NEW YORK STATE OF OPPORTUNITY. Department of Public Service

Three Empire State Plaza, Albany, NY 12223-1350
www.dps.ny.gov

May 31, 2023

VIA EMAIL

Hon. Michelle L. Phillips
Secretary to the Commission
3 Empire State Plaza
Albany, NY 12223-1350

Re: Matter No. 21-01188 – In the Matter of the Indian Point Closure Task Force and Indian Point Decommissioning Oversight Board.

Dear Secretary Phillips:

Please accept for filing in the above-captioned matter, responses to questions raised at the February 2, 2023 Indian Point Decommissioning Oversight Board meeting. Should you have any questions regarding this filing, please contact me. Thank you.

Respectfully submitted,

Tom Kaczmarek
Executive Director
Indian Point Closure Task Force
Indian Point Decommissioning Oversight Board

Responses to Public Comments and Questions
February 2, 2023 DOB Meeting

The source of the responses and the data contained herein should be assumed to be New York State unless otherwise noted.

ADMINISTRATION

1. **Why are there no Federal representatives on the DOB?**
   The DOB is a state and local body, inspired by legislation introduced by Senator Harckham and former Assemblywoman Galef, and provides a forum for information exchange on matters pertaining to decommissioning. The body plays an important public education and outreach function, with volumes of information available on its website, engaging public information forums and public statement hearing opportunities. It is also a forum for state regulatory bodies and local governments to coordinate activities relating to state and local oversight. While its membership is similarly focused on state and local representation, the DOB nonetheless regularly engages with federal agencies and the offices of Senator Gillibrand, Senator Schumer, and other members of the Hudson Valley's congressional delegation, and continues to welcome presentations and updates on their work in our nation's capital.

2. **Can slides be presented ahead of each meeting? It is hard to follow dense slides.**
   While there may be instances in which slides may not be able to be published in advance, we will endeavor to post meeting presentations prior to the start time of each respective meeting.

3. **Too much information is packed into meeting presentations. Please slow down so it is easier to digest.**
   As the decommissioning of Indian Point moves forward, we will continue to seek strategies and opportunities to discuss pertinent issues clearly and in depth, while continuing to offer opportunities for public comment.

4. **Can a health expert be added to the DOB?**
   While the New York State Department of Health (DOH) has been an active participant on the DOB's Monitoring Working Group, the Director of DOH's Bureau of Environmental Radiation Protection has participated in recent DOB public meetings and will do so moving forward. The DOB staff members' credentials and experience include multiple graduate degrees, including master's in public health, Board certification in Health Physics, expertise in radiation biology and radiation effects, and over 30 years' experience in radiation protection.

SPENT FUEL POOL WATER

Disposal Methods

5. **Does the amount of radiation decline the longer the water stays in its spent fuel pool tanks? Fukushima's tritium has basically hit its first half-life.**
   Yes, the longer the water is stored in spent fuel pools and storage tanks, the less radioactive it will be. While this reduction in radioactivity is beneficial, there are several downsides to storing large amounts of radioactive water onsite during decommissioning. According to Dave Lochbaum, while it is true that radiation levels of tritium decrease over time and that the tritium at Fukushima has undergone about one half-life of decay since the multi-unit severe accident that began on March 11, 2011, Fukushima's tanks leaked within 2.5 years of the accident. According to Mr. Lochbaum, even if leaks did not occur, tritiated water will evaporate regardless of containment strategy and is vented from storage tanks into the atmosphere. Additionally, this leakage and evaporation from Fukushima was not diluted with clean water flow, which occurs when treated water is discharged into the Hudson River. Storing treated water onsite for 12, 24, 36, or more years before discharging could result in lower amounts of tritium reaching the river, but presents risks that must be better understood, including: (1) risks of leaks from tanks, (2) releases of tritium via vents to the atmosphere, (3) delays to safe decommissioning of the site, and (4) additional expenses that draw down the trust fund dedicated for the purpose of thoroughly and completely decommissioning Indian Point. Further, the levels that were historically discharged at Indian Point have been at small fractions of the legal limits, and have been well below drinking water standards at the point of discharge. While some may contend that any amount of tritium is unsafe, a half-life only diminishes, but does not eliminate, the presence of tritium.

