U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Report No: 50-286/87-28

Docket No. 50-286

Licensee: New York Power Authority
10 Columbus Circle
New York, New York 10019

Facility: Indian Point Nuclear Generating Station, Unit 3

Location: Buchanan, New York

Dates: December 22, 1987 to February 8, 1988

Inspectors: P. S. Koltay, Senior Resident Inspector
P. W. Kelley, Resident Inspector, IP 2
T. Foley, Senior Resident Inspector

Approved by: Jon R. Johnson 2/23/88
Jon R. Johnson, Chief date
Reactor Projects Section 2C, DRP

Inspection Summary:
Inspection on December 22, 1987 to February 8, 1988 (Inspection Report 50-286/87-28)

Areas Inspected: Routine onsite regular and backshift inspection of plant operations including shift logs and records; facility operations; licensee actions on previously identified inspection findings; reactor trips; surveillance; maintenance; post accident sampling system operability test; fastener testing to determine conformance with applicable material specifications (NRC Bulletin 87-02, Temporary Instructions 2500/26); and probabilistic risk analysis based inspectons. The inspection involved 114 hours by the inspectors which included 2 hours of backshift inspection on January 4 and 5 hours of weekend inspection on February 7.

Results: No violations were identified during the inspection period. Random equipment failures resulted in two reactor trips. The motor bearing lubrication program is under review by the licensee following the failure of a shielded bearing on the main boiler feed pump lubricating oil pump. This item is unresolved pending licensee resolution. Plant housekeeping has been improved throughout; however, minor packing leaks with boron deposits were noted in the pipe penetration areas. A two week maintenance outage is scheduled to start on May 7.

DETAILS

1. Persons Contacted

Within this report period, discussions were conducted with W. Josiger, Resident Manager, J. Russell, Superintendent of Power, S. Munoz, Superintendent of Technical Services and other members of the onsite and offsite management and their staff.

2. Facility Operations

A reactor trip occurred from 100% of rated power on the first day of the report period, December 22, 1987. The reactor trip followed 108 days of continuous unit operation. The trip occurred while plant personnel were performing a monthly surveillance test on the reactor coolant low flow protection system. The unit was made critical on December 23, and 100% reactor power was reached on December 25. (See section 4.1)

A second reactor trip occurred on February 8, 1988, from 100% of rated power. Following the loss of both main boiler feed pumps due to the loss of a common oil pump, the operator manually tripped the unit in anticipation of loss of steam generator levels. (See section 4.2)

Routine entries into all accessible areas of the plant were conducted by the inspector during this period. The inspector noted improved housekeeping conditions in all areas, including the pipe penetrations, mini-containment and pipe chases, where housekeeping conditions were found to be poor following the cycle 5/6 refueling outage.

The inspector attended several meetings in which the licensee discussed the 14-day Spring maintenance outage scheduled to begin May 7, 1988. The outage worklist includes repairs to the incore detector drive, main turbine generator governor, stop valve controls, and feedwater system leaks.

No violations were identified.

3. Licensee Actions on Previously Identified Inspection Findings

(Closed) Unresolved Item (87-08-01) - Lack of formal policy addressing the use of wheel wrenches (valve cheaters) by operations personnel was identified in the subject report. The inspector verified that a memorandum to operations personnel dated November 4, 1987 provides a clear policy on the use of wheel wrenches by operators. Maximum wheel wrench sizes are identified to be used on certain size valves. The use of extensions to wheel wrenches is prohibited. The memorandum has been read and signed by each nuclear plant operator. The policy detailed in the memorandum is in addition to the existing initial and requalification training program provided to the operators in this area. This item is closed.

(Closed) Unresolved Items (87-08-05 and 87-08-07) - The jumper control procedure in place at the time of the inspection failed to provide a clear policy on the requirements for a safety evaluation prior to jumper installation and records retention upon jumper clearance. The procedure also failed to address changes to the plant computer instrument scan points. The inspector reviewed the licensee's revised procedure AP-13, Jumper Control, Revision 6. The inspector verified that the new procedure clearly establishes the requirement for jumper control. Additionally, a flow diagram aids the assistant shift supervisor, the designated preparer, in the determination of the need for a written safety evaluation. In order to facilitate maintenance activity to clear a jumper, a maintenance work request is written and its numbers entered on the jumper log entry form prior to the installation of the jumper. The jumper control procedure also addresses changes in computer monitoring of plant parameters. The removal of instrument scan points from the computer is identified as a jumper, requiring the evaluations specified by the procedure. This item is closed.

(Closed) Unresolved Item (87-08-08) - Quality assurance oversight of plant operations' activities lacked programmatic goals and procedures. The quality assurance department drafted procedure QAI 2.2, Operational Monitoring, which incorporates detailed goals for the program. The procedure will be issued during March, 1988. The department also initiated a scheduled one week-per-month backshift coverage of operations' activities. Three full time employees including one certified senior reactor operator (SRO) are currently implementing the program. An additional employee presently in SRO license certification training will be added later this year. This item is closed.

