



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION I  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PA 19406-1415

October 19, 2009

Mr. Joseph Pollock  
Site Vice President  
Entergy Nuclear Operations, Inc.  
Indian Point Energy Center  
450 Broadway, GSB  
P.O. Box 249  
Buchanan, NY 10511-0249

**SUBJECT: INDIAN POINT NUCLEAR GENERATING UNITS 1, 2 & 3 - NRC INSPECTION  
REPORT NOS. 05000003/2009008; 05000247/2009008; AND  
05000286/2009008**

Dear Mr. Pollock:

On September 4, 2009, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Indian Point Nuclear Generating Units 1, 2, & 3. The enclosed report documents the inspection results, which were discussed on August 19 and September 4, 2009, with Mr. Don Mayer and other members of your staff.

The purpose of this inspection was to assess the establishment, implementation, and maintenance of your Long-Term Groundwater Monitoring Program; review the circumstances surrounding a previously identified occurrence involving the detection of tritiated water in a Unit 3 storm drain system; review the performance of the site's Radiation Monitoring System; and inspect and assess your performance relative to radiological effluents monitoring and control.

The inspection involved an examination of activities conducted under Entergy's license as related to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of a selected examination of procedures and representative records, observations of activities, interviews with personnel, and independent assessment activities.

Based on the results of this inspection, no findings of significance were identified. Further, the inspectors determined that Entergy's Long-Term Groundwater Monitoring Program for the Indian Point Energy Center was effectively implemented and maintained in a manner that provided continued radiological monitoring of the groundwater conditions to confirm conformance with NRC regulatory requirements relative to the maintenance of public health and safety, and protection of the environment.

Since 2005, as approved by NRC's Executive Director of Operations, Region I conducted frequent and focused reviews of your groundwater investigation activities and long-term monitoring program that exceeded the scope of NRC's normal baseline inspection program. As a result, we have developed confidence in your commitment and ability to continue effective monitoring and assessment of the on-site conditions to assure the maintenance of

public health and safety, protection of the environment, and conformance with NRC regulatory requirements. Our inspectors confirmed that the objectives specified in our deviation memorandum dated December 16, 2008 (ML083590057) have been satisfied. However, we will continue to monitor your performance in this area, and will re-assess the need for continued heightened inspection oversight during our end-of-cycle review of your CY 2009 performance.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

***/RA by Peter R. Wilson for/***

Darrell J. Roberts, Director  
Division of Reactor Safety

Docket Nos: 50-003, 50-247, 50-286  
License Nos: DPR-5, DPR-26, DPR-64

Enclosure: Inspection Report Nos. 05000003/2009008, 05000247/2009008,  
05000286/2009008  
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NAME	JNoggle/JDN	TNicholson/tjn (telecon)	JWhite/jrw* ehg for*	BWelling/BW	DRoberts/prw for
DATE	10/06/09	10/14/09	10/19/09	10/16/09	10/16/09

\*see prior concurrence

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION I**

Docket Nos. 50-003, 50-247, 50-286

License Nos. DPR-3, DPR-26, DPR-64

Report Nos. 05000003/2009008, 05000247/2009008, and 05000286/2009008

Licensee: Entergy Nuclear Northeast

Facility: Indian Point Nuclear Generating Station Units 1, 2, & 3

Location: 295 Broadway  
Buchanan, NY 10511-0308

Dates: August 18, 2009 - September 4, 2009

Inspectors: J. Noggle, Sr. Health Physicist, CHP, team leader  
T. Nicholson, Sr. Technical Advisor for Radionuclide Transport  
J. Williams, U.S. Geological Survey, Troy, New York

Approved by: John R. White, Chief  
Plant Support Branch 2  
Division of Reactor Safety

Enclosure

## SUMMARY OF FINDINGS

IR 05000003/2009008, 05000247/2009008, 05000286/2009008; 08/18/2009 - 9/04/2009; Indian Point Nuclear Generating Station Units 1, 2 & 3; Other Activities – associated with ROP deviation memorandum, one PI&R sample, and radioactive effluents baseline inspection.