6. **Why are water discharges to the Hudson part of operations during decommissioning?**
   Even though Indian Point no longer produces power, it continues to have discharges to waters of the State. While many sources of wastewater have ceased, or have been reduced, several continue to discharge, including but not limited to the house service boiler and non-contact cooling water, floor drains, and stormwater. The federal NRC licenses provides authorization for Holtec to continue to release effluent containing radionuclides subject to regulatory limits, a state SPDES permit will be required for non-radiological discharges until all discharges from the facility permanently cease.

7. **We learned that the Fukushima tanks leaked considerably. Is that going on or were the tanks fortified? In other words, can leakage be stopped?**
   According to Dave Lochbaum, at least some of the tanks at Fukushima were surrounded by berms a few inches tall so that leaked water would pool. Nevertheless, leaked water got into the ground, and is traveling underground under the Fukushima site towards the ocean. These unplanned discharges are not diluted with clean water, and in some cases have not been sufficiently treated/filtered to remove other radionuclides.

8. **Is it possible to filter water in the spent fuel pools, leaving tritiated water in the pools to decay? Could storage of tritiated water on site impact the host community?**
   According to Dave Lochbaum, water can be filtered to remove virtually all its radioactivity, except for tritium. But tritiated water will evaporate. In the late 1990s, the spent fuel pool at Brookhaven National Lab on Long Island was discovered to have been leaking for years. Brookhaven's challenge was in distinguishing between water added to the pool to replace evaporation and water replacing leakage. They assumed the makeup was only for evaporation. While a spent fuel pool containing spent fuel will experience more evaporation than an emptied spent fuel pool, both will experience evaporation of tritiated water.

   In the late 2000s after monitoring wells were installed at the then-operating Pilgrim nuclear plant, tritium was detected in one or more of the wells. It was attributed to rainfall rather than leakage from pools, tanks, and/or pipes. Dave Lochbaum researched this explanation reviewing the annual reports submitted for Pilgrim the prior three or four years. The data showed that 94% of the tritium released from Pilgrim over that period was from evaporation of its spent fuel pool water. This reality supported the theory that rainfall returned tritium to the ground where it migrated into the monitoring wells. No leakage from any other location was ever identified.

   Storage onsite, whether in spent fuel pools or storage tanks, does not mean tritium will not be released. It will evaporate from pools and from vented tanks. It will then be breathed by downwinders or consumed by people drinking water or consuming foodstuffs containing tritium returning to earth. Through the evaporation mechanism, aerosolized tritium could migrate towards and into the local host community.

Characterization, Limits, and Treatment Methods

9. **Aside from the spent fuel pools, what other sources of radioactive water are present at Indian Point?**
   The Unit 2 and Unit 3 spent fuel pools are the primary sources of radioactive water still at Indian Point. In addition to the Unit 2 and Unit 3 spent fuel pools, other sources include the systems related to the use of cooling water connected to the Unit 2 and Unit 2 spent fuel pools, including treatment tanks, refueling water storage tanks, reactor cavities, discharge canal chambers, and the floor and equipment drains inside buildings. These drains collect any water leaked or spilled and route it to waste tanks. The waste tanks are processed as necessary to allow water to be re-used in the plant – a lesser option now that the reactors are shut down - or discharged to the river.

