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June 29, 1992

Re: Indian Point Unit No. 2
Docket No. 50-247

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US Nuclear Regulatory Commission
Mail Station P1-137
Washington, DC 20555

SUBJECT: 1991 10 CFR §50.59(b) Report for Indian Point Unit No. 2

Pursuant to 10 CFR §50.59(b)(2) enclosed please find a copy of Indian Point Unit No. 2's §50.59(b) changes, tests and experiments accomplished during 1991.

Should you or your staff have any questions regarding this matter, please contact Mr. Charles W. Jackson, Manager, Nuclear Safety and Licensing.

Very truly yours,

Enclosure

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ATTACHMENT

10 CFR 50.59 (b) REPORT

CHANGES, TESTS AND EXPERIMENTS FOR 1991

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
INDIAN POINT UNIT NO. 2
DOCKET NO. 50-247
JUNE, 1992

1. Cycle 10/11 Refueling - Cycle 11 Operation

Indian Point Unit 2 was refueled following the end of its tenth cycle of operation. All 53 region 10 fuel assemblies were removed, along with 3 assemblies from region 11 and 8 assemblies from region 12. They were replaced by region 13 fuel with enrichments of 3.75 and 4.05 w/o. The cycle 11 loading consists of 65 region 11 assemblies, 64 region 12 assemblies, and 64 region 13 assemblies.

The assemblies in regions 12 and 13 are Westinghouse optimized fuel assemblies (OFA), while the region 11 assemblies are Westinghouse low parasitic (LOPAR) fuel assemblies. Region 13 assemblies contain debris filter bottom nozzles to reduce potential fuel failures due to debris build-up. They also utilize integrated fuel burnable absorbers (IFBA), which are burnable absorbers coated onto the pellets of selected fuel rods. IFBA are used along with wet annular burnable poison absorbers (WABA) in controlling power peaking and the moderator temperature coefficient. The OFA fuel does not contain thimble plugs, although they are used in LOPAR fuel elements that do not contain either secondary sources or control rods.

The evaluation for cycle 11 demonstrates that the core reload, including the design changes discussed above, did not adversely affect the safety of the plant. It was determined that there was no increase in the probability of occurrence or the consequences of any accident or malfunction of equipment important to safety previously evaluated in the Updated Final Safety Analysis Report (UFSAR). The reactivity of the OFA fuel is within the limits of the spent fuel pool analysis. No technical specification revisions were required.

The margins of safety are not reduced, and no unreviewed safety question was found to be involved in the cycle 10/11 reload and cycle 11 operation.

2. Replacement of HP Turbine Rotor and Associated Setpoint Changes

In 1987 a new rotor was installed in the high pressure (HP) turbine. That rotor was optimized for a reactor power level of 2758 MWt, which was the licensed power at that time. In 1990, the operating license was amended to allow operation at 3071.4 MWt. The previously installed rotor has been refurbished and reconfigured to account for electrical power generation at the current licensed reactor power level. The refurbished rotor was installed in the HP turbine during 1991 and the HP turbine interstage drain system was modified by installing larger piping.

The turbine does not perform any safety or accident mitigating function. Previous analysis has shown that the HP turbine is not a credible source of missiles. No accident analysis or technical specifications were impacted by reinstalling the original rotor, and no unreviewed safety question was involved.

In conjunction with the rotor replacement, setpoints for certain safety, control and alarm functions were changed. The revised setpoints are consistent with technical specifications for operation at the 3071.4 MW power level, including appropriate uncertainties. They were found not to constitute an unreviewed safety question per 10 CFR 50.59.

3. Modify Emergency Diesel Generators to Increase Capability

The emergency diesel-generators (EDGs) were modified to increase their rated capabilities to 2300 kW (1/2 hour within any 24 hour period) and 2100 kW (2 hours within any 24 hour period.) The continuous rating remains at 1750 kW. Modifications included replacement of certain major engine components such as exhaust piping, the exhaust silencers, and turbo-chargers and jacket water/lubricating oil coolers.

The ventilation system for the EDG building was upgraded to enable it to handle the larger heat loads from the upgraded EDGs. Modifications included replacement of fans and their power supplies.

The modified EDGs meet applicable seismic Class I requirements. The ventilation system and its electrical supplies meet seismic, single failure and separation This modification did not degrade the capability of the EDG's to perform their safety function. Margins of safety were not reduced by these modifications and no unreviewed safety question was found to be involved.

4. Modifications to 480 VAC Electrical System

The 480 VAC electrical system was modified to eliminate requirements for extensive operator actions to strip non-essential loads in the event of loss of offsite power. Modifications consisted of installing three new motor control centers (MCCs), modifying power feeds to existing MCCs, and moving load feeds. Non-essential loads were segregated onto MCCs that are not automatically powered from the EDGs.

These modifications enhance the accident mitigation capability of the operators by eliminating the necessity to manually strip individual non-essential loads. The new MCCs (which feed essential loads) are class IE, and electrical redundancy and separation requirements were met. Cables routed between MCC's and the 480 VAC bus switchgear met all plant cable separation requirements. Seismic integrity of cable trays and conduits was maintained. Tray fill, de-rating and combustible loading have been evaluated and found to be acceptable. No unreviewed safety question was found to be involved.

