4 August 2014

Delivered by Email

Mr. David Gouveia
Acting Regional Administrator for Protected Resources
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930-2276

Re: **Addendum to the "Proposed Monitoring Plan for Indian Point Energy Center Take of Atlantic and Shortnose Sturgeons by Impingement at Cooling Water Intakes Revision 2" 13 June 2014**

Dear Mr. Gouveia:

We had a productive meeting with Ms. Julie Crocker, Ms. Julie Williams and Mr. Donald Dow of your staff at your office on 1 July 2014 to discuss Revision 2 of the "Proposed Monitoring Plan for Indian Point Energy Center Take of Atlantic and Shortnose Sturgeons by Impingement at Cooling Water Intakes" (i.e., the "Revision 2 Monitoring Plan") that was sent to you and others on 13 June 2014 on behalf of Entergy Nuclear Operations, Inc. ("Entergy") Indian Point Energy Center ("IPEC"). At this meeting, the Entergy team offered to provide NMFS by 22 July 2014 an expanded description of the proposed feasibility studies for monitoring Atlantic and Shortnose Sturgeon on the outer trash bar racks and within the forebays of the IPEC Unit 2 and Unit 3 cooling water intake structures to facilitate your review and acceptance of the Revision 2 Monitoring Plan. Ms. Crocker indicated that NMFS would provide a response to certain questions raised by Entergy during the meeting, and Entergy received those responses from you on 18 July 2014. To address those responses appropriately, Ms. Gray coordinated with Ms. Crocker on a new submittal date of 4 August 2014.

Accordingly, please find enclosed with this letter an Addendum to the Revision 2 monitoring Plan that provides the following supplemental information discussed at the meeting:

1. Proposed feasibility study to replace Section 2.1 (Trash Rack Studies) and Section 2.2 (Forebay Studies) of the Revision 2 Monitoring Plan.
2. Corrected Attachment 2 of the Revision 2 Monitoring Plan (typo in a delivery date corrected).

The text below provides Entergy's comments addressing NMFS's written comments to several issues discussed at the 1 July meeting and provided to Ms. Dara Gray in a letter dated 17 July and received 18 July 2014.

NORMANDEAU
environmental consultants

Availability of Shortnose and Atlantic sturgeon for studies

The Entergy team acknowledges that NMFS is unaware of a supply of sturgeon of Hudson River origin for establishing retention time of fish impinged on the trash bars and for establishing collection efficiency in impingement sampling. Accordingly, we will not pursue dead sturgeon from sources outside of the Hudson River that need to be certified as "disease free" and intend to rely on surrogate species like striped bass (preferred) or white catfish of appropriate sizes obtained from ongoing sampling activities in the Hudson River estuary. Furthermore, any deceased Atlantic or shortnose sturgeon obtained from impingement sampling at Indian Point will be considered candidates for retention time and collection efficiency studies pending NMFS's approval prior to their use. Since the Opinion for Indian Point requires a 24 hour notification of any incidental "take", both NMFS and Entergy will have a current list of those sturgeon and their disposition from which a selection can be made for study fish. These fish will be retained in a freezer following field processing at IPEC unless required by NMFS to be distributed to other researchers for necropsy or other uses.

Use of "surrogate species" for establishing retention time

See Entergy's comments above regarding the availability of test fish and use of surrogate species for retention time studies on the trash bars at IP2 and IP3. Retention time tests will be described in the trash rack pilot study plan to be written based on the results of the ongoing trash rack feasibility studies.

Documenting non-sturgeon species during impingement sampling

As discussed during our 1 July meeting, we believe that the annual reports generated as part of the Hudson River Monitoring Program will provide you with the desired information regarding the other fish populations in the area (i.e., potential inputs to the sturgeon food chain). To that end, Entergy has provided, and will continue to provide, your office a copy of each year's annual report (i.e., "Year Class Report"). In addition, Entergy offers to perform a qualitative examination of the by-catch of other fish species in the impingement sluice samples from IP2 and IP3 during each scheduled sampling day (i.e., 3 days/week) for sturgeon. These fish are expected to outnumber the sturgeon in each sample and must be removed from the collection net and returned to the river while examining each hourly sample for the presence of sturgeon. However, the time required to process these other fish to quantify them fully (e.g., identify, length, weight, condition) as is typically done for each impingement sample is estimated to at least double the field effort as presently planned for sturgeon sampling. Therefore, qualitative processing of the bycatch will include the following observations made by the sturgeon sampling crew while transferring the bycatch from the sampling net into the return sluices for each hourly sample:

1. Species identity of the estimated three most abundant fish taxa,
2. Relative abundance of these three most abundant taxa (low (<10), medium (10-100), or high (>100) abundance),

3. Predominant age group of these three most abundant taxa (young of year, yearling, older), and
4. Condition of most of the fish in these three most abundant taxa (alive or dead).

