U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-286/84-10

Docket No. 50-286

License No. DPR-64 Priority -- Category C

Licensee: Power Authority of the State of New York
Indian Point 3 Nuclear Power Plant
P.O. Box 215
Buchanan, New York 10511

Facility Name: Indian Point 3 Nuclear Power Plant

Inspection At: Buchanan, New York

Inspection Conducted: April 23-27, 1984

Inspectors: for Jean A. Cioffi 6-15-84
M. Miller, Radiation Specialist, NRC date

J. Cioffi, Radiation Specialist, NRC
A. Hull, Senior Scientist, Brookhaven National Laboratory (BNL)
W. Knox, Project Engieer, (BNL)
A. Kuehner, Health Physicist, (BNL)

Approved by: M. Shanbaky 6/18/84
Dr. M. Shanbaky, Chief, Facilities Radiation Protection Section date

Inspection Summary: Inspection conducted April 23-27, 1984 (Report No. 50-286/84-10)

Areas Inspected: Special, announced safety inspection of the licensee's implementation and status of the following task actions identified in NUREG-0737: Post-accident sampling of reactor coolant and containment atmosphere; increased range of radiation monitors; post-accident effluent monitoring; containment radiation monitoring; and in-plant radioiodine measurements. The inspection involved 168 hours on site by two region-based inspectors and three contractors from Brookhaven National Laboratory.

Results: Several areas requiring improvement were identified relative to post-accident sampling capability. No violations were identified.

Details

1.0 Persons Contacted

During the course of the inspection, the following licensee personnel were contacted or interviewed:

Licensee Personnel

*J. Brons, Resident Manager
*M. Albright, Instrumentation and Control (I&C) Superintendent
*B. Deschamps, Health Physics General Supervisor
J. Ferrott, Resident Superintendent
*J. Gillen, Chemistry General Supervisor
R. Grover, Corporate Chemist
*W. Hamlin, Assistant to Resident Manager
L. Kelly, Performance and Reliability Supervisor
*M. Kerns, Chemistry Supervisor
*L. Lomonaco, Assistant to Superintendent RESS
M. Morrissey, Performance Supervisor
*S. Munoz, Technical Services Superintendent
*J. Perrotta, Radiological and Environmental Services (RESS) Superintendent
*D. Quinn, RESS Senior Engineer
*P. Saunders, Health Physics Supervisor
J. Schivera, Licensing Coordinator
J. Semrai, I&C General Supervisor

Other members of the licensee's staff were also contacted and/or participated in an exercise of walk throughs of the post accident and monitoring systems during this inspection.

*Denotes attendance at exit interview on April 27, 1984.

2.0 Purpose

The purpose of this inspection was to verify and validate the adequacy of the licensee's implementation of the following task actions identified in NUREG-0737, Clarification of TMI Action Plan Requirements:

Task No.	Title
II.B.3	Post Accident Sampling Capability
II.F.1-1	Noble Gas Effluent Monitors
II.F.1-2	Sampling and Analysis of Plant Effluents
II.F.1-3	Containment High-Range Radiation Monitor
III.D.3.3	Improved Inplant Iodine Instrumentation under Accident Conditions

3.0 TMI Action Plan Generic Criteria and Commitments

The licensee's implementation of the task actions specified in Section 2.0 were reviewed against criteria contained in the following documents.

- NUREG-0737, Clarification of TMI Action Plan Requirements
- Generic Letter 82-05, Letter from Darrell G. Eisenhut, Director, Division of Licensing (DOL), NRC, to all Licensees of Operating Power Reactors, dated March 14, 1982.
- "Orders Confirming Licensee Commitments on Post-TMI Related Issues Indian Point Nuclear Generating Station, Unit No. 3, dated March 18, 1983.
- NUREG-0578, TMI-2 Lessons Learned Task Force Status Report and Shor-Term Recommendations, dated July 1979.
- Letter from Darrell G. Eisenhut, Acting Director, Division of Operating Reactors, NRC, to all Operating Power Plants, dated October 30, 1979.
- Letter from Darrell G. Eisenhut, Director, Division of Licensing, NRR to Regional Administrators "Proposed Guidelines for Calibration and Surveillance Requirements for Equipment Provided to Meet Item II.F.1, Attachments 1, 2, and 3, NUREG-0737" dated August 16, 1982.
- Regulatory Guide 1.4, "Assumptions Used for Evaluating Radiological Consequences of a Loss of Coolant Accident for Pressurized Water Reactors."
- Regulatory Guide 1.97, Rev. 3, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident."
- Regulatory Guide 8.8, Rev. 3, "Information Relevant to Ensuring that Occupational Radiation Exposure at Nuclear Power Stations will be As Low As Reasonably Achievable."

