44	< 20	at top of Tube Sheet
9	43	24	at top of Tube Sheet
10	41	65	at top of Tube Sheet
10	42	44	at top of Tube Sheet
11	43	20	1/2" above Tube Sheet
11	42	44	at top of Tube Sheet
11	41	60	at top of Tube Sheet
11	40	42	at top of Tube Sheet
11	39	< 20	1/2" above Tube Sheet
11	38	25	at top of Tube Sheet
11	37	40	at top of Tube Sheet
11	36	25	at top of Tube Sheet
12	36	44	at top of Tube Sheet
12	37	32	at top of Tube Sheet
12	38	20	at top of Tube Sheet
12	39	< 20	1/2" above Tube Sheet
12	40	< 20	1/2" above Tube Sheet
12	41	36	1/2" above Tube Sheet
12	42	< 20	1/2" above Tube Sheet
13	40	< 20	at top of Tube Sheet
13	31	< 20	1/2" above Tube Sheet
16	37	< 20	2" above Tube Sheet
16	38	< 20	2" above Tube Sheet
17	45	< 20	3" above Tube Sheet
17	42	< 20	3" above Tube Sheet
17	39	< 20	3" above Tube Sheet
17	38	< 20	2" above Tube Sheet
17	37	< 20	2" above Tube Sheet

TABLE 9

EDDY CURRENT TEST RESULTS

STEAM GEN. "C" INLET TEST FREQUENCE 400 KHZ

ROW	COLUMN	% DEFECT	LOCATION
3	24	< 20	½" above Tube Sheet
3	26	25	½" above Tube Sheet
3	46	< 20	Top of Tube Sheet
4	21	< 20	½" above Tube Sheet
4	23	< 20	½" above Tube Sheet
4	24	< 20	½" above Tube Sheet
4	25	< 20	Top of Tube Sheet
4	27	25	½" above Tube Sheet
5	21	< 20	½" above Tube Sheet
5	24	< 20	½" above Tube Sheet
5	25	< 20	½" above Tube Sheet
5	43	< 20	½" above Tube Sheet
5	44	< 20	½" above Tube Sheet
5	45	< 20	½" above Tube Sheet
5	64	< 20	½" above Tube Sheet
6	22	< 20	½" above Tube Sheet
6	23	< 20	½" above Tube Sheet
6	24	< 20	½" above Tube Sheet
6	25	< 20	½" above Tube Sheet
6	31	30	1" above Tube Sheet
6	32	< 20	½" above Tube Sheet
6	33	< 20	½" above Tube Sheet
6	34	< 20	½" above Tube Sheet
6	35	< 20	½" above Tube Sheet
6	45	< 20	½" above Tube Sheet

TABLE 9 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
6	46	< 20	½" above Tube Sheet
6	47	< 20	½" above Tube Sheet
6	48	20	½" above Tube Sheet
6	49	< 20	½" above Tube Sheet
6	72	< 20	½" above Tube Sheet
7	23	< 20	½" above Tube Sheet
7	24	< 20	½" above Tube Sheet
7	25	< 20	½" above Tube Sheet
7	26	< 20	½" above Tube Sheet
7	27	< 20	½" above Tube Sheet
7	32	< 20	1" above Tube Sheet
7	33	< 20	½" above Tube Sheet
7	42	30	½" above Tube Sheet
7	44	< 20	½" above Tube Sheet
7	45	26	½" above Tube Sheet
7	46	< 20	Top of Tube Sheet
7	47	< 20	½" above Tube Sheet
7	48	20	½" above Tube Sheet
7	49	< 20	Top of Tube Sheet
7	74	28	½" above Tube Sheet
8	22	< 20	½" above Tube Sheet
8	23	< 20	½" above Tube Sheet
8	24	< 20	½" above Tube Sheet
8	25	< 20	½" above Tube Sheet
8	26	< 20	½" above Tube Sheet
8	27	< 20	½" above Tube Sheet
8	28	< 20	½" above Tube Sheet

TABLE 9 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
8	31	< 20	½" above Tube Sheet
8	32	< 20	1" above Tube Sheet
8	33	< 20	½" above Tube Sheet
8	34	20	½" above Tube Sheet
8	42	25	Top of Tube Sheet
8	46	< 20	Top of Tube Sheet
8	47	< 20	Top of Tube Sheet
8	48	25	½" above Tube Sheet
8	49	< 20	Top of Tube Sheet
8	58	< 20	½" above Tube Sheet
8	70	< 20	½" above Tube Sheet
8	72	< 20	½" above Tube Sheet
8	73	< 20	½" above Tube Sheet
8	74	< 20	½" above Tube Sheet
8	75	< 20	½" above Tube Sheet
9	24	< 20	½" above Tube Sheet
9	26	< 20	½" above Tube Sheet
9	27	< 20	½" above Tube Sheet
9	29	< 20	½" above Tube Sheet
9	33	< 20	1" above Tube Sheet
9	34	< 20	½" above Tube Sheet
9	35	< 20	½" above Tube Sheet
9	39	20	½" above Tube Sheet
9	41	55	Top of Tube Sheet
9	42	40	Top of Tube Sheet
9	44	< 20	½" above Tube Sheet

TABLE 9 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
9	45	< 20	½" above Tube Sheet
9	46	< 20	Top of Tube Sheet
9	47	< 20	Top of Tube Sheet
9	48	< 20	½" above Tube Sheet
9	49	24	½" above Tube Sheet
9	59	< 20	½" above Tube Sheet
9	70	30	½" above Tube Sheet
9	71	< 20	½" above Tube Sheet
9	73	< 20	½" above Tube Sheet
9	74	< 20	½" above Tube Sheet
9	75	22	½" above Tube Sheet
10	24	< 20	½" above Tube Sheet
10	25	< 20	½" above Tube Sheet
10	26	< 20	½" above Tube Sheet
10	27	< 20	½" above Tube Sheet
10	28	< 20	½" above Tube Sheet
10	30	< 20	½" above Tube Sheet
10	33	< 20	1" above Tube Sheet
10	36	< 20	½" above Tube Sheet
10	37	< 20	Top of Tube Sheet
10	39	< 20	½" above Tube Sheet
10	40	< 20	½" above Tube Sheet
10	41	68	Top of Tube Sheet
10	42	60	Top of Tube Sheet
10	43	< 20	½" above Tube Sheet
10	45	< 20	½" above Tube Sheet
10	46	40	Top of Tube Sheet

TABLE 9 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
10	47	< 20	Top of Tube Sheet
10	50	< 20	½" above Tube Sheet
10	53	< 20	½" above Tube Sheet
10	61	< 20	½" above Tube Sheet
10	70	< 20	½" above Tube Sheet
10	71	< 20	½" above Tube Sheet
10	74	< 20	½" above Tube Sheet
11	24	< 20	½" above Tube Sheet
11	25	< 20	½" above Tube Sheet
11	26	< 20	½" above Tube Sheet
11	27	< 20	½" above Tube Sheet
11	29	< 20	½" above Tube Sheet
11	30	< 20	½" above Tube Sheet
11	31	< 20	1" above Tube Sheet
11	33	< 20	1" above Tube Sheet
11	35	< 20	½" above Tube Sheet
11	36	< 20	1½" above Tube Sheet
11	37	< 20	Top of Tube Sheet
11	38	< 20	½" above Tube Sheet
11	39	28	½" above Tube Sheet
11	46	< 20	½" above Tube Sheet
11	49	< 20	½" above Tube Sheet
11	50	< 20	Top of Tube Sheet
11	52	40	½" above Tube Sheet
11	53	< 20	½" above Tube Sheet

TABLE 9 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
11	70	< 20	½" above Tube Sheet
11	71	< 20	½" above Tube Sheet
11	73	< 20	½" above Tube Sheet
11	74	< 20	½" above Tube Sheet
12	24	< 20	½" above Tube Sheet
12	25	< 20	½" above Tube Sheet
12	26	< 20	½" above Tube Sheet
12	27	< 20	½" above Tube Sheet
12	29	< 20	½" above Tube Sheet
12	30	< 20	1" above Tube Sheet
12	31	< 20	1" above Tube Sheet
12	32	< 20	1" above Tube Sheet
12	33	< 20	1" above Tube Sheet
12	38	< 20	½" above Tube Sheet
12	41	< 20	Top of Tube Sheet
12	45	< 20	1" above Tube Sheet
12	50	25	Top of Tube Sheet
12	52	28	½" above Tube Sheet
12	66	< 20	½" above Tube Sheet
12	69	< 20	½" above Tube Sheet
12	70	32	½" above Tube Sheet
12	71	< 20	½" above Tube Sheet
13	24	< 20	½" above Tube Sheet
13	27	< 20	½" above Tube Sheet
13	29	< 20	½" above Tube Sheet
13	30	35	1" above Tube Sheet
13	31	< 20	1" above Tube Sheet

TABLE 9 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
13	32	< 20	1" above Tube Sheet
13	32	< 20	1½" above Tube Sheet
13	33	< 20	1" above Tube Sheet
13	35	< 20	1" above Tube Sheet
13	39	< 20	1" above Tube Sheet
13	42	< 20	3" above Tube Sheet
13	43	< 20	1" above Tube Sheet
13	48	< 20	½" above Tube Sheet
13	49	< 20	½" above Tube Sheet
13	50	< 20	½" above Tube Sheet
13	52	22	½" above Tube Sheet
13	58	< 20	½" above Tube Sheet
13	59	< 20	½" above Tube Sheet
13	62	< 20	½" above Tube Sheet
13	63	< 20	½" above Tube Sheet
13	64	24	½" above Tube Sheet
13	69	28	½" above Tube Sheet
13	70	26	½" above Tube Sheet
13	71	< 20	½" above Tube Sheet
14	25	< 20	½" above Tube Sheet
14	26	< 20	½" above Tube Sheet
14	27	< 20	½" above Tube Sheet
14	30	35	1" above Tube Sheet
14	31	< 20	1" above Tube Sheet
14	32	< 20	2" above Tube Sheet
14	33	40	1" above Tube Sheet
14	34	< 20	1" above Tube Sheet