No findings of significance were identified. The report covers the period from August 18 through September 4, 2009, and discusses inspection activities conducted by a region-based inspector, and an inspection team comprised of representatives of Region I, NRC's Office of Research, and the U. S. Geological Survey. The inspection provided bases for the NRC to determine that Entergy had completed actions necessary to satisfy the objectives delineated in our deviation memorandum, "Request for Renewal of Deviation to the Action Matrix to Provide Heightened NRC Oversight of the Onsite Groundwater Monitoring at the Indian Point Energy Center," (ML083590057), dated December 16, 2008. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

## Report Details

### **2. RADIATION SAFETY**

Cornerstone: Public Radiation Safety (PS)

#### 2PS1 Gaseous and Liquid Effluents (71122.01 – 3 samples)

##### a. Inspection Scope

- 1) The inspector reviewed the following documents to evaluate the effectiveness of the licensee's radioactive gaseous and liquid effluent control programs relative to the applicable regulatory requirements specified in the Technical Specifications and the Offsite Dose Calculation Manual (TS/ODCM).
  - The 2007 and 2008 Radiological Annual Effluent Release Reports were reviewed including independently assessing selected public dose calculations. There were no anomalous results reported in these two reports. The report included discussion of current groundwater conditions and the result of required monitoring activities; and instances involving out-of-service radiation monitors or effluent release flow rate monitors were listed in the reports and these were evaluated during this inspection.
  - The current ODCM was reviewed, including technical justifications for any changes made since the previous revision.
  - Applicable sections of the Updated Final Safety Analysis Report (UFSAR) were reviewed to verify the adequacy of system descriptions for gaseous radioactive waste and station ventilation systems.
  - The latest quality assurance audits of radioactive effluents and chemistry were reviewed, including Entergy's program for identifying, controlling and assessing potential contaminated spills and leakage.
  - There were no measurable effluent releases to the environment based on off-site dose calculations, and there were no reported off-site environmental sample measurements identifying plant-related radioactive materials during the 2007 and 2008 report period.
  
- 2) The inspector observed the following plant equipment and work activities to evaluate the effectiveness of the licensee's radioactive gaseous and liquid effluent control programs.
  - Walkdowns were performed of accessible gaseous and liquid release system components to review any recent changes or modifications; and to confirm the alignment, operation and material condition of the radioactive liquid and gaseous effluent radiation monitoring systems (RMS) at Units 1, 2 and 3.
  - Observations were conducted of radioactive effluent related sampling and associated laboratory measurement techniques.
  - Procedural controls and selected radioactive gaseous and liquid effluent release permits were reviewed to verify that radiation monitor alarm setpoint values and releases were in agreement with Technical Specification and ODCM requirements.

Enclosure

- Chemistry logs, relative to out-of-service radiation monitoring conditions, were reviewed to confirm the performance of compensatory sampling activities.
- Surveillance tests of gaseous filtration discharge systems were reviewed to confirm operability and ventilation flow rates with respect to the assumed flow rates used in gaseous effluent release calculations.
- Entergy's surveillance program of non-radioactive system interfaces with radioactive process systems was reviewed to confirm effective monitoring and control of potential effluent discharge paths to the environment.
- Radiation monitoring system and chemistry laboratory counting instrument calibration and quality control records were reviewed with respect to ODCM surveillance requirements to confirm the licensee's ability identify and report detectable radionuclides in radioactive measurement results.

3) Radioactive effluent control related corrective action program activities for 2007 through August 2009 were reviewed, including the results of audits and the resolution of issues identified through the condition report system. A comprehensive review was conducted of conditions and occurrences involving out-of-service radiation monitoring system components. Section 4OA2 pertains.

b. Findings and Observations

No findings of significance were identified. The following table summarizes the dose consequence of radiological effluent release in the period between 2007 and 2008.

