Attachment 2

EPA Response to Comments

Response to Comments for the National Pollutant Discharge Elimination System (NPDES) Permit No. MA0003557 – Pilgrim Nuclear Power Station (PNPS), Plymouth, MA

Introduction:

In accordance with the provisions of 40 C.F.R. § 124.17, this document presents responses to comments received on the draft NPDES Permit, MA0003557. The response to comments explains and supports the determinations that form the basis of the Final Permit. From May 18, 2016 to July 18, 2016, extended to July 25, 2016, the United States Environmental Protection Agency ("EPA") and the Massachusetts Department of Environmental Protection ("MassDEP") (together, the "Agencies") solicited public comments on a draft NPDES permit, MA0003557, developed pursuant to a permit application from the Permittee, for the reissuance of a NPDES permit to discharge various wastewaters and stormwater to Cape Cod Bay and to withdraw water from Cape Cod Bay for cooling uses. The discharges consist of condenser non-contact cooling water, unheated backwash water for bio-fouling control, intake screen wash water, plant service cooling water, neutralizing sump wastewater, demineralizer reject water, and station heating water. Additionally, there are five stormwater outfalls, which discharge stormwater runoff as well as stormwater that accumulates in various electrical vaults around the property that is periodically pumped out to one of these five stormwater outfalls.

The Agencies conducted a public hearing regarding the issuance of this permit on July 21, 2016. A list of all parties that commented on this draft permit in writing during the comment period or in person at the public hearing via submitted documents or oral testimony is included in Part V of this document. After a review of the comments received, the Agencies have made a final decision to issue this permit authorizing this discharge with the changes described below.

PNPS ceased electricity generation (*i.e.*, shut down) on June 1, 2019. The shutdown of operations has resulted in a 92 % reduction in cooling water intake as compared to the full operation of the plant when it was generating electricity. Therefore, the final permit has been revised to eliminate all pre-shutdown limits and conditions and the majority of comments regarding pre-shutdown conditions no longer warrant a response. In addition, Part I.G of the Final Permit (formerly Part I.H in the Draft Permit) has been changed slightly to comply with changes in federal and state electronic and hard copy reporting procedures that have occurred since the issuance of the Draft Permit in 2016.

The Agencies' decision-making process has benefitted from the comments and additional information submitted. In addition, the Permittee has provided additional clarifying information regarding post-shutdown operations which was not known or made available during the comment period. Therefore, the Agencies have made minor changes in response to some comments. These changes are explained in the responses to individual comments that follow and are reflected in the Final Permit.

Note: Goodwin Procter, LLP, on behalf of Entergy, submitted "supplemental comments" after the close of the public comment period—in particular, on October 31, 2016,[1] and on March 31, 2017.[2] Entergy also submitted an additional letter dated May 20, 2019, this time through its attorneys at Jones Day.[3] The Agencies have reviewed the submittals, but under applicable federal regulations, the permitting authority is only required to respond to significant comments submitted *during* the public comment period. 40 C.F.R. § 124.17(a)(2). "That is, within the interval of time between the beginning and end of the public comment period, not before, not after." *In re Avon Custom Mixing Servs., Inc*., 10 E.A.D. 700, 706 (EAB 2002); *see also In re City of Phoenix, Arizona Squaw Peak and Deer Valley Water Treatment Plants*, 9 E.A.D. 515, 524-31 (EAB 2000); *In re Steel Dynamics, Inc*., 9 E.A.D. 165, 194 n.32 (EAB 2000) ("Permitting authorities are under no obligation to consider comments received after the close of the public comment period."). The permitting authority retains the discretion, however, to consider comments received after the close of public comment. *In re Town of Newmarket*, 16 E.A.D. 182, 234 (EAB 2013) (*citing In re Upper Blackstone Pollution Control Dist.*, 15 E.A.D. 297, 312 (EAB 2011), *aff'd*, (1st Cir. 2012), *cert. denied*, 133 S. Ct. 2382 (2013).

According to Entergy, the October 2016 Supplemental Comments were submitted "for the purpose of clarifying or correcting certain statements, representations, and claims made by certain organizations—in particular, the Jones River Watershed Association ('JRWA'),[footnote omitted] the Association to Preserve Cape Cod ('APCC'),[footnote omitted] the Center for Coastal Studies – Provincetown ('CCS'), and Pilgrim Watch."[4] Thus, according to Entergy, its untimely October 2016 Supplemental Comments were submitted only for the purpose of responding to timely comments submitted by others, rather than raising new issues on the Draft Permit.[5] Despite Entergy's characterization, however, the Agencies note that the October 2016 Supplemental Comments include new issues not raised in the permittee's timely comments: new arguments relating to WET testing proposed in the Draft Permit[6] and a new issue regarding the technological feasibility of retrofitting PNPS to employ closed-cycle cooling ("CCC") to minimize adverse environmental impact.[7] The March 2017 Supplemental Comments address a single topic, amplifying and expanding on Entergy's claims in the October 2016 Supplemental Comments regarding technological feasibility of CCC at PNPS. The May 2019 Letter states that

[1] "Supplemental Comments of Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc., on Draft National Pollutant Discharge Elimination System and Massachusetts Clean Waters Act Permit, Permit No. MA0003557, with Respect to Pilgrim Nuclear Power Station" (October 31, 2016) (hereinafter, "October 2016 Supplemental Comments").

[2] "Supplemental Comments of Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc. on Draft National Pollutant Discharge Elimination System and Massachusetts Clean Waters Act Permit, Permit No. MA0003557, with Respect to Pilgrim Nuclear Power Station" (March 31, 2017) (hereinafter, "March 2017 Supplemental Comments").

[3] Letter from E. Zoli, Jones Day, to D. Webster, Region 1 EPA (May 20, 2019) (hereinafter, "May 2019 Letter").

[4] October 2016 Supplemental Comments, at 1.

[5] *Id.; see also* Comment III.1 (asserting that Entergy "reserves its right to supplement these Comments as appropriate, including for the purpose of responding to comments submitted by other members of the public"); October 2016 Supplemental Comments, at 1 (calling specific attention to that part of its timely comments in which Entergy asserted that it had "reserved its right to supplement those Comments, including for the purpose of responding to timely comments submitted by members of the public").

[6] October 26 Supplemental Comments at 30-32.

[7] *Id.* at 22-24.

it "updates" Entergy's timely comments regarding flow and chlorine limits and conditions in the Draft Permit applicable to the salt service water system.

First, as noted above, since the submittals were untimely, the Agencies are not required to respond to them at all. 40 C.F.R. § 124.17(a)(2). Second, to the extent the content of the October 2016 Supplemental Comments relates to timely comments raised by others, this Response to Comment document already addresses those issues. Third, with respect to Entergy's late comments raising the issue of feasibility of CCC at PNPS, the Agencies did not propose in the Draft Permit and Fact Sheet, or conclude in the Final Permit, that CCC is the best technology available ("BTA") at PNPS for minimizing adverse environmental impact. The Agencies have not made a finding that CCC either is or is not technologically feasible at PNPS, and such a finding is unnecessary. *See also* Response to Comment III.3.1.2. Thus, Entergy's late comments on this issue are not relevant or significant. For these and other reasons, including that the existing permit is long expired, the Agencies do not provide direct responses herein to each and every point made in the October 2016 Supplemental Comments, March 2017 Supplemental Comments, or May 2019 Letter. The Agencies address the new WET arguments in Response to Comment III.10.3, and the "updated" flow and chlorine comments in Responses to Comment III.4.2 and III.6.2.2, respectively.

A copy of the final permit and this response to comment document will be posted on the EPA Region 1 web site: http://www.epa.gov/region1/npdes/permits listing_ma.html.
A copy of the final permit may also be obtained by writing or calling George Papadopoulos, United States Environmental Protection Agency, 5 Post Office Square, Suite 100 (Mail Code: 06-1), Boston, Massachusetts 02109-3912; Telephone (617) 918-1579.

The changes from the Draft Permit to the Final Permit are summarized immediately below and are explained in the responses to the comments that follow:

The Permittee's name has been changed to Holtec Decommissioning International, LLC, as shown on the cover page of the Final Permit. See Response to Comment I.2.5.

The Final Permit has been revised to eliminate all pre-shutdown limits and conditions. The Draft Permit listed pre-shutdown permit conditions in Part I.A, post-shutdown conditions in Part I.B., and conditions that applied under both conditions were listed in Part I.C. Therefore, the Final Permit lists all remaining discharges under Part I.A. See introduction above.

The effluent limits for sodium nitrite and tolytriazole which previously applied to internal Outfalls 011 and 014 now will apply at the discharge canal compliance point for Outfall 001 in Part I.A.1. In addition, the Permittee is now required to report the total hours per month that either circulating water pump operates for Outfall 001. See Response to Comment I.3.6.

The Final Permit has established average monthly and maximum daily limitations for total residual oxidants of 0.1 mg/l at the discharge canal compliance point for Outfall 001. See Response to Comment III.6.2.2.

The average monthly flow limit for Outfall 001 has been changed to a monitor only requirement. See Response to Comment III.4.1.

The effluent temperature and temperature rise (delta T) limits for Outfall 001 have been changed to monitor only requirements. See Response to Comment III.5.1.

For Outfall 010, a maximum daily intake velocity limit of 0.5 feet per second (fps) has been established along with a monthly average monitoring requirement. This velocity applies at the traveling screens. See Response to Comment III.3.2.

At Outfall 010, the average monthly and daily maximum total residual oxidants limits have been changed from 7.5 ug/l and 13 ug/l to 0.5 mg/l and 1.0 mg/l, respectively. See Response to Comment III.6.2.2.

Part I.B of the Final Permit, formerly Part I.E., has been revised to specifically note that the permit does not authorize discharges of pollutants in the spent fuel pool water, stormwater associated with construction activity, or other specific discharges that may be associated with activities performed during decommissioning (e.g., pipeline and tank dewatering). See Response to Comment IV.5.1.

The Whole Effluent Toxicity (WET) Testing that was previously required at internal Outfalls 011 and 014 has been changed to the discharge canal compliance point at Outfall 001. WET sampling at the discharge canal compliance point at Outfall 001 must be conducted when Outfall 011 is discharging and Outfall 014 is not discharging. The reasons for this change are detailed in Response to Comment III.10.3.

The Agencies have added Outfall 013 in Part I.A.6 of the Final Permit but have not established any numeric effluent limits. See Response to Comments I.3.5 and IV.4.4.

A footnote was added to the non-thermal backwash discharge of Outfall 002 to limit the number of non-thermal backwashes to one per week unless more are needed to respond to infrequent, abnormal events where backwashing is necessary to avoid severe property damage. See Response to Comment III.5.1.

The monthly average and daily maximum flow limits for Outfall 010 have been revised from 7.8 MGD and 15.6 MGD, respectively, to 15.6 MGD and 19.4 MGD. See Response to Comment III.4.2.

At Outfall 010, the maximum daily effluent temperature has been changed from 85°F to 90°F and the maximum daily temperature rise (delta T) limit has been changed from 3°F to 10°F. See Response to Comment III.5.2.

The language in the Draft Permit regarding specific delta temperature change limits during load cycling and steady state operations (Part I.D.11) has been removed from the Final Permit since the facility has shut down.

The of list of discharges authorized for Outfalls 011 and 014 has been revised (Parts I.A.8 and I.A.9.) See Response to Comment III.6.

The definition of an unusual impingement event (UIE) at Part I.A.20 (formerly Part I.D.12) has been revised. See Response to Comment III.8.3.

Certain elements of the cooling water intake structure (CWIS) requirements at Part I.C (formerly Part I.F) have been revised to reflect revised permit limits and the shutdown. See Response to Comment III.3.

With the exception of impingement monitoring that is required once per month when the Permittee is operating a circulating pump, all other requirements of the Biological Monitoring Program in Attachment B have been eliminated. See Responses to Comments I.5.6 and III.8.1.

The monitoring requirements for the electrical vaults at Part I.A.7 (formerly Part I.C.3) have been revised to include quarterly monitoring for cyanide, antimony, hexavalent chromium, and total nickel. In addition, quarterly monitoring for internal Outfall 004B (manhole MH-2) has been substituted for the previous monitoring requirement for internal Outfall 007B (manhole MH-2A). See Responses to Comments I.3.6, III.10.1, and III.10.2.

Part I.F (formerly Part I.J) of the Final Permit has been corrected to state that sampling from seven (7) instead of six electrical vaults had previously been conducted. In addition, that would leave 18 vaults to be sampled pursuant to this section of the permit instead of 19. See Response to Comment III.10.4.

The Stormwater Pollution Prevention Plan (SWPPP) requirement formerly in Part I.H. of the Draft Permit is now included in Part I.D.2 of the Final Permit and is listed distinctly from a Best Management Practices requirement of Part I.D.1. The Final Permit includes specific, non-numeric technology-based effluent limitations found in Part 8.O. of the 2015 Multi-Sector General Permit for Stormwater (MSGP) which are associated with Steam Electric Generating Facilities. In addition, the SWPPP has been changed to require areas with industrial materials or activities exposed to stormwater, structural controls, and discharge points be inspected at least once per quarter instead of monthly to be consistent with the inspection requirement of the MSGP. See Responses to Comments I.3.4 and III.10.2.

The SWPPP at Part I.D.2.e has added language requiring the Permittee to design and implement appropriate controls to account for how any decommissioning activities on the site. See Response to Comment I.2.2.

The monitoring and reporting requirements outlined in Part I.G of the Final Permit (formerly Part I.K) have been revised.to include specific DMR submittal instructions and updated contacts for DMR submittals and verbal notifications. See introduction above.

Additional State Permit conditions have been added to Part I.H of the Final Permit. See, for example, Responses to Comments I.2.2 and IV.5.1.

CONTENTS

I. COMMENTS SUBMITTED BY JONES RIVER WATERSHED ASSOCIATION ET AL.[8]

1.0 Introduction

In 2012, a citizen group identified 33,000+ violations of the Federal Clean Water Act (CWA) and issued a Notice of Intent to Sue under the state and federal water pollution controls for these violations.[2] The group refrained from filing suit due to assurance from EPA and MassDEP that the revised NPDES permit would be issued by the end of 2013. The revised permit was not issued in 2013, and EPA and MassDEP have continued to allow PNPS to discharge pollutants and use massive quantities of water from Cape Cod Bay since that time, as well as violate terms of the original permit.

In 2014, EPA and MassDEP were asked to terminate PNPS's NPDES permit due to massive destruction of Cape Cod Bay resources, ongoing since 1972, and the continued delay in issuing a revised permit.[3] It continues to be our position, described in the 2014 letter and subsequent meetings, that the PNPS NPDES permit allowing use of the outdated 'once-through cooling system' should be terminated, and Entergy prohibited from continued use of Cape Cod Bay as a free source of cooling water and a dump for thermal and chemical effluents.[4] The only continued use that should be considered under the draft permit is cooling associated with spent fuel storage in PNPS's wet pool and for site decommissioning operations post power production.

PNPS's own reports show it has used and discharged massive quantities of water, containing numerous chemical pollutants, and killed billions of organisms each year – causing unquantifiable damage to the Cape Cod Bay ecosystem. Recreational, economic, social, health and environmental benefits are directly linked to a clean and unimpaired water source such as Cape Cod Bay. Entergy has destroyed public trust resources under a dissembled "permit to pollute" issued and sanctioned by EPA and MassDEP, and without any viable review for decades.

As described further below, there are no legitimate grounds for allowing PNPS to continue to operate its cooling water intake structure (CWIS). No modifications or upgrades will be sufficient to meet the standards of the Clean Water Act and the State's Surface Water Quality Standards (SWQS). Simply put, the 2016 draft NPDES permit is too little, too late.

In addition, climate change impacts are compounding the damage and risk associated with Entergy's CWIS and continued operations. According to a June 2016 report on climate change released by the Boston Research Advisory Group,[5] Boston area sea level is rising faster than previously projected, and precipitation will become more severe. In 2015, Jones River Watershed Association (JRWA) provided the U.S. Nuclear Regulatory Commission (NRC) with a brief analysis of sea level rise impacts at the PNPS site.[6] This recent science predicting rising

[8] Submitted by the following organizations: Jones River Watershed Association, Earthrise Law Center, Cape Downwinders, Citizens Awareness Network, Cape Cod National Seashore Advisory Commission, Concerned Neighbors of Pilgrim, Whale and Dolphin Conservation, Toxics Action Center, Nuclear Information & Resources Service.

seas and extreme precipitation in the Northeast further supports a sooner closure and decommissioning of PNPS. Ignoring these inconvenient truths as well as PNPS's location relative to sea level is a disservice to the public and is contrary to the duty of EPA and MassDEP to protect the public trust resources. EPA and MassDEP are the regulatory guardians of these essential resources. Allowing PNPS to continue to operate under a NPDES permit will not protect these resources and violates agencies' public trust duties.

If EPA and MassDEP decide nonetheless to proceed with NPDES permit renewal for full operations until 2019 and for decommissioning activities after 2019, then we request consideration of the following comments.

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[1] For full summary of PNPS's contentious history, see: Chronology of Events: PNPS, Plymouth, MA: 1960-2015. <http://www.capecodbaywatch.org/2015/10/pilgrim-chronology-1967-2015/>

[2] 33,253 violations (from 1996 to 2012) of the CWA by PNPS are outlined in: Ecolaw Notice of Intent letter. Oct. 5, 2012. Re: CWA § 505 Notice of Intent to Initiate Citizen Suit for Violations at Pilgrim Nuclear Power Station, Plymouth, Mass. NPDES Permit No. MA 0000355 <http://www.capecodbaywatch.org/wp-content/uploads/2012/10/10.05.12-noi-w-exhibits.pdf?d23684>

[3] CCBW letter to EPA. Jan. 28, 2014. Re: Pilgrim Nuclear Power Station, Plymouth, Mass.: Expired Clean Water Act NPDES Permit No. MA0003557 <http://www.capecodbaywatch.org/wpcontent/uploads/2014/01/NPDESLetter_Final_2014Jan28.pdf?d23684>

[4] JRWA. 2015. Entergy: Our Bay is Not Your Dump <http://jonesriver.org/2015-water-pollution/ >Comments Re: PNPS Draft NPDES Permit; July 2016; Page 2 of 29

[5] Boston Research Advisory Group. Climate Projections Consensus Report: Climate change and sea level rise projections for Boston. June 1, 2016. <http://climateready.boston.gov/findings>; Another 8 in. of relative sea level rise may happen by 2030, almost 3x faster than previously projected. By 2050, sea level may be as much as 1.5 ft. higher than in 2000, and as much as 3 ft. higher by 2070.

[6] Analysis of AREVA Flood Hazard Re-Evaluation Report Pilgrim Nuclear Power Station Plymouth, MA and updated geospatial maps of the site. See http://jonesriver.org/downloads/analysis-of-areva-flood-hazard-re-evaluation-report-for-pilgrimnuclear-power-station/

Response:

In this introductory comment, the Jones River Watershed Association et al. (hereinafter referred to as "JRWA") comment generally that the only continued use that should be considered is cooling associated with spent fuel storage in PNPS's wet pool and for site decommissioning operations post power production. PNPS ceased electricity generation (i.e. shut down) on May 31, 2019, after which the Draft Permit conditions associated with post-shutdown operations will take effect, including use of cooling water for cooling spent fuel. The shutdown of operations results in a 92% reduction in cooling water intake as compared to the full operation of the plant when it was generating electricity.

2.0 General Comments

2.1 EPA Has Failed to Ensure Timely Reissuance of PNPS's NPDES Permit

The draft permit has a 5-year term — a term imposed by the CWA — and expires at midnight, 5

years from the last day of the month preceding the effective date. The 20+ year delay in renewing PNPS's 1991 permit, which expired in 1996, has undermined the intent of the CWA by allowing PNPS to continue to operate for decades under one of the longest expired NPDES permits in the U.S. This delay raises serious concerns about whether EPA and MassDEP will issue a timely renewal of PNPS's new final NPDES permit that is issued for operation of the CWIS and decommissioning activities in a timely manner.

As of 2001, EPA had determined 27% of facilities operating under NPDES had expired permits that were "administratively continued."[7] While EPA is certainly aware of its failure to address permit updates in an appropriate time period, and is apparently working to address this issue,[8] how can EPA assure the public with certainty that this unacceptable backlog of expired NPDES permit will be resolved and that Entergy's new NPDES permit for PNPS will be reviewed and renewed in a timely manner to protect environmental concerns? It seems certain that EPA will not be in a position to conduct a timely review of PNPS's NPDES permit within 5 years after its issuance.

The CWA declares that NPDES permits to pollute waterways were not to be issued after 1985. As the Senate Report accompanying the legislation explained, "[T]his legislation would clearly establish that no one has the right to pollute - that pollution continues because of technological limits, not because of any inherent rights to use the nation's waterways for the purpose of disposing of wastes."[9] EPA and MassDEP's failure to address PNPS's expired permit and failure to require updates to eliminate pollution over the last 30+ years of operations under the CWA means EPA continues to ignore Congress' express "no-pollution" goal.

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[7] U.S. EPA. Factsheet: NPDES Permit Backlog Reduction. <http://www.epa.gov/npdes/pubs/factsht.pdf> Accessed 6/10/16.

[8] EPA Proposed Rule. May 18, 2016. NPDES: Applications and Program Updates. <https://www.federalregister.gov/articles/2016/05/18/2016-11265/national-pollutant-discharge-elimination-system-npdesapplications-and-program-updates>

[9] Sen. Rpt. No. 92-414, 92 Cong. 1st Sess. 41 (1971), reprinted in 2 Envtl. Policy Div., Cong. Ref. Serv., A Legislative History of the Water Pollution Control Act Amendments at 1972, at 1460 (Sen. Pub. Works Comm. Print 1973); 1972 U.S. C.C.A.N. 3668, 3709.

Response to Comment 2.1

EPA acknowledges that there was a considerable delay in reissuing this permit. This permit is one of the most complex permits in the Region and has been delayed over the last few years for various reasons, including competing permitting priorities (including for other complex power plant permits), new regulations governing the best technology available for existing cooling water intake structures, complex temperature variance considerations, and multiple consultations with various State and Federal agencies. In addition, a closure announcement by the Permittee during late stages of developing the draft permit required the development of new, post-shutdown permit conditions and altered preliminary determinations pertaining to ongoing operations of the power plant.

NPDES permits have gotten more complex since this permit was last issued. Specifically, power plant permits are especially challenging and require significant technical, legal, and administrative resources to reissue. Due to the limited expertise in the Region regarding the

operations of nuclear power plants, EPA also sought contractor assistance for certain aspects of the draft permit. In addition, EPA consulted with the Nuclear Regulatory Commission (NRC) regarding aspects of the draft permit's requirements that could pose a nuclear safety concern for the facility. All of these factors resulted in the drafting of this permit taking an extended period of time.

Regarding the comment about the goals of the CWA, NPDES permits are written to be consistent with Federal regulations and State water quality standards (WQS). The prior NPDES Permit included water quality and technology-based limits and conditions and the Final Permit maintains these conditions or includes more stringent conditions as appropriate. The NPDES Program is credited with eliminating many discharges and significantly reducing the pollutant loads from existing discharges. Each successive issuance of permits can further limit the magnitude of pollutants discharged through the implementation of revised technology- and water quality-based limits.

As already noted, PNPS stopped generating electricity on May 31, 2019. The Final Permit establishes limitations and requirements, consistent with this shutdown of operations, that result in a 92 % reduction in cooling water intake and 98% reduction in heat load as compared to the full operation of the plant. In addition, the Final Permit establishes effluent limitations and monitoring requirements on discharges of miscellaneous "low-volume" type wastes, stormwater, and stormwater that accumulates in electrical vaults. In all, the Final Permit includes a suite of effluent limitations, non-numeric limitations, and monitoring requirements that represents a significant advancement from the 1991 Permit and that will ensure that the aquatic community and designated uses of Cape Cod Bay are protected.

2.2 EPA Has Failed to Adequately Consider the Impacts of Climate Change on PNPS's Operations and Permitted Discharges

To fully understand the impacts of PNPS operations on water resources, EPA must consider climate change with regard to all requirements and conditions in the draft permit. The Northeast experiences significant impacts caused by climate change, such as coastline alterations due to rising sea levels, increased precipitation, increased air and ocean temperatures, more flooding, higher storm surge, more intense storms, and more.[10] These impacts could interfere with CWIS operations, cause further chemical pollutant discharges into Cape Cod Bay, and exacerbate the effects of PNPS's thermal effluent and impingement/entrainment on marine resources.

In July 2013, the U.S. Department of Energy (DOE) published a report outlining vulnerabilities from climate change trends at energy facilities, including nuclear power stations.[11] The report specifically cites climate change patterns such as increasing air and water temperatures, increasing intensity of storm events, sea level rise, and storm surges as having potential negative implications for thermoelectric forms of power generation (including nuclear facilities). Implications for coastally-based nuclear facilities include: 1) reduction in plant efficiencies and generation capacity due to increasing air and water temperatures, 2) increased risk of exceeding thermal discharge limits due to increasing water temperatures, and 3) increased risk of physical damage and disruption due to increasing intensity of storm events, sea level rise, and storm surge.

The National Oceanographic and Atmospheric Association (NOAA) estimates a sea level rise of 3.05 feet by 2065 in the northeastern U.S.[12] However, some have found that sea levels could be rising even faster: sea levels along the northeast coast rose nearly 3.9 inches in just a 2-year period (2009-2010) according to a Feb. 2016 study from the University of Arizona and NOAA.[13] Another recent study[14] found that Boston area sea level is rising faster than previously projected (another 8 in. of relative sea level could occur by 2030 and levels could be as much as 3 ft. higher by 2070).

As sea levels rise, groundwater levels will also rise, which will reduce storage capacity in some areas (i.e., more flooding).[15] Studies also suggest precipitation amounts will increase (and already have increased ~70% from 1958-2012) and storms/nor'easters could potentially become more severe.[16]

Flooding, sea level rise, and rising groundwater tables could increasingly flush contaminates present in groundwater and soil into Cape Cod Bay. As PNPS moves to decommissioning and site cleanup (which could be deferred for up to 60 yrs.), understanding how these impacts will influence contamination of Cape Cod Bay will become more critical. Additional sources of contamination could result from disturbed soils or demolished structures on the site, however decommissioning does not include cleanup or management of non-radiological contaminants. It is up to EPA to ensure that nonradiological contamination present on-site does not flush into water sources over time.

For example, EPA should ensure yard drain and electrical vault testing is done with more frequency after shutdown and until decommissioning is complete to ensure increased flooding, rising groundwater tables, and other climate change impacts are not leaching on-site contaminants into Cape Cod Bay. Furthermore, Outfall 013 is recognized in the new permit but has no monitoring requirements since it's not expected to drain to Cape Cod Bay except during extreme storm events, is not accessible, and drains a relatively small portion of the site. As discussed in more detail in section II.G, more precipitation and storms are expected as a consequence of climate change; therefore, outfall 013 and all outfalls to Cape Cod Bay should be monitored and limits imposed on contaminants with climate change impacts in mind.

EPA and MassDEP should consider that sea level rise and rising groundwater tables could impact buried and underground piping and tanks. Flood proofing was a part of site construction at PNPS more than 40 years ago, however time, salt, and elements have potentially compromised that protection (as evidenced by the levels of tritium in groundwater wells within several hundred feet of the shoreline, as well as the recent NRC report that identified corroded supports for piping that distributes cooling water to the reactor and other plant systems after it is pumped in from Cape Cod Bay[17]). These could become even more vulnerable to saltwater corrosion as saltwater intrusion increases the salinity of the groundwater. These potential sources of contaminants should be considered by EPA and MassDEP in the new permit (i.e., periodic monitoring of buried and underground pipes and tanks that carry non-radiological contaminants). This monitoring should be coordinated with the MassDPH.

In issuing the draft permit, EPA and MassDEP improperly rely on scientific data that are decades old. In particular, the draft permit relies on Entergy's 2000 CWA "Demonstration Report" to set thermal limits on water discharged to Cape Cod Bay. This Demonstration Report is flawed in several ways, discussed in more detail in section II.A. For example, additive and synergistic effects of thermal pollution combined with other existing issues in Cape Cod Bay were not assessed, such as the warming of oceans due to global warming. It would be appropriate for EPA and MassDEP to reassess impacts caused by PNPS's thermal discharge in light of global warming and the recent increase in average water temperatures in Cape Cod Bay. In the Fact Sheet, EPA acknowledges a "statistically significant warming trend in both the intake and in surface waters in Cape Cod Bay over the 37-year period of record." Until a reassessment of PNPS's thermal plume is carried out, we request that the temperature variance be denied and thermal discharges to Cape Cod Bay be terminated.

President Obama's Executive Order 13653[18] promotes risk-informed decision making among federal agencies and requires the consideration of climate change issues. EPA's own Policy Statement on Climate Change Adaption[19] states that EPA is "…committed to identifying and responding to the challenges that a changing climate poses to human health and the environment."; the "…agency must adapt if it is to continue fulfilling its statutory, regulatory and programmatic requirements" and "…plan for changes in climate and incorporate consideration of climate change into many of its programs, policies, rules and operations to ensure they are effective under future climatic conditions.

The draft permit does not adequately address climate change impacts and contradicts EO 13653 and EPA's Policy Statement. EPA's Climate Action Plan, mandated by EO 13653, recognizes that a "…changing climate can affect exposures to a wide range of chemicals. Exposures may change because of changing environmental conditions or changing use patterns." Yet the draft permit does not address how various climate change impacts will influence further chemical pollutant discharges from PNPS into Cape Cod Bay, nor does the science behind the draft permit assess what impacts climate change will have regarding thermal effluent and impingement/entrainment of marine resources.

In view of climate change impacts that will impact PNPS, decommissioning and site decontamination should be completed by 2030 and all NDPES permits should be terminated. No further discharge of pollutants into Cape Cod Bay and the groundwater on-site should be allowed to continue.

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[10] Coastal Risk Consulting. Dec. 2015. Analysis of AREVA Flood Hazard Re-Evaluation Report for Pilgrim Nuclear Power Station. <http://www.capecodbaywatch.org/wp-content/uploads/2012/06/CRC-PNPS-Analysis-Report_Dec2015_FINAL.pdf?d23684>

[11] U.S. Dpt. of Energy. 2013. U.S. Energy Sector Vulnerabilities to Climate Change and Extreme Weather. 84 pp.

[12] USACE (U.S. Army Corps of Engineers). 2014. Climate Change Adaptation. <http://www.corpsclimate.us/ccaceslcurves.cfm>

[13] Goddard PB, Yin J, Griffies SM, and S. Zhang. 2015. An extreme event of sea-level rise along the Northeast coast of North America in 2009–2010. Nature Communications. 6(6346): doi:10.1038/ncomms7346.

[14] Boston Research Advisory Group. Climate Projections Consensus Report: Climate change and sea level rise projections for Boston. Jun. 1, 2016. <http://climateready.boston.gov/findings>; Another 8 in. of relative rise may happen by 2030, almost 3x faster than previously projected. By 2050 levels may be as much as 1.5 ft. higher than in 2000; and as much as 3 ft. higher by 2070.

[15] Coastal Risk Consulting. Dec. 2015. Analysis of AREVA flood hazard re-evaluation report for Pilgrim Nuclear Power Station.
[16] Stratz S.A. and F. Hossain. 2014. Probable maximum precipitation in a changing climate: Implications for dam design. Journal of Hydrologic Engineering. 19(12): 06014006; Kunkel K.E., Karl T.R., Easterling D.R., Redmond K., Young J., Yin X., and P. Hennon. 2013. Probable maximum precipitation and climate change. Geophysical Research Letters 40(7): 1402-1408; Boston Research Advisory Group. Climate Projections Consensus Report: Climate change and sea level rise projections for Boston. June 1, 2016. <http://climateready.boston.gov/findings>; Melillo J.M., Richmond T.C., and G.W. Yohe, Eds. 2014. Climate change impacts in the United States: the third national climate assessment. U.S. Global Change Research Program, 841 pp. doi:10.7930/J0Z31WJ2.
[17] NRC. July 6, 2016. PNPS – Evaluation of Changes, Tests, or Experiments and Permanent Plant Modifications Team Inspection Report 05000293/2016007.
[18] Executive Order 13653. 2013. Preparing the United States for the Impacts of Climate Change.
[19] EPA. Policy Statement on Climate Change Adaption. Revised June 2014. <https://www3.epa.gov/climatechange/Downloads/impacts-adaptation/adaptation-statement-2014.pdf.

Response to Comment 2.2:

The comment asserts that the Draft Permit does not adequately address the impacts of climate change on future discharges from PNPS. The comment requests that decommissioning and site decontamination be completed and all NPDES permits be terminated by 2030, after which time no further discharge of pollutants into Cape Cod Bay and the groundwater on-site should be allowed to continue. As explained elsewhere in this Response to Comments, PNPS ceased operations as of May 31, 2019, and no longer operates as a generating facility. As such, the response is limited to post-shutdown discharges. The CWA does not dictate when decommissioning and site decontamination must be completed, and the Final Permit does not impose a deadline for decommissioning or termination of the permit. At the same time, the Agencies have considered the potential impacts of climate change on the discharges from PNPS raised by the commenter and how these impacts are mitigated by conditions and limits of the Final Permit.

As the comment points out, sea levels and water temperatures may rise in the future, and the severity and frequency of storm events may increase. EPA does not presently have sufficient data to attempt to make precise predictions about future water temperatures or sea levels in Cape Cod Bay for the purposes of establishing effluent limitations or conditions. Moreover, such an analysis is currently beyond the scope of this NPDES permit renewal. The Final Permit establishes permit limits and conditions that address wastewater, cooling water, and stormwater discharges from PNPS based on conditions as described by Entergy during the permitting process. The limits and monitoring required by the Final Permit will provide valuable information to evaluate any impacts of PNPS's discharges and climate change going forward.

For example, the comment requests that the Draft Permit's temperature variance be denied and thermal discharges be terminated until a reassessment of PNPS's thermal plume is carried out.[9] Since the facility has shut down, the heat load associated with the reduced cooling water withdrawals is substantially decreased and the Final Permit's temperature limits ensure that the

[9] The comment states that the Draft Permit "contradicts EO 13653 and EPA's Policy Statement." EPA notes that Executive Order 13653 was revoked by Executive Order 13783. *See* 82 Fed. Reg. 16,093 (Mar. 28, 2017). At the same time, EPA has addressed concerns about the impacts of climate change on PNPS's discharges in the response.

Facility maintains a 98% reduction in heat load as compared to the current permit. The temperature limits and reduction in heat load will ensure the protection and propagation of a balanced, indigenous population. Moreover, the remaining source of heat from PNPS is non-contact cooling water from the spent fuel pool. The spent fuel is scheduled to be transferred to the independent spent fuel storage installation (ISFSI) within the next five years, which will eliminate this thermal input from PNPS to Cape Cod Bay. Due both to the substantial and continuing reduction in heat load under the Final Permit and because the thermal discharge related to cooling the spent fuel pool is expected to be discontinued altogether in the near future, the thermal impacts from cooling water discharges are not expected to increase as a result of climate change.

The comment raises concerns that flooding, sea level rise, and rising groundwater tables could increasingly flush contaminants present in groundwater and soil into Cape Cod Bay. The comment also requests that post-shutdown yard drain and electrical vault testing be done with more frequency until decommissioning is complete. An increase in the frequency of flooding could increase the frequency and magnitude of discharges from the permitted stormwater outfalls. The Final Permit establishes effluent limits for total suspended solids, oil and grease, and pH at stormwater outfalls, except Outfall 013. Monthly monitoring will ensure that discharges are sampled in most years over a variety of storm events. The Final Permit also establishes new quarterly, routine monitoring at a subset of electrical vaults and additional monitoring for all vaults. *See* Responses to Comments I.3.5 and I.3.6. The comment does not explain how the monitoring frequency proposed in the Draft Permit is insufficient to respond to any potential impacts from climate change nor does it offer examples of conditions or monitoring requirements that would be more appropriate to address these impacts.

In addition to stormwater limits and monitoring requirements, the Final Permit requires that the Permittee develop and implement stormwater best management practices (BMPs) designed to reduce or prevent the discharge of pollutants in stormwater, including preventative maintenance programs, soil and erosion controls, and runoff management. These requirements are consistent with EPA's most recent Multi-Sector General Permit (MSGP) for stormwater associated with industrial activity. The implementation of BMPs must be documented in the stormwater pollution prevention plan (SWPPP), which includes requirements for additional quarterly inspections of stormwater outfalls and vaults. Based on sampling and quarterly inspections, the Permittee may be required to amend the SWPPP to reflect changes in activities that have a significant effect on the potential for the discharge of pollutants to Cape Cod Bay, including changes necessary to address flooding that occurs from the increased frequency and severity of storm events. The Agencies have determined that these limits and conditions are sufficient to ensure that any potential impacts from increased storm severity or frequency to the discharge of pollutants authorized by the NPDES permit are adequately addressed by the Final Permit. In addition, the Final Permit does not authorize the discharge of stormwater associated with construction activities such as demolition of plant structures and buildings. *See* Parts I.B and I.H.6 of the Final Permit ("Unauthorized Discharges") and Condition 4 of MassDEP's Water Quality Certificate. The Permittee must either seek a modification to its Final Permit or coverage under another NPDES permit to discharge pollutants in stormwater associated with construction activity. *See also* Response to Comment IV.5.1.

The comment requests that the Agencies consider potential sources of contaminants from buried and underground piping and tanks that could be impacted by sea level rise and rising groundwater tables. According to the comment, this infrastructure could become even more vulnerable to saltwater corrosion as saltwater intrusion increases the salinity of the groundwater. The comment requests that the Final Permit include "periodic monitoring of buried and underground pipes and tanks that carry non-radiological contaminants" and that such monitoring be coordinated with the Massachusetts Department of Public Heath (MassDPH). The comment does not explain how buried or underground pipes and tanks would result in discharges to surface waters or what non-radiological pollutants should be regulated. The permit includes routine monitoring at vaults and authorized outfalls that may capture potential sources of contamination from buried or underground pipes to the extent that these sources discharge from one or more authorized outfalls. The integrity of buried piping and tanks may also be regulated under other programs, including RCRA and NRC requirements. In addition, the Final Permit does not authorize the discharge of dewatering from pipelines and/or tanks that are being dismantled during decommissioning. *See* Parts I.B and Part I.H.6 of the Final Permit ("Unauthorized Discharges") and Condition 4 of MassDEP's Water Quality Certificate. The Permittee must either seek a modification to its Final Permit or coverage under another NPDES permit to discharge pollutants from the dewatering of pipelines and tanks. *See also* Response to Comment IV.5.1.

Beyond the NPDES permit, the Nuclear Decommissioning Citizens Advisory Panel (NDCAP) is an additional resource for raising concerns about the decommissioning of PNPS. Finally, the NRC's Decommissioning Planning Final Rule, 76 Fed. Reg. 35,512 (June 17, 2011), also requires licensees to conduct their operations to minimize the introduction of residual radioactivity into the site, which includes the site's subsurface soil and groundwater.

The comment also addresses Outfall 013, which has no monitoring requirements associated with it. The Agencies address the commenter's concerns about Outfall 013 in more detail in Response to Comment I.3.5. In the Fact Sheet, the Agencies acknowledged Outfall 013 and proposed to authorize stormwater discharges from it, but proposed no effluent limits, for a number of reasons, *see* Fact Sheet at 29, none of which the comment disputes. The comment does not provide any other specific explanation why the Agencies must establish effluent limits or monitoring requirements for Outfall 013, except to generalize that climate change will lead to more intense storm events during which stormwater discharges from Outfall 013 may occur. The Agencies have added Outfall 013 to the Final Permit but have not established any numeric effluent limits. The non-numeric, technology-based effluent limitations at Part I.C of the Final Permit are designed to minimize the discharge of pollutants in stormwater discharges associated with industrial activity at PNPS, including in the event of stormwater discharges from Outfall 013. Moreover, as the Agencies noted in the Fact Sheet, the drainage area for Outfall 006 is similar to that for Outfall 013 and the required sampling for Outfall 006 is therefore expected to provide an adequate characterization of stormwater discharges from both outfalls. *See* Fact Sheet at 29.

According to the comment, understanding how decommissioning and site cleanup influence contamination of Cape Cod Bay will become more critical because cleanup or management of non-radiological contaminants resulting from disturbed soils or demolished structures on the site

are not managed by decommissioning and EPA is responsible for ensuring that non-radiological contamination present on-site does not flush into water sources over time. The Agencies note that the comment does not request any specific changes to the Draft Permit limits or conditions. As explained above, the Final Permit establishes BMPs and requires that the Permittee develop and maintain a SWPPP to document the implementation of BMPs, including amending the SWPPP to address changes that could result in a significant effect on the potential to discharge pollutants to Cape Cod Bay. In addition, Part I.B of the Final Permit does not authorize discharges of pollutants in stormwater associated with construction activity or other specific discharges that may be associated with activities performed during decommissioning (e.g., pipeline and tank dewatering, discharge of spent fuel pool water). *See* Response to Comment IV.5.1. In accordance with Parts II.D.1.a and II.D.1.b of the Standard Conditions of the Final Permit, the Permittee must report any planned physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants or which could result in noncompliance with permit requirements. *See also* 40 C.F.R. § 122.41(*l*); 314 CMR 3.19(20)(c). If the Permittee expects to discharge these pollutants in the future, it will need to seek a modification of the Final Permit or authorization under another permit (e.g., EPA's Construction General Permit (CGP)). *See* Final Permit Parts I.B and I.H.6 and Condition 4 of MassDEP's Water Quality Certificate. The CGP requires appropriate stormwater controls (*e.g.*, buffers, perimeter controls, storm drain inlet protection) to minimize stormwater discharges of construction-related pollutants. The Agencies may also request additional information to determine if cause exists to modify or revoke and reissue the Final Permit, if necessary, to address new sources of contamination in the future. *See* Final Permit Part II.A.3; *see also* C.F.R. § 122.41(h); 314 CMR 3.19(8).

Finally, the comment requests that decommissioning and site decontamination be completed and all NPDES permits be terminated by 2030, after which time no further discharge of pollutants into Cape Cod Bay and the groundwater on-site should be allowed to continue. The CWA does not dictate when decommissioning and site decontamination must be completed, and the Final Permit does not impose a deadline for decommissioning or termination of the permit.[10] The Final Permit ensures that discharges from the site comply with applicable water quality requirements. In addition, permit termination may not necessarily be appropriate for all facilities that cease operating. Some facilities that are no longer operating but have NPDES Permit coverage, continue to require individual or general permit coverage due to residual pollutants being discharged in stormwater. For example, the former BioEnergy wood-chip fired power plant in West Hopkinton, NH was a shut down in 2009, but residual pollutants in stormwater runoff required the site to obtain coverage, in that case under EPA's MSGP for its stormwater discharges. The law requires the owner or operator of the facility to obtain authorization under the NPDES program and/or the Massachusetts Clean Waters Act as long as there are point source discharges from the site to Cape Cod Bay.

2.3 EPA Should Require Entergy to Mitigate the Past and Continuing Harm Caused by PNPS's Water Intake and Pollutant Discharges

[10] The PSDAR submitted by Holtec, which proposes the DECON decommissioning option, provides a schedule that plans for partial site release (except ISFSI) in early 2025 and license termination in 2063. *See* AR-696 at 17.

The draft permit should require Entergy to fund a mitigation account for environmental restoration and monitoring work in Cape Cod Bay and nearby estuaries, by local public and NGO groups. This account should be a robust dedicated fund used to mitigate the cumulative impacts of PNPS operations since 1972 and for a period after decommissioning ends. Attachment D to the draft permit reads that PNPS's water intake has removed and killed billions of aquatic organisms in Cape Cod Bay. In addition to direct impacts, the loss of aquatic organisms have indirect, ecosystem-level effects, including disruption of aquatic food webs,[20] disruption of nutrient cycles and other biochemical processes, alteration of species composition and overall levels of biodiversity, and degrade the overall aquatic environment. It has been assumed that 100% mortality occurs for entrained zooplankton at PNPS, especially when the cooling water temperature at discharge exceeds 84.2ºF (29ºC) and coincides with chlorination.[21] Entergy's current NPDES permit allows PNPS to continuously chlorinate each service water system.[22] It appears that this chlorinated water is mixed with the condenser discharge cooling water and a review of discharge monitoring reports from 2012-2014 shows that often the discharge temperature is above 84ºF.[23] Thus, 100% of the zooplankton can be assumed to have suffered mortality over the years.

Impacts to the marine environment by PNPS are clear and warrant dedicated monitoring and mitigation until decommissioning is completed (up to 60 years post shutdown). The fund should be used to address:

- Cumulative impacts of past/continued use of PNPS's CWIS, including thermal discharges, on fish eggs/larvae, adult fish, shellfish, crustaceans and other aquatic life.
- Cumulative impacts on the economy, including commercial and recreational uses in Cape Cod Bay, and on recreational, social, and economic interests of the region.
- Restoration and monitoring work in Cape Cod Bay and nearby estuaries to offset PNPS's massive destruction of marine resources and disruption of the local economy.

20 E.g., PNPS entrainment potentially influences the food chain. Entergy is not required to monitor/report entrainment rates for copepods and other planktonic resources important to North Atlantic right whales and other species. Right whale distribution is directly linked to planktonic resources. See: Memo to JRWA, Kingston, MA from Charles "Stormy" Mayo, Ph.D., Senior Scientist, Director, Right Whale Habitat Studies, Senior Advisor, Whale Disentanglement Program, Center for Coastal Studies, Provincetown, MA. Apr. 12, 2012.

21 This does not include mechanical damage. Bridges W.L. and R.D. Anderson. A brief survey of Pilgrim Nuclear Power Plant effects upon the marine aquatic environment. In: Observations on the ecology and biology of western Cape Cod Bay, Massachusetts. 1984. Eds, Davis, J.D. and D. Merriman. Springer-Verlag, p. 65-76.

22 Permit No. MA 003557, A.1.(a)(2)

23 For example, in Jun. 2011, the temperature was 97.7ºF (36.5ºC) and in Jul. 2010, the temperature 99ºF (37.2ºC) as reported in Entergy's Discharge Monitoring Reports. See Entergy's Jun. 2011 DMR and Jul. 2010 DMRs.

Response to Comment 2.3

JRWA comments that the permit should include a requirement for Entergy to fund a mitigation account for environmental restoration and monitoring work in Cape Cod Bay and nearby estuaries, in light of the impact of PNPS' operation, both since 1972 and until the facility is ultimately decommissioned. The comment does not, however, identify any provision under the federal CWA, the Massachusetts Clean Waters Act, or their respective implementing regulations as requiring such a permit condition. Nor does the comment identify any other NPDES permits that include any such condition. Notably, in responding to public comments on the § 316(b)

Final Rule, EPA disagreed with comments that requested additional permit requirements based on organism losses that occurred in the past. *See* Final Rule RTC at 108.

EPA also noted the potential difficulty in accurately calculating the effects of such past losses on current abundances of organisms and thereby determining an appropriate level of response. *Id.* Furthermore, in general, as part of a negotiated settlement to address past violations of a NPDES permit, the Agencies may require a Permittee to conduct supplemental environmental projects, which could include efforts to mitigate past environmental harm as described in the comment, but such a requirement occurs in the context of an enforcement action to resolve permit violations, not a permitting action.

The Agencies do not disagree with the comment that PNPS's cooling water intake has removed and killed billions of aquatic organisms in Cape Cod Bay since 1972 and indirectly impacted the aquatic environment as a result. Indeed, the Agencies closely examined environmental impacts associated with the facility's intake and discharge of cooling water in determining the appropriate BTA for the facility under CWA § 316(b) and temperature variance under § 316(a), as well as other effluent limitations. EPA's assessment included the assumption that organisms entrained through the cooling system suffered 100% mortality, including zooplankton. See Fact Sheet Attachment D at 15. The past withdrawal and discharge of cooling water, however, occurred in the context of a permitted activity sanctioned by the Agencies under previous permits issued pursuant to federal and state law. The comment does not allege that the impacts resulted from violations of past permits.

For all of these reasons, the Agencies do not agree that including the requested mitigation fund permit condition in the Final Permit is appropriate here. As to the period after May 31, 2019, when the facility stopped generating electricity, the Final Permit contains more stringent flow and temperature limits that are expected to coincide with a roughly 92% reduction in losses from impingement and entrainment and 98% reduction in heat load. These reductions in flow and temperature will significantly reduce the impacts from PNPS' withdrawals and discharges. (See Part III – 2.5)

Although Entergy had funded mitigation efforts in the past, their NPDES permit did not specifically require mitigation projects. Further, impacts to aquatic species will be significantly decreased under the Final Permit, which includes limits and conditions consistent with operation of PNPS after terminating its generation of electricity.

2.4 EPA Should Revise How Pollutant Concentrations are Reported in DMRs

It appears that under the current NPDES permit reporting program, only some pollution discharges are reported in Entergy's monthly Discharge Monitoring Reports (DMRs). For example, pH results for outfalls 001 and 002 have not been included in Energy's past DMRs. The draft permit also requests only select results be recorded and reported in DMRs (e.g., maximum daily flow of all thermal and non-thermal backwashes for outfall 002). Instead, the permit should clearly and explicitly require all effluent limits be recorded and reported in DMRs

to ensure transparency and provide information for enforcement purposes. Also, a more accessible system for monitoring results and routine filings to EPA should be provided and maintained on Entergy's or its consultant's website. Data tracking should be provided so that cumulative impacts and chronic issues can be rapidly addressed. The NetDMR system should be made available for public tracking of monitoring efforts and conditions.

Response to Comment 2.4

The requirements for recording and reporting of monitoring results at 40 C.F.R. § 122.48(b) state that "required monitoring including type, intervals, and frequency sufficient to yield data which are representative of the monitored activity including, when appropriate, continuous monitoring." Reporting may be no less frequent than specified in § 122.44(i), which specifies that requirements to report monitoring results shall be established on a case-by-case basis with a frequency dependent on the nature and effect of the discharge, but in no case less than once a year. *See* 40 C.F.R. § 122.48(c).

The Final Permit includes minimum and maximum pH limitations Outfalls 002, 010, 012, 004, 005, 006, 007, 011, and 014 and requires monitoring no less than once per month. The 1991 Permit required that the effluent pH not vary by more than 0.5 standard units from that of the intake water for Outfalls 001 and 002. However, the permit did not specify a pH range or how frequently the effluent pH should be measured and reported for these outfalls. The Permittee has not reported intake or effluent pH levels for these outfalls on their DMRs. Consistent with reporting requirements at 40 C.F.R. § 127 (Subpart B), the Permittee is now required to report the minimum and maximum monthly pH values based on this monitoring. See Parts I.A.2, I.A.2, I.A.3, I.A.4, I.A.5, I.A.8, and I.A.9 of Final Permit.

The monitoring program in the Final Permit specifies the frequency and type of sample required for each listed parameter. The Permittee must report the average monthly (where applicable) and maximum daily observed values in its monthly discharge monitoring reports (DMRs), which are used to monitor compliance with permit limits and conditions. The Permittee is obligated to monitor and report sampling results to EPA and the MassDEP consistent with the time frames specified in the permit, typically on a monthly or quarterly basis. The data from NetDMR are periodically uploaded to EPA's ECHO database, where monitoring results can be accessed by the public at https://echo.epa.gov/. Interested parties may also request DMR data from EPA.

