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NewYorkPower Authority

Robert J. Barrett
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U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Subject: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
License No. DPR-64
Submittal of Service Water Assessments and Improvement Plan

Dear Sir:

This letter provides, in Attachment I, a summary of the assessments and planned corrective actions for the Service Water System at Indian Point 3. This information is being provided in response to your request in the transmittal letter for NRC Region I Inspection Report 50-286/96-10.

Enclosure I contains the New York Power Authority's current Service Water System Improvement Plan for your information. Subsequent revisions to the Improvement Plan, if any, will be available onsite for your inspection.

There are no commitments made by the Authority with this letter. If you have any questions, please contact Mr. K. Peters at (914) 736-8029.

Very truly yours,

Robert J. Barrett
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Indian Point 3 Nuclear Power Plant

Attachment I
Enclosure I

cc: See next page

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cc: Mr. Hubert J. Miller
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Summary of Service Water Assessments and Improvement Plan

Two service water system material condition assessments have been performed which concluded that small bore pipe replacements and additional pipe weld inspections on large bore pipes are required during the upcoming refuel outage scheduled for April 1997.

The material condition assessments were performed both by NYPA and an outside consultant. The assessments evaluated the service water system design, operation, and maintenance practices.

The assessments concluded that the system has suffered from numerous pinhole leaks over the years. Leakage occurs mostly at pipe welds but occasionally occurs mid pipe and in valve bodies. The rate of leaks is about one per month and appears to be increasing. Leaks have been in both carbon steel and stainless steel materials. Small diameter pipe (less than 4 inch) is affected more than larger diameter pipe.

Most of the leaks are of the pinhole type with a very small leak rate. Leaks have not been significant to safety since they are not large enough to spray on safety-related equipment or significantly affect the cooling flows to equipment served by the service water system.

Failure mechanisms in the service water system include galvanic corrosion at dissimilar metal connections, general pitting in stainless steel valves and pipes with low or no flow, crevice corrosion in gaps between two sections of welded cement lined carbon steel pipe, general corrosion wastage in carbon steel valve bodies, and erosion in carbon steel pipes in highly turbulent areas.

Non-destructive examinations (NDE) have been performed extensively to evaluate material condition. Both ultrasonic testing (UT) and radiography (RT) have been used to identify wall thinning at welds and other locations. A pipe crawler visual inspection, conducted in 1992, showed that the cement liner was in place in a large section of one 24" main and that the liner at weld joints had been grouted after welding. The general condition was good.

To address the issue of leaks in the service water system a pipe replacement, inspection and contingency repair strategy has been developed. Inspections will be performed both prior to and during the refuel outage. This will be accompanied by a major pipe replacement effort. Pipe replacement will continue during the operating cycle following the spring 1997 (R09) refueling outage based on longer lead time on some key components. During the operating period following R09 and prior to the R10 refueling outage (estimated for spring of 1999), we expect to replace approximately 200 small bore valves. During R10, an additional 130 valves have been targeted for replacement. This is part of an ongoing valve replacement effort. The pipe replacement strategy will be reassessed after the R09 outage using the inspection results as a basis to determine appropriate corrective actions on large bore pipe. Current plans are to repair large bore cement lined carbon steel pipe, when feasible, or replace it with cement lined carbon steel.

Summary of Service Water Assessments and Improvement Plan

A. Background Information

The current efforts for the upgrade of the service water system during refueling outage R09 began with programs developed subsequent to the issuance of Generic Letter 89-13, but which have now been accelerated and expanded.

The response to GL 89-13 included the establishment of a corrosion monitoring program which involves non-destructive examination (NDE) of at least 50 locations in the service water system over a two year period, corresponding to the length of a full fuel cycle. The locations would be chosen based on guidelines provided in procedures developed for the program and based on review of past leakages in the service water system. Results from this program had already led to planned replacements of small bore piping in the system for R09. The scope of this work was further expanded with the results of more recent assessments of the condition of the service water system, along with recent extent of condition investigations of leaks in both piping and valves in the system.