5. Additional Power Source for Control Room Ventilation System Components

To improve reliability of the central control room ventilation system, feeds for the Back-up fan, Booster Fan 21, and eight motor operated dampers were moved. They had been powered from the same EDG (23) as their redundant counterparts. Modifications included installation of a new motor control center and a power distribution panel, connected to receive power from EDG 22. Power feeds for the items listed above were moved to the new components. The PAB exhaust fan #21, the boric acid transfer pump #21 and battery charger #23 where transferred to a different MCC to improve reliability.

The new motor control center is class IE, and associated power and control cables meet separation and seismic criteria. There was no change to the functioning of the system; this modification improved reliability by providing redundant equipment with redundant power sources in the event of loss of offsite power. No unreviewed safety question was found to be involved.

6. Improve Power Supply Separation for Component Cooling Pumps

Independence and redundancy of the power supplies for the component cooling pumps were improved by connecting them so that each of the three EDGs supplies power to one pump. Power cable routings were separated, and starting order and timing of these pumps and the non-essential service water pumps was changed. MCC-211 was also relocated to another 480 VAC bus and its automatic trip feature was removed so it will not be stripped.

Routing of cables associated with this modification meets separation requirements. Seismic integrity of trays and conduits has not been compromised. Tray fill, cable derating and combustible loading have been evaluated and found to be acceptable. For the worst-case, EDG loading would be within its rating. These modifications were found not to involve an unreviewed safety question.

7. Improve Separation of Small Power and Control Cables

Separation of small power and control cables has been improved by the installation of metal barriers and thermal blankets within the raceway system at locations where the minimum specified separation distances cannot be maintained. The barriers and blankets protect cables associated with one channel from damage induced by electrical faults and failures of a cable of a redundant system. This modification does not affect the separation requirements for safe shutdown systems that are used to comply with Appendix R to 10 CFR 50.

Installation of the barriers and blankets does not affect the safety functions of the cables or their systems. Required deratings and effectiveness of blankets as a thermal barrier were evaluated. The potential for materials inside the containment to degrade and block the recirculation sump was evaluated and ruled out. The modification was found not to involve an unreviewed safety question.

8. Improvement of Separation of DC Power to EDGs

Procedural changes have been made to improve the separation of the DC power supplies for the EDGs. Connections are provided so that each of the three EDGs can receive DC power from two different sources, selected by an automatic transfer switch. Two of the four battery sources provide either normal or alternate power to two EDGs. Procedures were changed to open a breaker from one source to each transfer switch, allowing each EDG to receive power from only one DC source, the DC source supplied with AC power from that EDG. In the event of failure of a DC power source, breakers would be manually operated to supply DC power from the other source, through the transfer switch.

This procedural change provides assurance that a failure of one DC supply could not affect more than one EDG. It also eliminates the possibility of a DC transient to one or more EDGs caused by the failure of the normal DC power supply and the subsequent operation of the transfer switch to restore power from the alternate source. Neither the probability of occurrence of an accident nor its consequences are increased. The possibility of an accident of a different type is not created, and no unreviewed safety question was found to be involved.

9. Provide Diverse Power Sources for 480 VAC Switchgear Room Fans

The three ventilation fans for the 480 VAC switchgear room previously received power from the same MCC. Their power supplies have been changed to assure that a single failure and/or loss of offsite power will not result in loss of power to all fans. Each fan is powered from a different MCC. One of these MCCs is powered from EDG 22 in the event of loss of offsite power, and two from EDG 21. To provide additional protection against excessive ambient temperature in the switchgear room, a high-temperature alarm has been provided in the control room.

These modifications improve the reliability of the ventilation system in maintaining normal temperatures in the 480 VAC switchgear room, and will provide a means to give the operators timely warning of high temperatures. Operation of the fans is not otherwise affected. This modification was found not to involve an unreviewed safety question.

10. Add Additional Breakers to DC Bus Ties

A single normally open tie breaker is provided between DC power panels 21 and 22, providing the operators with flexibility in dealing with abnormal events. This breaker is required by procedure to be locked open if the reactor is critical or the reactor temperature is above 350°F. A second breaker, which is subject to the same procedural requirements, was added in series with the existing tie breaker. Adding the second breaker eliminated the possibility of a single failure resulting in a failure to maintain DC train separation. The modification, which was performed with the plant in the cold shutdown condition, involved temporarily de-energizing power panel 21. This was done at cold shutdown during which many DC loads are not needed. Loads requiring power during this time were fed by temporary cables through breakers of appropriate capacity. The addition of the second bus tie breaker was found not to involve an unreviewed safety question.

11. Electrical Circuit Breaker Replacement

Type HFA molded case circuit breakers are being replaced with RHFA breakers on an as required basis during normal maintenance. The new breakers are specified by the original vendor as replacements for the originals, and have equivalent or superior design attributes. The function of the breakers is being maintained, and no new failure modes are introduced. An unreviewed safety question was found not to be involved.

12. Modifications to Facilitate Safety Injection Flow Testing

The Safety Injection System provides capability for coping with certain postulated accidents. The High Head Safety Injection (HHSI) Pumps are designed to be capable of delivering borated water to the reactor coolant system over a wide range of system pressures. The HHSI pumps are equipped with orifices in their discharge lines to balance flows and prevent exceeding their runout flow limits at low reactor coolant system pressures. The fixed orifices which had been used were replaced with variable orifices, and connections were provided for future installation of a full-flow test line.

