UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

YANKEE ATOMIC ELECTRIC COMPANY

DOCKET NO. 50-29

YANKEE NUCLEAR POWER STATION (YANKEE-ROWE)

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 18
License No. DPR-3

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Yankee Atomic Electric Company (the licensee) dated August 13, 1975, as supplemented November 3, 1975, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations; and

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

2. Accordingly, the license is amended by a change to the Technical Specifications as indicated in the attachment to this license amendment and Paragraph 3.A.(2) of Facility License No. DPR-3 is hereby amended to read as follows:

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

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" (2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications, as revised by issued changes thereto through Change No. 123 ."

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Original signed by:
Robert A. Purple

Robert A. Purple, Chief
Operating Reactors Branch #1
Division of Reactor Licensing

Attachment:
Change No. 123 to the
Technical Specifications

Date of Issuance: NOV 12 1975

ATTACHMENT TO LICENSE AMENDMENT NO. 18

CHANGE NO. 123 TO THE TECHNICAL SPECIFICATIONS

FACILITY OPERATING LICENSE NO. DPR-3

DOCKET NO. 50-29

Revise Appendix A as follows:

Remove pages 209:1, 209:6, 209:8, 209:10, 216:1, 228:3, 228:4 and insert identically numbered pages.

OFFICE ➤						
SURNAME ➤						
DATE ➤						

209 RADIOACTIVE WASTE DISPOSAL SYSTEM

General

The waste disposal system receives, contains, adequately treats and safely disposes of all radioactive wastes other than certain separately handled low activity wastes which may come from the secondary plant. The basic processes used in this system are: natural decay of radioactive isotopes, filtration to remove most of the radioactive particulate matter, evaporation to concentrate radioactive constituents in a small volume of liquid waste to be solidified in concrete, incineration to concentrate activity in a reduced volume of solid wastes, filtration by charcoal and HEPA filters, and dilution of low activity liquid and gaseous discharge. 123 It is the objective to operate the nuclear plant and the waste disposal system in such a manner as to maintain a balanced water inventory in the waste disposal tankage, such that little or no purified liquid waste discharge from the plant is necessary. This will be accomplished by recycling purified water to primary plant make-up. Small surplus amounts of purified water, together with certain liquid wastes from the secondary plant, will be diluted with condenser cooling water and discharged, as they occur. The waste disposal system consists of liquid and gas storage tanks, gas stripper, evaporator, incinerator, wet gas scrubber, pumps, compressors, heat exchangers, filters, instruments, piping and valves, all as shown on drawing No. 9699-RM-41F.

Although not a part of the waste disposal system, certain waste systems of the secondary plant are discussed in this section so that all waste handling methods are described in one place.

The potential sources of radioactive liquid and gaseous wastes to be processed by the waste disposal system are as follows:

Main Coolant System

Charging and Volume Control System

Purification System

Sampling System

Chemical Shutdown System

Vent and Drain System

Shutdown Cooling System

Vapor Container Drain Liquid

Safety Injection - Shield Tank Cavity System

Radioactive Laboratory, Decontamination Cubicle and Decontamination Pad Drain Liquids

Contaminated Laundry Drain Liquid (If on site laundry installed in future)

Contaminated Area Floor Drain Liquid

Steam Generator Drain Liquid

Processed liquid wastes from the waste disposal system will be discharged only if the activity contained therein, in combination with any activity being released from the steam generator blowdown, is within the maximum permissible concentration, after dilution, which is established in AEC Regulations, Part 20.

Although it is planned to have all contaminated clothing laundered under contract by a commercial laundry, all necessary facilities are provided for handling the waste liquids from an on site contaminated laundry. This will permit the installation and use of laundry equipment in the Service Building if this becomes necessary in the future.

The total volume of contaminated area floor drains and other miscellaneous drains cannot be determined. However, it is expected that these liquids will consist of small and infrequent batches of low activity fluids.

Processed Gaseous Wastes

The processed gaseous wastes consist almost entirely of hydrogen and radioactive fission product gases which are dissolved in the liquid discharged to waste disposal, or which continuously leak through or are released intermittently to the primary drain collecting tank by the pressure control valve on the low pressure surge tank. Fission gases and hydrogen are collected from the distillate accumulator and from the vapor space of all reactor effluent liquid drain and hold-up tanks in a completely closed waste gas header system. This is compressed to a gas surge drum, which is bled back to the compressor suction to maintain a constant pressure on the waste gas header and a cushion to permit filling and emptying of tanks. Initially, this system will be filled with nitrogen and this atmosphere may be maintained indefinitely at the option of the operator.