10. **How does the amount and concentration of tritium released into The Hudson River during the operation of Indian Point 's reactors compare with the proposed amount and concentration of tritium to be released in 2023 & onwards from the storage tanks?**
    Based on the maximum volumes of the containment chambers still holding water, including two spent fuel pools (Unit 2 and Unit 3), it is expected that total water volume for remaining processed wastewater discharges to be a far lower volume than when the nuclear reactors were

operational. According to Holtec's presentation to the DOB on April 27, 2023, there is approximately 1.5 million gallons of water remaining at the plant that is planned to be treated and discharged over a period of several years (versus an average of 3.37 million gallons per year during recent years when two of the reactors were operating). Furthermore, Holtec noted that the total radioactivity remaining onsite is approximately 400 curies, compared to historical annual discharges during plant operation of approximately 1,200 curies per year (which resulted in a dose level to the public of less than 1% of NRC's regulatory limit).

11. Please describe the monitoring and characterization of spent fuel pool water at Indian Point. Who is required to perform the testing? What is tested for? Does the federal government verify the testing methodology, testing equipment, and testing results? Can the public view the test results?

The Department of Environmental Conservation (DEC) SPDES Permit requires the facility to sample at various frequencies and submit those results though Discharge Monitoring Reports (DMR) to DEC on a monthly basis. DEC reviews the DMR data to ensure compliance with the effluent limits under DEC's jurisdiction.

The Department of Health has three water sampling locations near Indian Point, one of which is near the discharge location, the others being upstream and downstream of the facility.

The controls in place to monitor and account for radionuclides in water discharged to the river is described in the Offsite Dose Calculation Manual (ODCM) attached to the 2021 annual effluent report submitted to the NRC by Holtec. Before a storage tank is discharged, its contents must first be recirculated for at least three tank volumes. For example, suppose a tank holds 11,750 gallons and the pump that recirculates water through it has a flow rate of 100 gallons per minute. The minimum recirculation time would be:

$$\frac{\text{11,750 gallons x 3 tank volumes}}{\text{100 gallon per minute recirc rate}} = 5.9 \text{ hours}$$

After recirculation, a sample is drawn from the tank and analyzed to determine its radioactive contents (e.g., X picocuries/liter of tritium, Y picocuries/liter of nickel-63, Z picocuries/liter of cesium-137, etc.).

Federal regulations require split testing of the mandated samples – that is, samples collected and tested by two independent and federally-certified laboratories – and for results from the parallel testing to be annually provided to the NRC. NRC reserves the right to check every submittal.

The ODCM specifies a minimum dilution flow rate of 80,000 gallons per minute. The tank's contents are pumped into the discharge canal through which the dilution flow is passing and the combined flow goes into the river. The sampling results are used to determine the setpoint for a radiation detector in the discharge piping. If radiation levels above that setpoint are detected,

the discharge will be stopped. This radiation detector provides protection against sampling mistakes. If radioactivity unaccounted for during the analysis of the sampled water flow out the discharge path, their detection will result in termination of the release. Thus, it's a check and an additional barrier against unaccounted for releases of radioactivity to the Hudson River.

The sampling results and the tank's volume are used to determine how much of each radionuclide was discharged. The annual reports submitted to the NRC tally up all the releases to specify how much of each radionuclide was released. For example, Table 4-5 of the report for 2021 indicated 0.00644 curies of Cobalt-60, 0.0013 curies of Cesium-137, and 0.0000775 curies of Ruthenium-103 were discharged from Unit 3.

Slide 7 of Mr. Lochbaum's March 28, 2023 presentation to the Hendrick Hudson School District PTA shows the radiation monitor on the discharge canal to the lower right corner of the graphic. It is the green triangle symbol.

Another check and barrier are the offsite soil, fish, vegetation et al sampling. If the sampling pre-release misses anything significant, the offsite sampling provides a means of detecting it.
The 2021 annual report is posted online at
https://www.nrc.gov/docs/ML2218/ML22182A076.pdf

12. **What studies of bioaccumulation are conducted to determine environmental and health impacts from discharges of tritiated water to the Hudson?**
Indian Point has an established Radiological Environmental Monitoring program. The purpose of this program is to monitor/measure the radiation and radioactivity detectable in the environment that may be attributable to the Indian Point plant. This program, initiated in 1958, includes the collection, analysis, and evaluation of radiological data in order to assess the impact of Indian Point on the environment. Nuclear licensees provide an annual report to NRC each year. These are made publicly available on the NRC website. The latest report is dated May 3, 2022 and consists of sampling data and analyses from January 1 to December 31 of 2021. *See* Indian Point 2 & 3 | NRC.gov.