2.5 2012 Relicensing and Future Use

The U.S. NRC extended Entergy's operating license for PNPS in 2012 despite a NPDES permit that had expired in 1996.[24] During relicensing, the NRC failed to complete several environmental assessments (e.g., climate change impacts, ESA section 7 consultations) that are prerequisite to relicensing, making the NRC's environmental impact statement for the relicensing invalid.[25] EPA and MassDEP should have ensured that PNPS was not relicensed until a valid, current NPDES permit was in place. The lack of oversight by EPA and MassDEP of PNPS's CWIS operations and failure to ensure that relicensing did not occur until the NPDES permit was reissued was an egregious failure of the agencies' regulatory duties. Although the draft NPDES permit now in 2016 is stronger in some ways, it does nothing to mitigate these failures. At a minimum the new

permit should prevent continued use of Cape Cod Bay prior to any re-fueling (scheduled for spring 2017), and then focus on site decommissioning and decontamination post power production.

The final permit should specify that the permit cannot be transferred to another company (or the same company) for re-use of the site for commercial/industrial purposes, especially without a public review process. In 1999, Entergy inherited PNPS's NPDES permit from Boston Edison, and subsequently did not follow all permit conditions. This new permit should not automatically transfer as the previous permit was in 1999.

[24] As well as pending citizen challenges referred to NRC administrative appeal board, and pressure from the host community, citizens, legislators and organizations to not relicense PNPS. For example, see: Cape Cod National Seashore Advisory Commission letter to NRC. March 30, 2012. Re: Pilgrim Nuclear Facility <http://www.pilgrimcoalition.org/wpcontent/uploads/2012/05/03302012-NatSeashoreAdvisoryCom-to-NRC.pdf>
[25] JONES RIVER WATERSHED ASSOCIATION PETITIONS FOR LEAVE TO INTERVENE AND FILE NEW CONTENTIONS UNDER 10 C.F.R. § 2.309(a), (d) OR IN THE ALTERNATIVE 10 C.F.R. § 2.309(e) and JONES RIVER WATERSHED ASSOCIATION AND PILGRIM WATCH MOTION TO REOPEN UNDER 10 C.F.R. § 2.326 AND REQUEST FOR A HEARING UNDER 10 C.F.R. §2.309(a) and (d) IN ABOVE CAPTIONED LICENSE RENEWAL PROCEEDING. March 8, 2012.

Response to Comment 2.5

The comment points to what it views as several shortcomings of the NRC licensing process in 2012 and states that the Agencies should have ensured that NRC did not relicense PNPS until the Agencies re-issued the NPDES permit. The comment recommends that the Final Permit prevent continued use of Cape Cod Bay prior to any re-fueling and then focus on regulating discharges during the decommissioning process. Finally, the comment requests that the permit prohibit transfer of the permit.

The 2012 relicensing process referred to in the comment was an administrative proceeding before the NRC and is not at issue in this permit proceeding. Even if the comment were correct that EPA and MassDEP had a duty to ensure that NRC not approve the relicensing until the Agencies reissued the NPDES permit,[11] it is not clear what remedy, if any, would be available in the current proceeding to undo that relicensing, and the comment offers no explanation. The comment about use of Cape Cod Bay prior to any re-fueling is moot because the final re-fueling was completed in 2017 and PNPS' NRC license no longer authorizes it to re-fuel the nuclear reactor. 10 C.F.R. § 50.82(a)(2); *see also* Letter from Louise Lund, NRC, to Brian Sullivan, Entergy Nuclear Operations, Inc. (July 5, 2019) (noting that Entergy's certification that the fuel was permanently removed from the reactor has been docketed). As mentioned earlier in the response to comment I.2.1, this Permit has been in process for several years, with many delays caused by a variety of circumstances. As a result, the Final Permit focuses on regulated discharges following the plant's cessation of electricity generating operations. The Final Permit does not, however, authorize discharges of stormwater associated with construction activity and certain other discharges that may be related to decommissioning (e.g., pipeline and tank

[11] The NPDES permit for PNPS was administratively continued in 1996, meaning that PNPS did possess a valid NPDES permit at the time of the relicensing. *See* 40 C.F.R. § 122.6; Fact Sheet at 6.

dewatering) or to dismantling and demolition of plant buildings and structures. *See* Parts I.B and I.H.6 of the Final Permit and Condition 4 of MassDEP's Water Quality Certificate.

The Final Permit includes effluent limitations and CWIS requirements to ensure that the continued intake and discharge of water from and to Cape Cod Bay after shutdown (consistent with activities disclosed by Entergy at the time of the Draft Permit) will meet the requirements of the CWA and any more stringent surface water quality standards for Massachusetts, including, to the extent applicable to the permitting decisions at issue, climate change impacts and Section 7 consultation with the Services for any listed species in the action area. *See, e.g.*, Responses to Comments in Sections I.2.2, I.4.1, and I.5.5.

Entergy was the Permittee at the time the Agencies issued the Draft Permit. Entergy announced in 2018 that it would seek to sell the site and seek approval from the NRC to transfer its license to another entity to oversee the decommissioning process. The comment requests that transfer of this permit be prohibited. EPA regulations recognize, however, that a permitted facility may change ownership during the term of a NPDES permit and, in such a case, provide for the transfer of a permit after notice to the permitting authority. 40 C.F.R. § 122.41(*l*)(3). For instance, the automatic transfer of permits is authorized where the current permittee notifies the permitting authority at least 30 days in advance of the proposed transfer date and the notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage and liability between them. 40 C.F.R. § 122.61(b). A permit may also be transferred to a new owner or operator through a minor modification of the permit after notice to the permitting authority. 40 C.F.R. § 122.62(b)(2). Neither an automatic transfer nor a transfer pursuant to a minor modification requires public participation. *See* 40 C.F.R. §§ 122.61, 122.62, 122.63. Similarly, MassDEP's regulations at 314 CMR 3.19(25)(c) allow for automatic transfers of surface water discharge permits.

According to the comment, upon transfer of the NPDES permit for PNPS from Boston Edison to Entergy in 1999, the new owner failed to comply with all permit conditions, and that, consequently, the Final Permit should prohibit transfer. Under the EPA regulations discussed above, however, the responsibility and liability for the NPDES permit transfers to the new owner upon transfer of the permit. Thus, any violation of effluent limitations or permit conditions by the new owner is subject to enforcement action explained in Part II.A (Duty to Comply) and may incur the same penalties. *See* Final Permit Part II.A.1. In other words, the new owner has a duty to comply with the permit, and many remedies for any noncompliance are available, including enforcement, permit modification, permit revocation and reissuance, permit termination, or denial of a permit renewal application. 40 C.F.R. § 122.41(a). Moreover, assuming the comment's assertion is correct that Entergy failed to live up to its responsibilities under the permit following the transfer from Boston Edison, it is unclear why it would necessarily be beneficial for Entergy to remain the permittee of record.

In any event, EPA regulations at §§ 122.61, 122.62, and 122.63, and MassDEP regulations at 314 CMR 3.19(25)(c), specify the conditions under which the transfer of an NPDES permit may be achieved through minor modification of the permit or automatically (*i.e.*, without public notice). The Agencies do not agree that the comment's concern about subsequent permit compliance provides a basis under the regulations to prohibit any future transfer of the permit.

Moreover, on June 18, 2019, pursuant to 40 C.F.R. § 122.61.(b), Entergy notified EPA by letter of a pending transaction targeted to occur no later than December 31, 2019, that would transfer PNPS to Holtec International ("Holtec"). *See* AR-732. The letter also included a written agreement between the existing and new permittees to transfer permit responsibility, coverage, and liability to Holtec on the closing date. On August 23, 2019, Entergy notified EPA that the closing would occur on August 26, 2019, effective at 11:59 p.m. *See* AR-727. Consequently, the NPDES permit was transferred to Holtec automatically on that date and time. On August 22, 2019, the NRC approved the transfer of the operating license from Entergy to Holtec. *See* AR-759. The NRC's decision to transfer the license to Holtec is being contested by the Commonwealth of Massachusetts, and MassDEP has included a note in the Final Permit to reflect the fact and the condition upon which it has joined the Final Permit. With that caveat being noted, EPA has changed the name of the authorized permittee from "Entergy Nuclear Generation Company" on the Draft Permit to "Holtec Pilgrim, LLC" on the Final Permit to reflect the automatic transfer of the NPDES Permit effective August 26, 2019.

2.6 Increased EPA Engagement

We are not aware of EPA or MassDEP programs or efforts to address the significant threat posed by nuclear waste fuel stockpiles. EPA and MassDEP must become more fully engaged in this issue despite the long standing policy to defer to NRC, which does not yet have a long-term program for waste stockpiles, but rather defers to DOE which has not established a clear policy or practice for handling the tons of nuclear waste that threatens our environment and more. Although DOE is working on a "consent-based siting" plan, hundreds of tons of enriched nuclear waste is stored close to the shoreline at PNPS, and will continue to be in that location for an unknown period of time. At this location, there is high risk of salt water corrosion or storm damage. Efforts to manage ice, snow, and debris build-up is likely to include chemical, as well as mechanical, means. Run-off from the waste storage facility will ultimately end up in Cape Cod Bay.

Even though NRC is charged with handling radiological safety, EPA and MassDEP should address related issues such as siting and maintenance to ensure the potential for environmental impact is minimized. Here, we ask that EPA and MassDEP take a stand to require storage of nuclear waste, both spent nuclear fuel and stranded Greater-than-Class-C waste, to be stored beyond the reach and level of climate change impacts. Entergy has multiple options and should be required to engage in the safest handling of nuclear waste and avoid of any need for a permit to pollute. This stockpile of nuclear waste should not be allowed to impact the marine environment. EPA and MassDEP should issue an order to move it or to formally address management activities.

Response to Comment 2.6

Siting decisions about nuclear waste at this site are outside the scope of the CWA permit. As the commenter correctly notes, this is DOE's responsibility and is not a case of EPA deferring to the NRC. The Final Permit specifies that the discharge of radioactive materials must be in accordance with NRC requirements. *See* Final Permit at Part I.A.23; *see also* Response to Comment III.7.0.

To the extent that any pollutants associated with any nuclear waste storage area on the site and regulated under the CWA may be carried into the receiving waters by stormwater, the permittee would address such contaminants in its SWPPP and implement best management practices (BMPs) to reduce or prevent their discharge. BMPs designed to reduce stormwater discharges at the Facility must be documented in the Facility's SWPPP. *See* Parts I.D.1 and I.D.2 of the Final Permit. See Responses to Comments I.2.2 and IV.5.1.

3.0 Comments Specific to Draft Permit Effluent Limitations

3.1 Conditions and Effluent Limitations Applicable to Outfall 001 Must Be Revised (Discharge of Non-Contact Cooling Water to Cape Cod Bay)

Part 1.A: Permit effective date until shutdown

We support the draft permit's reduction in maximum daily flow rate from 510 million gallons per day (MGD) to 447 MGD until May 31, 2019 or before, and the preservation of flow limits despite requests by the permittee that these limits be removed for outfall 001.

The temperature rise (delta-T) in the draft permit is the same as the current permit (32°F). While we do not support any thermal pollution discharged into Cape Cod Bay, we at least recommend that this limit be reassessed in order to be granted a variance under CWA § 316(a) and we are strongly opposed to any increase in this limit in the final permit.

The delta-T limit is based on the CWA § 316(a) variance that was granted in the current 1991 permit. However, this variance is based on Entergy's outdated and flawed Demonstration Report. Much of information from the 1975 Demonstration Report was seemingly carried over to the updated 2000 report, with some exceptions. The 2000 Demonstration Report:

1) relies on outdated and incomplete data -- studies are mostly from the 1970s and the newer 1995 study was cut short and meaningful data were only collected for 2.5 days.
2) The 1975 report states that there are no rare and endangered species in the vicinity of PNPS, which is false (e.g., the entirety of Cape Cod Bay has recently been deemed critical habitat for critically endangered North Atlantic right whales); and the 2000 report does not discuss endangered species at all.
3) Representative Species (chosen due to biological importance, whether they are affected by operations, and commercial/recreational interest) are likely different 20 years later.
4) Additive and synergistic effects of thermal pollution combined with other existing issues in Cape Cod Bay was not assessed (e.g., invasive species, other pollution, and the warming of our oceans due to global warming was not considered at all).

Thermal pollution harms marine life and poses a serious threat to ecological health and individual species.[26] An average annual increase in water temperature of only about 1.8ºF (1ºC)

can have significant effects on coastal marine community dynamics by impacting a variety of biological and ecological processes.[27] According to one study used in Entergy's 2000 Demonstration Report, hundreds of acres of Cape Cod Bay could increase by at least 1°C due to the thermal discharge. In its Demonstration Report, Entergy did not adequately demonstrate how this temperature increase would affect the development/survivorship of ichyoplankton or affect the reproduction of adult fish in the long-term.[28] Not only is the Demonstration Report flawed for the reasons mentioned above, but Entergy did not adequately show that no significant impacts occur due to the heated discharge – not in 2000, and certainly not today.

Entergy has to reapply for its variance and has chosen to make the case for a variance "retrospectively"– showing that monitoring data collected during the plant's operations show no evidence of appreciable harm to balanced, indigenous populations attributable to the thermal discharge. This is in contrast with making the case "prospectively," where an extensive modeling of the thermal plume would be required. Entergy should be required to prospectively prove no harm and new modeling of the plume should be required.

Cape Cod Bay is different than it was when the studies in Entergy's Demonstration Report were carried out. Reassessing impacts from PNPS's thermal discharge in light of global warming, the recent increase in average temperatures in Cape Cod Bay,[29] among other more current information would be appropriate. Until this is done, we strongly recommend that the variance be denied.

CWA § 316(a) provides a mechanism for a variance from applicable thermal water quality standards where the permittee is able to demonstrate to EPA's satisfaction that the thermal effluent limit that would otherwise apply would be "more stringent than necessary to assure the projection [sic] and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on the body of water into which the discharge is to be made[.]" 33 U.S.C. § 1326(a). Such demonstration must take into account "the cumulative impact of [the discharger's] thermal discharge together with all other significant impacts on the species affected[.]" 40 C.F.R. § 125.73(a). Further, the discharger's variance request must show:

(i) That no appreciable harm has resulted from the normal component of the discharge (taking into account the interaction of such thermal component with other pollutants and the additive effect of other thermal sources to a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge has been made; or
(ii) That despite the occurrence of such previous harm, the desired alternative effluent limitations (or appropriate modifications thereof) will nevertheless assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made.

Id. § 125.73(c)(1). EPA guidance emphasizes the need for current information to support a renewed § 316(a) variance request.[30] The granting of a variance should not be automatic; rather, "the burden imposed by CWA section 316(a) is a stringent one[.]" In Re Dominion Energy Brayton Point, L.L.C., 12 E.A.D. 490 (E.P.A. Feb. 1, 2006).

The permit record does not support EPA's proposed renewal of PNPS's § 316(a) thermal variance. First, it is apparent from the § 316(a) Determination included as Attachment A to the Fact Sheet that the limited and outdated data relied upon by EPA in its decision to grant a renewed § 316(a) variance does not meet the "stringent" standard imposed by the Clean Water Act. Much of the data relied upon by EPA were derived from decades-old studies. For example, all of the studies regarding benthic fauna relied upon by MassDEP and EPA (including studies of the commercial lobster fishery, benthic fish assessments by otter trawl, and near-shore benthic assessments via shrimp trawl) occurred during the 1970's and 1980's, and the MassDEP Marine Organisms Impact Assessment does not mention a single benthic fauna study that is less than 25 years old. Further, the bulk of the inshore fish assessments relied upon by MassDEP and EPA are from the 1970's and 1980s, and the more recent studies (Gill Net studies at PNPS, which apparently continued "through the early 1990s") found "large differences . . . in pelagic species caught in the gill net deployed in the direct path of the thermal discharge[.]" *Id*. at 18. Prior to considering whether a § 316(a) variance is appropriate for PNPS, EPA should require the discharger to obtain new relevant data to support its assertion that a balanced, indigenous community of shellfish, fish and wildlife has been and will continue to be preserved in western Cape Cod Bay.

Second, the § 316(a) Determination does not adequately take into account "the cumulative impact of [PNPS's] thermal discharge together with all other significant impacts on the species affected[.]" 40 C.F.R. § 125.73(a). Although the § 316(a) Determination pays brief lip service to the "cumulative impact" of PNPS's thermal discharge, id. at 8-9, the language used by EPA throughout its § 316(a) Determination makes clear that the agency was considering the effects of PNPS's thermal plume in isolation. See, e.g., *id*. at 9 ("There have not been detected any changes in the zooplankton community that could be attributed to the thermal plume."); *id*. at 10 ("There has been no evidence of impaired/reduced reproduction in fish resulting from exposure to the thermal plume."). EPA should revise its § 316(a) Determination after performing the requisite cumulative impacts analysis. This is especially relevant given the increasing temperatures in Cape Cod Bay due to climate change, which are only compounded by PNPS's thermal discharge. Indeed, as MassDEP's Marine Organisms Impact Assessment[31] notes, "there has been a statistically-significant warming trend in both the intake and in surface waters in Cape Cod Bay over the 37-year period of record." *Id*. at 6.

Third, in its § 316(a) Determination EPA either minimized or ignored certain impacts to aquatic communities discussed elsewhere in the permit record which, taken together, indicate that there has been and will continue to be appreciable harm to the community of shellfish, fish and wildlife in Western Cape Cod Bay. For example, EPA states that there are no rare and endangered species in the vicinity of PNPS, which is false; the entirety of Cape Cod Bay has recently been designated as critical habitat for critically endangered North Atlantic right whales. Further, the Fact Sheet does not acknowledge that MassDMF scientists investigating the abundance of Irish moss in the vicinity of PNPS "estimated that about 10% of the test area (one of the harvest zones) had been negatively affected by the PNPS discharge." MDEP Marine Organisms Impact Assessment at 12.

In sum, the permit record - including the Fact Sheet, PNPS's § 316(a) Demonstration Report,

MassDEP Marine Organisms Impact Assessment, and documents referenced therein - do not support the conclusion that PNPS's thermal discharge, in combination with other pollutant discharges and thermal impacts, results in "no appreciable harm" to the aquatic community of western Cape Code Bay. Thus, a renewed CWA § 316(a) variance is inappropriate at this time, and PNPS should be required to comply with all applicable thermal effluent limitations pursuant to CWA § 301.

Page 8 of EPA's Fact Sheet states, "the discharge temperature is almost entirely a function of the intake water temperature." EPA also asserts that that effluent temperature and delta-T have never exceeded required limits. However, Entergy has shut PNPS down (or powered down) on several occasions due to the incoming water being too warm. For example, on August 9, 2015, PNPS's discharge water was very close to exceeding the permitted limit of 102ºF (reaching 101.2ºF), and incoming water temperature exceeded the NRC's permitted limit of 75ºF – forcing the plant to power down. As an increasingly warming climate heats the water temperature of our oceans, the water in Cape Cod Bay will continue to periodically (and likely more frequently) become too warm for PNPS's cooling system. EPA should monitor the discharge temperature and delta-T limits with more scrutiny in the future to ensure all limits are met, and it should be prepared to impose enforcement actions when they are not.

Temperature readings should be electronic and continuous, and public access to real-time monitoring data should be provided online.

We support EPA and MassDEP efforts to clarify how delta-T is calculated. The current NPDES permit is poorly written and this provision is unclear and allowed Entergy to provide less than transparent DMR reporting since at least 1994. It is now understood that Entergy will be required to report the "highest level recorded" for temperature each month in the DMRs – for both the daily maximum discharge temperature and delta-T. The draft permit should require the DMRs to explicitly state this methodology and how its applied in each instance.

For effluent limits related to Total Residual Oxidants (TRO; to measure chlorine dosing), in the current permit TRO is reported in mg/L while the new permit limits are reported in ug/L. There is also some inconsistency throughout the draft permit – some TRO limits are reported in ug/L (e.g., outfall 001) while some are reported in mg/L (e.g., outfall 002). We request that the draft permit be modified by keeping all units consistent. It appears that the TRO limit has been lowered for outfall 001 to 0.0075 mg/L (7.5 ug/L) as a monthly average and 0.013 mg/L (13 ug/L) daily maximum, and we support this reduction. EPA's Fact Sheet explains that the daily maximum for TRO has been exceeded on three occasions (but the monthly average limit has not been exceeded). We support the reduction, but EPA should ensure all limits are met and should be prepared to impose enforcement actions when they are not.

Oil and Grease (O&G) limits do not appear in the current 1991 permit, and we support the inclusion of these limits in the new draft permit. However, we are unclear why numeric limits are not included (only "report" is listed in the requirements). While the associated footnote states that EPA's testing method 1664A is to be used, which has a minimum level of quantification of 5 mg/L, it is still unclear why a specific limit is not included. EPA should include a specific limit for O&G for outfall 001, or at least explain why one is not included.

It appears that pH limits are more stringent (from 0.5 standard units to 0.2 standard units) and there is now specific monitoring requirements (weekly) added to the new permit. We support these changes.

[26] Azmi S., et al. 2015. Monitoring and trend mapping of sea surface temperature (SST) from MODIS data: a case study of Mumbai coast. Environmental Monitoring and Assessment. 187:165; Oviatt C.A. 2004. The changing ecology of temperate coastal waters during a warming trend. Estuaries. (27)6: 895-904.
[27] Including metabolic rates, population growth, distribution and abundance of prey, including phenology and productivity, and population connectivity; Oviatt C.A. 2004. The changing ecology of temperate coastal waters during a warming trend. Estuaries. (27)6: 895-904.; Hoegh-Guldberg O., et al. 2010. The impact of climate change on the world's marine ecosystems. Science. (328): 1523-1528.
[28] Letter to EPA from MassCZM, Jun. 27, 2000. Re: MCZM review of the Entergy-Pilgrim Station §316 Demonstration Report.
29 As outlined by EPA in Attachment C to the draft permit.
[30] Memorandum from James Hanlon, Director, Office of Wastewater Management, to Water Division Directors, Regions 1 – 10, Implementation of Clean Water Act Section 316(a) Thermal Variances in NPDES Permits (Review of Existing Requirements) (Oct. 28, 2008) (hereinafter, "Hanlon 316(a) Memo"), available at https://www3.epa.gov/region1/npdes/merrimackstation/pdfs/ar/AR-338.pdf.
[31] See Massachusetts Department of Environmental Protection's Assessment of Impacts to Marine Organisms from the Pilgrim Nuclear Thermal Discharge and Thermal Backwash, included as Attachment C to the Fact Sheet.

Part 1.B: From shutdown until permit expires

After PNPS shuts down, scheduled to be no later than May 2019, the draft permit provides that flow rate for outfall 001 is reduced from 447 MGD to 11.2 MGD (average monthly) and 224 MGD (maximum daily) to support shutdown operations. We support this flow rate reduction, but there should be a date certain upon which withdrawals must end. The permit should outline what the 224 MGD will be used for.

We also support continued pH and O&G limits for discharges after shutdown. Since Entergy will be prohibited from chlorinating the water that is withdrawn to support shutdown operations, EPA has removed the TRO limits from outfall 001 after shutdown. We support prohibiting chlorination post shutdown and therefore the removal of TRO limits in the permit after that time.

Since 001 will no longer be used for cooling the main condenser after shutdown, the maximum daily temperature is reduced from 102°F to 85°F (and a monthly average is added = 80°F). Although we do not support any thermal discharge to Cape Cod Bay, we do not object to these reduced temperature limits. However, the delta-T limit, which is reduced from 32°F to 3°F, seems arbitrary and should instead be consistent with the MA SWQS's delta-T limit of 1.5°F. EPA also states in the Fact Sheet that it is unclear what will cause the 3°F increase in temperature, and at no point is cooling of the spent fuel pool mentioned in this section. In order to effectively set thermal limits in the final permit, EPA should clearly understand and outline which activities at PNPS will create thermal effluent at 001 and not set limits based on assumptions.

Response to Comment 3.1

The comment identifies issues with effluent limitations and conditions from the Draft Permit that apply prior to and following the cessation of power generation at PNPS (the "pre-shutdown" and "post-shutdown" limits, respectively). The Agencies have reviewed and considered comments on both the pre- and post-shutdown limits. However, as explained in the Introduction to this Responses to Comments, PNPS ceased generating electricity on May 31, 2019. Therefore, the permit conditions and effluent limitations from the Draft Permit specific to operation of the electric generation facility, which would have been effective prior to the shutdown date, are no longer applicable. For this reason, the Agencies have not included the pre-shutdown effluent limitations and conditions in the Final Permit. As such, we do not address the comments specific to the pre-shutdown limits in the Draft Permit except where a concern or issue about the pre-shutdown limit would also be relevant to the post-shutdown limit. The comment also requests public access to real-time, on-line monitoring database. The Agencies have already considered and responded to comments on the availability of monitoring data. See Responses to Comment I.2.4.

The comment supports the post-shutdown reduction in circulating water flow from 447 MGD to an average monthly flow of 11.2 MGD and maximum daily flow of 224 MGD to support shutdown operations, which represents a 97.5% reduction from the current permitted flow. PNPS ceased operations on May 31, 2019 and as such, no longer operates the circulating water pumps to withdraw cooling water for the condenser on a continuous basis. The Draft Permit authorized limited operation of the circulating water pumps not to exceed 5% of the time on a monthly basis, which results in flow limits of average monthly and maximum daily flow limits of 11.2 MGD and 224 MGD, respectively. These limits were based on pre-Draft Permit communications with Entergy about the anticipated need for circulating water after shutdown. During the comment period, Entergy provided additional explanation for running the circulating water pumps and clarified its need to operate a circulating water pump for up to 48 hours at a time, once each rolling 28-day period. Water withdrawn using the circulating water pumps will be used as dilution water in compliance with NRC regulations, for backwashing the condenser lines, and for fire protection. The reporting cycle for permit conditions is monthly, not every 28 days. EPA considered the request and determined that authorization to operate a circulating water pump for up to 48 hours during a single calendar month is appropriate for the reporting period while still allowing PNPS to fulfill its shutdown operational needs. Part I.C.4 of the Final Permit authorizes the Permittee to operate one circulating water pump at a time for up to 48 hours during a single calendar month. This change still limits the maximum daily flow to 224 MGD but could result in an average monthly flow up to 16 MGD (based on 28 days in February), which, although slightly higher than the 11.2 MGD monthly average limit proposed in the Draft Permit, still results in a 96% reduction in water withdrawals through the circulating water pumps as compared to the current permit. Thus, the difference between this limit and the average monthly limit proposed in the Draft Permit is relatively minor but maintains consistency with the facility's requirements under the NRC. Because the Final Permit includes a maximum daily flow limit of 224 MGD and limits the duration of operation to no more than 48 hours in a calendar month, the average monthly limit has been changed to an hours of operation limit and reporting requirement.

The comment requests that the Final Permit include a date certain upon which withdrawals must end and asks for more explanation about what the 224 MGD will be used for. Circulating water

flow is necessary to support shutdown operations for purposes other than cooling the spent fuel pool. Because the circulating water pumps are not connected to the spent fuel pool, this water will not be used for that purpose. According to Entergy, the circulating water is primarily used for dilution to meet the NRC's requirements for the liquid radiological waste disposal system and for fire protection purposes, as well as for backflushing the circulating water pump lines to manage biofouling. While PNPS has ceased generating electricity, it is not certain at this point how long post-shutdown activities that require use of the circulating pumps will last. For this reason, the Final Permit does not include a date certain upon which the use of the circulating water pumps must cease. The Agencies conclude that the proposed operation, which results in a 96% reduction in flow from the circulating water pumps will ensure that the impacts from impingement and entrainment are minimized consistent with § 316(b) of the CWA. *See* Response to Comment I.4.2.

The commenter reiterates that, while it does not support any thermal discharge to Cape Cod Bay post-shutdown, it also does not object to the more stringent maximum daily and average monthly temperature limits for Outfall 001 proposed in the Draft Permit. According to the commenter, however, the proposed delta-T limit (reduced from the previous permit's limit of 32°F to the Draft Permit's limit of 3°F) "seems arbitrary" and should instead be consistent with the MA SWQS's delta-T limit of 1.5°F. The commenter also states that EPA should clearly explain the source of the post-shutdown thermal effluent at Outfall 001 and "not set limits based on assumptions." In the Draft Permit, we proposed a delta-T limit of 3°F based on EPA discussions with PNPS staff about post-shutdown operating needs which indicated that the circulating water pumps "may be run for *more than just* cooling water." AR-521 (emphasis added); *see also* Response to Comment III.4.1. In other words, the information from the permittee at the time suggested that the circulating water pumps would be needed to supply water for cooling, among other possible uses, and that, consequently, the permittee would discharge heat from Outfall 001. Furthermore, PNPS staff indicated that this thermal component was likely to result in a delta-T under 3°F based on the permittee's projections for the facility. *See* AR-520. The Agencies proposed the 3°F delta-T limit based on these projections and because it would satisfy the requirements for a CWA § 316(a) variance. *See* Fact Sheet at 23-24. More specifically, the Agencies proposed that, since a limit of 1.5°F would be more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the receiving water (aka, the "BIP") and a limit of 32°F would assure the protection and propagation of the BIP, then a more stringent limit of 3°F would logically also assure the protection and propagation of the BIP. *Id.* Entergy has since informed EPA that the circulating water pump discharge from Outfall 001 will <u>not</u> be used for cooling (for the spent fuel pool or any other systems) and will not be heated. Rather, Entergy states that there is no source of heat for the discharge from the system formerly used to cool the condenser and that this water will be used for dilution and for fire protection. *See* Comment III.4.1. Consequently, we have removed the temperature limits for Outfall 001 (including the delta-T limit) from the Final Permit, meaning that the Final Permit does not authorize the discharge of heat from Outfall 001. The Final Permit continues to require reporting the temperature and delta-T at the monitoring location for Outfall 001. See Response to Comment III.5.2.

The Final Permit retains thermal limits for the discharge from Outfall 010, which serves as the discharge of cooling water for the spent fuel pool. Spent fuel cooling needs were at their height

during the initial months immediately following shutdown and transfer to the spent fuel pool of the fuel rods then in the reactor and will decline over time. Entergy's comments and the PSDARs[12] submitted to the NRC describing the post-shutdown and decommissioning phase of PNPS recognize that the operational demand for cooling water and the thermal effluent has substantially declined following shutdown and will continue to do so as the radioactivity of the spent fuel decays and as it is relocated from the spent fuel pool. AR-692 at 22 and AR-696 at 21.

The comment expresses support for the post-shutdown continued pH limits for discharges at Outfall 001 following shutdown. The commenter also supports prohibiting use of chlorination, and as a result, elimination of the TRO limits following shutdown. The Final Permit prohibits chlorination at Outfall 001, but includes end-of-pipe limits for TRO at Outfall 010, which is continuously chlorinated. The Final Permit includes a water quality-based TRO limit of 0.1 mg/L, applied at the sampling location for Outfall 001, to ensure that effluent from Outfall 010 meets water quality standards for chlorine. *See* Response to Comment III.6.2.2. The Draft Permit included a pH limit at Outfall 001 of 6.5 to 8.5 standard units (S.U.) based on the surface water quality standards for Class SA waters. 314 CMR 4.05(4)(a)(3). In its comments on the Draft Permit, Entergy comments that, post-shutdown, Outfall 001 will consist only of seawater drawn through the facility by the circulating water pumps and used either for dilution water, for fire protection, and to flush out the system from any biofouling that may have occurred. *See* Comment III.4.1. Entergy states that this water will not be used for cooling or any other processes, and as such, there will be no change in the pH at Outfall 001 from intake to discharge. PNPS has ceased operating and its water use has been substantially altered as a result of the material change in the Facility. Post-shutdown, the discharge water from Outfall 001 is essentially the same as the intake water, with no intervening use that would alter the pH. For these reasons, the Final Permit eliminates the proposed pH limit for Outfall 001. While the prior permit included a requirement that the pH shall not vary by more than 0.5 S.U from that of the intake water, the elimination of such a pH requirement from the Draft Permit is consistent with the anti-backsliding requirements of CWA § 402(o), which provides for an exception where "material and substantial alterations . . . to the permitted facility occurred . . . which justify the application of a less stringent effluent limitation." CWA § 402(o)(2)(A); 33 U.S.C. § 1342(o)(2)(A). In this case, the permitted facility no longer generates electricity and has eliminated the prior use of Outfall 001 that justified the pH limit (*i.e.*, a material and substantial alteration). This removal of the uses that previously justified the pH limit similarly justifies removal of the pH limit. At the same time, the Fact Sheet explains that the sampling point for Outfall 001 is downstream from where the flow from Outfall 001 commingles with the discharges from a number of other outfalls, including Outfalls 004, 005, 010, 011, and 014. Fact Sheet at 20. The Fact Sheet also explains that the minimum pH limitations at the stormwater outfalls (6.0 S.U.) and Outfalls 001 and 014 (6.1 S.U.) are slightly below the water quality standards for Class SA waters (6.5 S.U.), but that there is sufficient dilution of these discharges when combined with the non-contact cooling water flow from Outfall 010. Fact Sheet at 33. The Final Permit includes reporting the minimum and maximum daily pH at the Outfall 001

[12] On November 16, 2018, the permittee and entities controlled by Holtec International ("Holtec") submitted a request to the NRC to approve a transfer of the PNPS Renewed Facility Operating License and the general license for the PNPS Independent Spent Fuel Storage Installation from the permittee to Holtec. Consequently, the permittee and Holtec both submitted PSDARs to NRC, the latter to be applicable only in the event the NRC approves the license transfer request.

compliance monitoring point when discharging stormwater or from Outfalls 011 and 014 to ensure that the water quality standard is met in the discharge canal.

The comment expresses support for the oil and grease (O&G) "limits" in the Draft Permit for discharges at Outfall 001 before and after shutdown, but indicates confusion as to why the Agencies proposed O&G monitoring without numeric limits. To be clear, the Draft Permit included a reporting requirement for O&G at the sampling point for Outfall 001 but did not propose a limit. The Fact Sheet explains that the sampling point for Outfall 001 is downstream from where the flow from Outfall 001 commingles with the discharges from a number of other outfalls, including Outfalls 004, 005, 010, 011, and 014. Fact Sheet at 20. The proposed O&G monitoring at the sampling location for Outfall 001 was not based on an expectation that O&G would be present in the wastestream from Outfall 001, because the Steam Electric Effluent Limitation Guidelines do not include technology-based limits for O&G for cooling water discharges and because the Agencies had no pre-shutdown data that O&G would be present in PNPS' cooling water in particular. *See id.* at 20. Furthermore, as explained above, the post-shutdown discharge from Outfall 001 is essentially seawater; there is no significant source that the Agencies expect would introduce O&G to this wastestream between the intake and discharge. Thus, the Draft Permit did not propose numeric O&G limits for the pre- or post-shutdown discharge from Outfall 001. Rather, the Agencies established the O&G reporting requirement to provide data to enable the Agencies to assess whether there are detectable levels of O&G at a point after which the discharges from all of the other Outfalls to the discharge canal (*i.e.*, 004, 005, 010, 011, 014) have combined. *See id.* at 24, 34.

While the basis of the O&G monitoring requirement in the Draft Permit was to monitor these combined O&G levels in the discharge canal, when the circulating pump is operating, the flow from Outfall 001 (155,500 gpm) comprises about 72% of the discharge at the monitoring location.[13] In other words, the flow at the sampling location when a circulating pump is in use is dominated by the flow from Outfall 001, which will dilute the contributions of O&G from the commingled outfalls. The Draft Permit proposed water quality-based, numeric O&G limits for stormwater from Outfalls 004 and 005 and technology-based, numeric O&G limits for discharges from Outfalls 010, 011, and 014. The numeric limit for O&G at stormwater Outfalls 004 and 005 is non-detect, consistent with the water quality standards for Class SA waters. 314 CMR 4.05(4)(a)(7). *See* Fact Sheet at 32. The numeric limit for O&G at Outfalls 010, 011 and 014 is a maximum daily concentration of 20 mg/L and an average monthly concentration of 15 mg/L based on best professional judgement (BPJ) and looking to the regulation of low volume wastes under the Steam Electric ELGs as guidance. *See* Fact Sheet at 38. Each of these outfalls will be monitored prior to commingling with any other wastestream. These maximum daily concentrations will be diluted after commingling with the cooling water discharge at Outfall 010, and, when the circulating pumps are running, by the discharge from Outfall 001. At a minimum, monitoring O&G at the Outfall 001 sampling location when the circulating water pumps are operating is not expected to be representative of the levels in the combined flows because it is at

[13] This value is based on a worst-case assumption that Outfall 010 is discharging at the maximum daily flow (13,500 gpm) and that the batch discharges from both Outfalls 011 and 014 discharge 15,000 gallons at the same time, which is higher than the maximum recorded daily discharge from January 2008 through March 2016 (12,200 gallons). See Fact Sheet Attachment A.

this point when the levels are at their most dilute.[14] For this reason, the Final Permit modifies slightly the proposed monitoring requirement for O&G at Outfall 001 to specify that such monitoring may not occur when a circulating pump is in use.

According to the comment, "EPA states that there are no rare and endangered species in the vicinity of PNPS, which is false…" The comment does not provide a citation for this statement, and the Fact Sheet does not support this statement. Section 11 of the Fact Sheet describes in detail the federally threatened and endangered species in the vicinity of Pilgrim Station, including sea turtles, whales, and Atlantic sturgeon. *See* Fact Sheet at 56. Section 11.2.1 of the Fact Sheet evaluated the potential impacts of the heated thermal discharge on ESA species and critical habitat in the vicinity of PNPS. Based on its assessment of the proposed alternative effluent limits for the Draft Permit and NMFS' evaluation of the thermal plume during the ESA consultation for the 2012 relicensing of PNPS, EPA concluded that the thermal plume is not likely to adversely impact threatened and endangered species or their critical habitat in the action area. See AR-465. EPA requested concurrence from NMFS on this conclusion. The Fact Sheet (at 60-61) also specifically identifies the newly expanded critical habitat for right whales in the North Atlantic raised in the comment. Because NMFS already considered the impacts of the thermal discharge on North Atlantic Right Whale critical habitat, the subsequent expansion of the designated critical habitat in Cape Cod Bay did not affect the Services' conclusion from 2012. NMFS concurred with EPA's finding that the 2012 consultation already considered the effects to critical habitat in the action area and, because no changes proposed in the Draft Permit would change the analysis of effects previously considered, the effects analysis in the 2012 consultation remains valid. See AR-694 and AR-698. NMFS's concurrence with EPA's preliminary findings would also apply to the post-shutdown effluent limitations, as the temperature limits at Outfall 010 are substantially more stringent in the Final Permit.

3.2 Conditions and Effluent Limitations Applicable to Outfall 002 Must Be Revised (Discharge of Thermal and Non-Thermal Backwash Water to Intake Structure and Out to Cape Cod Bay)

Part 1.A: Permit effective date until shutdown

The draft permit reduces the maximum daily flow limit from 255 MGD to 28 MGD. We support this reduction, especially since it appears that Entergy never used close to the 255 MGD limit. The temperature limit is reduced from 120°F to 115°F in the draft permit. While we support a reduction, 115°F is higher than that allowed by the MA SWQS and requires a variance to be granted from these standards. Entergy should be required to meet the MA SWQS limits (maximum daily temperature limit of 85°F and a monthly average limit of 80°F). Additionally, if a variance is needed for outfall 002, we reiterate our comments in the outfall 001 section: Entergy's Demonstration Report is flawed and Entergy has not adequately shown that no significant impacts occur due to the thermal discharge. Impacts from PNPS's thermal effluent needs to be reassessed in light of global warming and more current information now being

[14] As an example, the O&G concentration in the discharge canal after combining with flows from the circulating and salt service water pumps, based on a worst-case maximum daily concentration of 20 mg/L in a batch discharge of 15,000 gallons from both Outfalls 011 and 014, would be 3 mg/L. This value is less than the minimum detection level of 5 mg/L in the specified test method.

available. Entergy should be required to conduct a comprehensive assessment of the impact of the thermal discharge before a variance is granted or the variance should be denied.

The draft permit provides that the frequency of thermal backwash operations is reduced from 2x per week to 1x per week, with the same duration (3-hour maximum) as the current permit. While most thermal backwash operations last for about 1 hour, the draft permit indicates that under certain conditions three hour durations would be necessary. The supporting information for the draft permit should specify under which specific conditions a 3-hour backwash is allowed. Furthermore, EPA reports that thermal backwashes are performed 4-5 times per year and non-thermal backwashes are performed 3-4 times per year. It is unclear why the draft permit allows backwash operations up to 1x per week (50+ per year), if roughly 10 operations per year are occurring. This should be explained, and this requirement made more stringent.

The draft permit does not adequately address the range of tides at the site. A thermal backwash discharge at low tide could have a greater impact on the benthic environment than one at high tide. Backwash operations should not only be limited in terms of length of time and frequency, but also potentially to tide cycles to avoid superheating the near shore environment. If, during decommissioning, PNPS engages in restoration of the benthic environment, this will encourage more appropriate and thoughtful management of thermal and polluted discharges.

We support the draft permit's more stringent limit for pH for outfall 002. As for TRO, again, we request that numeric limits be established and not just that the licensee "reports" TRO results.

Part 1.B: From shutdown until permit expires

We support that thermal backwash operations are prohibited post shutdown at outfall 002. Limits for 002 only apply to non-thermal backwash water after shutdown. However, if Energy can prove thermal backwashes are needed post shutdown, then limits should be quickly reinstated in the permit via a formal amendment process.

Entergy should be required to meet the MA SWQS limits (maximum daily temperature limit of 85°F and a monthly average limit of 80°F). Entergy's Demonstration Report is flawed and Entergy has not adequately shown that no significant impacts occur due to the thermal discharge.

The supporting information for the draft permit should specify under which specific conditions a 3-hour backwash is allowed. It is unclear why the draft permit allows backwash operations up to 1x per week (50+ per year), if roughly 10 operations per year are occurring. This should be explained, and this requirement made more stringent.

Response to Comment 3.2

The comment identifies issues with effluent limitations and conditions from the Draft Permit that apply prior to and following the cessation of power generation at PNPS (the "pre-shutdown" and "post-shutdown" limits, respectively). EPA has reviewed and considered comments on both the pre- and post-shutdown limits. However, as explained in the Introduction to this Responses to Comments, PNPS ceased operating on May 31, 2019. Therefore, the permit conditions and

effluent limitations from the Draft Permit specific to operation of the electric generation facility, which would have become effective prior to the shutdown date, are no longer applicable. The pre-shutdown effluent limitations and conditions have been eliminated from Final Permit. As such, EPA has not addressed the comments specific to the pre-shutdown limits which were removed from the Final Permit except where a concern or issue about the pre-shutdown limit would also be relevant to the post-shutdown limit.

The comment supports the Final Permit's prohibition of post-shutdown thermal backwashes and requests that, if thermal backwashes are needed, limits on such backwashes should be quickly reinstated in the permit via a formal amendment process. (During thermal backwashes, heated water from the condenser is directed back through the intake structure to clear debris and help prevent biofouling). As noted in the comment, the Draft Permit proposed to authorize only unheated backwashes after Entergy shut the Facility down. *See also* Fact Sheet at 25. Furthermore, the Agencies understand from a conversation with Joe Egan of Entergy on May 17, 2019, that the Facility is no longer capable of conducting a thermal backwash, because the condenser, which was the source of heat, is shut down. Therefore, only unheated backwashes are possible, and only unheated backwashes are authorized in the Final Permit. Therefore, the comments about thermal backwash discharges no longer apply. *See also* Response to Comment III.5.1.

The comment also requests that the Agencies specify the conditions under which a 3-hour backwash is allowed and explain why the permit authorizes backwashes up to once per week (50+ per year), if only roughly 10 operations per year occur. The comment requests that this requirement be made more stringent (i.e., allow less frequent unheated backwashes). PNPS uses unheated backwashes similar to heated backwashes—to clear seaweed and other materials from the intake structure to assure that flow through the structure is not impeded. The current permit limited backwashing to once per week due to concerns over potential thermal impacts from multiple, heated backwashes during any particular week. The Final Permit also limits the number of unheated backwashes to one per week. In addition, there are no temperature limits at Outfall 002 because, after shutdown, there is no source of heat (due to elimination of the condenser) and the backwash water will be at ambient temperature. EPA expects the Permittee to backwash as necessary up to once per week and for a period of up to 3 hours to assure the maintenance of uninterrupted cooling water flows through the intake screens for nuclear safety reasons.

Based on DMR flow data for Outfall 002 from 2000 through 2018, the Permittee conducted about 3-5 backwashes per year prior to shutdown. The commenter requests that EPA limit the number of backwashes that occur per year that aligns with the actual needs of the Facility. Post-shutdown, backwashes will be conducted to assure the intakes are not impeded and maintain a reliable flow of water to continuously cool the spent fuel pool. Authorizing backwashing to keep the screens are free from debris will also ensure that the Permittee maintains a through-screen velocity no greater than 0.5 fps consistent with the BTA requirements for impingement mortality. The need to backwash the screens is demand-based; in other words, when accumulation of material warrants backwashing to maintain cooling water flow. PNPS was authorized to backwash the screens up twice per week in the 1991 Permit and still only discharged from Outfall 002 about 3-5 times per year. Since the permittee will be withdrawing

considerably less water now that the facility is shutdown, the frequency of backwashes is not expected to increase and will likely decrease. Moreover, post-shutdown the backwash water will be ambient temperature and will not impact the temperature of the receiving water. The comment has not provided any justification for restricting post-shutdown backwashes other than to align with the actual operations. An abnormal or infrequent event could arise that would warrant more frequent backwashing for a limited period to ensure that cooling water is not disrupted. In such a case, the risk of disrupting cooling water for the spent fuel is substantially higher than the potential impacts of more frequent, non-thermal backwashing of the intake screens. Regardless of the permit limit, PNPS is not expected to perform backwashing any more frequently than necessary to assure that the intakes are not impeded by biological growth, seaweed, or debris, which, under past operations, has been less frequent than once per week.

3.3 Conditions and Effluent Limitations Applicable to Outfalls 003 and 012 Must Be Revised (Discharge of Intake Screenwash Water To Cape Cod Bay Via the Main Fish Sluiceway)

Part 1.A: Permit effective date until shutdown & Part 1.B: From shutdown until permit expires

While flow limits are the same in the current and draft permits (4.1 MGD average monthly and 4.1 MGD daily maximum), the pH limits are more stringent, which we support. Again, we support TRO limits being added to the draft permit, but the draft permit should set actual numeric limits as opposed to Entergy being allowed to simply "report" test results.

Outfall 012 will continue after shutdown, but 003 will not. Entergy requested that the dechlorination requirement be omitted when screenwash water is discharged to outfall 012, but EPA has kept the dechlorination requirement in the draft permit to protect organisms washed from the screen. We support this decision. (Use of Beaudrey WIP technology could reduce the need for chlorination and protect species even more – see section III.B for more information.)

Response to Comment 3.3

The comment expresses support for the pH limits and dechlorination requirements at Outfall 012.[15] These limits and conditions have been included in the Final Permit. The comment also states that the TRO limit for Outfall 012 should be a numeric limit rather than a reporting requirement, but it does not explain why a numeric limit is required.

Water from the salt service water system, which is chlorinated, is used to wash the screens and directed to the sluiceway designated as Outfall 012. The Final Permit requires that salt service water used as screen wash water be dechlorinated prior to being sprayed on the traveling screens and discharged via these Outfalls. Final Permit at Part I.A.4. Moreover, the facility already employs a screenwash dechlorination system for this purpose. Fact Sheet at 26-28; AR-489 at 12. The prior permit also required dechlorination of the screen wash water, but it did not require the

[15] EPA has not responded to comments on Outfall 003, because this outfall is no longer in operation as of June 1, 2019 (when PNPS ceased electricity generating operations).

permittee to monitor and report TRO for these outfalls. Fact Sheet at 28. Thus, the Agencies do not have TRO data for these outfalls. The Agencies expect, however, that concentrations of TRO will not be detectable in the effluent as a result of the dechlorination of this water.[16] Therefore, the Agencies carried forward to the re-issued permit the dechlorination requirement from the prior permit and added a monitoring requirement to ensure compliance. The comment does not explain why a numeric limit is required. Because the Draft Permit already proposed to require dechlorination and confirmatory monitoring, and because the Agencies do not have any data to support the need for a numeric limit at this time or for use in calculating one, we have not added one to the Final Permit. The monthly reporting requirement will allow the Agencies to evaluate any potential need for a TRO limit in a future modified or re-issued permit.

EPA has addressed comments about the intake technology, including use of Beaudrey WIP technology in Response to Comment I.4.2. below. The comment above does not explain how the use of WIP screens would alter the need for chlorination. The water used for spraying the facility's existing intake screens comes from the salt service water system, which is chlorinated for other purposes. Washing of organisms and debris from the screens is accomplished not by chlorination but by the pressure of the screen wash water. As far as EPA understands, WIP screens still require occasional washing, which, in the case of PNPS, would likely use the same chlorinated source water. Thus, although the comment asserts that the use of Beaudrey WIP technology at PNPS "could reduce the need for chlorination," it is not clear that mandating WIP screens would reduce the need for chlorination, and the comment provides no basis for its conclusion.

3.4 Conditions and Effluent Limitations Applicable to Outfall 010 Must Be Revised (Discharge of Non-Contact Cooling Water From the Salt Service Water System (Low Volume Waste) to the Discharge (Canal/Cape Cod Bay))

Part 1.A: Permit effective date until shutdown

The flow rate in the draft permit is the same as current permit (19.4 MGD average monthly), however a daily maximum flow rate was added to new permit (also 19.4 MGD). This monthly average flow rate could be reduced further, especially since Energy doesn't appear to use more than about 14 MGD via outfall 010. Based on our review of DMRs from 2015-2016,[32] Entergy never used more than 14 MGD. The draft permit supporting documents indicates that, based on a review of DMRs, Entergy never reported a rate higher than 14.5 MGD. The monthly average flow rate should be reduced further to 15 MGD.

[16] PNPS uses sodium thiosulfate in its dechlorination system, which is widely used in the industry and, at the correct dosage, effectively removes total residual chlorine (TRC) to levels protective of aquatic life. For example, the standard protocol for marine acute toxicity testing in MA and NH requires effluent samples to be measured for TRC and, if detected, dechlorinated with sodium thiosulfate prior to toxicity testing. The EPA Region 1 Marine Acute Toxicity Test Procedure is available at https://www3.epa.gov/region1/npdes/permits/generic/marinewateracutetoxtest-rev.pdf.
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In contrast to the outfalls discussed so far (001, 002, 003, 012), there is an actual TRO numeric limit listed for outfall 010 (0.5 mg/L average monthly and 0.1 mg/L maximum daily). The permit's supporting documentation should clarify why it has listed a numeric limit for 010 but no other outfalls. These limits are the same as the current permit, and EPA reports that the daily maximum TRO limits have been exceeded 5 times at PNPS, but monthly averages have not. Just because one limit has not been exceeded does not excuse other violations. Violations should be taken seriously and EPA should hold Entergy accountable for any past exceedances, and be ready to impose enforcement actions for future exceedance under the new permit.

We support the addition of new limits added to the draft permit (TSS, O&G, pH) that were not in the current 1991 permit.

[32] For DMRs, this includes all 2015 months except Sept.; and Jan. and Feb. 2016.

