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March 31, 2014

**BY FEDERAL EXPRESS AND E-MAIL**

Linda M. Baldwin  
General Counsel  
New York State Department of State  
Counsel's Office  
One Commerce Plaza  
99 Washington Street  
Albany, NY 12231-0001

**Re: New York State Department of State File #F-2012-1028  
Consistency Certification for Entergy Nuclear Indian Point 2 and  
Entergy Nuclear Indian Point 3 License Renewal Application**

Dear Ms. Baldwin:

This letter provides supplemental information requested by the New York State Department of State (the "Department") in connection with the consistency certification (the "Consistency Certification") submitted on December 17, 2012, by Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC and Entergy Nuclear Operations, Inc. (collectively, "Entergy") for Entergy's Indian Point 2 and 3 ("Indian Point") License Renewal Application pending before the Nuclear Regulatory Commission ("NRC"). During its consultation session with Entergy on December 3, 2013, the Department requested Entergy to provide information regarding past unplanned releases of radiological materials at Indian Point and the potential effects of those releases on groundwater quality. In particular, the Department inquired whether the Unit 2 spent fuel pool leak discovered in August of 2005 has been adequately addressed, and whether Entergy can provide more up-to-date information on the results of groundwater monitoring at Indian Point.

In response to the Department's requests, Entergy is providing information regarding groundwater quality issues at Indian Point previously filed by Entergy with NRC in connection with current plant operations and the ongoing NRC license renewal proceeding for Indian Point,<sup>1</sup> and with the New York

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<sup>1</sup> NRC has exclusive jurisdiction to regulate radiological releases at Indian Point. See, e.g., *Train v. Colorado Public Interest Research Group, Inc.*, 426 U.S. 1, 16 n.12 (1976) ("States are precluded from playing any role in several significant areas of regulation, including the setting of limitations on radioactive discharges from nuclear power plants."); *N. States Power Co. v. Minnesota*, 447 F.2d 1143, 1151 (8<sup>th</sup> Cir. 1971) (stating "Congress intended to pre-empt the field of the licensing and

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State Department of Environmental Conservation (“NYSDEC”) in connection with its pending adjudicatory proceeding concerning Indian Point’s Water Quality Certification.<sup>2</sup> In addition, to assist the Department with its review of this technical information, Entergy is also providing a “white paper” that sets forth the relevant facts about groundwater at Indian Point.

Entergy reiterates that it is proceeding with federal consistency review by the Department under a full reservation of its rights under state and federal law, including, by way of example and without limitation, its right to argue that: (i) Indian Point is within a “grandfathering” exemption from federal consistency review under the New York Coastal Management Plan (the “CMP”); (ii) Indian Point has been previously reviewed for consistency with the CMP; and (iii) the Department’s purported federal consistency review under the CMP intrudes upon exclusive areas of federal regulatory authority and is preempted. Entergy additionally notes that the information being requested by the Department in this case was not requested by the Department in connection with its previous federal consistency reviews of nuclear power plants. Further, Entergy does not concede the relevance of the requested information to the Department’s review of Indian Point for consistency with the CMP.

Nonetheless, detailed information has already been prepared for both NRC and NYSDEC which demonstrates, as a factual matter, that: (i) the sources of past unplanned releases of radiological materials to groundwater at Indian Point have been eliminated or the causes have been addressed; (ii) the past unplanned releases of radiological materials to groundwater at Indian Point have not caused, and are not causing, threats to the public health or the environment; and (iii) the past unplanned releases of radiological materials to groundwater at Indian Point have not caused, and are not causing, a violation of state water quality standards. That supplemental information is being submitted in support of the Consistency Certification.

Due to the voluminous records associated with the aforementioned NRC and NYSDEC proceedings, Entergy has sought to identify and provide to the Department the subset of documents from those

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regulation of nuclear reactors to the exclusion of the states and that it did not intend to provide for dual regulation of radiation hazards”) aff’d 405 U.S. 1035 (1972); *United States v. Kentucky*, 252 F.3d 816, 823 (6<sup>th</sup> Cir. 2001) (stating that “The [Atomic Energy Act (AEA) of 1954] preempts any state attempt to regulate materials covered by the Act for safety purposes”); *United States v. Manning*, 527 F.3d 828, 838 (9<sup>th</sup> Cir. 2008) (finding that a state law that seeks to regulate “AEA materials out of concern for the health and environmental risks that increased contamination will cause. . . falls squarely within the field preempted by the AEA”); *Missouri v. Westinghouse Elec. LLC*, 487 F. Supp. 2d 1076, 1087-88 (E.D. Mo. 2007) (refusing to ratify a proposed consent decree because it attempted “to regulate the safety of a site that contains nuclear contamination – a field completely pre-empted by the Atomic Energy Act,” and stating that “[t]he presence of radiation hazards is sufficient to give rise to the NRC’s exclusive jurisdiction”).