TABLE 9 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
14	35	< 20	$1\frac{1}{2}$" above Tube Sheet
14	36	< 20	3" above Tube Sheet
14	37	< 20	2" above Tube Sheet
14	38	< 20	3" above Tube Sheet
14	39	< 20	3" above Tube Sheet
14	40	< 20	3" above Tube Sheet
14	41	< 20	3" above Tube Sheet
14	42	< 20	3" above Tube Sheet
14	43	< 20	2" above Tube Sheet
14	44	< 20	2" above Tube Sheet
14	45	26	1" above Tube Sheet
14	46	< 20	2" above Tube Sheet
14	49	< 20	$\frac{1}{2}$" above Tube Sheet
14	50	< 20	$\frac{1}{2}$" above Tube Sheet
14	58	< 20	$\frac{1}{2}$" above Tube Sheet
14	59	< 20	$\frac{1}{2}$" above Tube Sheet
14	60	34	$\frac{1}{2}$" above Tube Sheet
14	61	< 20	$\frac{1}{2}$" above Tube Sheet
14	63	< 20	$\frac{1}{2}$" above Tube Sheet
14	68	< 20	$\frac{1}{2}$" above Tube Sheet
15	26	< 20	$\frac{1}{2}$" above Tube Sheet
15	27	< 20	$\frac{1}{2}$" above Tube Sheet
15	29	< 20	$\frac{1}{2}$" above Tube Sheet
15	30	< 20	1" above Tube Sheet
15	31	< 20	1" above Tube Sheet
15	32	< 20	$1\frac{1}{2}$" above Tube Sheet
15	33	< 20	$1\frac{1}{2}$" above Tube Sheet

TABLE 9 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
15	34	$<$ 20	1" above Tube Sheet
15	36	$<$ 20	3" above Tube Sheet
15	37	$<$ 20	3" above Tube Sheet
15	38	20	3" above Tube Sheet
15	39	$<$ 20	3" above Tube Sheet
15	40	$<$ 20	3" above Tube Sheet
15	41	$<$ 20	3" above Tube Sheet
15	42	$<$ 20	3" above Tube Sheet
15	43	$<$ 20	3" above Tube Sheet
15	44	$<$ 20	3" above Tube Sheet
15	45	27	2" above Tube Sheet
15	46	$<$ 20	2" above Tube Sheet
15	47	$<$ 20	2" above Tube Sheet
15	50	$<$ 20	$\frac{1}{2}$" above Tube Sheet
15	51	$<$ 20	1" above Tube Sheet
15	60	$<$ 20	$\frac{1}{2}$" above Tube Sheet
15	61	$<$ 20	$\frac{1}{2}$" above Tube Sheet
15	62	$<$ 20	$\frac{1}{2}$" above Tube Sheet
15	64	$<$ 20	$\frac{1}{2}$" above Tube Sheet
16	25	$<$ 20	$\frac{1}{2}$" above Tube Sheet
16	28	$<$ 20	$\frac{1}{2}$" above Tube Sheet
16	29	$<$ 20	$\frac{1}{2}$" above Tube Sheet
16	30	32	1" above Tube Sheet
16	31	$<$ 20	1" above Tube Sheet

TABLE 9 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
16	32	< 20	1½" above Tube Sheet
16	33	< 20	1½" above Tube Sheet
16	34	94	1" above Tube Sheet
16	35	82	1" above Tube Sheet
16	36	< 20	½" above Tube Sheet
16	38	< 20	1½" above Tube Sheet
16	39	< 20	3" above Tube Sheet
16	40	< 20	3" above Tube Sheet
16	41	< 20	3" above Tube Sheet
16	42	< 20	3" above Tube Sheet
16	44	< 20	3" above Tube Sheet
16	45	< 20	3" above Tube Sheet
16	46	< 20	3" above Tube Sheet
16	47	< 20	2" above Tube Sheet
16	54	< 20	½" above Tube Sheet
16	59	< 20	½" above Tube Sheet
16	61	< 20	½" above Tube Sheet
16	62	< 20	½" above Tube Sheet
16	63	< 20	½" above Tube Sheet
17	25	< 20	½" above Tube Sheet
17	27	< 20	½" above Tube Sheet
17	28	< 20	½" above Tube Sheet
17	29	< 20	½" above Tube Sheet
17	30	44	2" above Tube Sheet
17	31	42	1½" above Tube Sheet
17	32	< 20	1" above Tube Sheet

TABLE 9 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
17	33	< 20	1½" above Tube Sheet
17	34	25	1" above Tube Sheet
17	35	< 20	1" above Tube Sheet
17	37	< 20	2" above Tube Sheet
17	38	< 20	1½" above Tube Sheet
17	39	< 20	2" above Tube Sheet
17	40	< 20	½" above Tube Sheet
17	41	< 20	3" above Tube Sheet
17	42	< 20	3" above Tube Sheet
17	44	< 20	3" above Tube Sheet
17	45	< 20	3" above Tube Sheet
17	46	< 20	3" above Tube Sheet
17	47	< 20	2" above Tube Sheet
17	49	< 20	½" above Tube Sheet
17	51	< 20	1" above Tube Sheet
17	54	< 20	½" above Tube Sheet
18	25	< 20	½" above Tube Sheet
18	26	< 20	½" above Tube Sheet
18	27	< 20	½" above Tube Sheet
18	29	< 20	½" above Tube Sheet
18	30	34	½" above Tube Sheet
18	31	34	1" above Tube Sheet
18	32	< 20	1½" above Tube Sheet
18	33	< 20	1½" above Tube Sheet
18	34	< 20	1" above Tube Sheet
18	35	< 20	1" above Tube Sheet

TABLE 9 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
18	39	< 20	1" above Tube Sheet
18	44	< 20	3" above Tube Sheet
18	45	24	3" above Tube Sheet
18	46	< 20	2" above Tube Sheet
18	49	< 20	½" above Tube Sheet
18	51	< 20	1" above Tube Sheet
18	58	< 20	½" above Tube Sheet
19	25	< 20	½" above Tube Sheet
19	28	< 20	½" above Tube Sheet
19	33	< 20	1" above Tube Sheet
19	34	< 20	½" above Tube Sheet
19	35	< 20	1" above Tube Sheet
19	36	< 20	½" above Tube Sheet
19	38	21	1" above Tube Sheet
19	41	< 20	1" above Tube Sheet
19	46	< 20	1½" above Tube Sheet
19	49	< 20	½" above Tube Sheet
19	50	< 20	½" above Tube Sheet
19	53	< 20	½" above Tube Sheet
19	54	20	½" above Tube Sheet
19	59	< 20	½" above Tube Sheet
20	26	< 20	½" above Tube Sheet
20	31	< 20	½" above Tube Sheet
20	32	38	½" above Tube Sheet
20	34	< 20	½" above Tube Sheet
20	36	< 20	½" above Tube Sheet

TABLE 9 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
20	37	< 20	1" above Tube Sheet
20	38	< 20	1" above Tube Sheet
20	44	< 20	Top of Tube Sheet
20	45	< 20	1" above Tube Sheet
20	46	< 20	1" above Tube Sheet
20	47	< 20	$\frac{1}{2}$" above Tube Sheet
20	49	< 20	$\frac{1}{2}$" above Tube Sheet
20	59	28	$\frac{1}{2}$" above Tube Sheet
20	60	24	$\frac{1}{2}$" above Tube Sheet
20	63	< 20	$\frac{1}{2}$" above Tube Sheet
21	30	< 20	$\frac{1}{2}$" above Tube Sheet
21	37	< 20	1" above Tube Sheet
21	38	< 20	1" above Tube Sheet
21	50	< 20	$\frac{1}{2}$" above Tube Sheet
22	28	< 20	$\frac{1}{2}$" above Tube Sheet
22	29	24	$\frac{1}{2}$" above Tube Sheet
22	30	< 20	$\frac{1}{2}$" above Tube Sheet
22	31	< 20	$\frac{1}{2}$" above Tube Sheet
22	32	< 20	$\frac{1}{2}$" above Tube Sheet
22	33	20	$\frac{1}{2}$" above Tube Sheet
22	34	< 20	$\frac{1}{2}$" above Tube Sheet
22	35	34	$\frac{1}{2}$" above Tube Sheet
22	38	< 20	1" above Tube Sheet
22	48	23	$\frac{1}{2}$" above Tube Sheet
22	49	< 20	$\frac{1}{2}$" above Tube Sheet
22	50	< 20	$\frac{1}{2}$" above Tube Sheet

TABLE 9 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
23	27	< 20	½" above Tube Sheet
23	28	< 20	½" above Tube Sheet
23	29	< 20	½" above Tube Sheet
23	30	< 20	½" above Tube Sheet
23	32	< 20	½" above Tube Sheet
23	34	< 20	½" above Tube Sheet
23	39	< 20	½" above Tube Sheet
23	50	< 20	½" above Tube Sheet
23	51	< 20	½" above Tube Sheet
23	52	< 20	½" above Tube Sheet
24	34	< 20	½" above Tube Sheet
24	44	< 20	½" above Tube Sheet
25	39	< 20	½" above Tube Sheet
25	44	< 20	½" above Tube Sheet
25	50	20	½" above Tube Sheet
25	52	< 20	½" above Tube Sheet
25	53	< 20	½" above Tube Sheet
26	42	< 20	½" above Tube Sheet
26	50	25	½" above Tube Sheet
26	51	22	½" above Tube Sheet
26	52	32	½" above Tube Sheet
26	53	21	½" above Tube Sheet
28	42	< 20	½" above Tube Sheet
29	43	< 20	½" above Tube Sheet
42	35	58	1½" above No. 6 Support

TABLE 9 (Continued)

ROW	COLUMN	% DEFECT	LOCATION
16	43	< 20	3" above Tube Sheet
17	43	< 20	3" above Tube Sheet
18	43	< 20	3" above Tube Sheet
17	48	< 20	2" above Tube Sheet
16	48	< 20	2" above Tube Sheet
18	48	20	2" above Tube Sheet
19	48	< 20	2" above Tube Sheet
20	48	< 20	2" above Tube Sheet

TABLE 10

STEAM GENERATOR "A" TUBES PLUGGED

ROW	COLUMN	% DEFECT	LOCATION
4	91	Leaker	
7	40	58%	1" above Tube Sheet
8	22	50%	1" above Tube Sheet
8	28	50%	2" above Tube Sheet
28	52	90%	2" above Tube Sheet
30	49	66%	Top of Tube Sheet
42	34	Leaker	2" above 6th Tube Support
43	33	88%	2" above 6th Tube Support