No violations were identified.

4. Reactor Trips

Two reactor trips occurred during this period. No major equipment was out of service and no unusual activities were underway prior to the reactor trips. Both trips were caused by equipment failures. Following each event, the reactor was stabilized in the hot shutdown condition. The Safety Parameter Display System (SPDS) computer failed to initiate a sequence of events following the December 22, 1988 reactor trip. Computer engineers identified a software design problem that was subsequently corrected. Sequence of events data was generated by the computer following the February 2, 1988 reactor trip. Post trip reviews were conducted in accordance with procedure AP 21.2, Revision 2. The inspector noted that the requirements of an expanded version of the same procedure were also followed by the licensee. The new revision, not yet issued, provides detailed and comprehensive instructions for post trip review, investigation, restart decisions, and followup activities. The licensee stated that the procedure will be issued during February 1988.

4.1 On December 22, 1987 at 4:30 p.m., the reactor tripped from 100% power due to low reactor coolant flow indication on two out of the three channels associated with reactor coolant loop No. 34. Prior to the reactor trip, Instrumentation and Control (I&C) technicians were performing monthly surveillance test 3PT-M3, Reactor Coolant Flow Analog Functional. The procedure requires that prior to the actual test, each of the twelve bistable switches be tripped, one at a time, to verify that associated bistable proving lamp, channel trip alarm and bistable status lamp function as required. Subsequently, after completing testing on Channel 1, Loops 31, 32 and 33, the bistable for Channel 1, Loop 34 was tripped and was immediately followed by a reactor trip. The licensee determined that contacts 5 to 10 (Channel III, on Loop 34 on relay FC-446X, a Westinghouse type 66BF relay), exhibited high contact resistance due to tarnish buildup. Prior to returning to power operations, the defective relay was replaced. There are 224 relays of this type in the Reactor Protection System (RPS). In order to assure an adequate test program confidence level, all relays (24) associated with trains A and B of RCS flow protection were tested. No additional problems were identified. The unit was returned to power operations on December 24.

4.2 On February 2, 1988 at 9:22 p.m., a reactor operator manually tripped the reactor from 100% power in anticipation of a low steam generator level trip caused by the loss of both main boiler feed pumps (MBFP). Following the trip, the lowest steam generator level was 45% of the wide range. Maintenance personnel determined that the operating lubricating oil pump motor, common to both MBFPs, had seized. This resulted in the loss of control oil pressure, which caused the steam supply valves to the pump turbines to go shut and the overspeed mechanism, also held open by oil pressure, to trip. The redundant oil pump and a D.C. powered backup pump both started upon the loss of the operating oil pump. Due to a lack of coastdown time, the redundant oil and a backup pump were unable to repressurize the oil system prior to the MBFP trip.

Maintenance engineers determined that improper lubrication was a contributing factor to the bearing failure. While the licensee followed technical manual lubrication requirements for the bearings, possible failure to remove a relief plug resulted in pressing the bearing shield against the ball bearings and subsequent failure due to restricted ball bearing rotation. The subject motor bearings have been in service since initial plant startup in 1976. Several years ago, relief valves had been installed in place of the relief plugs, therefore overpressurization of these bearings should not reoccur. Safety-related motors are on a preventive maintenance schedule that requires routine inspection of motor bearings and windings for proper lubrication. A maintenance engineer is reviewing and reevaluating the plant lubrication program for both safety and non-safety related motors. This item remains unresolved pending NRC review of the licensee's evaluation and corrective actions. (87-28-01)

4.3 Assurance of Quality

The site management's increased conservatism in post reactor trip reviews including method of data collection, event analysis, and subsequent unit restart decision has been evident following both reactor trips. The new post trip review procedure is designed to provide continuity for the program.

No violations were identified.

5. Surveillance

The inspector reviewed the following surveillance tests:

- 3PT-M20, Auxiliary Feed Water Pump Functional Test
- 3PT-M18, Residual Heat Removal Pump Functional Test
- 3PT-M17, Containment Spray Pump Functional Test, Rev. 11

No violations were identified.

6. Maintenance

The inspector observed or reviewed the following maintenance activities, while they were in progress, or upon their completion. Specific attention was paid to the following:

- Approved procedures, adequate to control the activity, were being used by qualified technicians.
- There was evidence of QC involvement in the activity.
- The overall internal condition of disassembled equipment, paying particular attention for signs of excessive wear and/or corrosion was acceptable.
- Adequate post-maintenance testing was conducted.

MWRs 11866 and 12776, Emergency Diesel Generator No. 31 Quarterly Preventive Maintenance

Maintenance activities on the EDG and associated output breaker were accomplished in accordance with Procedures 3 PM QES-5, Rev. 4 and 3 PM RES-6, Rev. 4. The equipment acceptance test was accomplished in accordance with Procedure 3PT V16, Rev. 5, Diesel Generator Functional Test.

