YANKEE ATOMIC ELECTRIC COMPANY

OPERATION REPORT NO. 33

For the month of

SEPTEMBER 1963

Submitted by

YANKEE ATOMIC ELECTRIC COMPANY
Boston Massachusetts

October 31, 1963

YANKEE NUCLEAR POWER STATION

OPERATION REPORT NO. 32

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Boston Massachusetts

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This report covers the operation of the Yankee Atomic Electric Company plant at Rowe, Massachusetts for the month of September, 1963.

The scheduled Core II - Core III refueling outage commenced on September 2 with a manual turbine trip at a plant load of 83 MWe following which the primary plant was placed in the hot standby condition in order to obtain decay heat measurements and control rod drop time data.

On September 4 the primary plant was cooled down, borated to 1600 ppm, and depressurized. During cooldown, the vapor container sound system indicated the possible presence of a main coolant leak. Prior to entry into the vapor container an air sample taken via the air particulate monitor exterior to the vapor container confirmed the presence of a main coolant leak. A subsequent investigation traced the leak to failure of the inner O-ring seal of the reactor vessel head flange and consequent discharge of main coolant through the tell-tale leak off line between the inner and outer seal. Closure of a valve in the tell-tale line and purging of the vapor container lowered the air-borne activity to acceptable limits.

Initial operations within the vapor container centered around decontamination of the stainless steel liner of the shield tank cavity. The work was performed by an outside contracting service using a sodium cyanide jell as a decontamination agent. The procedure was similar to that utilized this past winter for clean up of tools and equipment contaminated during the Core I - Core II refueling. A more detailed description of the liner decontamination can be found in the Health and Safety section of the report.

A leak test of the cavity liner was performed using freon as a tracer gas. Weld repairs to the liner were made as the test progressed, thereby, preventing eventual saturation of the cavity atmosphere with freon gas.

Other work in the cavity prior to head removal included stripping of the control rod drive mechanisms, installation of the control rod drive shaft storage rack, installation of fuel handling components on the manipulator crane, modifications to the nuclear detectors and a check out of the control rod-follower break joint mechanism.

The removal of the reactor vessel studs was facilitated by the use of a specially designed tool operated from the manipulator crane bridge. By locating the manned work area at the manipulator crane instead of the shield tank cavity floor, radiation exposure was kept to a minimum. Some studs, whose threads were silver plated during the last refueling, were seized in place and torque multipliers and air hammers were required to effect removal. All studs which were not silver plated at that time were backed out easily.

On September 18, all maintenance work within the shield tank cavity was discontinued and the vessel head was removed and stored on a flatcar under the vapor container. Thereafter, approximately two days were required for the removal of core internals, including control rod drive shafts, guide tubes, in-core instrumentation eggcrate and the upper core barrel.

Because of previous experience with silver contamination of the shield tank cavity the Core II Ag-In-Cd control rods were replaced immediately with hafnium rods. Twenty-two hafnium rods were inserted in the core along with two inconel clad Ag-In-Cd rods.

Prior to Core II operation, a number of irradiation specimens contained within a series of stainless steel capsules were installed around the periphery of the core, eight high flux specimen holders within the core baffle and two low flux specimen holders between the thermal shield and the inside surface of the vessel wall. While preparing for the removal of the specimen holders it was noted that the lifting bales of the eight high flux holders had broken off from their respective support plugs. During subsequent operations four holders were retrieved in good mechanical condition. Three holders were found separated from their respective support plugs and could not be retrieved. The plugs, however, were removed from the shield tank cavity. The remaining high flux specimen support plug could not be dislodged from the core baffle flange.

Due to the loss of the lifting bales, two techniques for removal of the specimen holders were attempted. Some holders were extracted by a vacuum lift and those remaining were retrieved by underwater welding. As the work proceeded with fuel loaded in the core in the vicinity of the work, a holder support plug and a small piece of welding rod were inadvertently knocked into the core region and lodged on the top of fuel assemblies. Both items were retrieved.

At the end of the reporting period work was in progress on the removal of the two low flux specimen holders.

Coincident with the irradiation specimen work, a program of interchange of fixed shim rod followers was initiated. The Core II shim followers were boron-stainless steel and were replaced by an all stainless follower. Concern for the possibility of long-term growth in the boron-stainless under irradiation prompted the change to an all stainless follower.