<sup>2</sup> This information is being submitted to the Department in fulfillment of the undertaking by Entergy, as set forth in its letter to the Department dated December 20, 2013, to provide to the Department by March 31, 2014, “information developed by Entergy before [NYSDEC] about groundwater quality issues at Indian Point.”

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proceedings that most directly address groundwater quality issues. Those documents (hard copies of which are enclosed) are listed on the charts below:

Entergy Nuclear Operations, Inc. (Indian Point Units 2 and 3)  
Docket Nos. 50-247-LR and 50-286-LR, ASLBP No. 07-858-03-LR-BD01  
Evidentiary Hearing  
**Selected Hearing Exhibits**

<b>Exhibit #</b>	<b>Contentions Addressed by Exhibit</b>	<b>Exhibit Name</b>	<b>Exhibit Submission Date</b>	<b>Mandatory Log Number Identification for NRC Agency-wide Documents Access and Management System ("ADAMS") Database</b>
RIV000066	RK-EC-3/ CW-EC-1	GZA, GeoEnvironmental, Inc., Hydrogeologic Site Investigation Report, Indian Point Energy Center, January 7, 2008, IPEC00195418	12/22/2011	ML12335A626
RIV000067	RK-EC-3/ CW-EC-1	Letter from Marsha K. Gamberoni, NRC, to Joseph Pollock, Entergy, "Indian Point Nuclear Generating Units 1 & 2 – NRC Inspection Report Nos. 05000003/2007010 and 05000247/2007010 (dated May 13, 2008)" <sup>3</sup>	12/22/2011	ML12335A624
RIV000068	RK-TC-2	Entergy, Groundwater Investigation Executive Summary, Indian Point Energy Center, Buchanan,	12/22/2011	ML12335A623

<sup>3</sup> NRC periodically prepares inspection reports of its inspections pertaining to Indian Point. NRC inspection reports are available to the public at [http://www.nrc.gov/NRR/OVERSIGHT/ASSESS/listofrpts\\_body.html#inp](http://www.nrc.gov/NRR/OVERSIGHT/ASSESS/listofrpts_body.html#inp). NRC inspection reports through 2009 are available at <http://www.nrc.gov/info-finder/reactor/ip/correspondence.html>. In addition, NRC inspection reports are available at the NRC "ADAMS" database <http://www.nrc.gov/reading-rm/adams.html> using the following ADAMS Accession Numbers, among others: ML12335A624, ML12338A648, ML12089A601, ML11356A520.

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Exhibit #	Contentions Addressed by Exhibit	Exhibit Name	Exhibit Submission Date	Mandatory Log Number Identification for NRC Agency-wide Documents Access and Management System ("ADAMS") Database
		NY (January 2008)		
RIVR00091	RK-EC-3/ CW-EC-1	Liquid Radioactive Release Lessons Learned Task Force Final Report, U.S. NRC (September 1, 2006)	12/22/2011	ML12335A608
NRC000095	RK-EC-3/ CW-EC-1	Ltr. To NRC from Entergy re: Remediation and Long Term Monitoring of Site Groundwater	3/30/2012	ML12339A651
ENT000300	RK-EC-3/ CW-EC-1	Entergy's Statement of Position on Consolidated Contention RK-TC-3/CW-EC-1 (Spent Fuel Pool Leaks)	3/29/2012	ML12089A574
ENT000301	RK-EC-3/ CW-EC-1	Testimony of Entergy Witness Donald M. Mayer, Alan B. Cox, Thomas C. Esselman, Matthew J. Barvenik, Carl J. Paperiello, and F. Owen Hoffman Regarding Consolidated Contention RK-EC-3/CW-EC-1 (Spent Fuel Pool Leaks)	3/29/2012	ML12338A621
ENT000302	RK-EC-3/ CW-EC-1	<i>Curriculum Vitae</i> of Donald M. Mayer	3/29/2012	ML12338A700
ENT000303	RK-EC-3/ CW-EC-1	<i>Curriculum Vitae</i> of Thomas C. Esselman	3/29/2012	ML12338A667
ENT000304	RK-EC-3/ CW-EC-1	<i>Curriculum Vitae</i> of Matthew J. Barvenik	3/29/2012	ML12338A679
ENT000305	RK-EC-3/	<i>Curriculum Vitae</i> of Carl J.	3/29/2012	ML12089A659