**Table of Effluent Release calculated dose and public dose limits for 2007 and 2008**

	Dose in mrem/yr	Air Dose Whole Body	% of Limit	Air Dose Max Organ	% of Limit	Liquid Dose WB	% of Limit	Liquid Dose Max O	% of Limit
2007	Units 1&2	2.43E-3	0.016	2.43E-3	0.016	5.35E-4	0.018	1.3E-3	0.013
2008	Units 1&2	2.07E-3	0.014	2.67E-3	0.018	6.11E-4	0.020	1.47E-3	0.015
2007	Unit 3	3.88E-3	0.026	3.88E-3	0.026	3.2E-4	0.007	2.14E-4	0.002
2008	Unit 3	1.99E-3	0.013	1.99E-3	0.013	1.56E-4	0.005	2.83E-4	0.003
2007	Groundwater					2.66E-4	0.009	9.94E-4	0.01
2008	Groundwater					2.86E-4	0.009	9.35E-4	0.009

**4. OTHER ACTIVITIES (OA)**

4OA2 Identification and Resolution of Problems

Cornerstone: Public Radiation Safety

.1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

a. Inspection Scope (71122.01)

The inspector reviewed approximately one hundred corrective action condition reports, initiated between January 2007 and August 2009, that were associated with the gaseous, liquid, and groundwater radioactive effluents program. The review was performed to

verify that problems identified by these condition reports were properly characterized in the licensee's event reporting system, causes were identified, and actions implemented commensurate the safety significance of the matters.

b. Findings and Observations

No findings of significance were identified.

.2 Radioactive Effluent Radiation Monitor System (RMS) Maintenance (71152 – 1 sample)

a. Inspection Scope

The inspectors conducted a review corrective action program condition reports associated with out-of-service radiation monitoring system equipment that was identified in the period between January 2007 and August 2009. Licensee personnel having cognizance of Radiation Monitoring System (RMS) performance and activities were interviewed, including the RMS system engineer and senior chemistry staff. "Radiation Monitoring System, Second Quarter 2009, Condition Report Trend Review for Radiation Monitoring System Improvement," dated September 2, 2009, was also reviewed.

b. Findings and Observations

No findings of significance were identified.

A large number of condition reports associated with the radiation monitoring system were initiated during the past two years. Most of the condition reports were associated with interruption of service of the RMS display consoles in both the Unit 2 and Unit 3 control rooms. While these temporary display outages affected operators' ability to poll individual detector readout displays, they did not interfere with control room annunciator actuation or actual detector operability.

The cause of the Unit 3 display console issues was determined to be related to excessive temperature in the RMS electronics cabinets that affected certain control room RMS display console components. Short-term corrective actions included installing permanent air conditioning to effect improved cooling of the RMS electronics cabinets.

The cause of Unit 2 RMS display console service interruptions continues to be under review. Notwithstanding, Entergy is evaluating replacing the RMS display console equipment in both control rooms to support station-wide computer network access improvements.

Less frequently occurring RMS equipment issues remain to be resolved, including occurrences involving the R-56 detectors, which monitor the discharge of waste sewage from Units 2 and 3. The location of these detectors was determined to be susceptible to failure due to flooding, power spiking, and power outages. In such conditions, waste sewage is diverted to an on-site holding tank in order to conduct sampling prior to off-site release. Accordingly, there is no safety significance to these RMS system failures. The inspector confirmed that the licensee has implemented appropriate remedial actions for these occurrences, and has initiated actions to improve the operating environment and detector function to reduce the out-of-service time.



Entergy has identified the Unit 2 RMS as an upgrade project in its Top Ten Action Plan for 2009. System engineering activities have been initiated for this improvement activity.

The inspector determined that the majority of identified problems with the Unit 2 and Unit 3 radiation monitoring systems were not associated with radiation detector operability or effluent release control functions. For those instances that resulted in out-of-service conditions, the licensee implemented appropriate compensatory measures as required by regulatory requirements. The inspector confirmed that Entergy is engaged in RMS improvement activities, and has initiated appropriate corrective actions.

#### **40A5 Other Activities**

##### **.1 Assessment of Licensee Performance Relative to Meeting the Objectives of the December 16, 2008 Memorandum Requesting Deviation from the Action Matrix**

Background:

On September 1, 2005, the NRC was informed by Entergy that cracks in a Unit 2 spent fuel pool wall had been discovered during excavation work inside the spent fuel pool building. Low levels of radioactive contamination were found in the vicinity. Entergy's initial investigation of the issue revealed that groundwater in the vicinity was contaminated with tritium. On September 20, 2005, Region I initiated a special inspection of this matter to examine the licensee's performance and determine if the contaminated groundwater affected, or could affect, public health and safety. Subsequently, Entergy initiated actions to perform a comprehensive groundwater site characterization, identify the sources, and effect mitigation and remediation of the condition.

