YANKEE ATOMIC ELECTRIC COMPANY

YANKEE NUCLEAR POWER STATION

(DOCKET NO. 50-29)

1997 ANNUAL REPORT

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INTRODUCTION

The Yankee Nuclear Power Station (YNPS) has been shutdown since October 1, 1991, and the reactor defueled since February 15, 1992. The plant has been operating under a Possession Only License (POL) since August 5, 1992. The Decommissioning Plan for the facility was submitted to the Nuclear Regulatory Commission (NRC) on December 20, 1993. Following its review by the NRC Staff, the Decommissioning Plan was approved in February 1995. However, in October 1995, the NRC issued CLI 95-14 revoking its approval and prohibiting Yankee Atomic Electric Company (YAEC) from conducting further major decommissioning activities pending approval of the decommissioning plan after completion of the hearing process. By Order dated October 18, 1996 (CLI 96-9), in the hearing process convened to determine whether an order approving the decommissioning plan for YNPS should be approved, the Commission granted YAEC's Summary Disposition and re-approved the plan. This Order, in accordance with the amended decommissioning regulation in 10CFR50.82, considers this plan to be the Post Shutdown Decommissioning Activities Report (PSDAR).

This report is submitted in accordance with 10CFR50.59(b)(2) and the YNPS Defueled Technical Specification 6.8.1. The changes identified in this report have been reviewed for, and were determined not to constitute, an unreviewed safety question as described in 10CFR50.59(a)(2).

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A. Engineering Design Changes (EDCs)

- **EDC 96-301, Lower Neutron Shield Tank Removal**

This EDC removed the lower neutron shield tank (LNST), including inner and outer shell, reactor support ring, and associated components located within the annulus area (internal piping and sensing components). This change followed removal of the reactor vessel and removed approximately 100,000 pounds of steel and an estimated 113 curies from the site. Activated materials were segmented and removed with remotely operated equipment to comply with ALARA policies. The remaining portions of the LNST were removed via manual cutting techniques or with remotely operated equipment. All materials were shipped off site to to an appropriate disposal facility.

The operational functions which the LNST once provided are no longer required and as such the LNST can be removed with no impact to other systems as part of the Yankee Rowe decommissioning. Removal of the LNST has no impact on the operability of the Spent Fuel Pool.

- **EDC 96-302, Relocation of Control Room**

This EDC relocated the Control Room to the Gatehouse creating a new control and monitoring facility which will serve the plant until such time as the spent nuclear fuel is removed and the site released for unrestricted access. This facility serves both the operational and security needs of the plant as the site is downsized. This modification provides sufficient control and indication to safely monitor the remaining systems throughout the current decommissioning phase. The hardware and all circuits interfaced for this design change are classified as non-nuclear safety.

The Gatehouse was connected to the existing plant instrumentation and control circuits through the use of a programmable logic control (PLC) system. This system utilizes a single twisted shielded pair communication wire to communicate with local field mounted units located throughout the site. The field mounted units, or I/O (Input/Output) units communicate with the field devices such as flow, pressure, or level transmitters, level or pressure switches, and alarm contacts which are located near the I/O rack and transmit the data to the PLC in the Control Room over the single twisted shielded pair communication wire. The PLC itself controls the logic that operates the plant components, and through the use of PC based software, displays the information on display screens for the operators use.

The majority of the functions installed in the new system are for monitoring. Only a few control functions were installed because of the substantial reduction in operating equipment and because much of the equipment remaining operational is not specifically controlled from the Control Room. The installed control functions included Spent Fuel Pool (SFP) Cooling pumps trip capability and Fire Pump start capability. Further remote control of the SFP Cooling pumps and the electrical distribution system breakers is not

needed since sufficient time exists for operator action to maintain the spent fuel pool cooling function.

This EDC also installed the Security Diesel Generator (SDG) Room I/O Rack on the south wall of the SDG room, and relocated the SDG alarm wiring. The meteorological/environmental computer was relocated to the Gatehouse and connected to the PLC communication bus.

In addition, this EDC modified the Control Room PLC/PC system and fire detection system to reflect the repowering of the primary and secondary electrical systems from the 13.8 kV Massachusetts Electric Line, and their separation from the 115 kV high lines.

- **EDC 97-301, Installation of Manual Controls for Dampers AD-AC-1 & 2**

This EDC installed manual controls and removed the pneumatic air controls and actuators to dampers AD-AC-1,2 &25 and electric operated AD-MC-9 located in the Fan Room. The existing dampers were not removed; however, manual damper controls were installed to allow continued function of the air flow control to Fans FN-11 and -19. This change was made to permit dismantlement of the secondary side plant and eliminated primary side ventilation system dependency on the Station Air System.