System performance was re-analyzed taking into account the best currently available information on system and component conditions, demonstrating that safety requirements are met. Variable orifices facilitate adjustments as required to assure optimum performance. The future full-flow test line will eliminate the need for reactor cooldown-draindown evolutions for system testing and orifice adjustments.

Similar variable orifices are used in other plant systems. Position indicators, positive locking devices and administrative controls are used to preclude mispositioning. The entire installation has been analyzed to assure its integrity under seismic conditions. Accident analyses confirm that the system meets criteria for accident mitigation. No unreviewed safety question was found to be involved.

13. Provide Overpressure Protection for Suction Line of Safety Injection Pump 22

Under certain conditions, leakage through the check valve at the discharge of Safety Injection Pump 22 could have caused excessive pressure in the pump's suction line, threatening its integrity. A relief line was installed between the suction piping, which is isolated for recirculation, and the common suction of the Safety Injection pumps. This line assures that pressure cannot exceed the design value. The modification was designed and installed in accordance with seismic and other system requirements. It will not adversely impact any other system, and no unreviewed safety question was found to be involved.

14. Condensate Storage Tank Oxygen Control

To minimize the oxygen content of the makeup water to the hotwell, the condensate storage tank (CST) is equipped with a system which injects nitrogen into the bottom of the tank at a low rate. Additional equipment to improve the control and measurement of oxygen in the CST has been installed, along with a permanent nitrogen storage tank.

The storage tank, which replaced the tank trailers that had been used, has a capacity of 6000 gallons of liquid nitrogen. Vaporizers, piping and other equipment were also installed.

The existing blanket system capacity was too low to prevent air from being drawn into the tank through the atmospheric vent when there was a high flow rate from the tank. Therefore, equipment has been added to sense water flow from the CST and inject additional nitrogen into the CST as required to prevent air ingress. The nitrogen can not affect the Auxiliary Feedwater (AFW) System or the condensate system since it is released to atmosphere after the void above the CST water is filled. An analyzer has been installed to monitor oxygen levels in the water in the CST.

To further minimize the amount of oxygen entering the steam generators, a hydrazine addition system has been installed for the line entering the CST from the vacuum deaerator booster pump discharge. Approximately 4 ppm residual hydrazine will be maintained in the water in the CST.

The nitrogen storage tank is located outside the CST security fence. It is seismically designed in accordance with the uniform building code, and is equipped with pressure relief and safety valves in accordance with the ASME Boiler and Pressure Vessel Code. Therefore, its installation has no effect on any plant systems or components.

Analysis has shown that the injection of additional nitrogen into the CST cannot cause overpressurization of the tank, by a large margin. The nitrogen, if injected at the maximum possible rate, will flow to the atmosphere via either the 8 inch vent or the 3 inch breather valve. Injection system components are supported so as to preclude the generation of seismically induced missiles.

The hydrazine addition system is designed and installed so it will not impact the CST or equipment it supplies. The addition of a residual hydrazine concentration to the CST has no affect on any piping or components. The CST analyzer is located outside the CST security fence and cannot seismically impact the CST or other safety-related equipment.

None of the equipment or components described above performs a safety related function. They do not increase the probability of occurrence or consequences of an accident, and margins of safety are not decreased. No unreviewed safety question was found to be involved with these modifications.

15. Radiation Monitoring System Modifications

The following monitors have been installed. Their analog output, control, and alarm functions were placed in service.

R41--Containment air particulate
R42--Containment gas
R43--Plant vent air particulate
R44--Plant vent gas
R52--Cooling water from steam generator blowdown purification system
R55A, B, C and D--Steam generator secondary system
R60--Stack Vent

Monitors R41 through R44, which meet seismic class I requirements, replaced monitors R11 through R14, which have been removed from service.

High range gas monitor R27 was connected to provide a signal to the MIDAS computer. This modification facilitates post-accident off-site radiation dose assessments. The power source for this monitor's low range sample pump was changed to improve reliability.

Radioiodine monitors RI1 through RI4 were removed from service. Their original function was to divert air flow from various plant vents through charcoal filters on detection of airborne radioiodine. Plant operation was subsequently changed so that air normally flows through the filters; therefore, the RI-1 through RI-4 monitors are no longer needed. Area monitor R-10, which was provided to monitor radiation levels inside containment following a LOCA, was also removed from service. Following the TMI-2 accident, monitors R-25 and R-26 were installed to fulfill the requirements of Regulatory Guide 1.97 for high-range containment monitoring, so that R-10 is no longer needed.

An interlock associated with the sample flow to the waste gas decay tank monitor, R50, was removed. This change assures that the monitor will receive a continuous sample flow.

Monitors R41 through R44 provide the same functions as R11 through R14, with greater reliability. R41 through R44 are seismically qualified and are powered from a class IE source.

Monitors RI1 through RI4 no longer served any purpose and there was no requirement for them. The other modifications improved the radiation monitor system. None of the changes described above were found to involve an unreviewed safety question.

16. Traveling Screen Replacement

New traveling screens have been installed for the circulating water system of unit 2 and for the river water system of unit 1, replacing the previously-installed traveling and fixed screens. Included in the replacement project are a new screen wash system, a fine screen for use when traveling screens are removed for servicing, and a system to return fish from the screens to the river. The screen wash system has a normally closed alternate supply to the non-essential service water header through a check valve to prevent potential loss of service water to the screen wash system.

The traveling screens and their accessories are not safety related. Equipment installed in this modification is seismically supported where it traverses the service water bays, which are safety related.

