FACT SHEET

NEW YORK STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (SPDES) DRAFT PERMIT RENEWAL WITH MODIFICATION INDIAN POINT ELECTRIC GENERATING STATION Buchanan, NY 0004472 – Rev. January 2017

Facility Name: Indian Point Nuclear Generating Station Units 2 and 3
SPDES #: NY-0004472

DEC Application #s: 3-5522-00011/00004

Fig. 1: Indian Point Nuclear Generating Station, Hudson River, New York State

I. Introduction:

These fact sheets generally describe the environmental and facility operational issues and draft permit conditions of a modified SPDES permit which the Department of Environmental Conservation (Department) proposes to issue for the Indian Point Electric Generating Station (Indian Point) in Buchanan, New York. The draft permit will be the subject of a public review and comment period, as well as an administrative hearing process (including adjudication, if determined to be appropriate), before the Department issues a final permit.

The draft permit contains conditions which address three aspects of operations at Indian Point regulated under the United States' Clean Water Act (CWA; 33 USC §1251, *et seq*.) and parallel New York State law and regulations: conventional industrial pollutant discharges, thermal discharge, and cooling water intake structure. Limits on the conventional industrial discharges are not significantly changed from the previous permit. New conditions are included to address the thermal discharge and to implement the "best technology available" (BTA) for minimizing adverse impacts to aquatic resources from the cooling water intake.

Detailed discussions of water quality and biological components of the permit follow in Attachments A and B. These discussions include updates made to the permit following a January 9, 2017 agreement between the Department, the permittee, and others to tentatively retire both units by 2021. This agreement represents the best technology

available for cooling water intake structures taking into consideration the expected time frame to design, manufacture, and install alternative solutions (e.g. wedgewire screens).

Attachments A and B at the end of this fact sheet include the Special Conditions and Biological Fact Sheet, respectively, specific to this permit.

II. Facility Description:

The Indian Point facility is located on the east shore of the Hudson River at about River Mile 42, in Buchanan, New York, south of Peekskill, in Westchester County, NY (figure 2, below). Indian Point Units 2 and 3 are nuclear powered steam electric generating plants owned and operated by Entergy Nuclear Indian Point 2 LLC and Entergy Nuclear Indian Point 3 LLC (Entergy - the permittee), respectively. Units 2 and 3 have a combined generating capacity of 2158 MW.

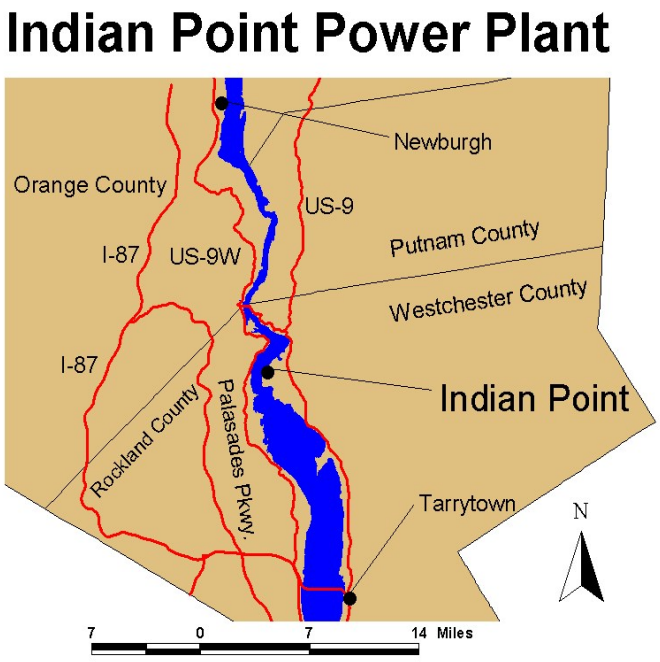

Fig. 2: General Location of Indian Point Nuclear Generating Station on the Hudson River, New York State

The Indian Point facility uses once-through cooling systems that withdraw up to 2.5 billion gallons of water per day from the Hudson River. This cooling water is drawn in through three intake structures located on the shoreline of the Hudson River. Heated non-contact cooling water is discharged back into the Hudson through sub-surface diffuser ports located along the seaward wall of the discharge canal which is located down-river (south) of the intake structures. Some residual industrial chemicals are discharged with the thermal discharge.