The DOB's independent technical expert reviewed the annual radiological environmental reports required by federal regulations to be submitted to the NRC. These reports include results from hundreds of samples of river water, drinking water, riverbed soils, fish in the river, and vegetation collected each year. The results were reviewed to see whether releases of water from Indian Point is concentrating or bio accumulating (i.e., releases far below the permitted levels collecting to pose larger hazards.) No such adverse trends were found. The annual radiological environmental report for 2021 is posted online at
https://www.nrc.gov/docs/ML2212/ML22123A206.pdf.

13. **What is the feasibility of deploying tritium removal technologies at Indian Point?**
The DOB's independent technical expert researched tritium removal technologies. While Mr. Lochbaum confirmed that tritium removal has been explored in Japan and Canada, he has not

come across a commercial nuclear power plant, operating or being decommissioned, that has used a system for removing tritium from water. He did identify an EPRI (Electric Power Research Institute in Palo Alto, CA) report of a lab system circa 2016 that showed the method could remove tritium, but was not a viable solution on a large scale.

Mr. Lochbaum further notes that the Canadian and Japanese methods do not make tritium disappear. Canada extracts the tritium from water in a gaseous form which is then sold for use in tritium exit signs. Thus, even if a skid could be delivered to Indian Point and placed in service, there would still be tritium gas to deal with -- either store, ship offsite, or release to the air.

DECOMMISSIONING MONITORING

School and Community Monitoring Working Group

14. Is there a medical or health expert from the Department of Health on the Working Group? Will they be present during upcoming public forums to address parents' questions and concerns?

Expert staff of the New York State Department of Health (DOH) have served as active members of the DOB's Monitoring Working Group since the group's inception in summer 2021. The DOB staff members' credentials and experience include multiple graduate degrees, including master's in public health, Board certification in Health Physics, expertise in radiation biology and radiation effects, and over 30 years' experience in radiation protection. DOH is also supporting the CAMP RFP process to procure community air monitoring for the school district and communities surrounding Indian Point, will participate in the contractor selection process to ensure the selected vendor meets the requisite criteria, and will participate in the open meeting and public forum currently being coordinated with the Buchanan-Verplanck Elementary School PTA.

Why are there no parents on the monitoring working group?

The Monitoring Working Group was established immediately following the creation of the DOB thanks to the advocacy of parents in the community and the Superintendent of the Hendrick Hudson School District. While the Working Group is comprised solely of DOB Board Members and technical experts, the Group included the Superintendent and regularly received, considered, and incorporated input from parents and their representatives in determining scientific-based solutions to incorporate the BV Elementary School, and the health and safety considerations of its student body, in any monitoring plan. These public comments and concerns were considered in the development of the Community Air Monitoring Plan (CAMP) Request for Proposals (RFP), which includes real-time monitoring for VOCs, PM-10 and radioactive materials at the Indian Point perimeter.

The Monitoring Working Group additionally participated in a public forum organized by the Hendrick Hudson School District PTA Advocacy Committee on March 28, 2023. Public comments and concerns were considered in the development of the CAMP RFP which includes real-time

monitoring for VOCs, PM-10 and radioactive materials at the Indian Point perimeter. The DOB will continue to work with the PTA and Superintendent to identify additional opportunities to engage with the parental and school community.

Existing Dust Mitigation

15. How is dust prevented from leaving the site?

Rules and regulations are designed to prevent releases of material from the site, and the State will monitor decommissioning activities with this important principle in mind. Several factors collectively lessen the chances that dust from decommissioning activities will affect the public offsite or workers onsite.

