New York State Department of Environmental Conservation
Erin M. Crotty, Commissioner

FACT SHEET

NEW YORK STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (SPDES) DRAFT PERMIT RENEWAL WITH MODIFICATION INDIAN POINT ELECTRIC GENERATING STATION Buchanan, NY - November 2003

Facility Name: Indian Point Units 1, 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 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 at Attachments A and B.

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 (NY), 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 1910MW. Indian Point Unit 1, also owned and managed by Entergy Nuclear, is no longer generating and is awaiting decommissioning; however, cooling and service water is still drawn through the Unit 1 intake.

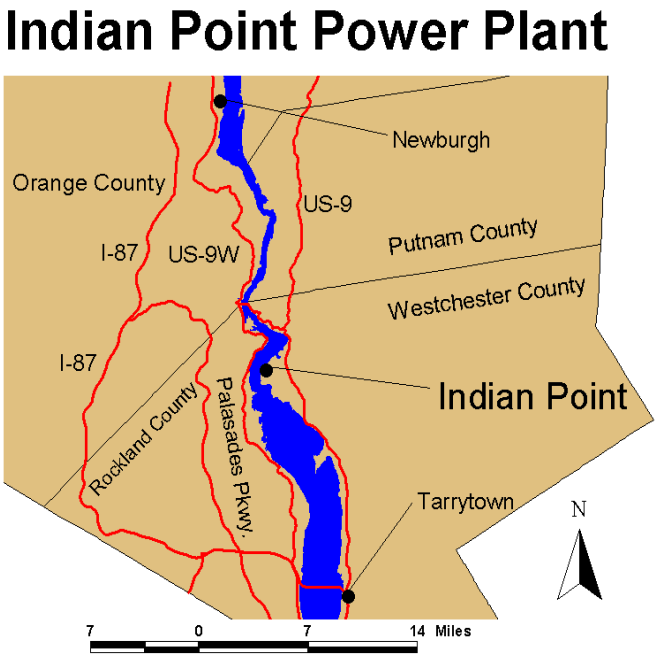

Fig. 2: General Location of Indian Point Nuclear Generating Station on the Hudson River, New York State

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 NY 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 thermal discharge conditions will generate data that the Department can use to determine whether the thermal discharges from Units 2 and 3, together or separately, meet New York State thermal criteria. The conditions related to the protection of aquatic organisms will reduce impingement and entrainment of fish and other small aquatic organisms. (Large fish are impinged against the cooling water intake screens. Smaller organisms are entrained when they are drawn into and through the plant's cooling water system.) Finally, the draft permit also mandates the continuation of certain aquatic resource protection measures and Hudson River monitoring studies currently in use at the facility.

A. Conventional Industrial Discharges: Discharges related to the former on-site sewage treatment plant have been discontinued because sanitary waste from Indian Point is now routed to the community wastewater treatment plant. No other significant changes are proposed to existing effluent limits.

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.

- Within the first two years of the SPDES permit term, the permittee must conduct a tri-axial (3-dimensional) thermal study to document whether the thermal discharges from Units 2 and 3 comply with NYS water quality criteria.

- In the event that the Indian Point cooling water discharge does not meet the NYS thermal criteria, the permittee may apply for a modification of one or more of the criteria as provided for under 6 NYCRR Part 704.4. In applying for a modification, the permittee must establish to the satisfaction of the Department that one or more of the criteria are unnecessarily restrictive and that the modification would not inhibit the existence and

propagation of a balanced indigenous population of shellfish, fish and wildlife in the Hudson River.

- ➢ Closed-cycle cooling is an available technology which can substantially reduce the amount of heat discharged into the Hudson River by reducing intake flow.

C. Cooling Water Intake Structure: Pursuant to Section 316(b) of the CWA, and 6 NYCRR Section 704.5, the Department has determined that the site-specific best technology available (BTA) to minimize adverse environmental impact of the Indian Point Units 1, 2 and 3 cooling water intake structures is closed-cycle cooling. However, the Department will give the permittee the opportunity to propose, within a year of the permit becoming effective, an alternative technology(s) that can minimize adverse environmental impact to a level equivalent to that which can be achieved by closed-cycle cooling at this site. The Department will evaluate any proposal submitted by the permittee. If the proposed technology(s) is accepted, the Department may modify the permit accordingly.