The facility currently operates Ristroph modified traveling screens, a fish handling and return system, two-speed pumps in Unit 2, and variable-speed pumps in Unit 3 as measures to reduce mortality of fish and aquatic invertebrates due to operation of the cooling water intake system.

III. Hudson River Settlement Agreement:

Prior SPDES permits for the Indian Point facility (along with the Roseton and Bowline Point steam electric generating units) reflected the terms of the 1981 - 1991 "Hudson River Settlement Agreement" (HRSA" and four subsequent Consent Orders (effective 1992 - 1998) that generally extended HRSA conditions. The HRSA and Consent Order terms included specific provisions to partially address thermal discharges, some aquatic organism protection measures and a series of long-term studies of Hudson River fish species. The last SPDES permit for the Indian Point facility expired in 1992, but its terms have been continued under provisions of the New York State Administrative Procedure Act (SAPA).

IV. Overview of the Permit

This draft permit continues the discharge limits on certain metals, solvents and other industrial pollutants contained in the current permit. In addition, it requires compliance with thermal discharge standards and includes measures to protect aquatic organisms. The revised permit includes a specified numerical mixing zone that is based on thermal studies conducted by the permittee (required in previous versions of the permit) to limit discharge condition to meet criteria set forth in 6NYCRR Part 704.

A. Conventional Industrial Discharges: No other significant changes are proposed to existing effluent limits for these parameters.

B. Thermal Discharges: The permittee must satisfy the provisions of Section 316(a) of the CWA and related requirements in 6 NYCRR Section 704.2 which provide that the thermal discharges from Indian Point to the Hudson River should meet regulatory temperature criteria for estuaries, and must meet the NYS standard of ensuring the propagation and survival of a balanced, indigenous population of shellfish, fish and other aquatic species. This requirement is being continued from the previous permit.

C. Cooling Water Intake Structure: Pursuant to Section 316(b) of the CWA, and 6 NYCRR Part 704.5, the Department has determined that the site-specific best technology available (BTA) to minimize adverse environmental impact of the Indian Point Units 2 and 3 cooling water intake structures is closed-cycle cooling.

1. Immediate Fish Protection Measures:

In addition to the steps above, upon the effective date of the SPDES permit, the permittee must take the following steps to reduce or mitigate adverse environmental impacts from the continued operation of the existing once-through cooling water intake system while steps are being taken to implement BTA.

% To reduce the number of fish and other aquatic organisms entrained by reducing water withdrawals at Indian Point, the permittee must schedule and take annual generation outages of no fewer than 42 unit-days between February 23 and August 23 of each calendar year (the entrainment season). These outages must continue as specified in the previous permit.

% To minimize injury and mortality to adult and juvenile fish due to impingement on the intake screens, the permittee must continue operating the existing, Department-approved fish impingement mitigation measures (*e.g.*, Ristroph screens, fish return sluiceway). This condition is being continued from the previous permit.

% To reduce entrainment when the facility is operating, the permittee must reduce flows throughout the year according to a prescribed schedule specified in the permit. This condition is being continued from the previous permit.

% The permittee must also, during each calendar year, continue to conduct long-term Hudson River fish monitoring programs: Long River Ichthyoplankton, Fall Shoals Trawls, Beach Seine, and Striped Bass/Atlantic Tomcod Mark-Recapture Survey. This condition is being continued from the previous permit.

D. Pending Issues: In reliance upon Entergy's commitment to retire Indian Point Units 2 and 3 no later than 2020 and 2021, respectively (subject to the terms and conditions of that commitment, which include electric system reliability considerations, as set forth in the January 9, 2017 Indian Point Agreement between and among Entergy and NYSDEC), the outage and reporting requirements, traveling screens and fish return and handling system reflected, and the flow conditions (which employ multi-speed pumps), constitute the continuing measures for best technology until termination of operations at Units 2 and 3. Additionally, the length of time required to design, permit and construct closed-cycle cooling technology at the facility would likely be at least 9.5 years and would involve significant costs.

SPECIAL CONDITIONS FOR OUTFALL 001

1. Discharge through Outfall 001 shall occur only through the subsurface ports of the outfall structure.

2. Sampling location for Outfall 001 is to be located upstream of the discharge from the common discharge canal into the Hudson River.

3. At no time shall the maximum discharge temperature at Outfall 001 exceed 43.3 degrees C (110° F).

4. The maximum discharge temperature at Outfall 001 shall not exceed 34°C (93.2°F) for an average of more than ten days per year; provided that the daily average discharge temperature at Outfall 001 shall not exceed 34°C (93.2°F) on more than 15 days between April 15 and June 30 in any year.