Numeric codes will be entered on the field sampling data sheet to categorize species, relative abundance, age group, and condition of these three most abundant fish taxa in the hourly samples. This level of information is the most that Entergy can provide without defeating the purpose of the modified traveling screens and fish return system to send impinged fish back to the river as quickly and with as little additional stress as possible.

Necropsy

The attached Section 3 from the developing "Indian Point Sturgeon Impingement Quality Assurance Plan and Standard Operating Procedures" (SOP) provides the specific protocols proposed for field processing of each sturgeon collected at the Indian Point intakes as required by the Biological Opinion. Sturgeon processing procedures addressed in this attachment include:

1. Criteria for distinguishing "fresh" or "old" dead sturgeon collected,
2. Species identification,
3. Genetic tissue sampling,
4. General biocharacteristics work up,
5. Field necropsy, and
6. Data sheet coding instructions.

In these field procedures, we have specified two classes of fish for necropsy, freshly dead fish (i.e. those that are estimated to have died within 24 hours of collection), and old dead fish (i.e., those likely dead longer the 24 hours before collection). Once NMFS has reviewed these procedures, we will work with you to identify individuals or facilities qualified to perform a more detailed necropsy (including pathogen analysis) on suitable specimens if desired by NMFS. Our understanding is that any pathogenic necropsy must be performed on freshly dead fish.

IP1 Trash Bars

A survey will be performed using sonar to fully describe the state of the IP1 trash racks, including condition of any remaining wire mesh. Based on recent testing performed in the Hudson River, and presented to your staff at the 1 July meeting, the high level of turbidity precludes an underwater camera from providing an adequate image of the IP1 trash rack area. Sonar images generated as a result of this survey will be provided to NMFS to provide 'visual documentation' of the present condition of the Unit 1 trash bars. Entergy is currently working on using sonar imaging at the IP1 trash rack area, and will provide the resulting images once they have been collected and post-processed.

With respect to sediment levels in the IP1 forebays, Entergy monitors the level to ensure the pumps are not being impaired such that they cannot perform their intended function. Entergy currently has

plans to remove the accumulated sediments before the end of 2014, but there has been no firm commitment made to do so at this time. If and when a decision is made to remove the accumulated sediment at the IP1 intake, Entergy will inform NMFS.

Forebay Studies

We also wanted to take the opportunity to further our dialogue with your staff on the study of residence times for fish occupying the forebays at IPEC. Because it relates to the study of residence times generally, and not to a particular aspect of the feasibility study, we feel this issue is best addressed in this cover letter rather than in the attached Addendum. In particular, we noted your reference to the 1990 Fletcher paper in the discussion of potential impacts to fish entering the forebay:

> *"Even if through-rack velocity is not high enough to preclude fish from exiting the area, they may have difficulty finding a way out, especially if there is debris in front of the trash bars. Information presented by Fletcher (1990) on the length of time that fish spent in the area between the trash racks and the Ristroph screens supports this idea; for marked striped bass during a release-recapture study at Indian Point, the mean time spent in the area between the trash racks and Ristroph screens prior to observation in the fish return sluice was 9.73 hours. The information presented in Fletcher (1990) indicates that fish could remain in this area long enough to become stressed, tired or disoriented which would increase the likelihood that they would become impinged on the Ristroph screens or captured in the traveling buckets."*

NMFS references the Fletcher (1990) paper to support its proposition that sturgeon entering the forebay may have difficulty finding their way back to the river through the trash bars. Our review of Fletcher (1990) leads us to a different conclusion. As discussed below, Fletcher (1990) found that the striped bass used in his experiment did not tire and become impinged, but instead were captured by the rotating fish buckets when they encountered the screen through random movements.

Additionally, the striped bass released in the mark-recapture study reported in Fletcher (1990) were given no opportunity to find their way to the river. A fixed screen was placed at the entrance to the forebay that prevented any fish from entering or leaving the forebay via the river during the experiment. The only exit from the forebay during the experiment was via the traveling screens:

> *"Recapture experiments with known sample sizes of striped bass and white perch released upstream in the intake bay were meant to provide information on expected recovery rates and the risks of death and injury to fish captured by the reconfigured apparatus.* ***Before and during each of those experiments, a fixed screen was placed at the river entry of the intake bay,*** *not to prevent the released fish from escaping, but to prevent contamination of the collections by fish entering from the river****."*** (page 404, Fletcher (1990); emphasis added)

Therefore, the result reported by Fletcher (1990) does not address the issue of the ability of fish to leave the forebay through the trash racks to the river. Nevertheless, as discussed below, some results presented in Fletcher (1990) are relevant to the forebay studies.