Part 1.B: From shutdown until permit expires

We support the reduced flow rate from 19.4 MGD (both average monthly and maximum daily) before shutdown, to 7.8 MGD (average monthly) and 15.6 MGD (maximum daily) after shutdown. We also support the TSS, O&G, and pH limits remaining in the permit post shutdown.

As discussed above, TRO units are inconsistent. Before shutdown, TRO limits are reported in mg/L, but then after shutdown are reported in ug/L. Units should remain consistent or at least add a footnote with the conversion. Aside from this, we support the reduction in TRO limits (before shutdown: 0.5 mg/L or 500 ug/L (average monthly) and 1.0 mg/L or 1000 ug/L (max daily); after shutdown: 0.0075 mg/L or 7.5 ug/L (average monthly) and 0.013 mg/L or 13 ug/L (max daily)).

After shutdown, outfall 010 will be the sole continuous remaining outlet in the discharge canal for heated effluent. We agree that it is important to establish temperature limits for this outfall for that reason and support the draft permit requirement that Energy identify limits that meet the state's SWQS (80°F average monthly and 85°F maximum daily). The delta-T limit of 3°F should be changed to 1.5°F for outfall 010 in order to meet state SWQS.

Response to Comment 3.4

As explained in the Introduction to this Response to Comments, PNPS ceased operating on May 31, 2019. EPA has reviewed and considered comments on both the pre- and post-shutdown limits. However, pre-shutdown permit conditions and effluent limitations from the Draft Permit are no longer applicable and have been eliminated from the Final Permit. As such, EPA has not addressed the comments specific to the pre-shutdown limits except where a concern or issue about the pre-shutdown limit would also be relevant to the post-shutdown limit.

The salt service water (SSW) pumps provide water used to cool the spent fuel rods in the spent fuel pool until all of the fuel is removed from the pool. The comment supports the post-shutdown average monthly and maximum daily flow limits for SSW at Outfall 010 of 7.8 MGD and 15.6 MGD, respectively. These limits were based on communication with Entergy about the anticipated need for cooling water after shutdown. *See* AR-520. During the comment period,

Entergy provided additional explanation about cooling water needs after ceasing electrical generation and requested higher average monthly and maximum daily flow limits. *See* Comment III.4.2. In addition, in a letter to EPA in May 2019 (AR-687), Entergy requested that the Final Permit authorize an average monthly and maximum daily flow limit of 19.4 MGD, which is equivalent to the design flow with all five SSW pumps operating. At the same time, Entergy indicated to NRC that service water use "after the plant is shut down and defueled…will be much less than during normal operation of the plant." AR-692 at 22. *See also* AR-696 at 21 ("The amount of water used by the service water system after shutdown will also be reduced."). Entergy has not adequately justified the need for maximum cooling water flow for the remainder of the period of spent fuel cooling in its comments or letter. As explained elsewhere, *see* Response to Comment III.4.2, the Agencies have included in the Final Permit a maximum daily flow limit of 19.4 MGD (five pumps operating) at Outfall 010 and an average monthly flow limit of 15.6 MGD. *See* Final Permit at Part I.A.3. In addition, the Agencies may consider modifying the permit to establish more stringent flow limits at Outfall 010 that more closely align with actual operating conditions based on the Permittee's experience during post-shutdown operations. For example, since shutting down on May 31, 2019, PNPS has reported a maximum daily flow of 6.6 MGD (in June 2019) at Outfall 010. The most recent available DMR submitted (for September 2019) reported a maximum daily flow of 3.8 MGD at Outfall 010.

The comment supports the pH, oil and grease ("O&G") and total suspended solids ("TSS") limits proposed in the Draft Permit. These limits have been retained in the Final Permit. The Final Permit has been changed to require reporting TRO concentration in mg/L at all outfalls after shutdown in response to the inconsistency identified in the comment. See Responses to Comments III.6.2.2 for a complete discussion of the Final Permit limits for TRO.

The comment also requests that EPA clarify why there is a numeric TRO limit for Outfall 010 "but no other outfalls." The Agencies explain elsewhere in this document the basis for the TRO-related requirements for the other Outfalls in the Final Permit. *See, e.g.*, Responses to Comments I.3.1, I.3.2, I.3.3, III.6.2.2. As for Outfall 010, even now that PNPS has ceased operations, the SSW system still requires continuous chlorination to control biological growth in the cooling equipment serving the spent fuel pool. As such, a numeric limit at this outfall is warranted. When PNPS was operating, Outfall 001 included condenser cooling water, which was also chlorinated. Part I.A.1 of the Draft Permit included water quality-based, pre-shutdown numeric TRO limits at Outfall 001 to ensure that chlorination of this outfall was consistent with water quality standards. Because the compliance point for Outfall 001 is downstream of where Outfall 010 discharges, the water quality-based numeric limit captured the comingled TRO discharge from both sources.

Since PNPS has ceased operations, the Permittee no longer chlorinates the wastewater at Outfall 001. The Final Permit prohibits chlorination of the intake water from either circulating water pump. At the same time, the effluent from Outfall 010 continues to be chlorinated and no longer has the benefit of dilution from combining with the discharge from Outfall 001. After considering comments on the Draft Permit, including Entergy's comments regarding the need for chlorination of the salt service water as a nuclear safety measure and to meet NRC mandates, Part I.A.3 of the Final Permit establishes less stringent TRO limits at Outfall 010 than proposed in the Draft Permit. In addition, the intermittent discharges from Outfalls 011 and 014 may contain purified city water and salt service water, both of which could contain chlorine. To

ensure that water quality standards continue to be met with the post-shutdown combined discharges from Outfalls 010, 011, and 014, Part I.A.1 of the Final Permit establishes a TRO limit of 0.1 mg/L at the sampling location for Outfall 001 consistent with the current permit.

Outfalls 004, 005, 006, 007, and 013 discharge only stormwater. Stormwater is not itself a source of TRO and there are no exposures at the site that are reasonably expected to contribute TRO to stormwater. No limits are warranted for the stormwater outfalls because there is no known or expected source of chlorine. The Final Permit includes a post-shutdown reporting requirement for TRO at screenwash Outfalls 003 and 012. The Final Permit requires dechlorination of the intake screenwash prior to using it at the screens. A reporting requirement is appropriate here to ensure compliance with this permit condition. *See* Response to Comment I.3.3.

Also with respect to TRO, the commenter states that EPA should not excuse the permittee for any past or future exceedances and that "[j]ust because one limit has not been exceeded does not excuse other violations." The Fact Sheet states: "Review of DMR data reveals that daily maximum TRO, in the form of TRC, has been exceeded on five (5) occasions, with a highest recorded daily maximum TRO concentration of 2.4 mg/L. The monthly average TRO effluent limitation has not been exceeded on any occasion." Fact Sheet at 35. EPA reviewed additional DMR data reported between April 2016 and March 2019 and noted an average value of 0.56 mg/L and no additional violations of the TRO limitations at Outfall 010. Part II.A.1 of the Draft Permit states that the permittee must comply with all conditions of the permit, and that permit noncompliance is grounds for enforcement action, for permit termination, revocation and reissuance, or modification, or for denial of a permit renewal application. *See also* 40 C.F.R. § 122.41(a)(2) ("Duty to Comply"). At the same time, EPA has discretion to enforce noncompliance with permit conditions. In the event of non-compliance, EPA exercises its enforcement discretion consistent with relevant law and guidance.

Finally, the comment supports the proposed post-shutdown temperature limits in the Draft Permit for Outfall 010 (80°F average monthly and 85°F maximum daily), but requests that the delta-T limit of 3°F should be changed to 1.5°F for Outfall 010 in order to meet surface water quality standards (SWQS). The proposed delta-T limit of 3°F and maximum daily limit of 85°F were based on the anticipated cooling needs of the spent fuel pool. As discussed elsewhere, after the Agencies issued the Draft Permit, Entergy re-evaluated the discharge from Outfall 010 and commented that it is unclear whether an 85°F maximum daily limit for service water can reasonably support the use of service water for necessary nuclear-safety functions post-shutdown, particularly given that this period will represent a greatly reduced flow dynamic compared to PNPS's historic electric-generating operations. See Comment III.5.2 and corresponding response. For the reasons discussed here and in Response to Comment III.5.2, Part I.A.3 of the Final Permit retains the average monthly temperature of 80°F but raises the maximum daily temperature limit from 85°F to 90°F and the maximum delta-T from 3°F to 10°F at Outfall 010. Even at a maximum daily flow of 19.4 MGD and delta-T of 10°F, the thermal effluent from Outfall 010 is expected to mix quickly with the receiving waters in the discharge canal and will be protective of the aquatic community of Cape Cod Bay. The heat load of the pre-shutdown thermal discharge and under the Final Permit limits can be calculated using the following equation:

$$Q_{plant} = c_p m_p \Delta T_p$$

Where:
Q_{plant} = heat load discharged from Facility
C_p = heat capacity of water = 1.0 btu/lb°F
M_p = volume of effluent (MGD)
ΔT_p = effluent rise in temperature

Under the current permit, which reflects operating conditions for generating electricity at PNPS, the total heat load to Cape Cod Bay from the circulating water pumps was about 14,336 mmBTU/day. EPA and MassDEP determined that the proposed pre-shutdown delta-T limit of 32°F, upon which the calculation is based, is protective of the balanced indigenous population. *See* Fact Sheet Attachments B and C. After shutdown and under the Draft Permit's temperature and flow limits for Outfall 010 (maximum daily flow of 15.6 MGD and delta-T of 3°F), the heat load to Cape Cod Bay was expected to decrease by 99.7% to 46.8 mmBTU/day. The Final Permit limits (maximum daily flow of 19.4 MGD and delta-T of 10°F) still result in a 98.6% decrease in the heat load to Cape Cod Bay (194 mmBTU/day). A delta T of 10°F will assure the protection and propagation of the BIP after shutdown, since the volume and overall rise in temperature have both substantially decreased, resulting in a substantial decrease in the heat load to Cape Cod Bay. The temperature monitoring at Outfall 001 will confirm the extent to which the effluent from Outfall 010 mixes as it transits the discharge canal.

3.5 Conditions and Effluent Limitations for PNPS's Stormwater Discharges (Outfalls 004, 005, 006, 007) Must Be Revised

Part 1.C: Permit effective date until permit expiration date

Under the current permit Entergy is supposed to test for O&G and TSS at 4 stormwater drain outfall locations twice per year (April and September, or "next possible opportunity") at PNPS when rainfall of >0.1" occurs after at least 3 days of dry weather, and in accordance with EPA's protocol and as required under 40 CFR 136. The draft permit supporting materials state that Entergy failed to conduct required sampling over roughly the past 10 years. Our research confirms this: After reviewing Entergy's DMRs from Jan 2009-Feb 2016, we found that sampling has only occurred 3 times since January 2009 and this only includes 3 of the 4 drains:

- June 9, 2009 Entergy sampled 3 of the 4 storm drain outfall locations (discharge points #005, #006 and #007). Discharge point #004 was omitted.
- November 4, 2010 Entergy sampled 2 of the 4 storm drain outfall locations (discharge points #005 and #006). Discharge points #004 and #007 were omitted.
- October 16, 2014 Entergy sampled 3 of the 4 storm drain outfall locations (discharge points #005, #006 and #007). Discharge point #004 omitted.

Entergy's claims that there was inadequate rainfall and therefore not enough flow are inaccurate. NOAA precipitation data from the Plymouth airport station (Jan. 2009-Apr. 2016) shows that Entergy missed 53 opportunities to test storm drains in the screening seasons they did not test (screening the months Apr.-Dec. of each year and using a conservative value of >0.5" of precipitation). Using EPA's storm event criteria of >0.1" of precipitation, Entergy missed 28 opportunities to test storm drains just in the months of Apr. and Sept. (in seasons with no

testing). In other words, Entergy failed to test drains in the months of Apr. and Sept. between January 2009 and April 2016 but had 28 opportunities to do so. This constitutes a violation of the NPDES permit and EPA and MassDEP should initiate enforcement action and seek penalties.

Page 29 of the Fact Sheet states that Entergy has indicated some of its stormwater outfalls are difficult to access and its often unclear whether a particular storm event triggers the monitoring requirement. However, in every DMR where the required testing was not reported, at no time does Entergy explain this. Instead, Entergy often states in DMRs – which it certifies to be accurate – that testing was not possible due to "environmental conditions" or "insufficient water flow." If Entergy has been unclear about certain NPDES requirements or was unable to test at a specific drain, it has had more than twenty years to clarify questions, formally amend the current permit, and/or remedy the methodology. Instead, Entergy, EPA, and MassDEP have allowed a decade to pass with minimal testing. This is wholly unacceptable and we strongly believe that EPA should impose the maximum penalty for every season that testing was not done in the past 10 years.

Even more concerning is, on page 31 of the Fact Sheet, EPA states that when storm drain sampling was done more frequently (from 1998-2007) certain parameters (e.g., TSS) were exceeded on many occasions. Not only has testing not been done, but exceedances were likely regularly occurring at the outfalls and went unreported to EPA and MassDEP. Maximum penalties should be imposed.

The draft permit supporting materials also indicate a "significant storm event" was not defined under the current permit, which contributed to Entergy's failure to conduct sampling. However, from our understanding grab sampling was supposed to occur when a "sudden onset of daytime rainfall" occurred after at least 72 hours of dry weather. According to EPA storm event criteria, this precipitation must amount to greater than 0.1" and the precipitation event must be preceded by at least 72 hours of dry weather. The rainfall criteria are clearly defined; and it is the common standard for stormwater sampling. Both professional sampling companies and volunteer monitoring programs conduct this type of sampling routinely throughout the U.S. Entergy's unfounded excuse for failing to conduct the sampling, which is required by law under the permit, warrants maximum penalties.

To address Entergy's failure to conduct the sampling required by the current permit, EPA has redesigned PNPS's storm drain sampling regime. We support the increase in sampling frequency in the draft permit, particularly given Entergy's minimal sampling in the past. This sampling will also be important post shutdown. When PNPS closes in 2019 or sooner, yard drains and storm water runoff could continue or increase pollution into Cape Cod Bay. The permit should require increased sampling frequency and contain stipulated penalties for failure to sample. The draft permit allows Energy to use undefined "unsafe conditions to evade sampling requirements. While we understand the safety of employees should be a priority, Entergy's track record of using unfounded excuses to evade sampling requirements raises concerns that "unsafe conditions" will be used as an unfounded excuse in the future. The conditions that relieve Entergy of sampling requirements should be detailed, and EPA and MassDEP should monitor this with heightened scrutiny and be prepared to impose enforcement actions when testing is not done or limits are exceeded.

Outfall 013 is addressed on page 29 of the Fact Sheet and is identified as a miscellaneous stormwater outfall that was never covered under the current permit. EPA states that this discharge is now acknowledged and authorized by the draft permit, but is still not listed in the permit language and no monitoring requirements apply since it is inaccessible. Although Entergy reports that it is not often used and it is not expected to drain to Cape Cod Bay except during extreme storm events, it should be included in the final permit and effluent limits should apply. This will be particularly important after decommissioning begins (when structures are demolished and soils disturbed), as these outfalls could become channels for contaminates entering Cape Cod Bay. Furthermore, the consequences of climate change are being experienced in the Northeast, including more intense storm events, precipitation and storm surge. If outfall 013 only drains to Cape Cod Bay during extreme storm events, there is no better time than now to apply effluent limits.

Response to Comment 3.5

The commenter identifies circumstances in which it believes the Permittee violated the current permit, both by not monitoring stormwater outfalls when the permit required and by violating numeric effluent limitations including, for example, TSS. While the comment requests that the Agencies "initiate enforcement action" and impose "maximum penalties" based on these instances, the Agencies pursue such actions outside the context of a permit renewal proceeding and the comment does not explain why such an approach is inappropriate here. The Agencies acknowledged in the Fact Sheet the limited sampling of these outfalls and have included permit conditions to improve sampling frequency. *See* Fact Sheet at 29. Between 1998 and 2007, the average monthly TSS limit of 30 mg/L in the current permit was exceeded during four sampling events at Outfall 005, one event at Outfall 006, and three events at Outfall 007. The maximum daily TSS limit of 100 mg/L in the current permit was exceeded once at each of Outfalls 005 and 007. *See* Fact Sheet at 31. EPA Region 1's Environmental Compliance Assurance Division (ECAD) tracks permit violations and determines the appropriate enforcement action based on the frequency, magnitude, and severity of violations.

Between April 2016 and April 2019, the Permittee conducted stormwater sampling twice at Outfalls 005, 006, and 007 (in September 2016 and April 2018). For all April and September sampling events at Outfall 004 and the remaining 5 events at Outfalls 005, 006, and 007, the Permittee reported "F" for insufficient flow for sampling. No samples exceeded the average monthly or maximum daily limit for TSS (Table 1, below).

Table 1. Results of Total Suspended Solids (TSS) monitoring results (in mg/L) for reported stormwater outfall sampling from April 2016 through May 2019. Permittee entered value of "F" to indicate insufficient flow for sampling.

	2016		2017		2018		2019
Outfall	Apr	Sep	Apr	Sep	Apr	Sep	Apr
004	F	F	F	F	F	F	F
005	F	0.1	F	F	3.6	F	F
006	F	0.3	F	F	4.6	F	F
007	F	0.1	F	F	13.8	F	F

The 1991 Permit required monitoring of the four stormwater outfalls twice per year, during significant storm events but did not define "significant storm event" in the permit. The Permittee often explained that outfalls were inaccessible for sampling and reported the NODI codes C (No Discharge) and F (Insufficient Flow), such as above in Table 1.

Again, in the Fact Sheet, the Agencies acknowledged that limited stormwater sampling had occurred and that vague language in the 1991 permit regarding such sampling contributed to this lack of data. Consequently, in the Draft Permit, the Agencies included more specific sampling language that should yield stormwater sampling on a regular and more frequent basis. These more detailed requirements, including the language defining storm events, have been carried through to the Final Permit. The Agencies do not agree, however, that these more detailed requirements in the "draft permit allow[] En[t]ergy to use undefined 'unsafe conditions['] to evade sampling requirements." The Final Permit (like the Draft Permit) provides that, "[i]f sampling within the first hour of a storm event is not feasible, the permittee shall sample as soon as is practicable after the start of a storm which meets th[e storm] definition [in the permit] and provide a brief explanation on the DMR or cover letter for that month as to why a first flush sample was not taken." Final Permit at Part I.A.5 n.3 (emphases added); *see also id.* Part I.A.6 n.3. Furthermore, the Final Permit (like the Draft Permit) provides that, "[i]f an outfall is inaccessible or submerged, the permittee shall proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with its analytical results." Final Permit at Part I.A.5 n.1; *see also id.* Part I.A.6 n.1 (emphasis added).

As noted above, the Final Permit also increases the monitoring frequency for four stormwater outfalls (004, 005, 006, and 007)—from twice a year to monthly. To the extent the comment requests a further increase,[17] the Agencies note that the comment fails to specify just how much of an increase the commenter believes is necessary or to explain why the frequency proposed by the Agencies is insufficient. Requiring monitoring on a monthly basis will ensure that stormwater will be sampled in most years, because there is likely to be sufficient flow for sampling during at least some months of the year, where the current permit only required sampling during two months. Moreover, the increase in sampling frequency to monthly will ensure that representative storm water samples will be collected over a variety of storm events. Increasing the monitoring frequency, specifying storm event criteria for outfall sampling, and

[17] The comment is not clear on this point; on the one hand, the commenter states: "We support the increase in sampling frequency in the draft permit," but later states: "The permit should require increased sampling frequency."

allowing sampling from a more accessible location (e.g., the first accessible upstream manhole rather than at the outfall) will limit the conditions under which the Permittee may report "C" or "F".

The comment also states that Outfall 013 "should be included in the Final Permit and effluent limits should apply." In the Fact Sheet, the Agencies acknowledged Outfall 013 and proposed to authorize stormwater discharges from it, but proposed no effluent limits, for a number of reasons, *see* Fact Sheet at 29, none of which the comment disputes. Furthermore, the comment does not provide any other specific explanation why the Agencies must establish effluent limits or monitoring requirements for Outfall 013, except to generalize that climate change will lead to more intense storm events during which stormwater discharges from Outfall 013. While the Agencies agree that Outfall 013 should be added to the Final Permit—and have done so,[18] *see* Final Permit at part I.A.6—we still have not established any numeric effluent limits. The non-numeric, technology-based effluent limitations at Part I.C of the Final Permit are designed to minimize the discharge of pollutants in stormwater discharges associated with industrial activity at PNPS, including in the event of stormwater discharges from Outfall 013. These include best management practices (BMPs) to address exposure of stormwater to industrial activities, spill prevention, runoff management, proper materials handling, training, and specific BMPs for steam electric generating facilities. The comment raises concerns about discharges "after decommissioning begins (when structures are demolished and soils disturbed), [the stormwater] outfalls could become channels for contaminants entering Cape Cod Bay." Part I.B.3 and 4 of the Final Permit do not authorize the discharge of pollutants in stormwater associated with construction activity (such as demolition of buildings) or other discharges of pollutants associated with the dismantlement and decontamination of plant systems and structures and/or the demolition of buildings. The Permittee must seek a permit modification or alternative NPDES permit coverage for these discharges. Moreover, as the Agencies noted in the Fact Sheet (and the comment does not gainsay), the drainage area for Outfall 006 is similar to that for Outfall 013 and the required sampling for Outfall 006 is therefore expected to provide an adequate characterization of stormwater discharges from both outfalls. *See* Fact Sheet at 29.

It is not unusual for EPA to require monitoring of a limited number of outfalls as representative of stormwater and other industrial discharges. See, for example, Parts 6.1.1 and 6.2.2.2 of EPA's 2015 Multi-Sector General Permit. The Agencies may decide in a future permit proceeding to establish limits for Outfall 013 if the results from required monitoring of Outfall 006 warrant such a decision. Furthermore, the Agencies understand that Outfall 013 does not typically discharge directly to Cape Cod Bay. In short, the Agencies have not added limits or monitoring requirements for Outfall 013, because Outfall 013 drains an area that is similar in character to that drained by a monitored outfall and other permit conditions are applicable to both areas that are designed to minimize the discharge of pollutants in stormwater discharges, and because the permittee reports that Outfall 013 is inaccessible and rarely discharges directly to Cape Cod Bay.

[18] The Fact Sheet acknowledges and discusses Outfall 013 and purports to authorize it. *See* Fact Sheet at 5, 29. Its omission from the Draft Permit, *see* Draft Permit at Part I.C.2, has been corrected in the Final Permit, so that authorization to discharge stormwater from this outfall is clear. *See* Final Permit at Part I.A.6.

3.6 Conditions and Effluent Limitations for PNPS's Discharge of Stormwater Via Electrical Vaults (Manholes) to Cape Cod Bay (Outfalls 004A 005A 005B 007A 007B) Must Be Revised

Part 1.C: Permit effective date until permit expiration date

As outlined by EPA in the draft permit supporting documentation, stormwater from 25 electrical vaults on the property is pumped to the closest stormwater outfall locations and discharged to Cape Cod Bay. These vaults are only now being considered for monitoring in the draft permit; they have gone unmonitored for years. Monitoring these vaults should have been added as a permit requirement via a formal amendment as soon as EPA and MassDEP learned of these outfalls. The draft permit supporting documentation does not specify exactly when the agencies learned of these vaults, only that it was "during the permit term." This vague language could mean that agencies knew about these discharge locations for two decades but failed to make them subject to the NPDES permit program. EPA and MassDEP should clarify when they learned of these discharges and explain why the vaults were not added to the permit until now.

The Draft Authorization indicates that EPA sent PNPS a CWA Section 308 letter on March 24, 2015 requiring water sampling from only seven of its 25 electrical vaults for a variety of pollutants.[33] While the draft permit requires a 1-time test of all 25 vaults, quarterly monitoring for only 5 vaults is considered representative of discharges from the 25 vaults.

- The draft permit lacks a basis for choosing the 5 test vaults without knowing whether (and which) pollutants are present in the other 18 vaults. All 25 vaults should be tested before representative test vaults are selected and the list of sampling parameters are finalized. At a minimum, the draft permit should provide an explanation that assures the public that all the vaults produce the same pollutants.
- A greater number of vaults should be tested regularly to ensure the tests are an appropriate representative of all 25 vaults -- testing only 5 vaults (20%) is not enough.
- All 25 vaults should be tested at least annually and frequency of testing in the representative vaults should be increased to monthly post shutdown. Testing of representative vaults should be adaptive; if annual tests show certain vaults are trending higher for pollutants, then these vaults should subsequently be tested monthly. While quarterly testing for representative vaults seems sufficient from the time the permit goes into effect until PNPS shuts down, the monitoring frequency should be increased to monthly post shutdown. As discussed previously, when decommissioning commences in 2019, yard drains and stormwater runoff could become conduits for pollution into Cape Cod Bay and it will be a critical time for monitoring these outlets. Furthermore, as sea level rises and storm severity increases, a more frequent and severe level of flooding is anticipated, which will lead to inundation and leaching of on-site contaminants to the environment. This will not be controlled without proper monitoring.

Water sampling from the 7 vaults found TSS, cyanide, phenols, phthalates, PCBs, antimony, iron, copper, zinc, lead, nickel, cadmium, hexavalent chromium. Lead, copper, and zinc were all exceeding marine water quality criteria. EPA states that the parameters listed in the draft permit reflect those pollutants that were detected in at least 1 vault. However, not all of these pollutants

are included in the draft permit. Cyanide, antimony, nickel, and hexavalent chromium appear to be omitted. EPA should test all 25 vaults, develop a complete list of parameters, then the complete list of parameters should be included in the final permit.

The presence of these pollutants in PNPS's discharge warrants further investigation for violations of the current permit, which prohibits discharge of metals. Page 3 of the current permit reads, "There shall be no discharge of treated or untreated chemicals which result from cleaning or washing of condensers or equipment wherein heavy metals may be discharged." The electrical vault sample results show that, for an unknown length of time, PNPS has been discharging heavy metals via the vaults and stormwater outfall locations to Cape Cod Bay. This is a further reason why a comprehensive study of the impacts of PNPS's discharges on marine life is needed before any further discharges are allowed. Entergy never documented that discharging these contaminants are consistent with the CWA and SWQS. In addition, the cumulative impact of these pollutants on the environment have never been studied.

Hexavalent chromium (Cr(VI)) is particularly harmful to aquatic life. One study[34] conducted research on eels, trout, and winter flounder (species present at PNPS) and found that Cr is highly toxic to fish and can cause physiologic, histologic, bio-chemical, enzymatic, and genetic problems, even upon short-term exposure. Cr(VI) induced "alterations in the morphology of gills and liver in fish in a dose and time-dependent manner." The permit should require monitoring and impose limits for hexavalent chromium to ensure this pollutant is not causing harm in Cape Cod Bay.

Cyanide was also found in one vault, at an estimated concentration of 5.3 ug/L. It is our understanding that EPA's limit for cyanide in saltwater is 1.0 ug/L based on effects to aquatic organisms. It is unclear how the 5.3 ug/L relates to EPA's saltwater limit, and why cyanide was omitted from the monitoring requirements in the draft permit. Limits for cyanide, and all other pollutants, should be assessed not only in terms of impacts to aquatic life, but also to the public. There is a popular public swimming beach located approximately 1-2 miles down current from PNPS. The recent revelation of the discharge of these harmful pollutants reflect Entergy's blatant disregard for the public health and the environment. The fact that EPA and MassDEP have allowed these discharges to occur for an unknown length of time and are only now subjecting PNPS's electrical vaults to the NPDES permit program is an egregious failure of regulatory oversight.

PNPS's current permit (page 3) states that "there shall be no discharge of polychlorinated biphenyl compounds commonly used for transformer fluid." National effluent limitation guidelines (ELGs) for Steam Electric facilities also appear to prohibit discharges of PCBs (see page 15 of the Fact Sheet: "for all discharges: no discharge of polychlorinated biphenyl compounds (PCBs)"). However, as reported by EPA in the draft permit supporting documentation, PCBs were found in 1 of the 7 electrical vaults tested on the PNPS site, which drain to the closest stormwater outfall and then to Cape Cod Bay – a violation of the current permit and ELGs. If agencies are aware that PCBs could be discharging to Cape Cod Bay, all electrical vaults should be tested immediately; and is even more reason that the number of vaults tested regularly should be increased and testing should be adaptive depending on monitoring

results. Agencies need to impose enforcement actions when PCBs are found to be discharging to Cape Cod Bay.

There are only monitoring requirements included in the draft permit in order to assess the need for effluent limitations for these toxic pollutants. The fact that these pollutants were found in the vaults should be enough evidence to implement effluent limitations in the final permit. Shockingly, the draft permit only requires Entergy to monitor these pollutants; instead, the permit should immediately impose pollutant limits for these parameters. Further, if stormwater from these 25 vaults is being discharged to stormwater outfalls 004, 005, 006, and 007, then the stormwater outfalls themselves should also tested for the full list of pollutants discussed above (quarterly until shutdown, then monthly post shutdown) and pollutant limitations implemented immediately.

[33] Draft Authorization to Discharge under the National Pollution Discharge Elimination System (Fact Sheet at 30).
[34] Velma V, Vutukuru SS, and PB Tchounwou. 2009. Ecotoxicology of hexavalent chromium in freshwater fish: a critical review. Reviews on Environmental Health. 24(2): 129-145.

Response to Comment 3.6

The comment states that monitoring of the electrical vaults "should have been added as a permit requirement via a formal amendment as soon as EPA and MassDEP learned of these outfalls" and requests that the Agencies "clarify when they learned of the [electrical vault] discharges and explain why the vaults were not added to the permit until now." In its October 2014 DMR (dated November 21, 2014), Entergy noted that water that had accumulated in several electrical vaults on the property was being pumped out and directed to the storm drain system, eventually discharging to one or more NPDES permitted outfalls. *See* AR-730. In a follow-up phone conversation with George Papadopoulos on 12/5/14, as noted in AR-501, Entergy requested the authorization to discharge water that periodically collects in the electrical vaults through existing, permitted stormwater outfalls. The 1991 Permit had expired and was administratively continued (*i.e.*, remained in effect) at the time Entergy's request was made. Since an expired permit cannot be modified, any permit limits or conditions for this water from the electrical vaults could only be established in the reissued permit (*i.e.*, this permit proceeding, which was already underway at the time). In the December 5, 2014, call noted above and referenced in AR-501, Entergy confirmed that water from the vaults was being temporarily collected in above-ground storage containers or allowed to infiltrate on the property grounds and was not being directed to stormwater outfalls. As noted in the comment, in March 2015, EPA sent the Permittee an information request letter (AR-501) pursuant to CWA § 308 requiring certain sampling to characterize the water in the vaults. In a June 9, 2015, letter (AR-506), following a subsequent meeting between EPA and Entergy, EPA refined the list of parameters for analysis and clarified that, since the 1991 Permit authorizes discharge of only stormwater from outfall serial numbers 004, 005, 006, and 007, to the extent that the water in the vaults consists only of stormwater, the 1991 Permit authorizes these discharges, provided that the effluent limits and other conditions in the permit were adhered to. On June 30, 2015, Entergy provided a written response (AR-507), including the results of sampling from seven vaults. AR-507.

As stated in the Fact Sheet, the Agencies determined that additional information beyond the 2015 sampling results was necessary to assess the need for effluent limits—specifically, a one-time

sampling of the remaining vaults and regular sampling of a subset of all the vaults from different portions of the site. The Draft Permit proposed conditions related to the discharge from electrical vaults to Cape Cod Bay via internal outfalls connected to Outfalls 004, 005, and 007, including sampling requirements, based on the 2015 sampling. Final Permit at Part I.A.6; Fact Sheet at 30-31. The comment raises concerns about the number of vaults that are required to be routinely monitored in the Draft Permit, the frequency of monitoring, the parameters included in the routine monitoring requirements, and the impacts of the discharges on aquatic life and public health. The comment requests that the Draft Permit establish limits for some parameters rather than just monitoring requirements. The Agencies address each of the concerns below.

The comment states that the Draft Permit lacks a basis for choosing the 5 test vaults without additional data from testing the other vaults. Like the Draft Permit, the Final Permit requires that, within 180 days of the permit's effective date, the Permittee collect a sample from each of the vaults that was not tested in 2015 and analyze it for the complete list of pollutant parameters that was required in 2015, as shown in Attachment C of the Final Permit. The Final Permit also establishes quarterly monitoring requirements at five vaults. Both of these monitoring requirements (*i.e.*, the one-time sampling of all remaining vaults and the routine sampling of five vaults) are intended to work together to provide the Agencies with data on potential pollutants pumped from these vaults to the stormwater outfalls and to inform future permitting decisions. In establishing these vault-related requirements, the Agencies balanced the need for additional data against the generally low concentrations for many, though not all, of the parameters detected in the initial sampling event and the availability of dilution in the discharge canal and intake embayment. Thus, the Permittee will be required to provide sampling data for all of the vaults. Depending on results from this new monitoring regime, the Agencies may request/require additional monitoring data from the Permittee, modify Part I.A.7 of the Final Permit to revise monitoring requirements for certain vaults, or both. *See* 40 C.F.R. § 122.62. The results of any additional or revised monitoring would also inform future NPDES permitting at the site.

The comment states that all 25 vaults should be tested before representative test vaults are selected and indicates that regularly testing only 5 vaults (20%) is insufficient. The Agencies selected the five vaults for quarterly sampling based on a map Entergy provided of electrical vault locations, *see* AR-507, choosing vaults to represent different portions of the property. Thus, the five particular vaults were chosen to be representative of the various locations of vaults as they are spread across the property, not based on the results of monitoring performed, since only a relatively small portion of the 25 vaults had been sampled. As explained above, depending on results from the regular and one-time monitoring requirements, the Agencies may request/require additional monitoring data from the Permittee, modify Part I.A.7 of the Final Permit to revise monitoring requirements for certain vaults, or both.

The commenter also requests that the monitoring frequency be increased to monthly post shutdown. The commenter speculates that when decommissioning commences in 2019, yard drains and stormwater runoff could become conduits for pollution into Cape Cod Bay and it will be a critical time for monitoring these outlets. The commenter has not provided specific evidence to support the substantial increase at this time in monitoring frequency during post-shutdown conditions from quarterly to monthly. Entergy has communicated to EPA that, as part of the decommissioning process, all of the electrical conduits and transmission equipment will be

dismantled by 2024. See AR-690, AR-696. As stormwater exposures change and flows are redirected, the Permittee must continue to implement measures that will reduce or prevent the presence of pollutants in stormwater discharges authorized by Part I.A.7 of the Final Permit. At this time, the Agencies expect that, until the electrical vaults are dismantled, the quarterly monitoring requirements in the Final Permit will provide data sufficient to characterize these discharges, although the Agencies have not ruled out the possibility of requesting/requiring more frequent sampling in the future, if warranted.

The comment states that EPA should test all 25 vaults, develop a complete list of parameters, and then include the complete list of parameters in the Final Permit. The list of parameters in the Draft Permit was determined by EPA to be representative of pollutants that may be associated with the discharges from the vaults based on discussions with Entergy about the function and operation of the vaults. See AR-501, AR-506. Monitoring of seven electrical vaults in 2015 indicated detectable levels of total suspended solids (TSS), cyanide (once), phenols, phthalates, PCBs (once), antimony, iron, copper, zinc, lead, nickel, cadmium, and hexavalent chromium (once). As the comment correctly points out, the Fact Sheet explains that the parameters listed in the Draft Permit were intended to reflect those pollutants that were detected in at least 1 vault, however, not all of these parameters were included in the Draft Permit. Cyanide,[19] antimony, nickel, and hexavalent chromium were also detected in at least one vault and were not included in the Draft Permit. For the ongoing quarterly monitoring that is required for five (5) specific vaults in the Final Permit in Part I.A.7, the Agencies have added all parameters that were detected in the initial CWA § 308 response at least once. This includes parameters that were detected between the method detection limit (MDL) and the laboratory reporting limit (RL). See detailed discussion of test methods in the response to comment III.10.2. As noted in that response, observations of pollutants above the MDL [even when below the minimum level of detection (ML)] indicate with 99% accuracy that the true concentration of the constituent in the effluent is greater than zero. The Final Permit includes monitoring for cyanide, antimony, nickel, and hexavalent chromium in addition to the other parameters that were included in the Draft Permit.

The comments states that sampling data indicate that PNPS has been discharging heavy metals via the electrical vaults and stormwater outfall locations to Cape Cod Bay for an unknown length of time and that these results provide "further reason why a comprehensive study of the impacts of PNPS's discharges on marine life is needed before any further discharges are allowed." Although some parameters in the samples from the vaults were detected above their respective water quality criteria, these discharges are subject to dilution in the discharge canal when combined with stormwater at Outfalls 004 and 005 and/or effluent from Outfalls 010 and 011. For example, copper was detected in all 7 samples at estimated values between 4.1 and 28.6 µg/l.

[19] The comment suggests that limits for cyanide (and all other pollutants) should be assessed not only in terms of impacts to aquatic life, but also to the public. In most cases, the Agencies use the aquatic life criteria to assess the impacts of the discharge. Aquatic life criteria are typically more stringent than human health criteria for a given parameter. For example, the aquatic life criterion for cyanide is 1 µg/L and the human health criteria (for the consumption of water and organism) is 4 µg/L. Where human health criteria are appropriate, or are more stringent than the aquatic life criteria, the Agencies evaluate the human health criteria to ensure public safety. Finally, EPA notes that the WQS for cyanide is expressed in terms of "free cyanide" and Entergy sampled and reported 5.3 µg/L of total cyanide, of which free cyanide is one component.

In Massachusetts, the current chronic and acute saltwater criteria for copper in Cape Cod Bay, which are consistent with the nationally recommended aquatic life water quality criteria (expressed in terms of dissolved metal), are 3.1 and 4.8 µg/l, respectively. At the maximum observed concentration, the effluent from Vault MH-4 (28.6 µg/l) would require dilution of about 1:6 to meet the acute water quality standard and about 1:10 to meet the chronic water quality standard. Available data indicate that the depth of water in the vaults at the time of sampling was relatively small (in the range of 0.25 feet to 3.35 feet), which suggests that the vaults contained low volumes of water. *See* AR-507 Table 1. It is reasonable to expect that a relatively small discharge from such a vault would be substantially diluted when combined with seawater or other discharges. For example, a single salt service water pump operating continuously discharges 2,700 gallons per minute through Outfall 010, and the permit limit is significantly higher (a maximum daily flow of 13,500 gpm). Based on the relatively high available dilution and limited data from existing sampling, the Agencies conclude that it is more reasonable at this time to require continued monitoring of discharges from the vaults for metals (including copper, cadmium, lead, zinc, iron, and nickel) to better characterize the discharges, rather than to immediately prohibit further discharge until the Permittee conducts a "comprehensive study of the impacts" to marine life. *See* Final Permit Part I.A.7.

The comment requests that the Final Permit impose limits for hexavalent chromium (Cr(VI)) to ensure this pollutant is not causing harm in Cape Cod Bay, presumably because Cr(VI) is "particularly harmful to aquatic life."[20] Hexavalent chromium was detected in 1 of the 7 samples at the estimated level of 8.6 µg/l, which was between the RL and MDL. The chronic and acute saltwater criteria for hexavalent chromium are 50 and 1,100 µg/l, respectively. The maximum contaminant level goal for total chromium (i.e., the level of a contaminant in drinking water below which there is no known or expected risk to health) is 100 µg/l. Therefore, the discharge of stormwater from the vault at the detected level would not be expected to violate criteria, even before taking dilution into account. The Agencies conclude that it is reasonable to require continued monitoring of hexavalent chromium discharges from the vaults, including routine quarterly monitoring of MH-2 in which chromium was initially detected, *see* Final Permit Part I.A.7, but that limits are not warranted at this time.

The commenter asserts that the detection of an isomer of PCB in one of the seven 2015 vault samples (MH-2) is "a violation of the current permit and [Steam Electric] ELGs." The comment further asserts that this detection warrants immediate monitoring of all of the vaults, an increase in the number of regularly monitored vaults, and adaptive testing based on the monitoring results. As noted earlier, *see* Response to Comment I.3.5, the Agencies pursue enforcement actions outside the context of a permit renewal proceeding. EPA Region 1's Environmental Compliance Assurance Division (ECAD) tracks permit violations and determines the appropriate action based on the frequency, magnitude, and severity of violations. In the event of non-

[20] The commenter references a study that "found that Cr is highly toxic to fish and can cause physiologic, histologic, bio-chemical, enzymatic, and genetic problems, even upon short-term exposure." While hexavalent chromium is a toxic pollutant and is listed as one of 126 priority pollutants under 40 C.F.R. Part 423 Appendix A, EPA notes that generally the exposure durations and concentrations observed in the studies reviewed by Velma et al. 2009 (AR-731 cited as footnote 34 in the comment) were substantially higher than the concentration reported in the sample from MH-2. For example, in the study cited in the comment (Roberts and Oris, 2004), rainbow trout exposed to 10 mg/L Cr over 28 days exhibited alterations in the morphology of gills and liver. The exposure concentration in the study was more than 1,000 times the observed concentration in MH-2 (8.6 µg/l).

compliance, EPA exercises its enforcement discretion consistent with relevant law and guidance. In addition, the permit already includes a condition that requires PCB testing (within the first 180 days of the permit term) of all 18 vaults that were not previously sampled, based in part on the detection of PCBs in one vault during the 2015 sampling event. *See* Fact Sheet at 30; Final Permit at Part I.F. The Final Permit retains the prohibition against the discharge of PCBs and requires quarterly monitoring for PCBs in the discharges from the electrical vaults. See Final Permit at Parts I.A.7 and I.A.18. In consideration of this comment, the Agencies have revised the Final Permit to require the quarterly sampling of the one vault in which PCBs were detected during the 2015 sampling event, designated MH-2, to be sampled quarterly. This replaces the vault designated MH-2A that was proposed for quarterly sampling in the Draft Permit.

The comments states that "the fact that these pollutants were found in the vaults should be enough evidence to implement effluent limitations" in the Final Permit. Part I.A.7 of the Final Permit includes ongoing monitoring for parameters detected during the initial round of vault sampling in 2015, but the Agencies do not agree that effluent limits are necessary at this time, for a number of reasons. As noted earlier, discharges from the electrical vaults are relatively small volumes that generally would be subject to considerable dilution once combined with the other flows being discharged to Cape Cod Bay or the intake embayment through Outfalls 004, 005, 006, and 007. The receiving water in the intake bay (for vaults discharging via Outfalls 006 and 007) and the cooling water discharge from Outfall 010 (for vaults discharging to the discharge canal) provide additional dilution for the vault discharges. The one-time sampling of all remaining vaults and the routine sampling of five vaults are intended to work together to provide the Agencies with data on potential pollutants pumped from these vaults to the stormwater outfalls and to inform future permitting decisions. In establishing these vault-related requirements, the Agencies balanced the need for additional data against the generally low concentrations for many, though not all, of the parameters detected in the initial sampling event and the availability of dilution in the discharge canal and intake embayment. Depending on results from this new monitoring regime, the Agencies may request/require additional monitoring data from the Permittee, modify Part I.A.7 of the Final Permit to revise monitoring requirements for certain vaults, or both. *See* 40 C.F.R. § 122.62. The permit could also be revised to include effluent limitations in the future, if appropriate. The results of any additional or revised monitoring would also inform future permit re-issuance proceedings.

Finally, the commenter requests that stormwater outfalls 004, 005, 006, and 007 also be tested for the full list of pollutants discussed above (quarterly until shutdown, then monthly post shutdown) since all discharges from the electrical vaults are discharged to one of these particular outfalls. EPA expressed concern in its March 2015 monitoring request that the stormwater that collects in the electrical vaults has come into contact with electrical wires and associated equipment and may contain pollutants that may not be representative of stormwater discharges from the site. AR-501 at 2. EPA also theorized that some of these vaults may be deep enough so as to possibly contain some groundwater through infiltration of the vaults themselves. *Id*. Therefore, EPA requested monitoring for a broader range of pollutants. *See* AR-506. Although the Permittee discharges the water in the vaults via its stormwater outfalls, the parameters at issue, which, as explained, may not be representative of other stormwater discharges from the site, are best sampled from the vaults themselves prior to any dilution provided by mixing with additional stormwater. For these reasons, the Final Permit does not include additional parameters

associated with the vaults at the stormwater outfalls. As explained in Response to Comment I.3.5, discharges from the stormwater outfalls 004 through 007 are subject to limits for TSS, oil & grease, and pH, which are pollutants commonly found in stormwater associated with industrial activity. Together with the non-numeric, technology-based requirements in Part I.D of the Final Permit, the proposed limits are believed to be appropriate to control the discharge of pollutants in stormwater from these outfalls.

3.7 Conditions and Effluent Limitations for PNPS's Internal Outfall: Demineralizer Reject Water, Station Heating, and Service Water Systems (Outfall 011) and Various Process Water/Wastewater from Waste Neutralization Sump (Outfall 014) to Cape Cod Bay Must Be Revised

Part 1.C: Permit effective date until permit expiration date

While some of the criteria in the draft permit are the same as the current permit (e.g., flow rate, TSS, sodium nitrite), tolyltriazole has been added. PNPS has been discharging tolyltriazole for years but it was not formally permitted until now. Entergy's discharge of tolyltriazole was "approved" in a letter from the EPA in 1995, after PNPS's permit was finalized and outside of the normal permit modification process. Beginning in February 2014, a leak was discovered that discharged trace amounts of sodium nitrite and tolyltriazole into Cape Cod Bay from PNPS's outfall #001. Even if the discharges were lawfully within the NPDES permit, the discharges are allowed only through outfall #011, not outfall #001, where the leak occurred. EPA should hold Entergy accountable and impose the maximum penalty for these unlawful past discharges of tolyltriazole.

EPA should not allow any further releases of tolyltriazole into Cape Cod Bay – it should be filtered and/or treated, as opposed to diluted, before discharge to Cape Cod Bay. EPA should require extraction of all of the most environmentally harmful pollutants, including tolyltriazole, from water before discharge to Cape Cod Bay. If EPA does move forward with formally permitting tolyltriazole without filtering/treatment, then it should monitor the discharge of tolyltriazole with more scrutiny to ensure limits are met, should ensure tolyltriazole is only discharged via the approved outfall, and should be prepared to impose enforcement actions when violations occur.

EPA merely asks Entergy to calculate the concentrations of sodium nitrite and tolyltriazole in the discharge canal by using a dilution factor. The idea that "dilution is a solution" is a flawed, unacceptable way to permit discharges of pollutants to Cape Cod Bay and undermines the fundamental "no-pollution" goal of the CWA.

While we know that many pollutants (including industrial chemicals) can be harmful to people and wildlife even in small amounts, the full effects of most manufactured chemicals are still unknown due to the sheer number of contaminants, the lack of information on biological effects of complex mixtures, and the fact that chemical effects are often species-specific. Dilution cannot render most pollutants harmless. These, and other, industrial chemicals have been discharged into Cape Cod Bay for more than 40 years since PNPS began operating. The draft

permit should require all pollution to be treated and removed before being dumped into Cape Cod Bay.

According to the draft permit, Entergy will need to carry out WET tests in Apr. and Oct. every other year (years 1, 3, and 5), or if no discharge occurs in these months, as soon as a discharge from these outfalls does occur. If this new permit is "administratively extended" as the current permit has been for two decades, EPA should be clear that testing would not end at year 5 and would continue despite an expired permit if needed, especially since decommissioning will be a critical time for the environment.

Response to Comment 3.7

The commenter states that the permit should not "allow any further releases of tolyltriazole" without filtering or treatment and requests that, at a minimum, EPA "should monitor the discharge of tolyltriazole with more scrutiny to ensure limits are met, should ensure tolyltriazole is only discharged via the approved outfall, and should be prepared to impose enforcement actions when violations occur." The Draft Permit proposed maximum daily limits for tolyltriazole and sodium nitrite with a monthly monitoring frequency.

Tolyltriazole is a common corrosion inhibitor for copper and copper alloy heat exchanger components in power plant cooling water systems. At PNPS, and at the recommendation of the Institute of Nuclear Power Operations, tolyltriazole is used in the reactor building and turbine building cooling water systems, station heating, and the emergency diesel generator cooling water system. *See* AR-164, AR-379. Although the use of tolytriazole associated with the turbine and reactor buildings has decreased now that the facility no longer generates electricity, it continues to be used in the remaining discharges authorized in the Final Permit for Outfalls 011 and 014. *See* AR-164. EPA authorized the use of tolyltriazole subject to the conditions and concentrations as stated in the letter from Boston Edison. *See* AR-379.

The proposed maximum daily tolyltriazole limit of 1.48 mg/L in the Draft Permit limit is based on a worst-case concentration of 20 mg/L, a maximum flow of 200 gpm from Outfall 011, and assuming initial dilution from one salt service water (SSW) pump (2,700 gpm). *See* Fact Sheet at 40-41. According to the Permittee, a tolyltriazole concentration of 2 mg/L is expected after the initial conditioning of the systems (which occurred in 1995), which would reduce the concentration after combining with just a single SSW pump running to 0.148 mg/L. *Id.* Acute toxicity (LC50) for rainbow trout is 23.7 mg/L and chronic toxicity to daphnia is 5.8 mg/L. *Id.* at 41. The concentration of tolyltriazole in the discharge canal with just one SSW pump running is well below the acute and chronic toxicity values. The Final Permit establishes a maximum daily tolyltriazole limit of 1.48 mg/L, which ensures that concentrations in the discharge canal will be below known toxicity values.

The commenter suggests that calculating the concentrations of sodium nitrite and tolyltriazole in the discharge canal using a dilution factor is inappropriate. The maximum daily limit is water quality-based. Under federal regulations, water quality-based limitations are to account for dilution of the effluent in the receiving water. 40 C.F.R. § 122.44(d)(1)(ii). Therefore, the Final Permit appropriately establishes a water quality-based limit considering minimal dilution once

combined with the flow from a single SSW pump in the discharge canal. As the commenter points out, the Draft Permit proposed that the limit would apply at Outfalls 011 (and 014) but would be reported as a calculated value based on the observed concentration divided by the available dilution at the time of discharge. The same condition applies to the proposed maximum daily limit for sodium nitrite. *See* Draft Permit Part I.C.4 and I.C.5 (footnote 5). In response to this comment, the Agencies have reconsidered how to ensure compliance with these limits. Because the limits account for dilution in the discharge canal, we have moved the compliance point to the discharge canal rather than require calculating values using a dilution factor, since the former will provide a more accurate measure of the dilution available during a discharge containing tolyltriazole and/or sodium nitrite. Therefore, the Draft Permit's proposed effluent limitations for tolyltriazole and sodium nitrite have been moved from Outfalls 011 and 014 to a compliance point at the monitoring location for Outfall 001. The Final Permit at Part I.A.1 establishes a maximum daily tolyltriazole limit of 1.48 mg/L and maximum daily limit of 2.0 mg/L for sodium nitrite, which must be monitored and reported at the compliance point for Outfall 001 in the discharge canal. Monitoring for these parameters must be conducted when PNPS is discharging from Outfall 011 and/or Outfall 014. If PNPS plans to discharge from Outfalls 011 and 014 at the same time, monitoring at the compliance point must be representative of the combined discharge.