4.0 Post Accident Sampling System, Item II.B.3

4.1 Position

NUREG-0737, Item II.B.3, specifies that licensees shall have the capability to promptly collect, handle, and analyze post accident samples which are representative of conditions existing in the reactor coolant and containment atmosphere. Specific criteria are denoted in commitments to the NRC relative to the specifications contained in NUREG-0737.

Documents Reviewed

The implementation, adequacy and status of the licensee's post accident sampling and monitoring systems were reviewed against the criteria identified in Section 3.0 and in regard to licensee letters, memoranda, drawings and station procedures as listed in Attachment 1.A.

The licensee's performance relative to these criteria was determined by interviewing principal personnel associated with post accident sampling, reviewing associated procedures and documentation, and conducting a performance test to verify hardware, procedures and personnel capabilities.

4.2 Findings

Within the scope of this review, the following items were identified:

4.2.1 PASS Performance Testing

A reactor coolant sample was collected during an operational test witnessed by the NRC Inspection Team on April 25, 1984. The test included a comparison of normal sampling results with those obtained during the post accident sampling system. This test and a drill performed by licensee personnel verified the integrated ability to collect and analyze a sample within the time and dose constraints of NUREG-0737, II.B.3.

A containment air sample was not collected. The licensee was performing a line/loss study which could not be interrupted.

4.2.2 Sampling

4.2.2.1 Reactor Coolant

The reactor coolant sampling system was designed to obtain samples of liquids and dissolved gases during all modes of operation. The ability to obtain representative samples within the stated commitments was satisfactorily demonstrated with the following exceptions:

- The ability to obtain representative samples during all cooling modes could not be demonstrated. Records indicated that all modes had been tested with the exception of the recirculation mode.

- The system's stated design limit for dissolved hydrogen was 200 cc/kg rather than 2000 cc/kg.

- The ability of the system to collect a representative dissolved hydrogen sample was questionable. The first throttle valve produces a sharp pressure drop (2200 to 100 psig) in the liquid/gas mixture which may cause the hydrogen/water ratio to change. This effect could possibly be more pronounced at high hydrogen concentrations.

- The system purge time had not been determined based on an analysis of the line volume and flow rate, and the pressure indicator would not be accessible during accident conditions.

During the test the inspector noted that the remote handling tool used for disconnecting the cask from the sampling station did not function properly. The operator had to manually disconnect the lines. There were also typographical errors, including improper valve identification and incorrect equations in procedure RE-CS-042, "Sampling Various Plant Systems During Accident Conditions." Another concern associated with the sampling procedure was the lack of a check list for procedural steps involving manipulation of valves. Some steps were also performed out of sequence during the drill.

Based on the above findings, the following items should be resolved:

- Document the ability of the PASS to obtain a sample when the reactor system is in the recirculation mode;

- Improve the system design to assure that a representative hydrogen sample can be obtained throughout the expected range of hydrogen concentrations and system pressures;

- Make provisions for observing the flow rate when the operator is outside of the sampling room, and determine the sampling line purge times based on an assessment of the line volume and flow rate; and

- Review procedures to assure that no typographical errors exist; particularly in critical areas such as valve identification and equations.

The licensee stated these actions would be completed by November 1, 1984 (50-286/84-10-01).

In addition to the above findings, the following items should be considered for improvements:

- Improve the design of the remote handling tool used to disconnect the flask from the sampling station;

- Establish a preventive maintenance program for the PASS system; and

- Develop a checklist for the operation of the PASS system and advise operators to sequentially follow the procedural steps.

These items will be reviewed in a subsequent inspection (50-286/84-10-02).

4.2.2.2 Containment Air Sampling

The containment air sampling system does not appear to provide a representative sample because of excessively long sample lines and no heat tracing. Currently, the licensee is conducting a line loss study for determining the plateout of particulates and iodines and expects to provide results of the engineering evaluation to NRR by June 1985. With regard to the operation and design characteristics of the system, the following concerns were identified:

There had been no correction factors developed to compensate for the change in the density of air created by the pumps at the sample collection point. In addition, at subatmospheric containment pressure, the air flow through the auxiliary iodine sampling pump might be reversed due to the action of the larger primary pump and atmospheric pressure on the output side. There were no pressure or temperature indicators associated with the system. The inspector also noted the system purge time required to collect a representative sample had not been determined based on an analysis of the line/sample volume and flow rate.