One of the first steps during decommissioning involves extensive surveying and sampling of the buildings and grounds to identify the locations of radioactive materials, asbestos, toxic chemicals, and other hazardous materials requiring special handling. These results inform the planning for the decommissioning work, including measures to guard against uncontrolled releases.

Buildings housing contaminated components or with concrete walls saturated with radioisotopes with longer half-lives will be dismantled from the inside out. During dismantling, air leaving the buildings flows through ducts and stacks monitored by radiation detectors. Excessive radiation levels will cause an alarm so the exhaust flow can be stopped. These detectors provide real-time, continuous protection against excessive releases of radioactivity to the air.

There are two backstops guarding against airborne radioactivity bypassing the radiation detectors and blowing downwind. The first and more rapid backstop are the personnel radiation monitors worn by workers performing decommissioning activities on contaminated equipment. The workers are closest to the creation of airborne radioactivity. The personnel radiation monitors would provide rapid – often even same day – indication of a problem to allow timely intervention and remediation as necessary.

The second backstop is the series of eight air sampling units located approximately one-quarter mile to just over 20 miles from the site that are operated 24/7 and checked at least weekly by the plant operator for radiation levels. In addition, more than three dozen radiation monitors are located offsite around Indian Point. These radiation monitors are collected each quarter. The most recent data is publicly available here: https://www.nrc.gov/reactors/operating/ops-experience/tritium/plant-specific-reports/ip2-3.html.

The effectiveness of the policies and procedures has been demonstrated in practice with the decommissioning of the Big Rock Point (MI), Yankee Rowe (MA), Zion (IL), and Rancho Seco (CA) nuclear plants.

These, and other, nuclear facilities have been decommissioned without experiencing airborne radioactivity releases in excess of federal limits.

New York State also has another tool to mitigate the migration of dust. State regulations also prohibit air pollution under 6 NYCRR part 211.1, which set standards about dust (among other pollutants) that is generated from any activity, including demolition. As a proactive measure, NYS DEC worked with the Village of Buchanan to directly incorporate these State standards into their demolition permit process. This provides for additional regulatory requirements on dust control and improves the local government's ability to halt any process that violates the demolition permit conditions. The State's on-site inspector will be able to observe any dust issues during heavy demolition and alert Holtec and the proper authorities if there are potential violations of NRC, state, or local requirements.

The pre-work mapping of radioactive material locations, the radioactive decay of short-lived radioisotopes, the monitoring of pathways for airborne radioactivity released during decommissioning work, the radiation monitoring of workers performing decommissioning work, the offsite radiation monitoring, and the additional New York State and local oversight over planned demolition collectively lessen the chances for harmful amounts of radioactive gases and particles to be deposited offsite.

Existing Monitoring

16. **Is air monitoring data available to the public?**
    A section of the DOB website is dedicated to community monitoring data (https://dps.ny.gov/community-monitoring). This page includes a link to reports filed by Indian Point with NRC regarding radiological effluent releases. The direct link to this page is https://www.nrc.gov/reactors/operating/ops-experience/tritium/plant-specific-reports/ip2-3.html. In addition, New York State performs water and air environmental radiation surveillance near Indian Point. Several links to this data are also available on the DOB's community monitoring webpage.

17. **Has anyone tested dust in any location outside Indian Point? Has anyone tested Buchanan Verplanck Elementary for radiological particulates?**
    The DOB created a Monitoring Working Group in summer 2021. After initial discussions, the Working Group recommended that a request for proposals (RFP) be issued to procure environmental consulting services to develop a Community Air Monitoring Plan (CAMP) with primary focus on fence-line monitors. The RFP was issued January 9, 2023. The Monitoring Working Group will work with the selected contractor to determine science-based solutions to incorporate the BV Elementary school. At the April 27, 2023 meeting of the DOB, the Chair announced that the state was allocating $500,000 to the Hendrick Hudson School District for the purpose of conducting an environmental assessment of the BV elementary school.