The conversion to manual controls does not impact the ability of the Primary Vent System to perform its intended function as described in the FSAR. The new manual control will lock the dampers for FN-11 and -19 at the required position, thereby maintaining the existing vent path and required flow rate to the Primary Vent Stack. Operating procedures have been revised to incorporate manual operation of the dampers.

FSAR Sections 228.1 and 404.3 were revised to delete the text describing station air, damper controls, and pneumatic valves for opening/closing ventilation dampers.

B. Decommissioning Work Packages (DWPs)

Activities, performed via a DWP, including consequences of potential events, are bounded by the decontamination, dismantlement, packaging events, storage events and material handling events in Section 403 of the FSAR. The following specific activities identified by the DWP have met the procedure safety review screening criteria requirements and did not require a change to the Defueled Technical Specifications or the FSAR.

- **DWP/FCVC-01, Fuel Chute Decon**

This DWP decontaminated the interior of the fuel transfer chute (FTC) reinforced concrete structure between the Spent Fuel Pool and VC shell and the interior of the below grade manway ("woodchuck hole") used to access the FTC. The area located at the Lower Lock Valve concrete block was not decontaminated during this DWP. This DWP also removed ladders, supports, leveling channel, pipes, conduits, and electrical cabling. The embedded portion of the Fuel Chute Dewatering Line was not decontaminated nor removed during this DWP.

- **DWP/MCS-05, Main Coolant System and Structures inside VC Removal**

This DWP removed the main coolant (MC) system piping, motor operated valves (MOV), check valves, main coolant pump volutes and loop by-pass piping and MOVs. Also removed were portions of the following systems located in the loop areas: pressurizer surge, charging and volume control (including feed and bleed heat exchangers), MC drain, safety injection, shutdown cooling, demineralized water, service air, breathing air, service water and loop ventilation. Removal included hangers, supports, conduit and electrical cabling for removed components and indicators, ancillary MC system equipment and/or supports including steam generator foundation supports and platforms and MC pump hanger rods and springs, and all structures, gratings, ladders, supports, hangers, brackets, and wall mounts.

This DWP also included removal of: (1) the concrete shield blocks, supports, lead shielding, and the fuel chute pipe, (2) miscellaneous systems, structures, and components inside the outer bioshield wall, and (3) miscellaneous cranes inside the VC, no longer required for equipment removal.

- **DWP/MS-03, Under VC Structures Removal**

This DWP removed all the remaining structures and equipment located in the yard from under the VC to the Turbine Building. The major structures and equipment removed consisted of the following:

  - the yard piping support steel structural framing
  - Non Return Valve (NRV) enclosure, contents and ancillary components
  - orifice house, contents and ancillary components
  - piping systems attached to framing
  - de-energized electrical equipment

- **DWP/PABA-03, PAB Cleanout**

This DWP removed the remaining mechanical, electrical and piping components located in the Primary Auxiliary Building (Upper/Lower Levels, East/West Sections), including the Upper Pipe Chase and Gas Bottle Room areas. Equipment removed included ducting, piping including demineralized/service water lines, steel platforms, pumps, instrument panels/rack/tubing, cable runs and primary building sump tank (TK-24).

This DWP also modified and installed a new SFP makeup pump (Demineralizer piping) and portable air compressor for primary side loads (SFP minipulator crane and PVS louvers).

- **DWP/PABA-05, PAB Decon**

This DWP decontaminated all interior concrete and steel surfaces in the Primary Auxiliary Building in preparation of final radiological surveys. The internal surfaces were decontaminated by either mechanical methods or hand wiping. Floors were decontaminated by mechanically removing a layer of concrete. Buried and embedded piping were either removed by cutting portions of the concrete floor to excavate and

remove the contaminated piping, or decontaminated in place. The exterior surfaces of the building including the roof were not included in this DWP since no decon was required.

- **DWP/SIBA-01, ECN #1, Safety Injection Building - Mechanical**

This DWP Engineering Change Notice (ECN) #1 installed a new, oil-fired hot water boiler and associated heat exchanger to heat the fire water storage tank and diesel fire pump house. This new system was installed in the SSS Building and replaced the heating system previously removed from the Safety Injection Building.

- **DWP/SSS-02, Safe Shutdown Building Decon**

This DWP performed final decontamination of two of the three rooms in the Safe Shutdown System (SSS) Building in preparation for the final radiological survey. One room, which houses the new, oil-fired hot water boiler used to heat the fire water storage tank (TK-55) and the diesel fire pump house will remain in service, and therefore, was not decontaminated. The exterior surfaces of the building, including the roof, were excluded from this DWP since no decon was required.