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Exhibit #	Contentions Addressed by Exhibit	Exhibit Name	Exhibit Submission Date	Mandatory Log Number Identification for NRC Agency-wide Documents Access and Management System ("ADAMS") Database
	CW-EC-1	Paperiello		
ENT000306	RK-EC-3/ CW-EC-1	<i>Curriculum Vitae</i> of F. Owen Hoffman	3/29/2012	ML12089A637
ENT000313	RK-EC-3/ CW-EC-1	2010 Annual Radiological Environmental Operating Report (NL-11-038) (May 16, 2011) <sup>4</sup>	3/29/2012	ML12339A710
ENT000319	RK-EC-3/ CW-EC-1	2010 Annual Radioactive Effluent Release Report, Rev. 1 (NL-11-068) (June 10, 2011) <sup>5</sup>	3/29/2012	ML12089A670
ENT000321	RK-EC-3/ CW-EC-1	Lawrence C. Skinner and Timothy J. Sinnott, Measurement of Strontium (90Sr) and Other Radionuclides in Edible Tissues and Bone/Carapace of Fish and Blue Crabs from the Lower Hudson River (Nov. 2009)	3/29/2012	ML12338A680
ENT000332	RK-EC-3/	GZA GeoEnvironmental,	3/29/2012	ML12089A649

<sup>4</sup> Entergy annually provides reports to NRC regarding radiological environmental monitoring. The reports are available to the public at the NRC "ADAMS" database <http://www.nrc.gov/reading-rm/adams.html> using the following ADAMS Accession Numbers, among others: ML061290085, ML071420088, ML081420476, ML091410203, ML101390564, ML11143A052, ML12144A412, ML13144A133.

<sup>5</sup> Entergy annually provides reports to NRC regarding radiological effluent releases. Those reports are available to the public at <http://www.nrc.gov/info-finder/reactor/ip/ip-groundwater-leakage/on-going-activities/on-going-activities10.html>, and at the NRC "ADAMS" database <http://www.nrc.gov/reading-rm/adams.html> using the following ADAMS Accession Numbers, among others: ML061240373, ML071230305, ML081280744, ML091260208, ML101240989, ML11172A042, ML12132A122, ML131570158.

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<b>Exhibit #</b>	<b>Contentions Addressed by Exhibit</b>	<b>Exhibit Name</b>	<b>Exhibit Submission Date</b>	<b>Mandatory Log Number Identification for NRC Agency-wide Documents Access and Management System ("ADAMS") Database</b>
	CW-EC-1	Inc., Changes in Computed Tritium Plume Total Activity Over Time - Exponential Decay Curve Trending of Quarterly Data through Q3 2011		
ENT000333	RK-EC-3/ CW-EC-1	GZA GeoEnvironmental, Changes in Computed Strontium Plume Total Activity Over Time - Exponential Decay Curve Trending of Quarterly Data through Q3 2011	3/29/2012	ML12089A663
ENT000343	RK-EC-3/ CW-EC-1	Letter from Darrel J. Roberts, NRC, to Joseph Pollock, Entergy, "[IP1, IP2 & IP 3] NRC Inspection Report Nos. 05000003/2009008; 05000247/2009008; and 05000286/2009008" (Oct. 19, 2009) <sup>6</sup>	3/29/2012	ML12338A648
ENT000344	RK-EC-3/ CW-EC-1	Letter from D. C. Lew, NRC, to J. E. Pollock, Entergy, "Annual Assessment Letter – Indian Point Nuclear Generating Units 2 and 3 (Reports 05000247/2010001	3/29/2012	ML12089A601

<sup>6</sup> See footnote 3, *supra*.



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<b>Exhibit #</b>	<b>Contentions Addressed by Exhibit</b>	<b>Exhibit Name</b>	<b>Exhibit Submission Date</b>	<b>Mandatory Log Number Identification for NRC Agency-wide Documents Access and Management System ("ADAMS") Database</b>
		& 05000286/20100001)" (Mar. 3, 2010) <sup>7</sup>		
ENT000345	RK-EC-3/ CW-EC-1	NYSDEC Community Fact Sheet (May 2008)	3/29/2012	ML12089A608
ENT000360	RK-EC-3/ CW-EC-1	EPA, Basic Information about Radionuclides in Drinking Water, web page	3/29/2012	ML12089A666
ENT000371	RK-EC-3/CW-EC-1	Letter NL-08-023, from J. Pollock, Entergy, to NRC, Results of Ground Water Contamination Investigation (Jan. 11, 2008)	3/29/2012	ML12089A679
NRCR00088	RK-EC-3/ CW-EC-1	NRC Staff Testimony of Stephen P. Klementowicz and James D. Noggle Concerning Contention Riverkeeper EC-3/Clearwater EC-1 (Spent Fuel Pool Leaks)	9/21/2012	ML12340A747
NRC00089	RK-EC-3/ CW-EC-1	Professional Qualifications, Stephen P. Klementowicz	9/21/2012	ML12339A646
NRCR00090	RK-EC-3/ CW-EC-1	James D. Noggle, Statement of Professional Qualifications	9/21/2012	ML12265A720

<sup>7</sup> See footnote 3, *supra*.