Although the comment requests that the Final Permit prohibit any further releases of tolyltriazole into Cape Cod Bay, it provides no specific justification for such a prohibition, instead merely articulating without citation or support only general assertions about the harmful effects of "many" pollutants and that dilution cannot render "most" pollutants harmless. The commenter states that effluent containing tolyltriazole should, therefore, be filtered and/or treated, as opposed to diluted, before discharge to Cape Cod Bay, but similarly points to no technological solution for removing tolyltriazole from the effluent. The Agencies are aware of no technology that can completely remove tolyltriazole, and, as explained above, the effluent limitation in the Final Permit will ensure the concentration in the discharge canal is well below that known to result in toxic effects on aquatic organisms. The Final Permit requires whole effluent toxicity (WET) testing for Outfall 011 to be sampled from the compliance point at the Outfall 001 monitoring location. *See* Response to Comment III.10.3. This discharge is likely to be variable in quality and could potentially contain metals and other pollutants that individually or cumulatively could be toxic to aquatic life. WET testing is conducted to assess whether an effluent contains a combination of pollutants which produces toxic effects and is used in conjunction with pollutant specific effluent limits to control the discharge of toxic pollutants.

Finally, the commenter requests that testing required under the Final Permit not end at year 5 but continue during the period for which the permit is administratively continued, if needed. As was the case with the 1991 Permit, if a Permittee submits a timely application for reissuance and a new permit is not issued immediately after a permit expires, an expired permit is administratively continued until a new permit is issued. A Permittee must continue to comply with all conditions, limitations, and requirements of an administratively continued permit until a new permit is issued. In other words, the Final Permit already requires the Permittee to continue testing beyond the permit expiration date, if it is administratively continued.

4.0 Additional Permit Provisions

4.1 Part I.D Provisions

Section 5.d. states that toxic components of PNPS's effluent shall not result in any demonstrable harm to aquatic life, and section 10 states that the thermal plume shall not block, severely restrict, interfere with spawning, or change the balanced indigenous population of the receiving waters. However, PNPS's operations have already impacted marine life and will continue to do so. Page 45 of the Fact Sheet discusses 2 events of gas bubble disease (e.g., in 1973 an estimated 43,000 menhaden died from gas bubble disease) and occurrences when dissolved nitrogen exceeded 115% (2005 and 2009). Entergy's thermal effluent has also interrupted the fall migration of those species that are attracted to the thermal plume (e.g., striped bass).[35] In a 2000 letter to EPA,[36] the Massachusetts Office of Coastal Zone Management addressed Entergy's Demonstration Report by stating that the report "does not provide adequate evidence to determining how a temperature increase of just a few degrees may affect the development and survivorship of eggs and larvae or how a temperature increase may affect the future fecundity of adults exposed to the discharge plume in Cape Cod Bay." We reiterate this point – Entergy has not sufficiently shown that it's thermal effluent has no effect on marine species and communities, nor that there is no increase in toxicity of other chemicals present. Entergy should be required to fund an independent comprehensive study of the impacts of the CWIS and discharges before the permit can be renewed. In the meantime, discharges and use of the CWIS should cease. The thermal discharge variance in the draft permit cannot be supported on the basis of the outdated Demonstration Report.

Section 8 states that Entergy must notify EPA/DEP as soon as possible if activity occurs that will result in a toxic pollutant discharged that is not limited in the permit and that will exceed the highest of the notification levels. It seems that any unpermitted pollutant should be reported if it will exceed the lowest of the notification levels.

Section 12 requires that Energy continue to report "unusual impingement events," as defined in the permit provisions. We support this requirement. EPA only states that Energy should report these usual events to EPA and MassDEP by phone, but it should be clear that these events should also be reported in DMRs, and in fact be made more publicly available (immediately upon reporting to EPA and MassDEP) via a designated online reporting page. Part 12.c. requests that Entergy provide its opinion of why an unusual event occurs. In most past DMRs, Entergy only reports "natural causes," which is at best a disingenuous explanation. EPA should require Entergy to address migration and spawning seasons of the effected species and the status of the thermal effluent right before and during an event. Weather, tide and sea conditions should also be included in the report. If the Pilgrim Administrative-Technical Committee is reestablished (see below), then it should address this.

The draft permit fails to acknowledge that the 1991 permit that is still in place has a requirement for the Pilgrim Administrative-Technical Committee (PATC; sometimes also referred to as the Pilgrim Technical Advisory Committee). This science-oriented PATC is a cornerstone of PNPS's current NPDES permit, and supervised marine impacts and recommend technology improvements or mitigation efforts as needed from 1991-2001. The PATC was disbanded in 2001, shortly after Entergy bought PNPS. This is in violation of PNPS's current permit, which

requires Entergy to "carry out the monitoring program under the guidance of the Pilgrim Technical Advisory Committee."

The new permit should require the PATC – or a similar advisory committee or third-party consultant – to provide independent, transparent oversight of Entergy's compliance with the permit. It should also provide guidance for practical adjustments during the remainder of operating years as well as during decommissioning. A monitoring program is only as valuable as the periodic evaluations that assess the program and the data generated.

[35] Letter to Boston Edison from MassDEP (PATC), Oct. 15, 1998, regarding a number of recent recommendations of the A-T Committee regarding monitoring, plant impacts and fisheries habitat restoration.
[36] Letter to EPA from MassCZM, Jun. 27, 2000. Re: MCZM review of the Entergy-Pilgrim Station §316 Demonstration Report.

Response to Comment 4.1

The comment identifies several issues related to the provisions of Part I.D, specifically the requirement at Part I.D.10 that the thermal plume resulting from discharges at PNPS not block or severely restrict fish passage, nor interfere with spawning of indigenous populations of fish, nor change the balanced indigenous population of the receiving water. According to the comment, Entergy has not sufficiently shown that its thermal effluent has no effect on marine species and communities, nor that there is no increase in toxicity of other chemicals present. EPA notes that Part I.D requires that the thermal plume not interfere with migration, spawning, or change the balanced, indigenous population. There is no requirement to demonstrate that the thermal plume has *no* effect on marine species; rather, the effect of the plume on aquatic organisms must not rise to a level that the protection and propagation of a balanced, indigenous population is not assured. Attachments B and C of the Fact Sheet present MassDEP's and EPA's assessment of the potential impacts of the thermal plume and the determination that the Draft Permit temperature limits, which were based on a variance under § 316(a) of the CWA, would assure the protection and propagation of the balanced, indigenous population consistent with Part I.D.10.

Having said that, PNPS ceased operating as of June 1, 2019. Therefore, the permit conditions and effluent limitations from the Draft Permit specific to operation of the electric generation facility, which would have been effective prior to the shutdown date, are no longer applicable. The pre-shutdown effluent limitations and conditions have, therefore, been eliminated from the Final Permit. The post-shutdown limits, which are included in the Final Permit, represent more than a 98% reduction in heat load to Cape Cod Bay. *See* Response to Comment I.3.4. These thermal limits regulating the remaining heated effluent from the spent fuel pool will continue to ensure the protection and propagation of the balanced, indigenous population, including not interfering with passage or spawning. The post-shutdown thermal effluent contributes about 98% less heat to Cape Cod Bay than the thermal effluent when PNPS was generating electricity, which the Agencies had found would not result in appreciable harm at the pre-shutdown temperature limits in the Draft Permit. The Final Permit includes temperature limits consistent with post-shutdown operations at Outfalls 001 and 010 and includes the provisions in Part I.D of the Draft, now numbered Part I.A.19, associated with maintaining passage and spawning for aquatic organisms.

The comment also questions why the requirement under Part I.D.8 of the Draft Permit requires notification when activity would result in an exceedance of the highest of the notification levels, and requests that notification be required when an activity would result in exceedance of the lowest of the notification levels. This permit requirement is consistent with the regulation at 40 C.F.R. § 122.42(a). The Final Permit is likewise consistent with 40 C.F.R. § 122.42(a) and has not been changed.

The comment supports Part I.D.12 of the Draft Permit, which requires reporting "unusual impingement events," defined as more than 20 fish per hour. According to the comment, the Final Permit should require that unusual impingement events be reported in DMRs. EPA agrees that reporting unusual impingement events that occur within the month should be reported electronically in the monthly DMRs. The Final Permit at I.A.20 requires the Permittee to report the occurrence of an unusual impingement event in the DMR for the monitoring period. The trigger for reporting an unusual impingement event has been changed slightly from 20 fish per hour to 250 fish in a single 12-hour period (an average of about 21 fish per hour) or more than 1,000 fish in a single impingement event to better match the actual operation of the screens. In addition, the Final Permit requires that the traveling screens be continuously rotated (in the event that they are not already required to because the circulating pumps are operating) until the impingement rate drops below 5 fish per hour. The Permittee must submit an attachment to the DMR for that month that includes additional information about the total number of individuals entrained, the length of the event, the intake volume at the time of the event, and the weather and tidal conditions at the time of the event.

The commenter also requests that the Final Permit require the Permittee report its opinion of why an unusual event occurs, address migration and spawning seasons of the affected species, and provide the status of the thermal effluent before and during an event. The comment offers no suggestions for how the Permittee is to know the cause of the event and points out that in the past it has typically reported "natural causes." In comment III.8.3, the Permittee asserts that large impingement events, which typically involve clupeid fish, are likely caused by cold shock or secondary consequences of predation, rather than by the operation of the CWIS. This is not to say that only cold shock or predation could cause large impingement events, but to highlight that determining the cause of unusual impingement events is extremely challenging. The Final Permit requires that the actual through-screen velocity at the CWIS be no greater than 0.5 fps as the BTA for impingement, with the exception of up to 48 hours per month when one of the circulating pumps is operating and during which time the traveling screens must be continuously rotated. EPA has determined that this technology is the BTA to minimize impingement mortality, including during any unusual impingement events.

The 1991 Permit, at Part I.A.8.b. requires that the Permittee "conduct such studies and monitoring as are determined by the EPA and the State to be necessary to evaluate the effect of the operation of the Pilgrim Station, on the balanced, indigenous community of shellfish, fish, and wildlife in and on Cape Cod Bay." The creation of the Technical Advisory Committee does not appear as a requirement in either the 1991 Permit or the 1994 Modified Permit. The current permit does require biological monitoring and, until 2000, the monitoring plans were reviewed by an advisory committee. Since 2000, Entergy has continued to submit the following year's monitoring plan to EPA and MassDEP for approval and revisions. The Agencies have continued

to consult with appropriate State Agencies where appropriate, consistent with Part I.A.8.d of the 1991 Permit. The biological monitoring required by the current permit, including the recommendations of the advisory committee, was intended to evaluate the effect of operation of PNPS on the balanced, indigenous community. PNPS is no longer operating as of May 31, 2019, and the Final Permit, which reflects the substantially altered post-shutdown operations, includes limitations and conditions that will result in a 98% reduction in the heat load to Cape Cod Bay and a 92% reduction in water withdrawals from Cape Cod Bay. These requirements are consistent with the best performing technologies to minimize the impacts from heat and cooling water intake structures in the industry. As such, the Final Permit requires monitoring to ensure compliance with the temperature, intake, and flow limitations but does not require continued biological compliance monitoring. *See* Response to Comment III.8.

4.2 Part I.F: The Draft Permit Does Not Comply with the CWA § 316(b) Because It Fails to Ensure that PNPS's CWIS Uses the BTA for Minimizing Adverse Environmental Impact

Under § 316(b) of the Clean Water Act, "any standard established pursuant to section 1311 of this title or section 1316 of this title and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available [BTA] for minimizing adverse environmental impact." 33 U.S.C.A. § 1326(b). PNPS's once-through cooling system is undeniably not BTA – even before operations began, in the 1970s, the Commonwealth requested closed-cycle cooling be installed at PNPS, which would cause less environmental damage and comply with state laws. Boston Edison sued to prevent having to install a closed-cycle system, winning the case and installing the cheaper, perennially destructive once-through CWIS that PNPS still uses today. Continuing to allow PNPS to operate with the same CWIS that was installed in the 1970s is a clear violation of the CWA requirement for BTA.

Failure to implement BTA causes massive environmental destruction through impingement, entrainment, thermal pollution, and scouring of the sea floor. PNPS's impingement impacts alone include twenty-one "large impingement events," where 1,000 to 107,000 fish have been killed in, oftentimes, a matter of a few days. The marine species affected are part of the larger ecosystem of Cape Cod Bay, and impingement impacts extend far beyond the mere number of fish killed. The same is true for entrainment – the cumulative and ecosystem-wide impacts of entraining large numbers of fish eggs and larvae has largely been ignored. Extensive impingement and entrainment of marine organisms will continue under the new draft permit.

In Attachment D to the draft permit, EPA states that the withdrawal of cooling water by PNPS's CWIS removes and kills billions of aquatic organisms, predominantly fish eggs and larvae, but also adult fish, shellfish, crustaceans and other aquatic life, from Cape Cod Bay. In addition to these direct impact, the loss of aquatic organisms due to CWISs can have indirect, ecosystem level effects, including disruption of aquatic food webs, disruption of nutrient cycle and other biochemical processes, alteration of species composition and overall levels of biodiversity, as well as degradation of the overall aquatic environment. While Entergy claims that impingement and entrainment mortality at PNPS are not of a magnitude to constitute an adverse environmental impact, we agree with EPA that Entergy's adverse impacts are clear. These impacts warrant

terminating the permit that allows use of the destructive CWIS; impacts also warrant dedicated monitoring and mitigation until the time of shutdown and until decommissioning is complete (up to 60 years).

Despite the dictates of § 316(b), the EPA has taken an impermissibly broad reading of §1326(b) that expands BTA to include the operational measures of a facility, here, those of PNPS. The EPA considers PNPS's proposed cessation of electricity generation by June 1, 2019 to represent BTA at PNPS because it will lead to a 96% reduction in flow. Draft Authorization to Discharge under the National Pollution Discharge Elimination System (see attachment D at 86).

In short, the EPA inappropriately treats the implementation of no new technology at PNPS as reflective of BTA. The EPA finds its justification in *Entergy Corporation v. Riverkeeper, Incorporated*, which held that the phrase, "best technology available," does not preclude cost-benefit analysis. 556 U.S. 208 at 220. As a consequence, the EPA has determined that:

> If all technologies considered have social costs not justified by the social benefits, or have unacceptable adverse impacts that cannot be mitigated, the Director may determine that no additional control requirements are necessary beyond what the facility is already doing. The Director may reject an otherwise available technology as a BTA standard for entrainment if the social costs are not justified by the social benefits.

40 C.F.R. § 125.98(f)(4). The EPA does just this when it dismisses the inclusion of cooling towers, assisted recirculation, and variable frequency as potential BTA for entrainment. However, the EPA's rule and application is not supported by the Supreme Court decision nor is it supported by the dictates of the Clean Water Act. For one, the Supreme Court decision permits the inclusion of a cost benefit analysis, but it does not permit a complete disregard for the dictates of 1326(b) which requires the location, design, construction, and capacity of CWIS to reflect the BTA.

In the present case, the CWIS at PNPS does not reflect BTA because it utilizes a once-through cooling system that is detrimental to aquatic life. Furthermore, the EPA's dismissal of potential BTA is not supported by the Supreme Court decision and runs afoul of the CWA. This is because the EPA's draft authorization leads to the absurd result that a power plant can sit on its outdated technologies, and its structures can still be considered to reflect BTA.

Technologies exist today that could entirely replace Entergy's CWIS or at least mitigate some of the environmental damage and pollution from PNPS. For example, approximately 40% of U.S. nuclear reactors use closed-loop, or some other type of recirculating system for cooling. Closed-cycle cooling is easily available for PNPS.[37] The draft permit Fact Sheet (page 46) addresses the applicability of closed-cycle cooling and the technology is discussed at length in Attachment D. Entergy not surprisingly came to the self-interested conclusion that converting to a closed system is not feasible because it would substantially impact the capacity of PNPS to generate electricity and is generally not consistent with a nuclear power plant designed for baseload generation. This is not an adequate justification for Entergy's refusal to install closed cycle cooling.

More than 40 years ago, prior to construction of PNPS, and before the CWA, the Commonwealth of Massachusetts's predecessor to MassDEP sought to require that PNPS's original owner, Boston Edison, install a closed-cycle cooling water system. Boston Edison filed a legal challenge to avoid implementing a closed-cycle system, and eventually prevailed. Yet in 2011, the Massachusetts Superior Court of Appeals found that "the Clean Waters Act, G. L. c. 21, §§ 26-53, confers on the Department of Environmental Protection (department) the authority to protect the water resources of the Commonwealth, and that that authority is broad enough to permit the department to regulate not only water pollution in the traditional sense (i.e., the discharge of harmful substances into a body of water) but also the intake of water, specifically, the components of industrial facilities that withdraw water from surface waterbodies."[38] Despite this, PNPS continues to use the more environmentally destructive, and outdated once-through cooling system.

If operations continue until 2019 as planned, and if EPA is unwilling to require a closed-cycle cooling system, there are other systems not considered here by EPA that have been implemented and could reduce impacts at PNPS. For example, the Beaudrey[39] water intake protection (WIP) system was approved by EPA in 2014 as BTA pursuant to 316(b) and has been in use in other electrical generating facilities. This system is presently under review in the Taunton River estuary for water intake up to 20 MGD to supply raw water to the water supply desalination plant. It is a system that is used world-wide, including in nuclear facilities' CWIS.[40] The Beaudrey WIP is a system designed to retrofit existing intake screening methods, and appears to achieve improved results to reduce mortality from impingement and entrainment, and is capable of handling velocities of 0.5 fps. The fish return system appears to be an improvement over the travelling screens and backwashing system, providing a gentler return for live organisms to their source water. Entergy apparently dismissed this alternative in a 2008 report to EPA (report in response to an EPA §308 letter) due to the fragility of species impinged by PNPS and the system had not yet been proven at U.S. facilities.[41] WIP screens have been used at non-U.S. based nuclear facilities, and at other electricity generating facilities in the U.S. Further, additional studies have come out (as recently as 2016) that look at impacts to species that are found near PNPS. PNPS should be required to evaluate and consider this, and other alternatives, to upgrade its antiquated and non-conforming once-through cooling system that has led to significant mortality of marine organisms over 40+ years of operation. The Beaudrey WIP system could designed to retrofit PNPS and be installed during PNPS's shutdown for refueling in 2017, and if the alternatives analysis suggests, could be required for the period post shutdown, and during decommissioning activities and site clean-up.

Modified Traveling Screens are another option that EPA must consider for PNPS. The EPA has determined in its Final Rule for existing facilities that the BTA for minimizing the adverse impacts of impingement mortality is modified traveling screens with a fish friendly return. 79 F.R. 48337. Additionally, the EPA has concluded that the existing traveling screens at PNPS lack specific measures for the protection of fish. Nevertheless, the EPA has excused PNPS's obligations because it determined that PNPS "may not complete the necessary upgrades and impingement technology performance optimization study before the facility would comply with the actual through-screen velocity BTA." Draft Authorization to Discharge under the National Pollution Discharge Elimination System (See Attachment D at 90).

There is no support for the contention that PNPS is unable to install upgrades and perform the accompanying study before June 1, 2019, and that contention should not excuse PNPS's obligations for the next three years. Modified traveling screens with a fish friendly return have already been established as BTA and the installation of a modified traveling screen with a fish friendly return will decrease impingement. The EPA overlooks the benefits of requiring modified traveling screens when it claims that "such improvements to the traveling screen and fish return are not expected to provide as great a reduction in impingement mortality as that associated with shutdown. Draft Authorization to Discharge under the National Pollution Discharge Elimination System (See Attachment D at 90). While shutdown will provide greater benefits than fish screens, it will not do so for another three years. On the other hand, modified traveling screens with fish friendly return can minimize the destruction of aquatic life during this time.

[37] Bechtel Power Corporation. 2013. Final Technologies Assessment for the Alternative Cooling Technologies or Modifications to the Existing Once-Through Cooling System for Diablo Canyon Power Plant (Draft). Report No. 25762-0003H-G01G-0001.
[38] ENTERGY NUCLEAR GENERATION COMPANY vs. DEPARTMENT OF ENVIRONMENTAL PROTECTION. 459 Mass. 319. February 7, 2011 - April 11, 2011. Superior Court, Suffolk.
[39] E. Beaudrey & Cie.
[40] See: https://beaudrey.securesites.com/page.php?language=English&file_name=products-wip.html
[41] See: Letter from EPA to NRC, July 10, 2014. Re: Clean Water Act Permit for Pilgrim Station in Plymouth, MA, and Nuclear Safety Issues Alleged by the Facility. <http://www.capecodbaywatch.org/wp-content/uploads/2012/10/Pilgrim-EPA-letter-to-NRC-071014-1.pdf?d23684>

Response to Comment 4.2

As the comment states, Section 316(b) of the CWA provides that any standard established pursuant to section 301 or 306 of the CWA and applicable to a point source must require that the location, design, construction, and capacity of cooling water intake structures (CWISs) reflect the best technology available (BTA) for minimizing adverse environmental impact. 33 U.S.C. § 1326(b). Adverse impacts include death or injury to aquatic organisms by impingement (the process by which fish and other organisms are killed or injured when they are pulled against the CWISs screens as water is withdrawn from a waterbody) and entrainment (the process by which early life stages of aquatic organisms are killed or injured when they are pulled into the CWIS and sent through a facility's cooling system along with water withdrawn from the waterbody for cooling purposes). *See, e.g.*, 40 C.F.R. § 125.92(h), (n). EPA clearly identifies the impacts from impingement and entrainment mortality at the CWIS at PNPS as adverse both in the Fact Sheet and Attachment D accompanying the Draft Permit, and in this Response to Comments. *See, e.g.*, Response to Comment III.2.1.

The comment generally asserts that "PNPS' once-through cooling system is undeniably not BTA" and that "[c]ontinuing to allow PNPS to operate with the same CWIS that was installed in the 1970s is a clear violation of the CWA requirement for BTA."[21] Section 316(b) of the CWA requires that the location, design, construction and capacity of CWISs reflect the BTA, but does

[21] The comment is not particularly clear on this point, but to the extent it relies for this assertion on an earlier "request" by the Commonwealth for closed-cycle cooling to be required at PNPS, it fails to explain why, if the erstwhile owner sued to avoid having to install CCC and won, the historic request should have preclusive effect on the Agencies' BTA determination now.

not further define the standard of BTA nor does it set forth the specific factors that EPA must consider in determining BTA. In the absence of applicable regulations implementing § 316(b), the decision as to what represents the BTA for each individual facility is one that EPA has been making on a case-by-case basis since the 1970s. On August 15, 2014, EPA published *Final Regulations to Establish Requirements for Cooling Water Intake Structures at Existing Facilities*, 79 Fed. Reg. 48,300 (Aug. 15, 2014) (codified at 40 C.F.R. part 122 and part 125, subpart J) (hereinafter, the "Final Rule"). The Final Rule became effective on October 14, 2014, prior to issuance of the Draft Permit, and, in 2018, was upheld by the U.S. Court of Appeals for the Second Circuit. *Cooling Water Intake Structure Coal. v. EPA*, 905 F.3d 49. The Final Rule includes a national performance standard as the BTA to address impingement mortality and a framework for site-specific determination of entrainment mitigation requirements at existing facilities like PNPS. These national requirements reflect the BTA for minimizing adverse environmental impact at existing facilities consistent with CWA § 316(b). As explained below, the Draft Permit's determination of the BTA for PNPS was made consistent with the requirements of the Final Rule and, as such, is not a violation of the requirements of the CWA. And while we agree with the comment that PNPS' CWIS has caused adverse environmental impact over the years, *see* Fact Sheet, Att. D at 23-30, we do not agree that the same level of impact will continue under the Final Permit, in part because the facility has stopped generating electricity and limits on flow and temperature have been significantly reduced compared to such limits in past permits for the facility. [22] Moreover, the cooling needs of the facility are expected to continue to decrease further as the spent fuel cools, thereby further reducing the volume and/or temperature of heated discharges. *See* Response to Comment III. 4.2.

The comment argues that EPA has taken an "impermissibly broad reading" of § 316(b) by expanding BTA to include "operational measures of a facility," and that in doing so, "EPA inappropriately treats the implementation of no new technology at PNPS as reflective of BTA." First, EPA maintains that including operational measures as a component of the BTA is contemplated in the Final Rule and is not an "impermissibly broad reading" of the statute, as explained more below. Second, the conclusion that no additional technology is required to meet the BTA for impingement mortality and entrainment is not reflective of the BTA determination; rather, the permit conditions that restrict cooling water flow and through-screen velocity after cessation of generation represent the BTA at PNPS. That PNPS is not required to implement any additional technology to meet these post-shutdown conditions is not inconsistent with the 2014 Final Rule. We determined that the "maximum reduction in entrainment warranted," 40 C.F.R. § 125.98(f), was that achieved by maintaining the once-through system without additional controls but with the flow reductions that accompanied the cessation in electrical generating operations. The comment does not explain how such a determination conflicts with the Final Rule.

[22] The Agencies have reviewed and considered comments on both the pre- and post-shutdown BTA. As explained elsewhere, *see, e.g.*, Responses to Comments in Section I.3.0, the Agencies have not included in the Final Permit the limits and conditions of the Draft Permit applicable to the pre-shutdown period, because the facility is no longer generating electricity. As such, the Agencies have not addressed comments specific to pre-shutdown limits removed from the Final Permit except where a comment indicates that a concern or issue about a pre-shutdown limit would also be relevant to the post-shutdown limit.

Under CWA § 316(b), one element of a CWIS that must reflect the BTA is capacity. In the Final Rule and in prior § 316(b) rulemakings, EPA assumes that entrainment and impingement (and associated mortality) are proportional to a source water intake volume. A reduction in intake flow, or capacity, results in a similar reduction in the number of organisms subject to impingement and entrainment. *See* 79 Fed. Reg. 48,331. In the Final Rule, EPA describes "variable speed pumps, seasonal operation or seasonal flow reductions, unit retirements, use of alternate cooling water sources, water reuse, and closed-cycle cooling systems" as common flow reduction technologies that could be considered as the BTA for reducing impingement and entrainment. *Id*. For example, under the Final Rule, a facility could scale back its operation (or not operate at all) during specific peak entrainment periods to reduce or eliminate the volume of cooling water withdrawn and, in turn, the numbers of organisms entrained or impinged. In addition, flow reduction due to unit closures could be included as part of a facility's impingement and entrainment mortality reduction strategy. *See id.* at 48,332. In addition, under 40 C.F.R. § 125.94(c)(6), an existing facility may comply with the impingement mortality BTA standard by implementing a system of technologies, management practices, and operational measures. Another compliance alternative, at § 125.94(c)(12), considers the annual average capacity utilization rate of a generating unit. Operational measure, as defined at 40 C.F.R. § 125.92(w), means "a modification to any operation that serves to minimize impact to all life stages of fish and shellfish from the cooling water intake structures." Thus, the Final Rule clearly contemplates operational measures including, but not limited to, flow reductions, as methods for complying with the BTA requirements of § 316(b). Considering operational measures in the determination of the BTA for PNPS is not an "impermissibly broad" reading of § 316(b).

The comment states that "EPA considers PNPS's proposed cessation of electricity generation by June 1, 2019 to represent BTA at PNPS" and argues that that this inappropriately treats implementation of no new technology as reflective of BTA. Attachment D of the Fact Sheet (at 86) states:

> EPA proposes that, considering the applicable factors at § 125.98(f)(2) and (3) and in light of Entergy's announcement to shut down the facility thereby drastically reducing its cooling water intake, instituting no additional entrainment control requirements prior to the earlier of the cessation of electricity generation or June 1, 2019 and, thereafter, eliminating water withdrawals for the main condenser and reducing other cooling water and other miscellaneous water withdrawals, resulting in a 96% reduction in flow, represents the best technology available for minimizing entrainment at PNPS.

The cessation of electrical generation is not the BTA. The reduction in the withdrawal of cooling water flow is the BTA, and Part I.F of the Draft Permit establishes technology-based BTA standards for the operation of the CWIS to minimize impingement and entrainment consistent with the Final Rule. In other words, EPA followed the framework established in the Final Rule and determined that the "maximum reduction in entrainment warranted," 40 C.F.R. § 125.98(f), was that achieved by the once-through system with the flow reductions accompanying the cessation in electrical generating operations. EPA described in the Fact Sheet why it had "rejected any entrainment control technologies or measures [e.g., closed-cycle cooling, assisted recirculation] that perform better than the selected technologies *or measures*." *Id.* § 125.98(f)(1)

(emphasis added); *see* Fact Sheet, Att. D at 37-86. In consideration of this and other comments received on the Draft Permit, Parts I.A.1, I.A.3, and I.C of the Final Permit limit flow for the service water pumps and circulating water pumps. Compliance with these flow limits enables PNPS to achieve a flow reduction greater than 92% as compared to the current permit, which is commensurate with the anticipated flow reduction that would have been achieved if the Permittee installed and operated closed-cycle cooling. *See* Fact Sheet, Att. D at 45. For impingement, the BTA is an actual through-screen velocity of no more than 0.5 fps consistent with 40 C.F.R. § 125.94(c)(3). The Draft Permit proposed continuous or near-continuous rotation of the traveling screens as an interim BTA prior to shutdown, but because PNPS has ceased generation this interim requirement has been eliminated. Post-shutdown, the Final Permit does require continuous rotation of the traveling screens during unusual impingement events and when operation one of the circulating water pumps (pump operation not to exceed 48 hours in a calendar month). The BTA determination appropriately adheres to the framework established in the Final Rule.

PNPS, as a result of the proposed shutdown, will not require installation of a *new* technology to meet the BTA standards; nonetheless, the resulting flow reduction and through-screen velocity are consistent with the highest performing technologies to reduce the adverse impacts of impingement and entrainment. The comment argues that this BTA determination "inappropriately treats the implementation of no new technology at PNPS as reflective of BTA." Neither the CWA § 316(b) nor the implementing regulations under the Final Rule require that a facility install any specific technology to minimize adverse environmental impact, rather, the design, location, construction, and capacity of the CWIS must reflect the BTA.[23] That PNPS will minimize the adverse impacts of its CWIS by drastically reducing its flows, rather than by installing new technology, does not diminish the environmental benefits of the permit requirements for impingement and entrainment mortality.

The comment asserts that the Draft Permit does not represent BTA because it continues to allow use of a once-through cooling system that is detrimental to aquatic life. Under the Final Rule, a permittee can meet the BTA standards for impingement mortality at 40 C.F.R. § 125.94(c) by complying with one of 12 alternatives, only one of which (i.e., (c)(1)) would necessarily prevent the use of a once-through cooling system. The BTA standards for entrainment are established on a site-specific basis and similarly do not prohibit use of a once-through cooling system. 40 C.F.R. §§ 125.94(d), 125.98(f). The Final Rule, which implements requirements for existing CWISs under § 316(b), explicitly recognizes that closed-cycle cooling will not be the BTA at every facility, based in part on the remaining useful life of the facility at issue, among other potential considerations. 79 Fed. Reg. at 48,342 ("Considering the long lead time to plan, design, and construct closed-cycle cooling systems, EPA determined that the [permitting authority] should have the latitude to consider the remaining useful plant life in establishing entrainment mortality requirements for a facility."); *id.* ("[G]iven that EPA estimates that 25 percent of

[23] EPA takes a similar approach in the Phase I Rule, which establishes requirements for cooling water intake structures at new facilities. 66 Fed. Reg. 65,278 (Dec. 18, 2001). A new facility may comply with the BTA requirements by achieving a flow reduction commensurate with closed-cycle cooling and a through-screen velocity no greater than 0.5 fps. See 40 C.F.R. § 125.84(b). The reuse and recycling of cooling water for purposes other than steam electric condensing (*e.g.*, for process water) are considered analogous to flow reduction for the purposes of meeting these capacity requirements. In other words, a facility is required to meet the performance standard in the rule and is provided some flexibility in how that standard is achieved. *See* 66 Fed. Reg. 65,278.

existing facilities may face some geographical constraints on retrofitting closed-cycle cooling and concerns about air emissions and the remaining useful life of a facility, EPA rejected the option of requiring uniform entrainment controls based on closed-cycle cooling."). Operation of a once-through cooling system at PNPS pursuant to the Final Permit is not inconsistent with the Act or regulations, and the comment offers no support for its statement suggesting otherwise. The Agencies determined that the BTA at PNPS is a 92% reduction in flow and an actual through-screen velocity no greater than 0.5 fps and that together, these measures will minimize the adverse environmental impacts from the CWIS on Cape Cod Bay. EPA established that these requirements represent the maximum reduction in entrainment warranted after consideration of the relevant factors at 40 C.F.R. § 125.98(f)(2) and (3). 40 C.F.R. § 125.98(f). *See* Fact Sheet, Att. D at 74-86.

As we have already noted, one of the relevant factors a permitting authority must consider when establishing site-specific requirements for entrainment under the Final Rule is useful plant life. *See* 40 C.F.R. § 125.98(f)(2)(iv). As explained in Attachment D of the Fact Sheet (at 75-76), major structural and operational changes may not be an appropriate response for a facility that will not be operating in the near future. During the development of the Draft Permit, Entergy announced its decision to close PNPS before or during 2019. In fact, PNPS ceased electricity generating operations and shut down on May 31, 2019. Letter from Brian Sullivan, Site VP, Entergy Nuclear Operations, Inc., to NRC (June 10, 2019), AR-691; Press Release, Entergy Corp., Pilgrim Nuclear Power Station Shut Down Permanently (May 31, 2019), AR-688. Further, on June 9, 2019, Entergy "permanently removed [the fuel] from the PNPS reactor vessel," acknowledging that its license therefore "no longer authorizes operation of the reactor." Letter from Brian Sullivan, Site VP, Entergy Nuclear Operations, Inc., to NRC (June 10, 2019). The relatively limited lifespan of the plant, and the dramatic changes in operations and, particularly, in water withdrawals, that result from this shutdown were properly considered as part of the BTA determination. Retrofitting a nuclear power plant with closed-cycle cooling is a complex process that requires a lengthy construction timeline. Entergy estimated that a retrofit at PNPS would require a minimum of 4 years. The plant was scheduled to, and did, cease operations less than four years after the Agencies issued the Draft Permit, before any reduction in entrainment would have been realized from operation of cooling towers based on the anticipated schedule.[24] In addition, to the extent the comment asserts that EPA eliminated closed-cycle

[24] The comment indicates that closed-cycle cooling is used at many nuclear reactors in the U.S. and that closed-cycle cooling is "easily available" at PNPS. EPA agrees that nuclear facilities may elect or be required to install closed-cycle cooling to comply with requirements under § 316(b), but the comment does not provide any site-specific evidence to support the claim that a retrofit at PNPS would be easy. Instead, the comment cites a study of closed-cycle cooling at Diablo Canyon Nuclear Power Station in California. EPA notes that Bechtel's 2012 *Third-Party Technical Assessment for Closed-cycle Cooling Water Technologies for the Diablo Canyon Power Plant* (AR-709) did not indicate that closed-cycle cooling was easily achievable at that facility either, stating (at 52) that "closed cooling systems…are considered feasibly constructible based on current day construction methods practice, and knowledge. However, all of the systems will have their own challenging issues and degree of difficulty." While none of the closed-cycle systems evaluated for the Diablo Canyon Power Plant had fatal flaws that would render them unavailable, neither did the study conclude that a closed-cycle cooling system retrofit would be easy. Thus, the comment does not provide support for its claim that closed-cycle cooling is "easily available" at PNPS. As the Fact Sheet acknowledges, Fact Sheet, Att. D at 37-46, the challenges to installing closed-cycle cooling at PNPS are not insignificant, even if the technology is technically available. Having said that, EPA eliminated closed-cycle cooling from further consideration on the basis of useful plant life, rather than feasibility/infeasibility of the technology or

cooling and assisted recirculation as available technologies for reducing entrainment based solely on social costs, it is incorrect.[25] EPA considered the social costs of retrofitting PNPS with closed-cycle cooling and assisted recirculation but rejected the two options as available technologies largely because they could not be built and put into service before the facility shut down. In other words, EPA determined that closed-cycle cooling and assisted recirculation were not available based in large part on the limited remaining useful life of the plant. 40 C.F.R. § 125.98(f)(1), (2)(iv).

The comment asserts that the Final Rule and its application in this permit proceeding "is not supported by the Supreme Court decision" in *Entergy Corporation v. Riverkeeper, Inc.*, 556 U.S. 208 (2009), "and runs afoul of the CWA" because an analysis that does not determine that a facility must install additional entrainment technologies is an "absurd result." The comment fails to explain, however, how the Supreme Court decision in *Entergy v. Riverkeeper* or the CWA foreclose a determination that no additional entrainment technologies are warranted, particularly where, as here, the remaining useful life of the facility is so limited. As noted earlier, EPA followed the framework established in the Final Rule, which the U.S. Court of Appeals for the Second Circuit has since upheld as a reasonable interpretation of the Clean Water Act, including the rule's consideration of remaining useful life in determining availability. *Cooling Water Intake Structure Coal.*, 905 F.3d at 58, 67. Additionally, and as also noted earlier, the Final Rule recognizes that flow reductions resulting from changes in operation and unit closures are properly considered in a BTA determination. 79 Fed. Reg. at 48,331-32. And to the extent that the comment asserts that the Massachusetts Supreme Judicial Court's ("SJC") decision in *Entergy Nuclear Generation Co. v. Department of Environmental Protection*, 944 N.E.2d 1027 (Mass. 2011), requires a determination that closed-cycle cooling is the BTA at PNPS, the comment does not point to anything in that opinion that would support such an assertion. We agree that the SJC held that MassDEP has the authority under the Massachusetts Clean Waters Act to regulate cooling water intake structures, but the opinion does not dictate what specific BTA determination must be made for PNPS. Nor does the opinion ever consider the issue of remaining useful life as a consideration in the DEP's exercise of that authority.

The commenter suggests that the BTA determination in the Draft Permit ignores the cumulative and ecosystem-wide impacts of entraining large numbers of fish eggs and larvae and suggests that these impacts merit both the termination of a permit that "allows use of the destructive CWIS" and "dedicated monitoring and mitigation until the time of shutdown and until decommissioning is complete (up to 60 years)." Attachment D of the Fact Sheet (at 13-30) plainly describes the adverse impacts associated with operation of the CWIS. EPA describes the impacts of entrainment and impingement in terms of the loss of billions of individual early life stages and hundreds of thousands of juvenile and adult fish, invertebrates, and adult equivalent fish, and the ecological impacts as a result of the loss of prey base. EPA also assessed the site-specific impacts of the CWIS on several individual species, including winter flounder, river herring, rainbow smelt, and Atlantic cod. Finally, EPA evaluated the direct impacts of the CWIS

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some other factor. Like PNPS, the owner of Diablo Canyon announced its decision to close the plant in 2016, which was approved by the California Utilities Commission in 2018.

[25] Nor did EPA necessarily accept Entergy's conclusion regarding feasibility and eliminate closed-cycle cooling on that basis. *See* Fact Sheet, Att. D at 37-46, 62-63.

as one of multiple, cumulative stressors affecting the aquatic community in Cape Cod Bay. In each case, EPA identified impingement and entrainment as adverse impacts that must be addressed by implementing the best technology available consistent with § 316 and the 2014 Final Rule. EPA notes that the comment does not identify any specific deficiency in the Fact Sheet's evaluation of the adverse impacts. The Fact Sheet (at 79-85) evaluates the potential environmental benefits of implementing technologies to minimize entrainment and impingement at PNPS. The comment also fails to identify any deficiencies in this analysis to support its statement that any benefits were ignored. The Final Permit includes BTA requirements that ensure that PNPS will achieve a reduction in flow greater than 92% and will consistently operate the CWIS at an actual through-screen velocity no greater than 0.5 fps. The actual through-screen velocity may increase to 0.9 fps when PNPS must operate one circulating water pump. The Final Permit limits operation of a circulating water pump to no more than 48 hours over a 28-day period, which allows PNPS to achieve an actual through-screen velocity of less than 0.5 fps about 93% of the time. When one of the circulating water pumps is operating, the Permittee must rotate the traveling screens continuously, which has been observed to reduce impingement mortality of non-fragile species in PNPS-specific studies. *See* AR-460. Together, these requirements reflect the BTA for minimizing the impacts from impingement and entrainment at PNPS's CWIS. *See* 40 C.F.R. § 125.94(c)(6) and 125.94(d). The monitoring requirements in the Final Permit, which are consistent with the Final Rule, are sufficient to ensure compliance with the BTA to minimize impingement mortality and entrainment at PNPS. *See* 40 C.F.R. §§ 125.94(c)(1) and (3), and §§ 125.96(a) and (b). With respect to the comment's assertion, without elaboration, that the impacts of PNPS' CWIS "warrant dedicated monitoring and mitigation . . . until decommissioning is complete (up to 60 years)," we provide further explanation for the basis for post-shutdown monitoring requirements in other responses, *see, e.g.*, Response to Comment I.5.5, and address the commenter's specific comments on "mitigation" above, *see* Response to Comment I.2.3.

Finally, the commenter asserts that other available technologies to reduce impingement and entrainment at PNPS, such as the Beaudrey Water Intake Protection (WIP) screen or modified traveling screens, were not fully considered. WIP screens are designed with large disks divided into pie-shaped wedges that rotate around a center axle perpendicular to the intake flow (Figure 1). A stationary suction scoop mounted over one section of the disk vacuums debris and organisms as each wedge rotates under the scoop. A fish-friendly pump transports the organisms and debris to a return trough. *See* AR-717 at 2-7. This design eliminates "carryover" because the screen face, vacuum, and pump are all located on the same side of the screen. The screen material is designed to minimize impacts and organisms remain submerged for the duration of impingement and transport to the source water body. The commenter supports this technology, noting that the WIP screen "appears to achieve improved results to reduce mortality from impingement and entrainment and is capable of handling velocities of 0.5 fps." The comment states that the WIP screen's fish return system is gentler than the traveling screen and backwash system and that studies have observed benefits to species found at PNPS.[26]

[26] A WIP screen has not been demonstrated to achieve measurable reductions in impingement and entrainment mortality of early life stages of species common to Cape Cod Bay. A recent study of the effectiveness of WIP screens for protecting early life stages of fish demonstrated that larger fish and lower approach velocities resulted in greater survival, and overall survival was relatively high (greater than 60%) for larvae and juveniles of the species

In the Draft Permit, EPA did not consider traveling screens, including the WIP screen, as an available technology for entrainment, because this technology is not considered effective for reducing entrainment.[27] Screens must consist of fine mesh to prevent entrainment of eggs and larvae, and fine mesh screens may lead to increased mortality of impinged eggs and larvae that would have otherwise been entrained. *See Technical Development Document for the § 316(b) Existing Facilities Rule* (TDD) at 6-23 and 6-45 to 48. WIP screens have been shown to be as effective or even more effective than modified traveling screens for reducing impingement mortality for many species. *See Id*. at 6-40 to 41. However, WIP screens to reduce entrainment at PNPS would likely have to be fitted with mesh sizes in the range of 0.5 to 1.0 mm. In addition, there are technical challenges to the installation of WIP screens that must be considered in an evaluation of this technology for PNPS.

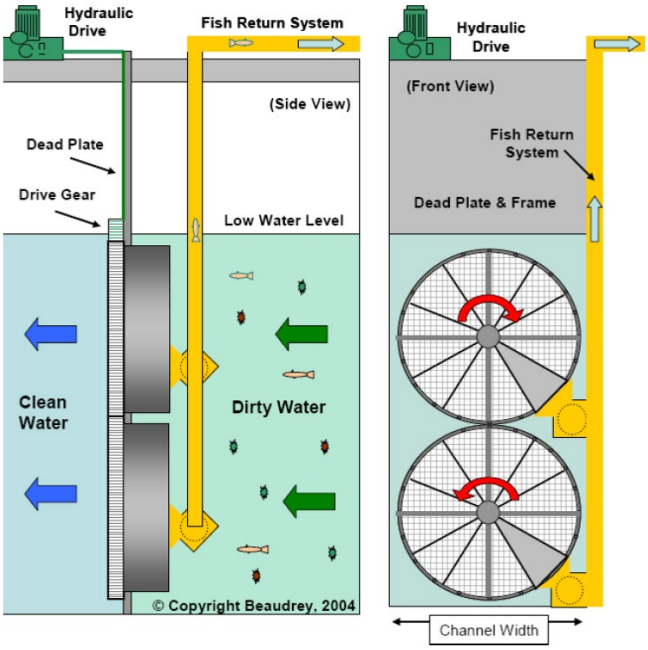

Figure 1. Schematic of a Beaudrey WIP Screen. (Source: Beaudrey).

According to the manufacturer, WIP screens can be installed in the existing traveling screen bays, which can make for easier and more cost-effective installation. However, because of the

tested. *See* AR-707. However, the study only observed early life stages of freshwater species: bigmouth buffalo, white sucker, bluegill, and common carp. The study notes that the results are believed to be indicative of performance with marine species of comparable hardiness, but species commonly entrained at PNPS are not likely to act similarly to the tested species. The study notes that entrainment at coastal power plants tends to be dominated by clupeids (American shad, blueback herring, Atlantic menhaden) and that these species are unlikely to be as hardy as the tested species. In addition, the mean larval length in the study was 26 mm; mean larval length of the most commonly entrained species at PNPS tends to be less than 10 mm. *See* AR-526. In addition, the study used 2 mm screens, but this mesh size is not likely to be effective for excluding Labrid (cunner-tautog-yellowtail) eggs, commonly entrained at PNPS, which are about 0.8 mm. While a WIP screen is not a proven technology for effectively reducing entrainment in a coastal system, this technology may be available to reduce impingement mortality at PNPS. Again, however, a study of impingement survival for species, or species similar to those, commonly entrained at PNPS is unavailable. The WIP study at North Omaha Station (AR-718) observed impingement survival of 90% or more for hardy, freshwater species (channel catfish, bluegill), as well as relatively high survival (75%) for emerald shiner and fathead minnow. The study demonstrates that this technology can effectively reduce impingement mortality for hardier species, but there is no evidence to support this technology as the BTA for impingement at PNPS, where impinged species are more fragile. The comment includes a reference to a study "as recent as 2016" but the reference was not provided in either the footnote or the references in the comments. EPA was unable to find a study of the WIP from 2016.

[27] Entergy evaluated traveling screens in its 2008 Engineering Response (AR-489 at 35) and concluded that upgrading the traveling screens, including to a WIP screen, would not measurably reduce impingement mortality because the majority of mortality at PNPS (89%) involves Atlantic menhaden and Atlantic silversides, which are not expected to survive screen impacts associated with impingement regardless of the screening technology employed.

design, the WIP screen has a smaller dimension than the conventional traveling screen (see Figure 1). If the same number of screen bays are replaced with the WIP screens, the through-screen velocity will increase because the flow rate will be withdrawn through a smaller screen area. If PNPS were to install WIP screens without increasing the existing through-screen velocity (or to achieve, as the comment suggests, through screen velocities of no greater than 0.5 fps), the existing intake structure would have to be expanded to accommodate additional screens. Similarly, because the screen mesh affects the velocity, decreasing the mesh size of WIP screens to exclude early life stages of marine fish (*e.g.*, less than 1 mm) would also necessitate additional screens to accommodate the required cooling water volume, which would require expansion of the existing intake structure. Expanding the intake structure would be more costly and would likely add a significant amount of time to the project as compared to simply installing new WIP screens in the existing bay. From a technical standpoint, while a WIP screen may be feasible for PNPS, it is not likely that it would meet the BTA requirements indicated in the comment without significant expansion of the CWIS. Moreover, the technology is not as effective as reducing impingement mortality and entrainment as the flow and intake velocity BTA requirements that can be achieved with the flow reductions associated with the shutdown.

The commenter also states that modified traveling screens are a proven technology for reducing impingement and that EPA overlooked these benefits in its analysis. The Final Rule's standard for impingement mortality is based on the performance of modified traveling screens, in part because this technology has demonstrated effectiveness and is widely available throughout industry. *See* 79 Fed. Reg. 48,328-9. The Final Rule requires that this technology be optimized to minimize impingement mortality of all *non-fragile* species. *Id*. Though modified traveling screens are available and may reduce impingement of non-fragile species at PNPS, more than 65% of total impingement is comprised of fragile species that are not expected to survive impingement even with modified traveling screens. *See* Fact Sheet Attachment D at 21, 91. In other words, implementing either a modified traveling screen or a WIP screen is unlikely to effectively minimize the majority of impingement mortality at PNPS, which is comprised of fragile species. Moreover, the effectiveness of either technology is surpassed by the effectiveness of the reduction in the actual intake velocity achieved following the shutdown of PNPS, which is a more biologically protective BTA standard for impingement mortality for all species, not just those classified as non-fragile.

After considering the points raised in the comment, EPA maintains that the BTA performance standards in the Final Permit, which require PNPS to achieve a flow reduction greater than 92% as a monthly average and achieve a through-screen velocity of 0.5 fps, represent the BTA for impingement and entrainment at PNPS. This site-specific determination was made under 40 C.F.R. § 125.98(g) in consideration of the relevant factors at § 125.98(f)(2) and (3) and the impingement mortality BTA standards at § 125.94(c). As such, this determination is consistent with CWA § 316(b). PNPS must meet the BTA standards in Part I.F. on the effective date of the Final Permit.

5.0 Comments on EPA's Fact Sheet

5.1 Anti-backsliding

We support cases where permit limits and conditions in the draft permit are more stringent than the existing 1991 permit. However, PNPS's permit has been weakened in several ways and Entergy's activities are less protective of Cape Cod Bay resources than in years past. For example:

- PATC oversight committee was disbanded in 2000: One of the cornerstones of PNPS's 1991 NPDES permit was the requirement for a scientific panel, the PATC, to oversee impacts and recommend technology improvements or mitigation as needed. The PATC was disbanded in early 2000, shortly after Entergy bought PNPS, because Entergy refused to participate. This is in violation of PNPS's current NPDES permit, which says Entergy must "carry out the monitoring program under the guidance of the Pilgrim Technical Advisory Committee." Before it disbanded, the PATC met several times per year, issued reports, and regularly expressed recommendations about PNPS's operations and monitoring. Since the PATC disbanded, there has been no regulatory oversight of PNPS's operations in the manner required by the current NPDES permit, and now the new draft permit omits the PATC altogether. The PATC should be reinstated, and strengthened, under the new permit.
- Entergy is no longer coordinating refueling and maintenance shut downs with times when there are high concentrations of winter flounder eggs and larvae in the water to avoid entrainment. There is no record that Energy has ever fully observed the PATC's recommendations to coordinate PNPS's planned refueling outages or to use "alternate cooling" during the last 2 weeks of April until the end of May to "coincide with the peak densities of winter flounder larvae in the water column."[42] While PNPS's scheduled refueling outages sometimes overlap with the months of April and May, the outages do not fully follow the PATC's recommendation (last 2 weeks of Apr. and throughout May). In years when refueling does not occur, Entergy does not use an alternate cooling system as recommended by PATC during this timeframe, despite the real and potential impacts to winter flounder and other migrating and threatened species like smelt and river herring. EPA should make this a restriction in the new draft permit.
- Entergy stopped funding mitigation projects. In the past, Boston Edison, and later Entergy, was required to fund mitigation projects in an effort to offset PNPS's destructive marine ecosystem impacts.[43] Soon after Entergy bought PNPS, most of the restoration funding ceased.
- Entergy ended marine monitoring of the "benthic" or sea floor habitat in front of PNPS.[44] The last benthic survey was done in 1999, the year Entergy bought PNPS.