The ceilings, walls, floors and steel structure were decontaminated by hand wiping. The floor in the Pump Room, including the pump bases, were decontaminated by mechanical removal of a 1/4 inch thick layer of concrete. This DWP also removed miscellaneous lighting fixtures and associated conduit and Gaitronics equipment.

- **DWP/WDBA-02, Waste Disposal Building Decon**

This DWP decontaminated the interior surfaces of the Waste Disposal Building in preparation of the final radiological survey. Previously implemented (and reported) DWPs removed the major mechanical and electrical equipment from this area. The ceilings, walls, and steel structure were decontaminated by hand wiping, vacuum blasting or other appropriate methods. Selected portions of the floor were decontaminated by mechanically removing some of the concrete. The concrete floor was either planed, scabbled or removed in selected locations in order to achieve the required decontamination removal depth. Buried floor drains were removed in accordance with the Decommissioning Plan.

This DWP also included decontamination of the Waste Holdup Tank (WHT) and Activity Dilution Decay (ADD) Tank moat interior areas in preparation of final radiological surveys. A sliding roof was constructed over the moat area during this DWP. Selected concrete floor and wall surfaces were decontaminated by mechanical methods. The remaining surface areas were hand wiped as necessary.

- **DWP/WHT-01, Waste Holdup Tank Removal**

This DWP dismantled and removed the Waste Holdup Tank (TK-31), including instrumentation, steam heating coils and associated steam supply and return lines, and the Test Tanks (TK 34-1 and 34-2) located in the Tank Farm area. These tanks were segmented by mechanical means and appropriately disposed.

- **DWP/VCA-03, VC Decon and Activated Concrete Removal**

This DWP involved the decontamination of all interior surfaces of the Vapor Container (VC) including VC skin, reactor support structure, activated concrete removal, removal of the Shield Tank Cavity liner, reactor support structure columns, and any remaining structural platforms in the VC. This DWP also: (1) removed any temporary and remaining permanent systems, structures and components, including the Containment Ventilation Fans (FN-10-1 and -3), the Purge System ductwork, miscellaneous equipment, piping/tubing components and structural steel platforms, (2) cut an opening from the Upper Pipe Chase in the PAB to the lower VC skin under Broadway, and (3) reconfigured temporary power and repowered the polar crane to support decontamination of the inner bioshield wall.

- **DWP/Y-01, Yard Area Underground Piping Removal**

This DWP excavated, decontaminated and removed underground piping from the yard area between the PAB, Waste Disposal Building and SSS Building and included underground piping from the waste disposal system, safety injection system, safe shutdown system and other miscellaneous systems in the RCA. This DWP also included removal of the Demineralized Water Storage Tank (TK-1) [including associated piping and electrical components] located in the yard area under the Vapor Container.

C. Temporary Design Changes

- **Temporary Change Request (TCR) 97-001, Modification of Polar Crane Hoist**

This TCR replaced the existing 75 ton capacity lower block with a 15 ton capacity block, and also, re-reeved the wire rope from a 12 part configuration to a 2 part configuration. The lower capacity hoist will result in a higher hook speed which will expedite movement of material within the Vapor Container (VC) and through the equipment hatch. Following large component removal, the 75 ton capacity lower block is not needed.

The polar crane, reactor support structure and biological shield wall which supports the crane, and the VC structure which surrounds it are all classified non-nuclear safety. FSAR Section 238.1 references the rated capacity of the VC polar crane and has been revised to reflect the implementation of this TCR.

D. Non-Nuclear Safety (NNS) Changes

- **NNS 96-003, Repowering Electrical System from 13.8 kV Massachusetts Electric Line**

This NNS modification repowered the primary and secondary electrical systems from the 13.8 kV Massachusetts Electric Line, which currently powers the site in a limited capacity. The repowering of plant equipment from the Massachusetts Electric 13.8 kV line allowed the site to separate from the 115 kV high lines and initiate dismantlement of the Turbine

Building and other secondary side areas. All plant equipment affected by this NNS modification are classified as NNS. Also, the modification does not adversely impact any Technical Specification required equipment.