TABLE II

STEAM GENERATOR "B" TUBES PLUGGED

ROW	COLUMN	% DEFECT	LOCATION
4	49	51	½" above Tube Sheet
5	49	50	½" above Tube Sheet
5	50	55	Top of Tube Sheet
8	50	54	½" above Tube Sheet
9	54	56	½" above Tube Sheet
10	51	53	½" above Tube Sheet
10	52	73	Top of Tube Sheet
10	90	60	1" above 1st Tube Support
11	51	53	½" above Tube Sheet
11	57	60	Top of Tube Sheet
11	58	50	Top of Tube Sheet
11	59	55	½" above Tube Sheet
12	57	50	Top of Tube Sheet
12	58	55	Top of Tube Sheet
13	57	66	Top of Tube Sheet
13	58	52	Top of Tube Sheet
22	62	60	Top of Tube Sheet

TABLE 12

STEAM GENERATOR "C" TUBES PLUGGED

ROW	COLUMN	DEFECT	LOCATION
9	41	55	Top of Tube Sheet
10	41	68	Top of Tube Sheet
10	42	60	Top of Tube Sheet
16	34	94	1" above Tube Sheet
16	35	82	1" above Tube Sheet
42	35	58	1½" above 6th Tube Support

TABLE 13

LOCATION OF PLUGGED TUBES

SG "A"

ROW	COLUMN	REMARKS
1	1-92	Plugged, 1971
4	91	Plugged, 1974
5	41	Plugged, 1972
6	20	Plugged, 1972
7	21, 27, 28	Plugged, 1972
7	40	Plugged, 1974
7	41	Plugged, 1972
7	43-47	Plugged, 1972
8	22	Plugged, 1974
8	25, 26	Plugged, 1972
8	28	Plugged, 1974
8	29, 30, 31	Plugged, 1972
8	42, 45, 48	Plugged, 1972
8	50, 51, 52	Plugged, 1972
9	47	Plugged, 1972
15	41	Plugged, 1972
16	40	Plugged, 1972
18	46	Plugged, 1972
19	48	Plugged, 1972
27	52	Plugged, 1973

TABLE 13 (Continued)

ROW	COLUMN	REMARKS
28	52	Plugged, 1974
30	49	Plugged, 1974
42	34	Plugged, 1974
43	33	Plugged, 1974

TABLE 14

LOCATION OF PLUGGED TUBES

STEAM GENERATOR "B"

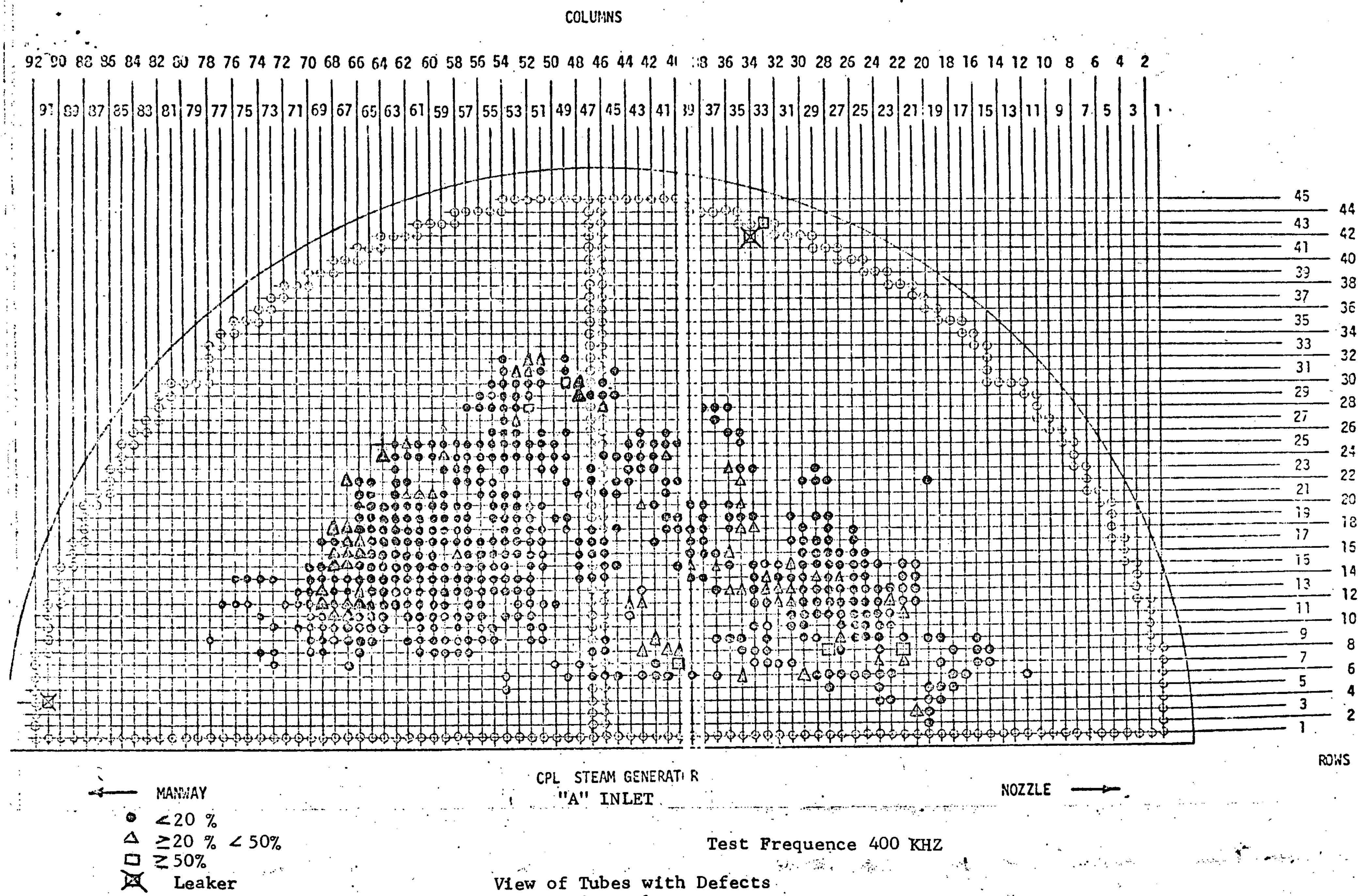
ROW	COLUMN	REMARKS
4	49	Plugged, 1974
5	49	Plugged, 1974
5	50	Plugged, 1974
8	50	Plugged, 1974
9	54	Plugged, 1974
10	41, 51	Plugged, 1974
10	52	Plugged, 1974
10	90	Plugged, 1974
11	41, 51	Plugged, 1974
11	57	Plugged, 1974
11	58	Plugged, 1974
11	59	Plugged, 1974
12	57	Plugged, 1974
12	58, 74	Plugged, 1974
13	57, 58	Plugged, 1974
16	70	Plugged, 1974
18	41	Plugged, 1972
20	43	Plugged, 1974
20	44, 45	Plugged, 1972
20	46	Plugged, 1972
22	62	Plugged, 1974

TABLE 15

LOCATION OF PLUGGED TUBES

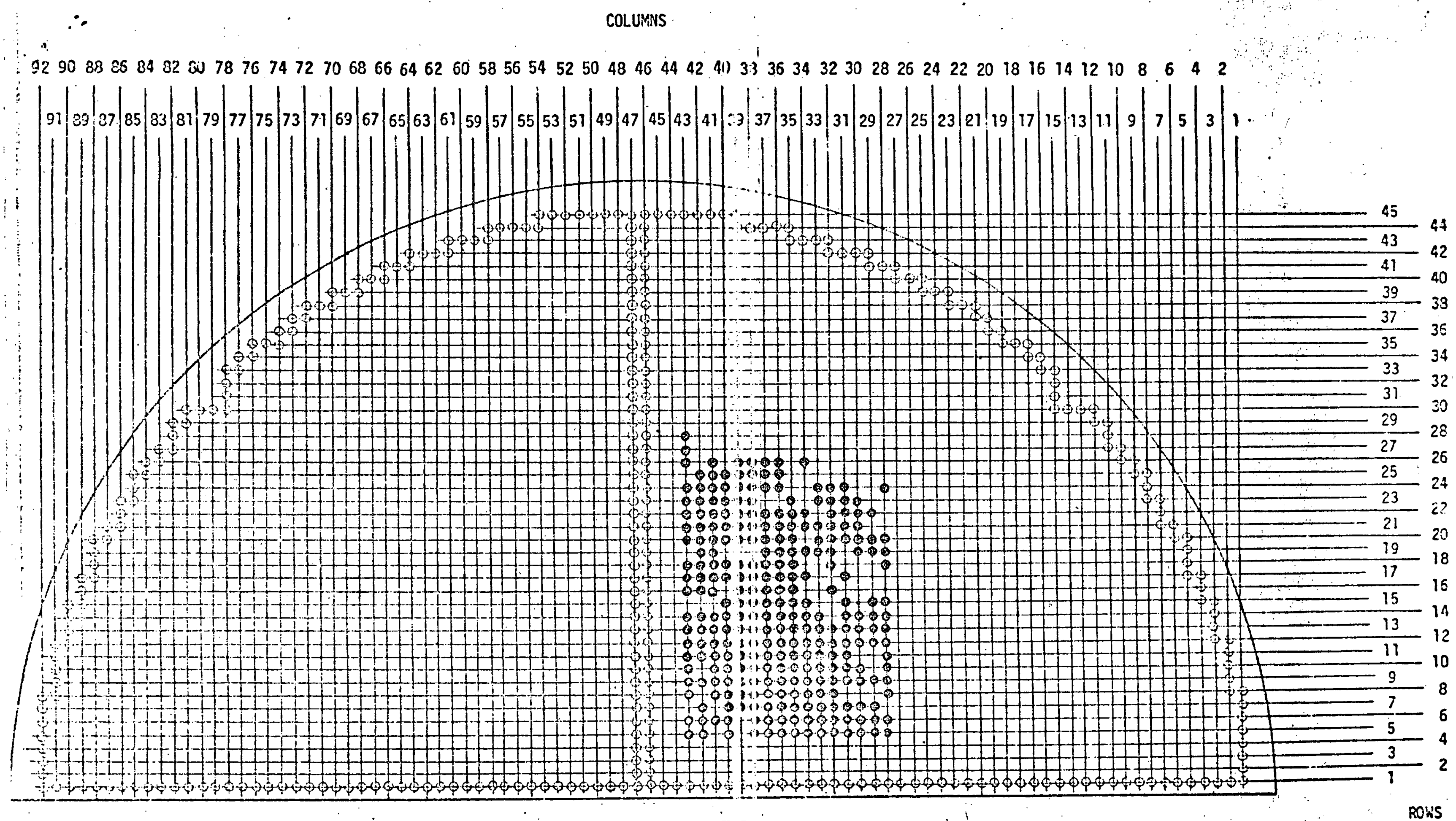
SG "C"