This modification did not create the possibility for an accident or malfunction of a different type than previously evaluated, and the margins of safety as defined in the technical specifications are not reduced. The intake requirements for the service water pumps are unaffected. No unreviewed safety question was found to be involved.

17. Install Titanium Tubes in Condenser 21

Condenser 21 was modified by removing the tubes, support plates, tubesheets and water boxes, and installing modular titanium tube bundles and new water boxes. This modification will reduce in-leakage and enhance secondary system water chemistry. The condenser is not safety related, and is located in a non-safety related area. The replacement did not involve any functional change to the condenser, and contained no changes that would degrade fire protection, environmental qualification or seismic adequacy. No unreviewed safety question was found to be involved.

18. Install Additional Thermal Sleeve in Steam Generator Feedwater Nozzles

A second thermal sleeve was installed in each steam generator feedwater nozzle. The purpose of the modification was to eliminate leakage into the annulus formed by the thermal sleeve and the nozzle. The newly installed sleeve has been evaluated for a minimum life of at least 1000 reactor trips. The design assures that failure of the modification would not introduce loose parts into the steam generator. Flow effect is negligible, and the service life of the thermal sleeve was not reduced. This modification was found not to involve any unreviewed safety questions.

19. Improve Subcooling Monitoring Capability

The existing microprocessor-based subcooling margin monitors provide the operators with information for use in mitigating inadequate core cooling events and determining effectiveness of recovery actions. Additional temperature and pressure signals were provided to the monitors for redundancy and to allow them to supply additional information. Displays were installed in place of another subcooling monitor, which was removed. The modified subcooling monitors can give the operators subcooling information based on representative core exit data, hot leg conditions, and cold leg conditions. The monitors are fully redundant, and each receives redundant temperature and pressure signals.

This modification improves the reliability of information supplied to the operators. It will have no adverse affects on the equipment with which it interfaces, and was not found to involve an unreviewed safety question.

20. Component Cooling Pump Control Improvements

Either one or two of the three component cooling pumps are run at any time, depending on plant conditions and river water temperature. A pressure switch automatically starts a component cooling pump if one operating pump stops. The system was modified by adding a second pressure switch. In the two-pump mode, the remaining pump will start if a pump stops. On loss of offsite power and/or safety injection signal, the low pressure signal for automatic start is bypassed and component cooling pumps are started either automatically or manually, depending on conditions. A flow switch was also added to provide local indication and control interlocks for pump operation.

This modification affects no accident prevention or mitigation features, and introduces no functional or seismic degradation. Margins of safety were not reduced and no unreviewed safety question was found to be involved.

21. Provide Bypass for Testing Channel Trip Logic

Individual channels of protection systems have been modified to bypass their trip logic relays during channel testing, reducing the risk of inadvertent reactor trip during on-line testing. Systems affected are the reactor trip system, the engineered safety features initiation system, the auxiliary feed pump auto-start system, and the high steam generator level turbine trip system.

The modification is based on generic designs and evaluations which have been reviewed and approved by NRC. They show that the reduction in inadvertent trips more than offsets any decrease in system reliability during the short periods that the relays are bypassed. This design incorporates existing alarms and indication as well as procedural controls and double verification to ensure only one protection set is in test at a time and to ensure return of the set to normal.

These changes do not alter the functions of the reactor trip system or the safety features initiation systems. They do not create the possibility of a new or different type of accident, and do not reduce the margins of safety. No unreviewed safety question was found to be involved.

22. Replace Pressurizer Spray Valves

To improve reliability and maintainability, one of the pressurizer spray valves was replaced and a manual isolation valve provided. The spray valve function was not altered. Analysis and modification of the pipe supports assured that seismic capability was maintained. Design pressures, temperatures, flow rates and other system parameters were not changed. Margins of safety were not reduced, and no unreviewed safety question was found to be involved.

23. Instrument Air System Improvements

The instrument air system was improved by replacing copper tubing with stainless steel, replacing some isolation valves and installing additional ones, adding drain valves, and installing fittings to facilitate in-service testing. These changes improve system reliability and flexibility, and facilitate in-service testing of other plant components. There was no change to system function and design characteristics and no new failures are introduced. Evaluations were performed and supports added as required to assure that the system continues to be capable of functioning after a safe shutdown earthquake. No unreviewed safety question was found to be involved.

24. Facilitate Inspection of An Accumulator Check Valve

A section of component cooling water piping located just above one accumulator check valve interferes with disassembly and inspection of the valve. Flanges were added to the cooling water piping to facilitate its removal and reinstallation when required. There were no functional changes. The installation meets appropriate piping code and seismic requirements. This modification was found not to involve an unreviewed safety question.

25. Revise and Update the Fire Protection Program Plan

The Fire Protection Program Plan (FPPP) documents the fire protection plan for the plant to meet the requirements of 10 CFR 50.48(a) and includes fire protection and safe shutdown evaluations. The FPPP has been revised to (1) make editorial and administrative corrections, (2) reflect plant design changes that were subject to previous 10 CFR 50.59 evaluations, (3) add new fire hazards analyses for four plant areas, (4) add safe shutdown flow diagrams, and (5) incorporate evaluations resulting from NRC Generic Letter 86-10. These changes are consistent with NRC requirements and guidance and/or were previously approved by NRC as part of the plant fire protection licensing basis. No unreviewed safety question was found to be involved.