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Exhibit #	Contentions Addressed by Exhibit	Exhibit Name	Exhibit Submission Date	Mandatory Log Number Identification for NRC Agency-wide Documents Access and Management System ("ADAMS") Database
ENT00575 A	RK-EC-3/ CW-EC-1	GZA GeoEnvironmental, Inc., Final IPEC Quarterly Long-Term Groundwater Monitoring Report, Quarters One Through Four 2011 (Sept. 26, 2012) <sup>8</sup>	10/2/2012	ML12276A480

<sup>8</sup> Entergy is providing to NRC quarterly updates of its groundwater monitoring reports. Those updated groundwater reports are available to the public at <http://www.safesecurevital.com>. Groundwater reports from 2008 through 2011 are available at the NRC "ADAMS" database <http://www.nrc.gov/reading-rm/adams.html> using the following ADAMS Accession Numbers, among others: ML080320540, ML12338A639, ML12089A597, ML12089A615, ML12089A614, ML12089A616, ML12338A637, ML12089A591, ML12089A596, ML12089A598, ML12094A117, ML12276A480, ML12276A486, ML12277A057, ML12276A493, ML12276A492.



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*In the Matter of Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, and  
Entergy Nuclear Operations Inc.'s  
Joint Application for CWA § 401 Water Quality Certification  
DEC App. Nos. 3-5522-00011/00030 (IP2)*

**Selected Testimony, Exhibits and Briefing**

<b>Entergy Exhibit #</b>	<b>Issue Addressed</b>	<b>Document Description</b>	<b>Date Submitted To Tribunal</b>
N/A	Issue #3: Radiological <sup>9</sup>	Pre-filed Testimony of Matthew J. Barvenik in Support of Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC and Entergy Nuclear Operations, Inc. (adopted under oath on January 23, 2012)	7/22/2011
N/A	Issue #3: Radiological	Pre-filed Testimony of F. Owen Hoffman in Support of Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC and Entergy Nuclear Operations, Inc. (adopted under oath on January 11, 2012)	7/22/2011
N/A	Issue #3: Radiological	Combined Pre-filed Rebuttal Testimony of Thomas C. Esselman, Ph.D., Matthew J. Barvenik, and F. Owen Hoffman, Ph.D. (adopted under oath on January 11 & 23, 2012)	10/4/2011
80	Issue #3: Radiological	NYSDEC Community Fact Sheet (Sept. 2007)	10/04/2011
121	Issue #3: Radiological	IPEC's Yearly Discharges vs Commonly Occurring Doses	1/11/2012
N/A	Issue #3: Radiological	Proposed Findings of Fact ("PFF") of Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, and Entergy Nuclear Operations, Inc. Radiological Issues	4/27/2012
N/A	Issue #3: Radiological	Post Hearing Memorandum of Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point	4/27/2012

<sup>9</sup> *In the Matter of Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, and Entergy Nuclear Operations Inc.'s Joint Application for CWA § 401 Water Quality Certification ("WQC")*, DEC App. Nos. 3-5522-00011/00030 (IP2), Issues List, p.1 (Dec. 13, 2010) (defining issue #3 as "[w]hether Department Staff properly denied the WQC application based upon radiological considerations").

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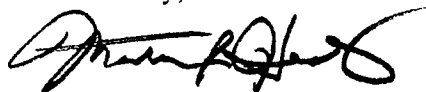
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Entergy Exhibit #	Issue Addressed	Document Description	Date Submitted To Tribunal
		3, LLC, and Entergy Nuclear Operations, Inc., Radiological Issues	
N/A	Issue #3: Radiological	Post Hearing Reply Memorandum of Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, and Entergy Nuclear Operations, Inc., Radiological Issues, dated October 5, 2012	10/5/2012

Several categories of documents listed above (*e.g.*, quarterly groundwater monitoring reports, annual radioactive effluent release reports) are updated and filed, or are otherwise made available to NRC, on a quarterly or annual basis. For such categories of documents, Entergy is providing to the Department written copies of documents that are most directly responsive to its specific information requests. For the Department's convenience, Entergy is also providing references to where related documents (*e.g.*, earlier or later versions of certain enclosed reports, as applicable) are publically available for the Department's examination. In addition, several documents being provided to the Department contain citations to supporting testimony and exhibits that are not specifically identified above or enclosed. If the Department would like copies of any such supporting testimony or exhibits, or other additional information with respect to unplanned radiological releases to groundwater, please let me know.

We look forward to discussing this supplemental information with you at your convenience.