The NRC special inspection report, issued in March 2006, assessed Entergy's performance, achievements, and plans for more extensive site characterization, and reported that the groundwater contamination did not, nor was likely to, adversely affect public health and safety. In the report, and subsequent public meetings, NRC indicated that a final conclusion would be reached after Entergy completed its groundwater characterization initiative.

The NRC Region I continued inspection and monitoring of Entergy's activities in accordance with successive approved deviation to the normal Reactor Oversight Process for calendar years 2006 (ML053010404), 2007 (ML063480016), 2008 (ML073480290) and 2009 (ML083590057). During this period, the NRC staff closely monitored Entergy's groundwater characterization efforts, performed independent inspections and testing, and independently evaluated radiological and hydrological conditions affecting groundwater onsite. Additionally, the NRC independently verified groundwater releases by conducting split monitoring well sampling with Entergy and the State of New York.

On January 11, 2008, Entergy submitted the results of its comprehensive hydrogeologic site characterization investigation (ML080320600), and included its plan for remediation and long-term monitoring of the on-site groundwater conditions. In its report, Entergy described the source of groundwater contamination to be from the Unit 1 and Unit 2 spent fuel pools. The NRC documented its review of Entergy's report in inspection report 05000247 & 05000003/2007010 on May 13, 2008 (ML081340425). In a subsequent inspection 05000247/2008004 (ML083110566) dated November 6, 2008, the NRC

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confirmed that Entergy's conceptual site model of the site, which included both the vadose zone and saturated zone processes and conditions, effectively characterized the onsite groundwater plume behavior and radionuclide transport. Evaluation of radionuclide concentrations and pathway analyses indicated that the groundwater contamination did not adversely affect public health and safety. Detailed discussions and analyses indicated that the licensee's plans for long-term monitoring of the site, relative to monitoring natural attenuation of residual groundwater contamination, were reasonable.

On November 3, 2008, Entergy completed Unit 1 spent fuel pool system drainage and sludge removal activities, essentially terminating the source from that facility. Given the change in conditions, Entergy initiated actions to establish a new groundwater contaminant baseline in support of its long-term monitoring program.

a. Inspection Scope

The most recently approved Memorandum of Deviation, i.e., "Request for Renewal of Deviation to the Action Matrix to Provide Heightened NRC Oversight of the Onsite Groundwater Monitoring at the Indian Point Energy Center," dated December 16, 2008 (ML083590057), identified the following objectives to be addressed in order to support resumption of normal inspection activities in accordance with the Reactor Oversight Process:

- Entergy has completed sufficient data collection and assessment to establish a new groundwater contaminant baseline, now that the Unit 1 source term has been terminated.
- Entergy has determined whether active leakage has been terminated or continues to persist in regard to the Unit 2 spent fuel pool; and has implemented appropriate monitoring and control measures, as necessary.
- Entergy has established and implemented effluent control and environmental monitoring procedures that provide reasonable assurance that the existing groundwater conditions will continue to be effectively monitored and assessed, that the procedures will detect new or changed conditions in a timely manner, and that the procedures are sufficient to monitor natural attenuation of the Unit 1 and Unit 2 groundwater contamination plumes.

The NRC team reviewed the licensee's performance and achievements relative to the completion of these objectives.

b. Findings and Observations

No findings of significance were identified.

The inspectors determined that Entergy completed the actions necessary to satisfy the objectives delineated in the approved Memorandum of Deviation, dated December 16, 2008, (ML083590057). Notwithstanding, NRC will continue to monitor performance in this area, and re-assess the need for continued heightened inspection oversight as part of the CY 2009 end-of-cycle performance review of IPEC.

The following pertains:

- Objective 1: Completion of sufficient data collection and assessment to establish a new groundwater contaminant baseline, now that the Unit 1 source term has been terminated.

As a result of the defueling, drainage, and de-sludging of the Unit 1 spent fuel pool system in the Fall of 2008, the groundwater contamination source term from the Unit 1 facility was terminated. The inspectors confirmed that Entergy's subsequent data collection and assessment activities, associated with the continual monitoring of the residual groundwater contamination, would be sufficient and effective to establish a new baseline relative to monitoring the residual groundwater condition and subsequent assessment of dose consequence.