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 23 February and 23 August of each calendar year (the entrainment season). These outages must continue until the permittee has commenced operation of a closed-cycle cooling system at the Indian Point facility.

- ➢ 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).

- ➢ 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.

- ➢ 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.

2. Additional Compliance Measure:
Upon the effective date of the SPDES permit, the permittee must pay $24 million annually into an escrow account entitled the Hudson River Estuary Restoration Fund (HRERF), to be made available to the Department. All of the HRERF funds shall be held for the benefit of the HRERF, from which the Department will draw funds for programs or projects that are designed to restore, protect, or enhance Hudson River Estuary resources. These resources include but are not limited to aquatic habitat, fish, shellfish and other aquatic species (all life stages), and Hudson River water quality. This amount represents: a) the difference between the cost of operating and maintaining the existing facility and the cost of operating and maintaining a facility using closed-cycle cooling, and b) the expected return on unspent capital (i.e. the cost to construct cooling towers) that is instead available for investment. These annual payments will continue until the permittee has commenced construction of cooling towers for the closed-cycle cooling system at the Indian Point facility.

D. Pending Issues: Actual construction of a closed-cycle system cannot occur until certain initial investigations and proceedings have been completed. The permittee must, therefore, undertake specific steps to implement closed-cycle cooling:

1. Pre-Design Engineering Report
The permittee must complete certain site-related inquiries, including but not limited to assessing: potential need for blasting as well as any potential impacts from blasting; cooling tower particulate emissions; potential need to relocate the Algonquin Gas Company's natural gas pipeline; whether construction outages for Units 2 and 3 must occur simultaneously, can be done sequentially, or under an alternative schedule; and whether the construction outages, 42 day annual operating outages, or other measures can be undertaken so as to reduce potential impacts to energy reliability or capacity. Thus, the Department is requiring the permittee to submit for approval a Pre-Design Engineering Report that addresses and resolves all regulatory and engineering issues associated with installing closed-cycle cooling for Units 1, 2, and 3. This submission must occur within one year of the effective date of the SPDES permit.

2. Detailed Engineering Plans
Within one year after submission of the Pre-Design Engineering Report, the permittee must submit complete design plans that address all construction issues for conversion of Units 1, 2 and 3 to closed-cycle cooling.

3. License Modification and Other Approvals
The permittee must obtain approvals for closed-cycle cooling system construction from other government agencies having authority over the nuclear power generation facilities or aspects of the construction site. This includes, but is not limited to, the permittee's obtaining modifications of its operating licenses from the Nuclear Regulatory Commission (NRC) to authorize conversion to closed-

cycle cooling. The NRC will review operational safety and hazard issues that arise as a consequence of the permittee's proposal to convert to closed-cycle cooling. It also includes obtaining the approval of the Federal Energy Regulatory Commission (FERC) to relocate the Algonquin Gas Company's natural gas pipeline, if such relocation is determined to be necessary. Other state and local agency approvals may also be required. To address these issues, the Department is requiring the permittee to submit, within 6 months of the effective date of the SPDES permit, a schedule showing the permittee's plan for seeking other necessary government approvals for the construction of closed-cycle cooling for the Indian Point facility. If the NRC denies or requires changes to Entergy's application to modify its licenses, or if FERC does not approve relocation of the Algonquin pipeline, the Department may initiate a modification of the permit, or take other appropriate action.

4. NRC License Extension

An important unsettled issue relates to the potential for Entergy to seek an extension of its NRC operating licenses. The Department cannot require the permittee to seek NRC license extensions. If the permittee determines that it will not extend its NRC licenses, or the NRC denies the license extensions, the Department will not require the construction of a closed-cycle cooling system. In that case the Department may also initiate a proceeding to modify the permit, including revision of the Department's BTA determination.