5. When the temperature in the discharge canal exceeds 90°F or the site gross electric output equals or exceeds 600MW, the head differential across the outfall structure shall be maintained at a minimum of 1.75 feet. When required, adjustment of the ports shall be made within four hours of any change in the flow rate of the circulating water pumps. If compliance is not achieved, further adjustments of the ports shall be made to achieve compliance. Flow schedules in Special Condition 6, below, shall take priority over this condition.

6. Cooling water flow volume will be maintained through flow minimization by actively managing flow within existing equipment design parameters to utilize the minimum volume of water necessary or appropriate for condenser cooling (accounting for optimal condenser back-pressure and turbine generator output) and to comply with applicable authorizations, including NRC licenses and the thermal limits of this permit, as well as nuclear industry practice regarding pump parameters and station stability.

7. a. The thermal discharge from Outfall 001 is subject to 6 NYCRR Part 704.

b. The thermal discharge from the Indian Point nuclear facilities shall assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on the Hudson River. In this regard, the Department has approved and hereby imposes as a condition the permittee's request for an acreage-based thermal discharge mixing zone pursuant to 6 NYCRR Section 704.3 for the term of this permit and each renewal permit. The water temperature at the surface of the Hudson River shall not be raised more than 1.5 degrees Fahrenheit (from July through September, when surface water temperature is greater than 83 degrees Fahrenheit) above the surface temperature that existed before the addition of heat of artificial origin (Section

704.2[b][5][iii] of the State's Criteria Governing Thermal Discharges), except in a mixing zone of seventy-five (75) acres (total) from the point of discharge. The thermal

discharge from the Indian Point nuclear facilities to the Hudson River may exceed 90 degrees Fahrenheit (6 NYCRR Section 704.2[b][5][i] of the State's Criteria Governing Thermal Discharges) within the designated mixing zone area, the total area of which shall not exceed seventy-five (75) acres (3,267,000 square feet) on a daily basis.

8. The flow of condenser cooling water discharges shall be monitored and recorded every eight hours by recording the operating mode of the circulating water pumps. Any changes in the flow rate of each circulating water pump shall be recorded, including the date and time, and reported monthly together with the Discharge Reporting Form. The permittee shall indicate whether any circulating pumps were not in operation due to pump breakdown or required pump maintenance and the period(s) (dates and times) the discharge temperature limitation was exceeded, if at all. Methods, equipment, installation, and procedures shall conform to those prescribed in the Water Measurement Manual, U.S. Department of the Interior, Bureau of Reclamation, Washington D.C.: 1967 or equivalent approved by the NYSDEC.

9. a. The service water system may be chlorinated continuously.

b. Should the condenser cooling water system be chlorinated, the maximum frequency of chlorination for the condensers of each unit shall be limited to two hours per day. The total time for chlorination of the three units for which this permit is issued shall not exceed nine hours per week. Chlorination shall take place during daylight hours and shall not occur at more than one unit at a time.

10. Continuous monitoring of Total Residual Chlorine (TRC) during condenser chlorination is required. If the continuous monitor fails, is inaccurate, or is unreliable, TRC shall be monitored during condenser chlorination by analyzing grab samples taken at least once every 30 minutes during each chlorination period.

11. Grab samples shall be taken at least once daily during low level service water chlorination and at least once every 30 minutes during high level service water chlorination. During service water chlorination, Outfall 001 TRC concentrations may be determined by either direct measurement at Outfall 001 or by multiplying a measured TRC concentration in the service water system by the ratio of chlorinated service water flow to the total site flow.

CONDITIONS FOR SUB-OUTFALLS

12. The calculated quantity of lithium hydroxide in the discharge shall be determined by using the analytical results obtained from sampling that is to be performed on internal waste streams 01C and 01D.

13. Phosphate limit applies to only those internal streams at Indian Point 2 and 3 which comprise outfall 01G.

14. Because Outfall 01J cannot be monitored, the following shall apply:

a. All oil spills shall be handled under the Spill Prevention Control and Countermeasure (SPCC) plan.

b. Flow into the floor drains shall not contain more than 15 mg/L of oil and grease nor any visible sheen.

c. Treated wastewater from the desilting operation within the intake structure and forebays shall be monitored once per 12 hour shift on the sand filter effluent. Grab samples shall be analyzed for total suspended solids and oil and grease. An estimate of discharge flow rate and a visual observation for the presence of any visible sheen shall be made on the sand filter effluent. The limitations for this discharge event are: 15 mg/L (oil & grease), 50 mg/L (total suspended solids) and no visible sheen.