18. **In Massachusetts, the Department of Health keeps records of incidents of cancer in towns throughout the state. Could the DOB check with the NYS Department of Health to see if they have kept such records?**
    Cancer maps are available for all of New York State. See the following link for maps and data. https://apps.health.ny.gov/statistics/cancer/environmental_facilities/mapping/map/

DECOMMISSIONING OVERSIGHT

General

19. **When the nuclear facility was first commissioned, what was the original plan to decommission? The plan could not have been to operate the facility forever.**
    It is correct that any nuclear power generation facility is not expected to operate forever, especially first- and second-generation units such as those commissioned at Indian Point in the 1960s and 1970s. However, the former U.S. Atomic Energy Commission, predecessor to the U.S. Nuclear Regulatory Commission (NRC), did not address this issue back in 1956 when it issued the first construction permit for the Indian Point site or in 1962 when it issued the provisional operating permit for the first unit (Indian Point Unit 1). The NRC began developing decommissioning regulations in the 1980s.

NRC Inspection Reports

20. **How can HDI say there was no release of radionuclides if there were radioactive particles in soil?**
    This question may stem from confusion emanating from the Holtec presentation during the February 2, 2023 DOB meeting. Mr. Burroni read from his slides which mentioned a Non-Cited violation that "*references a different site where reactor vessel segmentation activities resulted in particles in soil samples*." The official inspection report is publicly available in the ADAMs database on the NRC website (ML22306A065). The inspection report reference ADAMs accession numbers (ML21067A225 and ML22069A329) which contain documents from the Zion nuclear plant in Illinois. With regards to the Indian Point violation, the inspection report does have the statement, "*No aggressive work (cutting, grinding, etc.) was being performed at the time of the observation and the inspectors noted that the air sample taken that day did not indicate any release of material*."

PIPELINE SAFETY

21. **Why was Enbridge "made aware" of the sink hole rather than discovering it on their own? If nobody noticed, how long would it have taken for the company to find it?**
    According to Enbridge, sink holes can rapidly appear without warning. If the sink hole had not been discovered on December 24, 2022, it is likely that the sink hole would have been identified during the next scheduled patrol.

    Consistent with federal pipeline safety regulations, Enbridge is required to perform a patrol of its pipelines four times each year. Per its procedures, Enbridge performs patrols of its pipeline

on a far more frequent basis. While the frequency may not be disclosed due to critical infrastructure security concerns, DPS staff can confirm it would have allowed Enbridge to discover the condition soon after it occurred.

22. **Have potential subsidence issues been evaluated at/near Indian Point?**
    According to Enbridge, the Indian Point area has been assessed for land movement and flooding hazards, and no geohazards or pipe movement features affecting girth welds or pipeline integrity were identified. No sink holes or other subsidence features have been identified through ground-based or aerial LiDAR-based inspections within the Enbridge right-of-way adjacent of the Indian Point facility.

23. **When will the pipeline right-of-way where heavy decommissioning activities are conducted at Indian Point be properly marked?**
    Significant attention has been focused on addressing safety and security concerns related to the co-location of interstate natural gas pipelines near the Indian Point facilities. Such actions have included, in part: (1) formalized, regular communication between decommissioning entity Holtec Decommissioning International (HDI) and pipeline operator Enbridge, as required by joint agreement with the Department of Public Service; (2) clear marking of the pipeline over roadways on site; (3) installation of an air bridge to physically protect the pipe during any heavy load crossings; and (4) establishment of a Memorandum of Understanding (MOU) between HDI and Enbridge establishing communication, notification, and safety protocols regarding heavy pipeline crossings or any work that could affect the pipelines. While the pipeline right-of-way on site is visible and includes markings consistent with federal pipeline safety regulations and Enbridge procedures, enhancing pipeline markings on the Indian Point property is a reasonable request we extended to Enbridge. To further enhance visibility and awareness of the pipelines, Enbridge installed additional pipeline markers between the current markers within the site.