This permit does not require the construction of cooling towers unless: (1) the applicant seeks to renew its NRC operating licenses, (2) the NRC approves extension of the licenses, and determines that the installation and operation of closed-cycle cooling is feasible and safe, and (3) all other necessary Federal approvals are obtained. If the NRC grants extensions of the permittee's licenses, the permittee must submit for Department approval a revised construction schedule to reflect any construction design or schedule changes resulting from the NRC approval process or other approvals. Entergy has estimated that once construction begins, the conversion to closed-cycle cooling will take 4 years and 9 months to complete. In order to ensure reliability of the State electric system, the Department will require that the permittee, in the process of producing the revised compliance schedule, investigate avoiding construction outages during the summer months of peak electricity consumption. Implementation of closed-cycle cooling will be subject to the specific preliminary requirements described above.

V. Attachments:

A: SPDES Permit Fact Sheet and summary of proposed permit changes for Wastewater Data, Receiving Water Data, and Permit Limit Derivation.

B: SPDES Permit Biological Fact Sheet and summary of proposed permit changes for Aquatic Resources and Best Technology Available (BTA) Determination.

Attachment A

SPDES PERMIT FACT SHEET and summary of proposed permit changes: Wastewater Data, Receiving Water Data, and Permit Limit Derivation.

SPDES PERMIT FACT SHEET: Wastewater Data, Receiving Water Data, and, Permit Limit Derivation.

(see last pages of fact sheet for explanatory notes).

(1) General Permittee Data:

Permit Number	Permittee Name	Facility Name	Location (C, T, V)	County	Industrial Code	Major/Sub Basin
0004472	Entergy Nuclear, Indian Point	Indian Point Nuclear Generation Facility	Buchanan	Westchester	4911	13-01

(2) Summary of Final Outfall Flow Rate(s) and Receiving Water Data:

Outfall Information					Receiving Water Information								
	Latitude	Longitude	Flow Rate (MGD)					*For use by WQ Engineer* - Critical Data					
Outfall #	°, ‘, “	°, ‘, “	Average	Maximum or Design	Name	Class	Water Index Number	7Q10 (MGD)	30Q10 (MGD)	Dilution/ Mixing	pH (SU)	Temp (°F)	Hardness (mg/l)
001	41 16 07	73 57 19		2500	Once-Through Cooling Water & LVW	SB	H						
002-009	“	“		Variable	Uncontaminated Stormwater Runoff	“	H						
01P	“	“		TBD	Eductor Pit Discharge	“	“						

(3) Individual Outfall Data Summaries and Permit Limit Development:

Outfall 001

Source(s) of Wastewater	Once-through Cooling Water, contributory treated wastewater streams (low volume wastewater)
Existing Wastewater Treatment Facilities	
EPA Point Source Category & Production Rate	Steam Electric Power Generation 40 CFR 423

Effluent Parameter (Units)	**Existing Effluent Quality**				**Technology Based Effluent Limit**					**Water Quality Based Effluent Limit**				**Permit Basis** (T or WQ)
(concentration units - mg/l, ug/l or ng/l; mass units - lbs/d or g/d)	concentration		mass					PQL		AWQC	Effluent			
	Avg/Max	95%/99%	Avg/Max	95%/99%	conc.	mass	Type	conc.	Basis	conc.	conc.	mass	Type	
WET TESTING					NA					Recommended?		NO		
Flow Rate, units = MGD	Average		Maximum	2500				NA	NA					
pH (su)	Minimum	6.0	Maximum	9.0			Range		40CFR423					
Total Residual Chlorine mg/l	0.2				0.2				40CFR423	0.0075				T
Lithium Hydroxide mg/l	0.01				0.01				BAT/BPJ	NA				T
Boron - Acid Soluable mg/l	0.7				1.0	525			BAT/BPJ	1.0				T
Temperature Degrees F*	110				110				6NYCRR Part 704					
* See (4) Additional Issues Page 4 of this document														
SUM OF 01B,01C, 01D, 01J& 01L														
Total Suspended Solids mg/l					50				BCT					T
SUM OF 01C & 01D														
Hexavalent Chromium mg/l					.1				BAT/BPJ	0.054				T
OUTFALL 01G														
Phosphates as P mg/l					38				BPJ	NA				T