ROW	COLUMN	REMARKS
9	41	Plugged, 1974
10	41	Plugged, 1974
10	42	Plugged, 1974
15	48	Plugged, 1972
16	34	Plugged, 1974
16	35	Plugged, 1974
19	45	Plugged, 1972
42	35	Plugged, 1974



Test Frequence 400 KHZ

View of Tubes with Defects
Figure 1



CPL STEAM GENERATOR

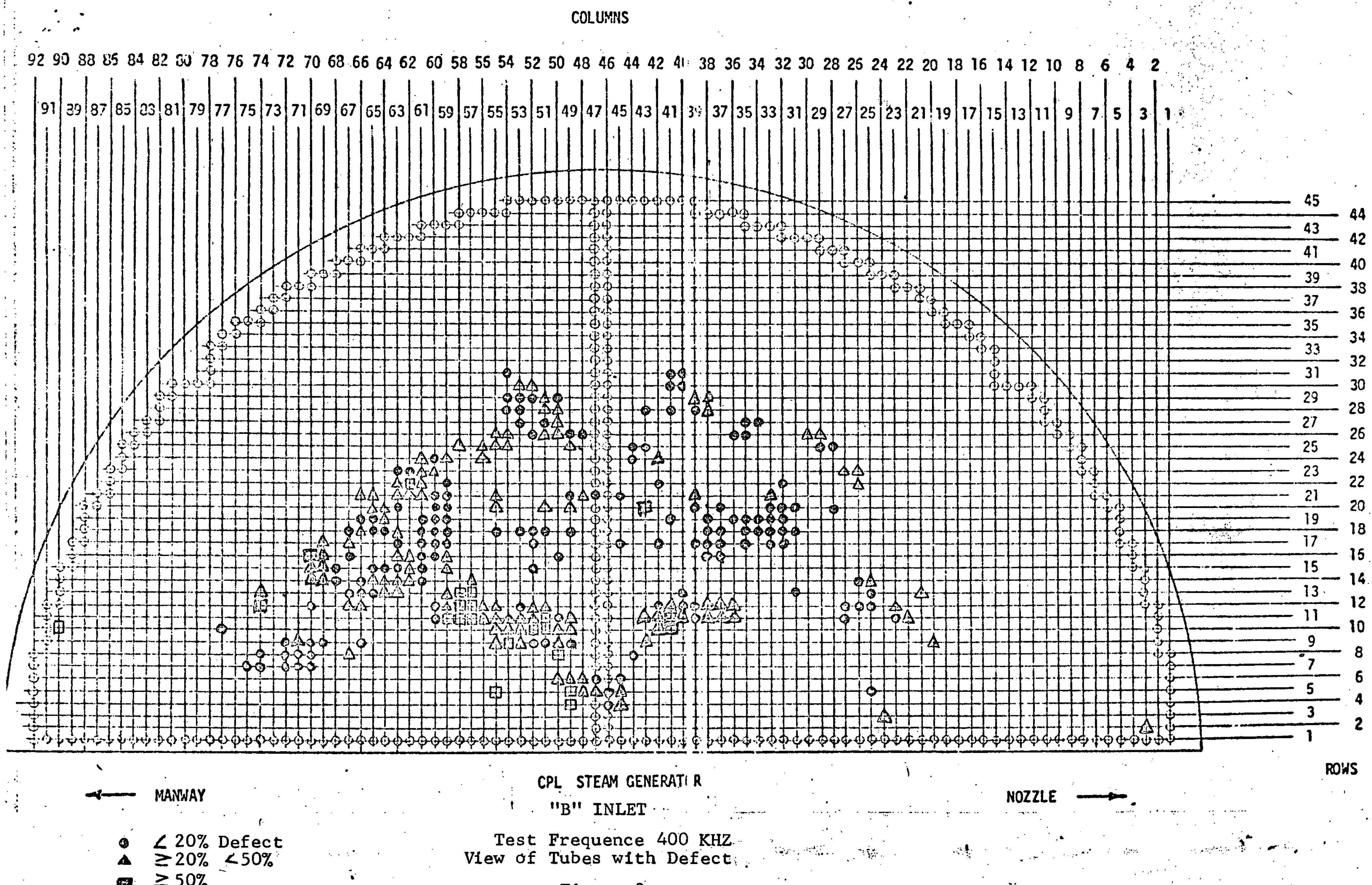
"A" Outlet

20% Defect

Test Frequence 400 KHZ

● View of Tubes with Defects

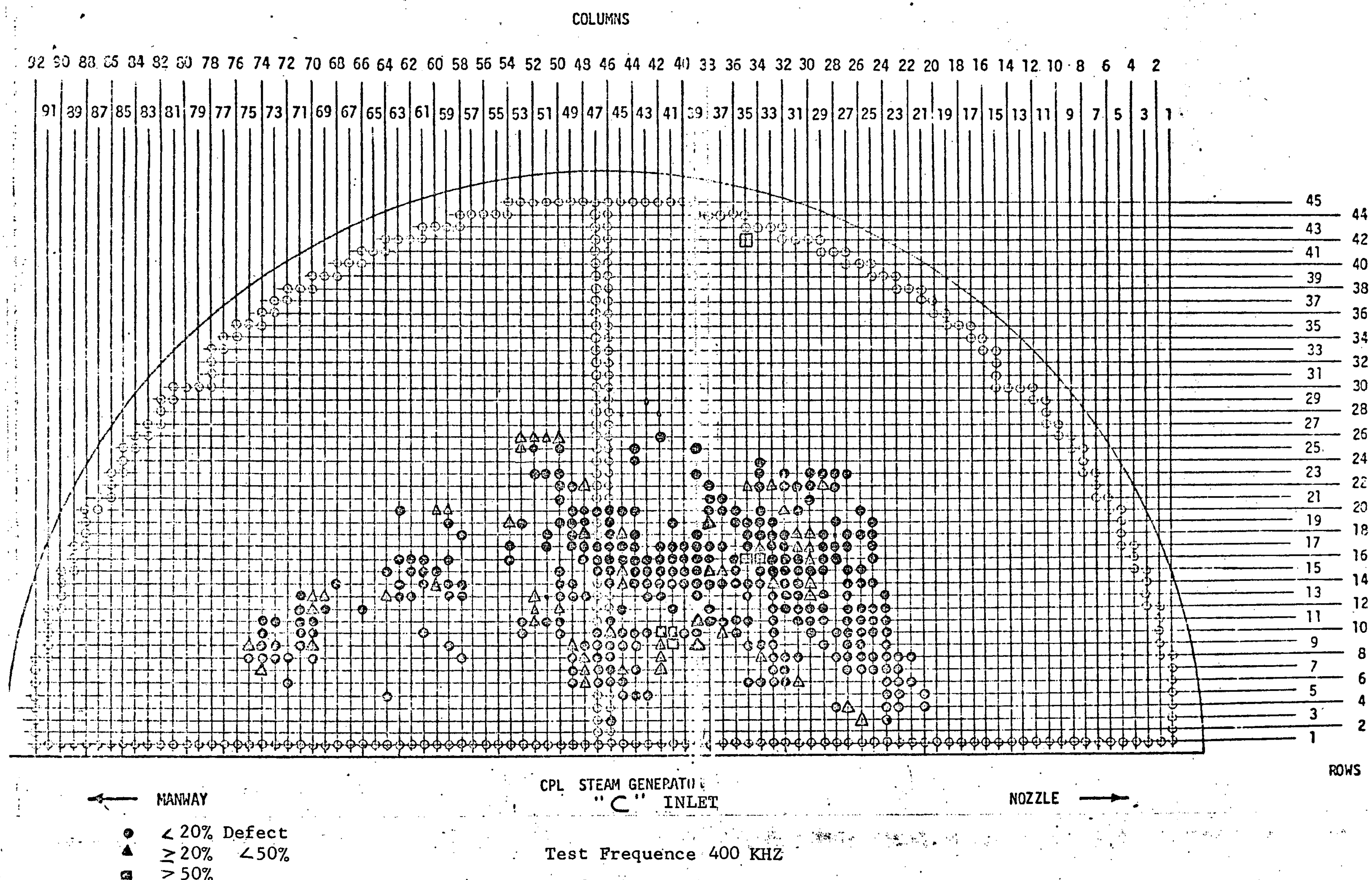
Figure 2



CPL STEAM GENERATOR
"B" INLET