15. The calculated quantity of boron in the discharge shall be determined by using the analytical results obtained from sampling that is to be performed on internal waste streams 01B, 01C, 01D and 01L.

16. One flow proportioned composite sample of total suspended solids (TSS) shall be obtained from one grab sample taken from each of the internal waste streams 01B, 01C, 01D, 01I and 01L.

17. One grab sample of oil and grease shall be obtained from each of the internal waste streams 01C, 01D, and 01L and the samples shall be analyzed separately. The results shall be reported by computing the flow-weighted average.

18. One composite sample of boron shall be obtained from one grab sample taken from each of the internal waste streams 01B, 01C, 01D, 01L.

WATER QUALITY REPORTING REQUIREMENTS:

19. The permittee shall submit on an annual basis to the NYSDEC at its offices in White Plains and Albany (see addresses below) a month-by-month report of daily operating data in EXCEL© format, by the 28th of January of the following year that includes the following:

a. Daily minimum, maximum and average station electrical output shall be determined and logged.

b. Daily minimum, maximum and average water use shall be directly or indirectly measured or calculated and logged.

c. Temperature of the intake and discharge, including as calculated to establish conformity with the condition 7(b) mixing zone, shall be measured and recorded continuously. Daily minimum, maximum and average intake and discharge temperatures shall be logged.

d. One copy of each annual report must be sent to the NYSDEC; Division of Water, Bureau of Watershed Compliance Programs; 625 Broadway; Albany, New York 12233¬3506; and a second copy must be sent to NYSDEC; Regional Water Engineer, Region 3; 100 Hillside Ave, Suite 1W; White Plains, New York 10603-2860.

20. Beginning upon the effective date of this permit, the permittee shall submit to the NYSDEC Offices in Albany and White Plains (see addresses in condition 19.d, above), a copy of their Semi-Annual Effluent and Waste Disposal Reports submitted to the Nuclear Regulatory Commission (NRC).

OTHER WATER QUALITY REQUIREMENTS

21. Notwithstanding any other requirements in this permit, the permittee shall also comply with all applicable Water Quality Regulations promulgated by the Interstate Environmental Commission (IEC), including Sections 1.0(i) and 2.05(f) as they relate to oil and grease.

22. It is recognized that, despite the exercise of appropriate care and maintenance measures, and corrective measures by the permittee, influent quality changes, equipment malfunction, acts of God, or other circumstances beyond the control of the permittee may, at times, result in effluent concentrations exceeding the permit limitations. The permittee may come forward to demonstrate to the NYSDEC that such circumstances exist in any case where effluent concentrations exceed those set forth in this permit. The NYSDEC, however, is not obligated to wait for, or solicit, such demonstrations prior to the initiation of any enforcement proceedings, nor must it accept as valid on its face the statement made in any such demonstration.

23. All chemicals listed and/or referenced in the permit application are approved for use. If use of new biocides, corrosion control chemicals or water treatment chemicals is intended, application must be made prior to use. No use will be approved that would cause exceedance of state water quality standards.

24. There shall be no net addition of PCBs by this facility's discharges to the Hudson River.

BIOLOGICAL REQUIREMENTS:

25. Within 3 months of the Effective Date of the Permit (EDP+ 3 months), the permittee must submit to the Department an approvable plan for continuation of a Hudson River Biological Monitoring Program (HRBMP) consisting of the Long River Survey, Beach Seine Survey and Fall Shoals Survey performed at current (2015) levels in the tidal Hudson River (River miles 0-152). This plan will also contain a commitment and plan by the permittee to work with the Department to determine a reduced monitoring effort that would provide the data necessary to continue collecting the long-term record of or data to identify status and trends reasonably attributable to Indian Point's continued operations in the Hudson River fish community sampled. Upon receipt

of Department approval, the permittee must conduct the HRBMP in accordance with the approved plan until Units 2 and 3 are retired pursuant to Entergy's commitment to do so as set forth in Condition 28. The approved HRBMP plan will become an enforceable interim condition of this SPDES permit. Upon the completion of the reduced monitoring effort study, the Department will require the implementation of the agreed upon recommendations contained in the final report. Within 6 months of the Effective Date of the Permit (EDP+6 months), the permittee must submit to the Department all of the data that has been collected to date but has yet to be provided to the Department for the "Hudson River Striped Bass and Atlantic Tomcod Surveys'' in an agreed upon electronic format.