Other concerns associated with the containment air sampling system were no provisions for purging the iodine cartridge, and the system pumps had not been included in a preventive maintenance program.

Based on the above findings, the following items should be resolved:

- Provide a status report and schedule of actions to Region I based on the line loss study for the containment air sampling lines by January 1, 1985;

- Evaluate and develop appropriate correction factors to compensate for the decreased air density caused by pumps;

- Evaluate and modify system design, as appropriate, to assure that a containment iodine sample can be obtained throughout the expected range of containment pressure;

- Install temperature and pressure indicators near the sample collection point; and

- Determine the sampling line purge times based on an assessment of the line volume and flow rate.

The licensee stated these actions would be completed during the next outage (50-286/84-10-03).

In addition to the above findings, the following items should be considered for improvement:

- Establish a preventive maintenance program for the system pumps; and

- Make provisions for purging the iodine cartridge of noble gases.

These items will be reviewed in a subsequent inspection (50-286/84-10-04).

4.2.3 Analytical Capability

The stated range, accuracy and sensitivities of the analytical methods are not compatible with NUREG-0737 and Regulatory Guide 1.97, Revision 3. The licensee is currently conducting a study to determine the degree of compliance with regulatory guidelines. After the study is complete, specific actions relative to improving the analytical capability will be determined.

The design features of the sample analysis station could also be improved. The air was exhausted through a small pipe, and as such, the linear air flow in the analysis station appeared to be low. Also, there are no drains to control potential spills.

The sample analyses had not been conducted using the standard test matrix. The licensee is evaluating the degree to which the elements in the matrix will be used.

The pump associated with the system has not been included in a preventive maintenance program.

4.2.3.1 Chloride

Chloride analysis was conducted using a specific ion electrode. The licensee indicated interferences had been noted when using the probe in the presence of iodine. An ion chromatograph available was in the laboratory which would not be subject to iodine interferences. However, no provisions had been made to use the system for post accident sample analyses.

The licensee satisfactorily demonstrated the capability to analyze chloride within the stated degree of accuracy. The results of the analyses of spiked chloride samples are contained in Attachment II.

4.2.3.2 Boron

A plasma emission spectrometer was used for determining the concentration of boron in samples. Based on the results of the spiked sample analyses, the licensee satisfactorily demonstrated the ability to conduct boron analyses within his stated range and accuracy. The results of the analysis of the spiked samples are contained in Attachment II.

During the analysis of the sample, the exhaust hood associated with the plasma emission spectrometer was not turned on. There was no step in procedure RE-CA-004, "Determination of Boron In Aqueous solutions", to include turning on the exhaust during the analysis of radioactive samples. This could have caused airborne activity to be released to the laboratory.

4.2.3.3 pH

There are no procedural provisions for conducting pH analyses. Based on discussions with personnel, the equipment was available, however, no commitment has been made to determine the pH of samples.

4.2.3.4 Gross Activity and Isotopic Analyses

The gross activity and isotopic analyses capability were satisfactorily demonstrated. The results of the comparison of the PASS sample and normal sample is contained in Attachment II.

The library of the multi-channel analyzer did not include Ru-105; however, Ru-105 was listed as a reference isotope in the core damage procedure. This isotope was added to the library during the inspection period. Sr-90 was also listed in the core damage procedure as a reference isotope; however, no provision have been made for the analysis of Sr-90.

4.2.3.5 Hydrogen

The gas sample could not be analyzed for the hydrogen content. The gas chromatograph was inoperative.

4.2.3.6 Resolution

Based on the above findings the following items should be resolved to achieve acceptable analytical capability:

- Improve the range, accuracy and sensitivities of the analytical techniques, as appropriate, in order to conform with NUREG-0737 and Regulatory Guide 1.97, Revision 3;

- Demonstrate that elements in the standard test matrix do not significantly interfere with each analytical method;

- Revise RE-CA-004 to require "the plasma emission spectrometer exhaust hood to be turned on when analyzing radioactive samples; and

- Revise the generic core damage procedure to include appropriate site specific conditions and establish a position on the analysis of samples for Sr-90 and its use in the core damage procedure.