Test Frequence 400 KHZ
View of Tubes with Defect

Figure 3

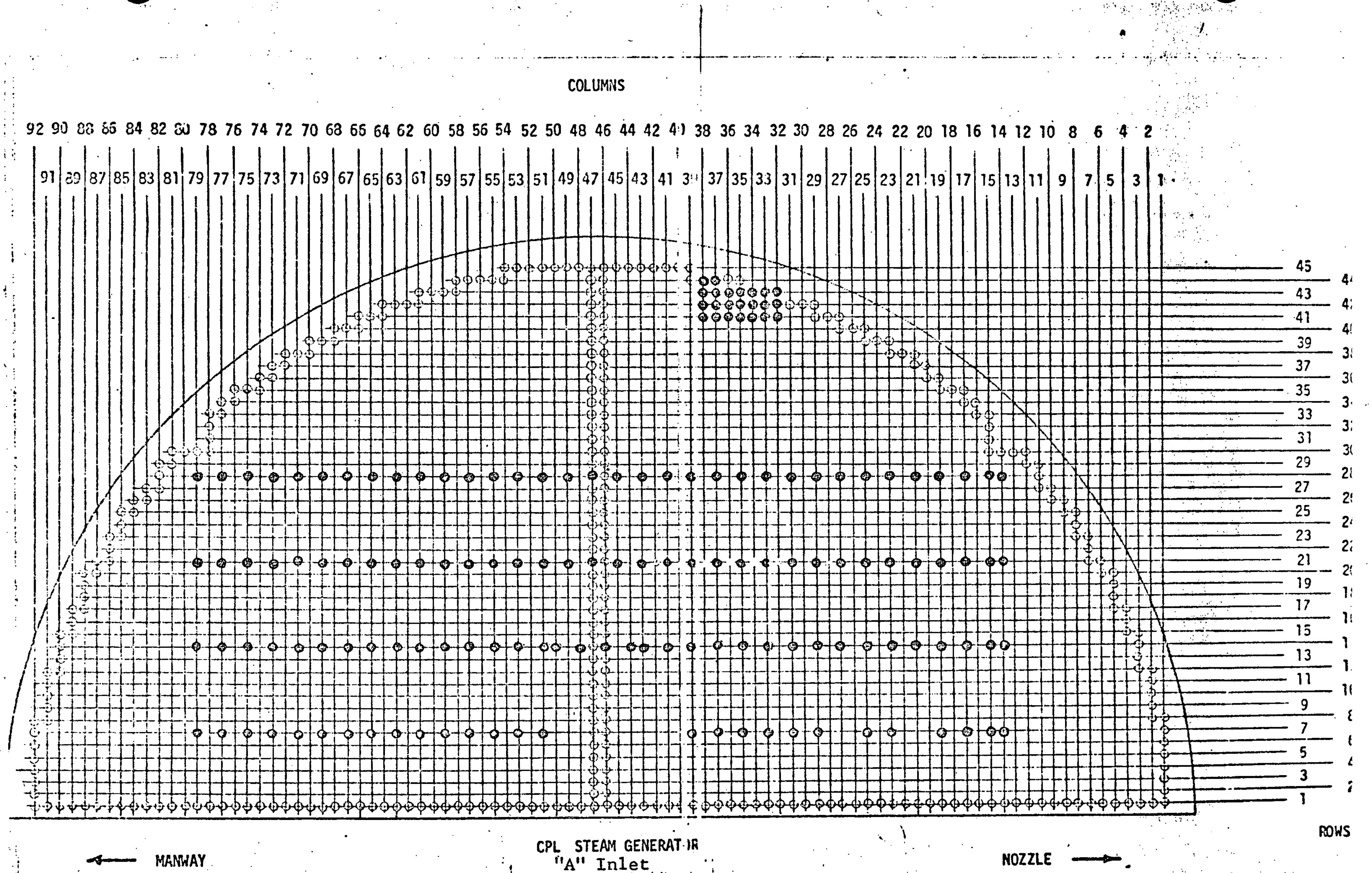


"C" INLET

Test Frequence 400 KHZ

View of Tubes with Defects

Figure 4

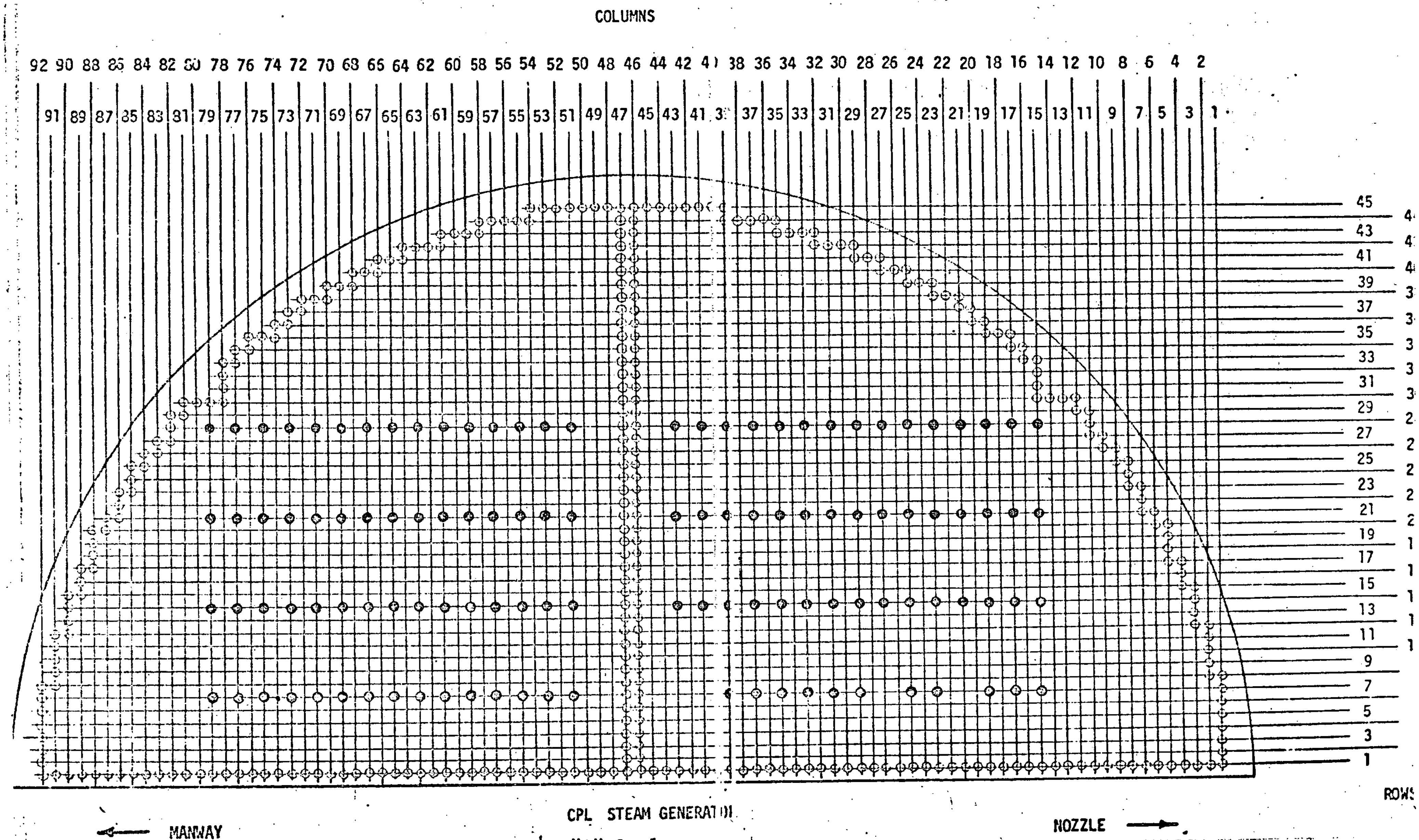


"A" Inlet

● Tubes Inspected at Test Prequence of 25 KHZ

View of Tubes at 25 KHZ

Figure 5

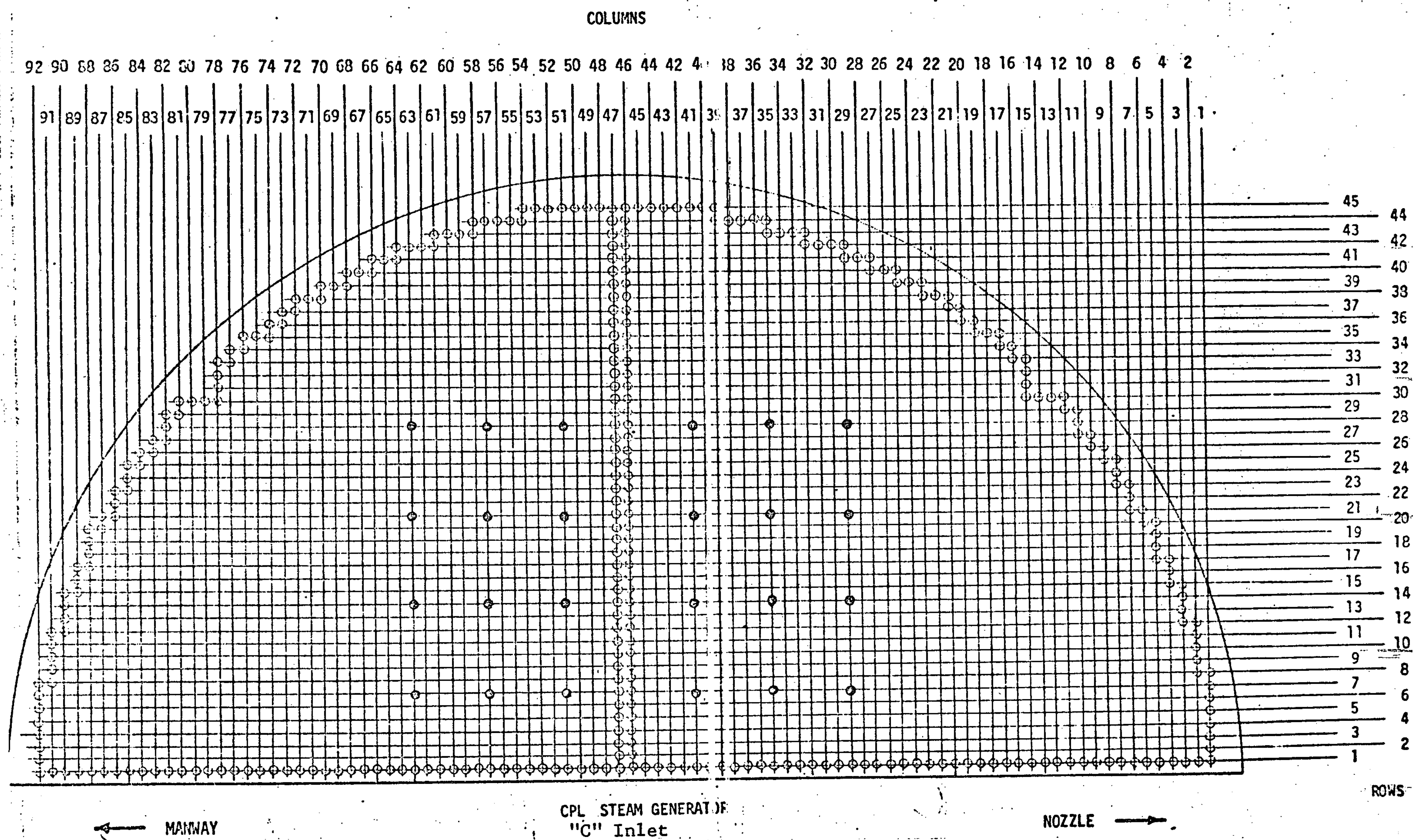


CPL STEAM GENERATOR

"A" Outlet

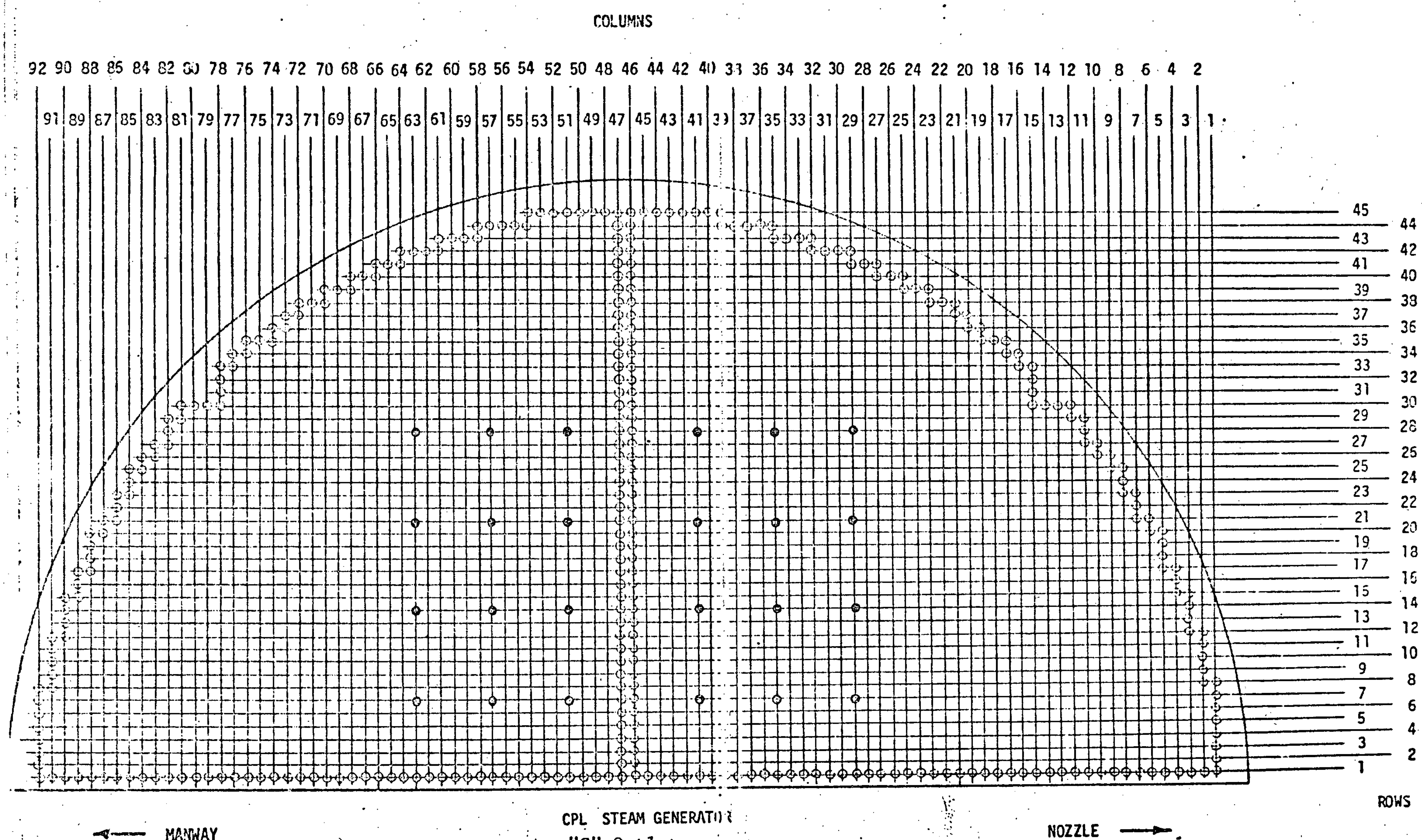
● Tubes Inspected at Test Frequence of 25 KHZ