The first shim and follower to be removed from the core were given a detailed inspection and then returned to the core since equipment modifications were required to the break joint mechanism. While entering the core, a loud noise and shock was experienced on the manipulator crane. An examination of the partially inserted rod was made with no unusual effects noted and it was agreed to continue insertion. However, at approximately 12 feet above normal seated position, the rotary joint of the shim rod suddenly disconnected and the boron-stainless follower fell into its shroud tube.

The primary cause of the accident was traced to a design problem at the very bottom of the boron steel follower. Since these followers were originally designed for use in either the fuel region or below, depending on control requirements, the bottom detail has a span of only 4.6 inches while the guides for insertion to the cruciform slot between adjacent fuel assemblies are approximately 5.0 inches apart. Consequently, as the rod was being inserted in the core it struck the top end plate of two fuel assemblies prior to sliding into the cruciform slot, this being the noise first heard by the operator. A rotation of the TV boom for inspection following this first incident caused the main tool boom to rotate slightly since it was not locked securely in position. The rotation of the shim was sufficient to unlatch it from its follower whose orientation was maintained by the cruciform slot between fuel assemblies.

To determine the extent of possible damage, the four fuel assemblies surrounding the shim rod were given a detailed inspection. Three assemblies were found in satisfactory condition, however, the fourth was found to be damaged in the top nozzle area. Contact between the shim rod-follower assembly and the top end plate of the fuel assembly caused the plate to bend slightly downward which in turn caused bowing of a number of fuel tubes. No obvious clad failure was observed. Borescopic examination of the lower shroud tube and the bolts which hold it to the lower core support plate indicated no damage to the respected internals. To prevent a recurrence of this incident the eight new shim rod extensions were modified to conform to the design of the control rod followers whose span is sufficient to permit contact with the guides on adjacent fuel assemblies.

Throughout the reporting period detailed inspections of selected core components were conducted. A description of the inspection program and the preliminary results obtained thus far can be found in the Reactor Plant Performance section of this report.

Because of the delays incurred only 20% of the actual fuel interchange was completed at the end of the reporting period. Eleven new 4.1% enriched and four new 3.4% enriched assemblies had been added to the core while ten spent 3.4% assemblies had been moved to their final Core III position.

At the end of the reporting period the plant was in the cold, borated condition as refueling operations continued.

Plant Shutdowns

Shutdown No. 62-2-14	A scheduled outage for Core II-Core III refueling.

Maintenance

To assist in the large maintenance program planned for the refueling shutdown the normal plant staff was augumented by 30 outside personnel obtained from sponsor company maintenance groups.

Following is a summary of major activities carried out by plant maintenance personnel during September:

1. The exciter commutator was resurfaced.

2. The leaking terminal box on the generator was repaired.

3. The polar crane sheaves were converted to the lubricated type and the crane inspected.

4. No. 1 manipulator crane was checked out and made operational.

5. The missile shield, cable trays, coil stacks and air coolant ducts were removed from the shield tank cavity.

6. Modifications to improve the air removal capacity of the circulating water system continued during the period.

7. No. 3 boiler feed pump was dismantled and inspected.

8. No. 3 condensate pump was dismantled and inspected.

9. Modifications to the turbine moisture separators to permit higher power operation continued during the month.

10. The shutdown cooling pump mechanical seal was replaced.

11. New resistor bank wiring for the fuel chute drive was installed.

12. The shield tank cavity liner was leak tested and defective welds repaired where necessary.

13. Installation of four new main steam line safety valves continued during the month.

14. Installation of main steam line vibration suppressors continued during the period.

15. The four turbine control valve servo motors and gland steam regulator were removed and sent to a local machine shop for reworking.

16. An inspection of Z-126 and Y-177 lines OCB's was completed.

17. No. 20 control rod drive pressure housing was removed from the reactor vessel head for internal inspection.

18. The coil stacks of the control rod drive mechanisms were inspected and new coils replaced where necessary.

19. The new transformer bushings were fitted with a test connection and Doble tested.

20. An outside contracting service radiographed the steam generator nozzle welds.

21. Defective tubes in the condenser tube sheet were plugged.

22. The solenoid operated pressurizer spray line valve was replaced with a motor operated valve.

23. The motor operated discharge valve from the safety injection tank was relocated indoors.

24. The main coolant stop valves were repacked.

Chemistry

Prior to the shutdown of September 2, the five inch loop bypass valves were opened to permit flushing of the bypass line. Thereafter, the main coolant crud level increased to 16 ppm being reduced to 1.2 ppm just prior to the shutdown through mixed bed purification.