The licensee stated these actions would be completed by September 1, 1984 (50-286/84-10-05).

In addition to the above findings, the following items should be considered for improvement:

- Improve the design features of the sample analysis station by increasing the linear air flow rate and adding a drain; and
- Include the system pumps in the preventive maintenance program.

These items will be reviewed in a subsequent inspection (50-286/84-10-06).

4.2.4 Item II.B.2. Design Review of Plant Shielding and Environmental Qualification of Equipment for Spaces/Systems which may be Used in Post-Accident Operations

The shielding and environmental qualification study in the areas which impacted item II.B.3 appeared to be incomplete. The following deficiencies were noted:

The shielding study was based on the concentration of radionuclides existing 8 hours before shutdown rather than 1 hour.

There was no shielding provided for a section of line outside the sampling station leading to the pressure indicator. Although, this is a "dead leg", there would eventually be a build-up of activity in the line. Note: the "dead leg" cannot be flushed.

The in-line oxygen analyzer was in series with, and upstream of the sample cask. The environmental qualification of the system had not been determined. Since the analyzer was located behind the sample panel, this area may not be accessible during an emergency due to the unshielded sampling lines which cannot be flushed.

The inspector also noted that the air exhausted from the iodine cartridge sample would be vented to station ventilation pipe which would contain, primarily, vented noble gases which was not included in the shielding study.

Based on the above findings, the following items should be resolved:

- Provide shielding for the section of pipe leading from the sampling station to the pressure indicator;
- Determine the environmental qualifications of the oxygen analyzer or assure accessibility during emergency conditions;
- Include the analysis of the dose contribution from the containment sample station vent in the shielding study; and

- Perform a dose evaluation study for post accident reactor coolant sampling in accordance with Regulatory Guide 1.4 which assumes one hour decay.

The licensee indicated these actions would be completed by September 1, 1984. These items will be reviewed in a subsequent inspection (50-286/84-10-07).

5.0 Noble Gas Effluent Monitor, Item II.F.1-1

5.1 Position

NUREG-0737, Item II.F.1-1 requires the installation of noble gas monitors with an extended range designed to function during normal operating and accident conditions. The criteria, including the design basis range of monitors for individual release pathways, power supply, calibration and other design considerations are set forth in Table II.F.1-1 of NUREG-0737.

Documents Reviewed

The implementation, adequacy, and status of the licensee's monitoring systems were reviewed against the criteria identified in Section 3.0 and in regard to licensee letters, memoranda, drawings and station procedures as listed in Attachment 1.B.

The licensee's performance relative to these criteria was determined by interviewing the principal persons associated with the design, testing, installation and surveillance of the high range gas monitoring systems, reviewing associated procedures and documentation, examining personnel qualifications and direct observation of the systems.

5.2 Findings

Within the scope of this review, the following was identified:

The licensee had installation a GA Technologies Wide Range Gas Monitor to sample noble gas releases from the main plant vent. They have also made a commitment to install, during the 4/5 shutdown, a system which will provide the same capability for the main steam vent. The current system provides 3 channels of varing sensitivity to provide coverage of the desired dynamic range. The low range channel consists of an isokinetic sampling head connected by heat traced tubing to a sample conditioning module containing particulate and iodine filters. The sample then passes to the sample detection module which includes a 2 cfm pump and a plastic scintillator radiation detector. The intermediate and high range detectors have a separate sampling system sized for isokinetic sampling at 0.6 cfm, including heat traced lines and shielded iodine and particulate filters. The detectors used for this portion of the system are CdTe(Cl) directly coupled to 30 cm^3 and .02 cm^3 gas volume. A microprocessor controls the sample flow rate and which filter and detector channels are used as well as computing and displaying release information. The equipment has been calibrated according to GA Technologies procedures and personnel have been trained.

Based on the above findings, the following item should be resolved:

- The calibration factor for the mid and high range channels should be chosen for the isotopic mix appropriate for a specific time post shutdown. A chart should be prepared showing correction factors to be used for adjusting the release information as a function of time and it should be incorporated into the procedure for determination of the magnitude of release (50-286/84-10-08).

In addition the above finding, the following item should be considered for improvement:

- The GA Technologies wide range gas monitor has an extremely small (.02 cm^3) sample volume in its high range channel. This coupled with the use of solid calibration standards rather than a gas standard in the sample volume leaves a question in the calibration of this channel. A reliable system to assure reproducible sample/detector geometry or the use of a gas standard is required during installation of this system (50-286/84-10-09).