Figure 6



Tubes Inspected at Test Frequence of 25 KHZ

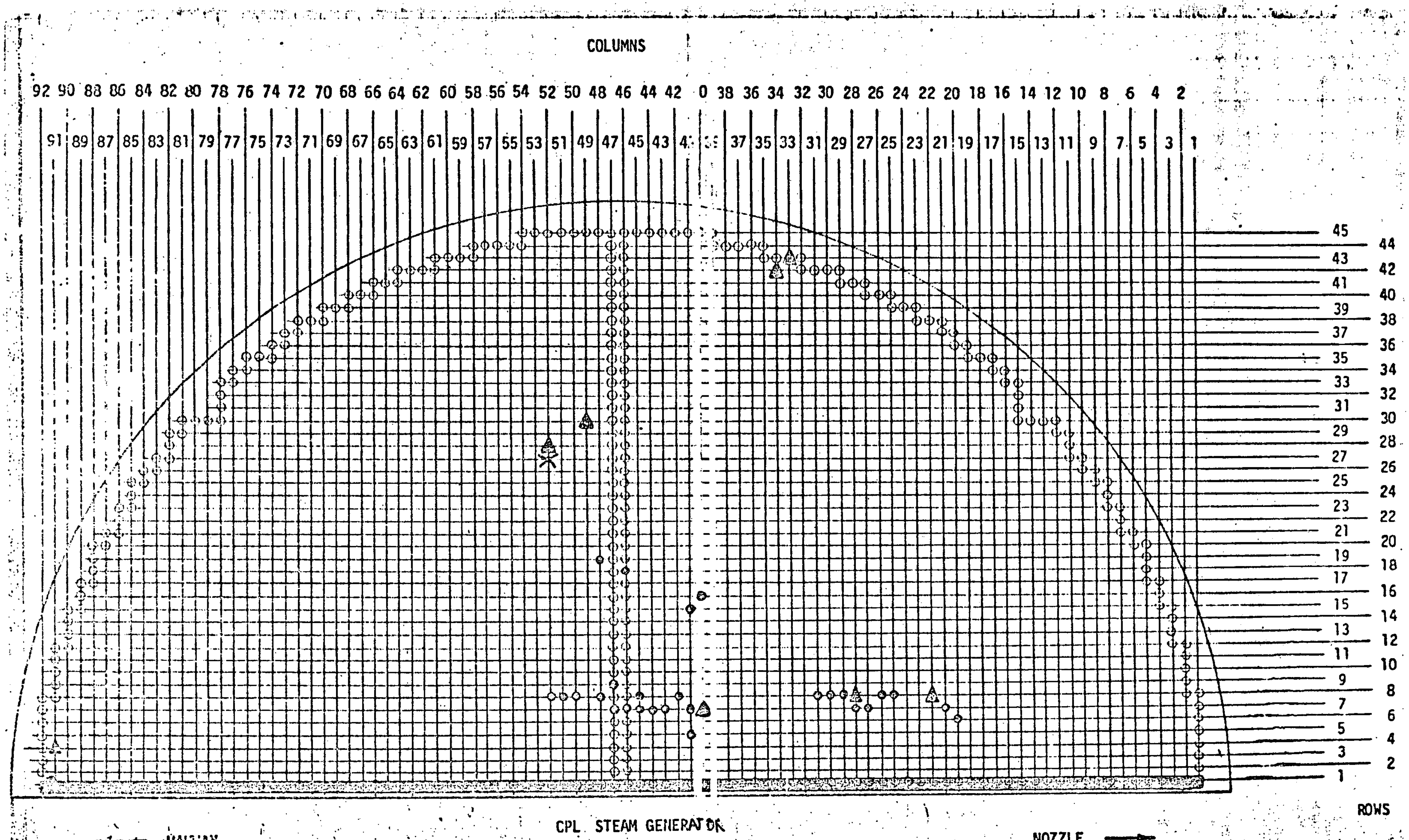
Figure 7



CPL STEAM GENERATOR
"C" Outlet

● Tubes Inspected at Test Frequence of 25 KHZ

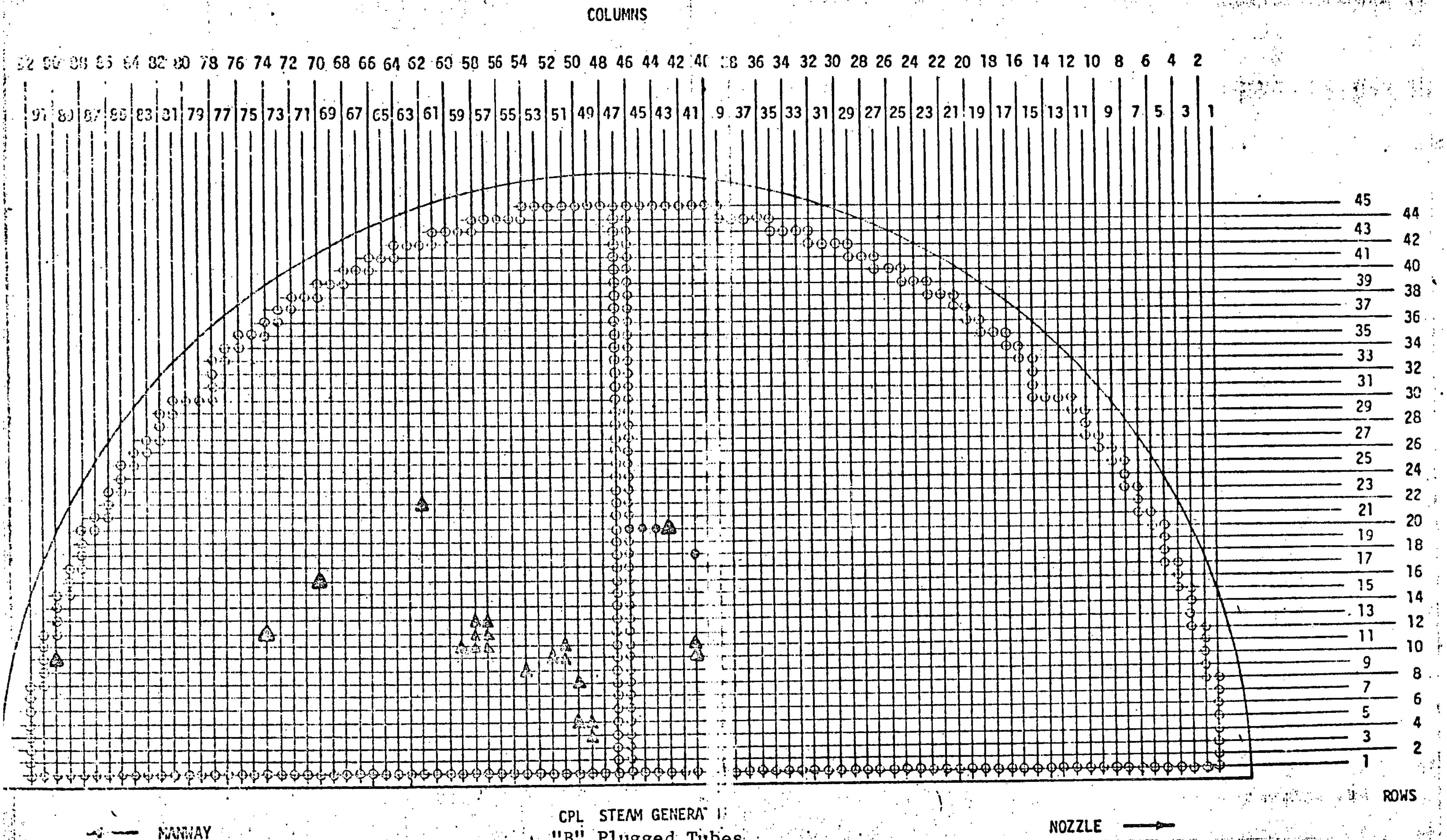
Figure 8



"A" Plugged Tubes

- Plugged, 1971