26. Unless otherwise excused by the New York State Public Service Commission or the New York State Independent System Operator, the permittee must schedule and take its annual planned refueling and maintenance outage at one IPEC unit, which in recent years have averaged approximately 30 unit days per year, between February 23 and August 23 each year during the remaining operating life of the facility.

Reporting: The permittee must give the NYSDEC's Steam Electric Unit Leader an annual report that provides: (a) a list of unit-day outages for each calendar year and (b) the running average of unit-day outages.

27. The Ristroph modified traveling screens number 21 through 26 and 31 through 36 must continue to be operated on continuous wash when the corresponding cooling water circulation pump is running. The low pressure wash nozzles installed at each of these screens must be operated at 4 to 15 PSI so that the fish and invertebrates are removed from the traveling screens, washed into the existing fish return sluiceway, and returned to the Hudson River. The operation of the screens and fish return system must be inspected daily and the screen wash pressures recorded in the wash operator's log. The traveling screens and the fish return and handling system must minimize the mortality of fish to the maximum extent practicable.

28. In reliance upon Entergy's commitment to retire Indian Point Units 2 and 3 no later than 2020 and 2021, respectively (subject to the terms and conditions of that commitment, which include electric system reliability considerations, as set forth in the January 9, 2017 Indian Point Agreement between and among Entergy and NYSDEC), the outage and reporting requirements reflected in Condition 26, the traveling screens and fish return and handling system reflected in Condition 27, and the flow conditions reflected in Condition 6 (which employ multi-speed pumps), constitute the continuing measures for best technology until termination of operations at Units 2 and 3. Based on its consideration of these and other unique and specific factors, and the record established in the combined SPDES permit and WQC proceedings, and Entergy's commitment to retire Indian Point Units 2 and 3, as set forth above in this Condition, in its best professional judgment NYSDEC has determined that the measures as set forth in this SPDES permit represent the best technology available for the cooling water intakes for Indian Point Units 2 and 3.

Attachment B

SPDES PERMIT BIOLOGICAL FACT SHEET and summary of proposed permit changes:

Aquatic Resources and Best Technology Available (BTA) Determination

1. Biological Effects

Each year Indian Point Units 2 and 3 (collectively "Indian Point") cause or contribute to the mortality of aquatic species by entrainment of early life stages of aquatic organisms through the plant and the impingement of juvenile fish on intake screens. Entrainment occurs when fish larvae and eggs are carried into and through the plant with cooling water in a manner that can cause mortality from physical contact with structures and thermal stresses. Impingement occurs when juvenile fish are caught against racks and screens at the cooling water intakes in a manner that can cause these organisms to be trapped by the force of the water and suffocate or otherwise be injured. Historic losses at Indian Point are distributed primarily among 7 species, including bay anchovy, striped bass, white perch, blueback herring, Atlantic tomcod, alewife, and American shad.

2. Alternatives Evaluated

The following technologies were evaluated to determine whether they would effectively minimize adverse environmental impact from this facility:

> Relocation of intake structure

> Technologies currently in use at Indian Point:

Fish Handling and Return Systems
Ristroph Modified Traveling Screens
Variable- or Multi-Speed Pumps

> Aquatic Microfiltration Barriers

> Flow Reductions

> Closed-Cycle Cooling

> Generation Outages

> Cylindrical wedgewire screens

3. Discussion of Best Technology Available

According to Section 316(b) of the federal Clean Water Act , 6 NYCRR Part 704.5 and Commissioner's Policy 52 ("CP-52"), the location (A), design (B), construction (C), and capacity (D) of cooling water intake structures must reflect the "best technology available" (BTA) for minimizing adverse environmental impact (impingement and entrainment). In addition, the costs of these technologies should not be "wholly disproportionate" to the environmental benefits derived. The application of BTA is site-specific and on a best professional judgment basis.

A. Location

The existing intake structure is located on the shoreline of the Hudson River adjacent to the power plant. Relocation of the intake structure to another shoreline location or an offshore location would not decrease the mortality of aquatic organisms because fish eggs and larvae in this area of the Hudson River are equally abundant in all alternate locations.

B. Design

Technologies currently in use at Indian Point

The current design of the intake structure includes Ristroph modified traveling screens, a fish handling and return system, two-speed pumps serving Unit 2, and variable-speed pumps serving Unit 3.