These items will be reviewed in a subsequent inspection.

6.0 Sampling and Analyses of Plant Effluents, Item II.F.1-2

6.1 Position

NUREG-0737, Item II.F.1-2, requires the provision of a capability for the collection, transport, and measurement of representative samples of radioactive iodines and particulates that may accompany gaseous effluents following an accident. It must be performable without exceeding specified dose limits to the individuals involved.

The criteria including the design basis shielding envelope, sampling media, sampling considerations, and analysis considerations are set forth in Table II.F.1-2.

Documents Reviewed

The implementation, adequacy and status of the licensee's sampling and analysis system and procedures were reviewed against the criteria identified in Section 3.0 and in regard to licensee letters, memoranda, drawings and station procedures as listed in Attachment 1.B.

The licensee's performance relative to these criteria was determined by interviewing the principal persons associated with the design, testing, installation, and surveillance of the systems for sampling and analysis of high activity radioiodine and particulate effluents, by reviewing associated procedures and documentation, by examining personnel qualifications, and by direct observation of the systems.

6.2 Findings

The licensee has installed a system which draws a sample as a side stream from an existing plant vent monitor. Samples of particulates, iodine and noble gas are obtained and taken to a counting facility for determination of the iodine to noble gas ratio. This ratio is used with an independent measure of the noble gas release to provide a measure of the total iodine release and release rate. It was determined that the long sampling lines (approximately 200 ft) produced substantial pressure drops at the pumping rates used for sample collection. This could result in a error in the flow determination on which the particulate and iodine samples are based. The noble gas sample will also be affected by the reduced pressure at normal flow rates.

Based on the above findings the following items should be resolved:

- The pressure at the sample station should be measured during sampling and incorporated in the particulate/iodine sample flow rate and noble gas volume determinations; and

- Provision should be made for the purge of noble gas from the plant vent particulate/iodine samples prior to their removal from the sample collection shield. This should reduce the dose received during transfer of the samples to the transport shield and during subsequent operations (50-286/84-10-10).

In addition to the above findings, the following items should be considered for improvement:

- The iodine line loss study now going on should evaluate the effect of altered conditions during the course of an accident. These should include: water vapor, variation of chemical form, continuous vs. intermittent flow and others that might be considered appropriate.

- Consideration should be given to the use of the particulate and iodine filters from the wide range gas monitor. Its present location probably precludes their use for the largest accident considered in 0737 but its shorter sample lines, controlled isokinetic sampling, and provision for remotely controlling the collection of a grab sample are important advantages over the current system.

These items will be reviewed in a subsequent inspection (50-286/84-10-11).

7.0 Containment High Range Radiation Monitor, Item II.F.1-3

7.1 Position

NUREG-0737, item II.F.1-3, specifies that high range containment radiation monitors be installed. The specific requirements are set forth in Table II.F.1-3.

Documents Reviewed

The implementation, adequacy, and status of the licensee's monitoring systems were reviewed against the criteria identified in Section 3.0 and Modification Procedure 79-3-127-RMS, "Containment Hi-Range Area Radiation Monitors".

The licensee's performance relative to these criteria was determined by interviewing the principal persons associated with the design, testing, installation and surveillance of the containment high range monitoring systems, reviewing associated procedures and documentation, examining personnel qualifications and direct observation of the systems.

7.2 Findings

Within the scope of this review, the following was identified:

Two GA ion chamber detectors with extended ranges of 10^1 - 10^8 R/hr had been installed with appropriate separation in containment. Calibration and functional tests had been performed. However, during the last quarterly review to validate operability, one detector did not respond to the test source. The licensee considers the monitor out of service and is investigating the problem.

The inspector noted the licensee was not required to complete the installation of the monitors until Cycle 4/5 outage. This item will be reviewed in a subsequent inspection (50-286/84-10-12).

8.0 Improved In-plant Iodine Instrumentation Under Accident Conditions (Item III.D.3.3)

8.1 Position

NUREG-0737, Item III.D.3.3 requires that each licensee shall provide equipment and associated training and procedures for accurately determining the airborne iodine concentration in areas within the facility where plant personnel may be present during an accident.