On September 4, the main coolant was borated to the required shutdown concentration of approximately 1600 ppm.

In anticipation of a recurrence of the silver problem as experienced during the past refueling, essentially continuous main coolant purification was maintained following shutdown. Gross specific activity ranged between 1.7 and 2.0 x 10^{-3} μc/ml. Until September 9, the major contributor was Co-58. On that date 0.5 ppm oxygen was detected in the main coolant following which the contribution of the Ag-110m nuclide to the specific activity began to increase although the gross activity decreased.

On September 18, the shield tank cavity was flooded and the specific activity decreased to 8.4 x 10^{-5} μc/ml, the activity reduction being due to the dilution.

Greater than 99% of the activity was due to Ag-110m. A comparison of shield tank cavity water activity for comparable periods of Core I and Core II refuelings is as follows:

Core I 5.6 x 10^{-3} μc/ml   Core II 3.4 x 10^{-4} μc/ml

Continuous main coolant purification was not maintained during the first refueling as the problem of silver activity had not become apparent. With continuous purification the activity is, as expected, much lower.

The chemical analysis of crud removed from No. 20 control rod pressure housing is as follows:

Nickel	95%
Iron	0.15%
Manganese	0.56%
Chromium	0.88%
Silver	0.013%

Through the use of specially designed filters installed in the ion exchange pit, visibility through the water in both the shield tank cavity and the spent fuel pit has been excellent throughout the reporting period.

Reactor Plant Performance

The reactor conditions at the end of Core II life were:

411°F Tavg. 303 MWt @ 2.0" Hg
83.3 MWeG All rods @ 88 7/8 in.

Temperature coefficient data measured following the shutdown indicated:

@ 2.5% $\Delta\rho$ in xenon, 2000 psi, 475°F,
boron free, all rods @ 88 7/8 in.
$\Delta\rho / \Delta T = -1.97 \pm .10 \times 10^{-4}$ $\Delta\rho/°F$

Control rod drop time data measured on selected rods following the shutdown averaged 1.53 seconds showing no significant difference from data obtained at the beginning of Core II life.

During the month selected core components were inspected in detail with underwater viewing equipment. The following is a partial summary of the results of the program:

A. Fuel Assemblies

1. Core I Recycled Assemblies

Two Core I fuel assemblies were reused in Core II to observe what effects, if any, could be discerned due to the higher burnup achieved. After operating two core cycles both assemblies were found to be in excellent condition. No significant mechanical defects were noted. Crud deposits were minimal. Assembly appearance was essentially unchanged from earlier examinations.

2. Core II Assembly

One Core II fuel assembly being recycled in Core III was inspected in detail and found to be in excellent condition.

3. Control Rods and Followers

As expected, extensive deterioration of the nickel plate was observed on all Ag-In-Cd rods removed from the core.

No wear was observed at the stainless to stainless joint between the control rod and follower.

General appearance of the zircaloy followers was good and they will be reused for Core III operation.

Patterns of wear were observed on some vanes of all rods inspected. The wear, approximately 0.25 inches by 2 inches, was perpendicular to the axis of the rod and not on all vanes of a particular rod. In most cases the wear was found entirely on the stainless steel rubbing strap. However, some areas were noted where the wear had passed completely through the strap until the suraface of the rod had become a bearing area. The cause of the wear was traced to contact between the control rod absorber and the guide blocks on the upper core support plate when the rod is in the fully withdrawn position.

The top adapters of both absorber A41 and A39 were examined to determine the extent of wear at the absorber drive shaft joint. A41 showed no indication of wear while A39 showed a loss of some 3-5 mils of material on one vane while the other three vanes showed negligible wear. A39 was the only control rod drive assembly to operate during Core II without a locking cap on the drive shaft.

4. Shim Rods

On all shim rods inspected during the month wear was found on the upper end of the zircaloy section. The pattern is similar to that observed on the control rods and is due to contact with the guide blocks on the upper core support plate. The wear on these sections was observed during Core I-II refueling and has progressed to a lesser degree during Core II operation.

5. No. 20 Control Rod Drive Pressure Housing

No. 20 pressure housing was removed from the vessel head for inspection of the internal surface and moveable gripper fingers. The inspection of the housing revealed no evidence of drive shaft locking cap interference. Corrosion effects in the housing were considered normal with slight deposits of tightly adherent crud noted. A chemical analysis of the loose crud removed from the housing can be found in the Chemistry section of this report. Axial scratch marks of insignificant depth were observed. Wear marks were also observed on the moveable gripper fingers but appeared to be only superficial. However, new fingers were installed to permit a more detailed examination of the worn areas.