26. Modification of Procedure for Charcoal Filters Deluges

The deluge systems for the charcoal filters for the primary auxiliary building, the boric acid building, and the containment building purge system had been operated in the automatic mode, in which deluge is initiated automatically by a high temperature signal. To prevent this, procedures were modified to allow operational modes that require operator action, prompted by high temperature alarms, to initiate deluge. Inadvertent actuation of the water systems would significantly degrade the capability of the charcoal filters. These operating modes are in accordance with current industry standards and recommendations. The increase in response time for a filter fire would not significantly affect fire suppression capability. System performance for design basis events is preserved, and the potential for adverse affects of spurious actuation is reduced. No unreviewed safety question was found to be involved.

27. Disconnect Heat Trace Circuits for Monitor Tanks

Heat trace circuits for the three monitor tanks were disconnected and removed from service. The monitor tanks were part of a system for boron recovery and reuse which is no longer used and has been partially removed. The heat trace circuits served no purpose, and their disconnection was found no to involve an unreviewed safety question.

28. Install High-point Vent on Containment Spray Line

A high-point vent valve was installed on the line from the refueling water storage tank to the containment spray pumps. The valve facilitates removing air which is trapped when the tank is emptied and refilled. Installation of the vent did not affect the safety function of the line. Analysis assures its integrity under seismic conditions. No unreviewed safety question was found to be involved.

29. Install Waste Holdup Tank Overflow

A 6-inch overflow line has been installed to route overflow from the waste holdup tank (WHT) to the WHT pit sump, preventing the overflow from going to the primary auxiliary building ventilation system. The WHT pit is designed to hold the entire contents of the WHT. This modification decreased the probability of a radiological release to the environment and was found not to involve an unreviewed safety question.

30. Provide Enclosure for Containment Valves

A permanent enclosure was constructed for the exterior containment purge supply and exhaust valves, replacing a temporary enclosure. The permanent enclosure has a heating system to maintain an ambient temperature of at least 60°F. This will assure optimum performance of the purge valves, which have resilient seals. All components are seismically mounted to ensure protection of the valves during a design basis earthquake.

The heating function is not safety related. Accident analyses were not affected by this modification, and margins of safety were not reduced. No unreviewed safety question was found to be involved.

31. Modify Topping Pump Piping

The topping pump is used to provide makeup to the accumulators. It has no safety function but is located near the safety injection pumps and connected to their suction and discharge piping through normally-closed valves. The topping pump suction piping was replaced with larger pipe. A section of the discharge line was also replaced with larger pipe. This modification introduces no functional changes to any plant system and does not result in flow diversion from the safety injection system or affect system performance requirements. The installation is seismically designed to assure the integrity of the safety injection system will be maintained in the event of a safe-shutdown earthquake. This modification was found not to involve any unreviewed safety question.

32. Provide Improved Refueling Cavity Floor Plate Covers

Before the refueling cavity is flooded for refueling, covers are installed over openings in the floor plate. New covers have been provided which were designed with additional margins of safety against impact of a dropped heavy object. Quick locking fasteners are used to minimize personnel exposures during installation. Margins of safety were not reduced and no unreviewed safety question was found to be involved.

33. Steam Generator Carry-over Measurement

Moisture carryover in the steam from the steam generators was measured using sodium-24 as a tracer. The steam generator isolation function, which is initiated by the steam generator blowdown monitor (R-49), was placed in the bypass position so it would not initiate closure of the blowdown isolation valves. Capability of closure on phase A containment isolation was not affected. The offsite dose from postulated accidental release of the tracer was analyzed and was found to be well below technical specification limits. Exposure to plant operators was controlled by procedure. Plant operating conditions during the test were within the bounds of the safety analyses.

No unreviewed safety question was found to be involved in performing the test.

34. Steam Generator Tube Plugs

Industry experience has shown that steam generator tube plugs made of Inconel 600 can be susceptible to stress corrosion cracking. In the event of full circumferential failure of a plug, its head could separate from the body and be propelled at high velocity into the tube. Various methods have been used to preclude this potential for the various plugs that have been installed, including the use of plug-in-plug devices, plug retainers, and replacement of plugs.

At Indian Point 2, plug retainers have been inserted into some existing tube plugs, and plug-in-plug devices have been installed in others. In the event of plug failure, either would serve to restrict the flow of primary coolant toward the plug, thus limiting the velocity of the plug head. Both plug retainers and plug-in-plug devices are designed to meet appropriate criteria of the ASME Code, Section III.

One existing rolled plug contains a mandrel which was broken off during installation of the plug and cannot be retrieved without incurring excessive radiation exposures to personnel. Analysis shows that the mandrel would restrict flow in the event of plug failure, thereby preventing excessive velocity of the plug head.

Plugs were also removed and replaced with plugs made of Inconel 690, which is more resistant to stress corrosion cracking in certain environments. The design and fabrication of these plugs is based on the requirements of the ASME Code, Section III.

Welded plugs were also used, accompanied by weld plug dams. A weld plug dam is a device used to stop any dripping or leaking water from interfering with installation of a welded plug. It is a mechanical plug with a hole drilled through. The hole is closed by a small amount of polypropylene, which melts at operating temperatures and precludes a closed space between the dam and the plug.

These methods provide additional protection against failure of existing tube plugs. They do not increase the probability or consequences of any accident or malfunction previously analyzed, or create the possibility of a an accident that has not been previously analyzed. Margins of safety were not reduced and no unreviewed safety question was found to be involved.