The implementation, adequacy, and status of the licensee's in-plant iodine monitoring under accident conditions was reviewed against the criteria in Section 3.0 and in regard to the following documents:

- HPI-6.39, Rev. 1, "Emergency Plan Airborne Activity Determination"
- IP-1070, Rev. 10, "Periodic Check of Emergency Preparedness Equipment"
- IP-1001, Rev. 4, "Discussion of the Determination of the Magnitude of Release"
- Letter from Steven A. Varga, Chief, Operating Reactors, Br. 1, DOL to Leroy W. Sinclair, Pres. & Chief Operating Officer, PASNY, dated February 9, 1982.

8.2 Findings

Dedicated portable equipment for iodine sampling was located in the CR, and OSC/TSC, which was inventoried on a monthly basis. The instrumentation available in the designated areas consisted of a Radeco HD-28B air sampler, with an adequate supply of silver zeolite cartridges and glass fiber particulate filters, an MS-2/SPA-3 gamma spectrometer, single channel analyzer, with a low background cave, a BC-4 beta counter, and a back-up RM-14/HP-210 beta counting system. Adequate records for personnel training in the use of the portable sampling equipment were maintained. There were also specified procedures for the handling of the portable sampling equipment (HPI-6.39). The actual equipment available for gamma spectrometry differed from the equipment described in the emergency procedure IP-1001, Rev. 4, section 8.3. Additionally, no provisions were made for purging loose noble gases from the sampling cartridges.

Based on the above findings, the following item should be resolved:

- Make provisions for purging of iodine sampling cartridges to remove loose noble gases as specified in NUREG-0737, Item III.D.3.3, and revise procedure IP-1001 to address utilization of the available equipment.

This item will be reviewed in a subsequent inspection (50-286/84-10-13).

9.0 Exit Interview

The inspection team met with the licensee's representatives (denoted in Section 1.1) at the conclusion of the inspection on April 27, 1984. The inspection team leader summarized the purpose and scope of the inspection and identified the findings as described in this report.

At no time during this inspection effort was written material provided the licensee by the NRC inspection team.

Attachment I.A
Documentation for NUREG-0737, II.B.3

- PASNY - Indian Point No. 3 Nuclear Power Plant Emergency Procedures

  -- AP-6, "Emergency Plan", Rev. II, dated September 21, 1983.

  -- IP-1001 "Discussion of the Determination of the Magnitude of Release", Rev. 4, dated September 28, 1983.

  -- IP-1002 "Determination of the Magnitude of Release", Rev. 5, dated December 12, 1983.

  -- IP-1028 "Core Damage Assessment", Rev. 0, dated November 24, 1983.

  -- IP-1030 "Procedure for Control Room" Emergency Notification, Communication and Staffing", Rev. 9, dated October 25, 1983.

- PASNY Final Safety Analysis Report, Indian Point 3 Nuclear Power Plant, FSAR Update, Rev. 0, dated July 1982.

  -- 9.4 "Sampling System"

  -- 11.2 "Radiation Protection"

- New York Power Authority Special Procedures

  -- 3PT-A18 "Post Accident Sampling System Operability Test", Rev. 0, dated April 20, 1984
  -- IP3 FSAR Update "Sampling System", Rev. 0, dated September, 1982.
  -- Specification No. 9321-05-252-73 "Specification for Sample Cooling Coils", dated August 18, 1969.

- New York Power Authority Chemistry Procedures

  -- RE-CS-042 "Sampling Various Plant Systems During Accident Conditions", Rev. 6, dated April 19, 1984.
  -- RE-CI-057 "Calibration and Operation of Rexnord Dissolved Oxygen Analyzer", Rev. 1, dated January 23, 1984.
  -- RE-01-007 "Operation of the Fisher Model 1200 Gas Partitioner", Rev. 1, dated September 26, 1983.
  -- RE-CA-071 "Chlorides, Determination by Specific Ion Electrode", Rev. 1, dated May 28, 1982.
  -- RE-CA-300 "Radiochemical Analysis Using Nuclear Data ND 6620 System", Rev. 2, dated March 1, 1982.
  -- RE-CA-004 "Determination of Boron in Aqueous Solutions", Rev. 2, dated May 28, 1982.