Sincerely,



Martin R. Healy

MRH

cc:

U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk (w/encl. except for ADAMS documents)  
Douglas V. Pickett, Senior Project Manager, NRC NRR DORL (w/encl. except for ADAMS documents)  
William M. Dean, Regional Administrator, NRC Region 1 (w/encl. except for ADAMS documents)

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NRC Resident Inspectors Office (w/encl. except for ADAMS documents)  
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Kari Gathen, Associate Attorney (w/encl.)  
Jeffrey Herter, Assistant Bureau Chief, Division of Development (w/encl.)  
Gregory Capobianco, Director, Division of Development (w/encl.)  
Jeffrey Zappieri, Supervisor, Consistency Review Unit (w/encl.)  
Matt Maraglio, Consistency Reviewer (w/encl.)  
Fred Dacimo, Vice President License Renewal, Indian Point Energy Center (w/encl.)  
William B. Glew, Jr., Associate General Counsel, Entergy Services, Inc. (w/encl.)  
Kelli Dowell, Assistant General Counsel, Environmental, Entergy Services, Inc. (w/encl.)  
Dara Gray, Chemistry/Environmental, Indian Point Energy Center (w/encl.)

**March 31, 2014**

**Response to New York State Department of State Request for Supplemental Information  
Regarding Groundwater Quality Issues at Indian Point**

**I. Request for Supplemental Information.**

On December 3, 2013, Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC and Entergy Nuclear Operations, Inc. (collectively, “Entergy”) and the New York State Department of State (the “Department”) engaged in a consultation session at which the Department requested supplemental information regarding past unplanned releases of radiological material to groundwater at Indian Point and the potential effects of those releases on groundwater quality. In Entergy’s letter to the Department dated December 20, 2013, Entergy undertook to provide to the Department supplemental information on that topic on or before March 31, 2014.

**II. The Source of Information Regarding Radiological Releases.**

Indian Point, like all operating nuclear power plants, is designed and operated in accordance with strict Nuclear Regulatory Commission (“NRC”) criteria that require, among other things, that any radiological releases, including unplanned releases, must comply with applicable NRC safety and health standards and, as appropriate, must be closely monitored. *See, e.g.*, Reference 1 (establishing annual dose limits to individual members of the public from the licensed activity), and Reference 2 (establishing standards to maintain releases of radiological materials to the

environment as low as reasonably achievable (“ALARA”)). In furtherance of its statutory responsibilities, NRC has conducted periodic inspections of Indian Point, and has required Energy to file periodic reports concerning any radiological releases to the environment. *See, e.g.*, Reference 3 (providing guidance to operators on the regulatory requirement to measure, evaluate and report radiological releases). In response to the discovery of unplanned releases of radiological material at Indian Point, and in order to minimize the possibility of a future unplanned or unmonitored release, NRC is overseeing Entergy’s implementation of a rigorous groundwater monitoring program. *See, e.g.*, Reference 4. Moreover, in connection with License Renewal at Indian Point (the “NRC Proceeding”), Entergy has submitted, and NRC has closely evaluated, detailed information regarding the potential effects on public health or the environment of unplanned radiological releases to groundwater. *See, e.g.*, Reference 5. Finally, in connection with the New York State Department of Environmental Conservation (“NYSDEC”) adjudicatory hearing for Indian Point (the “NYSDEC Proceeding”), Entergy has submitted evidence demonstrating that the unplanned releases of radiological materials to groundwater have not violated state water quality standards.

### **III. Summary of Facts Regarding Unplanned Radiological Releases to Groundwater at Indian Point.**

#### **A. The Sources of Past Unplanned Releases of Radiological Materials to Groundwater Have Been Eliminated or Their Causes Have Been Addressed.**

The removal of all fuel from and the draining and de-sludging of the Unit 1 spent fuel pools was completed in late 2008. As a result, Unit 1 no longer is an active source of radionuclides to the subsurface. *See* Reference 6 at 43. In addition, the prior identified unplanned releases associated with Unit 2 have been repaired, and a robust monitoring system is in place to promptly identify and respond to any future releases. Reference 6 at 50; Reference 7 at pp. 15-19. There has been no identified unplanned spent fuel pool release to the environment from Unit 3.

