

May 3, 2006

Ms. Harriet D. Cornell, Chairwoman
The Rockland County Legislature
Allison-Parris County Office Building
11 New Hempstead Road
New City, New York 10956

Dear Chairwoman Cornell:

Thank you for your letter dated March 30, 2006. We understand your concern about vulnerability of children to the conditions at the Indian Point Energy Center, and have responded to a similar inquiry from Ms. Dorice Madronero, President, Rockland County Conservation Association. Based on information evaluated to-date, our review of Entergy's radiological assessment of the groundwater conditions at Indian Point indicates that exposure to the public is a small fraction (about 0.1 per cent) of the regulatory limits. The assessment considered all age groups, including children.

At our March 28, 2006 public meeting, held to discuss the groundwater contamination conditions at Indian Point, we stated that the estimated annual dose commitment to the maximally exposed individual was 0.0034 mrem, total body, based on our review of Entergy's radiological dose calculation. As we indicated, the maximally exposed individual for total body was considered to be an adult.

Regulatory Guide 1.109 (available on the NRC Public Website as <http://www.nrc.gov/reading-rm/doc-collections/reg-guides/power-reactors/active/01-109/01-109.pdf>) provides the acceptable method that NRC currently requires for determining annual doses from releases of reactor effluents. The Regulatory Guide also provides dose factors for each age group (infant, child, teenager, and adult), for each pathway (such as inhalation and ingestion), and for each radionuclide of interest. The Regulatory Guide provides the calculational method to estimate the dose to the maximally exposed individual based on the specific pathway of interest and a set of reasonable assumptions, such as the consumption rate of food and water for each age group. Entergy's Technical Specifications for Indian Point limits the annual dose commitment to any member of the public, from radioactive materials in liquid effluents, to 3 millirem to the total body; and 10 millirem to any organ.

In the case of liquid release to the Hudson River, the exposure pathway is the ingestion of fish and invertebrates (aquatic foods) from the area surrounding Indian Point. Entergy's dose assessment, based on the Regulatory Guide, indicated that the maximally exposed individual relative to annual total body exposure (i.e., the individual that is likely to receive the highest annual total body dose commitment due to ingestion of fish and invertebrates from the Hudson River) is the adult, at about 0.0034 millirem.

The maximally exposed individual relative to annual organ dose commitment is dependent on the age group, the radionuclide mix of the released effluent, and the associated critical organ. Accordingly, in the case of a liquid effluent release involving the ingestion pathway, the maximally exposed age group varies over time based on the amount of aquatic food ingested and the radionuclides in the radiological effluent associated with each reactor unit. For example, in the case of strontium-90, the child may be determined (for any single reactor unit) as the maximally exposed individual, with bone as the critical organ. However, when summing the liquid effluent releases from all of the reactor units on the Indian Point site, including the contribution from all other sources (such as groundwater), and considering all age groups that may be affected, the adult is the maximally exposed individual. In the case of Indian Point the dose commitment was determined to be about 0.01 millirem to the bone. All other age groups, including the child, were determined to have less exposure.

For perspective, infants, children, teenagers and adults are all exposed to the same annual radiation background, i.e., about 300 millirem. This is about 100,000 times higher than the estimated annual exposure from Indian Point via the ingestion pathway discussed previously. Additionally, the NRC regulatory requirement 10 CFR Part 20.1301, "Dose limits for individual members of the public," requires licensees to conduct operations so that total effective dose equivalent to any individual member of the public does not exceed 100 millirem in a year. This regulation also states that licensees are subject to the provisions of EPA's generally applicable environmental radiation standard, 40 CFR Part 190, Environmental Radiation Protection Standards for Nuclear Power Operations, which stipulates an annual dose equivalent of 25 millirem, whole body and organ dose (75 millirem, thyroid), for any member of the public as a result of planned discharges of radioactive materials. To assure that exposure to members of the public are maintained as low as reasonably achievable, 10 CFR Part 50, Appendix I, specifies that the estimated annual dose from liquid effluents released to unrestricted areas not exceed 3 millirem to the total body, and 10 millirem to any organ, from all pathways of exposure. These limits are specified in the Technical Specifications for the facility, and pertain to any member of the public, including children.

The reference you made to the NRC website relative to dose to minors was in regard to 10 CFR Part 20.1207, "Occupational dose limits to minors," which indicates that the annual occupational dose limits for minors are 10 percent of the annual dose limits specified for adult workers in 10 CFR Part 20.1201, "Occupational dose limits for adults." This regulation refers to the occupational exposure limitations applied to individuals under the age of 18 years, who, in the course of employment, may be assigned duties that involve exposure to radiation or radioactive material. This regulation does not apply to minors that are members of the public.

We hope that this explanation helps your understanding of this matter. Please contact Mr. John White of my staff (610.337.5114) if you have further questions.

Sincerely,

/RA by Marsha Gamberoni for/

A. Randolph Blough, Director
Division of Reactor Safety, Region I

H. Cornell

4

cc:

Honorable C. Scott Vanderhoef, County Executive, Rockland County

J. Facelle, Commissioner of Health, Rockland County

D. Madronero, Rockland County Conservation Association

H. Cornell

5

Distribution:

- J. Noggle, DRS
- J. White, DRS
- A. Blough, DRS
- S. Klementowicz, NRR
- R. Bores, SLO
- J. Boska, NRR
- D. Screnci, PAO

DOCUMENT NAME: E:\Filenet\ML061230038.wpd

SUNSI Review Complete: JRW (Reviewer's Initials)

After declaring this document "An Official Agency Record" it **will** be released to the Public.

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	RI/DRS	RI/DRS	RI/DRP	RI/ORA	RI/DRS
NAME	JNoggle (JDN)	JWhite (JRW)	ECobey (EWC)	RBarkley (RSB)	ABlough (MKG for)
DATE	04/25/06	04/27/06	04/28/06	04/28/06	05/03/06

OFFICIAL RECORD COPY