Traveling Screens: The Ristroph modified traveling screens are designed to reduce the mortality of fishes associated with traditional traveling screens. The screens at Indian Point also include a low pressure spray system that washes impinged fish and other larger aquatic organisms off the screens separately from debris that is removed using a high pressure spray.

Fish Handling Systems: The fish handling and return systems convey the fish and other organisms washed off the screens back into the Hudson River.

Multiple-Speed Pumps: The two-speed and variable-speed pumps allow Entergy to more precisely adjust the volume of water drawn into the plant compared to single-speed pumps. This more precise adjustment allows for a reduction in the volume of cooling water drawn into the plant, thereby reducing the numbers of aquatic organisms entrained and impinged.

According to Entergy, this current design, along with seasonal flow reductions and generation outages (see below), attains an estimated 77% reduction in impingement mortality and 35% reduction in entrainment mortality over full flow conditions (ASA Analysis & Communication 2003).

Aquatic Microfiltration Barriers (Gunderboom® Marine Life Exclusion System™ or similar technology)

Aquatic microfiltration barriers are designed to prevent entrainment of organisms by excluding them from the water near the intake structure. These barriers are made of fabric with a limited porosity. A large surface area of this fabric is required to pass large volumes of water. The limited porosity combined with the large design flow of cooling water at this facility (up to 2.5 billion gallons of water daily) would require an aquatic microfiltration barrier many thousands of feet in length. An aquatic microfiltration barrier of this size would be orders of magnitude larger than any previous deployment in New York. The physical dimensions combined with logistical constraints of anchoring would make seasonal deployment difficult, at best. In addition, use of an aquatic microfiltration barrier would require an offshore location for the intake structure to avoid hydraulic impacts from the intake on barrier performance (ASA Analysis & Communication 2003). Any offshore location at Indian Point would likely create a hazard to navigation. Based on all the above factors, installing an aquatic microfiltration barrier at Indian Point would not be feasible.

Cylindrical Wedgewire Screens

Cylindrical wedgewire screens work by preventing some early life stage aquatic organisms from being carried into the intake structure. Entergy proposed to install 144 2.0 mm screens in the vicinity of the existing intake structures to effectively eliminate impingement mortality and reduce entrainment mortality. A cylindrical wedgewire screen installation of this size would be larger than any previous deployment in New York. Design and installation of the screens is expected to take an estimated five to six years and to cost approximately $300 million.

C. Construction

With the exception of cylindrical wedgewire screens, there will be no impacts on aquatic organisms from construction activities for any feasible alternative because these alternatives do not require physical work in the river. Construction of cylindrical wedgewire screens would require construction and installation of 144 2.0 mm cylindrical wedgewire screens on the bed of the Hudson River in front of Indian Point. In addition, erosion and sediment control plans are required for upland construction activities under the Environmental Protection Agency's Phase II stormwater regulations. The requirements contained in these regulations should prevent incidental impacts to aquatic resources from stormwater runoff.

D. Capacity

Flow Reductions

Minimizing cooling water intake flow volume beyond Entergy's current commitment to efficient flows by further varying or reducing intake pump speeds is not a

feasible alternative for substantially reducing fish mortality at Indian Point. In order to operate safely, the Plants must run their cooling water pumps at 60% capacity or greater. It is possible to reduce flow by 40%, and that can be and is done when River water temperatures are low, primarily during winter months, providing an opportunity for reducing fish mortality.

Generation Outages

Generation outages are another way to reduce cooling water flow that could result in substantial decreases in the mortality of aquatic organisms. The 2003 draft SPDES permit called for seasonal outages between February 23 and August 23 based on evidence that peak entrainment occurs during those months. Accordingly, unit outage days for refueling and maintenance lasting, on average, approximately 30 unit days between February 23 and August 23, with provision for electric-system reliability considerations, would result in reductions in fish mortality.

Closed-Cycle Cooling

Closed-cycle cooling recirculates cooling water in a closed system that substantially reduces the need for taking cooling water from the River. Entergy's analysis (Enercon Services 2003) showed that the construction of hybrid cooling towers is generally feasible (Enercon Services 2003), but faces substantial site-specific challenges (Enercon Services 2010; Tetra Tech 2013) and would require prior review and approval from the Nuclear Regulatory Commission (NRC), which issues Entergy's operating licenses.