On January 25, the inspector noted a shift log entry indicating that on the same date, upon reinstalling the No. 31 EDG output breaker following maintenance, an auxiliary feedwater pump and a component cooling system pump unexpectedly started. At the time, the No. 31 EDG was still tagged out for preventive maintenance, and logged as a 72 hour LCO. Operators

promptly secured the equipment and reset both pumps to the automatic start position. The maintenance engineer's investigation identified a small lever on the side of the breaker auxiliary switch enclosure that was installed 180 degrees out of phase, causing a change in the auxiliary switch pattern that initiated a blackout logic start of the equipment. The installation was immediately corrected. The inspector reviewed the maintenance package associated with the breaker maintenance. The breaker disassembly/reassembly procedure did not address the removal and installation of the subject lever, while the removal of the lever was necessary to facilitate the prescribed maintenance. The technical manual for the breaker also failed to identify the lever and its proper positioning. The maintenance engineer stated that he has been assigned the responsibility to develop a test procedure that will verify auxiliary switch position while the breaker is outside the breaker cubicle. The test is planned to be incorporated into the breaker preventive maintenance program prior to the next scheduled preventive maintenance activity on the subject breakers.

The inspector expressed a concern regarding the maintenance mechanics' decision to complete a step that was not identified in the procedure, and to continue with the job without checking with the maintenance engineer. This item was discussed in detail with licensee management. The inspector noted that in response to previously identified procedural weaknesses and numerous examples of failure to follow procedure by plant personnel, site management has initiated training programs to instill a philosophy of close procedural adherence. Procedures continue to be improved in both detail and clarity. The inspector concluded that licensee personnel are fully cognizant of the new program designed to improve procedures and procedure use; therefore, the subject event is considered an isolated case. Management's corrective action by emphasizing the importance of detailed procedures and following of procedural requirements was prompt. No violations were identified.

7. Post Accident Sampling System Operability Test

On January 12, the inspector observed a post accident sampling system drill conducted by site chemistry and health physics personnel. The activity consisted of sampling the reactor coolant during simulated accident conditions in accordance with procedure 3PT-A18, Revision 2. An actual reactor coolant sample was obtained and analyzed as per the procedure.

The licensee demonstrated a thorough familiarity with the evolutions detailed in the procedure. Excellent ALARA practices throughout the drill resulted in whole body and extremity exposure to the participants that were well below the calculated limits which were based on the estimated post accident dose rates. In conjunction with the drill, the technicians tested the use of self-contained breathing equipment, fixed breathing air stations in the PAB, and portable communication systems. All of the above equipment is required to be used during post accident sampling.

All objectives of the drill, including acceptance criteria for reactor coolant sample analyses and calculations to obtain hydrogen, total gas and boron content as well as gas activity and liquid activity, were met. The licensee indicated that minor precautionary procedural changes will be made by clarifying minimum sample line pressure while the sample is obtained and preventing the sample cask from being placed on the floor grating during transport.

No violations were identified.

8. Fastener Testing to Determine Conformance With Applicable Material Specifications (NRC Bulletin 87-02, Temporary Instructions 2500/26)

Material receipt inspection for Category I safety-related and certain non-safety-related material, equipment components and systems identified as Category M, is conducted in accordance with the following procedures:

- Quality Assurance Procedure QAP 7.3, Receiving INspection, Revision 1, dated January 25, 1985

- Quality Assurance Procedure QAI 7.3, Receiving Inspection, Revision 1, dated November 1, 1987

- Quality Assurance Procedure QAI 7.2, Receiving Sampling Inspection, Revision 0, dated December 21, 1983

On January 4, 1988, the inspector witnessed the selection of fastener samples from the licensee's onsite warehouse as required by T.I 2500/26 and NRC Bulletin 87-02. Ten sets, studs and nuts, were selected, tagged and bagged from both safety-related and non-safety-related fasteners. Manufacturer's markings were noted on all samples. The inspector verified that the samples were properly tagged prior to shipment from the site. The licensee stated that test results will not be available in time to meet the response date identified in the bulletin. In a letter to the Regional Administrator dated January 11, 1988, the licensee committed to submit the test results by February 12, 1988.

No violations were identified.

9. Probabilistic Risk Analysis Based Inspections

Using the Probabilistic Risk Analysis (PRA) inspection guidance provided by NUREG-4565, "Probabilistic Safety Study Applications Program for Inspection of the Indian Point Unit 3 Nuclear Power Plant," the inspector performed modified walkdowns outlined in the NUREG for the accessible portions of the following systems:

- Auxiliary Feed Water System

- Containment Spray System

No violations were identified.

10. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable, deviations or violations. An unresolved item is discussed in paragraph 4.2 of this report.

11. Exit Interview

At periodic intervals during the course of the inspection, meetings were held with senior facility management to discuss the inspection scope and findings. An exit interview was held on February 8, 1988 to discuss this report period. During the discussion, the licensee did not identify any 10 CFR 2.790 material.