[42] Letter to EPA from Szal G.M. (PATC), Dec. 8, 1998. Re: Pilgrim Nuclear Power Plant.
[43] For example, rainbow smelt spawning habitat enhancement in the Jones River. See: Entergy, 1999. Final report on rainbow smelt (*Osmerus mordax*) restoration efforts in the Jones River, 1994-1999. PNPS Marine Environmental Monitoring Program, Report Series No. 8. (Mass. DMF, Lawton R. and J. Boardman)
[44] Oct. 5, 2012 Notice of Intent to Sue Letter, p. 12.

Response to Comment 5.1

According to the comment, the Draft Permit is weaker than the 1991 Permit because it omits requirements for an advisory committee to guide monitoring efforts; coordination of refueling with presence of winter flounder eggs and larvae; mitigation funding; and benthic surveys. The comment classifies these issues under the heading "Anti-backsliding," though it does not explain how such permit conditions are required under anti-backsliding or cite any statutory or regulatory language to otherwise support such a claim. In addition, while the comment quotes some language from Part I.8.d of the 1991 Permit in support of its claims regarding the advisory committee, it does not identify the other requirements in any particular provision(s) of the 1991 Permit.

The anti-backsliding provision of the Act, Section 402(o), generally provides that "a permit may not be renewed, reissued, or modified to contain effluent limitations [that] are less stringent than the comparable effluent limitations in the previous permit." Sections 402(o)(1) and (2) provide several exceptions to anti-backsliding, including, but not limited to, circumstances where material and substantial alterations or additions to the permitted facility occurred after permit issuance. CWA § 402(o)(2)(A); *see also id.* § 303(d). Section 402(o)(3) of the Act provides a catchall limitation, specifying that at no time shall a reissued, renewed, or modified permit contain an effluent limitation that is less stringent than required by effluent guidelines in effect at the time of issuance or if implementation of a less stringent limit would result in a violation of a water quality standard. An "effluent limitation" is defined as "any restriction established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean, including schedules of compliance." CWA § 502(11).[28] EPA regulations also address backsliding: "[W]hen a permit is renewed or reissued, interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit." 40 C.F.R. § 122.44(*l*)(1). The regulations similarly contain a number of exceptions, including where the circumstances on which the previous permit was based have materially and substantially changed. *Id.* As explained in the Introduction and elsewhere in this Response to Comments, PNPS permanently ceased operating on May 31, 2019, and, as a result, drastically reduced water withdrawals and discharges of heated effluent.

The commenter first asserts that the Final Permit should "reinstate[]" and "strengthen[]"[29] the Pilgrim Technical Advisory Committee (PTAC), apparently based on language in Part I.A.8.d of the 1991 Permit requiring the permittee to "carry out the monitoring program, under the guidance of the Pilgrim Technical Advisory Committee." This quoted phrase from the 1991 Permit, however, is only part of Part I.A.8.d and should be read together with two other provisions—all of which appear in the 1991 Permit under the heading "Biological Monitoring." Part I.A.8.b requires the Permittee to "conduct such studies and monitoring as are determined by

[28] *See also* 40 C.F.R. § 122.2 (defining "effluent limitation" as "any restriction imposed by the Director on quantities, discharge rates, and concentrations of 'pollutants' which are 'discharged' from 'point sources' into 'waters of the United States,' the waters of the 'contiguous zone,' or the ocean").

[29] To the extent the commenter asserts that anti-backsliding requires the Agencies to issue a permit that is *more* stringent than the previous permit, we disagree. Nothing in the statutory or regulatory anti-backsliding provisions supports such an argument, and the comment provides no explanation for such a view.

the EPA and the State to be necessary to evaluate the effect of the operation of the Pilgrim Station, on the balanced, indigenous community of shellfish, fish, and wildlife in and on Cape Cod Bay." Part I.A.8.c provides that "[t]he 1990 Environmental Monitoring Programs and plans," previously submitted to the Agencies and approved, "become[] an integral element of this permit (Attachment A)." Finally, Part I.A.8.d—partially quoted in the comment—begins with the requirement that the Permittee submit to EPA and Massachusetts each year any revisions to the annual monitoring program for 1990 described in Part I.A.8.c. It also provides that such revised monitoring for the next year be incorporated into the permit and carried out "under the guidance of the Pilgrim Technical Advisory Committee."

The statutory anti-backsliding provision does not appear to be applicable to the biological monitoring requirements in the 1991 Permit (or any other condition referenced in the comment), because these requirements do not meet the definition of "effluent limitation." Nor does the comment explain how a provision regarding the advisory committee (or the others) is an "effluent limitation." Moreover, it is not clear from the comment why the regulatory anti-backsliding provision should apply, because the comment does not explain how the Draft Permit is any less stringent than the 1991 Permit.[30] In any event, even if one or both of the anti-backsliding provisions applied to the pre- or post-shutdown period (or both periods), the cessation of electricity generating operations and the concomitant drastic reduction in withdrawals and thermal discharges constitute material and substantial changes to the facility and the permitted activity since the 1991 Permit was issued that would justify permit conditions that are different. The Final Permit need not contain the provision regarding biological monitoring carried out under the guidance of the advisory committee, because the permittee has permanently shut down the facility, which resulted in a reduction of water withdrawals commensurate with the best performing technology and drastically reduced its heat load discharge to Cape Cod Bay. In other words, the exception for material and substantial changes applies.

The comment also asserts that the Final Permit should require the Permittee to coordinate refueling and maintenance shut downs with times when there are high concentrations of winter flounder eggs and larvae in the water to avoid entrainment. The comment does not identify such a requirement in a particular provision of the 1991 Permit, meaning that anti-backsliding is not implicated by the lack of such a condition in the Final Permit. In any event, there will no longer be refueling outages at PNPS because PNPS shut down and certified that the fuel was permanently removed from the reactor as of June 9, 2019. *See* AR-691. Therefore, any permit conditions related to refueling outages are no longer applicable consistent with the material and substantial alteration of the facility. The comment also asserts that the Final Permit must include

[30] The Draft Permit still required the permittee to conduct biological monitoring "determined by EPA and MassDEP to be necessary to evaluate the effect of the permittee's discharges on the balanced, indigenous population of shellfish, fish, and wildlife in and on Cape Cod Bay." *Compare* Draft Permit at Part I.G *with* 1991 Permit at Part I.A.8.b. The Draft Permit also required the permittee to submit to EPA and MassDEP each year "any revisions to the existing biological monitoring program (BMP) which may be warranted by the availability of new information." *Compare* Draft Permit at Part I.G *with* 1991 Permit at Part I.A.8.d; *see also id.* at Att. B. Lastly, the Draft Permit still provided that, upon approval by EPA and MassDEP, "the revised program submitted in accordance with this paragraph shall be incorporated as a part of this permit." *Compare* Draft Permit at I.G *with* 1991 Permit at Part I.A.8.c, d. In other words, the Draft Permit would still have required the permittee to conduct biological monitoring that the Agencies determined to be necessary and that the Agencies approved. The comment does not explain how or why "guidance" from an "advisory" committee would have provided for (and required) more stringent monitoring.

provisions for mitigation funding and benthic monitoring based on anti-backsliding, yet similarly points to no corresponding provisions in the 1991 Permit that could make anti-backsliding applicable. And even if applicable, the substantial reduction in withdrawals and heated discharges would justify re-issuing the permit without such permit conditions. *See* 40 C.F.R. § 122.44(*l*). Moreover, the comment does not assert that any of these conditions are required under any effluent guidelines or that their absence would result in a violation of a water quality standard.

Following its purchase of PNPS, Entergy continued to submit the following year's monitoring plan to EPA and MassDEP for approval and revisions pursuant to Part I.A.8.d of the 1991 Permit. The Agencies consulted with additional State Agencies, such as the Massachusetts Division of Marine Fisheries, when appropriate. The biological monitoring required by the 1991 permit, including the guidance of the advisory committee, was intended in part to evaluate the effect of operation of PNPS on the balanced, indigenous community. In 1999—when the heat load to Cape Cod Bay was substantially higher than under the Final Permit—the Massachusetts Division of Marine Fisheries (a member of the PTAC) stopped monitoring the effects of the thermal plume due to the lack of findings of significant impacts since the 1970s and shifted the monitoring focus to the impacts of impingement and entrainment. *See* Fact Sheet Att. C at 33. The cessation of thermal plume monitoring was authorized pursuant to Part I.A.8.d of the 1991 Permit and, thus, no further "guidance" under the PTAC was necessary for such monitoring. As previously explained, PNPS is no longer operating as of May 31, 2019, and the Final Permit, which reflects the substantially altered operation following shutdown requires monitoring to ensure compliance with the temperature, intake, and flow limitations but does not require continued biological compliance monitoring for entrainment. *See also* Responses to Comments I.5.5, I.6.1, III.8.1.

The Final Permit includes limitations and conditions reflecting a 98% reduction in the heat load to Cape Cod Bay and a 92% reduction in water withdrawals from Cape Cod Bay. These requirements are consistent with the best performing technologies to minimize the impacts from heat and cooling water intake structures in the industry. As such, the operation of PNPS has substantially reduced the potential impacts to the balanced, indigenous community by reducing the thermal discharge and the impacts from impingement and entrainment, which were the focus of the biological monitoring studies evaluated by the PTAC. As explained in Response to Comment I.3.4 and elsewhere, the temperature limits in the Final Permit are more stringent than the 1991 permit and will ensure the protection and propagation of the balanced, indigenous population. Re-initiating biological studies evaluating the impacts of thermal discharges is not warranted in this case.

5.2 Anti-Degradation

There are no new or increased discharges being proposed within this permit reissuance therefore EPA believes that MassDEP is not required to conduct an anti-degradation review. We disagree. There are new outfalls, and outfalls have been identified that were not covered under the last permit (012, 014, 013). Decommissioning could also create new sources of contamination entering Cape Cod Bay. As buildings are demolished and soils disturbed, new contaminants could end up in Cape Cod Bay. MassDEP should be required to conduct an anti-degradation

review. As discussed above in section III.B, the CWA affords MassDEP the authority to protect the water resources, including the discharge of pollutants and water intake.

Response to Comment 5.2

The comment requests that MassDEP conduct an anti-degradation review on the new Outfalls 012, 014, and 013. In addition, JRWA comments that anti-degradation should also apply to the new sources of contamination that may arise during decommissioning. Although Outfalls 012 and 014 are newly designated in the Draft Permit, neither is considered a new or increased load of pollutants because each is a subset of Outfalls 003 and 011, respectively. In both cases, the newly designated outfalls do not represent new or increased discharges, but rather an alternative flow path and discharge location of an existing outfall from the current permit, which does not require an antidegradation review.

The Fact Sheet at 27 explains that Outfall 012, which discharges to the discharge canal, is used as an alternative to the discharge to the fish sluiceway at Outfall 003, which discharges to the intake embayment. This discharge option is used to prevent the re-impingement of seaweed, which could occur during storm events were these flows to be discharged to Outfall 003. In other words, the discharge from Outfall 012 would otherwise have been discharged from Outfall 003 and, as such, does not represent a new or increased discharge to Cape Cod Bay consistent with EPA's characterization in the Draft Permit.

As explained in the Fact Sheet (at 37), Outfall 014 discharges flow that would otherwise be discharged from Outfall 011 directly to the discharge canal. Flow from the waste neutralizing sump, which combines with other wastestreams and is discharged from Outfall 011 under the current permit, may be leaking into stormwater Outfall 005. The waste neutralizing sump was rerouted to avoid the possibility of leaking into Outfall 005, which ensures that this wastewater is monitored for the appropriate parameters and avoids improperly comingling and discharge from the stormwater outfall. In other words, similar to Outfalls 003 and 012, flows from Outfall 014 do not represent new or increased discharges even though the outfall is newly designated because these flows are currently permitted to be discharged through Outfall 011, which does not trigger an antidegradation review.

The Fact Sheet (at 29) explains that Outfall 013 is a newly identified stormwater outfall located between stormwater Outfalls 006 and 007. Stormwater in this storm drain is expected to infiltrate to sandy soil and not discharge directly to the intake embayment. Since identification of the storm drain, PNPS has added additional security fencing and a concrete wall, which makes the storm drain inaccessible for monitoring. This outfall was only expected to discharge to the intake embayment in the event of extreme weather conditions. The Draft Permit recognizes and authorizes discharge from this storm drain, but does not establish any monitoring requirements since the outfall is not expected to discharge directly to Cape Cod Bay except under extreme storm events, drains a relatively small area similar in character to the drainage area for Outfall 006, and is reportedly inaccessible.

Regarding decommissioning activities, it is not known at this time whether they will result in the new or increased discharge of pollutants. The Permittee must revise its SWPPP and associated

BMPs in response to any changes that result in a significant effect on the potential for the discharge of pollutants, including a change in design, construction, operation, or maintenance. Part I.D.2.e of the Final Permit requires the Permittee to revise the SWPPP to reflect changes made to stormwater controls at PNPS. However, the Final Permit (Part I.B) clarifies that discharges of pollutants in stormwater associated with construction activity, including demolition of buildings, is not authorized. Similarly, the Final Permit does not authorize the discharge of pollutants in effluent associated with the dismantlement and decontamination of plant systems and structures or demolition of buildings. The Permittee must seek a permit modification or alternative NPDES permit coverage (e.g., the Construction General Permit) for authorization to discharge pollutants associated with these wastestreams. *See also* Response to Comment IV.5.1.

5.3 Additional Permit Conditions

EPA states that the lack of discharge related mortality events and recent gas saturation data (as well as pending shutdown in 2019) shows that gas bubble disease is unlikely to occur, therefore PNPS's draft permit does not include permit conditions requiring a fish barrier net or a maximum average dissolved nitrogen saturation level. This is unacceptably less stringent than the previous permit – the fish barrier net should be required, a maximum average dissolved nitrogen saturation level should be included, and PNPS should be required to shut down during certain time of the year when migrating fish are more likely to be impacted by operations.

Response to Comment 5.3

The commenter requests that the Final Permit include requirements to maintain a fish barrier net at the end of the discharge canal, a maximum average dissolved nitrogen saturation level in the discharge canal, and mandatory shutdown during certain times of the year to protect migrating fish. The comment suggests these requirements are necessary to prevent discharge mortality events related to gas bubble disease that were last observed in the 1970s. The Fact Sheet explains that such discharge mortality events are associated with the high temperature of this discharge, which can also result in supersaturation of dissolved nitrogen, both of which can result in mortality. Fact Sheet at 45. As the Agencies noted in the Fact Sheet, and the comment does not dispute, "[u]se of the barrier net was discontinued in 1995 because there had been 'no evidence of any significant thermal discharge related incidents for the past several years such . . . .'" *Id.* The Agencies further noted that dissolved gas saturation measurements from 2003 to 2012 indicated that dissolved nitrogen had exceeded the critical threshold for adult menhaden once in June 2005 and once in September 2009, both during low tide when contact with the bottom limits the extent of the plume outside of the discharge canal. PNPS has not reported any discharge related mortality events in the period since the Draft Permit was on public notice. A fish barrier net or dissolved nitrogen limitation do not appear to be necessary. As explained in the Introduction to this Response to Comment, PNPS ceased generating electricity on May 31, 2019, and the heated discharge from the main condenser has been terminated. Compared to the current permit maximum daily and delta-T limits of 102°F and 32°F, respectively, the Final Permit will achieve a 98% reduction in heat load. See Response to Comment I.3.4. This substantial reduction in the temperature of the discharge justifies the discontinuation of these conditions in the 1991 permit. The Final Permit does not include permit conditions requiring a barrier net or a maximum average dissolved nitrogen saturation level.

5.4 Endangered Species

EPA discusses a consultation between NOAA Fisheries (NMFS) and NRC concerning an assessment of the potential effects of PNPS operations on listed species as part of PNPS's renewal process in 2012. NMFS specified that re-initiation would likely be necessary when EPA reissued a revised NPDES permit. We recommend that a re-initiation would be appropriate given that EPA is revising PNPSs NPDES permit, the newly established, expanded critical habitat area for North Atlantic right whales in Cape Cod Bay,[45] the fact that more endangered right whales (including at least 1 calf)[46] are being sighted in the western part of Cape Cod Bay with more frequency than when PNPS's current NPDES permit was issued and when PNPS was relicensed in 2012, the current special concern status of rainbow smelt, and on-going moratorium on the take of river herring.

EPA outlines listed species in vicinity of PNPS in section 11.1, however no birds are listed. Roseate terns spend extended periods of time in close proximity to PNPS (within 4 miles) and PNPS's operations impinge fish species that terns rely on for prey (e.g., blueback herring, Atlantic menhaden).[47] Roseate terns should be considered.

[45] Right whale distribution and occurrence is keyed directly to the plankton resources and the health of the population depends on the quality and quantity of the food that the whales obtain in all of their few known critical feeding habitats areas of which one is Cape Cod Bay. See: Memo to Jones River Watershed Association, Kingston, MA from Charles "Stormy" Mayo, Ph.D., Senior Scientist, Director, Right Whale Habitat Studies, Senior Advisor, Whale Disentanglement Program, Center for Coastal Studies, Provincetown, MA. Apr. 12, 2012.

[46] See Ecolaw letter to NOAA Fisheries. June 28, 2012. Re: Pilgrim Nuclear Power Station: Request to Reinitiate Consultation for Entergy Nuclear Generating Corporation Operating License Renewal. <http://www.capecodbaywatch.org/wpcontent/uploads/2013/01/06.28.12-final-nmfs-req-reinitiate-1.pdf?d23684>; Declaration of Regina Asmutis-Silvia, Whale and Dolphin Conservation, regarding the Jan. 2013 sighting of Wart and calf in Cape Cod Bay. Mar. 21, 2013.

[47] Affidavit of Ian Christopher Thomas Nisbet, Ph.D., from: JRWA and Pilgrim Watch Request to Reopen, For a Hearing, and to File New Contentions and JRWA Motion to Intervene on Issues of: (1) Violation of State and Federal Clean Water Laws; (2) Lack of Valid State § 401 Water Quality Certification; (3) Violations of State Coastal Zone Management Policy; and (4) Violation of NEPA.

Response to Comment 5.4

The comment indicates that re-initiation of ESA consultation is appropriate under the NPDES permit because the permit is being revised, the designated critical habitat for North Atlantic right whale has been expanded since the 2012 NRC consultation was completed, there have been more frequent sightings of right whales in western Cape Cod Bay in recent years and given the special concern status of rainbow smelt and river herring. EPA assessed the effects of the proposed re-issuance of the NPDES Permit for PNPS on listed species and critical habitat, including the indirect effects on prey and habitat. *See* Fact Sheet at 61-65.

EPA proposed that the re-issuance of the NPDES Permit for PNPS is not likely to adversely affect listed species or critical habitat in the action area, which includes Cape Cod Bay. In addition, EPA proposed that because the Draft Permit limits are as stringent or more stringent that the permit in effect at the time of the 2012 consultation with NRC, in which NOAA Fisheries found that the impacts of the proposed relicensing were unlikely to adversely affect

listed species or designated critical habitat (including the continued operation in compliance with the administratively continued permit), re-initiation of formal consultation is not necessary at this time. *See* AR-698, AR-465. *See also* Fact Sheet at 54-65. NOAA Fisheries concurred with EPA's finding that re-initiation of consultation is not necessary for the Final Permit. *See* AR-694. All effects of the proposed action on listed species and designated critical habitat have been previously considered in the 2012 consultation and the analysis remains valid. In particular, the 2012 consultation already considered the effects to designated critical habitat for the North Atlantic right whale in Cape Cod Bay. In other words, the analysis remains valid even as the area of critical habitat was expanded in 2016 because the 2012 consultation already considered the impacts to designated critical habitat.

The comment also requests that EPA consider additional species in the ESA assessment, including rainbow smelt and river herring. The Fact Sheet (at 54-56) explains that Section 7(a) of the ESA requires Federal agencies, in consultation with and with the assistance of the Secretary of Interior, to ensure that any action that the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. Rainbow smelt and river herring were not included in the ESA assessment because neither species is listed as federally threatened or endangered species. In other words, Section 7(a) does not apply to these species. Having said that, EPA did consider the potential impacts of the CWIS and effluent discharges on both species for the Draft Permit and again in responding to comments on the Draft Permit. *See*, *e.g.*, Fact Sheet Attachment D at 26-27 and Response to Comment III.2.1.6. If a new species is listed (including either river herring or rainbow smelt), or critical habitat is designated or revised, and the species or habitat may be affected by the action, EPA will re-initiate consultation with the Services.

Finally, the comment requests that EPA consider impacts to roseate terns. The roseate tern is a federally threatened species under the jurisdiction of the United States Fish and Wildlife Service (USFWS). EPA notified USFWS of the public notice for the Draft Permit but did not receive any comments. In response to this comment, EPA corresponded with USFWS regarding the potential impacts of the permit reissuance on roseate tern (*Charadrius melodus*) and red knot (*Calidris canutus rufa*). *See* AR-699. USFWS concurred with EPA's assessment that renewal of the PNPS NPDES permit may affect, but is not likely to adversely affect, any listed species or critical habitat under USFWS' jurisdiction. *See* AR-700.

5.5 Attachment B: Biological Monitoring

We support the requirement to continue to require biological monitoring after shutdown in 2019 to ensure monitoring of impingement and entrainment. After shutdown, impingement and entrainment monitoring will occur periodically when cooling withdrawals and circulating water pumps are operating. As long as PNPS's spent fuel pool requires cooling, we understand that cooling water will be used from Cape Cod Bay – therefore, we expect impingement and entrainment monitoring to be required until PNPS's spent fuel pool is no longer used, and the intake system is shut down permanently.

Winter flounder studies will cease after shutdown. However, Energy should be required to continue these studies in order to monitor any improvement to the populations after PNPS ceases operating. Entergy should be required to study and mitigate the impacts it has had over the past

40+ years, including at least 10 years after shutdown and certainly until decommissioning is completed.

Due to the discontinuance of the PATC, Entergy no longer carries out rainbow smelt studies but PNPS continues to impinge and entrain them with impunity. One study estimates that more than 1,300,000 rainbow smelt are killed each year by Entergy's operation of PNPS.[48] Smelt populations in the Jones River are erratic, and this species continues to be listed as of "special concern" by NMFS. The smelt studies should be reestablished.

[48] Based on data from 1974-1999; Stratus Consulting. 2002. Habitat-based replacement costs. Report for the U.S. EPA, Region 1.

Response to Comment 5.5

The comment supports the continued biological monitoring required in the Draft Permit and explained in Attachment B of the Draft Permit. The Draft Permit required weekly impingement monitoring and weekly entrainment monitoring during the peak season (March through October) prior to shutdown. As discussed in the Introduction to this Responses to Comment and in response to other comments, PNPS ceased electrical generating operations on May 31, 2019. As such, the pre-shutdown conditions related to biological monitoring have been eliminated from the Final Permit. The issues raised with the pre-shutdown monitoring requirements will not be addressed, because the pre-shutdown monitoring requirements are not in the Final Permit and will not go into effect.

Parts I.A.1, I.A.2, and I.C of the Final Permit, which is consistent with operations following shutdown of PNPS, requires the Permittee to meet flow limits that will achieve a flow reduction of greater than 92% as compared to the current permit. This flow reduction is commensurate with operation of closed-cycle cooling had the Facility continued to operate. In addition, the Permittee must maintain an actual through-screen velocity of no greater than 0.5 fps except when operating one of the circulating water pumps. When operating a circulating pump, which occurs for a limited time on a monthly basis, the Permittee must also continuously rotate the existing traveling screens. The Draft Permit proposed a reduced biological monitoring frequency following shutdown, including impingement monitoring once per week only when PNPS operates one of the circulating water pumps, and entrainment monitoring twice per month.

In consideration of this and other comments on the proposed biological monitoring in the Draft Permit, the Agencies have re-examined the Draft Permit's biological monitoring requirements. Monitoring requirements for impingement mortality in compliance with the 2014 Final Rule are established at 40 C.F.R. §§ 125.94(c) and 125.96(a). Monitoring requirements for entrainment are determined on a site-specific basis to meet the requirements established for minimizing entrainment at 40 C.F.R. § 125.94(d). *See* 40 C.F.R. § 125.96(b). Additional monitoring requirements may be required under 40 C.F.R. § 125.96(c). To demonstrate compliance with the flow reduction requirements, the Permittee must monitor flow daily at each pump and report the average monthly and maximum daily flows for each monitoring period. *See* Final Permit Parts I.A.1 and I.A.2. The flow reductions reflected in the Final Permit compared to the 1991 permit are similar to closed-cycle cooling, and entrainment performance commensurate with a closed-cycle recirculating system can be determined by reducing a baseline level of entrainment (E_B) by

the percentage of flow reduced through the use of a closed-cycle cooling system. 79 Fed. Reg. at 48,378. To demonstrate compliance with the actual through-screen velocity, the Permittee must monitor the through-screen velocity at the intake screens daily. In lieu of monitoring, the Permittee may calculate the maximum through-screen velocity using water flow, depth, and open screen area. *See* Parts I.A.2 and I.C.2 of the Final Permit. *See also* 40 C.F.R. § 125.94(c)(3). Facilities complying with an actual through-screen velocity of 0.5 fps in compliance with the BTA standard for impingement mortality under 40 C.F.R. § 125.94(c)(3) are not subject to biological compliance monitoring unless otherwise specified by the permitting authority. *See* 79 Fed. Reg. 48373. *See also* 2014 Final Rule Response to Comments at 271 ("biological compliance monitoring is no longer required for pre-approved and other approvable technologies in 40 CFR 125.94(c)(1) through (5) of today's rule beyond that required for the permit application, and monitoring may be greatly reduced for facilities choosing other compliance alternatives"), 277.

The Agencies have determined that part of the BTA to minimize impingement mortality (in addition to meeting a through-screen velocity no greater than 0.5 fps when operating only the SSW pumps) includes limiting operation of one of the circulating water pumps to no more than 48 hours in a calendar month and continuously rotating the screens when a circulating water pump is in operation. The Final Permit requires impingement monitoring of the traveling screens once per month when operating a circulating pump. *See* Part I.C.6 and Attachment B of the Final Permit. After considering Entergy's comments and the expected operation of a circulating pump, the Agencies have determined that monthly monitoring is a sufficient frequency. Given the uncertainty in how PNPS will operate the pumps over the calendar month, the Final Permit requires one 8-hour collection per month *to the extent practicable* and requires the Permittee to provide an explanation in the Annual Biological Monitoring Report when impingement sampling was fewer than 8 hours in a single month. In other words, the Agencies do not intend for the Permittee to operate a circulating water pump solely to meet the 8-hour monitoring period requirement if it does not otherwise need to operate a pump for that long to meet its operational needs. In addition, EPA typically recommends that impingement monitoring captures three time periods: morning, afternoon, and night and in fact, the Draft Permit did require monitoring over three time periods. The Final Permit requires that, to the extent practicable, impingement monitoring be conducted such that a morning, afternoon, and night sample are collected over three consecutive months. The Permittee must provide an explanation in the Annual Biological Monitoring Report when collection over three time periods in three months is not practicable, however. The Final Permit also includes a new requirement that the traveling screens be visually inspected daily and retains the Draft Permit's conditions for continuous operation of the traveling screens and reporting in the event of an unusual impingement event. *See* Part I.A.20 of the Final Permit. Finally, the Final Permit allows the Permittee to request elimination or a reduction in frequency of impingement monitoring after a minimum of two years. *See also* Response to Comment I.5.1 (regarding anti-backsliding provisions as they relate to biological monitoring requirements).

The effective BTA requirements upon issuance of the Final Permit include limiting flow from the cooling water intake structure commensurate with a 92% reduction as compared to pre-shutdown volumes (for entrainment) and, for the majority of time, maintaining an actual through-screen velocity at the existing traveling screens of 0.5 fps or less (for impingement

mortality). PNPS must monitor flow continuously and report the average monthly and maximum daily flows at Outfalls 001 and 010, which will ensure compliance with the requirement to achieve a 92% reduction in flow. The Permittee must perform limited, monthly impingement monitoring when a circulating water pump is operating (i.e., when the actual intake velocity is greater than 0.5 fps). *See* Response to Comment III.8.1. Finally, there is an extensive record of entrainment at PNPS's CWIS dating back to 1980 and the baseline entrainment density under the pre-shutdown flow regime is well documented. As a result of shutting down, PNPS has reduced its flow commensurate with closed-cycle cooling. The benefits of this flow reduction can be calculated using the existing record of entrainment and the actual flow at PNPS without additional monitoring. For this reason, the Final Permit does not require biological monitoring for entrainment. *See* Responses to Comments I.4.1 and III.8.1.

6.0 Comments: NPDES Standard Conditions, Part II.A, General Requirements

6.1 Violations of Permit Standards and Requirements

Part I, Duty to Comply, reads, "the permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application." However, Entergy has been in noncompliance with the current permit in a variety of ways discussed in our comments above (e.g., not carrying out required storm drain testing for nearly a decade, disbanding the required PATC that watched over marine impacts, exceeding effluent limits for a variety of pollutants).

These violations should be "grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application." It is clear that enforcement of NPDES requirements have been woefully inadequate in the past. EPA and MassDEP should hold Entergy accountable for past violations and ensure this pattern does not continue with the new permit. It is imperative that EPA and MassDEP hold Entergy accountable to NPDES limits and requirements in order to effectively reduce impacts to Cape Cod Bay.

Response to Comment 6.1

EPA's Environmental Compliance Assurance Division (ECAD) tracks permit violations and determines the appropriate enforcement action based on the frequency, magnitude, and severity of violations. *See* Response to Comment I.3.5

The requirement to convene and utilize a Pilgrim Technical Advisory Committee (PTAC) for this site was not a permit condition, as the PTAC was convened prior to when operations at Pilgrim were initiated. Therefore, the disbanding of the PTAC would not be considered a permit violation. As noted earlier, even though the PTAC is no longer active, EPA, MassDEP, and fisheries agencies that formerly comprised the PTAC have coordinated on the reviews of past biological monitoring conducted at Pilgrim Station. *Also see* Response to Comment I.5.1.

II. COMMENTS SUBMITTED BY ASSOCIATION TO PRESERVE CAPE COD (APCC)[31]

1.0 Comments on the Draft Permit

In March of 2014 APCC completed a study of the environmental impacts of Pilgrim on Cape Cod Bay and Cape Cod (copy attached and included in comments).[32] APCC identified a number of problems and concerns. Since the release of that report, APCC has become increasingly concerned about Pilgrim's risk to the environment and Entergy's declining performance, particularly related to safety and the environment. It is APCC's view that the draft NPDES permit in its present form violates federal and state law and cannot be issued as a final permit. The draft permit merely protects the status quo and does nothing to work toward the elimination of pollutants or implementation of the best technology available. The draft permit condones decades of regulatory neglect and allows the polluter to shift the cost of pollution to the taxpayers.

In 1972, with the passage of comprehensive amendments to the Federal Water Pollution Control Act, this country embarked on a mission to eliminate water pollution. Indeed, the goal was to eliminate all pollution discharges into the navigable waters of the United States by 1985. The goal to eliminate fisheries-related water pollution that impaired the propagation of fish and/or shellfish was to be no later than 1983, 33 U.S.C. § 1251. The principal purpose of the Clean Water Act (CWA) is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a). Unfortunately, the purpose of the National Pollutant Discharge Elimination System (NPDES)—to eliminate pollutant discharges and reach the state goal of the law—was overlooked in drafting the permit currently under review.

NPDES permits in theory are short term permits (five years) that allow regulators and polluters to review developing technologies and implement/require the best available technology economically achievable (BAT) so that discharges and environmental harm can be minimized and ultimately eliminated. For Pilgrim there were at least four permit renewal cycles completely lost to bureaucratic inefficiency—1996, 2001, 2006, and 2011. By delaying issuance of an updated NPDES permit for Pilgrim Nuclear Power Station, the Environmental Protection Agency (EPA) ignored the basic tenets of the CWA and allowed the polluter, Entergy, to avoid and delay implementation of BTA. Now, with the plant in its twilight, EPA has again refused to require implementation of BTA and erred in not requiring implementation of long-proven technologies to eliminate thermal and radioactive pollution discharges and protect fish and shellfish propagation. In determining what is economically achievable at Pilgrim, the economic analysis should be based on at least 23 years (1996-2019) of return on investment and not on what appears to be the remaining three years of the plant's possible operation. Closed cycle

[31] On July 14, 2016, EPA received a series of emails expressing support for, but not adding to or modifying, the comments from the Association to Preserve Cape Cod (APCC) from the following individuals: C. Staff, R. Summersgill, M. Sabin, A. Rosenkranz, L. Roscoe, E. Ridge, B. Nevin, D. Langeland, P. Gadsby, B. Forgione, C. Fischer, J. Coyle, R. Smith Coté, M. Burgess, S.V. Walker, C. Wolcott, T. and L.A. Zicko, and R. Brown. Our responses to APCC's comments, therefore, also respond to these emails.

[32] Statements from the referenced APCC document are reproduced in Comment II.2.0 below.

technology is economically achievable in less than 20 years. Brayton Point is an excellent local example of the economics of closed cycle technology. While EPA identified operational differences between fossil fuel and nuclear generating facilities, EPA relied primarily on an outdated biased report completed at the behest of Entergy. The literature indicates that the concern for implementation of closed cycle BTA is purely economic and not operational.

Based upon the EPA's own press releases (e.g. Settlement Will Spur Major Environmental Improvements at Brayton Point Power Plant, Release Date: 12/17/2007), closed cycle technology to reduce thermal pollution by as much as 95 percent has been well-accepted and would curb Pilgrim's thermal discharge into Cape Cod Bay. Indeed, when Entergy purchased Pilgrim in 1999 it did so knowing that Pilgrim's NPDES permit was expired and that closed cycle technology was the best technology available (BTA) for limiting thermal pollution discharges and minimizing fisheries harm. Entergy also knew that the EPA was struggling to perfect a regulatory framework for economic achievability of BTA. (See, Entergy Corp. v. Riverkeeper, Inc., 129 S. Ct. 1498 (2009). By 2001, EPA required closed cycle technology for all new power plants; Entergy should have known that BTA would be required for all power plants unless the owner could demonstrate that it was not economically feasible.

Further, according to these same EPA press documents, implementation of a closed cycle cooling system takes less than three years. At a minimum, the Pilgrim permit should require a three-year implementation deadline for closed cycle technology. There is no guarantee the plant will close by 2019 other than Entergy's stated intention. The permit should put the plant on the definite track to implement BTA or closure by 2019. The plant's nuclear license expires in 2032 so there is potential for more than a decade of operation without BTA. According to EPA estimates this would mean loss of another 15 billion fish from Cape Cod Bay. This requirement is essential, especially if Entergy should change its mind or find a buyer interested in continued operation of the plant. The plant should not be allowed to operate beyond 2019 without a BTA cooling system.

In addition to reducing thermal pollution, closed cycle cooling systems reduce large-scale impingement and entrainment of fish and shellfish. Justice Scalia noted in the cited Entergy decision that "closed-cycle cooling systems could reduce impingement and entrainment mortality by up to 98 percent." Entergy's own 2007 Environmental Impact Statement (EIS) for relicensing Pilgrim identified 91 different species of marine and diadromous fish entrained or impinged in the Pilgrim existing cooling system. This is more species than EPA identified. In the 2007 EIS, Entergy concluded that the existing cooling system was having "moderate" impacts on winter flounder, an important bottom-dwelling commercial and recreational species. While the nation spends more than a billion dollars of taxpayers' money on fisheries management and protection, the EPA allows Entergy to operate a fisheries Cuisinart essentially for free on the shores of Cape Cod Bay, one of the most important fisheries grounds in the country.

The history of Pilgrim's chronic discharge of radioactive substances into the environment and towards Cape Cod Bay is well documented in the EIS and Entergy's own monitoring reports. For example, in some cases discharges of tritium exceeded federal drinking water standards, and tritium flow pathways were towards Cape Cod Bay. The fact sheet attached to the draft NPDES permit does not properly address discharges of radioactive substances such as tritium as a

pollutant, nor does it address the duration of the leakage. Moreover, the fact sheet does not indicate that anyone other than Entergy has determined that the leakage has been fully addressed. Tritium discharges must either be expressly permitted or treated as a violation of the CWA. The EPA has for too long ignored the reported violation of the CWA. Radioactive discharges from Pilgrim pose a regional threat to environmental quality, human health and the health of Cape Cod Bay's ecosystems. Additional monitoring and operating conditions must be added to the permit specifically for tritium, but also for other radioactive discharges. The monitoring must include the determination of any health impacts on shellfish and fish in Cape Cod Bay. This monitoring must begin immediately and continue well beyond cessation of operations at the plant.

According to the EPA, "stormwater runoff is generated from rain and snowmelt events that flow over land or impervious surfaces, such as paved streets, parking lots, and building rooftops, and does not soak into the ground. The runoff picks up pollutants like trash, chemicals, oils, and dirt/sediment that can harm our rivers, streams, lakes, and coastal waters. To protect these resources, communities, construction companies, industries, and others, use stormwater controls, known as best management practices (BMPs). These BMPs filter out pollutants and/or prevent pollution by controlling it at its source." In its recently enacted Massachusetts municipal separate storm sewer system (MS4) general permit, the EPA articulated a comprehensive and modern approach to stormwater management. The Pilgrim draft permit overlooks and ignores all of the technological improvements in stormwater management. Foremost, the draft permit fails to require reduction or even the monitoring of pollutants being discharged directly into Cape Cod Bay via the various permitted and existing stormwater discharges. Secondly, there is no requirement to identify and correct illicit discharges from Pilgrim. Lastly, there is no requirement for employee education and training related to stormwater management.

The draft permit does not contain a site-specific variance from the national performance standards. Any variance from the regulatory requirements, including avoidance of BTA, requires a site specific analysis of both environmental impacts and the economics of remediation/ correction. The harms at Pilgrim include thermal pollution of Cape Cod Bay, tritium leakage, and fisheries impingement and entrainment. (See APCC report attached.) Ultimately, a variance does not appear warranted in the totality of the facts and history surrounding Pilgrim.

Entergy is also well aware of the Commonwealth of Massachusetts regulations regarding cooling water intake structures (CWIS). See, Entergy Nuclear Generation Co. v. Dept. of Environmental Protection, 459 Mass. 319 (2011). As noted in the decision affirming the state's right to regulate thermal pollution, the state must consider adding appropriate conditions, including mandating BTA cooling systems to the subject discharge permit. The state has not added appropriate conditions to the permit as required by the Massachusetts Clean Waters Act and the decision in the Entergy DEP case. As drafted, the permit violates the Massachusetts Clean Waters Act.

Cape Cod Bay is a unique and precious resource. Key natural resources include shellfish beds, commercial and recreational fisheries, wildlife that includes rare species, robust fish habitat and miles of adjacent coastal habitat including beach, bays and salt marsh. The draft permit does nothing to protect these important CWA resources and actually promotes additional degradation. Considering more than 20 years of EPA effort went into crafting this permit, to say that APCC is disappointed is the understatement of the year. In essence the permit turns the technology clock

back to 1970 and allows Entergy to proceed at full speed ahead with business as usual. Without a requirement to phase in BTA, the draft permit violates the CWA. Without appropriate stormwater management conditions, the draft permit violates the CWA. Without appropriate monitoring conditions, the draft permit violates the CWA. For these reasons as well as express CWIS violations, the permit also violates the Massachusetts Clean Waters Act.

Response to Comment 1.0

APCC comments that the Draft Permit violates both the CWA and the Massachusetts Clean Water Act because it does not include a requirement to phase in best technology available (BTA), appropriate stormwater management conditions, or appropriate monitoring conditions. The Agencies address each of these points below and, where appropriate, refer to responses to similar issues raised in the comments submitted by JRWA et al. and addressed in Section I of this Responses to Comments.

In addition, the comment identifies issues with effluent limitations and conditions from the Draft Permit that apply prior to the cessation of power generation at PNPS. The Agencies have reviewed and considered comments on limits and conditions that apply both prior to and after shutdown. However, as explained in the Introduction to this Responses to Comments, PNPS ceased generating electricity on May 31, 2019. Therefore, the permit conditions and effluent limitations from the Draft Permit specific to operation of the electric generation facility, which would have been effective prior to the shutdown date, are no longer applicable. For this reason, the Agencies have not included the pre-shutdown effluent limitations and conditions in the Final Permit.

Turning to the requirements for the CWIS, the comment argues that the Draft Permit does not require the Permittee to implement the BTA to minimize impingement and entrainment. In some ways, the comment appears to reflect a misunderstanding of section 316(b)'s requirement that cooling water intake structures "reflect the best technology available for minimizing adverse environmental impact"—often referred to as BTA and decided in a process referred to as a BTA determination. While closed-cycle cooling is generally considered the best *performing* technology for minimizing entrainment and impingement, it is not necessarily the best technology *available* (i.e., BTA) for every facility. Under the Final Rule—and similar to EPA's historic practice—a permitting authority undertakes a site-specific inquiry to determine the BTA at a particular facility, considering a number of relevant factors, such as numbers and types of organisms entrained, impact of pollutants associated with entrainment technologies, land availability, remaining useful plant life, and social benefits and costs. 40 C.F.R. § 125.98(f). While the comment suggests that the only relevant factor is economic feasibility and that otherwise a facility should be required to install closed-cycle cooling, this view is not supported by the regulatory framework set out in the Final Rule.[33] *Id.* Attachment D of the Fact Sheet

[33] The comment also asserts that an "economic analysis" of closed-cycle cooling should be "based on at least 23 years (1996-2019) of return on investment and not on what appears to be the remaining three years of the plant's possible operation." The Agencies did not, however, reject closed-cycle cooling based on economic considerations. Nor would anything in the Act or the Final Rule require the backward-looking analysis sought by the commenter.

explains the basis for the site-specific BTA determination in this permit proceeding, including the consideration of factors in 40 C.F.R. § 125.98(f).

In any event, the Final Permit requires the Permittee to meet flow limits that are comparable to those that could be achieved with operation of closed-cycle cooling at PNPS. The post-shutdown flow limits in the Final Permit for Outfall 010, which is the primary intake and discharge during shutdown, result in a 96% reduction in cooling water flow as compared to the current permit limits. The Final Permit also authorizes the operation of one of the circulating water pumps to support shutdown operations for no more than 48 hours over a single calendar month. Together, the total flow at the cooling water intake structure on an average monthly basis represent a 92% reduction in flow as compared to the current permit, which equates roughly to a 92% reduction in entrainment. The expected net reduction in flow if PNPS had installed closed-cycle cooling would have been 91%. *See* Fact Sheet, Att. D at 45. In other words, the Final Permit requires the Permittee to meet flow limits comparable to the operation of closed-cycle cooling at PNPS. That PNPS did not install closed-cycle cooling to meet the flow reductions, as a result of the shutdown, does not diminish the environmental benefits gained by reducing impingement mortality and entrainment under the new flow limits.[34] EPA maintains that the BTA performance standards in the Final Permit, which require PNPS to achieve a flow reduction greater than 92% as a monthly average and achieve a through-screen velocity of 0.5 fps (except when operating a circulating water pump up to 48 hours per month), satisfy the BTA for impingement and entrainment at PNPS. This site-specific determination was made under 40 C.F.R. § 125.98(g) in consideration of the relevant factors at § 125.98(f)(2) and (3) and the impingement mortality BTA standards at § 125.94(c). As such, this determination is consistent with CWA § 316(b). *See also* Response to Comment I.4.2.

The Final Permit's flow limits, which reflect operations following shutdown, also result in a substantial reduction in the heat load to Cape Cod Bay. Under the current permit, which reflects operating conditions for generating electricity at PNPS, the total heat load to Cape Cod Bay from

[34] APCC comments that closed-cycle cooling could have been implemented at PNPS in less than three years, citing an EPA press release related to the NPDES Permit for the Brayton Point Power Station. A key factor in the Agencies' decision not to require closed-cycle cooling was that PNPS was scheduled to close in 2019, roughly three years from the issuance of the Draft Permit, and that the technology, even if construction began soon thereafter, would not be operational before the scheduled closure. *See* Fact Sheet, Att. D at 75-77. This decision is consistent with the Final Rule, which requires consideration of the useful life of the plant when establishing entrainment controls. *See* 40 C.F.R. § 125.98(f)(2)(iv); *see also* 79 Fed. Reg. at 48,342, 48,366. Moreover, the cited press release does not support the commenter's claim. The press release regarding the Brayton Point Station reports a schedule for that facility of three years, commencing only after the facility obtained "all of the required construction and operating permits and approvals," which the press release suggests could take at least an additional year-and-a-half. Based on the available information, EPA concluded that cooling towers at PNPS "are likely to take a minimum of 4 years to construct." Fact Sheet, Att. D at 76. Thus, the cited press release does not support the commenter's claim that "implementation of a closed cycle cooling system takes less than three years" and is not inconsistent with EPA's conclusion about timing at PNPS. Moreover, the commenter essentially asserts, without any explanation, that the Agencies should have required PNPS to begin construction on a closed-cycle cooling system on the basis of a Draft Permit. Note that the NPDES Permit for Brayton Point Station requiring the technology was issued in 2003 and that construction did not begin until 2009, fully 6 years after the Final Permit was issued. Even had PNPS begun construction in 2016 based on issuance of the Draft Permit, the cooling towers would only have been operable for, at most, a few months before the Facility shut down. Entergy did shut PNPS down on May 31, 2019, and the Facility is now achieving flow reductions commensurate with operation of closed-cycle cooling.

the circulating water pumps was about 14,304 mm BTU/day. The Final Permit limits (maximum daily flow of 19.4 MGD and delta-T of 10°F) result in a 98.6% decrease in the heat load to Cape Cod Bay. This reduction in heat load will ensure protection and propagation of a balanced, indigenous population in Cape Cod Bay and is consistent with the reduction in heat load that would be achieved through operation of closed-cycle cooling. Temperature monitoring at the monitoring point for Outfall 001 will confirm the extent to which the effluent from Outfall 010 is mixed prior to discharge. *See also* Response to Comment I.3.4.

APCC requests that the Final Permit include additional monitoring and operating conditions for tritium and other radioactive discharges. According to the comment, discharges of tritium at PNPS have exceeded federal drinking water standards and the fact sheet does not properly address discharges of radioactive substances such as tritium as a pollutant. APCC requests that the Final Permit expressly authorize the discharge of tritium and include appropriate permit conditions and monitoring requirements, or these discharges should be treated as a violation of the CWA. These comments reflect an additional misunderstanding about the Clean Water Act—in particular, its role in the regulation of discharges of radioactive materials. While the CWA defines "pollutant" to include "radioactive materials," that definition does not include radioactive materials regulated by the NRC under the Atomic Energy Act. *See also* 40 C.F.R. § 122.2 (defining "pollutant" to include "radioactive materials," "*except* those regulated under the Atomic Energy Act of 1954 (AEA), as amended (42 U.S.C. 2011 et seq.).)" (emphasis added). In *Train v. Colorado Public Interest Research Group*, 426 U.S. 1 (1976) (hereinafter, "*Train*"), the Supreme Court upheld this view, interpreting the term "pollutant" at CWA § 502(6) consistent with EPA's regulatory definition at 40 C.F.R. § 122.2. The Court held that "special nuclear materials," "by-product," and "source materials" are not encompassed within the CWA's definition of "pollutant." In other words, the Court agreed with EPA that these materials are not "pollutants" within the meaning of the CWA and, thus, not within EPA's authority to regulate; at the same time, the Court did not contest EPA's general authority under CWA to regulate discharges of pollutants. EPA does not regulate discharges of tritium under the CWA because it is a byproduct material as defined in Section 11e(1) of the Atomic Energy Act and is regulated by the NRC under 10 C.F.R. Part 30. *See also* 10 C.F.R. § 20.1003. Entergy began routine monitoring of groundwater wells for tritium in 2007. Under the current program, well and surface water samples collected by Entergy are sent to an independent analytical lab and duplicate samples are provided to Massachusetts Department of Public Health (MassDPH) for analysis at the Massachusetts Environmental Radiation Lab. MassDPH provides quarterly updates on groundwater and surface water results.[35] Neither Entergy nor MassDPH has indicated that the groundwater monitoring program at PNPS will be discontinued now that PNPS has shut down. Finally, although NRC oversees and regulates the decommissioning of nuclear power plants, the NRC and the EPA have signed a memorandum of understanding on the consultation and finality on decommissioning and decontamination of contaminated sites that may be relevant to the comment, even if outside the scope of the NPDES permit. *See* AR-695. Under the MOU, if, during the license termination process NRC determines that there is radioactive groundwater contamination above certain limits, NRC will consult with EPA, consistent with its authority

[35] Monitoring data are available to the public at https://www.mass.gov/lists/environmental-monitoring-data-for-tritium-in-groundwater-at-pilgrim-nuclear-power-station.

under CERCLA, on the appropriate approach in responding to the circumstances at sites with groundwater contamination.

Other than tritium, the comment does not establish which additional radioactive discharges should be addressed with additional monitoring and conditions. Consistent with *Train*, the Final Permit does not regulate special nuclear materials, by-product, or source materials, since these are not "pollutants" under the CWA. *See* Draft Permit, Part I.D.15. *Train* and the years of NPDES permitting of nuclear power plants across the country support the view that Congress intended that effect be given to both the CWA and the AEA, where possible, and that nuclear power plants would be regulated under the CWA insofar as they use cooling water intake structures and discharge pollutants within the meaning of CWA. To the extent that APCC is including radioactive discharges that are regulated under the Atomic Energy Act, these constituents are not included in the NPDES permit because they are not regulated as pollutants under the CWA. At the same time, under the AEA and Reorganization Plan No. 3 of 1970, EPA is responsible for establishing standards for radiation releases and doses to the public from normal operation of nuclear power plants and other uranium fuel cycle facilities. *See also* 35 FR 15623, 15624 (Oct. 6, 1970). The NRC is responsible for implementing and enforcing these standards, including to ensure that radiological releases from PNPS are protective of public health. *See* 40 C.F.R. Part 190. *See also* 42 Fed. Reg. 2860 (Jan. 13, 1977). EPA's role in establishing such standards does not derive from the Clean Water Act, and therefore is not implemented via a NPDES permit. EPA has responded to similar comments regarding EPA's oversight of radioactive materials in Responses to Comments I.2.6 and III.7.0. MassDPH oversees a monitoring program for nuclear power station emergency planning zones, including at PNPS. The Massachusetts Bureau of Environmental Health monitors radiation at a series of stationary monitors surrounding PNPS. These data are transmitted to MassDPH, which ensures real-time environmental monitoring of radiation from PNPS. The Radiation Control Program also monitors radiation levels in surface water, sediment and biota, and fish and shellfish around PNPS. *See* AR-701.

Further, Part I.A.23 of the permit states "The discharge of radioactive materials shall be in accordance with and regulated by the Nuclear Regulatory Commission (NRC) requirements (10 C.F.R. Part 20 and Technical Specifications set forth in facility operating license, DPR-35)." To allow MassDEP to review information generated by the Permittee regarding these NRC requirements, and to ensure that MassDEP is aware of potential impacts to Massachusetts waters and aquatic life, MassDEP has added Parts I.H.4 and 5 to the Final Permit and Conditions 2 and 3 to its Water Quality Certificate.