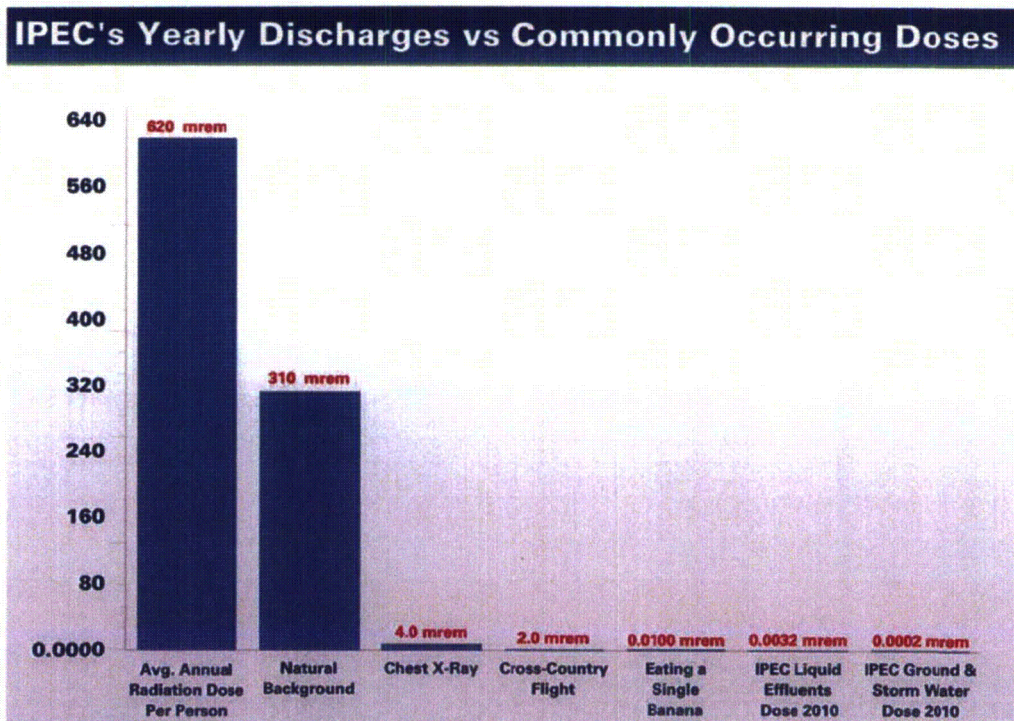
Based upon an independent review, NYSDEC concluded that, with the removal of the active contamination source at Indian Point, planned use of monitored natural attenuation is an acceptable approach to managing the remaining radionuclide plumes. *See* Reference 8.

#### **B. The Past Unplanned Releases of Radiological Materials to Groundwater Have Not Caused, and Are Not Causing, Threats to Public Health or the Environment.**

- i. There is no credible scientific basis to conclude that Indian Point’s unplanned releases have impaired, or will impair, the public health or environment.*

One of Entergy’s groundwater experts, Dr. Hoffman, a pre-eminent scientist in the field of radiological health and safety: (i) identified the sources and amounts of radiological materials released into the environment from Indian Point; (ii) determined whether there were any exposure pathways for humans or aquatic biota to those radionuclides; (iii) calculated the radiation dose to humans or aquatic biota resulting from those exposure pathways; and (iv) translated that dose to risk to human health or impact on aquatic biota. *See* Reference 9 at 6-9, 11, 14.

To put things in perspective, Dr. Hoffman concluded that the annual dose in 2010 from Indian Point's unplanned releases (the year for which the most recent data was then available) to the hypothetical maximally-exposed individual was 0.0002 mrem, a small fraction of the dose that an individual would get from eating a single banana. See Reference 7 at ¶¶ 119, 127, 143; Reference 10.



Dr. Hoffman then applied the linear no-threshold model to convert these doses into a risk to people of developing cancer in later life, finding that in order for such releases to cause a single incidence of cancer-related illness in later life, five billion people would have to be maximally exposed to Entergy's unplanned releases. Reference 7 at ¶ 136. After noting that an exposure to such a large population was impossible, Dr. Hoffman's conclusion was clear and uncontested: his expert opinion is that the unplanned releases from Indian Point are expected to have zero impact on the health of the public. Reference 7 at ¶ 138.

For purposes of evaluating impacts to the environment, Dr. Hoffman applied the two commonly accepted scientific methods for analyzing the potential dose to aquatic biota from radiological releases (the RESRAD-BIOTA dose model and the UNSCEAR model) to Indian Point's unplanned releases in 2010. Reference 7 at ¶¶ 139-141. His analysis confirmed that the dose rate (dose-per-day) to aquatic biota resulting from Indian Point's unplanned releases was "orders of magnitude" lower than the scientifically accepted threshold for protection of aquatic biota. Reference 7 at ¶ 142.