(3) Individual Outfall Data Summaries and Permit Limit Development:

Outfalls	01M, 002-009

Source(s) of Wastewater	Uncontaminated Stormwater Runoff
Existing Wastewater Treatment Facilities	
EPA Point Source Category & Production Rate	40CFR423

Uncontaminated Stormwater Runoff - NO MONITORING REQUIRED

OUTFALLS 01L, 01P and 01N

Effluent Parameter (Units)	Existing Effluent Quality				Technology Based Effluent Limit					Water Quality Based Effluent Limit				Permit Basis (T or WQ)
(concentration units - mg/l, ug/l or ng/l; mass units - lbs/d or g/d)	concentration		mass					PQL		AWQC	Effluent			
	Avg/Max	95%/99%	Avg/Max	95%/99%	conc.	mass	Type	conc.	Basis	conc.	conc.	mass	Type	
01L					NA					Recommended?		NO		
Flow Rate, units =	Average		Maximum					NA						
pH (su)	Minimum	6.0	Maximum	9.0	6.0-9.0		Range		BCT					T
Florides						5.0 lb/day			AL					AL
Iron					4mg/l				AL					AL
Copper					1.0mg/l				AL					AL
CONTRIBUTORY WASTEWATER TO 001 01P EDUCTOR PIT DISCHARGE														
Oil & Grease mg/l					15				BCT					T
Total Suspended Solids mg/l					50				BCT					T
01N														
Oil & Grease mg/l					15				BCT					T
Total Suspended Solids mg/l					50				BCT					T

4) Additional Issues (see next page)

(4) Additional Issues

Water Quality Based Effluent Limits (WQBELs):
New York State water quality regulations (for surface waters) are implemented by applying the Total Maximum Daily Load (TMDL) process to watersheds, drainage basins or waterbody segments on a pollutant specific basis. The analysis determines if there is a "reasonable potential" that the discharge of a pollutant will result in exceedance of ambient water quality criteria (AWQC). If there is a reasonable potential for an exceedance of AWQC, the TMDL is used to establish waste load allocations for point sources and load allocations for nonpoint sources of the pollutant. For point sources, the waste load allocations are translated to WQBELs for inclusion in SPDES permits.

Reference - TOGS 1.3.1; USEPA Guidance for Water Quality - Based Decisions: The TMDL Process; 40 CFR 130; and the Clean Water Act 303(d).

See also thermal discharge discussion, below.

Statistics:
The statistical methods utilized are consistent with TOGS 1.2.1 and the USEPA, Office of Water, Technical Support Document For Water Quality-based Toxics Control, March 1991, Appendix E. They are generally based on log normal analysis. If other data distributions such as normal or delta-lognormal are utilized, it is noted below. Statistical calculations were not performed for parameters with insufficient data. Generally, ten or more data points are needed to calculate percentiles. Two or more data points are necessary to calculate an average and a maximum. Non-detects were included in the statistical calculations at the reported detection limit unless otherwise noted.

Monitoring data collected during the following time period was used to calculate statistics: N/A

This data was taken from the following source(s): N/A

Internal Waste Stream Monitoring:
40 CFR 122.45(h)(1) allows the permit authority to monitor and limit parameters at internal locations when controlling them solely at the final outfall is impractical or infeasible. Dilution of a process wastewater with large volumes of cooling water and/or storm water is one example of when the use of an internal monitoring point is justified. Monitoring at the following internal outfalls is necessary: 01B, 01C, 01D, 01G, 01L, & 01P.

WET Testing:
Testing is required, in accordance with TOGS 1.3.2, for the following reasons: NOT REQUIRED

Indicator Parameters:
In accordance with 40 CFR 122.44(e)(2), The permit writer has determined that effective treatment and/or acceptable performance for specific parameters is indicated by one or more other parameters which are limited and therefore a decision has been made to not limit or monitor these specific parameters. This judgement is based on the similarity between this and the regulated parameter(s) and historical data where available. The use of indicator parameters is not appropriate for WQBELs. Following is a list of the affected parameters: N/A

Thermal:
Under Section 316(a) of the Clean Water Act (CWA), a permittee may submit a demonstration that its thermal discharge does not threaten the survival of indigenous aquatic populations even if it does not meet state water quality criteria. Such a study was prepared in 1978 by the prior owners of the Indian Point units, but it was superseded by provisions of the 1981 - 1991 Hudson River Settlement Agreement and subsequent Consent Orders effective 1992 - 1998. Based on that older "316(a) demonstration", the former operators of the Indian Point units asserted that the facility complied with the NYS thermal standard (6 NYCRR Part 704).