- Plugged, 1972
- Plugged, 1973
- Plugged, 1974

Figure 9

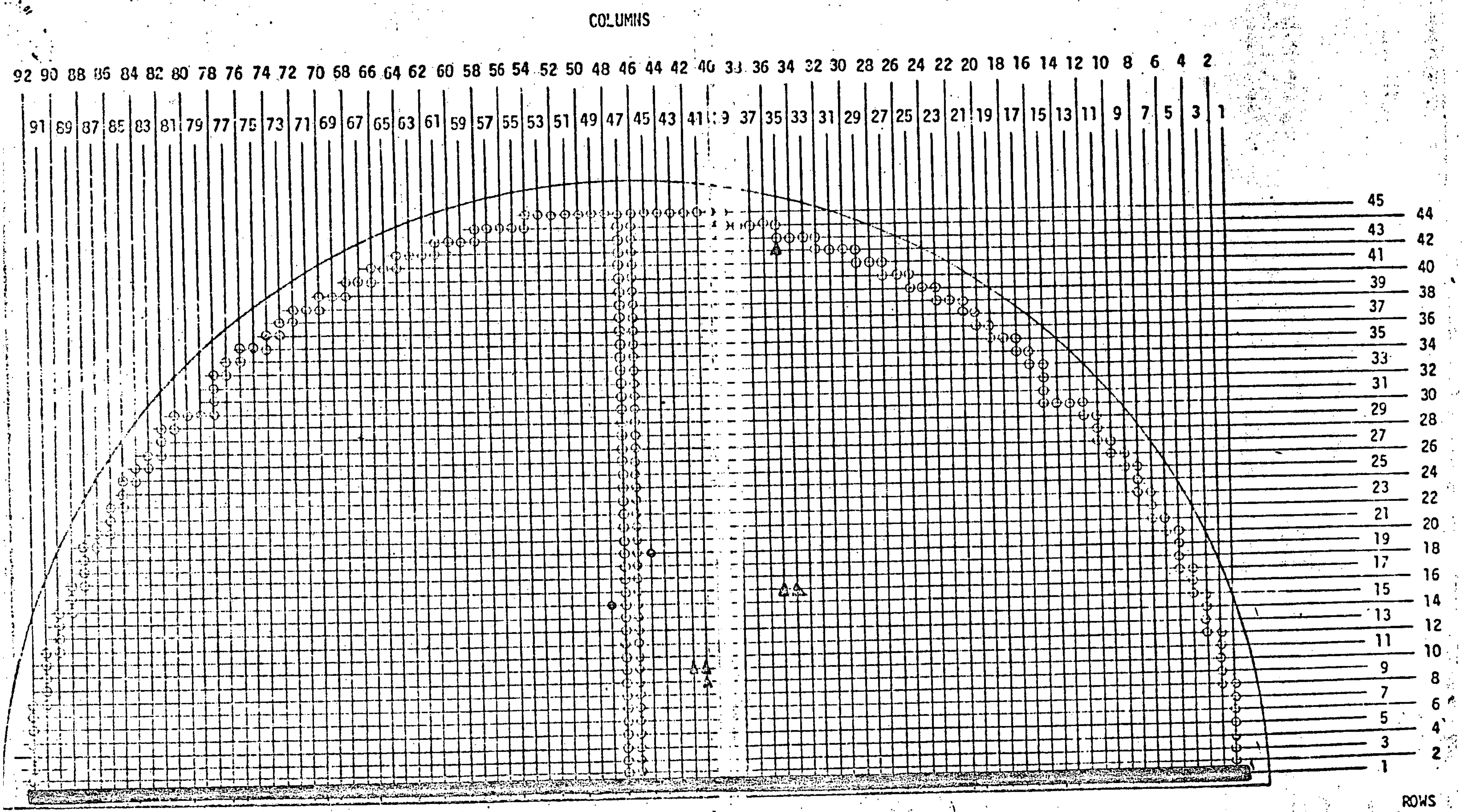


CPL STEAM GENERA[illegible]

"B" Plugged Tubes

- Plugged, 1972
- ▲ Plugged, 1974

Figure 10

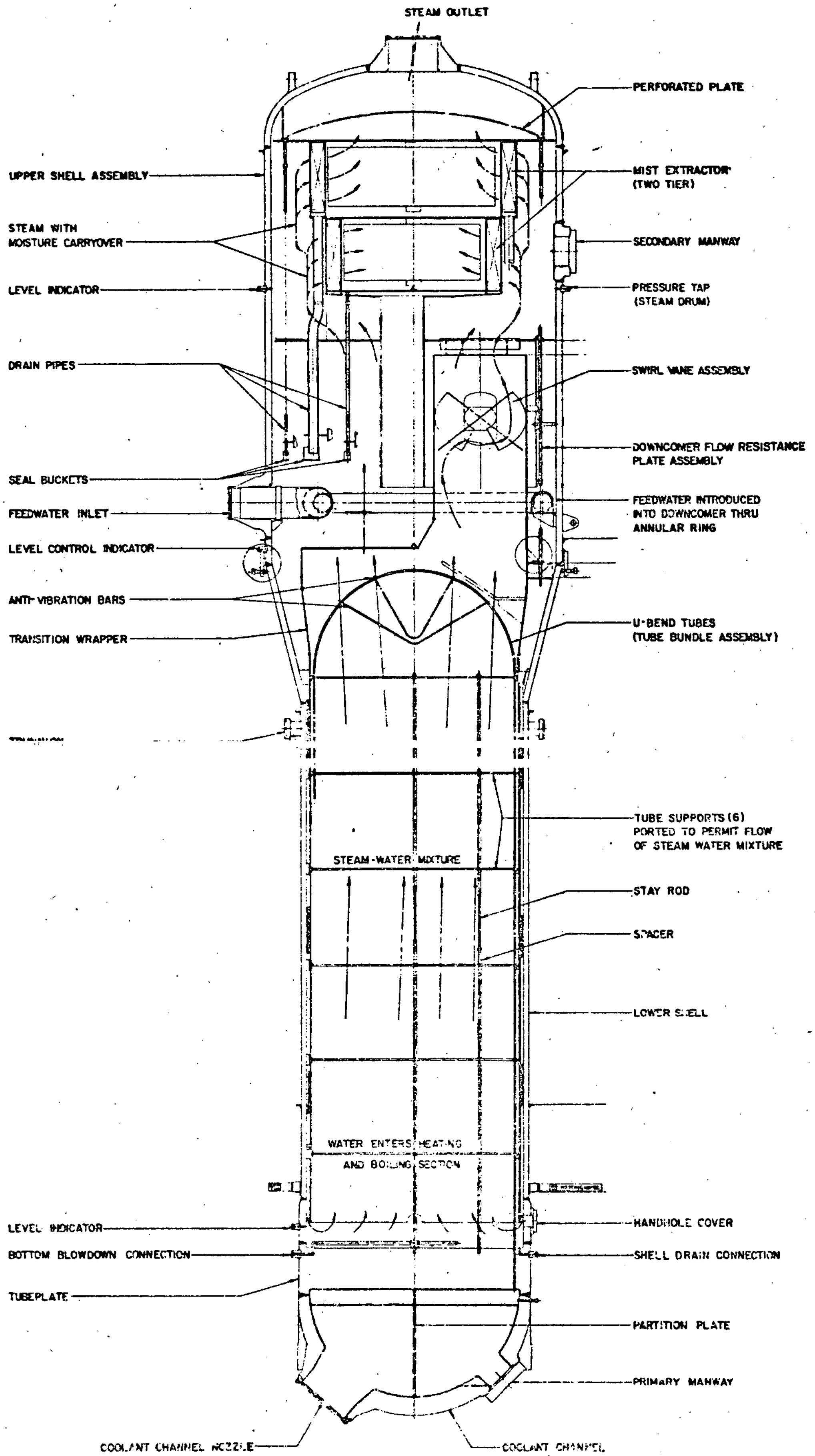


CPL STEAM GENERAT[illegible]