The net gas make collects gradually in the waste gas surge drum and is removed once each month from the compressor discharge line and stored under pressure in one of the three gas decay drums for about 60 days to reduce the activity. The decayed gas discharged from a gas decay drum is passed through a deep bed particulate filter and then released at a carefully controlled rate to either of two exhaust ventilation system filter banks consisting of prefilters, charcoal and HEPA's. The primary auxiliary building filter train is normally used, however if this train becomes inoperative, the vapor container ventilation and purge train can be used. Interlocks are provided to shut off, automatically, the flow of waste disposal gas if either fan stops. After filtration, the decayed gas and exhaust ventilation air are discharged to the atmosphere from the primary vent stack. The stack gases are continuously monitored. The processed gaseous waste equipment is designed and sized to accommodate the maximum expected activity emanating from the main coolant. Dilution is also provided so that all gaseous effluent accumulated during a period of continuous plant operation can be discharged at acceptable concentration during two-thirds of the hours in that period. This provides operating flexibility and allowance for equipment maintenance. 12

In the case of waste disposal plant operation alone, and when averaging concentrations over a period of one month or one year, the MPC calculated for continuous exposure in an unrestricted area may be increased by a factor of 1.5, since radioactive air is to be discharged only 20 out of every 30 days of plant operation. This gives a corrected MPC in the air discharged from the stack of 4.5×10^{-7} microcurie per ml for krypton-85 or for xenon-133.

Based on the intermittent discharge of a mixture of air and radioactive krypton-85 and xenon-133 to the suction of either the Primary Auxiliary Building exhaust fan or the vapor container purge fan, the volumes and activity levels of gaseous waste, assuming cladding defects in 1% of all fuel rods, are as follows:

Average volume of gaseous wastes, scf per month	205
Average gross activity of gaseous wastes:	
At zero decay, microcurie per ml	80.1
At 60 days' decay, microcurie per ml	4.31
Discharge rate of decayed gaseous wastes, scf per hr*	0.43
Air dilution volume, cfm	23,000
Average gross activity of air discharge from the stack, microcurie per ml	1.35×10^{-6}
Total activity discharged to the atmosphere, curie per month	25.2
Total volume of radioactive krypton-85 released, ml per month	16.2

123

The air discharged from the stack during a 20 day period has a gross activity level about one-fifth that permitted by the AEC Regulations for mixed identified isotopes in a restricted area. In order to satisfy the AEC proposed MPC of 4.5×10^{-7} microcurie per ml for discharge two-thirds of the total time in an unrestricted area, an additional dilution factor of about 4.6 is required. Since the decayed gas is being emitted at 26 fps, the dilution by entrainment above the stack gives the required dilution, with wind speeds less than 10 fps, without resorting to the atmospheric diffusion away from the source to produce the dilution. At wind speeds in excess of 10 fps, the turbulent atmosphere provides a dilution factor of 5 within 30 ft of the stack. The formulae in Section 301, METEOROLOGY, show that the expected maximum ground level concentration, with wind speeds of 10 fps, and an effective stack height of 150 ft, is of the order of 1/3,000th of the concentration at the top of the stack; i.e., a dilution factor of 3,000.

*Based on discharging decayed gas 20 days out of every 30 days of plant operation.

The analysis of the leakage hazard is based on the split of volatile and nonvolatile main coolant activities given in Section 106 and maximum permissible concentrations (MPC's) of radioisotopes appearing in the current text of AEC Regulation 10, CFR Part 20. MPC's for isotopes not appearing in the current text are obtained from the proposed amendment to Part 20. Where the MPC for the soluble and insoluble forms of an isotope differ, the more restrictive form is assumed. No credit is taken for radioactive decay of nonvolatile isotopes during steam generator holdup.

Two general criteria for MPC's are used. One set of criteria for mixtures of unidentified isotopes is used as a basis for selecting set points for continuous radiation monitoring equipment. A second, less restrictive set of criteria may be used after periodic sampling and isotopic determinations of steam generator blowdown and air ejector effluent to permit maximum discharge rates consistent with 10 CFR Part 20.

The following MPC criteria are established to provide a basis for continuous monitoring.

a. For "unrestricted area" water-borne activity consisting of "unidentified beta or gamma emitters or any undetermined mixtures of beta or gamma emitters": 1×10^{-7} μc per ml at the circulating water discharge to Sherman Pond.

Steam generator blowdown monitor alarm set points will be established based on the availability of approximately 138,000 gpm of condenser circulating water for dilution purposes which will be assumed to contain no natural or fallout activity. This dilution is less than Sherman Pond inflow during 1941, the driest recorded year, which averaged over 200,000 gpm.

b. For "unrestricted area" air-borne activity consisting of "unidentified beta or gamma emitters or any undetermined mixtures of beta or gamma emitters": 1×10^{-9} μc per ml at the closest unrestricted area.

The air ejector effluent monitor alarm set point will be established based on the availability of approximately 23,000 cfm of primary auxiliary building exhaust fan or vapor container purge fan capacity for dilution purposes which will be assumed to contain no natural or fallout activity. In addition, a dilution factor of 1,000 will be assumed to be available from the top of the primary vent stack to the closest unrestricted area. Smoke tests performed under the most unfavorable meteorological conditions - that is, with a temperature inversion and light down-valley winds - indicate that a dilution factor of approximately 5,000 may be expected. These smoke tests are discussed on pages 301:3, 301:4, and 403:7. 123

216 VAPOR CONTAINER ATMOSPHERE CONTROL SYSTEMS

General

The vapor container is a spherical steel envelope designed to contain all vapors, gases, liquids, and solid materials which may be the result of leakage from the primary system. The atmosphere control systems limit the vapor container temperature to a minimum of 50°F in the winter and 120°F during summer operation and will remove the airborne radioactivity during operation and after shutdown to facilitate refueling and maintenance operations. The systems are shown on drawing No. 517-F-417.