Based on modeling submitted with the 1999 DEIS by the prior owners of Indian Point (along with owners of two other Hudson River generating stations), the thermal criteria outlined in 6 NYCRR Part 704.2 are not being consistently maintained under the present operation of the facility. Appendix VI Chapter 6 of the 1999 DEIS, "Near-field Temperature Modeling", concludes that newer analyses of the discharge from Indian Point "... indicate that it is highly likely that the exceedance of the top-width criterion, and possible the cross-sectional area criterion, would occur under slack conditions. Top-width exceedances occur under all flood scenarios . . . ." In more general terms, this means that temperatures measured at the water surface along a line running from the outfall across the river to the far shore, and measured at varying depths along the cross-section below that line from outfall to far shore, likely exceed the thermal criteria in the Department's regulations during periods with lowest river flow velocities, that is, during the transition between tidal cycles. Furthermore, temperatures at the water surface along that same line from outfall to far shore appear to exceed the thermal criteria at all flow levels classified as "flood", that is, during high tides.

The permit therefore requires the permittee to conduct additional thermal studies to verify actual in-stream conditions of the thermal component of the discharge. The in-stream tri-axial study mandated by Special Condition 7 will require actual measurement of river and outfall temperatures at multiple points on the surface and at depth, along the surface and in cross-section running from the outfall and across the river to the far shore, as well as temperature measurements on the surface and at various depths at specified points running parallel to the course of the river. Using this additional data plus existing sources, the Department will be able to determine if the Indian Point facility complies with the thermal standard and whether to grant Indian Point a variance from NYS thermal criteria.

Schedule of Compliance:

A schedule of compliance items and submissions has been developed and summarizes all required submissions for the term of the permit.

5) Summary of Proposed Permit Changes:

Compared to the issued permit this draft is intended to replace, the following significant changes are proposed:

Deleted outfalls: 01A and 01F

Added outfall 01P - Eductor Pit Discharge.

Added Thermal studies.

Removed all references to the now-expired Hudson River Settlement Agreement.

Includes a schedule of compliance.

(6) Explanatory Notes:

Please note that some of these terms are not applicable to every fact sheet.