As expected, the first and second-quarter ground-water sample results in 2009, collected from Monitoring Wells in the immediate vicinity of the Unit 1 spent fuel pool, indicated an increase in Sr-90 groundwater concentrations. As determined from review of the licensee's data and analysis, this increased concentration was the expected result of the volume of water that was necessary to fill the spent fuel pool system to effect defueling. Accordingly, Entergy's baseline data was predicated on the existing groundwater conditions determined from its continuing analysis of collected monitoring data. Given that the original source of the contamination associated with leakage from the Unit 1 spent fuel pool system has been terminated, the residual groundwater contamination involving Sr-90 is expected to naturally attenuate over time. The inspectors confirmed that the current groundwater contaminant concentrations have not, nor are expected to, affect public health and safety; and the public radiological dose consequence is expected to continue to be a fraction of the NRC annual regulatory limit affecting liquid effluents. The inspectors confirmed that continual monitoring of the migration and attenuation of the Unit 1 associated groundwater contamination condition is being performed in accordance with Entergy's Long-Term Ground-Water Monitoring Program (LTGWMP).

The inspectors confirmed that Entergy has established, implemented and maintains a long-term ground-water monitoring program that has sufficient in scope and implementation requirements to effectively monitor and assess this condition. Accordingly, the intent of this objective was considered satisfied.

- Objective 2: Determination whether active leakage has been terminated or continues to persist in regard to the Unit 2 spent fuel pool, and that appropriate monitoring and control measures have been implemented, as necessary.

Entergy has been actively engaged in analyzing Monitoring Well data associated with the H-3 (tritium) groundwater contamination condition that resulted from previously identified leakage from the Unit 2 spent fuel pool. Entergy's analysis indicated an overall decreasing trend in tritium concentration in the groundwater as a result of previous efforts to examine the condition of the spent fuel pool and transfer canal liner, and effect repair, as necessary. Notwithstanding, as previously reported, Entergy's examination of the spent fuel pool liner was necessarily limited to only the accessible surfaces. That is, only about 40 % of the total liner surfaces were accessible for examination; the remaining surfaces were necessarily inaccessible due to the proximity of stored spent fuel that prevented examination.

The inspectors reviewed the licensee's analysis derived from groundwater monitoring data, and confirmed that there was no apparent indication of any significant large flux on-going active leakage. The inspectors also reviewed the licensee's monitoring well detection sensitivity data, which supports that active leakage, if occurring, would likely not exceed 30 gallons per day (0.02 gpm). This sensitivity analysis was based on comparison of the tritium concentration that is available in the spent fuel pool and the actual tritium concentration derived from samples collected from relevant monitoring wells in the near vicinity of the spent fuel pool. Additionally, the inspectors reviewed licensee analysis and data from a long-term tracer test that indicated the potential for slow, episodic tritium migration in the fractures of the vadose zone that affect the mobility of contaminated groundwater from the immediate vicinity of the Unit 2 spent fuel pool to the water table. The licensee's analysis is supported by the fact that fluorescein dye, which was injected as part of the groundwater characterization study over two years ago, is still detectable in certain nearby monitoring wells.

The inspectors noted that there were occasional spikes and general variability in some monitoring well tritium concentration values that were not characteristic of the expected attenuation that would normally be expected at this time. Additionally, the licensee continued to occasionally collect a small quantity of water from the leak collection box that was installed on the Unit 2 spent fuel pool wall crack that was identified in 2005. Accordingly, while there was no indication of any significant large flux active leakage, there was insufficient basis to conclude that there is absolutely no persistent low flux leakage from the Unit 2 spent fuel pool, at this time.