The benefit of hybrid cooling towers for minimizing environmental impacts is substantial, if such towers can be operated throughout the entrainment season, with a 97% reduction in fish mortality in that instance (ASA Analysis and Communication 2003). However, on a site-specific basis, entrainment season operation faces substantial challenges in the record and cannot be assumed. The length of time required to design, permit and construct closed-cycle cooling technology at the facility would likely be at least 9.5 years and would involve significant costs (Enercon 2010; Tetra Tech 2013).

NYSDEC has determined that Entergy's commitment to retire Indian Point Units 2 and 3 no later than 2020 and 2021, respectively (subject to the terms and conditions of that commitment, which include electric system reliability considerations, as set forth in the January 9, 2017 Indian Point Agreement between NYSDEC and Entergy) ("Early Retirement"), will effectively eliminate impingement and entrainment on a timeframe that is years sooner than the timeframe for construction and operation of closed-cycle cooling. Indeed, early retirement reductions are nearly 100%. In consideration of these factors, NYSDEC has determined that closed-cycle cooling is not the best technology available given the length of time that would be required to retrofit from the existing once-through cooling system to a closed-cycle cooling system at both Units, and given the limited life

span (if any) of Indian Point Units 2 and 3 after implementation of the closed-cycle cooling system.

4. Determination of Best Technology Available

After evaluating all of the known and available alternatives, and in reliance on Entergy's commitment to Early Retirement, as well as Entergy's continued operation of the variable speed pumps, flow limitations, Ristroph modified traveling screens and fish handling and return systems, paired with the Condition 26 outages commitment referenced above, the Department has determined, in its best professional judgment, that in this case closed-cycle cooling does not represent the best technology available for minimizing adverse environmental impacts from the cooling water intake structure at Indian Point.

Although the Department preliminarily determined in 2003 that closed-cycle cooling represented BTA for this site, in reliance upon Entergy's commitment to Early Retirement, NYSDEC has determined that Early Retirement represents the *best* available technology from the suite of technologies and operational options considered. Closed-cycle cooling is not the best technology available given the substantial, site-specific challenges and length of time that would be required to retrofit from the existing once-through cooling system to a closed-cycle cooling system at both Units, and given the limited life span (if any) of Indian Point Units 2 and 3 after implementation of the closed-cycle cooling system. The length of time required to design, permit and construct closed-cycle cooling technology at the facility would likely be at least 9.5 years and would involve significant costs. Early Retirement as reflected in Condition 28, in connection with the outage requirements reflected in Condition 26, the flow limitations in Condition 6, and the traveling screens and fish return and handling system reflected in Condition 27, constitute the continuing measures for best technology until retirement of Units 2 and 3. Based on its consideration of these and other factors, and the record established in the combined SPDES permit and WQC proceedings, in its best professional judgment NYSDEC has determined that the measures as set forth in the final SPDES permit represent the best technology available for the cooling water intakes for Indian Point Units 2 and 3 through termination of operations.

5. Legal Requirements

The requirements for the cooling water intake structure in this SPDES permit are consistent with the policies and requirements embodied in the New York State Environmental Conservation Law, in particular - Sec.1-0101.1.; 1-0101.2.; 1-0101.3.b., c; 1-0303.19.; 3-0301.1.b., c, i., s. and t.; 11-0303.; 11-0535.2; 17-0105.17.; 17-0303.2., 4.g.; 17-0701.2, and the rules thereunder, specifically 6 NYCRR Section 704.5. Additionally, the requirements are consistent with the Clean Water Act, in particular Section 316(b), and with CP-52.

6. References

ASA Analysis and Communications, Inc. 2003. Response to New York State Department of Environmental Conservation Request for Information on Indian Point Unit 2 and Unit 3, Items 3 & 4. June 2003.

Central Hudson Gas & Electric Corp., Consolidated Edison Company of New York, Inc., New York Power Authority, Southern Energy New York. 1999. Draft Environmental Impact Statement for State Pollutant Discharge Elimination System Permits for Bowline 1 & 2, Indian Point 2 & 3, and Roseton 1 & 2. December 1999.

Enercon Services, Inc. 2003. Economic and Environmental Impacts Associated with Conversion of Indian Point Units 2 and 3 to a Closed-Loop Condenser Cooling Water Configuration. June 2003.

Enercon Services, Inc. 2010A. Evaluation of Alternative Intake Technologies at Indian Point Units 2 and 3. February 2010.