35. Steam Generator Modifications and Operation

During steam generator maintenance activities, minor design modifications were made. The generators were inspected and foreign objects were found and retrieved. A few objects could not be retrieved, and others known to be present could not be found. Their effects during plant operation were evaluated.

One design change was the addition of a threaded hole for mounting an accelerometer on steam generator #24. The hole is 1/4 inch in diameter and 1/2 inch deep, in the 3.75 inch thick shell. Stresses and fatigue usages have been evaluated in accordance with the ASME Code and shown to be acceptable. Installation of the accelerometer does not add any significant load.

The other design change is a new design for the fastener for the insert which is attached to the primary manway covers. It protects the cover from corrosion by the primary fluid and retains the gasket during installation. The fasteners are threaded fasteners modified to reduce the time (and radiation exposure) required for installation. They are outside the gasket sealing surface and not exposed to the reactor coolant.

The potential effects of foreign objects in the steam generators were evaluated to assure that the plant could be operated safely. The evaluation considered tube wear, chemistry, effects on instrumentation, and potential for migration to other systems. It concluded that there is no unreviewed safety question with respect to the objects in the steam generators. Similarly, the modifications described above were found not to involve an unreviewed safety question.

36. Discharge from Unit 1

A planned, monitored release of sightly radioactive water was made from the Indian Point Unit 1, annulus recirculation sump to the Hudson River. The water was recirculated and sampled prior to release according to plant procedures. All sources of fluid to the release source were isolated during the release. No unreviewed safety question was found to be involved.

37. Operation of Purge/Pressure Relief Valves

With the reactor in the cold shutdown condition, a jumper was temporarily installed to permit opening the containment purge and pressure relief valves with radiation monitors R-11, R-12 and R-14 out of service. However, radiation monitor R-27 was in service. The applicable operating procedure was followed, and the valves were opened. Because of reactor coolant conditions and procedural safeguards, the possibility of an accident or malfunction of a different type than any previously analyzed was not created. No unreviewed safety question was found to be involved.

38. City Water System Outage

The city water system, which supplies the fire protection water system, was taken out of service and its storage tank drained to replace several valves. Water for fire protection was available from the diesel-driven fire pump supplied from the fire water storage tank. A dedicated operator in contact with the control room was available to start the pump in the event of a fire emergency, and one of the electric fire pumps could have been started if needed. Backup high-pressure fire protection water was available from Indian Point Unit 3. An additional backup water supply was available from the service water system through a hose connection. Continuous fire patrols were established, and other compensatory measures were taken to maintain a high level of fire protection.

The city water system outage was accomplished during cold plant shutdown with all fuel removed from the reactor vessel. It was not in conflict with the technical specifications since alternate fire protection water supplies were provided. The valve replacement and associated water system outage was found not to involve an unreviewed safety question.

39. Install Replacement Circuit Breaker

The circuit breaker for one reactor coolant pump seal injection stop valve was temporarily replaced with a different model. The breaker provides overcurrent protection for the motor-operated valve. The replacement breaker performs the same function as the original, and is set to trip at the same current. Both the original and the replacement are class IE, seismic category I. The replacement does not adversely impact any plant system or component, and preserves the original protective function. No unreviewed safety question was found to be involved.

40. Temporarily Jumper Primary Auxiliary Building Fan Interlocks

Inoperable interlocks for the supply fan of the primary auxiliary building ventilation were temporarily jumpered to allow normal ventilation system operation. The interlocks that were jumpered prevent fan operation if the exhaust fan is not operating or is under freezing conditions. Exhaust fan operation was assured by administrative controls. Freeze protection was available from temperature sensors which monitor temperature downstream of the supply fan heating coils. The temporary jumper was found not to involve an unreviewed safety question.

41. Remove Interlock on Electrical Tunnel Exhaust Fans

A single relay was provided to stop both electrical tunnel exhaust fans in the event of actuation of the cable spreading room halon system (a manually actuated fire protection system). To prevent a trip of both fans in the event of a single failure, the interlock was bypassed. The halon system is manually actuated, and the fans will be manually stopped if it is actuated. An alternate safe-shutdown system is provided which is independent of the cable spreading room. Fire protection was not adversely affected by this change, and the reliability of the fans, which are required by technical specification, was improved. There was found to be no unreviewed safety question.

42. Temporarily Modify Sodium Hydroxide Flow Requirement

A sodium hydroxide solution is available to control the pH of the containment sump in the event of a loss of coolant accident. The solution is added to the containment spray solution through an eductor in the containment spray piping. During surveillance testing, the flow rate of sodium hydroxide through the eductor was found to be less than the value specified in the UFSAR. The required flow was recalculated based on specific plant conditions (actual boron concentrations, volumes, etc.) at the time. The available flow was found to be adequate to perform the required function of assuring the proper pH in the containment. The calculation demonstrated temporary continued operability of the containment spray system and was found not to involve an unreviewed safety question.

43. Block Louvers in Emergency Diesel Generator Building

One of the air-operated louvers in the EDG ventilation system was temporarily blocked open pending repairs to its actuator. Blocking open has been specified for May through October, and blocking closed the other months. Analysis shows that operation in this mode will assure adequate ventilation to prevent excessive temperatures with the EDGs running, and will assure that the building temperature remains above the required minimum. This temporary change was found not to involve an unreviewed safety question.