Notwithstanding, the inspectors determined that the licensee's sensitivity analysis of groundwater monitoring data, relative to its ability to detect active leakage in excess of about 30 gallons per day, was reasonably derived. Additionally, the inspectors confirmed that the current groundwater conditions, even if there was persistent low flux leakage from the Unit 2 spent fuel pool, has not, nor would be expected to, affect public health and safety; and the public radiological dose consequence would be expected to continue to be a fraction of the NRC annual regulatory limit affecting liquid effluents. The inspectors confirmed that continual monitoring of the migration and attenuation of the Unit 2 associated groundwater contamination condition was being performed in accordance with Entergy's Long-Term Ground-Water Monitoring Program; and that the program implemented appropriate monitoring and control measures for this condition.

The inspectors confirmed that Entergy has established, implemented and maintained a long-term ground-water monitoring program that has sufficient scope and implementation requirements to effectively monitor and assess the present condition. Further, the licensee is considering monitoring in the vadose zone, in the vicinity of the Unit 2 facility, to assist in the detection of large flux releases. Accordingly, the intent of this objective was considered satisfied.

- Objective 3: Establishment and implementation of effluent control and environmental monitoring procedures that provide reasonable assurance that the existing groundwater conditions will continue to be effectively monitored and assessed, that the procedures will detect new or changed conditions in a timely manner, and that the procedures are sufficient to monitor natural attenuation of the Unit 1 and Unit 2 groundwater contamination plumes.

The NRC has conducted several inspections (August 2007, October 2008, and August 2009) of the licensee's Long-Term Ground-Water Monitoring Program. The inspectors confirmed that Entergy has established, implemented and maintained a Long-Term Ground-Water Monitoring Program that was sufficient in scope and implementation requirements to effectively monitor and assess the existing contaminated groundwater conditions affecting the Indian Point Energy Center.

During this inspection, the inspectors examined the refurbishment of the LaFarge No. 2 Monitoring Well (one of the principal off-site monitoring wells) and confirmed its acceptability as a valid off-site monitoring location. Additionally, the inspectors verified that the administrative controls, established in the Long-Term Groundwater Monitoring Program, were sufficient to provide assurance of review and appropriate communication of activities and changes that affect ground-water monitoring conditions; and that the program included sufficient sampling requirements for storm drains and the Unit 1 foundation drain systems.

During this inspection, the inspectors reviewed a March 25, 2009 instance involving the licensee's detection of tritiated water in the catch basin of a storm drain in the vicinity of Unit 3, and in an adjacent shallow monitoring well. The licensee conducted an extensive investigation but was unable to find an explanation for this one-time occurrence. The inspectors confirmed that the occurrence had no radiological consequence onsite or offsite; and no leakage was identified from any Unit 3 component containing tritiated water. However, the nature of the occurrence indicated uncertainty in the ability of the existing Unit 3 monitoring wells to detect potential leakage from that facility. While there was no current on-going leakage affecting the groundwater at Unit 3, Entergy initiated action to re-evaluate the Unit 3 groundwater monitoring configuration (both vertically and horizontally) to determine its effectiveness in meeting the objectives and recommendations of the NEI "Industry Groundwater Protection Initiative– Final Guidance Document, August 2007" (ML072600292 and ML072610036); and amend the Long-Term Groundwater Monitoring Program, as necessary.

Notwithstanding, the inspectors confirmed that Entergy has established, implemented and maintained a Long-Term Ground-Water Monitoring Program that has sufficient scope and implementation requirements to effectively monitor and assess the existing groundwater conditions affecting Indian Point Energy Center. Accordingly, the intent of this objective was considered satisfied.

## .2 Groundwater Sampling

### a. Inspection Scope

During the licensee's groundwater investigation, over 1200 groundwater samples were collected and analyzed from the established on-site monitoring well network by the second quarter of 2009. The analytical results provide the basis for assessing the extent of the groundwater plume and for performing calculations of offsite doses to members of the public. In order to assess Entergy's performance in this area, the NRC implemented an independent split sample collection program with the licensee beginning in September 2005. The monitoring wells selected for independent verification included the southern boundary wells and those wells bordering the Hudson River that were used

in support of effluent release and dose assessment calculations. Sample identity was assured by chain-of-custody procedures that included sample collection observation by the NRC or a representative of the NYS DEC. The NRC samples were analyzed by an independent government laboratory to ensure validation of the licensee's groundwater contamination results and off-site environmental sample radioactive measurements.