- Correspondence

  -- Memorandum from D. Quinn to J. Perrotta dated April 20, 1984.
  -- Letter from J.P. Bayne, executive Vice President Nuclear Generation to S.A. Varga, Operating Reactors Branch No. 1 Chief dated March 23, 1984.
  -- Letter from J.P. Bayne, Executive Vice President Nuclear Generation to D.G. Eisenhut, Director, Division of Licensing, NRC, dated February 17, 1984.
  -- Letter from J.P. Bayne, Executive Vice President Nuclear Generation to S.A. Varga, Chief, Operating Reactors Branch, Division of Licensing, NRC, dated October 26, 1983.
  -- Letter from S.A. Varga, Chief, Operating Reactors Branch, Division of Licensing, NRC, to J.P. Bayne, Executive Vice President Nuclear Generation, Power Authority of the State of New York, dated August 15, 1983.
  -- Letter from W.V. Johnston, Assistant Director Materials, Chemical and Environmental Technology, Division of Engineering to G. Lainas, Assistant Director for Operating Reactors, Division of Licensing, NRC, dated July 28, 1983.
  -- Letter from J.P. Bayne, Executive Vice President Nuclear Generation to D.G. Eisenhut, Director Division of Licensing, Office of Nuclear Reactor Regulation, NRC, dated June 17, 1983.
  -- Letter from J.P. Bayne, Executive Vice President Nuclear Generation to D.G. Eisenhut, Director Division of Licensing, NRC, dated May 10, 1983.
  -- Letter from Quality Assurance and Regulatory Affairs Manager, Orion Research Incorporated to F. Witt, NRC, dated February 10, 1983.
  -- Letter from J.P. Bayne, Executive Vice President Nuclear Generation to S.A. Varga, Chief Operation Reactors Branch No. 1, Division of Licensing, NRC, dated October 12, 1982.
  -- Letter from B.G. Motes, Radiochemistry, to C.E. McCraken, NRC, dated February 16, 1982.
  -- Letter from J.C. Brons, Resident Manager Power Authority of the State of New York, to R.C. Haynes, Director Office of Inspection and Enforcement Region I, NRC, dated December 22, 1981.

- New York Power Authority Drawings

  -- A202245 "Flow Diagram Safety Injection System Sheet 1", Rev. 14, dated September 23, 1983.
  -- A202276 "Flow Diagram Safety Injection System Sheet 2, Rev. 11, dated February 12, 1980.
  -- A202255 "Flow Diagram Sampling System", Rev. 7, dated November 11, 1975.
  -- A202277 "Flow Diagram Auxiliary Coolant System Sheet No. 2", Rev. 12m, dated November 11, 1975.
  -- M-RMS-SK-012 "Containment and Plant Sampling Modification (T.M.I.)", Rev. 2, dated February, 1980.

-- 5651D72 "Logic Diagrams Safeguards Sequence" sheets 3 and 7, Rev. 0, dated 1983.
-- E-RCS-SK-009 "Post Accident Sampling Analysis Cask Schematic and Control Station Wiring Diagram", Rev. 1, dated February 22, 1983.
-- E-RCS-SK-010 "Post Accident Sampling System Conduit Plan and Connection Diagram", Rev. 1, dated February 22, 1983.

Attachment I.B
Documentation for NUREG-0737, II.F.1-1 & 2

- New York Power Authority Procedures

  -- CS-042 "Sampling Various Plant Systems During Accident Conditions", Rev. 5, dated March 13, 1984.

  -- ENG 86A "Acceptance Test Functional Test Procedure for Mod. 80-03-054 RMS, Wide Range Gas Monitor for Plants Vent, Rev. 0, April 7, 1983.

- Licensee Memoranda

  -- D. Quinn to J. Perotta "Dose Evaluation for Post-Accident RCS Sampling and Analysis", dated April 20, 1984.

- Letters

  -- From J.P. Bayne PASNY to D.G. Eisenhut dated March 10, 1983.

  -- J.P. Bayne, Vice President, PASNY to D.G. Eisenhut, Director, DOL, NRR, dated May 10, 1983. IPN83-38.

  -- J.P Bayne, Vice President, PASNY to D.G. Eisenhut, Director, DOL, NRR, dated June 17, 1983.

  -- W.V. Johnston to C.D. Lienas dated July 28, 1983.

  -- S.A. Verge to J.P. Bayne, dated August 15, 1983.

  -- J.P. Seyner, Vice President, PASNY to S.R. Verga, Chief, Operating Reactors Br. 1, DOL dated October 12, 1982.