Additional work stemming from GL 89-13 included a heat exchanger performance pilot test program and biofouling monitoring both in the service water system and at the intake structure.

B. Refueling Outage (R09) Efforts

The key areas of the service water system scheduled to be replaced, subject to material availability during R09 are:

- The 3 inch and smaller pipes and valves to and from the Instrument Air Closed Cooling (IACC) heat exchangers (approximately 490 feet of pipe and 11 valves).
- The 3 inch and smaller carbon steel pipe and valves to the Control Room Air Conditioning (approximately 132 feet of pipe and 16 valves). The condensers in the air conditioning units will also be replaced.
- The Containment Recirculation Fan (CRF) cooling coil inlet flanged connections will be eliminated (approximately 100 feet of pipe with 160 flanges).
- The CRF motor cooler return pipe between each motor cooler outlet isolation valve up to and including the SWN-71 containment isolation valves (approximately 800 feet of pipe with 5 valves and 5 instruments).
- The CRF inlet relief valve discharge and drain pipe lines (approximately 100 feet of pipe and 5 valves).
- The five SWN-51 CRF radiation monitor sample line containment isolation valves.

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- Pipe and valves associated with R16A and R16B (approximately 100 feet of pipe and 5 valves).

- The 4 inch and smaller carbon steel pipe to the Turbine Building Chemistry Lab (approximately 160 feet of pipe, 1 1/2" and 4" predominating, and 3 valves).

- Four Isolation valves and two bypass valves around TCV 1106 and 1107.

- Twelve new brass valves on the excitor air coolers.

- The four Main Turbine Generator hydrogen gas coolers, which were sleeved in the Fall of 1995, will be replaced with coolers using an improved aluminum bronze alloy tubes and tubesheets.

- A total of nine, 3" isolation valves will be added to the Service Water and back-up Service Water Strainer Backwash system to allow on line replacement of 3 inch and smaller pipe during the next operating cycle. Valves will be either AL6XN or, depending on availability, 316 stainless steel.

- An isolation flange will be installed at each of the circulating water pumps to facilitate online replacement of the circulating water pump bearing pipe and valves during the next operating cycle. Six sets of flanges will be installed to allow for partial completion of this modification on line. Total project scope involves approximately 540 feet of 1" and 2" pipe with 150 valves.

- Replacement piping material will use 904L stainless steel at the CRF cooling coils and 6% molybdenum stainless steel in all other replacements noted here. These materials have shown excellent resistance to corrosion, especially in low flow or stagnant conditions.

- There will be approximately a two fold increase in the non-destructive examinations (NDEs) performed on the service water system to assess the material condition of large bore pipes. Thirty radiograph examinations (RT) will be performed on large bore pipes in the containment just prior to or during the R09 outage. This represents about a 10 percent weld population of large bore pipes inside containment. A minimum of twenty five additional NDEs will be performed outside of the Containment just prior to or during the R09 outage on pipe associated with key areas in the service water system (e.g., Emergency Diesel Generators and the Component Cooling Water Heat Exchanger, etc.). Based on these weld inspection results this population may be expanded.

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- Interior inspection of approximately 400 feet of underground 24 inch pipe will be performed during R09 using a robot crawler with a television camera.

C. Post Refuel Outage (R09) Efforts

The scope of pipe replacement begun during R09 will continue after the plant has returned to service. Three modifications will be completed during plant operation Cycle 10. They are as follows:

1. The installation of new 2" and 3" backwash piping on the main service water strainers (approximately 200 feet of pipe and 18 additional valves);

2. The installation of new 2" and 3" backwash piping on the backup service water strainers (approximately 100 feet of pipe and 9 additional valves); and

3. The replacement of pipe and valves (primarily 1") downstream of the isolation flanges on the seal oil cooling and bearing lubrication lines for the circulating water pumps.

Due to material availability, more modifications will be performed during refueling cycle R10, as well as the replacement of any valves that were installed temporarily during R09 using a material other than the 6% molybdenum stainless steel.

No large bore piping is scheduled to be replaced at this time. However, based on the NDEs performed during R09, large bore pipe replacement will be evaluated within one month of startup.