"C" Plugged Tubes

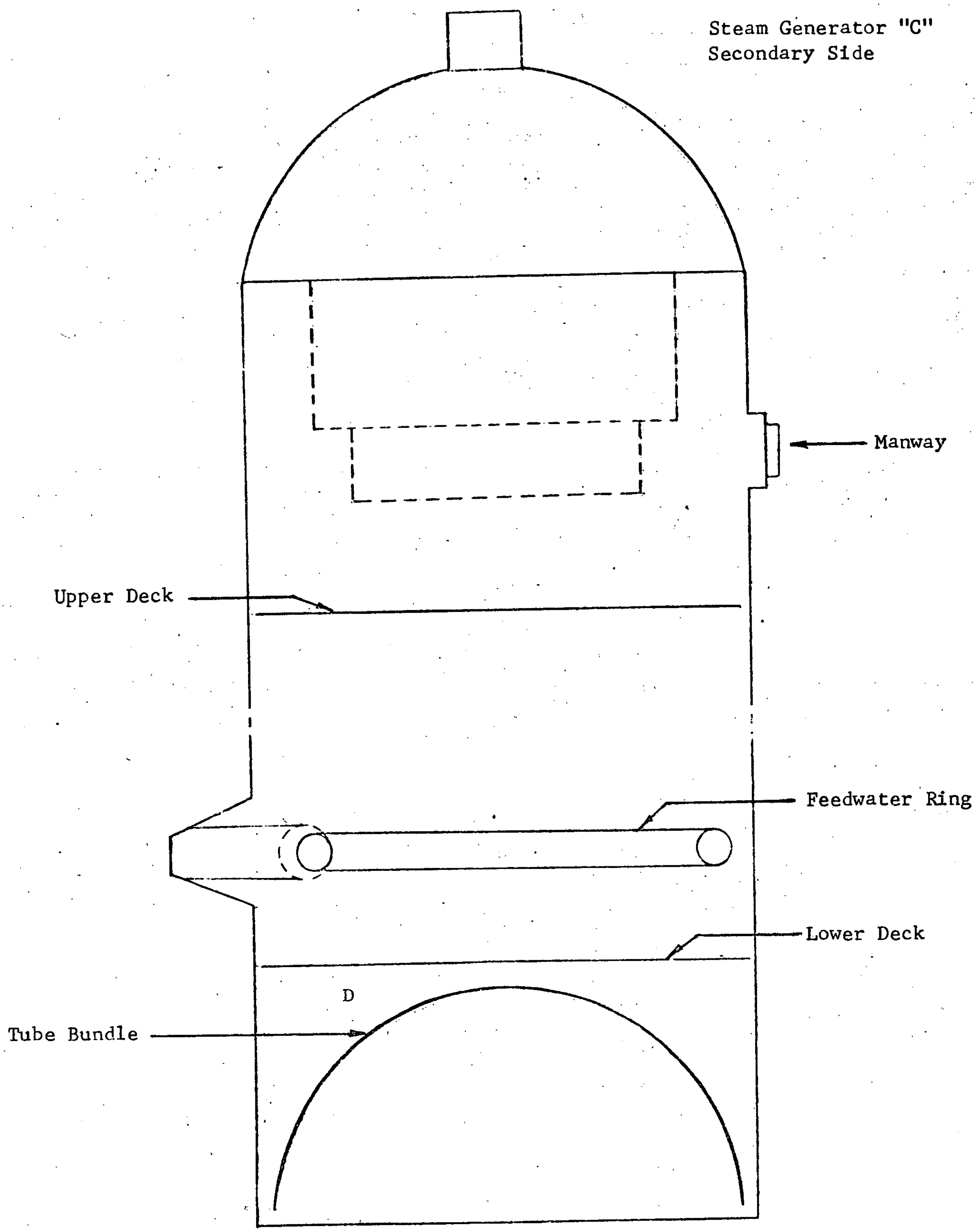
▩ Plugged, 1971
● Plugged, 1972
▲ Plugged, 1974

Figure 11



STEAM GENERATOR
FIGURE 12

FIGURE 13

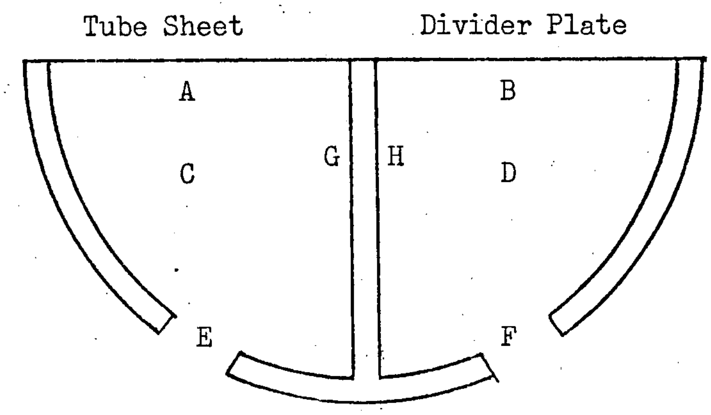


Location	Description	Radiation Level
A	Manway	3mr/hr
B	General Area	25 mr/hr
C	Feedwater Ring General Area	1 R/hr
D	Tube Bundle	6 R/hr

Figure 14

Radiation Level

STEAM GENERATOR "A"

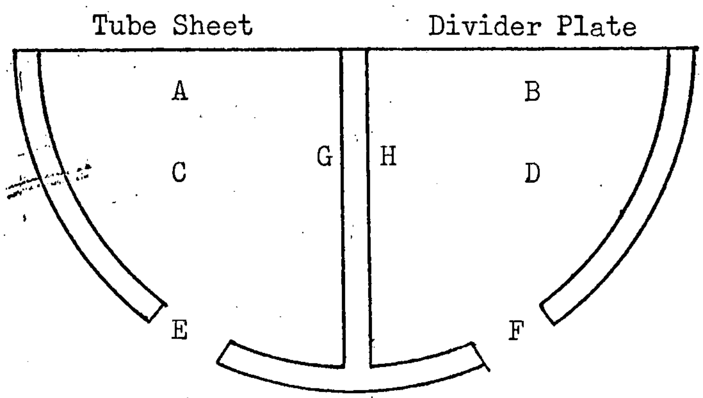


Readings Mr/hr

SURVEY	INLET	OUTLET
A Tube Sheet	15000	
B Tube Sheet		12000
C Interior	10000	
D Interior		10000
E Manway	3000	
F Manway		3000
G Divider Plate	10000	
H Divider Plate		10000
J General Field	10000	10000

Figure 15

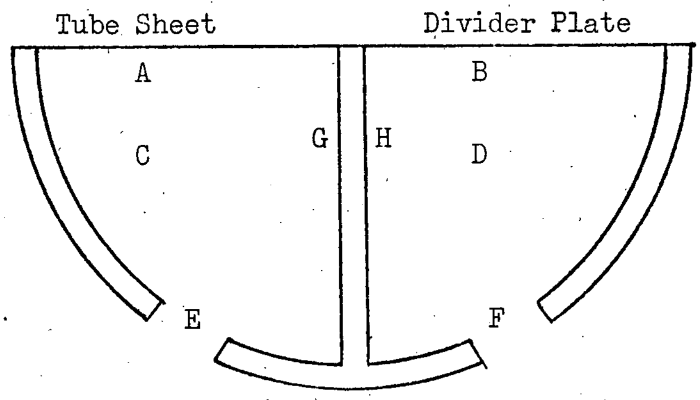
STEAM GENERATOR "B"



Readings	Mr/hr	
SURVEY	INLET	OUTLET
A Tube Sheet	15000	
B Tube Sheet		15000
C Interior	16000	
D Interior		16000
E Manway	5000	
F Manway		5000
G Divider Plate	16000	
H Divider Plate		18000
J General Field	16000	16000

Figure 16

STEAM GENERATOR "C"

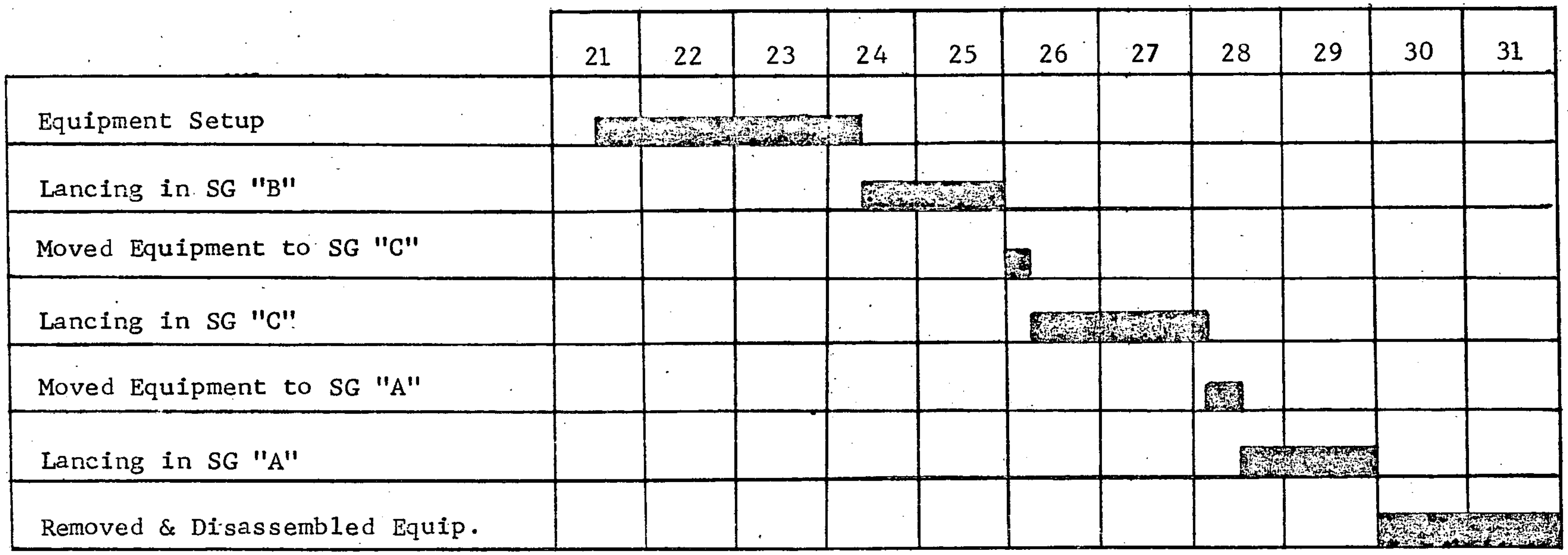


Readings Mr/hr

SURVEY	INLET	OUTLET
A Tube Sheet	15000	
B Tube Sheet		15000
C Interior	12000	
D Interior		14000
E Manway	10000	
F Manway		7000
G Divider Plant	13000	
H Divider Plant		13000
J General Field	12000	14000

Chronological Sequence of Events

Sludge Lance Operation



NOTE: This job was conducted in approximately one 10-hour shift per day.