APCC comments that the Draft Permit fails to require reduction or monitoring of pollutants being discharged directly into Cape Cod Bay via stormwater discharges. Permit limits and conditions for stormwater discharges at PNPS were included in Parts I.C.1, I.C.2, I.C.3 and I.H of the Draft Permit and are included in Parts I.A.5, I.A.6, I.A.7, and I.D of the Final Permit. Stormwater discharged from Outfalls 004, 005, 006, and 007 is subject to limits on total suspended solids, oil and grease, and pH. *See* Fact Sheet at 29-31. A subset of the electrical vaults which discharge stormwater to the authorized stormwater outfalls must be monitored for a suite of parameters including total suspended solids, copper, iron, lead, and pH, among others. In addition, the Draft Permit requires sampling from all 25 electrical vaults at least once during the

permit term. *Id*. The Draft Permit also requires the Permittee to implement BMPs and document its actions in a Stormwater Pollution Prevention Plan (SWPPP), which must include a site description of stormwater activities (including stormwater flows, monitoring locations, control measures, conveyances, and exposures), a summary of pollutant sources, and a description of stormwater controls. *See* Fact Sheet at 53-54. APCC does not explain which of these stormwater limits and requirements are inadequate nor does it request any specific changes to the stormwater requirements in the Draft Permit or why such changes are required under state or federal law.

APCC also comments that the Draft Permit does not include a requirement to identify and correct illicit discharges or a requirement for employee education and training related to stormwater management. Part I.D.1 of the Final Permit requires preventative maintenance and spill prevention measures to avoid releases of pollutants into stormwater and employee training to ensure personnel understand the stormwater requirements. Part I.D.2.c requires the Permittee to conduct regular inspections of all areas with industrial materials or activities exposed to stormwater and report leaks or spills and tracking or blowing of materials to exposed areas. Part I.B of the Permit requires the Permittee to report any discharges of wastewater from any other point sources not authorized by this permit within 24 hours. Furthermore, Part II of the Final Permit incorporates the NPDES Standard Conditions, including the Duty to Mitigate, which requires the permittee to "take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. *See* 40 C.F.R. § 122.41(d).

APCC comments that the Draft Permit does not address technological improvements in stormwater management. While APCC does not elaborate on specific improvements that the Draft Permit lacks, it does reference generic stormwater controls, or best management practices (BMPs), and the approach to stormwater management in the Massachusetts municipal separate storm sewer system (MS4) general permit. The non-numeric BMPs and SWPPP requirements in the Draft Permit are consistent with EPA's 2015 Multi-Sector General Permit (MSGP) for stormwater associated with industrial activity.[36] This General Permit is the more appropriate reference for controlling discharges of stormwater associated with industrial activity, such as at PNPS. The Final Permit retains the effluent limitations, monitoring requirements, and non-numeric, technology-based limits from the Draft Permit.

Partially in response to this comment, EPA has revised how the non-numeric, technology-based limits are presented in the Final Permit to improve consistency with the 2015 MSGP. Part I.D of the Final Permit (Special Conditions) includes two separate sections: best management practices (BMPs) and stormwater pollution prevention plan (SWPPP). The first section describes the BMPs that must be implemented, consistent with the 2015 MSGP, to minimize pollutant discharges from stormwater associated with industrial activity. The Final Permit includes a brief description of each of the BMPs and refers the Permittee to Part 2.1.2 of the 2015 MSGP, which includes a more detailed discussion of potential control measures to address each of the BMPs. These include minimizing exposure of stormwater to processes and material storage areas, good housekeeping measures, preventative maintenance programs, spill prevention and response, erosion and sediment controls, runoff management practices, proper handling, and minimizing dust. The Final Permit also requires the Permittee to implement employee training to ensure

[36] The 2015 MSGP is available at https://www.epa.gov/npdes/stormwater-discharges-industrial-activities.

personnel understand the stormwater related requirements of the permit, including staff responsible for stormwater controls, staff responsible for storage and handling of materials that may be exposed to stormwater, and staff responsible for inspections. The BMPs from the MSGP were developed using best professional judgement to result in the reduction or elimination of pollutants from stormwater discharges associated with industrial activity and generally correspond to the six minimum control measures in the Massachusetts municipal separate storm sewer system (MS4) general permit.[37] The second section describes the required elements of the SWPPP that will document how the BMPs in the first section are implemented. Together, the numeric limits, monitoring requirements, and non-numeric limits in the Draft Permit will ensure that pollutants being discharged directly into Cape Cod Bay via stormwater discharges are minimized.

APCC comments that the Draft Permit "does not contain a site-specific variance from the national performance standards" and maintains that "[a]ny variance from the regulatory requirements, including avoidance of BTA, requires a site specific analysis of both environmental impacts and the economics of remediation/correction." The comment suggests that the type of impacts to be analyzed at PNPS include "thermal pollution of Cape Cod Bay, tritium leakage, and fisheries impingement and entrainment," citing a Position Statement APCC attached to its comments. *See* Comment II.2.0. The comment is muddled and conclusory. It fails to explain what APCC considers a variance or provide a statutory or regulatory citation specifying any particular variance. Nor does it identify, or explain the basis for, a specific approach that the Agencies should have taken. As explained in Section 6.0 of the Fact Sheet, the technology-based and water quality-based effluent limitations are consistent with regulations for establishing limitations, standards, and other permit conditions at 40 C.F.R. § 122.44. The BTA requirements for the CWIS in the Final Permit are based on a site-specific analysis and are consistent with national performance standards under the 2014 Final Rule. *See* 40 C.F.R. §§ 125.94(c), 125.98(f), 125.98(g); *see also* Response to Comment I.4.2. The Final Permit's temperature limits at Outfall 010 result in a 98% reduction in the heat load to Cape Cod Bay. The Agencies determined that the pre-shutdown temperature limits in the Draft Permit, which were based on a variance from water quality and technology-based limits, would assure the protection and propagation of the balanced, indigenous population (BIP) of shellfish, fish, and wildlife in and on Cape Cod Bay consistent with the criteria for determining alternative effluent limitations under CWA § 316(a). *See* 40 C.F.R. part 125, subpart H; Fact Sheet at 45-50 and Attachments B and C. The criteria and standards for determination of thermal limits under § 316(a) are provided in 40 C.F.R. § 125.73 and do not require an economic analysis. Because the Final Permit thermal limits are more stringent and will result in a substantial reduction in the heat load to Cape Cod Bay, the Agencies have determined that these limits will assure the protection and propagation of BIP. *See also* Responses to Comment I.3.1, I.3.4. The Agencies have already addressed APCC's comments on tritium leakage above.

APCC states that MassDEP must establish "appropriate conditions" in the Final Permit for the cooling water intake structure, including mandating closed-cycle cooling, which the commenter views as being required by the Massachusetts Clean Waters Act (MCWA) and the Supreme Judicial Court of Massachusetts ("SJC") decision in *Entergy Nuclear Generation Co. v.*

[37] Stormwater Management: Summary of the Six Minimum Control Measures for the Small MS4. https://www3.epa.gov/region1/npdes/stormwater/ma/six-minimum-control-measures.pdf

Massachusetts Department of Environmental Protection, 944 N.E.2d 1027 (Mass. 2011) (hereinafter, *Entergy v. MassDEP*). According to APCC, without such conditions, the Draft Permit violates the MCWA. The comment fails, however, to explain or support this position in any meaningful way. We agree that the SJC held in *Entergy v. MassDEP* that MassDEP is authorized to regulate cooling water intake structures under the MCWA, but the comment points to nothing in the opinion that dictates a particular BTA determination or prohibits the determination the Agencies made in this permit proceeding. Similarly, the comment fails to cite to any provision of the MCWA or its implementing regulations mandating a determination that closed-cycle cooling is the BTA at PNPS. EPA and MassDEP work cooperatively to develop and issue NPDES permits. The effluent limitations and permit conditions, including those applicable to the CWIS, were established pursuant to the CWA and the MCWA.

EPA and MassDEP agree that Cape Cod Bay is a unique and precious resource that provides excellent habitat for shellfish, fish, including commercially and recreationally important fisheries, and wildlife, swimming and boating opportunities, and excellent aesthetic value. The effluent limitations, monitoring requirements, and permit conditions in the Final Permit, including limits that require the Permittee to maintain substantial reductions in flow (and thus impingement and entrainment) and heat load, will ensure compliance with applicable water quality requirements.

2.0 Summary Comments from APCC Attachment[38]

Regarding Pilgrim, many organizations, agencies and officials have identified threats to human health and safety. Potential threats to the Cape's environment and resources have received less attention. Human health and environmental quality are linked. Our statement therefore focuses on the potential threats posed by Pilgrim to the Cape's environment as summarized below:

Summary Statement 1: Safety issues at Pilgrim include power outages, a power-down in July 2013 due to seawater being too warm to cool the reactor, a fire that could have damaged the reactor, storage of spent nuclear fuel in overcrowded spent-fuel-pools, partial blockage of an emergency cooling system by mussels, and vulnerability to natural hazards and terrorism. In January 2014 the NRC downgraded Pilgrim's performance to "degraded"; only seven other nuclear power facilities in the nation are in this performance category. These issues point to aging infrastructure, outdated systems, failure to account for climate change, and inadequate maintenance, oversight and regulation. Safety issues increase the risk of a serious accident occurring that could damage the Cape's environment.

> Safety Issues at Pilgrim: Safety issues at Pilgrim point to aging infrastructure, outdated systems of cooling and operation, failure to take account of changes in ocean temperature affecting cooling, inadequate maintenance, oversight, and regulation. Safety issues are of great concern because they indicate below-par performance that raises the risk of harm to

[38] To its comment letter on the Draft Permit, APCC attached a "Position Statement on Pilgrim Nuclear Power Station" dated March 17, 2014. In the interest of brevity, the Agencies have reproduced verbatim summaries of APCC's statements from the document's executive summary as well as the individual "Statements" and the "Conclusion" from the main document. The Agencies have considered the content of the entire document and included it in the administrative record.

humans and the environment from ongoing operations or a nuclear accident. APCC believes that Pilgrim's inability to meet existing safety and performance requirements calls for termination of their permits.

Summary Statement 2: Pilgrim is causing environmental impacts nearby and in Cape Cod Bay, namely: release of radioactive materials, including releases of tritium into groundwater that exceed drinking water standards; impingement and entrainment of 90+ species of fish and shellfish which is affecting some species at the population level; discharge of heated seawater into Cape Cod Bay resulting in a thermal plume, erosion, barren and stunted areas, warm-water algal growth, and increased thermal burden on marine ecosystems that are already experiencing warming; potential impacts on rare species, fish and wildlife; and cumulative impacts of all of the above. Such impacts are unacceptable. Furthermore, regulatory agencies have allowed these impacts to continue, increasing the chances that a larger area such as Cape Cod will eventually be affected.

Release of Radioactive Materials: Radioactive discharges from Pilgrim pose a regional threat to environmental quality, human health and the health of Cape Cod Bay's ecosystems. Discharges of radioactive tritium into groundwater pose a threat to Plymouth's sole-source aquifer and to Cape Cod Bay's water quality and ecosystems. APCC believes that Pilgrim's discharge of radioactive materials should cease and that permits allowing for discharge should be terminated.

Seawater intake system impacts commercially and recreationally important fisheries in Cape Cod Bay: Pilgrim's once-through seawater intake system adversely impacts commercially and recreationally important species of fish that are experiencing declines. Many local, state and federal agencies, organizations (including APCC) and citizens have expended time, effort and millions of dollars to protect and restore fisheries and their habitat. Allowing these impacts to continue counteracts protection and restoration efforts and represents a failure by regulators to protect fisheries. APCC believes that these impacts are unacceptable and should be ended.

Cumulative impacts of thermal plume and warming sea temperatures: Pilgrim's discharge of heated seawater is environmentally detrimental and adds to the thermal burden on fish, wildlife and marine ecosystems that are already experiencing warming to climate change. These cumulative impacts could result in a tipping point for some marine species. Also, as ocean temperature continues to rise, it is uncertain whether Pilgrim can safely continue operations. APCC believes that discharge of heated seawater poses unacceptable risks for marine ecosystems and that Pilgrim's discharge permit should be terminated.

Changes in rare species, fish and wildlife populations were not considered: The environmental impact analyses for relicensing Pilgrim did not account for changes in the distribution of rare species, fish and wildlife populations that occurred after the permit was issued. This raises the risk that Pilgrim will cause impacts because permit conditions based on old information are not protective enough.

Cumulative impacts of fish impingement/entrainment, radioactive releases, thermal discharges and climate change were not adequately evaluated or regulated: Cumulative impacts of fish impingement and entrainment, radioactive releases, thermal discharges and climate change were not adequately evaluated or regulated. Given Pilgrim's inability to avoid causing impacts, APCC believes that Pilgrim represents a serious threat to Cape Cod's resources and its permits should be revoked.

Summary Statement 3: The Fukushima nuclear disaster provided important lessons: a) improbable accidents occur, and b) if an accident results in major radioactive contamination, there can be serious and widespread impacts on water resources, fish, wildlife, food webs, crops, the economy, human populations and society.

Lessons learned from Fukushima and other Nuclear accidents. Nuclear accidents can release radioactive materials into the environment that can enter the food web. The scale of impacts on humans and living organisms can range from individuals to populations and ecosystems. Most impact studies have focused on human health risks rather than effects of radiation on other living organisms or ecosystems. Despite the relative lack of studies on ecological effects, APCC believes that decision makers should proactively take steps to protect our resources from the effects of a nuclear accident.

All of Cape Cod lies within a 50-mile radius from the Pilgrim Nuclear Power Station [(17)]. If a nuclear accident were to occur at Pilgrim, impacts on Cape Cod would depend on many factors: the type and extent of the accident, amount and type of radiation released, human responses, prevailing weather and ocean currents, environmental conditions, and the types of resources impacted. However, if a radioactive plume or fallout were to reach Cape Cod, we are concerned that the following impacts could occur:

- Contamination of shellfish beds, aquaculture, and fishing areas;
- Contamination of water bodies (both freshwater and marine) affecting aquatic ecosystems and public uses;
- Contamination of drinking water supplies;
- Contamination of land, soil and sediments;
- Impacts on life, including plankton, invertebrates, fish, shellfish, wildlife, plants, their habitats, food webs, and ecosystem processes;
- Closure of swimming beaches;
- Impacts on local agriculture;
- Economic impacts resulting from the above; and last but not least,
- Impacts on Cape Cod's residents and communities due to health risks, dislocation, economic impacts and social disruption.

A nuclear accident at Pilgrim has the potential to significantly damage the Cape's environment, natural resources and economy. Given Pilgrim's safety record and history of causing impacts, we believe that it is unlikely that Pilgrim will be able to upgrade its facilities to ensure full safety and avoid impacts.

Therefore, APCC calls for Pilgrim's permits to be terminated and for the facility to be decommissioned. We also call on public officials and regulatory agencies to:

- Provide full regulatory oversight of the decommissioning process, including implementation of safeguards to protect public health and the environment before, during and after the decommissioning process, as outlined in NRC's process for decommissioning [(35)];
- Require storage of all spent fuel rods in dry cask storage, which represents the safest storage system in the absence of a national repository [(36)];
- Implement a radiation monitoring system on Cape Cod that includes monitoring of air, water, fish and shellfish, with reports to the public on a regular basis;
- Expand emergency planning throughout the 50-mile-radius zone to protect Cape Cod's residents and natural resources;
- Find safer and less polluting alternative energy sources for Pilgrim's customers. Replacing nuclear energy with greenhouse-gas-producing energy sources such as natural gas or other fossil fuels is not a satisfactory long-term solution, as climate change is also impacting the environment [(19)];
- Support scientific research on the effects of radiation on ecosystems; and
- Form an independent commission to oversee decommissioning of Pilgrim, to review progress and to identify problems to be addressed to help ensure safe and effective decommissioning.

Response to Comment 2.0:

In Comment II.1.0, APCC raised issues related to the facility's cooling water intake structure as well as issues related to its discharge of heated effluent and stormwater. The comment also raised issues related to the discharge of radioactive materials regulated by the NRC (including tritium) that are not "pollutants" under the CWA. *See* Response to Comment II.1.0. As referenced in, and in apparent support of, Comment II.1.0, APCC submitted a "Position Statement on Pilgrim Nuclear Power Station" (hereinafter referred to as the "Position Statement") that APCC apparently approved in March 2014, over two years before the Agencies issued the Draft Permit and roughly a year and a half before Entergy announced its plans to shut the plant down. As a result, the Position Statement does not take PNPS' shutdown into account or comment on the limits and conditions in the Draft Permit. The Position Statement includes general statements about APCC's view of the facility's then on-going impacts to the environment. Below, the Agencies provide general responses. *See In re Town of Concord*, 16 E.A.D. 514, 539-40 (EAB 2014). Furthermore, many of our responses and explanations in Response to Comment II.1.0 apply to concerns reiterated by APCC in the Position Statement. In addition, because the Position Statement was apparently prepared in 2014, prior to issuance of the Draft Permit, it is unclear if APCC statements therein calling for termination of "Pilgrim's permits" are intended to refer to the NPDES permit or the NRC licenses.

The Position Statement provides APCC's position on the impacts of PNPS on the environment of Cape Cod Bay, including impacts arising from "safety issues," which the Position Statement states "are of great concern because they indicate below-par performance that raises the risk of harm to humans and the environment from ongoing operations or a nuclear accident." We first

reiterate that safety issues and performance of the plant, including with respect to "nuclear accidents," are overseen by the Nuclear Regulatory Commission (NRC); EPA and MassDEP, through the NPDES permit, regulate the intake of seawater and discharges of pollutants to Cape Cod Bay. EPA also works separately with the NRC to set air emissions and drinking water standards for radioisotopes, however, NRC is ultimately responsible for the enforcement of those standards as to certain radioactive materials, including tritium. *See* 10 C.F.R. Part 20; 40 C.F.R § 122.2 (defining "pollutant"). *See also* Responses to Comments I.2.2, I.2.5, IV.3.5. With respect to the concern about safety issues raising the risk of harm from "ongoing operations," PNPS ceased generating electricity on May 31, 2019. APCC does not explain how safety issues purportedly affecting electricity generating operations are still applicable to the NPDES permit. In addition, neither in Comment II.1.0 nor in the Position Statement, does APCC explain the impact such safety issues must have on the limits and conditions in the permit applicable to the post-shutdown period, other than to state that "Pilgrim's permits" should be "terminated" and the facility decommissioned. As has already been discussed, PNPS has shut down and is entering a decommissioning phase of its own accord. Termination is not necessarily appropriate for all facilities as soon as they cease operating. For instance, PNPS will continue to discharge pollutants in stormwater exposed to industrial equipment and activities at the site. *See also* Response to Comment I.2.2, I.3.5. The comment also does not explain why permit termination is required by law.

The Position Statement also discusses APCC's position on the environmental impacts related to the release of radioactive materials; impacts from the permitted withdrawals and discharges, including impingement and entrainment; impacts from the discharge of heated seawater; potential impacts on rare species, fish and wildlife; and cumulative impacts of all of the above, particularly in conjunction with climate change. We have already addressed many of these issues in Response to Comment II.1.0, above. For instance, the NRC is responsible for enforcing regulations concerning discharges of radioactive materials regulated pursuant to the Atomic Energy Act. Impacts from impingement and entrainment associated with the facility's cooling water intake structure are expected to decrease significantly because the Final Permit establishes flow limits that are significantly lower than those in the previous permit and similar to flows associated with closed-cycle cooling. With respect to impacts from the plant's thermal discharge, the Final Permit's flow limits also result in a 98% reduction in the heat load to Cape Cod Bay. *See also* Responses to Comments I.2.2, I.3.4.

In preparing the Draft and Final Permit, EPA also considered potential impacts to federally endangered and threatened species using the most recent information of these species' distributions. *See* Fact Sheet at 54-65. In response to comments received on the Draft Permit, EPA consulted with the United States Fish and Wildlife Service. *See* Response to Comment I.5.5. APCC's comments do not provide any information on changes in the distribution of particular species that EPA should have considered in this permit proceeding. As explained above, the Agencies conclude that the 92% reduction in flow combined with the 98% reduction in heat load and the other water quality and technology-based effluent limits and conditions in the Final Permit will ensure the protection of the aquatic community in Cape Cod Bay, including rare species. See also Responses to Comments in Sections I.3, I.4., and I.5.

The APCC Position Statement also raises impacts to human health and the environment from the 2011 nuclear accident at the Fukushima Daiichi Nuclear Power Plant in Japan and other nuclear accidents. APCC's comments do not include any specific recommendations for the PNPS NPDES Permit related to such accidents, however, stating in the Position Statement only that "decision makers should proactively take steps to protect our resources from the effects of a nuclear accident." EPA is committed to ensuring public safety and protecting the environment. Under the Final Rule, if the owner or operator of a nuclear facility demonstrates to the permitting authority, upon the permitting authority's consultation with the NRC, that compliance with the Final Rule "would result in a conflict with a safety requirement established by" the NRC, the permitting authority must establish site-specific BTA requirements that would not result in a conflict with the safety requirement. 40 C.F.R. § 125.94(f); *see also* Response to Comment III.3.1. The permittee has not made any such demonstration with respect to PNPS. The Position Statement also includes a list of recommendations for "public officials and regulatory agencies." APCC does not explain how any of these recommendations should be incorporated into the permit or are even within the scope of a NPDES Permit. While the decommissioning process is overseen and regulated by the NRC, licensees are required to comply with the CWA for any discharges of pollutants (as defined under the CWA) to waters of the U.S. during that process. In Response to Comment IV.5.1, the Agencies clarify that the Final Permit authorizes only those discharges that the permittee disclosed to the Agencies and adequately characterized; several specific discharges are not authorized under the Final Permit. The conditions and limits in the Draft Permit were not intended to cover, for instance, discharges associated with construction activity which, in this case, would include discharges related to the dismantlement of plant structures, systems, and buildings, as well as dust suppression water. Any request for a permit modification to authorize coverage for construction-related stormwater discharges must be accompanied by a sufficiently detailed characterization of the types of activities, effluent, and outfalls that the request for authorization covers. The Agencies will evaluate such requests in accordance with the CWA and MCWA. In addition, the investigation and clean-up of contamination from non-radiological, hazardous materials at the site may also be addressed by EPA and/or MassDEP under the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. 6901 et seq., or other state environmental laws. *See also* Response to Comment IV.5.1.

III. COMMENTS SUBMITTED BY ENTERGY

1.0 Introduction

Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc. (collectively, "Entergy"), respectively the owner and operator of Pilgrim Nuclear Power Station ("Pilgrim" or "PNPS"), are the applicants for a renewed, jointly issued National Pollutant Discharge Elimination System ("NPDES") and Massachusetts Clean Waters Act ("MCWA") permit, NPDES Permit No. MA0003557. On May 18, 2016, United States Environmental Protection Agency, Region 1 ("EPA") and the Massachusetts Department of Environmental Protection ("DEP") issued: (1) the Draft Authorization to Discharge Under the National Pollutant Discharge Elimination System, including Attachments A through C (collectively, the "Draft Permit"), as well as (2) the Fact Sheet, including Attachments A through E thereto (collectively, the "Fact Sheet"; on a consolidated basis, the "Draft Permit package").[1]

Entergy respectfully submits the following comments ("Comments") on the Draft Permit, which reflect terms and conditions that Entergy supports, subject to the corrections and clarifications provided in the Comments below. These Comments also include, as a separate attachment, exemplary revisions to the factual aspects of the proposed Fact Sheet, provided to ensure that EPA and DEP's stated rationale is both correct and supports issuance of the final permit (the "final Permit").[2]

It is worth underscoring that Entergy appreciates the efforts of EPA and DEP with respect to the Draft Permit package. Entergy specifically appreciates EPA and DEP's acknowledgement of the United States Nuclear Regulatory Commission's ("NRC") exclusive jurisdiction over nuclear operations and activities, including with respect to radioisotope discharges. In our experience, the express acknowledgement of NRC's jurisdiction helps to clarify for the public the impropriety of comments to EPA and DEP related to nuclear operations and activities, including with respect to radioisotope discharges and decommissioning, all in a manner that reduces extraneous comments. Entergy further appreciates the incorporation into the Draft Permit of conditions relating to Pilgrim's planned cessation of electricity generation ("shutdown") in 2019. The inclusion of pre-shutdown and post-shutdown conditions allows the public to better understand Pilgrim's NPDES activities over the next five years, particularly during a period of transition.

These Comments are organized as follows. The first Section below, titled "Environmental Context," summarizes the extensive, robust and consistent scientific record demonstrating that Pilgrim's cooling water intake structure ("CWIS") operations have had no more than a *de minimis* adverse environmental impact on the aquatic community of Cape Cod Bay, and that Pilgrim's operations continue to ensure the protection and propagation of the balanced indigenous population (or community)[3] of fish, shellfish and wildlife. With that context in mind, Entergy's specific comments on the Draft Permit and Fact Sheet, contained in the "Discussion of Draft Permit Language" Section below, proceeds in nine (9) Subsections. Subsection I addresses the impropriety, as a matter of law or fact, of what on the face of the Draft Permit appears to be a condition that requires PNPS to shutdown no later than June 1, 2019 and immediately thereafter enter into decommissioning, both actions within the sole control of Entergy and NRC. Subsection II addresses the volumetric flow limitations proposed by the Draft Permit after shutdown, in particular for service water, which represents the primary continuing (albeit, greatly reduced) discharge during that period. Subsection III addresses the Draft Permit's proposed thermal discharge and backwashing limitations. Subsection IV addresses the Draft Permit's chlorine and boron limitations. Subsection V requests clarification of the Draft Permit's definition of "toxic pollutant" to make clear that it does not include radionuclides. Subsection VI addresses post-shutdown biological monitoring. Subsection VII focuses on Fact Sheet statements concerning listed species and essential fish habitat. Subsection VIII addresses electrical vaults limitations. Finally, Subsection IX addresses the use of PNPS's sea foam suppression system.

Entergy submits these Comments subject to the following understandings and reservations of rights:

We understand that, as reflected in the Draft Permit,[4] EPA and DEP plan to issue a final Permit that will function as both a NPDES and an MCWA discharge permit, each pursuant to EPA's and DEP's respective laws and procedures. However, the Draft Permit is not clear as to the source of authority for particular sections. Accordingly, Entergy directs these Comments to both EPA and DEP, and specifically requests that each agency clarify which aspects of the final Permit has been issued pursuant to the CWA, as distinct from the MCWA.

Under EPA's and DEP's respective permitting procedures, each agency is required to respond, in writing, to comments on the Draft Permit, including these Comments.[5] Accordingly, Entergy respectfully requests either separate responses to these Comments from both agencies, or some designation within a combined response that identifies the responding agency, e.g., "Response [by DEP]."

Under EPA's and DEP's respective permitting procedures, each agency also is required to prepare and issue a fact sheet or statement of basis for draft surface water discharge permits, including the Draft Permit.[6] The Fact Sheet also is not clear as to the source of authority for the various determinations relevant to the Draft Permit, and how those determinations relate to the federal CWA, the MCWA or both.[7] Accordingly, Entergy directs its Comments on the Fact Sheet to both EPA and DEP, and respectfully requests that each agency clarify those aspects of the Fact Sheet that are pursuant to the federal CWA, as distinct from the MCWA.
Entergy also reserves its right to supplement these Comments as appropriate, including for the purpose of responding to comments submitted by other members of the public or responses to comments by EPA and DEP.[8]

Finally, and consistent with Entergy's longstanding commitment to environmental stewardship and collaboration with regulators, Entergy stands ready to respond to requests for additional information that may be needed by EPA or DEP to issue an informed and factually supported final Permit and fact sheet.

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1 *See* Joint Public Notice of a Draft National Pollutant Discharge Elimination System ("NPDES") Permit to Discharge into the Waters of the United States Under Section 301, 316(a), and 402 of the Clean Water Act , as Amended, and Request for State Certification under Section 401 of the Act, NPDES Permit No. MA0003557, Public Notice No. MA-010-16 (May 18, 2016) ("Public Notice"). The Public Notice originally set a comment period from May 18, 2016 to July 18, 2016. EPA and DEP subsequently extended the public comment period to July 25, 2016, scheduling a public hearing for July 21, 2016. *See, e.g.*, Joint Extension of Public Comment Period and Public Notice of a Public Hearing Pertaining to the Issuance of a Draft National Pollutant Discharge Elimination System (NPDES) Permit to Discharge into the Waters of the United States Under Sections 301, 316(a), and 402 of the Clean Water Act ("CWA" or the "Act"), as Amended, and Under Sections 27 and 43 of the Massachusetts Clean Waters Act, as Amended, NPDES Permit No. MA0003557, Public Notice No. MA-012-16 ("Public Notice Extension").
2 With respect to the Fact Sheet, Entergy suggests a meeting with EPA and DEP to best ensure that the facts required to support the final Permit are accurate and complete.
3 EPA's regulations implementing Section 316(a), 33 USC § 1326(a), use the perm population and community interchangeably, as do these Comments. *See, e.g.,* 40 C.F.R. § 125.71(c) ("The term balanced, indigenous community is synonymous with the term balanced, indigenous population in the Act and means a biotic community typically characterized by diversity, the capacity to sustain itself through cyclic seasonal changes, presence of necessary food chain species and by a lack of domination by pollution tolerant species. Such a community may include historically non-native species introduced in connection with a program of wildlife management and species whose presence or abundance results from substantial, irreversible environmental modifications… .").
4 *See* Draft Permit, Part I.I, at 41.

5 *See* 40 C.F.R. § 124.17; 314 Code Mass. Regs. § 2.09.
6 *See, e.g.*, 40 C.F.R. § 124.8; 314 Code Mass. Regs. § 2.05(1).
7 *See* Fact Sheet at 32, 36, 45, 50, 70.
8 *See* 40 C.F.R. § 124.19; 314 Code Mass. Regs. § 2.08(2)-(3); 310 Code Mass. Regs. § 1.0 *et seq.*

Response to Comment 1.0:

In its comment Entergy provides a framework for its written comments on the Draft Permit and submits its understanding of the responsibilities of EPA and of MassDEP in jointly issuing the NPDES permit for PNPS. EPA and MassDEP acknowledge the permittee's support for the Draft Permit generally, including as it applies to the bifurcation of permit limits and conditions applicable before and after the anticipated cessation of power generation at PNPS which was completed on schedule on June 1, 2019. The Agencies have reproduced Entergy's written comments verbatim and respond to Entergy's more detailed comments in sections of this document that follow Entergy's introductory comment.[39] The Agencies also recognize and have reviewed Entergy's revisions to the 2016 Fact Sheet, which has been included in the Administrative Record for this permit proceeding. *See* AR-719. A Fact Sheet is prepared for a Draft Permit and is typically not reissued based on comments submitted on the Draft Permit. *See* 40 C.F.R. §§ 124.8, 124.56. The Agencies will not reissue the Fact Sheet that accompanied this Draft Permit or individually address each revision made by the permittee; however, we have included specific examples of language from those revisions where such examples are significant or otherwise aid or clarify the position of either the Agencies or the permittee in responding to the written comments below.

In response to the permittee's comment that jurisdiction over radioisotope discharges lies exclusively with the United States Nuclear Regulatory Commission's (NRC), EPA reiterates that the definition of "pollutant" at 40 C.F.R. § 122.4 encompasses radioactive materials but expressly excludes "those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)." As the Fact Sheet (at 37) explains:

> EPA and the NRC, in the past, have signed a Memorandum of Understanding (MOU) which specifies that EPA will be responsible for the water quality aspects of the discharge in concert with the State, and the NRC will be responsible for the levels of radioactivity in the discharge. Thus, the draft permit addresses only the chemical aspects of water quality and does not regulate radioactive materials encompasses within the Atomic Energy Act's definitions of source, byproduct, or special nuclear materials. *See Train v. Colorado Public Interest Research Group*, 426 U.S. 1, 25 (1976) (holding that "the 'pollutants' subject to regulation under the [CWA] do not include source, byproduct, and special nuclear material.") All NRC radioactive discharge requirements will continue to be in effect, as required, in 10 C.F.R. Part 20 and plant technical specifications.

Having said that, the permittee's characterization of NRC's "exclusive jurisdiction over nuclear

[39] For instance, we do not agree with Entergy's general comment above that PNPS' cooling water intake structure "operations have had no more than a *de minimis* adverse environmental impact on the aquatic community of Cape Cod Bay," as explained in Responses to Comments III.2.0 and III.2.1.

operations and activities" more broadly could potentially encompass the intake and discharges regulated under the NPDES program. To the extent that the permittee means to differentiate the regulation of radioactive materials regulated under the Atomic Energy Act of 1954 and the act of decommissioning, EPA generally agrees that these activities are under the jurisdiction of NRC. *See also* Response to Comment III.7. The Final Permit continues to authorize and regulate the intake and discharges subject to the NPDES program. *See* CWA § 402(a); 40 C.F.R. §§ 122, 124, 125, 126.

Finally, Entergy notes its understanding of the duality of the permit as issued jointly by EPA and the Commonwealth of Massachusetts. As noted on Page 41 of the Draft Permit, this authorization to discharge includes two separate and independent permit authorizations: (i) a federal National Pollutant Discharge Elimination System permit issued by the U.S. Environmental Protection Agency (EPA) pursuant to the Federal Clean Water Act, 33 U.S.C. §§1251 et seq.; and (ii) an identical state surface water discharge permit issued by the Commissioner of the Massachusetts Department of Environmental Protection (MassDEP) pursuant to the Massachusetts Clean Waters Act, M.G.L. c. 21, §§26-53, and 314 CMR 3.00.

This response document has been prepared jointly by EPA and MassDEP to address significant comments on the Draft Permit. Likewise, the Final Permit was developed jointly by EPA and MassDEP. The permit authorization also incorporates the state water quality certification issued by MassDEP under § 401 of the Federal Clean Water Act, 40 C.F.R. 124.53, M.G.L. c. 21, §27 and 314 CMR 3.07. All of the requirements (if any) contained in MassDEP's water quality certification for the permit are incorporated by reference into this state surface water discharge permit as special conditions pursuant to 314 CMR 3.11(11)(a).

2.0 Environmental Context

Before turning to a discussion of the Draft Permit, the focus of which is on Section 316, 33 U.S.C. § 1326, Entergy respectfully submits this summary of the extensive, robust and continuous review, as compiled and analyzed by leading national biologists and statisticians,[9] of Pilgrim's potential impacts on the aquatic ecosystem in Cape Cod Bay over the last nearly half century. As summarized below, this scientific record demonstrates that Pilgrim's historic operations have had no more than a *de minimis* adverse environmental impact to the aquatic ecosystem, including as a result of impingement and entrainment ("I&E") mortality.[10] This scientific record further demonstrates that PNPS's continued operations have in the past and will continue to ensure the protection and propagation of the balanced, indigenous aquatic population (community) of fish, shellfish and wildlife.

For nearly a half century, PNPS's leading national experts have performed a robust suite of integrated environmental monitoring programs that collected and analyzed a wide range of I&E, as well as source of waterbody, aquatic population and aquatic community, data.[11] The plans for these studies, and the studies themselves, were conducted under the direction, oversight and review of EPA, DEP and, for a subset of those years, a specially constituted technical advisory committee (the "PATC").[12] Thus, and to date, for example, Pilgrim's experts have issued 87 semi-annual biological monitoring reports, each charting the health of the aquatic ecosystem and the absence of Pilgrim's impacts.[13]

In addition to this continuous dataset of biological monitoring reports, PNPS's owners and operators over the years have commissioned object-specific studies. Major areas of focus for these studies have included the potential impacts of Pilgrim's operations on: (1) phytoplankton and zooplankton; (2) intertidal and subtidal benthic communities in western Cape Cod Bay; (3) larval, juvenile and adult fish of species of particular concern, including winter flounder, rainbow smelt, cunner, and American lobster; and (4) long-term I&E.[14]

Of particular importance to the Draft Permit, in 2008, Entergy's leading national biological and statistical experts issued an "*Adverse Environmental Impact Assessment for Pilgrim Nuclear Power Station*" ("AEI Report") demonstrating that "operation of the [PNPS] CWIS has not adversely affected populations of any of the species . . . representative of the impinged and entrained organisms at [PNPS] and therefore of [PNPS's] potential I&E effects."[15] The AEI Report findings – which were updated with new I&E data covering the 2008-2013 period in what is hereinafter called the "2014 Update,"[16] and through 2014 in the most recent annual biological monitoring report (the "2015 Biological Report")[17] – represent the best available scientific evidence.[18] As detailed below, these twin reports underscore the absence of discernible adverse environmental impact, as contemplated by Section 316(b); impairment of the balanced indigenous community, as contemplated by Section 316(a); or impairment of Commonwealth water quality standards ("MWQS"). Indeed, in the 2014 Update, these leading national experts concluded, *inter alia*, that the "long-term trend in annual dominance diversity values over the 1980 through 2013 time-series … indicat[es] a stable [aquatic] community…."[19]

Likewise of importance to the Draft Permit are the various thermal studies. The first reports were published contemporaneous with Pilgrim's commencing operations in 1974 and 1976,[20] and supplemented in 1995.[21] Additional focused assessments of the potential effect of PNPS's thermal discharges on Cape Cod's aquatic ecosystem were published in two separate Section 316(a) demonstrations, the first performed in 1975 by Stone and Webster Engineering Corporation ("Stone and Webster"), and the second in 2000 by ENSR Corporation ("ENSR"). ENSR concluded, based on the then-thirty-year record of study, that PNPS's thermal discharges to Cape Cod Bay had caused no prior appreciable harm to representative important species ("RIS"), and by extension to the aquatic community, and would not do so in the future.[22]

In view of this uniquely robust, continuous and verified record, it is unsurprising that, in the Fact Sheet for the Draft Permit, EPA and DEP conclude not only that this record is sufficient, but also that PNPS's continued operations "will assure the protection and propagation of the balanced, indigenous population."[23]

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[9] With exception of Dr. Barnthouse who is traveling internationally, affidavits from these respective experts, attaching their respective curriculum vitae ("CVs"), were provided to EPA and DEP in 2008, and are herein provided to reflect updated CVs and current validation of historic documents. Dr. Barnthouse's affidavit will be provided upon his return to the United States.

[10] *See* 40 C.F.R. § 125.94(c)(11).

[11] *See, e.g.*, AKRF, Inc., LWB Environmental Services, Inc. and Normandeau Associates, Inc., *Adverse Environmental Impact Assessment for Pilgrim Nuclear Power Station* (June 2008), at 7-11; Entergy Nuclear Operations, Inc., *Proposal for Information Collection to Address Compliance with Clean Water Act §316(b) Phase II Regulations: Pilgrim Nuclear Power Station* (Oct. 6, 2006) ("PIC").

[12] While it functioned, the PATC consisted of representatives from the federal and Commonwealth water and fisheries resource agencies, as well as technical experts from regional public institutions and the Station. Entergy

has continued to provide, on an annual basis, copies of its annual Marine Ecology Reports to those individuals who sat on the PATC when it stopped meeting, and has responded to occasional questions received from former PATC members as they have arisen. *See, e.g.*, Letter from Elise N. Zoli, on behalf of Entergy, to Tom Chapman, U.S. Fish & Wildlife Service (July 13, 2012), Appendix A, at A-2, *available at* http://adams.nrc.gov/wba (Accession No. ML12207A583).

13 *See* PNPS's annual biological monitoring reports (also called ecological studies), which have previously been provided to EPA. These reports followed pre-operational environmental monitoring that began in 1969, and continued until operation began, thus ensuring robust comparison of pre- and post-operational conditions. *See* PIC at 1. In addition, many ecological studies (1969-1982) were summarized in a peer-reviewed scientific publication titled "*Observations of the Ecology and Biology and Western Cape Cod Bay, Massachusetts*," edited by J.D. Davis and D. Merriman (1984).

14 *See* PIC at 9-14. These studies include: (1) R.C. Toner, *Phytoplankton of Western Cape Cod Bay* (1984); (2) R.C. Toner, *Zooplankton of Western Cape Cod Bay* (1984); (3) J.D. Davis and R.A. McGrath, *Some Aspects of Nearshore Benthic Macrofauna in Western Cape Cod Bay* (1984); (4) SAIC, *The Ichthyoplankton of Cape Cod Bay* (1992); (5) G. Matthiessen, *The Seasonal Occurrence and Distribution of Larval Lobsters in Cape Cod Bay* (1984); (6) R.P. Lawton, *et al.*, *Fishes of Western Inshore Cape Cod Bay: Studies in the Vicinity of the Rocky Point Shoreline* (1984); (7) R. Lawton, *et al.*, *Final Report on Bottom Trawl Survey (1970-1982) and Impact Assessment of the Thermal Discharge from Pilgrim Station on Groundfish* (1995); (8) B. Kelly, *et al.*, *Final Report on Haul Seine Survey and Impact Assessment of Pilgrim Station on Shore-Zone Fishes, 1981-1991* (1992); (9) M.D. Scherer, *The Ichthyoplankton of Cape Cod Bay* (1984); (10) R.D. Anderson, *Impingement of Organisms at Pilgrim Nuclear Power Station* (1999); and (11) T. Horst, *et al.*, *Seasonal Abundance and Occurrence of Some Planktonic and Ichthyofaunal Communities in Cape Cod Bay: Evidence for Biogeographical Transition* (1984). Many of these studies may be found in volume 11 of Davis and Merriman (1984), *see supra* note 11.

15 AEI Report at 34.

16 The AEI Report was updated in August 2014, as Attachment 4 to the report entitled "*Engineering Response Supplement to United States Environmental Protection Agency CWA §308 Letter: Pilgrim Nuclear Power Station, Plymouth, Massachusetts*"(hereinafter "2014 Engineering Response Supplement"), prepared on a lead consultant basis by Enercon Services, Inc. ("Enercon") and submitted on behalf of Entergy in response to a May 14, 2014 informational request by EPA to Entergy pursuant to Section 308 of the Clean Water Act. *See* 2014 Engineering Response Supplement, Attach. 4, Normandeau Associates, Inc. Biological Input.

17 The 2015 Biological Report, *Marine Ecology Studies Pilgrim Nuclear Power Station, Report No. 85, January 2014 – December 2014*, April 30 2015, includes three reports prepared by Normandeau Associates, Inc.: *Winter Flounder Area Swept Estimate Western Cape Cod Bay 2014* ("Normandeau 2015a"); *Ichthyoplankton Entrainment Monitoring At Pilgrim Nuclear Power Station, January – December 2014* ("Normandeau 2015b"); and *Impingement of Organisms on the Intake Screens at Pilgrim Nuclear Power Station, January – December 2014* ("Normandeau 2015c").

18 2014 Engineering Response Supplement, Attach. 4, Normandeau Biological Input, at 2-6 (providing updated information); AEI Report at 15; *see, e.g.*, *San Luis & Delta-Mendota Water Auth. v. Jewell*, 747 F.3d 581, 602 (9th Cir. 2014) (noting that under "best available scientific information" standard, agencies "cannot ignore available biological information" or "disregard available scientific evidence that is in some way better than the evidence it relies on" (quoting *Kern County Farm Bur. v. Allen*, 450 F.3d 1072, 1080-81 (9th Cir. 2006)).

19 2014 Engineering Response Supplement, Attach. 4, Normandeau Biological Input, at 4; *see also* AEI Report at 16-34.

20 *See, e.g.,* Pagenkopf, *et al.*, *Circulation and Dispersion Studies at the Pilgrim Nuclear Power Station, Rocky Point, MA* (1976), *in Marine Ecology Studies Related to the Operation of Pilgrim Station*, Semi-annual Report No. 7; Pagenkopf, *et al.*, *Oceanographic Studies at Pilgrim Nuclear Power Station to Determine Characteristics of Condenser Water Discharge* (1974).

21 *See* EG&G, *Pilgrim Nuclear Power Station Cooling Water Discharge Bottom Temperature Study, August, 1994* (1995).

22 *See* ENSR, *§316 Demonstration Report-Pilgrim Nuclear Power Station*, Document Number 0970-021-200, prepared for Entergy Nuclear Generation Company (2000) (hereinafter "ENSR (2000)"); Stone and Webster, *§316 Demonstration: Pilgrim Nuclear Power Station – Units 1 and 2* (1975).

23 Fact Sheet at 70.

Response to Comment 2.0:

In the comment, Entergy quantifies the biological studies completed on behalf of PNPS and concludes that, on the basis of these studies, the operations at PNPS have not caused and will not cause either adverse environmental impact as contemplated by § 316(b), impairment of a balanced, indigenous population of shellfish, fish and wildlife as contemplated by § 316(a), or impairment of water quality standards.

Turning first to the effluent limitations for the discharge of heat established under § 316(a), EPA and MassDEP agree that, on the basis of the demonstration and the thermal studies conducted at PNPS, the pre-shutdown temperature limits in the Draft Permit, which are consistent with those in the 1991 Permit, have not resulted in appreciable harm and assure the protection and propagation of a balanced, indigenous community of shellfish, fish, and wildlife on and in Cape Cod Bay. *See* Fact Sheet at 70 and Attachments B and C. Having said that, PNPS ceased operating as of May 31, 2019 and, at that time, terminated the discharge of condenser cooling water, which comprised the majority of heated effluent in the discharge. The post-shutdown thermal limits at the remaining cooling discharge, Outfall 010, which are based on the anticipated needs of the Facility during shutdown, are substantially more stringent than the pre-shutdown. The resulting heat load represents a 98% reduction as compared to the pre-shutdown conditions.

In its discussion of § 316(b), the commenter argues that the operations at PNPS have had no more than a de minimis adverse environmental impact to the aquatic ecosystem, including as a result of impingement and entrainment mortality. The comment also states that the biological studies conducted at PNPS "underscore the absence of discernable adverse environmental impacts as contemplated by Section 316(b)." EPA disagrees both with the comment that PNPS has not had any adverse environmental impact on Cape Cod Bay and that the impacts have been de minimis. The Fact Sheet (Attachment D at 23) clearly explains that the loss of billions of eggs and larvae and thousands of adult and juvenile fish each year as a result of entrainment and impingement at PNPS is an adverse impact. EPA continues:

> …the preamble to the Final 316(b) Rule for Existing Facilities generally refers to impingement and entrainment mortality associated with the withdrawal of cooling water through a CWIS as an adverse environmental impact. *See, e.g.*, 79 Fed. Reg. at 48,318-21 and 48,328 ("EPA interprets section 316(b) to require the Agency to establish a standard that will best minimize impingement and entrainment—the main adverse effects of cooling water intake structures . . . ."). Thus, the loss of, or injury to, aquatic organisms (including fish eggs and larvae, juvenile and adult fish, and other types of organisms) from being entrained or impinged by a CWIS constitutes adverse environmental impact under CWA § 316(b). EPA Region 1 has established, in the discussion above, that PNPS is responsible for the loss of billions of eggs and larvae, and millions of fish and other aquatic organisms annually as a result of the operation of its CWIS. Consistent with the Final Rule, these losses represent an adverse environmental impact to Cape Cod Bay.

Fact Sheet Attachment D at 24. EPA considered the biological data referenced in the comment during development of the Draft Permit, including the 2008 AEI Report (AR-105). Entergy does not provide any explanation or evidence to dispute the determination of adverse impact in the

Fact Sheet, nor does the comment raise any new arguments or evidence which would alter EPA's determination since the issuance of the Draft Permit. On the contrary, the Fact Sheet demonstrates and these responses to comments confirm, that entrainment and impingement at PNPS's CWIS is an adverse environmental impact to the waterbody. See Response to Entergy's Comment 2.1 (below). EPA considers the loss of billions of organisms taken from Cape Cod Bay ecosystem and killed by PNPS's CWIS as an adverse impact that needs to be addressed under CWA § 316(b) and that these losses are not de minimis.

2.1 The AEI Report, The 2014 Update, And The 2015 Biological Report Demonstrate That PNPS's CWIS Has Had And Is Expected To Have Only A *De Minimis* Adverse Environmental Impact

The Fact Sheet states that "on average, PNPS entrains about 2.8 billion eggs and 354 million larvae annually, and impinges about 42,800 fish annually."[24] Entergy agrees that these values are sufficient to trigger searching review under Section 316(b).

However, the best scientific evidence is that, despite their apparent magnitude, these levels represent a de minimis adverse environmental impact. The reasons are several. First, levels of I&E must be examined in the proper ecological context, i.e., whether I&E levels are large enough to have a significant impact on the relevant fish populations. Second, levels of I&E must account for the actual quotient of mortality attributable to Pilgrim, e.g., whether the vast majority (typically more than 99.9%) of eggs, if fertilized, die of natural causes (e.g., non-fertilization, starvation and predation) before those fish could contribute to future populations.[25] To account for high early life stage mortality, it is widely accepted practice among scientists and EPA to convert the number of eggs and larvae lost into an equivalent number of adults, because doing so puts early life stage I&E losses into their proper ecological context.[26] Indeed, in its August 15, 2014 Final Regulations to Establish Requirements for Cooling Water Intake Structures at Existing Facilities ("Final 316(b) Phase II Rule" or "Rule"), EPA expressly approves the use of adult-equivalent losses (i.e., "the number of individual organisms of different ages impinged and entrained by facility intakes, standardized to equivalent numbers of [adult] fish") to evaluate impacts under Section 316(b), stating "EPA finds it appropriate to use the [adult equivalent] measure because information in the record indicates that an overwhelming majority of eggs, larvae and juveniles do not survive into adulthood and the [adult equivalent] calculations adjust for differences in survivorship based on species and age-specific mortality rates."[27]

The 2008 AEI Report focused on four fish RIS, *i.e.*, winter flounder, cunner, Atlantic menhaden, and Atlantic mackerel, and one commercially important crustacean RIS, *i.e.,* American Lobster.[28] As explained in that Report, the RIS satisfy EPA's selection criteria, both for potential I&E mortality and thermal impacts.[29] Further, selection of these RIS, which dominate I&E at PNPS,[30] precipitated no objection or criticism from EPA, DEP or the PATC.[31]

The data evaluated in the AEI Report, the 2014 Update and the 2015 Biological Report come from three sources, collected annually: (1) I&E data collected at PNPS; (2) near-field fisheries monitoring studies; and (3) regional and coastal fisheries data available from state and federal resource management agencies.[32] These data are valid and verified by the consultants, have been directed and reviewed, and in some instances were performed, by governmental agencies, or are

the product of independent governmental authorities with specialized fisheries-management knowledge, *e.g.*, the Atlantic States Marine Fisheries Commission ("ASMFC") and the National Marine Fisheries Service ("NMFS").[33] Therefore, the data represent the "most authoritative available information concerning abundance, recruitment, and other characteristics useful in interpreting the potential impacts of I&E at PNPS on harvested fish populations," *i.e.*, the best available information to determine whether PNPS's operation has had any adverse environmental impact on Cape Cod Bay species.[34]

The AEI Report and the 2014 Update establish that populations and communities, not individuals, are the proper focus for evaluating the potential adverse impacts of Pilgrim's operations on Cape Cod Bay.[35] In brief, the AEI Report, the 2014 Update, and the data in the 2015 Biological Report together demonstrate that PNPS has had no discernible adverse impact to the aquatic community. In general, equivalent adult losses of RIS are trivial, particularly compared to conservative (*i.e.*, understated), independent estimates of the abundance of local and regional populations and approved fisheries management practices (and yields). Additional lines of evidence, including standard fisheries management models, also indicate that I&E losses from operation of PNPS's CWIS are not sufficient to affect the ability of representative populations to persist and fulfil their normal functions, including propagation.[36] Therefore, the best available scientific information would not reasonably support a finding of adverse environmental impact for PNPS.[37] The data and analyses presented in the AEI Report, the 2014 Update, and the 2015 Biological Report for individual RIS are summarized in the following sections.