44. Decontaminate Unit 1 Steam Generators

The steam generators of Indian Point Unit 1, which are no longer in service, were chemically decontaminated to reduce future radiation exposures to personnel. Coolant pumps and other primary system components up to the loop isolation valves were also decontaminated. Activities associated with this project were confined to the Unit 1 containment and chemical systems building. Since Unit 1 is no longer in service there was no impact on safety related systems or components. Liquid wastes were returned to the plant for processing and resins were packaged for offsite disposal. Fire protection and ALARA requirements were met. There was no impact on any technical specification for either Unit 1 or Unit 2. No unreviewed safety question was found to be involved.

45. Provide Future Unit 2 Electrical Supply to River Water Pumps

The river water system, which receives power from Indian Point Unit 1, may be used to supply cooling water to various coolers associated with Unit 2 steam and power conversion systems. Using the river water system reduces the load on the Unit 2 service water system. Components have been installed to provide future controls and power to the river water system for Unit 2. These consist of control switches in the Unit 2 control room along with 6.9 kV swithgear and breakers.

A control switch for the Unit 2 sluice gate solenoid dump valves was also installed. This is a Class 1E circuit.

Neither the river water system nor the systems it supplies are safety related. The 6.9 kV breakers are seismically restrained to assure they cannot affect nearby safety-related equipment. The installation, including cables and conduit,

meets plant fire protection, separation and seismic criteria. Margins of safety were not reduced and no unreviewed safety question was found to be involved.

46. Provide for Transfer of CVCS Wastes to Waste Collection Tanks

A pipe, a check valve and a stop valve have been installed from the gas stripper feed pumps of the chemical and volume control system (CVCS) to the Unit 1 waste collection tanks. This allows direct transfer of wastes from the CVCS to the waste collection tanks, eliminating the necessity of transferring them to the waste holdup tank and then on to the waste collection tanks. The installation meets seismic class I criteria. It allows bypass of an intermediate holding point for liquid wastes, but does not impact the normal effluent release process. No unreviewed safety question was found to be involved.

47. Replace Retaining Block Studs in Accumulator Check Valves

Retaining block studs were replaced in the check valves in the accumulator discharge lines of the emergency core cooling system. The replacement studs are stronger and more resistant to stress corrosion cracking than the originals. Valve functioning was not affected and no unreviewed safety question was found to be involved.

48. Relocate Cooling Water Feed for Auxiliary Feedwater Pumps

Bearing cooling water for the motor-driven auxiliary feedwater pumps is supplied from the city water system. The cooling water takeoff point was changed to provide better isolation of the city water system from the AFW pump suction. Bearing cooling water enhances the operational life of the pumps. Cooling water piping involved in this modification is seismically supported. No unreviewed safety question was found to be involved.

49. Installation of Current Limiters on Non-IE Cables

Current limiters have been installed in certain feeder circuits from safety-related busses to preclude non-class IE cables from potentially affecting redundant trains or channels. The current limiters (which are similar to fuses) clear faults quickly to protect against exceeding the thermal limits of these cables. They provide additional protection beyond that afforded by the Class IE breakers provided for these feeders.

These devices, along with the breakers in the feeder circuits, assure that these cables (which do not serve safety related functions) will not affect the safety-related circuits with which they are associated. They are seismically installed and do not affect the functioning of any circuit. No unreviewed safety question was found to be involved.

50. Generic Replacement of Valves

Manual and check valves, 2 inches and smaller, are being replaced on an "as-needed" basis with Conval valves. In addition, when valves are replaced on vents and drains which are 3/4 inch and smaller, blind flanges are replaced by swagelock fittings. The new valves are functionally equivalent to those being replaced. Components meet or exceed existing specifications, materials are compatible, and system functions are not changed. Seismic capabilities are verified as appropriate. Therefore, no unreviewed safety question was found to be involved in connection with the modification.

51. Provide Temporary Nitrogen Supply During ILRT

The instrument air system was taken out of service during the containment integrated leak rate test. A temporary nitrogen supply was provided to certain valves to maintain them in the position required for the test. The valves would otherwise have gone to the "safe" position on failure of the temporary supply or occurrence of a signal to the valves to change position. Their safety function was not changed and no unreviewed safety question was found to be involved.

52. Upgrade Manipulator Crane Accessories

The load cell and the limit switch on the manipulator crane were replaced with upgraded components to improve reliability. The crane is used only during refueling outages with the reactor shut down. The function and design requirements for the crane were not affected by the change, and the probability or consequences of a fuel handling accident were not increased. No unreviewed safety question was found to be involved.

53. Chemical and Volume Control System Decontamination

The letdown and charging portions of the chemical and volume control system were chemically decontaminated to reduce personnel radiation exposures during maintenance activities. This was accomplished by circulating chemical solutions through the system. At the conclusion, the system was rinsed and purged to remove any residual chemicals. Double barriers were used to assure the decontamination solutions did not reach other systems, and all fuel was removed from the reactor during the operation. The process used has been tested and determined to have no effect on system materials. Design functions were maintained and no unreviewed safety question was found to be involved.

54. Upper Internals Evaluation

During refueling, the reactor upper internals assembly was inadvertently moved laterally in a manner that allowed it to contact its storage stand. The assembly and the lifting rig were inspected and found to be undamaged except for two small rub indications. Estimates of stresses resulting from the impact showed they were within allowable limits. Functional capability of the components were not degraded, and no unreviewed safety question was found to be involved.