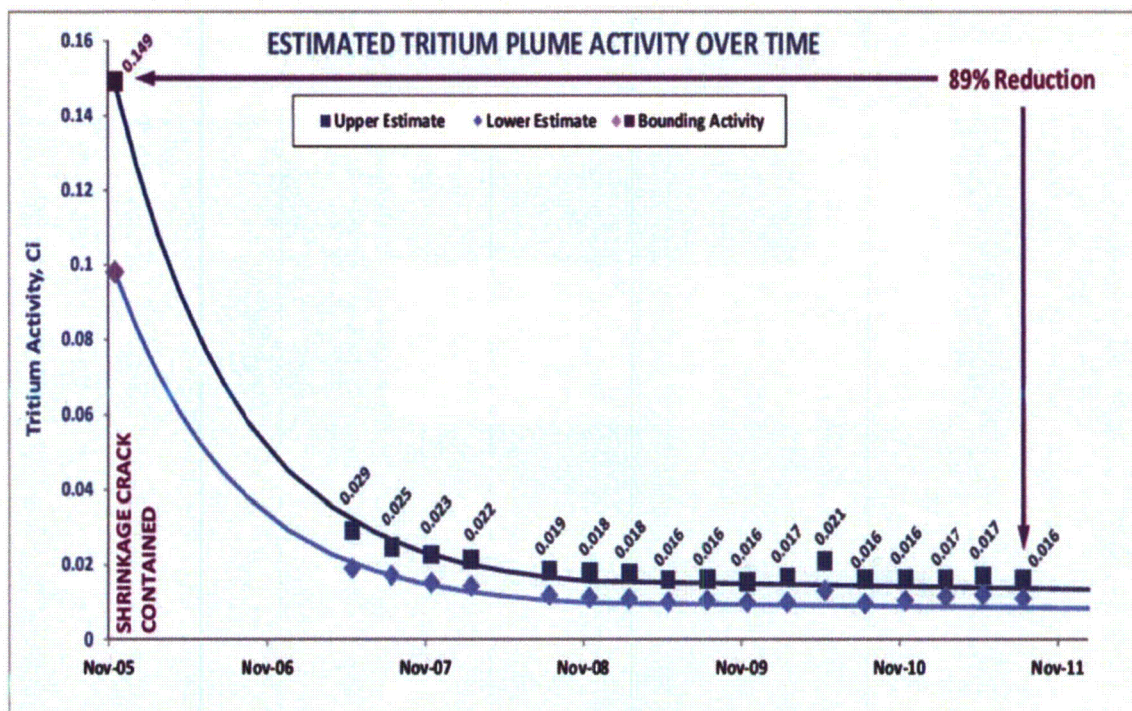


- ii. *There has been no discernible impact on the level of radionuclides in the Hudson River due to unplanned releases.*

Based on extensive, ongoing sampling and testing of Hudson River water in the vicinity of Indian Point and at control locations away from Indian Point, the migration of low levels of radionuclides to the Hudson River has no discernible effect on the levels of radionuclides contained in Hudson River water. Reference 6 at ¶ 99. NYSDEC sampling showed no significant difference between Strontium-90 in the flesh of fish caught near the site and fish caught as far as 70 miles upstream. See Reference 8. The radionuclide plumes in groundwater have not affected properties surrounding Indian Point. See Reference 11 at p. 30 n. 21 and Reference 12. Over time, the radionuclide plumes are diminishing in size. Reference 7 at ¶ 66.

Between November 2005 (when the Unit 2 unplanned release was first addressed) and November 2011, estimated radionuclide concentrations in the plume associated with the Unit 2 unplanned release had diminished by approximately 89%. Reference 7 at ¶ 67.

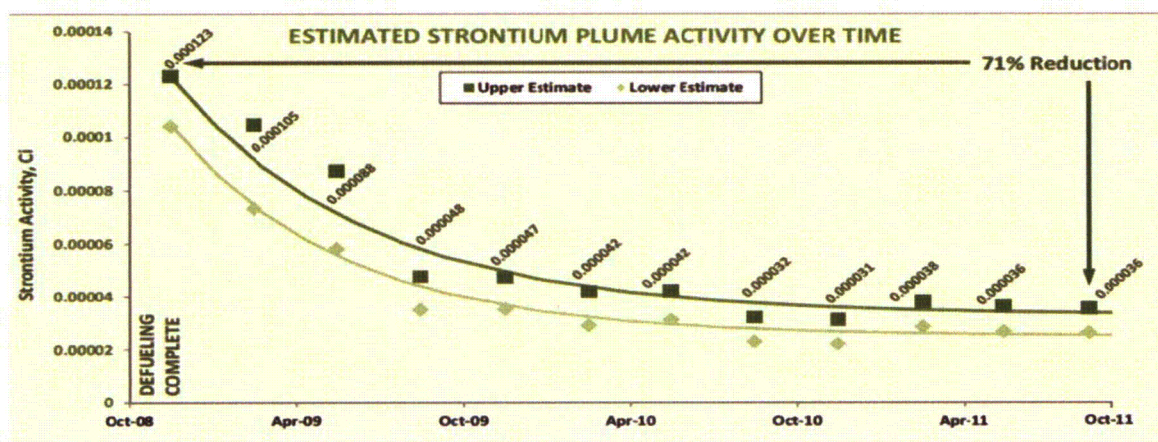
ENT000332  
Submitted: March 29, 2012





Between October 2008 (when the Unit 1 spent fuel pools were drained) and October 2011, estimated radionuclide concentrations associated with the Unit 1 unplanned release had diminished by approximately 71%. Reference 7 at ¶68.