Before addressing the RIS individually, Entergy respectfully submits that the equivalent adult entrainment loss estimates provided in the Fact Sheet for winter flounder, cunner, Atlantic menhaden, Atlantic Herring, Atlantic cod and Atlantic Mackerel, although attributed to the 2015 Biological Report, do not reflect that document correctly. The table below presents a comparison of the equivalent adult entrainment loss estimates (without accounting for entrainment survival) for these species as given in the Fact Sheet and the same metric calculated from the data in the 2015 Biological Assessment.[38]

	Equivalent Adult Entrainment Losses	
Species	Fact Sheet	2015 Biological Report
Winter flounder	17,047	12,474
Cunner	785,219	680,116
Atlantic menhaden	2,508	2,653
Atlantic herring	12,837	13,249
Atlantic cod	1,816	950
Atlantic mackerel	1,437	1,524

Entergy respectfully requests that the correct 2015 Biological Report numbers be employed in the final Fact Sheet.

Additionally, EPA's presentation of adult equivalent entrainment losses fails to account for the fact that survival of entrainment has been demonstrated for some of the species.[39] When demonstrated survival is accounted for, as noted below, estimated adult losses are substantially lower than the losses summarized in the table above or reported in the Fact Sheet for most

species.

24 *Id.* at 68; *id.*, Attach. D, at 15.
25 *See*, *e.g.*, EPRI, *Extrapolating Impingement and Entrainment Losses to Equivalent Adults and Production Foregone*, July 2004.
26 *Id*. at 1-1; *see also infra* note 26.
27 79 Fed. Reg. 48300, 48,403 (Aug. 15, 2014). EPA specifically approves the use of age-1 equivalents, *i.e.*, equivalent numbers of 1-year-old fish, to represent adult fish. However, certain species mature at older ages (*e.g.*, after two or three years), and for those species age-2 or other equivalents should be used to represent adult equivalents. In other words, adult equivalent ages below vary with species.
28 *See* AEI Report at 1. American lobster was included as a result of perceived commercial and recreational overharvesting of lobsters in Massachusetts waters, not because of perceived Pilgrim impacts. *Id.*
29 *See id.* at 1, 7-8; *see also* EPA, *Draft Interagency 316(a) Technical Guidance Manual and Guide for Thermal Effects Sections of Nuclear Facilities: Environmental Impact Statements*, § 3.5.2.1, at 36-39 (May 1, 1977) (discussing selection criteria and noting that five is a "high" number of RIS for study).
30 ENSR (2000) at 5-5 to 5-9.
31 AEI Report at 1, 7-9. Because it arises later in these Comments, it is worth emphasizing that *alosines* alewife, Atlantic silverside and rainbow smelt are represented by RIS Atlantic menhaden. *Id.* at 9.
32 AEI Report at 12-15.
33 *Id.*
34 *Id.* at 15; *San Luis & Delta-Mendota Water Auth.*, 747 F.3d at 602; *Kern County Farm Bur.*, 450 F.3d at 1080-81.
35 *See* AEI Report at 2; *see also, e.g.*, John A. Veil, *et al.*, *A Holistic Look at Minimizing Adverse Environmental Impact Under Section 316(b) of the Clean Water Act*, Scientific World Journal (Apr. 2002), at 48 ("Impingement and entrainment, when they result in death or harm to an organism, create an adverse impact to that organism. However, they do not necessarily create an adverse impact on the population or ecosystem at large."); David A. Mayhew, *et al.*, *Adverse Environmental Impact: 30-Year Search for a Definition*, Scientific World Journal (Mar. 2002), at 28 ("Over the last 30 years, the scientific community has attempted to define AEI on a scientific basis, *i.e.*, based on impacts at the population level. This is consistent with the clear intent of Section 316(b) to minimize *environmental* impact.").
36 *See, e.g.*, AEI Report at 11, 18, 22, 31.
37 AEI Report at 15, 34; *see also* 2014 Engineering Response Supplement, Attach. 4, Normandeau Biological Input, at 4 (concluding that more recent data confirm conclusion that Cape Cod Bay aquatic community has been stable since 1980, notwithstanding PNPS's operations); *San Luis & Delta-Mendota Water Auth*, 747 F.3d at 602; *Kern County Farm Bur.*, 450 F.3d at 1080-81.
38 *See* Fact Sheet at 68 and Attach. D at 17; *see also* Normandeau 2015b, Tables 5, 9, 13, 15, 18, 20. In Normandeau 2015b, averages over the period 1980-2014 omit the years 1984 and 1987 due to unusually low numbers resulting from plant outages in those years. *Id*.
39 *See*, Normandeau 2015b.

2.1.1 Atlantic Menhaden

The Atlantic menhaden is a migratory, pelagic fish that is abundant from Florida to Nova Scotia and believed to consist of a single spawning population with no evidence of local or regional subpopulations.[40] The AEI Report relied on two lines of evidence to determine whether historic or continued operation of Pilgrim's CWIS has caused an adverse impact on Atlantic menhaden: (1) comparison of I&E at the PNPS CWIS, expressed as age-1 equivalents, to estimates of age-1 abundance of Atlantic menhaden available from ASMFC; and (2) the use of fisheries assessment models to calculate the impact of PNPS on Atlantic menhaden recruitment and spawning stock biomass.

Comparison Of Age-1 Equivalent I&E To Age-1 Population

An average of 24,364 Atlantic menhaden per year were impinged at the PNPS from 1980 through 2007, based on normal operational flows of 461.28 MGD, making this species the most abundant fish impinged at PNPS's CWIS during the period assessed in the AEI Report.[41] This number of fish converts to 15,369 adult (age-1) equivalents, most impinged during seasonal transitions (and cold shock events) or predation.[42] An estimated 66,969,349 eggs and larvae were entrained over the 28-year period, which converts to 1,956 age-1 equivalents.[43] ASMFC estimated that age-1 abundance of Atlantic menhaden varied between 1.57 billion and 10.4 billion over the period from 1980-2005, with an average abundance of 4.78 billion fish.[44] Thus, the AEI Report demonstrated that I&E at PNPS is a miniscule fraction—0.0004% to 0.0005%, depending on the method of calculation—of the average age-1 population of Atlantic menhaden.[45]

The data in the 2014 Update confirm that from 2008-2013, I&E remained a small fraction of the Atlantic menhaden population. From 2008-2013, an average of 25.6 million eggs and larvae were entrained and 3,198 fish were impinged, which together convert to just 406 adult equivalent fish per year.[46] According to the ASMFC's 2014 stock assessment, the average age-1 abundance of Atlantic menhaden from 2008 to 2013 ranged from 2.8 billion to 8.8 billion, with an average of 4.88 billion fish.[47] Thus, from 2008-2013, I&E at PNPS was an even smaller fraction—0.00001%—of the average age-1 Atlantic menhaden population than that reported in the AEI report.

As provided in the 2015 Biological Report, over the entire 1980-2014 period an average of 63.54 million Atlantic menhaden eggs and larvae per year were entrained and impinged, which converts to an average of 8,950 adult (age-2) equivalents per year.[48] However, these long-term average I&E figures do not account for the fact that a portion of Atlantic menhaden eggs and larvae have been shown to survive entrainment, [49] despite being identified by EPA as fragile under the Final 316(b) Phase II Rule.[50] When entrainment survival is taken into account, annual adult equivalent I&E losses over the entire 1980-2014 period average just 7,587 per year.[51]

Fisheries Assessment Models

The AEI Report presents the results of a model used to calculate year-specific conditional mortality rates ("CMRs") from year-specific estimates of population structure and total egg production available from stock assessment reports.[52] The CMR is a measure of the mortality imposed on a year class of a population by a stressor such as a cooling water intake structure.[53] Information required to implement the model includes: (1) age-specific natural mortality rates for all 1-year-old and older fish; (2) age-specific fecundities and sex ratios for mature fish; (3) the number of eggs spawned during each year included in the calculation (calculated from estimates of the total abundance and age structure of the spawning stock); (4) the number of these eggs that survive to become one-year-old fish; and (5) the number of fish lost due to entrainment during each year.[54] The model's output consists of the total rate of mortality for age 0 fish and the rate of mortality due to I&E, expressed as a CMR. In essence, the CMR identifies the contribution of I&E to total age 0 mortality, as determined from empirical stock assessment data.[55] Over the years 1985-2004 modeled, the combined impingement and entrainment CMRs for the PNPS CWIS averaged only 0.00078%, equivalent to a 0.00078% reduction in recruitment of age-1

Atlantic menhaden.[56] As noted in the AEI Report, from a cumulative impact perspective, more than 12,000 power plants, each imposing a CMR of 0.00078%, would be required to raise the cumulative entrainment and impingement CMR for Atlantic menhaden to 1%.

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40 AEI Report at 16.
41 *Id*.
42 *Id*. at 16-17, 48. *See also, e.g.*, EPRI, *The Role of Temperature and Nutritional Status in Impingement of Clupeid Fish Species* (Mar. 2008), at 2-10.
43 AEI Report at 16-17, 48.
44 *Id*. at 17, 50.
45 *Id*.
46 *See* 2014 Update, Appendix B, Tables 9-12. Data through 2013 are presented because the data for numbers of eggs and larvae entrained in 2014 in the 2015 Biological Report are converted to age-2 equivalents and therefore are not directly comparable to age-1 equivalents provided in the 2014 ASMFC stock assessment.
47 *See* Southeast Data, Assessment and Review, *SEDAR 40 Stock Assessment Report: Atlantic Menhaden, Section II:*
Addendum to the 2014 Atlantic Menhaden Benchmark Stock Assessment, January 2015, Table 3.
48 *See* Normandeau 2015b, at Tables 15, 17.
49 *See id.* at 75.
50 *See* 40 C.F.R. § 125.92(m).
51 Normandeau 2015b, at Tables 16, 17.
52 AEI Report at 18.
53 *Id*.
54 *Id*.
55 *Id*.
56 *Id*.

2.1.2 Winter Flounder

The winter flounder is a benthic right-eyed flatfish important to both the commercial and recreational fisheries in Cape Cod Bay and in the Gulf of Maine.[57] Winter flounder larvae and eggs are distributed throughout Cape Cod Bay with higher densities of eggs and larvae associated with Barnstable, Wellfleet, and Plymouth Harbor estuaries, although tidal fluxes and currents disperse the ichthyoplankton throughout the bay.[58]

As discussed in the AEI Report, based on normal operational flows, the estimated total number of winter flounder eggs and larvae entrained at PNPS annually from 1980 through 2007 averaged 25.4 million, while the number winter flounder impinged averaged 985 fish.[59] These numbers of fish convert to a total of 15,766 age-3 (adult) equivalents.[60] When this number is adjusted for demonstrated, site-specific survival, the annual total number of age-3 equivalents is reduced to just 8,029 age-3 winter flounder.[61]

Three lines of evidence were used in the AEI Report to determine whether the operation of the PNPS CWIS has caused an adverse impact on winter flounder: (1) the percent of the larval flux past PNPS that is entrained, as determined by larval transport studies; (2) comparison of equivalent adult losses to spawning population estimates for Gulf of Maine stock, and to the adult population present in Cape Cod Bay; and (3) the use of fisheries assessment models to calculate the impact of the PNPS CWIS on winter flounder recruitment, spawning stock biomass, and fishery yield.

Larval Transport

PNPS conducted a study of the flux of winter flounder larvae passing the PNPS CWIS, for the purpose of estimating the percent of larvae in the vicinity of PNPS that may be entrained.[62] These data provide a direct estimate of the potential impact of entrainment on susceptible winter flounder populations.[63] Sampling was conducted during three years—2000, 2002, and 2004—and during each, field sampling of four stages of winter flounder larvae was conducted at five or more transects along the Plymouth (western) coast of Cape Cod Bay.[64] Concurrently, water velocity measurements were performed at each transect and winter flounder entrainment samples were collected at the PNPS CWIS.[65] The percent entrainment over all three years ranged from 0.45% to 2.03%, and averaged 1.23%. Thus, only a very small fraction of the winter flounder transported past PNPS's CWIS are entrained.

Equivalent Adult Losses

The estimated number of age-3 winter flounder entrained from 1980 through 2007 (summarized above) was compared to NMFS's estimate of the number of age-3 winter flounder in the Gulf of Maine stock for the years 1982-2005. Over the years 1980-2002 (a period that accounts for the three-years needed to reach age-3) an average of 8,452 equivalent age-3 winter flounder were entrained or impinged per year.[66] This represents an average of only 0.25% of the Gulf of Maine stock of age-3 winter flounder over that same period, which was estimated to be more than 3.4 million.[67] I&E of winter flounder also was compared to the abundance of adult winter flounder present in Cape Cod Bay, as estimated from PNPS's Area Swept Trawl Survey that at the time had been conducted annually from mid-April to mid-May from 2000 through 2006.[68] Over the period 1997-2003 an average of approximately 16,800 age-3 equivalents per year were entrained or impinged at PNPS. Over the period 2000-2006, when these fish would have been 3 years old, an average of 286,000 adult winter flounder were present in the PNPS study area and, assuming that the study area represents 1/6 the area of Cape Cod Bay, 1.714 million age-3 winter flounder would have been present in all of Cape Cod Bay. Based on these estimates, I&E of winter flounder at the PNPS CWIS over the 1995 through 2006 period was equivalent to 1% of the adult population present in Cape Cod Bay.[69] Even this small percentage may be an overestimate, as some of the larval winter flounder entrained likely originated from outside Cape Cod Bay.[70]

Fisheries Assessment Models

The AEI Report employed a Spawning Stock Biomass Per Recruit ("SSBPR") model, which calculates the expected lifetime reproduction of a typical female recruit, measured in terms of the expected future egg production or biomass, to evaluate the potential impact of entrainment on the ability of susceptible winter flounder populations to sustain themselves and support future commercial and recreational fisheries.[71] The SSBPR model, requires estimates of age-specific mortality rates (available from NMFS) and weights of one-year-old and older fish, and an estimate of mortality by PNPS entrainment, expressed as a CMR.[72] The SSBPR model was used to model the increase in spawning potential ratio ("SPR," a measure of the impact fishing has on the ability of each recruit to contribute to spawning) that could have occurred: (1) if PNPS had not been operating; and (2) if ten power plants with the same impact as the PNPS (assuming that

such plants existed and had been operating at full capacity) had not been operating.[73] According to the model, had PNPS not been operating, winter flounder SPR would have increased by less than 1%.[74] Hypothetically, had there been ten plants with the same impact as the PNPS withdrawing water from the Gulf of Maine, and if impacts of all ten of these plants were removed from the SPR calculations, winter flounder SPR would have been raised only to 30%.[75] Each of these values is far below the 50% overfishing threshold level specified in the ASMFC Fisheries Management Plant for winter flounder, indicating that PNPS is only a minor contributor to overall human influences on this stock and does not threaten the sustainability of the susceptible winter flounder populations.[76]

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57 *Id*. at 19.
58 *Id*. at 19.
59 *Id*. at 19, 52.
60 *Id*.
61 *Id*. *See also* K.A. Rose, *et al.*, *Simulating winter flounder population dynamics using coupled individual-based young-of-the-year and age-structured adult models.* Can. J. Fish. Aquat. Sci. 53:1071-1091 (1996). In addition, as shown in the 2015 Biological Report, for the years 2008-2014, an average of 19,484,840 eggs and larvae were entrained, and another 752 fish were impinged, converting to a total of 12,556 age-3 equivalents. Normandeau, 2015b, Tables 5, 7. Accounting for survival, combined egg and larval losses averaged 18,004,020 per year, which converts to average age-3 equivalent losses of just 9,473. *Id*. at Tables 6, 8. This is particularly low for a species for which Pilgrim has run an effective hatchery. *See* Normandeau Associates, Inc., *Hatchery Production Study Report: Young-of-the-Year Winter Flounder Post-Release Collections 2010* (Apr. 2011).
62 AEI Report at 20.
63 *Id*.
64 *Id*.
65 *Id*.
66 *Id*. at 21.
67 *Id*.
68 *Id*.
69 *Id*.
70 *Id*.
71 *Id.* at 22.
72 *Id.*
73 *Id*. at 22-23.
74 *Id*. at 23.
75 *Id*. at 23-24.
76 *Id*. at 24. Attachment D of the Fact Sheet raises a potential concern about I&E of winter flounder, based on that species' high level of site fidelity to natal spawning grounds. *See* Fact Sheet, Attach. D, at 25-26. The 2014 Update, however, reports an annual average I&E mortality of just 744 age-1 equivalent winter flounder from 2008-2013, as compared to an average annual adult (age-3) population in western Cape Cod bay of 200,160 over the same period. *See* 2014 Update, Appendix B, Tables 9-12; Normandeau (2015), Winter Flounder Area Swept Estimate, Western Cape Cod Bay 2014 (April 30, 2015) at 5-6. Thus, Pilgrim's I&E represents just 0.4% of the annual estimated adult population in western Cape Cod Bay.

2.1.3 Cunner

The cunner is a temperate reef fish that is abundant in rocky areas of the Atlantic coast from the Middle Atlantic States to Newfoundland and is typically associated with rocky subtidal habitats such as those found in the vicinity of PNPS in Western Cape Cod Bay.[77] Since cunner larvae are planktonic, they can be transported for large distances before they settle and occupy a home range.[78] The PNPS breakwaters promote the settlement of cunner, resulting in an artificially

localized high density.[79] On average, 2.27 billion cunner eggs and larvae were entrained annually between 1980 and 2007, and just 286 impinged.[80] These numbers convert to an annual average of 829,482 age-1 (adult) equivalents.[81] The 2015 Biological Report shows that, from 2008 through 2014, cunner I&E was somewhat lower, with an average of 2.12 billion cunner eggs and larvae entrained, and fish 381 impinged, which converts to an average of 657,132 age-1 equivalents.[82] However, cunner eggs and larvae have been shown to exhibit substantial entrainment survival, and older cunner life stages often survive impingement.[83] When this survival is taken into account, the average number of eggs and larvae lost to I&E from 1980 to 2014 is reduced to approximately 221.2 million per year, which converts to an average of just 149,820 age-1 equivalents per year.[84]

Because cunner are considered to have no commercial or recreational value, stock estimates are not readily available.[85] As explained in the 2015 Biological Report, a rough estimate of the population in the PNPS area can be determined by using representative fecundity values to calculate the number of adult cunner that would be necessary to produce the number of eggs found there.[86] For 2014, an estimated 6.9 trillion eggs were produced by an estimated 364 million adult fish.[87] The number of adult equivalent cunner lost due to PNPS I&E in 2014—817,967— represents just 0.2% of the estimated spawning stock.[88] If cunner survival is accounted for, the estimated number of adults lost in 2014,—179,278—is just 0.05% of the estimated spawning stock.[89]

Four additional lines of evidence were used in the AEI Report to determine whether the operation of PNPS's CWIS has caused an adverse impact on cunner: (1) estimation of the size and location of the region from which entrained cunner eggs are withdrawn; (2) analysis of recruitment of cunner larvae to rocky habitats in the vicinity of PNPS; (3) comparison of entrainment losses at the PNPS CWIS to potential cunner production within a 9 km radius surrounding the PNPS site; and (4) comparison of impingement losses to mark and recapture population estimates of the local cunner population inhabiting the artificial habitat created by the breakwater protecting the PNPS CWIS.

Withdrawal Region Size and Location

According to a hydrodynamic study performed by MIT, 90% of eggs entrained at PNPS (which account for 97% of all life stages entrained) would have been spawned within a local subregion extending from approximately 5.5 miles north of PNPS to about 1 mile south.[90] This nearfield area, which is the dominant contributor of eggs entrained at the PNPS CWIS, is only a small fraction of the total habitat available to cunner in Cape Cod Bay. Further, while 90% of entrained eggs are derived from a relatively small subregion of Cape Cod Bay, this does not imply that entrainment is depleting the cunner population in this subregion, as detailed below.[91]

Recruitment of Cunner to Rocky Habitats Near PNPS

As reported in the AEI Report, Nitschke (1998) studied recruitment of cunner juveniles to rocky habitats in the vicinity of PNPS to determine whether entrainment could be reducing the abundance of cunner in the nearfield area.[92] He measured the abundance of settling juveniles as a function of distance from PNPS, and also the relationship between the abundance of settling

juveniles and the number of juveniles surviving to the end of the recruitment period. Nitschke reasoned that if entrainment at PNPS were significantly reducing cunner abundance in the vicinity of the plant, then the density of settling cunner larvae should be lower near PNPS than at two sites farther away.[93] However, contrary to this prediction, the density of settling cunner was higher near PNPS than at the other two sites.[94] Nitschke also found that the post-settlement survival of juvenile cunner was inversely related to initial density. Although the initial density of settling cunner in July was highest at the discharge site, by the time sampling ended in November, there was no difference in cunner density between sites.[95] This result is consistent with the hypothesis that settlement success of juvenile cunner is density dependent, which would act to reduce the potential impact of PNPS' CWIS on the abundance of cunner larvae available for settlement.

Comparison of Entrainment Losses at PNPS to Potential Cunner Production within a 9 km Radius

The AEI Report discusses the 1975 sampling of cunner eggs within a 9 km radius surrounding the PNPS site.[96] Correcting for sampling efficiency and for the development time of cunner eggs, approximately 7 trillion cunner eggs were present in this region during 1975.[97] The average annual entrainment of cunner eggs at PNPS is 0.04% of this value.[98] The annual average number of equivalent adult cunner entrained at the PNPS, including both eggs and larvae, over the 1980 through 2006 period was 0.16% of the estimated total population value within this radius.

Comparison of Impingement Losses to Mark and Recapture Population Estimates

As reported in the AEI Report, Lawton et al. (2000) performed mark and recapture sampling in 1992, 1994 and 1995 to estimate the population of cunner in the vicinity of PNPS.[99] This sampling estimated that, in those three years, 4,976, 7,408 and 9,300 adult cunner were present off the outer breakwater at PNPS.[100] In the same three years, 28, 77, and 346 equivalent adult cunner were impinged at PNPS, respectively.[101] Hence, impingement of cunner at PNPS is equivalent to 4% or less of the adult cunner then present in the vicinity of the PNPS breakwater.[102] Since the breakwater is an artificial habitat that did not exist prior to the construction of the PNPS, even accounting for impingement mortality, the cunner inhabiting the breakwater represents a net increase in the abundance of cunner in western Cape Cod Bay, compared to the population that would have been present without PNPS.

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77 AEI Report at 25.
78 *Id*.
79 *Id.*
80 *Id*. at 25, 57.
81 *Id.*
82 Normandeau 2015b, Tables 9, 11.
83 *Id*. at 69. *See also* EPRI, *Review of entrainment survival studies: 1970 – 2000, Final Report*, EPRI Report 1000757 (2000) ("EPRI (2000)"); MRI, *Assessment of finfish survival at Pilgrim Nuclear Power Station final report, 1980-1983* (2004) ("MRI (2004)").
84 Normandeau 2015b, Tables 10, 12.
85 *Id*. at 70.
86 *Id*.

87 *Id*.
88 *Id*.
89 *Id*.
90 *Id.* at 26.
91 *Id*.
92 *Id*.
93 *Id*.
94 *Id*.
95 *Id*.
96 *Id*. at 27.
97 *Id.*
98 *Id.*
99 *Id.*
100 *Id.*
101 *Id.*
102 *Id.*

2.1.4 American Lobster

The American lobster, a crustacean representative of the mobile megabenthic macroinvertebrate community of the sublittoral zone, comprises the most important fishery within Massachusetts territorial waters.[103] Three lines of evidence were used to determine whether the operation of the PNPS CWIS has caused an adverse impact on American lobster: (1) comparison of equivalent adult losses to adult population estimates for Massachusetts portion of the Gulf of Maine stock, and to the entire Gulf of Maine stock; (2) comparison of the reduction in adult abundance due to I&E to the reduction caused by harvesting; and (3) the use of fisheries assessment models to calculate the impact of the PNPS CWIS on American lobster fishery yield.

Comparison of Equivalent Adult Losses to Adult Population Estimates

The AEI Report compares American lobster I&E at PNPS for the years 1998-2007 to stock abundance estimates for the years 1982-2007 obtained from ASMFC for the Massachusetts portion of the Gulf of Maine stock and the larger Gulf of Maine. It demonstrates that I&E combined represent 0.01% of the stock abundance in Massachusetts waters every year analyzed (with the exception of 2005 when they represent 0.02% of the stock abundance) and 0.001% or less of the entire Gulf of Maine stock.[104]

Comparison of Exploitation Rates Due to Commercial Harvest vs. I&E Losses

Estimates of the annual exploitation rate, *i.e.*, the proportion, ranging from 0 to 1, of the exploitable (legal size) American lobster population that is actually harvested by the commercial fishery in a given year, in both the entire Gulf of Maine stock and Massachusetts waters, were obtained from the ASMFC.[105] Exploitation rates due to the commercial harvest range from 0.33 to 0.61 (33% to 61%) for the entire GOM stock, and from 0.54 to 0.90 (54% to 90%) in Massachusetts waters, over the period of 1982-2003.[106] Adult equivalent lobster losses due to I&E were expressed in terms of annual exploitation rates by dividing the annual adult equivalent I&E totals by ASMFC's annual stock abundance estimates.[107] Adult equivalent exploitation rates due to entrainment at PNPS are less than 0.00004% for the entire Gulf of Maine stock and less than 0.001% in Massachusetts waters.[108] Adult equivalent exploitation rates due to

impingement at PNPS are less than 0.001% for the entire Gulf of Maine stock and less than 0.02% in Massachusetts waters every year from 1998-2003.

Fisheries Assessment Models

The AEI Report presents the results of a simple yield per recruit model of the type that has played a central role in the development of lobster management policy in both Canada and the United States.[109] A comparison of natural and fishing mortality rates for age 1-4 and age 5 (adult) lobster demonstrates that for every lobster recruit entering the fishery in a given year, about 0.18 kg (0.4 lbs.) was obtained from the fishery.[110] Multiplying the adult equivalent numbers lost to I&E, combined with 0.18 kg, results in a range of 17-200 kg (37- 441 lbs.) potentially lost to the fishery per year between 1998 and 2007, or approximately 0.0001 % to 0.0007% of the average annual GOM landings from 2000-2003.[111] By comparison, the average pounds per trap fished in Massachusetts waters of the Gulf of Maine is roughly 24 lbs.[112] Yield lost to I&E therefore conservatively represents less than 2 to 18 traps fished for a year.[113] Thus, fisheries management models demonstrate that I&E at PNPS have a negligible impact on the American lobster population.

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103 *Id*. at 28.
104 *Id*. at 27, 59.
105 *Id*. at 30.
106 *Id*.
107 *Id*. at 30, 59.
108 *Id*.
109 *Id.* at 31, 60.
110 *Id.*
111 *Id.*
112 *Id.*
113 *Id.*

2.1.5 Atlantic Mackerel

The Atlantic mackerel is a migratory, pelagic fish that is abundant from North Carolina to the Gulf of St. Lawrence.[114] One component of the stock spawns along the southern New England corridor and a second spawns in the Gulf of St. Lawrence; only eggs and larvae spawned in the southern New England region are susceptible to entrainment at PNPS.[115] An estimated 799.8 million Atlantic mackerel eggs and larvae were entrained at PNPS annually from 1980 through 2007 while an average of only 6 fish per year were impinged during that same interval.[116] These convert to a total of 5,097 age-1 (adult) equivalent mackerel. Two lines of evidence were used in the AEI Report to determine whether the operation of the PNPS CWIS has caused an adverse impact on Atlantic mackerel: (1) estimation of the size and location of the region from which entrained Atlantic mackerel eggs are withdrawn; and (2) comparison of entrainment losses from the PNPS CWIS, expressed as age 1 equivalents, to estimates of age 1 abundance of Atlantic mackerel available from NMFS.

Size And Location Of The Region From Which Eggs Are Withdrawn

Eggs account for more than 95% of Atlantic mackerel entrainment at the PNPS, and Atlantic

mackerel eggs usually hatch within 4 days at water temperatures typical of the late spring/summer period in western Cape Cod Bay.[117] Based on the results of the MIT hydrodynamic modeling study, entrained Atlantic mackerel eggs would have been spawned no more than about 10 miles north or 2 miles south of the CWIS under typical conditions.[118] Because Atlantic mackerel spawn throughout southern New England, only a negligible fraction of Atlantic mackerel eggs spawned in this region are susceptible to entrainment by PNPS. *Id.*

Comparison Of Age-1 Equivalent Entrainment Losses To NMFS Estimates Of Age-1 Abundance

Over the period 1980-2004, estimates of Atlantic mackerel entrainment, expressed as age-1 equivalent fish, ranged from 82 to 19,125 per year, with an annual average of 4,606.[119] The most recent stock assessment available from NMFS, by comparison, reported that the estimated coastwide abundance of age-1 equivalent Atlantic mackerel during the period 1961-2004 ranged from 100 million to 5.1 billion, with an average abundance of 1.1 billion age-1 equivalent fish.[120] Based on these estimates, average annual entrainment at PNPS during the 1980-2004 period is equivalent to only 0.004 percent of the average abundance of age-1 equivalents for this species.[121] If one were to conservatively assume that only 10% of the coastwide Atlantic mackerel stock spawns in southern New England, then entrainment at PNPS still would be equivalent to only 0.04 percent of the annual average recruitment for this species.[122] From a cumulative impact perspective, it would take 25 comparably sized power plants along the southern New England corridor, each imposing a CMR of 0.04 percent on the New England component of the Atlantic mackerel population, for the cumulative CMR to equal 1%, confirming that even viewed cumulatively, the I&E of this species represented by PNPS has at most a negligible impact.[123]

The 2008-2014 I&E data provided in the 2015 Biological Report confirm that I&E of Atlantic mackerel at PNPS is trivial considering the overall abundance of the population, in that the average annual I&E of this species at IPEC over these later years has declined to just 469 age-1 equivalent fish per year.[124]

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114 *Id*. at 31.
115 *Id*.
116 *Id*. at 31, 61.
117 *See id.* at 32; *accord* 2014 Update, Appendix B, Table 9 (eggs account for more than 97% of Atlantic mackerel entrainment for the 2008-2013 period).
118 *See* AEI Report at 32.
119 *Id.* at 32-33.
120 *Id.* at 33.
121 *Id.*
122 *Id.*
123 *Id.*
124 *See* 2014 Update, Appendix B, Table 11.

2.1.6 Additional Species of Interest

While these Comments appropriately focus on the RIS, Attachment D to the Fact Sheet also discusses coastwide population declines in rainbow smelt, river herring (which includes alewife) and Atlantic cod, none of which is attributed to or reasonably could be attributable to PNPS.[125]

With respect to river herring, the Jones River population—nearest to Pilgrim and therefore most likely to be impacted—is not even in decline. Rather, as the Fact Sheet indicates, the Jones River population has fluctuated from year to year, with an overall increasing trend (positive slope from 2005-2014 with a p value of 0.03).[126]

With respect to rainbow smelt, the 2014 Update indicates that from 2008-2013, an average of just 63,952 larvae were entrained at Pilgrim annually, with another 496 smelt impinged.[127] Together, these figures equate to a mortality of just 859 adult (age-1) equivalent fish, which cannot reasonably be interpreted as having an adverse impact on the smelt population.[128] For Atlantic cod, the 2014 Update reported an average of 5,444,856 eggs and larvae entrained from 2008-2013, and 74 fish impinged, which together correspond to mortality of just 1,439 adult (age-1) equivalent fish.[129] Although the coastwide population of Atlantic cod has been in recent decline due to overfishing, NMFS has estimated that the average age-1 recruitment for the Gulf of Maine stock ranged from 6.73 million to 8.35 million (depending on the model used) over the years 2008 to 2013, and even in the lowest years, 2013 and 2014, age-1 recruitment ranged from 2.55 to 3 million.[130] Thus, since the AEI Report, I&E mortality of Atlantic cod has remained a small fraction of adult recruitment in the Gulf of Maine, totaling just 0.02% of the 2008-2013 average age-1 stock and 0.05 to 0.06% in the two most recent years of data, 2012 and 2013. Indeed, Attachment D to the Fact Sheet acknowledges the average annual losses attributed to PNPS over the last two decades—about 3,700 pounds of cod per year— are trivial, compared to the annual commercial and recreational losses (as landings) along the Massachusetts coast, *i.e.*, respectively 2.2 million and 471,000 pounds.[131]

Thus, there is no reasonable, scientifically grounded concern that Pilgrim has a measurable impact on Rainbow smelt, river herring or Atlantic cod.

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[125] *See* Fact Sheet, Attach. D, at 27; AEI Report at 9-10; *see also* Affidavit of Michael D. Scherer, Ph.D., in Support of Entergy's Answer Opposing Jones River Watershed Association's and Pilgrim Watch's Motion to Reopen and Hearing Request, *In re Entergy Nuclear Generation Co. & Entergy Nuclear Operations, Inc. (Pilgrim Nuclear Power Station)*, Docket No. 50-293-LR, ASLBP No. 06-848-02-LR (NRC Mar. 19, 2012) ("Scherer ASLB Aff."), ¶¶ 5, 71-73 (concluding PNPS's operations likely have no effect on river herring populations, which are subject only to "infrequent[] entrain[ment]" and "minimal" impingement at PNPS).

[126] *See* Fact Sheet, Attach. D, at 26-27 (Table 3).

[127] *See* 2014 Update, Appendix B, Tables 9-12.

[128] *Id*.

[129] *Id*.

[130] *See* NMFS, Gulf of Maine Atlantic Cod 2014 Assessment Update Report (August 22, 2014), Table 1 at 5.

[131] *Id.* at 27-29.

Response to Comment 2.1 (including subparts 2.1.1 through 2.1.6):

Entergy agrees that the impingement and entrainment of billions of organisms each year at PNPS's CWIS "are sufficient to trigger searching review under Section 316(b)" but comments that the levels nonetheless represent a *de minimis* adverse environmental impact. To Entergy's first point, EPA clarifies that the "trigger" for a BTA analysis pursuant to Section 316(b) is not any particular amount of impingement and entrainment, but simply that the NPDES permittee operates a CWIS. Section 316(b) of the CWA provides that:

> [a]ny standard established pursuant to [CWA sections 301 or 306] and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.

33 U.S.C. § 1326(b). To satisfy § 316(b), the location, design, construction, and capacity of the facility's CWIS(s) must reflect "the best technology available for minimizing adverse environmental impacts" ("BTA"). Thus, to the extent the comment suggests that review under § 316(b) is only appropriate where a permitted facility impinges and entrains billions of organisms, it is incorrect. Further, for an existing facility like PNPS, the requirements of the August 15, 2014, *Final Regulations to Establish Requirements for Cooling Water Intake Structures at Existing Facilities* ("Final Rule"),[40] apply if the facility is a point source, uses or proposes to use one or more cooling structures with a cumulative design intake flow (DIF) greater than 2 MGD to withdraw from waters of the U.S., and 25 percent or more of the water withdrawn on an actual intake flow basis is used exclusively for cooling purposes. 40 C.F.R. § 125.91(a). The criteria for the applicability of § 316(b) is 1) a point source and 2) the operation of a CWIS. Section 125.90(b) is clear that, where cooling water intake structures are not subject to requirements under Subparts J (for existing facilities that do not meet the criteria stated above), I (for new facilities), or N (for new offshore oil and gas extraction facilities), they "must meet requirements under section 316(b) of the CWA established by the Director on a case-by-case, best professional judgment (BPJ) basis." There is no question that CWISs are subject to § 316(b) regardless of the actual number of organisms impinged. What remains is the determination of what represents the BTA for an individual facility that operates a CWIS.

Second, EPA disagrees that the entrainment of 2.8 billion eggs and 354 million larvae annually, and impingement of about 42,800 fish annually represents a *de minimis* environmental impact. Stated differently, EPA maintains, as it established in the Fact Sheet, that impingement and entrainment at this level represents an adverse environmental impact. The comment claims 1) that levels of impingement and entrainment must be examined in the "proper ecological context, *i.e.*, whether I&E levels are large enough to have a significant impact on the relevant fish populations" and 2) that levels of impingement and entrainment must account for the "actual quotient of mortality attributable to Pilgrim." EPA addresses each of these points below.

According to Entergy, the data evaluated in the AEI Report, the 2014 Update and the 2015 Biological Report represent the "most authoritative available information concerning abundance, recruitment, and other characteristics useful in interpreting the potential impacts of I&E at PNPS on harvested fish populations, *i.e.*, the best available information to determine whether PNPS's operation has had any adverse environmental impact on Cape Cod Bay species." EPA does not dispute the validity of the data evaluated in the referenced documents. Rather, EPA disagrees with the fundamental premise of the comment that an environmental impact can only be

[40] In its comments, Entergy refers to the 2014 Final Rule for CWIS requirements at existing facilities (79 Fed. Reg. 48300) as the "Final 316(b) Phase II Rule." The Phase II Rule refers specifically to a final rule implementing § 316(b) at certain existing power producing facilities (69 Fed. Reg. 41575, July 9, 2004), which EPA withdrew in 2008 pending further rulemaking (72 Fed. Reg. 37107, July 9, 2007). The 2004 Phase II Rule was replaced with the 2014 Final Rule. To avoid confusion, EPA refers to the final rule implementing § 316(b) at certain existing facilities promulgated on August 15, 2014 as the "Final Rule" in this Response to Comments.

considered "adverse" if it has a negative, population-level effect; this interpretation is incorrect and finds no support in the statute, EPA's 2014 Final Rule, or past interpretations from § 316(b)'s rulemaking history. Moreover, this interpretation of adverse environmental impact as a population-level impact has been rejected by the courts.

EPA considers the loss of, or injury to, aquatic organisms (including fish eggs and larvae, juvenile and adult fish, and other types of organisms) from being entrained or impinged by a CWIS to constitute adverse environmental impact under CWA § 316(b). Not only is this the case for this permit, but it has also long been EPA's view generally. Attachment D of the Fact Sheet (at 23-30) clearly explains the term "adverse environmental impact" (AEI) and the basis for its interpretation. Neither statute nor regulation expressly limits the extent of adverse environmental impact that may be considered. Stated differently, neither statute nor regulation specifies an impact threshold above which a CWIS's effects must rise before the BTA requirement is triggered.[41]

EPA has consistently interpreted the entrainment and impingement of aquatic organisms to constitute adverse environmental impact, without requiring a demonstration of broader-scale harm to populations of individual species or particular communities of organisms. EPA General Counsel Decisions from 1976 and 1977 concluded, based on the language and structure of CWA § 316(b), that CWISs must reflect the BTA for minimizing AEI whether or not those adverse impacts were considered to be "significant." *Decision of the General Counsel No. 41 (In Re Brunswick Steam Elec. Plant)*, at 203 (June 1, 1976) ("The [cooling water intake] structures must reflect the best technology available for *minimizing* . . . adverse environmental impact – significant or otherwise."); *Decision of the General Counsel No. 63 (In re Central Hudson Gas and Elec. Corp.)*, at 381–82 (July 29, 1977) ("Under Section 316(b), EPA may impose the best technology available . . . in order to minimize . . . adverse environmental impacts – significant or otherwise.").

In EPA's 2001 Phase I CWA § 316(b) regulations applicable to new facilities, *see* 40 C.F.R. Part 125, Subpart I, EPA embraced the same interpretation of "adverse environmental impact" that the Region applied here—one that considers the numbers of organisms impinged and entrained. When this interpretation was challenged, the United States Court of Appeals for the Second Circuit specifically addressed and upheld EPA's position. *Riverkeeper, Inc. v. EPA*, 358 F.3d 174, 196 (2d Cir. 2004) ("*Riverkeeper I*"). In *Riverkeeper I*, industry petitioners argued that, under the Phase I Rule, the "EPA should only have sought to regulate impingement and

[41] As mentioned above, the legislative history behind CWA § 316(b) is sparse, but in the House Consideration of the Report of the Conference Committee for the final 1972 CWA Amendments, Representative Clausen stated that "Section 316(b) requires the location, design, construction and capacity of cooling water intake structures of steam-electric generating plants to reflect the best technology available for minimizing *any* adverse environmental impact" (emphasis added). 1972 Legislative History at 264. At the same time, EPA has interpreted "minimize" to mean "reduce to the smallest amount, extent, or degree reasonably possible" in the context of § 316(b). 40 C.F.R. § 125.92(r). The majority opinion in *Entergy Corp. v. Riverkeeper, Inc.* discusses the term "minimize" in the context of considering whether EPA has discretion to consider a comparison of the costs and benefits of alternative technologies. 556 U.S. 208, 218-20. Both interpretations include an implicit limitation of reasonableness. The Final Rule, at 40 C.F.R. § 125.98(f)(2) and (3), sets out a list of factors that the permitting authority must or may consider in establishing site-specific entrainment controls, which essentially provides a framework for determining whether a particular level of reduction is reasonable. *See also* Determination Document at 232-3.

entrainment where they have deleterious effects *on the overall fish and shellfish populations in the ecosystem*," because "removing large *numbers* of fish or eggs is not, by itself, an adverse impact." *Id.* (emphases added). The court found, however, that "the EPA's focus on the *number* of organisms killed or injured by cooling water intake structures is eminently reasonable" and that "Congress rejected a regulatory approach that relies on water quality standards, which is essentially what [the industry petitioners] urge[] here in focusing on fish *populations* and consequential environmental harm. . . . [W]e are inclined to defer to the EPA's judgment of how best to define and minimize 'adverse environmental impact.'" *Id.* at 196-197 (emphases added).

The same issue came up again in litigation concerning the later withdrawn Phase II CWA § 316(b) regulations and, again, the Second Circuit upheld EPA's interpretation. *Riverkeeper, Inc. v. EPA*, 475 F.3d 83, 123–24 (2d Cir. 2007) ("*Riverkeeper II*"), *rev'd on other grounds, Entergy Corp. v. Riverkeeper, Inc.*, 556 U.S. 208 (2009). In *Riverkeeper II*, in a challenge to the Phase II Rule, the court explained that:

> [i]n the Phase II Rule, as in the Phase I Rule, the EPA has interpreted the statutory directive of section 316(b) to minimize "adverse environmental impact" ("AEI") to require the reduction of "the number of aquatic organisms lost as a result of water withdrawals associated" with cooling water intake structures.

Id. at 123. The *Riverkeeper II* court once again rejected the argument advanced by the industry petitioners in *Riverkeeper I*. 475 F.3d at 124. In particular, the court explained:

> In *Riverkeeper I*, we rejected the argument[] . . . that removing large numbers of aquatic organisms from waterbodies is not in and of itself an adverse impact. We specifically rejected the view that "the EPA should only have sought to regulate impingement and entrainment where they have deleterious effects on the overall fish and shellfish populations in the ecosystem, which can only be determined through a case-by-case, site-specific regulatory regime." We emphasized that "the EPA's focus on the number of organisms killed or injured by cooling water intake structures is eminently reasonable." We reiterated that Congress had "rejected a regulatory approach that relies on water quality standards," analogizing the argument pressed there as urging what is essentially a water quality standard that focuses on fish populations and consequential environmental harm. [FN omitted]. Given that the record evidence on this issue has not changed in any meaningful way since the Phase I rulemaking, we are both persuaded and bound by our statements on this issue in *Riverkeeper I*.
>
> Were we considering the issue in the first instance, however, we would be inclined to defer to the EPA's judgment in any event. The EPA explained that it has set "performance standards for minimizing adverse environmental impact based on a relatively easy to measure and certain metric—reduction of impingement mortality and entrainment." It explained further that it chose this approach "because impingement and entrainment are primary, harmful environmental effects that can be reduced through the use of specific technologies" and stated that "where other impacts at the population, community, and ecosystem levels exist, these will also

> be reduced by reducing impingement and mortality." We see no reason to second-guess this judgment, given the Agency's consideration of the various environmental consequences of cooling water intake structures.

Id. at 124–25 (internal citations omitted). The court also noted that the "statutory structure [of the CWA] indicates that Congress did not intend to limit 'adverse environmental impact' in section 316(b) to population-level effects." *Id.* at 125 n.36. More specifically, the court observed:

> It is significant that in section 316(a), which governs thermal discharges, Congress permits the EPA to vary the standard applicable to a point source "by considering the particular receiving waterbody's capacity to dissipate the heat and preserve a 'balanced, indigenous' wildlife population." It is also significant that Congress "did not include that [water quality or population level] approach (or make any reference to it) in the very next subsection," since "where Congress includes particular language in one section of a statute but omits it in another section of the same Act, it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion."

Id. (alterations in original) (internal citations omitted).[42] Thus, EPA's interpretation of "adverse environmental impact" under CWA § 316(b) is consistent with the statute, is longstanding, and has been upheld by the courts.

The 2014 Final Rule, consistent with *Riverkeeper I* and *II*, explains:

> Aquatic organisms drawn into CWIS are either impinged (I) on components of the intake structure or entrained (E) in the cooling water system itself. In CWA section 316(b) and in this rulemaking, these impacts are referred to as adverse environmental impact (AEI).

79 Fed. Reg. at 48,303; *see also id.* at 48,304 ("Today's final rule establishes national requirements applicable to the location, design, construction, and capacity of cooling water intake structures at existing facilities that reflect the BTA for minimizing the adverse environmental impacts−impingement and entrainment−associated with the use of these structures"). For the Final Rule, EPA considered and rejected the argument that Entergy makes in its comment above. *See* 79 Fed. Reg. at 48,354. *See also* Final Rule Response to Comments (RTC) at 105-107; 101. Finally, EPA has clearly maintained the same interpretation of adverse environmental impact through the Phase I rule, the remanded Phase II rule, the Phase III rule, and the proposal to the 2014 Final Rule. *See* 66 Fed. Reg. 65,289-97 (December 18, 2001); 69

[42] *See also ConocoPhillips Co. v. EPA*, 612 F.3d 822, 840–42 (5th Cir. 2010) (upholding BTA requirements based on likely AEI given presence of eggs and larvae in area of CWIS, without any necessity to evaluate AEI at the species population or biological community level); *In re Pub. Serv. Co. of New Hampshire (Seabrook Station, Units 1 & 2)*, 1 E.A.D. 332, 341-42 (Adm'r 1977), 1977 EPA App. LEXIS 16, at *20–*21 (CWA § 316(b) standard requiring that CWISs reflect BTA for minimizing adverse environmental impact differs from § 316(a) standard requiring that thermal discharge limitations protect balanced indigenous populations of fish, shellfish and wildlife, and § 316(b) may require further minimization of adverse impacts even if balanced indigenous populations would not be undermined). The comment seems to conflate (without explanation or citation) the different standards of § 316(a) and (b).

Fed. Reg. 41,612 (July 9, 2004); 71 Fed. Reg. 35,019 (June 16, 2006); 76 Fed. Reg. 22,196 (April 20, 2011).

For impingement, EPA concluded in the 2014 Final Rule that the BTA for minimizing mortality was "modified traveling screens," as defined in the rule. 79 Fed. Reg. at 48,329; *see* 40 C.F.R. §§ 125.92(s), 125.94(c)(5). In addition to the option to employ modified traveling screens to comply with the standard, the rule includes six alternatives whose performance is equivalent to, or better than, modified traveling screens. 40 C.F.R. § 125.94(c). Consequently, the Final Rule provides that "[t]he owner or operator of an existing facility must comply with one of the alternatives in paragraphs (c)(1) through (7) of this section, except as provided in paragraphs (c)(11) or (c)(12) of this section, when approved by the" permitting authority. *Id.* The comment asserts that annual impingement of 42,800 fish is *de minimis*; however, the actual *de minimis* impingement provision in the regulations—paragraph (c)(11)— provides in relevant part:

> In limited circumstances, rates of impingement may be so low at a facility that additional impingement controls may not be justified. The Director, based on review of site-specific data submitted under 40 CFR 122.21(r), may conclude that the documented rate of impingement at the cooling water intake is so low that no additional controls are warranted.

40 C.F.R. § 125.94(c)(11). Several themes are evident from a review of paragraph (c)(11) and are further explained in the record for the rulemaking. First, there is no express language supporting the commenter's claim that anything less than a population-level impact is *de minimis*. Second, the *de minimis* impingement provision will only be available "[i]n limited circumstances." Thus, a decision by a permitting authority that no additional impingement controls are warranted at a facility based on *de minimis* impingement will be an infrequent occurrence. Indeed, in the record accompanying the Final Rule, EPA explained that it expects the *de minimis* impingement provision to be "rarely used." Final Rule RTC at 25 n.4; *see also id.* at 118 ("[T]he Agency intends for the *de minimis* provision to be infrequently used."), 212 (noting that only in "the most rare cases" will *de minimis* impingement be demonstrated under § 125.94(c)(11)); TDD at 12-3 ("EPA intends that this provision would not be utilized often"). Third, the rate of impingement must actually be quite low, not just low enough that broader-scale harm to populations of individual species or particular communities of organisms have not been observed. In responding to comments on the Final Rule, EPA described the provision as potentially applicable only where rates of impingement are "exceptionally low." Final Rule RTC at 42 ("The final rule provides flexibility for the Director to decide not to require impingement controls where rates of impingement are *exceptionally low* as to be de minimis.") (emphasis added), 118 ("In seeking to avail themselves of the de minimis provision, facilities are required to submit data to the Director indicating that they experience *exceptionally low* impingement rates; the Director will then determine what measures are appropriate.") (emphasis added); *see also* TDD at 12-3 ("EPA has included a provision in the final rule that permits the Director to conclude that a site-specific determination of BTA for impingement mortality is warranted at sites *with exceptionally low rates of impingement*.") (emphasis added). EPA explained the relationship between the two concepts, noting that EPA had not established "metrics for what qualifies as 'exceptionally low' impingement rates, as the Agency intends for the *de minimis* provision to be infrequently used," and citing as an example an impingement rate of "several fish

per month." Final Rule RTC at 118. By comparison, annual impingement of 42,800 fish amounts to several *thousand* fish per month. Furthermore, in disagreeing with a comment opposing an annual *de minimis* threshold on the basis that it could mask significant short-term impingement, EPA noted that "the absolute number of fish impinged is likely to be sufficiently low" such that masking would not be numerically possible and that such a facility "likely would not qualify for the de minimis provision." *Id.* at 109, 118. Fourth, the *de minimis* provision is within a permitting authority's *discretion* to invoke in a particular instance and is not automatically applied in any case. 40 C.F.R. § 125.94(c)(11) ("The Director . . . *may* conclude that the documented rate of impingement at the cooling water intake is so low that no additional controls are warranted.") (emphasis added); Final Rule RTC at 264 ("[T]he Director has the discretion to conclude that the documented rate of impingement at the cooling water intake is so low that no additional controls are warranted."). Reviewing the information presented in the comments in light of the *de minimis* provision in the Final Rule, the Region does not agree that impingement of tens of thousands of adult fish represents a *de minimis* adverse environmental impact.