The primary electrical system is repowered from the 13.8 kV / 480 Vac, 1000 kVA Spent Fuel Pool Transformer. The specific loads which are repowered by the primary side transformer are:

- Construction Motor Control Center CMCC-A
- Construction Motor Control Center CMCC-B
- Vapor Container Distribution Panel VC-5
- Spent Fuel Pool Motor Control Center SFP-MCC

The secondary electrical system is repowered from the 13.8 kV / 480 Vac, 1000 kVA Massachusetts Electric Line Transformer. The specific loads which are repowered by the secondary side transformer are:

- Screenwell House Equipment (SWH-MCC), including fire pumps
- Turbine Building Outside Panel 1 (TBOS-1) with new loads
- Security Diesel Generator Panel SDG-1
- MEC Distribution Panel T-9 with new and existing loads
- MCC-3 Bus 1 with new and existing loads
- MCC-3 Bus 2 with new and existing loads
- Miscellaneous temporary power racks

- **NNS 97-005, Heating and Freeze Protection**

This NNS modification addressed heating requirements for freeze protection for the following plant systems and areas:

- Compactor Building
- Fire Protection Line in the Turbine Building and Auxiliary Boiler Room
- Office Building Telephone Room and UPS Area

Subsequent to the removal of the Auxiliary Boilers, steam was no longer available to provide building heating. As a result, the heating of occupied spaces and freeze protection of water lines had to be provided prior to the onset of Winter. Electric heaters were chosen to eliminate the concerns related to the delivery, storage and transportation of gas and oil.

The Compactor Building and Office Building Telephone Room heaters are 480 volt, wall mounted units with internal thermostats. Heat tracing and the portable UPS room heater are powered from a 120 volt source. All heating equipment and components required for installation, are commercial-grade items and are powered from non-nuclear safety sources. With the exception of the HP Panel, electrical heater loads will not challenge the available capacity of the heater power sources. For the HP Panel, a new feeder cable was required to accommodate the increase in power consumed by the addition of the Compactor Building heaters.

The addition of electric heaters and heat tracing does not impact any safety-related system or power source. Also, this modification does not constitute a change to the FSAR.

E. Other Changes

- **Safety Evaluation - 1997 FSAR Update**

This safety evaluation supported the biennial update of the Yankee Nuclear Power Station (YNPS) FSAR that was performed in accordance with the requirements of 10CFR50.82. All of the FSAR changes can be classified in one of the following categories:

- Changes that are strictly administrative in nature (e.g., correction of typographical errors).
- Editorial additions that describe the current status and configuration of a system.
- Adminstrative changes that clarify and/or supplement existing information.
- Administrative changes that update decommissioning activities, schedule and cost estimate by incorporating information from the YNPS License Termination Plan.
- Changes that reflect the implementation of EDCs.
- Changes that reflect the implementation of DWPs.

- **Safety Evaluation - DE&S Acquisition of YNSD Assets**

This safety evaluation supported the acquisition of the assets of Yankee Atomic Electric Company's (YAEC's) Yankee Nuclear Services Division (YNSD) by Duke Engineering and Services (DE&S). YAEC's Facility Operating License No. DPR-3 (Docket No. 50-29), as well as YAEC's operational and fiduciary responsibilities associated with the decontamination and decommissioning of the Yankee Nuclear Power Station (YNPS), were not affected by this acquisition. A change notice to the YNPS FSAR was prepared to reflect this acquisition. All of the FSAR changes can be classified as administrative in nature, and essentially remove organizational references to YNSD in order to accurately reflect YNPS's license condition following acquisition of YNSD's assets by DE&S. In summary, these FSAR changes do not constitute an unreviewed safety question as defined in 10CFR50.59. A letter was sent to the NRC on December 5, 1997, apprising them of the purchase of YNSD assets by DE&S.

- **Safety Evaluation - Change to Fire Protection Technical Requirements Manual (FPTRM)**

This safety evaluation provided the basis and justification for a change (Rev. No. 2) to the existing Fire Protection Technical Requirements Manual (FPTRM). Changes to the FPTRM consisted of the following:

- Reference to the following fire barriers was deleted:
  1. Primary Auxiliary Building/SI Building - Common Wall
  2. SI Building / EDG Cubicles Nos. 1, 2, and 3 - Common Wall
  3. No. 1 and No. 2 EDG Cubicles - Common Wall

4. No. 2 and No. 3 EDG Cubicles - Common Wall
5. PICS Building / West Wall and Center Wall Between Rooms

- Guidance was added to the 50.59 review portion of the Definitions and Clarifications section for the justification of removal of the fire detection or protection equipment from a plant area.

- The following note was added: All detection and suppression systems have an asterisk to indicate the items are not required for nuclear safety but are either insurance related, fire protection good practices, or Massachusetts fire code requirements with the following exceptions -

1. Fire Suppression Water System (pumps, water sources and piping)
2. PCA Warehouse and Old PCA Building Dry Sprinkler System
3. Compactor Building Sprinkler System
4. Yard Hydrants
5. Inside Containment Hose

The change to the FPTRM has no adverse effect on decommissioning activities, loss of support systems, external events or fuel storage events. This change provides a means of maintaining the fire protection for safe spent fuel storage and minimizing the release of radioactive material to the environment in the event of a fire. No Technical Specifications are affected by this change.