Ventilation to Outside Atmosphere

Some airborne activity may still be present in the vapor container air after depressurizing the main coolant system. The ventilation and purge system reduces the activity levels in the vapor container to allow personnel access. 123
The purge system capacity is based on the radioactivity in the air of the vapor container at the time the main coolant system is depressurized. This system filters the vapor container air until the concentration of airborne activity is reduced to tolerance levels as prescribed by the AEC Regulations (10 CFR Part 20).

Outside air is delivered into the vapor container through an air supply unit (consisting of filters and heating coils), fan and interconnected ductwork. 123
The exhaust air from the vapor container passes through a high efficiency filter assembly (consisting of prefilters, charcoal and HEPA's) before being discharged up the primary vent stack. Normally closed valves are provided at the vapor container, to be opened only after the primary plant has been depressurized.

The air filters, heating coils, and exhaust fan are located in the mechanical equipment room of the Primary Auxiliary Building. 123
The inlet fan for the vapor container is located on the roof of the P.A. Building. The supply and exhaust air valves are located at the container.

Two valves, one 8 in. and one 30 in., are provided in the exhaust duct for control of the exhaust air rate. The air leaving the vapor container is discharged to the atmosphere through the primary vent stack located between the Primary Auxiliary Building and the vapor container.

The components of the ventilation system are shown on drawing No. 517-F-417.

Recirculation, Heating and Cooling

Heat released during plant operation from hot insulated and uninsulated surfaces, together with solar radiation, contribute to the heat gain of the vapor container air. The vapor container is completely sealed from the natural atmosphere and no air, other than that which leaks from the container and is replaced by the leakage monitoring system, enters or leaves the container during operation. The ventilation system cooling units limit the air temperature inside the container to values which will prevent damage

Roof exhaust fans are provided for summer heat removal for the machine shop and water treating plant. Outdoor air for ventilation of the machine shop is drawn through open windows and doors and for the water treatment plant through louvered openings in the exterior wall.

Summer ventilation for plant stores, service office and contaminated instrument room is by natural means through open windows.

The unit ventilator and air conditioning equipment for the supply air are located in mechanical equipment room No. 1 above the Service Building roof. This room also houses the decontamination cubicle exhaust fan as well as water heating equipment, hot water heating system heat exchanger, expansion tank and circulators. The mechanical equipment room is exhausted in the summer by a thermostatically controlled roof exhaust fan, interlocked with a motor operated damper associated with a louvered air intake in the exterior wall.

Office Building

With the exception of the toilet and locker rooms and the janitor's closet, ventilation of spaces in the Office Building is by natural means through windows.

A unit ventilator serves the toilet and locker rooms. Air is exhausted from these spaces by a system connected to a fan located above the roof.

Primary Auxiliary Building

In the radioactivity clean portion of the Primary Auxiliary Building a roof type exhaust fan provides summer ventilation with supply air entering through open windows and doors.

Ventilation, heat removal, heating, dilution and filtration of possible 123
hydrogen leakage in certain equipment compartments during operation and maintenance periods for the potentially contaminated portion of the Primary Auxiliary Building are provided by a supply system and an exhaust system. Filtered outdoor air, heated when required, is furnished by a supply unit ventilator located in mechanical equipment room No. 3 and is distributed by ducts to the potentially contaminated area. Air is exhausted from each of the shielded compartments through ducts connected to a high efficiency filter assembly (consisting of
prefilters, charcoal and HEPA's) and an exhaust fan which discharges to the 123
primary vent stack. The filter assembly and exhaust fan are located in the mechanical equipment room. Provisions are made to permit the use of the vapor container purge filter assembly or fan for Primary Auxiliary Building exhaust in the event the Primary Auxiliary Building exhaust filter assembly or fan becomes inoperative.

The mechanical equipment room is ventilated by the systems serving the potentially contaminated areas of the building.

Waste Disposal Building

Air from the waste disposal building is exhausted to the mechanical 123

equipment room No. 3. There, it is joined by the Primary Auxiliary Building exhaust air ventilation for filtering through the high efficiency filter assembly before being discharged to the primary vent stack by the Primary 125
Auxiliary Building exhaust fan. There is a wall mounted exhaust fan in the waste gas compressor room that will automatically start in the event air flow in the duct system is lost. Make-up air is heated in the winter by unit heaters.

Fuel Transfer Pit House

Ventilation for the fuel transfer pit house is also provided by the 125
Primary Auxiliary Building exhaust fan via the high efficiency filter assembly. After filtering the fan discharges the exhaust air to the primary vent stack. Outdoor air enters the structure through a wall mounted supply louver.