AL -	Action level calculated in accordance with TOGS 1.2.1 (non POTWs) and TOGS 1.3.3 (POTWs). See the permit for a complete definition.
AVG or Av -	Average. The arithmetic mean.
AWQC -	Ambient water quality criteria for the receiving water. The applicable standard, guidance value or estimated value in accordance with TOGS 1.1.1, TOGS 1.3.1 and 6NYCRR 700-705.
Basis -	The technical analysis, internal guidance, regulation and/or law upon which an effluent limit or monitoring requirement is proposed.
BAT -	Best Available Technology Economically Achievable in accordance with TOGS 1.2.1 (non POTWs) and TOGS 1.3.3 (POTWs), 40 CFR 125, 6NYCRR 754, ECL 17-0811 and the Clean Water Act.
BCT -	Best Conventional Control Technology in accordance with TOGS 1.3.4, 40 CFR 125, 6NYCRR 754, ECL 17-0811 and the Clean Water Act.
BPJ -	Best Professional Judgement in accordance with TOGS 1.2.1 (non POTWs) and TOGS 1.3.3 (POTWs), 40 CFR 122 and 125, 6NYCRR 754.1, ECL 17-0811 and the Clean Water Act.
BPT -	Best Practicable Control Technology in accordance with TOGS 1.2.1, 40 CFR 125, 6NYCRR 754, ECL 17-0811 and the Clean Water Act.
BTA-	Best Technology Available
Conc. -	Concentration in units of mg/l, ug/l or ng/l.
Design Flow -	Treatment system design capacity as noted in an approved engineering report.
EDP	Effective date of permit.
Final -	Final permit period requirements. A level of performance that must be achieved according to a schedule specified in either the permit or a consent order.
FERC-	Federal Energy Regulatory Commission
g/d -	Grams per day discharged.
GW -	Groundwater effluent limitation developed in accordance with TOGS 1.2.1 (nonPOTWs), TOGS 1.3.3 (POTWs), TOGS 1.1.2 and 6NYCRR 703.
Ind -	Indicated parameter. See definition in section (4).
Interim -	Interim permit period requirements. A level of performance that must be achieved while improvements are being implemented in order to achieve final permit period requirements.
lbs/d or #/d -	Pounds per day discharged.
LVW	Low volume wastes/wastewater
Mass -	Mass discharge in units of #/d or g/d discharge.
Max or Mx -	The maximum value.
MGD -	Million gallons per day.
mg/l -	Milligrams per liter.
Dilution/Mixing -	Used to determine dilution available in receiving waters. For lakes, estuaries and slowly flowing rivers and streams, mixing zone dilution is generally assumed to be 10:1 unless data is available to indicate otherwise.
Model -	Calibrated water quality model applied in accordance with TOGS 1.3.1.
Mon -	Monitor only.
NA or N/A -	The characteristics of this parameter and the reported discharge levels do not justify routine monitoring or a limit. Also indicates "not applicable".
ng/l -	Nanograms per liter. 1000 ng/l = 1 ug/l = 0.001 mg/l.
NRC-	Nuclear Regulatory Commission
POTW -	Publicly owned treatment works (i.e., sewage treatment plants)
PQL -	The DEC published or site specific practical quantitation limit; the concentration in wastewater at which analytical results are thought to be accurate to within approximately plus or minus thirty percent.
R -	"Rolled Over", i.e. the specific requirement in this permit is equivalent to the previous permit. R(T) is roll over of a technology based requirement and R(WQ) is roll over of a WQBEL.
Range -	The discharge is limited to a range of effluent values, e.g. a pH limit of (6.0-9.0) SU.
RREL -	EPA's Risk Reduction Engineering Laboratory treatability database.
T -	Technology based effluent limit or requirement.
TOGS -	Technical and Operational Guidance Series. Internal guidance to permit drafters used by the NYSDEC Division of Water to aid in permit drafting. Copies of these guidance documents may be obtained from the internet at http://www.dec.state.ny.us/website/dow/togs/index.htm.
ug/l -	Micrograms per liter. 1000 ug/l = 1 mg/l.
WET-	Whole Effluent Toxicity (testing). See TOGS 1.3.2.
WQ -	Water quality.
WQBEL -	Water quality-based effluent limit. See information in section (4).
7Q10 -	The minimum average 7 consecutive day flow at a recurrence interval of 10 years. Applicable to evaluations involving aquatic health based AWQC.
30Q10 -	The minimum average 30 consecutive day flow at a recurrence interval of 10 years. Applicable to evaluations involving human health based AWQC.
95% -	The 95th percent confidence interval for the historical effluent data used to draft the permit.
99% -	The 99th percent confidence interval for the historical effluent data used to draft the permit.
133 -	Secondary treatment requirements in accordance with TOGS 1.3.3, 40 CFR 133, 6NYCRR 754, ECL 17-0509 and the Clean Water Act.
+ -	These parameters represent scans. Detections vary among the compounds which are included in the scans. The listed value represents the maximum detected level of any compound in the scan.

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 the mortality of more than a billion fish from entrainment of various life stages of fishes through the plant and impingement of fishes on intake screens. Entrainment occurs when small fish larvae and eggs (with other aquatic organisms) are carried into and through the plant with cooling water, causing mortality from physical contact with structures and thermal stresses. Impingement occurs when larger fish are caught against racks and screens at the cooling water intakes, where these organisms may be trapped by the force of the water, suffocate, or otherwise be injured. Losses at Indian Point are distributed primarily among 7 species of fish, including bay anchovy, striped bass, white perch, blueback herring, Atlantic tomcod, alewife, and American shad. Of these, Atlantic tomcod, American shad, and white perch numbers are known to be declining in the Hudson River (ASA Analysis and Communications 2002). Thus, current losses of various life stages of fishes are substantial.