Turbine Plant Performance

In anticipation of higher power operation, modifications to secondary components continued during the month. Four safety valves of higher relieving capacity were installed on the main steam lines. Gussets were added to each dished head of the moisture separators. All flanged joints in the moisture removal system were reinforced through the addition of high strength bolts. New gaskets were installed at the circumferential flanged midpoint of each separator to eliminate the steam leakage problem that occurred periodically throughout Core II operation.

During Core II operation No. 3 Boiler Feed Pump was found to have a 3 mil vibration at the bearing housing. During a scheduled shutdown in April of this year, alignment of the pump and motor was measured and found to be within specifications. Following shutdown on September 2, the pump was dismantled for an internal inspection under the direction of the manufacturer's representative. The shaft was found to have a 6 mil runout thus accounting for the observed vibration. Mechanical straightening followed and the pump was reassembled. Testing of the pump will follow startup.

In June of this year a leak in the main condenser was noted, based on an increased chloride concentration in the steam generators. During the month a hydro-test of the condenser pinpointed failed tubes and they were subsequently plugged. Failure was due to steam side erosion of the tubes. To limit further erosion stainless shields were added to surrounding tubes in the affected areas.

General condition of the turbine was good with no excessive erosion noted due to moisture carryover in the steam. The overall erosion rate was found to be less than that observed following Core I operation.

Modifications to the air removal system on the circulating water discharge line continued during the month. The new system provides for additional venting of the system at selected points along the discharge piping.

During the month vibration snubbers were attached to the main steam piping both interior and exterior to the vapor container. The locations of the snubbers were selected by an outside consulting service who had measured main steam line movement while the plant was operating at various power levels.

Instrumentation and Control

During the month all narrow range main coolant temperature channels were recalibrated in anticipation of higher power operation.

A scram sequence panel has been added to the memory light circuit to identify the first scram signal to reach the scram amplifiers. Previously, following most scrams, more than one light would appear on the memory circuit and consequently the cause of the scram would not be readily apparent. The new sequence panel will light upon receiving the first signal from the scram circuitry. All signals that follow will be locked out.

The six ion chambers containing both power range channels and startup channels were removed individually from their respective thimbles in the neutron shield tank to permit inspection and repairs.

New internals were installed in the four feedwater regulators due to the increased flow required at higher power levels.

Due to the addition of 4.1% enriched fuel to Core III, control rod group No. 6 has been broken down into two groups of four rods each.

Health and Safety

Liquid waste containing a total activity of 0.02 mc was discharged from the plant during September. No gaseous waste was discharged from the site.

Thirteen drums of non-combustible radioactive waste containing a total activity of 47 mc were prepared in September. Seventy-two drums were shipped containing an estimated 1.3 curies, being the residue from the decontamination of the shield tank cavity liner.

An outside contracting service was engaged to decontaminate the shield tank cavity prior to the inception of work in the area. A sodium cyanide jell was applied to the walls followed by a rinse with demineralized water. The principal radiation source on the stainless liner has been and continues to be Ag-110m deposited there during the Core I-Core II refueling. Radiation levels measured prior to decontamination were 100 - 200 mr/hr general area being reduced to 40 - 100 mr/hr general area. An estimated 1.3 curies of Ag-110m activity was removed from the cavity walls.

Radiation levels measured during raising of the reactor head were as follows:

	Radiation Levels	
Head Raised	Under Head	At Moat
2 inches	500 mr/hr	150 mr/hr
6 inches	2 r/hr	150 mr/hr
1 foot	5 r/hr	300 mr/hr
2 feet	5 r/hr	400 mr/hr
3 feet	8 r/hr	550 mr/hr

Prior to raising the head, the contact radiation reading at the flange was 70 mr/hr.

Radiation levels on the flatcar as the reactor head was lowered through the equipment hatch were as follows:

Position of Head	Height above flatcar	Radiation mr/hr
Top of equipment hatch at charging floor	81 feet	3.5
Halfway down hatch	55 feet	7.0
Bottom of hatch	29 feet	10.0
Halfway from bottom of hatch to flatcar	8 feet	35.0

The radiation level measured directly under the head while it was positioned on the flatcar was 500 mr/hr at 1 - 2 feet inside the flange.