Although the striped bass used for the experiments were fairly small, with an average fork length of 7.6 cm (i.e., about 3 inches), they were capable of sustained swimming speeds greater than 30 cm/sec (approximately 1 ft/sec):

> *"As observed in the Houston flume tests, juvenile striped bass of the sizes employed in these field experiments were capable of sustained swimming at flow speeds greater than the 30-cm/s flow speed in the Indian Point intake forebay."* (page 408, Fletcher (1990))

As documented in Entergy's 23 July 2012 report on sturgeon impingement and cited on page 68 of the 30 January 2013 Biological Opinion, sturgeon larger than 19.5 cm TL are expected to have sustained swimming speeds in excess of 1 ft/sec. Also, as documented in Entergy's 23 July 2012 report, all shortnose sturgeon collected during impingement sampling at IPEC from 1974-1990 were larger than 19.5 cm TL, and 90% of Atlantic sturgeon collected during that period were larger than 19.5 cm TL. Therefore, in terms of sustained swimming ability, the striped bass reported in Fletcher (1990) may be a suitable, albeit conservative (because almost all impinged sturgeon were larger than 19.5 cm TL with higher sustained swimming speeds), surrogate for sturgeon.

Fletcher conducted an analysis of the time to collection by the traveling screen that was based on random encounters with the screen by freely swimming fish:

> *"On the thesis of random encounter with the escape route (a travelling fish trough in this case) and the success rates of capture (the first-encounter probabilities) observed in the flume experiments,* ***the recovery rates of freely swimming fish*** *were expected to follow Poisson processes, as hypothesized by Fletcher (1985)"* (page 404, Fletcher (1990); emphasis added)

Fletcher's description of the time pattern of recovery of striped bass by the traveling screens was consistent with a constant rate of encounter with the traveling screen over the 36 hour duration of the experiment. If striped bass had become *"stressed, tired or disoriented which would increase the likelihood that they would become impinged on the Ristroph screens or captured in the traveling buckets"* as suggested, then the rate of encounter with the traveling screens would have increased over time. Fletcher found that not to be the case:

> *"In the case of fish able to swim against the flow for extended periods, the release-recapture experiments tended to confirm the hypothesis of random encounter and active capture by the redesigned fish troughs."* (page 414, Fletcher (1990))

In addition, Fletcher reported only 3% mortality (including fish that were injured or dead after 8 hours) for all striped bass collected by the traveling screens during the mark-recapture experiment. Fletcher also noted that the cause of mortality was more likely attributable to the fish recovery process in the fish return sluice than to the active collection of fish by the buckets of the Modified Ristroph traveling screens:

> *"…impingement as such is not the proximate agency of high mortality it was thought to be, provided the durations of impingement are short and the speed of the water approaching the screen is moderate. Given such conditions, we found that captured fish were harmed more by injuries imposed during the recovery process."* (page 414, Fletcher (1990))

In summary, the results presented in Fletcher (1990) demonstrated the following for fish with sustained swimming abilities no greater than those of sturgeon:

1. When trapped in the forebay by a fixed screen placed at the river entry side of the forebay, fish swam freely in the forebay for 36 hours;
2. Fish that were collected by the Modified Ristroph screens, encountered the screens due to random movements within the forebay (the time pattern of collection was not consistent with them becoming stressed, tired or disoriented as time passed);
3. Fish that encountered the screens and were actively collected by the buckets of the Modified Ristroph screens were transferred to the fish return sluice largely unharmed.

Other Comments

As suggested, we have compared the revised monitoring plan with the Reasonable and Prudent Measures, and the Terms and Conditions of the Final Biological Opinion, and with the comment letters from NMFS of 23 October 2013, and those of 4 March, 1 May, and 17 July 2014. We feel the revised monitoring plan meets NMFS' requirements to the greatest degree possible, given the current knowledge about performance of the monitoring technologies at the IPEC cooling water intakes. Once we have completed the feasibility studies, we will work with NMFS to ensure the remaining requirements are satisfied.

A copy of this cover letter, the Addendum to the Revision 2 Monitoring Plan, and SOP Section 3 are also being sent by email to the members of your staff and others identified in the attached distribution list.

Entergy appreciates the constructive dialogue with your staff in the preparation of the IPEC monitoring plan. If you have any questions or need additional information, please contact Ms. Dara Gray of IPEC at the address shown below.

Sincerely,

NORMANDEAU ASSOCIATES, INC.

Mark T. Mattson

Mark T. Mattson, Ph.D.

Vice President

Email Distribution List 4 August 2014

Addendum to the "Proposed Monitoring Plan for Indian Point Energy Center Take of Atlantic and Shortnose Sturgeon by Impingement at Cooling Water Intakes Revision 2" 13 June 2014.

Section 3 of "Indian Point Sturgeon Impingement Quality Assurance Plan and Standard Operating Procedures", July 2014.

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