  -- J.P. Bayne to S.A. Varga, dated October 26, 1983. (IPN-83-89)

  -- J.P. Bayne to S.A. Varga dated December 7, 1983.

  -- J.P. Bayne to S.A. Varga dated March 23, 1984.

  -- J.P. Bayne, Vice President, PASNY to D.G. Eisenhut, Director, DOL, NRR, dated April 28, 1982.

  -- S.A. Varga, Chief, Operating Reactors 1, DOL to L.W. Sinclair, President, PASNY dated June 30, 1982.

Attachment I.C.
Documentation of NUREG-0737, II.F.1-3

- Letters

  -- From S.R. Varga, Vice President, PASNY to G.T. Bayne dated January 19, 1982.

  -- J.C. Bayne to S.A. Varga, Chief Operating Reactor, Branch No. 1, DOL, dated February 1, 1982

  -- From J.G. Bayne, Vice President, PASNY to S.A. Varga, Chief Operating Reactor, Branch No. 1, DOL, dated February 8, 1982.

  -- From J.G. Bayne, Vice President, PASNY to S.A. Varga, Chief Operating Reactors, Branch No. 1, DOL, dated February 19, 1982.

  -- From R.W. Houston, Asst. Director for Radiation Protection, DSI to T.M. Novak, Asst. Director for Operating Reactors, DOL dated February 26, 1982.

  -- From S.A. Varga, Chief Operating Reactors, Branch No. 1, DOL, to L.W. Sinclair, President, PASNY dated March 17, 1982.

  -- J.P. Bayne, Vice President, PASNY to D.C. Eisenhut, Director, DOL, dated April 20, 1982.

  -- S.A. Varga, Chief Operating Reactors Branch No. 1, to D.G. Eisenhut, Director DOL, dated September 7, 1983.

  -- J.P. Bayne, Vice President, PASNY to D.G. Eisenhut, Director DOL dated February 15, 1983.

  -- R.D. Purple, Deputy Director, DOL to PASNY dated March 18, 1983.

II.F.1-1

- PASNY - Indian Point No. 3 Operating Procedures

  -- SOP-RM-6, "Wide Range Gas Monitor", Rev. 0, dated November 21, 1983.

  -- 3DT-M59 "Wide Range Vent Gas Monitor (R-27) Rev. 0, dated April 19, 1984.

II.F.1-2

- Licensee Memoranda

  -- D. Meyer to J. Perotta "Dose Evaluation for Plant Vent and Vapor Containment Post-Accident Sampling" (Draft).

- Procedures

  -- CS-0112 "Sampling Various Plant Systems During Accident Conditions" Rev. 5, dated March 13, 1984.

Attachment II

Comparison of Analytical Results

A. Chemical Analysis

- Boron

The test data were:

Standard	Analyses Results	%Error	NUREG-0737 Requirements	Licensee Commitment
500 ppm	475 ppm	-5	± 50 ppm	± 15%
1000 ppm	986 ppm	-1.4	± 5%	± 15%

- Chloride

The test data were:

Standard	Analyses Results	%Error	NUREG-0737 Requirements	Licensee Commitment
1.0 ppm	<2 ppm*		± 10%	± 40%
5.0 ppm	3.6 ppm	-28%	± 10%	± 40%
15.0 ppm	13 ppm	-13.3%	± 10	± 40%
20.0 ppm	17 ppm	-15%	± 10	± 40%

*This is a result of the dilution of the spiked sample. Normally the sample would not have been diluted; however, there was not a sufficient volume of spiked sample to conduct the analysis.

-pH

The sample was not analyzed for pH.

-Dissolved Hydrogen

The gas chromatograph was inoperative.

-Containment Hydrogen

A containment air sample was not collected. The gas chromatograph was also inoperative.

B. Gross Activity and Isotopic Analysis

The following is an isotopic comparison of the normal and PASS sample results for selected radionuclides:

Isotopes	PASS uCi/ml	Normal uCi/ml	%Error
I-131	1.36E-2	1.06E-2	+28.3%
I-132	1.10E-2	8.43E-2	+30.5%
I-135	1.02E-2	1.10E-2	- 7.3%
Na-24	2.11E-3	2.07E-3	+ 1.9%
Cs-137	9.84E-4	7.70E-4	-27.8%
Xe-133	1.54E-1	3.17E-1	-51.4%
Xe-135	5.86E-2	1.16E-1	-49.1%
Kr-85M	8.53E-3	1.29E-2	-33.8%