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-Speed Pumps
- Aquatic Microfiltration Barriers
- Flow Reductions
- Closed-cycle Cooling
- Generation Outages

Other available technologies, like wedgewire screens, were not evaluated as alternatives because they were determined not to be feasible for Indian Point's site and operation.

3. Discussion of Best Technology Available

According to Section 316(b) of the federal Clean Water Act and 6 NYCRR Part 704.5, 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. In addition, the costs of these technologies should not be "wholly disproportionate" to the environmental benefits derived. The application of BTA is site-specific.

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 but only 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 and a large surface area of this fabric is required to pass large volumes of water. This limited porosity combined with the large 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. 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.

C. Construction

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. 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.

D. Capacity

Flow Reductions

Minimizing cooling water intake flow volume by 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. Although it is possible to reduce flow by 40%, this can only be done when River water temperatures are low, primarily during winter months. Since few fish are susceptible to entrainment during those months, this presents only a minimal opportunity for reducing 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 but will 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 adverse environmental impacts is substantial, with greater than a 98% reduction in fish mortality (ASA Analysis and Communication 2003) that is primarily a result of reducing intake flow volumes. Although the projected capital cost to construct hybrid cooling towers is approximately $740 million, with additional operational and maintenance costs of $145 million (Enercon Services, Inc. 2003), these costs, projected over the life of the plant (assuming twenty year license extensions after the 2013 and 2015 license expirations for Units 2 and 3, respectively), represent approximately 5-6% of Indian Point's annual gross revenue. The Department considers that these costs are not wholly disproportionate to the environmental benefits of the near

elimination of fish mortality due to entrainment and impingement from Indian Point.

Generation Outages

Generation outages are another way to reduce cooling water flow that could result in substantial decreases in fish mortality. Annual outages lasting 32 weeks would result in reductions in fish mortality similar to closed-cycle cooling. Since these generation outages would be necessary each year, the economic costs to the operator over a possible 30 year life of the plant (assuming twenty year license extensions after the 2013 and 2015 license expirations for Units 2 and 3, respectively) would represent approximately 62% of Indian Point's annual gross revenue. The Department considers these costs to be wholly disproportionate to the environmental benefits derived.

4. Determination of Best Technology Available

After evaluating all of the known and available alternatives, the Department has determined that in this case closed-cycle cooling represents the best technology available for minimizing adverse environmental impacts from the cooling water intake structure at Indian Point. As noted above, the costs of hybrid cooling towers are not wholly disproportionate to the benefits derived, assuming 20-year license extensions for both units.

Although the Department has determined that closed-cycle cooling represents the best technology available for this site, several points need to be addressed prior to the construction of cooling towers. First, a detailed Pre-Design Engineering Report and design plans that identify and address all regulatory and engineering issues must be developed. Second, the NRC must review and approve any proposed change to a nuclear power plant. The NRC review will address safety and hazard considerations related to construction impacts to the reactor systems and is understood to involve license modification proceedings that would take approximately one year to complete. Third, construction of closed-cycle cooling, as described in Entergy's June 2003 submission of a preliminary design to the Department, would likely require the Algonquin Gas Company (Algonquin) to relocate its gas pipeline, currently located in the vicinity of Indian Point Unit 3 (Enercon Services, Inc. 2003). Such a relocation would require the approval of the Federal Energy Regulatory Commission (FERC), a separate process which may take approximately a year or more. The actual length of time required to complete all of these necessary steps is currently unknown and is not regulated by any State permit. Consequently, this SPDES permit requires Entergy to do the following:

1) Within one year of the effective date of the permit, submit for the Department's approval, a Pre-Design Engineering Report addressing regulatory and engineering issues. A detailed schedule for regulatory approvals and an interim progress report are also required (see Special Condition 28. b. of permit);