Enercon Services, Inc. 2010B. Engineering Feasibility and Costs of Conversion of Indian Point Units 2 and 3 to a Closed-Loop Condenser Cooling Water System. February 2010.

Enercon Services, Inc. 2012. Technical Design Report for Indian Point Units 2 and 3: Implementation of Cylindrical Wedge Wire Screens. April 2012.

New York State Department of Environmental Conservation. 2003. Final Environmental Impact Statement Concerning the Applications to Renew New York State Pollutant Discharge Elimination System (SPDES) Permits for the Roseton 1 & 2, Bowline 1 & 2, and Indian Point 2 & 3 Steam Electric Generating Stations, Orange, Rockland, and Westchester Counties. June 25, 2003.

Nieder, William. 2015. Indian Point Energy Center Unit 2 and Unit 3 BTA Analysis Step Four of the BTA Procedure: The Wholly Disproportionate Test. Amended Wholly Disproportionate Test Report With Outages. June 2015.

Tetra Tech. 2013. Indian Point Closed-Cycle Cooling System Retrofit Evaluation. June 2013.

Tetra Tech. 2014. IPEC ClearSky Retrofit: Planning Schedule. March 27, 2014.

7. Summary of Proposed Permit

Condition 3 of the previous permit allowed the permittee to exceed the maximum cooling water flows stipulated in the Hudson River Settlement Agreement (HRSA) in order to meet thermal limits required in conditions 1 and 2. As the HRSA has expired, this condition is no longer relevant.

Condition 4 of the previous permit provided for increased cooling water flows above stipulated HRSA limits in order to meet thermal limits contained in the permit. As the HRSA has expired this condition is no longer relevant.

Condition 5 of the previous permit referenced the HRSA and is no longer relevant.

Condition 6 of the previous permit stated that no thermal effluent limitations (other than existing conditions 1 through 4) would be imposed at the Indian Point facility. This condition relates to the agreement that the terms of the HRSA would satisfy the New York State Criteria Governing Thermal Discharges. As the HRSA has expired, this condition is no longer relevant.

New Thermal Condition 7B: The permittee meets thermal water quality standards, and will utilize a mixing zone described in acres of no more than seventy-five (75) acres, within which the thermal discharge of the units may exceed 90 degrees Fahrenheit, in order that the thermal discharge from the Indian Point nuclear facilities shall assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on the Hudson River. Outside the mixing zone, the temperature at the surface of the Hudson River shall not be raised more than 1.5 degrees Fahrenheit (from July through September, when surface water temperature is greater than 83 degrees Fahrenheit). The conversion of Indian Point's historic mixing zone system to acreage reflects statewide efforts by NYSDEC to use a simplified system for mixing zones.

Alternative conditions:

Condition 25 requires the continuation of a Hudson River Biological Monitoring program.

Condition 26 requires Indian Point to schedule its annual refueling and maintenance outage at one IPEC unit, which in recent years have averaged 30 unit days per year, between February 23 and August 23 each year over the remaining operating life of the facility.

Condition 27 requires that the modified Ristroph modified traveling screens number 21 through 26 and 31 through 36 must be operated on continuous wash when the corresponding cooling water circulation pump is on at the correct pressure in order to maximize the survival of fish impinged on the traveling screens.

Condition 28 requires that, in reliance upon Entergy's commitment to retire Indian Point Units 2 and 3 no later than 2020 and 2021, respectively (subject to the terms and conditions of that commitment, which include electric system reliability considerations), NYSDEC has determined that closed-cycle cooling is not the best technology available given the length of time that would be required to retrofit from the existing once-through cooling system to a closed-cycle cooling system at both Units, and given the limited life span (if any) of Indian Point Units 2 and 3 after implementation of the closed-cycle cooling system. The length of time required to design, permit and construct closed-cycle cooling technology at the facility would likely be at least 9.5 years and would involve significant costs. Early Retirement as reflected in Condition 28, in connection with the outage requirements reflected in Condition 26, the flow limitations in Condition 6, and the traveling screens and fish return and handling system reflected in Condition 27, constitute the continuing measures for best technology until retirement of Units 2 and 3. Based on its consideration of these unique and specific factors, as well as other factors, and the record established in the combined SPDES permit and WQC proceedings, in its best professional judgment NYSDEC has determined that the measures as set forth in the final SPDES permit represent the best technology available for the cooling water intakes for Indian Point Units 2 and 3 through termination of operations.