By the second quarter of 2009, over 300 split groundwater samples were obtained to provide an independent check of Entergy's analytical results and to independently verify if there was any detectable migration of groundwater contaminants offsite. These split samples represent over 1,200 analyses, primarily for hydrogen-3 (tritium), strontium-90, nickel-63, and gamma-emitting radionuclides that characterized the effluent releases. Analyses for other radionuclides were performed, but none were detected.

b. Findings and Assessment

No findings of significance were identified.

In general, Entergy's groundwater measurements of radioactivity were of good quality and of sufficient sensitivity to assess radiological impact. The quality of Entergy's measurements were confirmed by various split samples analyzed by the NRC. Of the over 1200 results that were reviewed, there were only a few sample disagreements based on the statistical comparison criteria specified in NRC Inspection Procedure 84750, "Radioactive Waste Treatment, and Effluent and Environmental Monitoring." As a result of these few discrepancies, Entergy took corrective action to establish, implement, and maintain procedures to effect improved quality control and assurance of sample analysis performed by its own laboratory and contract analytical laboratories.

During the past 3½ years, the on-site groundwater transport pathway has been effectively characterized by the licensee, and a significant quantity of on-site groundwater monitoring data has been collected and analyzed by Entergy. A representative numbers of split samples have confirmed the overall efficacy of the licensee's analytical capability. As the site characterization was tested through pumping and tracer testing, the contaminant plume uncertainty has been significantly reduced. Given this accomplishment, and the NRC determination that Entergy has demonstrated an effective groundwater sample quality control program, the NRC will discontinue any further split sampling activities.

4OA6 Meetings, including Exit

.1 Exit Meeting Summary

The inspectors presented the inspection results to Mr. D. Mayer and other licensee and New York State representatives on August 19, 2009 and September 4, 2009. The licensee acknowledged the findings presented. Based upon discussions with the licensee, none of the information presented at the exit meeting and included in this report was considered proprietary.

**ATTACHMENT**

**SUPPLEMENTAL INFORMATION**

**KEY POINTS OF CONTACT**

Licensee Personnel

J. Pollock	Site Vice President
M. Barvenik	Principal Engineer, GZA Geo Environmental, Inc.
P. Conroy	Director, Nuclear Safety Assurance
D. Croulet	Licensing Engineer
P. Donahue	Chemistry Specialist
C. English	Unit 1 Project Engineer
G. Hinrichs	Project Engineer
D. Loope	Radiation Protection Superintendent
T. Jones	Licensing Engineer
R. LaVera	Radiological Engineer
D. Mayer	Director, Special Projects
J. Michetti	RMS System Engineer
J. Peters	Plant Chemist
D. Rusczyk	Environmental Assessment, GZA
S. Sandike	Chemistry ODCM Specialist
J. Simpson	Environmental Assessment, GZA
R. Walpole	Manager, Licensing

New York State Inspection Observers

L. Rosenmann	Engineering Geologist, New York State, Department of Environmental Conservations
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**INSPECTION PROCEDURES USED**

71122.01      Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

**LIST OF DOCUMENTS REVIEWED**

Annual Radiological Effluent Release Reports - 2007 and 2008  
Off-Site Dose Calculation Manual, Revision 2  
O-CY-2730, Rev. 1, Airborne Radioactive Effluents  
O-CY-2740, Rev. 1, Liquid Radioactive Effluents  
IP-SMM-CY-001, Rev. 7, Radioactive Effluents Control Program  
IP-SMM-CY-110, Rev. 3, Radiological Groundwater Monitoring Program  
2-CY-2625, Rev. 14, General Plant Systems Specifications and Frequencies  
3-CY-2325, Rev. 8, Radioactive Sampling Schedule  
2-SOP-5.2.4, Rev. 33, Calculation and Recording of Radioactive Gaseous Releases  
2-SOP-5.1.5, Rev. 34, Calculation and Recording of Radioactive Liquid Releases  
3-SOP-WDS-014, Rev. 25, Liquid Waste Releases

3-SOP-WDS-013, Rev. 25, Gaseous Waste Releases  
EN-RP-113, Response to Contaminated Spills/Leaks  
EN-CY-109, Sampling and Analysis of Groundwater Monitoring Wells  
EN-CY-108, Monitoring of Non-Radioactive Systems