Radiation levels over the shield tank cavity during flooding were as follows:

Water Level	Radiation Level mr/hr
Cavity dry	50
3 feet	50
6 feet	20
9 feet	17
12 feet	13
15 feet	10
Top of drive rod shafts	2.5
Top of guide pins	2
17.5 feet	2

While filling the shield tank cavity a sample valve in the cavity purification line located over the ion exchange pit was inadvertently left open. A spill of approximately 10 gallons of water from the safety injection tank resulted. Part of this water ran off the deck of the pit and on to a section of the black top surface on the west side of the pit. The radiation level at the immediate spill area was 70 - 100 mr/hr measured at one inch. Contamination levels were 10^6 to 10^7 dpm for areas of several square inches. Runoff water caused contamination levels of 20 - 60,000 dpm/ft^2.

The ion exchange pit are[illegible]s surveyed and roped off after discovery of contamination on the shoes of a chemist who obtained a water sample later in the day. Vacuum cleaning and mopping of the spill area reduced radiation levels to 1 - 2 mr/hr and contamination levels to 20,000 dpm/ft^2.

A radioactive liquid spill in the P.C.A. storage building occurred during decontamination of No. 20 control rod drive mechanism due to overflowing of the receiving barrel. The activity of the water was 2 x 10^{-3} μc/cc. Normal cleanup was carried out to reduce contamination levels to acceptable limits.

The discharge of 24 Ag-In-Cd control rods to the spent fuel pit caused activity levels of the pit water to increase by a factor of 10 to 3.7 x 10^{-3} μc/cc due primarily to the Ag-110m nuclide. Radiation levels over the pit increased by a factor of two to three. To limit the amount of silver activity released to the water the control rods were encapsulated in an aluminum storage can.

Due to the immediate removal of the control rods from the shield tank cavity, radiation levels on the charging floor are substantially lower than those measured during the Core I - Core II refueling. Radiation levels measured at the cavity edge during Core I refueling were generally

15 to 25 mr/hr being reduced during the present refueling to < 2 mr/hr, the decrease being entirely attributal to the lower level of Ag-110m in the cavity water.

Personnel exposures for Yankee plant personnel as measured by film badge for the month of September, 1963 were

Average for all station personnel	=	485 mr
Maximum individual exposure	=	1220 mr

Design Changes

Due to the availability of most system components a number of design changes were completed during the month to improve the operations and performance of the station.

1. As discussed in the operating report for August, 1963 storage for spent Core II fuel was to have been provided by a boral-aluminum rack. However, when the rack was delivered to the site, numerous small defects were observed in the seal welds covering the edges of the boral poison material, which was included in the rack for reactivity control, and consequently the use of the rack was deferred.

   To accomodate storage of Core II fuel, a 26 assembly rack, relying on center to center distance for criticality control, has been fabricated and installed in the spent fuel pit. Authorization to install this rack was requested in Proposed Change No. 44 which was submitted on August 30, 1963. A.E.C. approval was granted on September 12, 1963.

2. The boron stainless steel sections of the eight fixed shim rods have been replaced with mechanically similar sections fabricated of type 304 stainless steel. Concern for the integrity of the joint between the boron stainless and zircaloy sections has prompted the change since boron stainless under irradiation has in some applications exhibited dimensional growth. Authorization for this design change was requested in Proposed Change No. 43, submitted on August 9, 1963. A.E.C. approval was granted on September 23, 1963.

3. A one inch valved vent was installed on the Low Pressure Surge Tank safety valve discharge header. The vent was located inside the vapor container and was equipped with a short, capped nipple on the discharge of the vent valve. The change was made to simplify maintenance on the header. Since a hydrogen atmosphere is maintained in the tank, thorough purging of the line is needed to remove the potentially explosive hydrogen. The addition of the valved vent line now provides an escape point to permit thorough and convenient purging of the header. Authorization for this design change was requested in Proposed Change No. 41, submitted on July 23, 1963. A.E.C. approval was granted on September 6, 1963.

4. The 24, nickel plated, Ag-In-Cd control rods were replaced with 22 hafnium control rods and two inconel clad, Ag-In-Cd rods.

Extensive deterioration of the nickel plate on the present rods and consequent release of highly radioactive Ag-110m to the reactor environment has prompted the change to hafnium rods. The mechanical design of the hafnium rods is similar in all respects to those rods used previously. The new rods are equipped with stainless steel rubbing straps and riveted stainless steel adapters.

Due to its proven nuclear characteristics, availability and low cost, Ag-In-Cd presents an ideal control rod material provided it is protected with a suitable cladding.