2) Within one year after submission of the Pre-Design Engineering Report, submit for the Department's review and approval detailed engineering drawings for the construction of closed-cycle cooling towers (see Special Condition 28. e. of permit);

3) Upon the effective date of the permit, continue the use of Ristroph modified traveling screens in continuous wash mode (see Special Condition 27 of permit);

4) Upon the effective date of the permit, continue the use of the existing fish handling and return system (see Special Condition 27 of permit);

5) Upon the effective date of the permit, reduce cooling water flow between October and June of each calendar year (see Special Condition 6 of permit);

6) Upon the effective date of the permit, take an annual 42 unit-day outage during entrainment season (23 February and 23 August). This requirement is only an interim measure and Entergy would not be required to take an outage during the entrainment season following the conversion of Indian Point's operations to closed-cycle cooling (see Special Condition 26 of permit);

7) Upon the effective date of the permit, continue to conduct the annual Longitudinal River Survey, Beach Seine Survey, Fall Shoals Trawls and Striped Bass/Atlantic Tomcod Mark Recapture Survey. These long term studies monitor the abundance of fishes in the Hudson River (see Special Condition 25 of permit); and

8) Provide $24 million per year to an escrow account entitled the Hudson River Estuary Restoration Fund (HRERF) that will provide a mechanism to fund restoration, enhancement and protection programs and projects benefiting the Hudson River Estuary (see Special Condition 29 of permit). HRERF monies are intended to benefit the Hudson River Estuary and eliminate Entergy's potential financial savings from the delayed implementation of closed-cycle cooling. The annual amount for this fund represents:

(a) the difference between the cost of operating and maintaining the existing facility and the cost of operating and maintaining a facility using closed-cycle cooling; and

(b) the expected return on unspent capital (i.e., the cost to construct hybrid cooling towers, approximately $740 million) that is instead available for investment.

Entergy would not be required to contribute additional money to the HRERF in the event that it commences construction of cooling towers.

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 Sections 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).

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.

ASA Analysis and Communications, Inc. 2002. 1999 Year Class Report for the Hudson River Estuary Monitoring Program. August 2002.

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.

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.

7. Summary of Proposed Permit Changes

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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 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 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 HRSA has expired, this condition is no longer relevant.

Additional Conditions

Condition 2 of the previous permit pertaining to the handling of solid waste and aquatic organisms has been deleted. The requirement to return organisms to the Hudson River through the sluices has been incorporated into the draft permit as condition 27.

Condition 4 of the previous permit referencing biological monitoring at Indian Point, which was a requirement of HRSA has been deleted, as no impingement or entrainment monitoring at the facility are required during this permit period.

Conditions 7 and 11 of the previous permit referencing the expired HRSA have been deleted. Relevant requirements contained in the HRSA are incorporated in this permit as conditions 25, 26, and 27.

New conditions:

Condition 25 requires the continuation of Hudson River Monitoring programs (which were previously embodied in HRSA).

Condition 26 requires a minimum of 42 unit-days of outages between February 23 and August 23 for each calendar year of the permit term. These outages must continue until complete conversion of Indian Point's operations to closed-cycle cooling. This is a continuation of the same level of outages required by HRSA.

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 the following submissions:

1) a schedule for obtaining all necessary approvals during this permit term from the Nuclear Regulatory Commission (NRC), Federal Energy Regulatory Commission (FERC), and other governmental agencies to enable the construction of closed-cycle cooling at Indian Point;

2) a report on the progress to date of the Pre-Design Engineering Report;

3) a Pre-Design Engineering Report addressing regulatory and engineering issues associated with installing closed cycle cooling at Units 1, 2, and 3;

4) engineering design plans that address all construction issues for the conversion of the cooling water systems for Units 1, 2, and 3 to a closed-cycle system;

5) within 30 days after receipt of license extensions from the NRC, the permittee must submit a revised or updated construction schedule for the Department's approval reflecting any changes resulting from the NRC license extension process; and

6) notification to the Department's Division of Environmental Permits, in writing, within 5 business days of the submission of an application for license modification or extension to the NRC.

Condition 29 requires the permittee to pay $24 million dollars annually into a Hudson River Estuary Restoration Fund escrow account.