55. Remove Air Ejector Drains to Condenser

The drains from the Steam Jet Air Ejector Condensers to the main condenser were cut and capped. The possibility of heat exchanger leakage of service water made them a potential source of chloride contamination to the condenser and steam generators. The drains had been isolated from the condenser prior to their removal. None of the components involved serve a safety function, and there was found to be no unreviewed safety question.

56. Install Jumper to Refill Residual Heat Removal System

A hose jumper was connected to fill the residual heat removal system with borated water from the refueling water storage tank. The system had been drained for maintenance while all reactor fuel was stored in the spent fuel pool. The jumper, which had a pressure rating well in excess of the maximum available pressure, was contained within the radiologically controlled area. Affected safety systems were not required during this operation, since the reactor had been defueled. No unreviewed safety question was found to be involved. This jumper was controlled procedurally to ensure its proper removal at the appropriate time.

57. Flush Seal Injection Piping

Hose jumpers were connected to supply water from the primary water system to flush the seal injection piping of one reactor coolant pump. The procedure was carried out with the reactor in the cold shutdown condition. The piping to be flushed was isolated from other systems to assure that the reactor coolant chemistry would not be affected. The procedure did not adversely affect the functional performance of any system, and no unreviewed safety question was found to be involved. This jumper was controlled procedurally to ensure its proper removal at the appropriate time.

58. Inspect Service Water Bay

The service water bay of the intake structure was inspected by divers. To ensure their safety, it was necessary to shut down the service water pumps. Two hose jumpers from the fire protection system supplied the service water system during the service water pumps outage. The plant was in the cold shutdown condition and service water flow requirements were minimized while maintaining emergency power capability and other required safety functions. Evaluations showed that fire protection requirements were met during this procedure. No unreviewed safety question was found to be involved.

59. Jumper Condensate System Valve Open

A minimum condensate storage tank inventory is reserved for the auxiliary feedwater system to assure safe plant shutdown. To guarantee its availability, the valve supplying water for other uses automatically closes if the tank level drops to a preset point. The sensor that initiates valve closure was temporarily jumpered during performance of maintenance activities. To compensate for loss of this automatic function, additional tank inventory was maintained and verified by the control room operators at intervals of 15 minutes. They would have been able to initiate valve closure if necessary. Analysis showed that a 30 minute delay in closing the valve would assure maintenance of the minimum required inventory. These measures and analysis established that this temporary jumper did not reduce the margins of safety; and no unreviewed safety question was found to be involved.

60. Provide Temporary Portable Diesel Generator

With the plant in the cold shutdown condition and fuel removed from the reactor, two emergency diesel generators (EDGs) were removed from service. One EDG remained operable and a portable diesel generator was installed, so that adequate redundant emergency power sources were available to back up offsite power. The margin of safety was not reduced. Technical specifications do not address EDG operability while the plant is in cold shutdown. No unreviewed safety question was found to be involved.

61. Provide Temporary Power Supplies During Electrical Maintenance

Various motor control centers and busses were de-energized for maintenance with the reactor in the cold shutdown condition. Temporary jumpers were installed to provide power for the following:

- the battery chargers,
- MCC 27, which supplies the spent fuel pit pumps and the fuel storage building exhaust fan, among other items
- a backup supply for a spent fuel pit pump,
- the auxiliaries for EDG 22,
- the compressor for containment radiation monitors R11 and R12, and
- MCC 28, which provides power for the polar crane.

All jumpers and power sources were capable of carrying the temporary loads, and appropriate circuit protection was provided. Outages of the various busses and MCCs were sequenced to maintain an appropriate level of reliability and redundancy. Required functions were maintained and no unreviewed safety question was found to be involved.

62. Use of Freeze Seals

Freeze seals were used to facilitate a condensate storage tank piping repair and several component repair/replacements in the component cooling water (CCW) system. Freeze sealing is conducted in accordance with qualification testing and approved station procedures. Precautions are taken to prevent brittle fracture or freeze formation over surface flaws, and emergency repairs required in the unlikely event of freeze failure are pre-planned. The CCW repairs were made with the fuel removed from the reactor and stored in the spent fuel pit. The only CCW cooling load was the spent fuel pit. At least two sources of makeup to the pit were available. No unreviewed safety question was found to be involved.

63. Temporary Fuse Clip Replacement

A defective fuse clip in MCC-29 was temporarily replaced with a clip that was modified to match the connecting cable. The current carrying capacity of the modified clip meets load requirements and the function of the fuse is not affected. The clip is in the non-safety-related portion of the MCC. No unreviewed safety question was found to be involved.

64. Provide Alternate Power to Solenoid Valve for Diesel-Generator Building Louvers

EDG 21 was removed from service for maintenance, removing control power from one of the two solenoid valves that control the EDG building ventilation louvers. An alternate source of power for the solenoid valve was provided during the maintenance outage, maintaining the functional capability of systems to control EDG building temperature. No unreviewed safety question was found to be involved.

65. Replace Charging Pump Check Valves

The two check valves in the discharge line from each charging pump were replaced. The original valves were oversized, causing eventual seat deterioration and leakage. The replacements are correctly sized as determined by engineering calculations. This modification improves their reliability but does not change the functioning of the valves or the Chemical and Volume Control System. Margins of safety were not reduced and no unreviewed safety question was found to be involved.