The inconel clad rods have a compartmented configuration, each vane being composed of five, individual, longitudinal modules, electron beam welded to form the completed vane. Four vanes are then electron beam welded to an inconel center plug to form the cruciform shaped rod. Stainless steel adapters are welded to the cruciform at top and bottom. Authorization for this design change was requested in Proposed Change No. 40, submitted on July 17, 1963. A.E.C. approval was granted on September 20, 1963.

5. The solenoid operated spray valve on the pressurizer has been replaced by a motor operated valve. During previous operations the solenoid spray valve has occasionally stuck in the open position, requiring in one instance a depressurization and cooldown of the primary plant to effect repairs. Its replacement by a more positive operating motorized valve will greatly improve system reliability. Authorization for this design change was requested in Proposed Change No. 35, submitted on May 28, 1963. A.E.C. approval was granted on September 6, 1963.

6. MOV-532 on the discharge of the safety injection tank has been moved to an indoor location. The outdoor location of the valve results in it being subjected to quite low ambient temperatures. On occasion, particularly during severe winter weather, some difficulty has been experienced in operating the valve.

Additionally, a higher pressure rating valve was installed upstream of MOV-532 to further improve the design and reliability of the system in that this new valve will now absorb the starting pressure of the high head safety injection pump during weekly performance checks of the system. Authorization for this design change was requested in Proposed Change No. 34, submitted on May 28, 1963. A.E.C. approval was granted on September 27, 1963.

7. As a result of an expected power level increase during the operation of Core III, the following secondary plant modifications have been made:

    a. The dished heads of the moisture separators were reinforced by the addition of gussets. In addition, the flanged joints of the moisture separators were rebolted with higher strength bolts.

    b. Main steam line safety valves with an increased steam relieving capacity were installed.

8. To assist in determining the initiating signal in a reactor scram, a scram sequence panel has been added to the memory light circuit. In the past, the sequence of events following a scram has occurred so rapidly that it was virtually impossible in some cases to discern the initiating signal. The new panel will identify the initiating signal.

9. Control rod group 6, consisting of eight control rods located in the outer periphery of the core, has been broken down into two groups of four control rods each. This minor change has been made to improve power distribution control.

Changes in Operating Procedures

In accordance with Proposed Change No. 39, submitted on June 28, 1963, and approved by the A.E.C. on August 30, 1963, revised versions of Maintenance Instructions 506E2 and 506E4 were issued. The modifications in the instructions were made primarily to reflect the current status of the plant.

Plant Operations

Attached is a summary of plant operation statistics for the month of September 1963, and a plot of daily average plant load for the same period.

YANKEE ATOMIC ELECTRIC COMPANY - OPERATING SUMMARY

SEPTEMBER 1963

ELECTRICAL

		MONTH	YEAR	TO DATE
Gross Generation	KWH	3,861,500	834,646,000	2,536,118,000
Sta. Service (While Gen. Incl. Losses)	KWH	414,944	56,538,482	187,295,049
Net Generation	KWH	3,446,556	778,107,518	2,348,822,951
Station Service	%	10.74	6.77	7.38
Sta. Service (While Not Gen. Incl. Losses)	KWH	619,800	1,640,838	15,609,676
Ave. Gen. For Month (720 HRS.)	KW	5,190	--	--
Ave. Gen. Running (46 HRS.)	KW	83,946	--	--

PLANT PERFORMANCE

		MONTH	YEAR	TO DATE
Net Plant Efficiency	%	24.16	28.39	--
Net Plant Heat Rate	Btu/KWH	14,126	12,021	--
lbs. Steam/Net KWH		18.29	--	--
Circulating Water Inlet Temp.				
Maximum	°F	70	--	--
Minimum	°F	62	--	--
Plant Operating Factor	%	3.15	77.41	67.15

NUCLEAR

		MONTH	CORE II	TO DATE
Times Critical		6	44	306
Hours Critical	HRS	54.33	8305.68	21,553.11
Times Scrammed		0	8	38
Equivalent Reactor Hours @ 540 MWt	HRS	26.4	7286.2	15,203.3
Average Burnup of Core	MWD/mtU	28.6	7882.1	--

Control Rod Position at Month End

Equilibrium at 0 MWt 150°F Tavg.

Group 1 Rods out-inches	0
Group 2	0
Group 3	0
Group 4	0
Group 5	0
Group 6	0

YANKEE ATOMIC ELECTRIC COMPANY

DAILY AVERAGE LOAD

for

SEPTEMBER 1963