"Industry Groundwater Protection Initiative  
– Final Guidance Document, August 2007" (ML072600292 and ML072610036)

Unit 2 Liquid Release Permit No. 090016  
Unit 2 Gaseous Release Permit No. 090126  
Unit 3 Liquid Release Permit No. 090081  
Unit 3 Gaseous Release Permit No. 090067

Condition Reports:

CR-IP3-2007-0803	CR-IP2-2009-1334	CR-IP2-2009-1295
CR-IP2-2009-2089	CR-IP2-2009-2352	CR-IP2-2009-2090
CR-IP3-2009-3356	CR-IP3-2009-3201	CR-IP2-2009-2603
CR-IP2-2009-2528	CR-IP3-2009-3254	CR-IP3-2009-3208
CR-IP2-2009-3307	CR-IP2-2009-3306	CR-IP3-2007-3953
CR-IP3-2007-3954	CR-IP3-2007-3925	CR-IP3-2007-4183
CR-IP2-2008-0270	CR-IP2-2007-5226	CR-IP2-2007-5217
CR-IP2-2008-0375	CR-IP2-2008-0549	CR-IP2-2008-1149
CR-IP3-2008-0718	CR-IP2-2008-0960	CR-IP2-2008-0404
CR-IP2-2008-0377	CR-IP2-2008-0144	CR-IP2-2008-0492
CR-IP2-2009-2266	CR-IP3-2008-0569	CR-IP3-2008-0846
CR-IP2-2008-1236	CR-IP3-2008-0852	CR-IP2-2008-0179
CR-IP3-2007-3860	CR-IP3-2008-0942	CR-IP2-2008-3154
CR-IP3-2008-1112	CR-IP2-2008-2468	CR-IP3-2008-0194
CR-IP3-2008-2915	CR-IP3-2008-1215	CR-IP2-2008-3526
CR-IP3-2008-1042	CR-IP2-2008-2581	CR-IP2-2008-2691
CR-IP2-2008-2767	CR-IP3-2008-1218	CR-IP3-2009-0080
CR-IP2-2008-4136	CR-IP3-2008-2001	CR-IP2-2008-2955
CR-IP3-2008-2184	CR-IP2-2008-3342	CR-IP2-2008-3492
CR-IP2-2008-3662	CR-IP3-2008-1899	CR-IP3-2008-1979
CR-IP3-2008-2125	CR-IP2-2008-4193	CR-IP2-2008-4108
CR-IP2-2008-4130	CR-IP2-2008-4254	CR-IP2-2008-4202
CR-IP2-2008-4529	CR-IP2-2008-4337	CR-IP3-2008-2296
CR-IP2-2008-4191	CR-IP3-2008-2279	CR-IP3-2008-2294
CR-IP2-2008-4568	CR-IP3-2008-0624	CR-IP3-2007-0005
CR-IP3-2007-0151	CR-IP3-2007-3367	CR-IP3-2007-2748
CR-IP3-2007-2899	CR-IP3-2007-3061	CR-IP3-2007-2870
CR-IP3-2007-2134	CR-IP3-2007-3075	CR-IP2-2008-1132
CR-IP3-2007-3129	CR-IP2-2008-4848	CR-IP3-2008-2862
CR-IP2-2008-4981	CR-IP2-2008-5055	CR-IP2-2009-0477
CR-IP2-2008-5552	CR-IP3-2009-0038	CR-IP2-2009-0184
CR-IP2-2009-0609	CR-IP2-2009-1125	CR-IP3-2009-0494
CR-IP2-2009-0565	CR-IP2-2009-0798	CR-IP3-2009-0591
CR-IP2-2009-2238		



NRC Groundwater Sample Result Documentation (CY 2009, 1<sup>st</sup> Quarter)

ML090400502, ML090920949, ML090920932

**LIST OF ACRONYMS USED**

FSAR	Final Safety Analysis Report
GPM	gallons per minute
LTGWMP	Long Term Ground-Water Monitoring Program
NYS DEC	State of New York Department of Environmental Conservation
ODCM	Offsite Dose Calculation Manual
pCi/L	pico-Curies per Liter
PI&R	Problem Identification and Resolution
ROP	Reactor Oversight Process