ENT000333  
Submitted: March 29, 2012



### C. The Past Unplanned Releases of Radiological Materials to Groundwater Have Not Caused a Violation of State Water Quality Standards.

The Hudson River near Indian Point is classified as “SB” saline surface waters. *See* Reference 13 at Table 1, Item 2. “The best usages of Class SB waters are primary and secondary contact recreation and fishing. These waters shall be suitable for fish, shellfish and wildlife propagation and survival.” Reference 14. Primary contact recreation consists of recreational activities where the human body may come in direct contact with raw water to the point of complete body submergence. Primary contact recreation includes, but is not limited to, swimming, diving, water skiing, skin diving and surfing. *See* Reference 15. Secondary contact recreation consists of recreational activities where contact with the water is minimal and where ingestion of the water is not probable. Secondary contact recreation includes, but is not limited to, fishing and boating. *See* Reference 16.

Dr. Hoffman’s analyses, described above, establish that Indian Point’s unplanned releases do not violate state water quality standards. First, Dr. Hoffman demonstrates that members of the public engaging in recreational activities on the Hudson River are unaffected by Indian Point’s unplanned releases. *See* Section III.B.ii. Accordingly, there is no credible scientific basis to conclude that Indian Point’s unplanned releases have impaired or will impair the use of the Hudson River for primary or secondary contact recreation, such as swimming, fishing, and boating. Second, Dr. Hoffman establishes that Indian Point’s unplanned releases were “orders of magnitude” lower than the scientifically accepted threshold for protection of aquatic biota. *See* Section III.B.ii. Accordingly, there is no credible scientific basis to conclude that releases of

radionuclides to groundwater that has migrated to the Hudson River have impaired or will impair the suitability of the Hudson River for fish, shellfish, and wildlife propagation and survival.

#### **IV. Conclusions**

The sources of past unplanned releases of radionuclides at Indian Point have been eliminated or their causes have been addressed. Those releases have not caused, and are not causing, threats to the public health or the environment. Nor have those releases caused a violation of state water quality standards.

## REFERENCES

1. Radiation Dose Limits for Individual Members of the Public, 10 C.F.R. Part 20, Subpart D.
2. Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion “As Low as is Reasonably Achievable” for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents, 10 C.F.R. Part 50, Appendix I, Section II.
3. NRC, Regulatory Guide 1.21, Measuring, Evaluating, And Reporting Radioactive Material In Liquid And Gaseous Effluents And Solid Waste, Rev. 2 ( June 2009).
4. Letter dated October 19, 2009, from Darrel J. Roberts, NRC, to Joseph Pollock, Entergy, Subject: Indian Point Nuclear Generating Units 1, 2 &3—NRC Inspection Report Nos. 05000003/2009008; 05000247/2009008; and 0400286/2009008 (ML12338A648).
5. Contentions RK-EC-3 and CW-EC-1, presented to and dismissed by the Atomic Safety and Licensing Board in connection with NRC Docket Nos. 50-247-LR and 50-286-LR, ASLBP No. 07-858-03-LR-BD01 (Entergy Nuclear Operations, Inc.—Indian Point Units 2 and 3).
6. NRC Proceeding, Entergy Exhibit ENT000301, Testimony of Entergy Witness Donald M. Mayer, Alan B. Cox, Thomas C. Esselman, Matthew J. Barvenik, Carl J. Paperiello, and F. Owen Hoffman Regarding Consolidated Contention RK-EC-3/CW-EC-1 (Spent Fuel Pool Leaks) (March 29, 2012) (ML12338A621).
7. NYSDEC Proceeding, Proposed Findings of Fact of Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, and Entergy Nuclear Operations, Inc. Radiological Issues Entergy Proposed Findings of Fact (Apr. 29, 2012).
8. NRC Proceeding, Entergy Exhibit ENT000345, NYSDEC Community Fact Sheet (May 2008) (ML12089A608).
9. NYSDEC Proceeding, Prefiled Testimony of F. Owen Hoffman in Support of Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC and Entergy Nuclear Operations, Inc. (July 22, 2011).
10. NYSDEC Proceeding, Entergy Exhibit 121, IPEC’s Yearly Discharges vs Commonly Occurring Doses.
11. NYSDEC Proceeding, Post Hearing Reply Memorandum of Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, and Entergy Nuclear Operations, Inc., Radiological Issues (October 5, 2012).

12. NYSDEC Proceeding, Entergy Exhibit 80, NYSDEC Community Fact Sheet (Sept. 2007).

13. 6 NYCRR § 864.8.

14. 6 NYCRR § 701.11.

15. 6 NYCRR § 700.1(49).

16. 6 NYCRR § 700.1(56).