Turning to entrainment, the requirements of the Final Rule informed the determination of the BTA for PNPS even as the permit is considered an on-going permit proceeding under 40 C.F.R. § 125.98(g). *See* Fact Sheet Attachment D at 9-10, 74-75. The comment overlooks that, when establishing site-specific requirements for entrainment consistent with 40 C.F.R. § 125.94(d), EPA *must* consider the "*[n]umbers* and types of organisms entrained," 40 C.F.R. § 125.98(f)(2)(i) (emphasis added), and *may* consider entrainment impacts on the waterbody, *id.* § 125.98(f)(3)(i). In other words, the Final Rule *requires* EPA, when establishing entrainment controls, to consider the number of organisms entrained, but has no such requirement to consider population-level impacts. While the comment asserts that any entrainment impact less than a population-level impact must be *de minimis*, it fails to explain how this view squares with the regulatory framework.[43] EPA's consideration of the adverse environmental impacts caused by PNPS's CWIS in the context of its BTA determination for this permit have been both reasonable and consistent with applicable law and relevant Agency policy. To be clear, EPA is not saying that it cannot consider other effects in determining the maximum reduction in entrainment warranted (*e.g.*, the magnitude of the impact associated with the relative costs and benefits of available technologies). EPA is simply saying that, contrary to the comment, population-level effects are not required for "a finding of adverse environmental impact."

The comment's second argument is that levels of impingement and entrainment must account for the "actual quotient of mortality" attributable to Pilgrim. According to the commenter, EPA must recognize that the vast majority of eggs, if fertilized, will die of natural causes before those fish could contribute to future populations. Entergy comments that high early life stage mortality can be accounted for by converting the number of eggs and larvae lost to the CWIS into an equivalent number of adults, because doing so puts early life stage losses into their "proper ecological context." To support its comment, Entergy claims that EPA approves the use of adult-

[43] Further, the comment does not identify specific permit condition(s) that should be changed or in what way, even if population-level impacts from entrainment were a prerequisite for finding adverse environmental impact (which they are not). Moreover, in the Fact Sheet to the Draft Permit, the Agencies concluded that no additional entrainment controls were warranted, based on Entergy's representations about PNPS' remaining useful life and post-shutdown CWIS operation. *See, e.g.*, Fact Sheet, Att. D at 86. Thus, it is not clear from the comment what effect the assertion that population-level impacts are required to support a finding of adverse environmental impact, even if true (which, again, it is not), would have on the permit.

equivalent losses to evaluate impacts under Section 316(b) in the Final Rule. Adult equivalents can be a useful metric when establishing national standards under § 316(b), or when comparing the performance of available technologies on a site-specific basis, or when standardizing impingement and entrainment counts from multiple facilities. The reference to the preamble to the Final Rule in footnote 27 of the comment explains how EPA used adult equivalents as one of the standard fishery modeling techniques to standardize sampling counts for impingement and entrainment across facilities in calculating the benefits of different options considered in the rulemaking. *See* 79 Fed. Reg. 48,404.

As the comment points out, the Final Rule states "EPA finds it appropriate to use the [adult equivalent] measure because information in the record indicates that an overwhelming majority of eggs, larvae and juveniles do not survive into adulthood and the [adult equivalent] calculations adjust for differences in survivorship based on species and age-specific mortality rates." 79 Fed. Reg. 48,403. Entergy uses this quotation to mean that EPA finds it appropriate to use the measure for evaluating impacts under § 316(b). EPA does not believe this is the case. This statement describes EPA's approach to estimating the *national* environmental benefits of the Final Rule and other options considered by EPA, in particular, how EPA used models (including A1E) to standardize facility-derived impingement mortality and entrainment counts collected on a site-specific basis under a range of conditions and protocols. The Final Rule does not prohibit consideration of A1E in evaluating the site-specific entrainment controls; however, to suggest that the Final Rule uses adult equivalent fish in the context of assessing adverse environmental impact is incorrect and inconsistent with the Final Rule itself, which requires the permitting authority to consider the numbers of organisms entrained. *See* 40 C.F.R. §125.98(f)(2)(i); *see also*, *e.g.*, 79 Fed. Reg. at 48,303 ("Aquatic organisms drawn into CWIS are either impinged (I) on components of the intake structure or entrained (E) in the cooling system itself. In CWA section 316(b) and in this rulemaking, these impacts are referred to as *adverse environmental impact* (AEI).").

In addition, valuing individual life stages only in terms of the contribution to the adult population overlooks additional functions of early life stages in supporting growth and survival of juvenile fish within the estuarine system.[44] *See* AR-720. Indeed, in the same paragraph as the quotation above, the preamble to the Final Rule continues "using A1Es [age-one equivalents] simplifies a complex ecological situation, because some of the smaller fish would provide an ecological benefit to other species as food even if they would not survive to adulthood." 79 Fed. Reg. 48,403. At the same time, EPA acknowledges that the importance of each organism to the system is not necessarily equivalent. For example, a single egg plays a less important role in the ecosystem than a single adult fish of the same species. Still, the CWIS at PNPS presents an additional source of mortality not accounted for by the natural mortality rates and life histories of marine fish. That an individual egg or larva killed by entrainment would likely not have survived to adulthood naturally does not excuse a facility from killing billions of organisms each year, and it does not establish a lack of adverse environmental impact. EPA, in this case and in the Final Rule, recognizes that the direct loss of millions of early life stages to entrainment is itself an adverse environmental impact to the aquatic environment of Cape Cod Bay. Even considering

[44] For example, focusing only on adult equivalents would also overlook the role that high numbers of eggs and larvae in providing a "compensatory reserve" for a species that experience high levels of natural mortality. *See* 79 Fed. Reg. 48303, 48318, 48319.

the natural mortality of early life stages, the loss of hundreds of thousands of adult fish each year is an adverse impact.

According to the comment, the estimated entrainment losses provided in the Fact Sheet and in Attachment D (at 17-18) for winter flounder, cunner, Atlantic menhaden, Atlantic herring, Atlantic cod, and Atlantic mackerel do not reflect the 2015 Biological Report correctly. Entergy provides a table of the equivalent adult entrainment loss estimates (without accounting for entrainment survival) for these species from the data in the 2015 Biological Assessment. EPA reviewed the 2015 Report and the tables referenced in the footnote (Tables 5, 9, 13, 15, 18, 20,) but was unable to replicate these values. Having said that, EPA does not reissue Fact Sheets and, as such, the Fact Sheet to the Draft Permit will not be revised. In addition, the differences between the two (the Fact Sheet and the 2015 Report) are relatively small and do not alter the decision that the annual loss of hundreds of thousands of adult equivalent fish from entrainment represents an adverse impact on the aquatic community in Cape Cod Bay. At this writing, the Marine Ecology Report for January-December 2017 is available. Rather than revise the values in the Fact Sheet, the 2018 Report (summarizing results of monitoring from 1980 to 2017) is used in responding to comments on the Draft Permit.

Finally, in comments 2.2.1 through 2.1.6, Entergy maintains that its CWIS has had no adverse environmental impact on a species-specific basis when one converts the entrainment and impingement losses to adult equivalents and considers the magnitude of such losses in the context of populations of these species in the Gulf of Maine. First, as we have already explained, impingement and entrainment that do not have population-level effects may still constitute adverse environmental impact. Thus, while EPA has not replicated Entergy's calculations of spawning stock populations and has no reason to believe them to be inaccurate, losses from impingement and entrainment at PNPS as a percentage of the overall stock in the Gulf of Maine or regionally are not required for EPA to conclude that the mortality of aquatic organisms at PNPS from the CWIS is an adverse impact.

Second, Entergy converts the raw numbers of life stages lost at PNPS to adult equivalent fish. Again, EPA has not reviewed Entergy's adult equivalent models or the underlying data used to calculate adult equivalents, but has no reason to believe them to be inaccurate. Converting raw losses, especially for early life stages that exhibit high natural mortality, to adult equivalent fish is common and has been used by EPA to evaluate the potential benefits of various options during rulemaking under § 316(b). EPA has responded above to comments about how this value has been considered in the context of § 316(b). Again, EPA plainly considers impingement and entrainment to be an adverse environmental impact that must be addressed by ensuring that the CWIS is operated using the BTA to minimize the impacts of impingement and entrainment, and does not specify that EPA only consider the loss of age-1 or adult fish. In making the determination of what entrainment controls may be necessary to minimize this impact, EPA may choose to consider the possible benefits of various available technologies, including, as one possible means of standardizing the comparisons, the number of age-1 fish saved. Considering age-1 fish when determining if and what additional technologies may be required to minimize adverse impacts is not the same as establishing that there is an adverse impact. Regardless, Entergy's comments at 2.1.1 through 2.1.6 indicate that past operation of the CWIS has resulted in the impingement and entrainment of more than 862,000 age-1 cunner and nearly 33,000 other

adult equivalent fish annually. Even after adjusting for the possible survival, this equates to the death of more than 173,000 adult fish per year. While EPA is not required to assess adverse impact on the basis of loss of adult equivalent fish, the loss of hundreds of thousands of fish per year at PNPS's CWIS is an adverse impact that must be addressed by the BTA.

The BTA requirements are included as Part I.C of the Final Permit. In this case, PNPS ceased operations as of June 1, 2019 and no longer withdraws cooling water for the condensers, resulting in an overall flow reduction of more than 92%. Therefore, EPA determined that no additional controls are warranted to minimize entrainment at PNPS after consideration of the relevant factors. *See* 40 C.F.R. § 125.98(f). The near elimination of withdrawals via the circulating water pumps also allows PNPS to achieve an actual through-screen velocity of less than 0.5 fps much of the time, which is consistent with the available impingement mortality BTA options at 40 C.F.R § 124.94(c)(3). During the limited period when PNPS must operate one of the circulating water pumps, which the Final Permit limits to 48 hours within a calendar month, the through-screen velocity will exceed 0.5 fps. Consequently, the existing traveling screens must be rotated continuously to limit the impingement duration and increase the likelihood that impinged fish survive and are transported to the receiving water.

2.2 As The Fact Sheet Recognizes, PNPS's Thermal Discharges And Thermal Backwashes Have Not Compromised The Aquatic Community Of Cape Cod Bay

The Fact Sheet concluded, on the basis of species-specific analysis presented in Attachment C to the Fact Sheet, that PNPS's thermal discharges to Cape Cod Bay and occasional thermal backwashing have resulted in no prior appreciable harm to Cape Cod Bay RIS, and therefore that the thermal limits contained in PNPS's current permit are "more stringent than necessary to assure the protection and propagation of the balanced indigenous population [or community] of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made," *viz.* Cape Cod Bay.[132] Specifically, Attachment C concludes that: PNPS's thermal discharges "are not a cause for appreciable harm to fish populations in the environs of the PNPS";[133] there has been no evidence of thermally related fish kills occurring at PNPS since the 1970s;[134] any thermal impact to river herring, rainbow smelt, tautog, cunner, Atlantic silverside, blue fish, striped bass, winter flounder, and American lobster is only "*de minimis*";[135] and historical impingement of Atlantic menhaden in connection with thermal cycling has not occurred since the 1970s.[136]

Some commenters, however, have asserted the 2000 Demonstration is outdated. As a matter of law, this objection is without merit. As EPA precedent and technical guidance concerning 316(a) demonstrations recognize, determinations under Section 316(a) are to be made "on the basis of the best information reasonably attainable," which is satisfied by the periodic thermal assessments discussed at the beginning of the "Environmental Context" Section, *supra*, particularly assessments that were contemporaneous with (*i.e.*, 1995), and postdate (*i.e.*, 2000) Pilgrim's NPDES application.[137] Indeed, EPA's Section 316(a) regulations likewise recognize the principle that prior studies of thermal impacts do not lose their relevance by mere passage of time, and expressly allow applicants for renewal of a thermal variance to rely on prior submissions, absent requests from EPA for additional information: "[a]ny application for the

renewal of a section 316(a) variance shall include only such information … as the Director requests within 60 days after receipt of the permit application."[138]

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[132] *See* 33 U.S.C. § 1326(a); 40 C.F.R. § 125.71(c) (again, equating statutory term "balanced, indigenous population" with "balanced, indigenous community" and defining both to mean "a biotic community typically characterized by diversity, the capacity to sustain itself through cyclic seasonal changes, presence of necessary food chain species and by a lack of domination by pollution tolerant species").
[133] Fact Sheet, Attach. C, at 33.
[134] *Id.*
[135] *Id.* at 19-22, 24-30.
[136] *See id.* at 22-24.
[137] *See In re Pub. Serv. Co. of N.H. (Seabrook Station, Units 1 and 2)*, NPDES Appeal No. 76-7, Decision of Administrator, 1977 WL 22370, at *12 (E.A.B. June 10, 1977) ("*Seabrook I*") (stating that EPA must make decisions "on the basis of the best information reasonably attainable." (quoting 1974 EPA Draft §316(a) Guidance)). Courts also recognize that "EPA cannot reject the 'best available' evidence simply because of the possibility of contradiction in the future by evidence unavailable at the time of action – a possibility that will *always* be present." *Chlorine Chem. Council v. EPA*, 206 F.3d 1286, 1291-92 (D.C. Cir. 2001); *accord Bldg. Indus. Ass'n v. Norton*, 247 F.3d 1241, 1246 (D.C. Cir. 2001) (best scientific data "available" does not mean "the best scientific data possible").
[138] 40 C.F.R. § 125.72(c).

Response to Comment 2.2:

In its comment Entergy reiterates the conclusion from the Fact Sheet and supporting analysis that the thermal discharges from PNPS are protective of the BIP. EPA and MassDEP determined that the Draft Permit limits, which were based on a variance from technology- and water quality-based thermal limits under § 316(a) of the CWA, will be protective of the balanced indigenous population (or "BIP"). EPA maintains that the Draft Permit's pre-shutdown, variance-based temperature limits are protective of the BIP. Since PNPS ceased operations as of May 31, 2019, all pre-shutdown limits, including the maximum daily temperature limit of 102°F and delta-T of 32°F, which applied at Outfall 001, have been eliminated from the Final Permit. The Final Permit at Part I.A.3 includes a maximum daily temperature limit of 90°F, average monthly limit of 80°F, and delta-T of 10°F temperature limits, which apply at Outfall 010. These limits are based on the anticipated post-shutdown cooling needs and are more stringent than the variance-based pre-shutdown limits, will also ensure the protection of the BIP. The post-shutdown temperature limits, which will become effective on the effective date of the Final Permit, represent a 98.6% reduction in the heat load to Cape Cod Bay. *See* Responses to Comments I.3.1, I.3.4, and III.5.2.

In its comment, Entergy states the thermal limits contained in PNPS's current permit are "more stringent than necessary to assure the protection and propagation of the balanced indigenous population [or community] of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made" and references 33 U.S.C. § 1326(a) and 40 C.F.R. § 125.71(c). As a point of clarification, the current permit limits, which were based on a variance under § 316(a) and continued as pre-shutdown temperature limits in the Draft Permit, will assure the protection and propagation of the balanced indigenous population. The current permit limits are not *more* stringent than necessary. CWA § 316(a) states:

> any effluent limitation proposed for the control of the thermal component of any discharge from such source will require effluent limitations more stringent than

> necessary to assure the projection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made, the Administrator (or, if appropriate, State) may impose an effluent limitation under such section for such plant, with respect to the thermal component of such discharge (taking int account the interaction of such thermal component with other pollutants), that will assure the projection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on that body of water.

33 U.S.C. § 1326(a). *See also* 40 C.F.R. § 125.70. In other words, where a technology-based and/or water quality-based temperature limit would be more stringent than necessary to ensure protection of the BIP, the permitting authority may impose an alternative effluent limitation that will ensure the protection of the BIP. For PNPS, MassDEP and EPA agreed that the technology- and water quality-based temperature limits would be more stringent than necessary, but that the Draft Permit pre-shutdown limits (which are consistent with the current permit's temperature limits) were sufficiently stringent to ensure protection of the BIP. *See also* 40 C.F.R. § 125.73(a) ("[t]hermal discharge effluent limitations or standards established in permits may be less stringent than those required by applicable standards and limitations if the discharger demonstrates to the satisfaction of the director that such effluent limitations are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made.")

2.3 Summary

In sum, PNPS's historic operations have had a *de minimis* impact on the aquatic ecosystem of Cape Cod Bay, which has remained stable since 1980, as demonstrated by the AEI Report and 2014 Update.[139] The absence of such impacts underpins the Draft Permit, because a demonstrable "adverse environmental impact" is the prerequisite to technology forcing under Section 316(b)[140] or to a finding of any alteration of the "excellent habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions" for which MWQS provide.[141]

There also is no reasonable question that U.S. nuclear power stations, including PNPS, have played an essential role in the reduction of greenhouse gas ("GHG") emissions and thus in mitigating devastating effects of climate change.[142] Setting aside the profound confusion among some commenters at the July 21, 2016 public hearing on this question, the only evidence is that closure of PNPS will result in more GHGs and exacerbated climate change conditions, the long term impacts of which will affect Cape Cod Bay, with results that may well be catastrophic.[143]

With this background on the aquatic community, which underscores Pilgrim's lack of adverse environmental impact, impairment of the balanced indigenous aquatic community or impairment of MWQS, Entergy respectfully submits the following corrections and clarifications to the Draft Permit.

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[139] AEI Report; 2014 Engineering Response Supplement, Attach. 4: Normandeau Biological Input, at 4; *see also* 40 C.F.R. § 125.94(c)(11).
[140] 33 U.S.C. § 1326(b).

141 314 Code Mass. Regs. § 4.05(4)(a), (4)(a)(2)(d).
142 *See, e.g.*, Pushker A. Kharecha & James E. Hansen, *Prevented Mortality and Greenhouse Gas Emissions from Historical and Projected Nuclear Power*, 47 Environ. Sci. & Tech. 4889 (2013) (concluding, based on analysis of historical production data, that global nuclear power use has prevented an average of 64 gigatonnes of CO_2-equivalent GHG emissions that otherwise would have resulted from fossil-fueled generation); NERA, *Economic Assessment of Fish-Protection Alternatives at Pilgrim Nuclear Power Station* (June 26, 2008) ("Economics Report"), at 71-79 (reporting that reductions in generation of electricity at PNPS will "requir[e] that other sources of generation be used more intensively, or that new generating units be built," with the result that there would be significant increases in CO_2 emissions, among other criteria air pollutants).
143 *See* Kharecha & Hansen, *supra* note 142, at 4893 (noting continued potential for "devastating climate impacts").

Response to Comment 2.3:

In Response to Comment III.2.1, EPA explained that Section 316(b) of the CWA, 33 U.S.C. § 1326(b) provides that:

> [a]ny standard established pursuant to [CWA sections 301 or 306] and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.

33 U.S.C. § 1326(b). To satisfy § 316(b), the location, design, construction, and capacity of the facility's CWIS(s) must reflect "the best technology available for minimizing adverse environmental impacts" ("BTA"). In other words, Section 316(b) applies to the operation of a cooling water intake structure and is *not* triggered by a threshold level of organisms impinged or entrained. For an existing facility like PNPS, the requirements of the Final Rule applies if the facility is a point source, uses or proposes to use one or more cooling structures with a cumulative design flow (DIF) greater than 2 MGD to withdraw from waters of the U.S., and 25 percent or more of the water withdrawn on an actual intake flow basis is used exclusively for cooling purposes. *See* 40 C.F.R. § 125.91(a). The criteria for the applicability of § 316(b) is 1) a point source and 2) the operation of a CWIS. Entergy appears to agree that § 316(b) applies to PNPS, stating in Comment III.2.1 that the estimated losses or impingement and entrainment "are sufficient to trigger searching review under Section 316(b)."

According to Entergy, demonstration of "adverse environmental impact" is the prerequisite to technology forcing under Section 316(b) or to a finding of any alteration of the "excellent habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions" for which Massachusetts surface water quality standards provide. The statute at 33 U.S.C. § 1326(b), above, requires that cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. The adverse environmental impact is not at issue, rather, the location, design, construction, and capacity of the cooling water intake structure must reflect BTA. What remains is for the permitting authority to determine what the BTA is to minimize the impact, which, as the Final Rule makes clear, may be no additional entrainment controls. *See* 40 C.F.R. § 125.98(g).

Finally, EPA acknowledges that closure of PNPS may increase overall GHG emissions if electricity that was generated at PNPS is replaced primarily by electricity generation that results in greater GHG emissions. The comment does not request any change to the permit based on this

assertion nor does it explain how the change in greenhouse gases would affect any condition of the Draft or Final Permits. As such, EPA has not addressed this comment further.

3.0 The Final Permit Should Not Include What May Be Misconstrued As A Mandatory-Shutdown Condition Or Continuous Rotation Of The Traveling Screens

The Draft Permit states that, as of June 1, 2019, "PNPS *will terminate* cooling water withdrawals for the main condenser and will be authorized to continue withdrawing cooling water only as necessary to support decommissioning activities and to cool the spent fuel rods for a limited period of time following the shutdown of PNPS."[144] The Draft Permit further provides that, "[u]pon termination of generation of electricity *or no later than June 1, 2019*, the permittee shall," *inter alia*, "[c]ease cooling water withdrawals for the main condenser and reduce total cooling water withdrawals to an average monthly rate of 7.8 MGD."[145] The Draft Permit also states that "[t]he permittee has informed EPA and MassDEP that it will terminate operations at PNPS *and enter a decommissioning phase no later than June 1, 2019*."[146] Thus, Draft Permit provisions do more than memorialize Entergy's planned shutdown. Rather, the language suggests, and (if intentional)[147] could be interpreted as imposing, a shutdown mandate no later than June 1, 2019, followed by immediate decommissioning.

This mandatory shutdown and decommissioning condition is legally inappropriate, and the immediate shutdown condition is factually inappropriate. Both, therefore, should be removed from the final Permit. As Section I.A below explains, a mandatory closure condition is not within EPA's authority and is otherwise contrary to law. Further, while shutdown is expected to occur no later than June 1, 2019, decommissioning cannot commence immediately. Indeed, as a matter of law, decommissioning cannot commence until at least 90 days after Entergy submits its Post-Shutdown Decommissioning Activities Report ("PSDAR") to NRC, which is not due to NRC until two years following the shutdown.[148] Further, as a matter of industry practice, SAFESTOR is routinely employed by stations and is a viable option at PNPS, in which case decommissioning activities may not commence for many years.[149] Thus, Entergy respectfully submits that a statement that decommissioning activities will proceed "immediate[ly]" is not correct.

Section I.B below discusses the proposed new condition that PNPS be required to continuously rotate the traveling screens, and to monitor through-screen velocity, during post-shutdown dilution water usage. As detailed there, these proposed conditions are factually unsupported and lack any environmental rationale, and should therefore be deleted from the final Permit.
As a result, Part I.F of the Draft Permit, including the preamble thereto, must be clarified when the final Permit is issued. Proposed revisions are provided below in Section I.C.

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144 Draft Permit, Part I.F, at 32 (emphasis added).
145 *Id.* at 33 (emphasis added).
146 *Id.* at 32 (emphasis added).
147 Based on language appearing in Attachment D of the Fact Sheet, it remains unclear whether EPA or DEP actually intend to impose such a condition. For example, EPA states that, "*[s]hould the plant operate beyond June 2019*, EPA would have to *reconsider*" the "cost-benefit comparison" and "potential availability" of other BTA alternatives that "have been *eliminated from [its BTA] analysis due to the limited remaining useful life of the plant*." Fact Sheet, Attach. D, at 86 (emphasis added). Such statements suggest the Draft Permit's language may be intended merely to

reflect what Entergy has announced. To that end, Entergy's requested clarification should be readily satisfied.
148 *See* 10 C.F.R. § 50.82(a)(4)-(6).
149 *See, e.g.*, NRC, *Backgrounder: Decommissioning Nuclear Power Plants* (May 2015), at 5-6 (Table) (reflecting that most nuclear facilities for which decommissioning is planned have elected SAFSTOR).

3.1 The Draft Permit's Mandatory-Shutdown Language Is Both Unlawful And Unnecessary To Protect The Environment

3.1.1 Shutdown And Decommissioning Mandates Are Impermissible

A mandatory shutdown condition infringes on NRC's exclusive jurisdiction over nuclear-reactor operations and radiological decommissioning, and therefore is beyond the legal authority of EPA. In enacting the Atomic Energy Act of 1954 ("AEA"), Congress bestowed on the Atomic Energy Commission (now, NRC) exclusive jurisdiction over, among other things, the "operation" of nuclear power plants.150 This field necessarily encompasses within its scope nuclear reactor operations, as well as issues related to such operations and shutdown, *e.g.*, *nuclear* fuel management, radiological safety and radiological discharges.151 EPA and DEP are prohibited from encroaching on this exclusive domain, even when acting according to their respective general grants of authority to regulate water withdrawals or discharges. For decades the Supreme Court has made clear that Congress's grant of CWA authority to EPA was not intended to, and therefore did not, pare back the exclusive authority that Congress previously had bestowed on NRC to regulate nuclear reactor operations, as to which NRC plainly has superior expertise.152 EPA therefore lacks the legal authority to command ("shall") Pilgrim to cease operating its nuclear reactor as of June 1, 2019, or to regulate facility operations in any way that "directly and substantially" affects the operator's decisions, including those "concerning nuclear safety levels," fuel management, spent fuel management or radiological discharges.153

As a state agency, DEP has no greater authority than EPA to dictate to PNPS that it must shut down its nuclear reactor by some date certain. Indeed, the federal courts have held that state law may not mandate even "temporary" shutdowns of nuclear-reactor operations,154 nor may it "regulate the operation of [the] nuclear reactor," even if such regulation stops short of a shutdown mandate.155

In sum, the Draft Permit's language *mandating* that PNPS shut down on June 1, 2019 is inappropriate as a matter of law, because EPA and DEP lack the legal authority to impose such a condition.

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150 *See, e.g.*, *Pac. Gas & Elec. Co. v. State Energy Res. Conserv. & Dev. Comm'n*, 461 U.S. 190, 212 (1983).
151 *Id.* ("At the outset, we emphasize that the statute does not seek to regulate the construction or *operation* of a nuclear power plant. It would clearly be impermissible for California to attempt to do so, for such regulation, even if enacted out of non-safety concerns, would nevertheless directly conflict with NRC's exclusive authority over plant construction and *operation*." (emphasis added)); *accord Entergy Nuclear Vt. Yankee LLC v. Shumlin*, 733 F.3d 393, 411 (2d Cir. 2013) (observing that *Pac. Gas* "emphasiz[ed]" that a "state statute that seeks to regulate the construction or *operation* of a nuclear powerplant" would "directly conflict with the NRC's exclusive authority over plant construction or *operation*" (emphases added)); *County of Suffolk v. Long Island Lighting Co.*, 728 F.2d 52, 56 (2d Cir. 1984) ("[T]he NRC retains responsibility to regulate "the construction *and operation* of any production or utilization facility." (emphasis added)); *Missouri v. Westinghouse Elec., LLC*, 487 F. Supp. 2d 1076, 1084 (E.D. Mo.

2007) (reciting that in *PG&E* the Supreme Court "noted two general areas in which state regulation is pre-empted: the construction and *operation* of nuclear power plants…." (emphasis added)).
152 *Train v. Colo. Pub. Interest Research Group, Inc.*, 426 U.S. 1, 15-17 (1976) (holding that EPA's general authority under CWA to regulate discharges of pollutants does not trump NRC's exclusive authority under AEA to regulate handling of radionuclides); *see also Whitney Nat'l Bank v. Bank of New Orleans & Trust Co.*, 379 U.S. 411, 419-20 (1965) ("[W]here Congress has provided statutory review procedures designed to permit agency expertise to be brought to bear on particular problems, those procedures are to be exclusive.").
153 *See, e.g., English v. Gen. Elec. Co.*, 496 U.S. 72, 84-85 (1990); *United States v. Manning*, 434 F. Supp. 2d 988, 1007 (E.D. Wash. 2006); *Me. Yankee Atomic Power Co. v. Bonsey*, 107 F. Supp. 2d 47, 55 (D. Me. 2000).
154 *See, e.g.*, *County of Suffolk*, 728 F.3d at 59-60 (holding that state-law injunction "that even temporarily shuts down [a nuclear facility] would infringe on the NRC's authority over construction and operation").
155 *Boeing Co. v. Robinson*, No. CV 10-4839-JFW, 2011 WL 1748312, at *11 & n.11 (C.D. Cal. Apr. 26, 2011).

3.1.2 The Permit Must be Flexible About Shut Down Dates

The following comment was provided at the Public Hearing by Mr. Romeo of Entergy. Significant wholesale market conditions, brought about by record low fossil fuel prices and poor market design that does not value the carbon free base load electricity generated at Pilgrim, we made the decision to shut the plant down. With this context, I wanted to outline what lies next for the station during the last years of operation, specifically, as it relates to Pilgrim's permit. Again, our shut down is targeted for June of 2019. It will not surprise you that shutting down a major electricity supplier is a complicated matter. As a result, the exact timing of that shut down in 2019 depends on a variety of factors, including further discussions with the New England independent system operator, our fuel design and our fuel loading considerations.

For this reason, the permit must be flexible about shut down dates. Until that shut down, Pilgrim will continue to operate as usual with the flows and discharges that are permitted under Pilgrim's existing permit or the draft permit.

Response to Comments 3.0, 3.1, 3.1.1, and 3.1.2:

Introduction

The Agencies have not mandated that Entergy shut PNPS down or begin decommissioning "immediately" after shutdown; Entergy made the decision to close the plant—a decision it reaffirmed in this and other comments on the Draft Permit.[45] The BTA analysis in the Fact Sheet recognized Entergy's choice, and the Agencies' conclusion that no additional entrainment technologies are warranted is appropriately premised on the decision made by, and the date chosen by, Entergy. The comment offers no evidence that the Agencies had, or sought to have, any say in that decision or that date. In the Fact Sheet, the Agencies recognized the potential for PNPS to operate beyond June 2019 and advised that, in such a case, they would have to revisit the BTA analysis, as it could impact the basis for the conclusion that no additional entrainment technologies are warranted. Fact Sheet, Attachment D at 86. Entergy repeatedly and consistently reaffirmed both its decision and its chosen date, including in its comments on the Draft Permit, in

[45] *See, e.g.*, Entergy Redline of Fact Sheet at 9 ("*Entergy's decision to close Pilgrim* was based on numerous factors, including the Commonwealth's decisions to subsidize oil storage at natural gas facilities and hydropower utilities in Canada. These conditions rendered continued station operation uneconomical.") (emphasis added).

"Supplemental Comments" it submitted after the close of the public comment period, and in public filings with the NRC and ISO-NE before and after the issuance of the Draft Permit. Furthermore, Entergy never informed the Agencies that it had changed its position and intended to operate beyond June 1, 2019. In addition, Entergy continued to represent to the NRC its intent to cease power operations at PNPS permanently no later than June 1st, 2019. *See, e.g.*, Letter from Mandy Halter, Director of Nuclear Licensing, Entergy Nuclear Operations, Inc. to NRC (Nov. 16, 2018) (transmitting Pilgrim Nuclear Power Station's Post-Shutdown Decommissioning Activities Report) *See* AR-696. More importantly, on May 31, 2019, Entergy did in fact cease generating electricity at PNPS. Letter from Brian Sullivan, Site VP, Entergy Nuclear Operations, Inc., to NRC (June 10, 2019) *See* AR-688; Press Release, Entergy Corp., Pilgrim Nuclear Power Station Shut Down Permanently (May 31, 2019) (hereinafter, "Entergy May 2019 Press Release"). Further, on June 9, 2019, Entergy "permanently removed [the fuel] from the PNPS reactor vessel," acknowledging that its license therefore "no longer authorizes operation of the reactor." Letter from Brian Sullivan, Site VP, Entergy Nuclear Operations, Inc., to NRC (June 10, 2019). As a result, and as explained earlier, the Agencies have not included in the Final Permit the conditions from the Draft Permit that were to apply prior to June 1, 2019. Although these facts render irrelevant the comments that the Agencies lack the authority "to command" Entergy to "shut down" its nuclear reactor and that the "permit must be flexible about shut down dates," the Agencies provide additional response regarding the purported "shutdown and decommissioning mandate" below.

The BTA determination relies on Entergy's repeated and consistent public representations that it would permanently cease generating electricity at the plant of its own accord by June 1, 2019, and on the actual closure of PNPS undertaken by Entergy. Should the permittee decide to change its decision, it may submit an application for a permit modification informing the Agencies of its new plans, so that the Agencies may revisit the BTA analysis as necessary based on any updated factors, including the remaining useful life of the plant. In such a case, the Agencies would be properly authorized to make the decision as to the water pollution control criteria to which the facility's cooling system should be held in light of such changed conditions.

"Shutdown"

Pursuant to federal regulations at 40 C.F.R. §§ 125.94(d) and 125.98(f), EPA, as the NPDES permitting authority in Massachusetts, is required, in connection with the reissuance of the facility's NPDES permit, to establish site-specific requirements for entrainment for PNPS reflecting EPA's determination of the maximum reduction in entrainment warranted after consideration of several enumerated factors relevant for determining the best technology available for minimizing adverse environmental impact at the facility. The relative weight to assign to each factor is a matter given over to EPA discretion, based on the circumstances of each facility.[46] Among these factors is the consideration of the remaining useful life of the facility. Well before the Agencies published the Draft Permit, Entergy announced that it had decided to close PNPS "no later than June 1, 2019," and that, "[a]fter shutdown," the facility would "transition to decommissioning." Press Release, Entergy Corp., Entergy to Close Pilgrim Nuclear Power Station in Massachusetts No Later than June 1, 2019 (Oct. 13, 2015) (hereinafter,

[46] In an ongoing permit proceeding such as this one, the BTA determination may be based on some or all of the factors in § 125.98(f). 40 C.F.R. § 125.98(g).

"Oct. 2015 Press Release"). At around the same time as that announcement, Entergy sent ISO-NE a Non-Price Retirement request, indicating that PNPS would not participate in the forward capacity market after May 2019, which request was approved by ISO-NE on December 18, 2015. Further, in a November 10, 2015, letter to the NRC, Entergy certified that "it has decided to permanently cease power operations at the Pilgrim Nuclear Power Station no later than June 1, 2019." Letter from John Ventosa, Entergy, to NRC (Accession No. ML15328A053). In April 2016, Entergy publicly reiterated that it would "cease operations on May 31, 2019." Press Release, Entergy Corp., Entergy Intends to Refuel Pilgrim in 2017; Cease Operations on May 31, 2019 (Apr. 14, 2016) (hereinafter, "Apr. 2016 Press Release"). *See* AR-636. Email from Joe Egan to George Papadopoulos on October 13, 2015 citing news release announcing shutdown of Pilgrim no later than June 1, 2019. *See* AR-724.

EPA, relying on Entergy's numerous representations to the public, to ISO-NE, to the NRC, and directly to EPA, reasonably considered the remaining useful life of the plant to extend only through May 31, 2019. As EPA evaluated various entrainment technologies, it concluded that, of three potentially available technologies, two that could result in the greatest reduction in entrainment (namely, assisted recirculation and closed-cycle cooling[47]) most likely could not be constructed and operational prior to Entergy's self-imposed closure date. Consequently, EPA determined that neither was available within the remaining useful life of the plant and did not consider these technologies further in the BTA determination. Concluding that VFDs were available within this time frame, however, EPA considered their social costs and benefits, ultimately concluding that the social costs of VFDs at PNPS were not justified by the social benefits that would be provided over the extremely limited period during which they would operate. (The comment does not suggest that EPA incorrectly relied on the remaining useful life factor to rule these entrainment technologies out or to conclude that VFDs are available but not justified). Consequently, EPA concluded that no additional entrainment control requirements were necessary. EPA made clear, however, that this conclusion was predicated on Entergy's public announcement and actions to cease power operations at the facility by a date certain (again, a date of Entergy's own choosing) and, as a consequence, reduce cooling water

[47] The Agencies have not made a finding on the question of whether closed-cycling cooling is technologically feasible or infeasible at PNPS; it is unnecessary for the Agencies to do so in this permit proceeding. As the Fact Sheet explains, prior to the release of the Draft Permit, Entergy presented several arguments that closed-cycle cooling was not technologically feasible, which we agreed would present difficult issues for retrofitting PNPS but which did not themselves appear to be conclusive on the question of infeasibility. *See* Fact Sheet, Att. D at 37-46. For instance, in the Fact Sheet, we noted that PNPS concluded that conversion to closed-cycle cooling is infeasible because it would require frequent power reduction that "would substantially impact the capacity of the plant to generate electricity and is generally not consistent with a nuclear power plant designed for baseload generation." *Id.* at 40-43. We noted, however, that Entergy's modeling results evaluating larger cooling towers suggested that PNPS could potentially avoid that problem by operating closed-cycle cooling seasonally. *Id.* at 43-44. We also noted the potential for partially alleviating the concern by increasing the size of the condenser. *Id.* at 44. While Entergy argued for infeasibility on the basis that such a modification of the condenser would be unprecedented, we observed that "it does not necessarily follow that it is therefore infeasible." *Id.* at 45. Indeed, Entergy concluded that assisted recirculation, a technology similar to closed-cycle cooling, would be unprecedented but still feasible. *Id.* at 51. In any event, the Agencies concluded that closed-cycle cooling was not available within the remaining useful life of the plant and ruled it out as BTA at PNPS on that basis, *id.* at 76-77, obviating any need for the Agencies to make a finding regarding its technological feasibility at PNPS, *see also* AR-749. Furthermore, since the issuance of the Draft Permit and Fact Sheet, Entergy has shut PNPS down.

withdrawals by approximately 96%. As a result, the flow limits in the Draft Permit for the cooling water intake structure decrease from 466.4 MGD (avg. monthly) and 529.4 MGD (max. daily) to 7.8 (avg. monthly) and 15.6 MGD (max. daily) "following termination of electricity generation at the facility, no later than June 1, 2019." Draft Permit Part I.B.

Since the release of the Draft Permit and the close of public comment, Entergy continued to affirm its plans to cease power operations at PNPS permanently by June 1, 2019. For instance, on August 18, 2016, it asked NRC to defer compliance with various NRC requirements, in part based on "the limited operating time left . . . prior to the defueling of the plant" in 2019. Letter from John A. Dent, Jr., Site Vice President, Entergy, to NRC, Accession No. ML16250A018 (Aug. 18, 2016).[48] On December 8, 2017, it told NRC that it "plans to permanently cease operations of PNPS no later than June 1, 2019," and that "PNPS will permanently cease operation prior to the applicable compliance date of June 30, 2019 for [a particular NRC] order"). Letter from Brian R. Sullivan, Site Vice President, Entergy Nuclear Operations, Inc., to NRC (Dec. 8, 2017). In a June 11, 2018, email to EPA, an Entergy representative reiterated that the plant was "shutting down for good no later than 5/31/2019." AR-685. True to those representations, PNPS did, in fact, cease generating electricity on May 31, 2019, and permanently removed the fuel from the reactor vessel on June 9, 2019, placing it in the spent fuel pool. Letter from Brian Sullivan, Site VP, Entergy Nuclear Operations, Inc., to NRC (June 10, 2019); Entergy May 2019 Press Release. In other words, Entergy has shut PNPS down without any "mandate" from the Agencies.

In its written comments on the Draft Permit, Entergy opposed including in the Final Permit its chosen date for a reduction in cooling water intake structure withdrawals. Entergy requested instead that we simply strike the date and provide an open-ended authorization to continue such withdrawals. Such an open-ended condition, however, had the potential to result in indefinite continuation of withdrawals without re-analysis by the Agencies. It would have ignored and rendered irrelevant the factor that largely undergirded the BTA analysis—Entergy's repeated and consistent public representations about the limited remaining useful life of the plant and the drastic reduction in flows through the CWIS projected by Entergy to occur by June 2019. Thus, in the Agencies' views, the commenter's proffered solution would have resulted in permit conditions that were not supported by, and would not have reflected, the BTA analysis. Moreover, it would be incongruous to require a permitting authority on the one hand to factor the remaining useful life of a facility into its BTA analysis, 40 C.F.R. § 125.98(f)(2)(iv), only to prohibit the agency from factoring it into the permit conditions, particularly where, as here, the permittee had publicly, repeatedly, and consistently said that the remaining useful life of the plant did not extend even to the end of the five-year permit term, *see id.* § 122.46(a). The commenter's proposed open-ended condition could have significantly undermined the BTA determination and would not have ensured compliance with section 316(b). *See* CWA

[48] *Available at* https://www.nrc.gov/docs/ML1625/ML16250A018.pdf. *See also* Letter from Dent to NRC, Accession No. ML16250A017 (Aug. 18, 2016) ("Additionally, PNPS is informing the NRC that, in light of . . . the decision to permanently shut down and defuel in 2019, seismic activities being performed to meet the NRC 10 Code of Federal Regulation 50.54(f) request for information and any related commitments planned between now and the 2019 Cessation of Power Operations are requested to be deferred. With the limited operating time left, there is insufficient time to complete evaluations, design and approve changes to the plant, and then implement those changes such that a meaningful improvement to safety is achieved prior to the defueling of the plant."), *available at* https://www.nrc.gov/docs/ML1625/ML16250A017.pdf.

§ 402(a)(2); *see also* 40 C.F.R. §§ 122.4(a) (prohibiting the NPDES permitting authority from issuing a permit "[w]hen the conditions of the permit do not provide for compliance with the applicable requirements of CWA, or regulations promulgated under CWA"), 122.43(a) (requiring the permitting authority to "establish conditions, as required on a case-by-case basis, to provide for and ensure compliance with all applicable requirements of CWA and regulations"). Consequently, we do not agree that the inclusion of such an open-ended condition would have been appropriate. (Such a condition would have been unnecessary in any event because the PNPS stopped generating electricity on May 31, 2019, and Entergy removed the fuel from the reactor vessel shortly thereafter). The Agencies did not mandate the closure of the plant, but rather appropriately proposed permit conditions that reflected the permittee's decision to close "no later than June 1, 2019," that appropriately supported the conclusions of the BTA analysis, and that ensured compliance with applicable CWA requirements. The Agencies did not mean to imply that Entergy could not change its decision. As stated in the Fact Sheet, in such an event, the Agencies would need to revisit the BTA analysis. Fact Sheet, Att. D at 86.

In support of its comment to remove "no later than June 1, 2019," as an effective date for the applicability of the reduced intake flow limits, the comment asserts that the condition "infringes on NRC's exclusive jurisdiction over nuclear-reactor operations" and is beyond EPA's legal authority. Of course, the proposed permit conditions reflected Entergy's decision and would have placed the limits on PNPS's withdrawal that Entergy told the Agencies were the maximum necessary by that point in time, as explained above. See, for example, AR-520, AR-521. In any event, the commenter does not cite to any particular provision of the Atomic Energy Act ("AEA") to support its assertion, but instead mostly advances a legal argument regarding field pre-emption of state law by the AEA that is inapplicable to the CWA.[49] The doctrine of pre-emption is inapplicable to other federal laws because it derives from the Supremacy Clause of the U.S. Constitution, which provides that the Constitution and federal statutes are "the supreme law of the Land" and shall be binding on the states. U.S. Const. art. IV, cl. 2. Thus, although federal pre-emption may potentially apply to a particular state law, it does not apply to another federal law (*i.e.*, the Clean Water Act). *See, e.g.*, *POM Wonderful LLC v. Coca-Cola Co.*, 134 S.Ct. 2228, 2236 (U.S. 2014) (The "state-federal balance [of pre-emption] does not frame the inquiry" where two federal statutes overlap). Instead, "[t]he Supreme Court provides that 'it is a cardinal principle of construction that . . . . when there are two acts upon the same subject, the rule is to give effect to both.'" *United States v. Palumbo Bros.*, 145 F.3d 850, 862 (7th Cir. 1998)

[49] For instance, the comment first cites to *Pacific Gas & Electric Co. v. State Energy Resources Conservation & Development Commission*, 461 U.S. 190, 212 (1983), a case in which a state law imposed a moratorium on the construction of new nuclear plants. *Id.* at 198. Incidentally, the Supreme Court upheld the state provision in this case, finding that it was not preempted by the AEA. *Id.* at 222. (In fact, four U.S. Supreme Court decisions have examined in detail claims that the AEA preempted a particular state law, and, in each case, the Court found the AEA did not preempt state law. *See also Virginia Uranium v. Warren*, 587 U.S. ___ (2019); *English v. Gen. Elec. Co.*, 496 U.S. 72 (1990); *Silkwood v. Kerr-McGee*, 464 U.S. 238 (1984)). Similarly, in *Entergy Nuclear Vermont Yankee v. Shumlin*, 733 F.3d 393, 409 (2d Cir. 2013), next cited in the comment, the owners of a nuclear power plant sued state officials alleging that the AEA preempted three state laws. 733 F.3d 393, 397-98 (2d. Cir. 2013). The other cases cited in the comment likewise involve preemption of state law by federal law. *See English v. Gen. Elec. Co.*, 496 U.S. 72, 78 (1990); *Cty. of Suffolk v. Long Island Lighting Co.*, 728 F.2d 52, 55 (2d. Cir. 1984); *Missouri v. Westinghouse Elec., LLC*, 487 F. Supp. 2d 1076, 1080-82 (E.D. Mo. 2007); *Boeing Co. v. Robinson*, No. CV 10-4839-JFW, 2011 U.S. Dist. LEXIS 52507, at *3 (C.D. Cal. Apr. 26, 2011); *United States v. Manning*, 434 F. Supp. 2d 988, 992 (E.D. Wash. 2006); *Maine Yankee Atomic Power Co. v. Bonsey*, 107 F. Supp. 2d 47, 48-49 (D. Me. 2000).

(quoting *United States v. Borden Co.,* 308 U.S. 188 (1939)). "Congressional intent behind one federal statute should not be thwarted by the application of another federal statute if it is possible to give effect to both laws." *Id.*; *see also Morton v. Mancari*, 417 U.S. 535, 551 (1974) ("[W]hen two statutes are capable of co-existence, it is the duty of the courts, absent a clearly expressed congressional intention to the contrary, to regard each as effective.").

Even where preemption is the applicable inquiry, EPA notes that a preemption analysis "starts with the basic assumption that Congress did not intend to displace state law," *Maryland v. Louisiana*, 451 U.S. 725, 746 (1981), and that, with respect to the AEA in particular, the U.S. Supreme Court has dismissed the notion that the AEA "is intended to preserve the federal government as the sole regulator of all matters nuclear," *Pacific Gas & Elec. Co. v. State Energy Res. Conservation & Dev. Comm'n*, 461 U.S. 190, 205 (1983). Moreover, "the AEA contains no provision preempting state law in so many words." *Virginia Uranium, Inc. v. Warren*, 587 U.S. ___, ___, slip op. at 4 (2019). Rather, the courts have held that the federal government has occupied the field of "nuclear safety concerns," *Pacific Gas*, 461 U.S. at 212 (emphasis added); *see also Entergy Nuclear Vermont Yankee v. Shumlin*, 733 F.3d 393, 409 (2d Cir. 2013) ("*Radiological safety* . . . represents an arena of field preemption that Congress, acting within its proper authority, has determined must be regulated by its exclusive governance, thus precluding any regulation by the states.") (emphasis added) (internal quotation marks omitted); *Skull Valley Band of Goshute Indians v. Nielson*, 376 F.3d 1223, 1242 (10th Cir. 2004) ("[S]tate laws within the entire field of *nuclear safety concerns* are preempted, even if they do not directly conflict with federal law.") (emphasis added) (internal quotation marks omitted); *United States v. Kentucky*, 252 F.3d 816, 823 (6th Cir. 2001) ("[T]he AEA preempts any state attempt to regulate materials covered by the Act *for safety purposes*.") (emphasis added); *Illinois v. Kerr-McGee Chemical Corp.*, 677 F.2d 571, 581 (7th Cir. 1982) ("[T]he Atomic Energy Act has expressly and impliedly preempted regulation by the states *of the radiation hazards* associated with nuclear materials.") (emphasis added). In other words, the federal government has the exclusive authority to regulate for protection against radiation hazards. Thus, a state may not regulate on the basis of radiological safety or where state regulation, even if not based on nuclear safety, presents an "actual conflict" with the NRC's regulation of radiation hazards. *Kerr-McGee*, 677 F.2d at 582, 584. Courts have further held that a state law may be pre-empted by the AEA, if the decision to pass it was "grounded in radiological safety concerns," *id.* at 422 (quotation marks and brackets omitted); *but see Virginia Uranium, Inc. v. Warren*, 587 U.S. ___, ___, slip op. at 9-14 (2019) (questioning in the lead opinion the propriety of examining the state's purpose where the activity does not touch on activities in section 2021 of the AEA), or if the law has an actual effect on nuclear safety, *English v. Gen. Elec. Co.*, 496 U.S. 72, 84 (1990); *Entergy Nuclear Vermont Yankee*, 733 F.3d at 416-17; *Skull Valley*, 376 F.3d at 1247-48. But,

> not every state law that in some remote way may affect the nuclear safety decisions made by those who build and run nuclear facilities can be said to fall within the pre-empted field. We have no doubt, for instance, that the application of state minimum wage and child labor laws to employees at nuclear facilities would not be pre-empted, even though these laws could be said to affect tangentially some of the resource allocation decisions that might have a bearing on radiological safety. Instead, for a state law to fall within the pre-empted zone, it must have *some direct*

> *and substantial effect* on the decisions made by those who build or operate nuclear facilities *concerning radiological safety levels*.

English, 496 U.S. at 85 (emphases added); *see also Virginia Uranium*, 587 U.S. at ___, slip op. at 5 (reiterating that the AEA should not be read to prohibit a State "from regulating any activity even tangentially related to nuclear power"); *Silkwood*, 464 U.S. at 256 ("It may be that the award of damages based on the state law of negligence or strict liability is regulatory in the sense that a nuclear plant will be threatened with damages liability if it does not conform to state standards, but that regulatory consequence was something that Congress was quite willing to accept."); *Pac. Gas*, 461 U.S. at 222 (dismissing the suggestion that "the promotion of nuclear power" is to be accomplished "at all costs"). The AEA also contains a savings clause at § 2021(k) that explains that "States remain free to regulate the activities discussed in §2021 for purposes *other than* nuclear safety without the NRC's consent." *Virginia Uranium*, slip op. at 6 (lead opinion), slip op. at 8 (concurring opinion) (both citing 42 U.S.C. § 2021(k)). Section 2021(k) provides that "Nothing in this section shall be construed to affect the authority of any State or local agency to regulate activities *for purposes other than protection against radiation hazards*." *Id*. (emphasis added).[50]

Here, the commenter does not describe any actual conflict between the (presumably state) permit condition and NRC's regulation of radiation hazards. Moreover, the comment does not explain what "direct and substantial effect" the permit condition will have "on the decisions made by [the permittee] concerning radiological safety levels," especially considering that the permittee had *already* decided to, and now actually has, shut the facility down. The permittee has not even alleged that the permit conditions are grounded in a concern about radiological safety. (They are not; as previously explained, the flow conditions are grounded in the BTA analysis and Entergy's public, repeated, and consistent statements that Entergy has decided to shut PNPS down). EPA has also recognized in its regulations that BTA determinations may appropriately be revised based on a demonstrated conflict with an NRC safety requirement, *see* 40 C.F.R. § 125.94(f), but the comment does not even allege, let alone demonstrate, that the flow limits or their timing would result in a conflict with any particular NRC safety requirement. "Invoking some brooding federal interest . . . should never be enough to win preemption of a state law." *Virginia Uranium*, 587 U.S. at ___, slip op. at 3 (lead opinion); *see also In re Town of Newmarket*, 16 E.A.D. 182, 217 (EAB 2013 (holding that vague and speculative arguments are insufficient to overturn a permit condition and do not demonstrate error); *In re Three Mountain Power, LLC*, 10 E.A.D. 39, 59 (EAB 2001) (same).

Not only did the comment fail to identify an actual conflict with the AEA or a particular NRC safety requirement and fail to explain how the BTA determination is grounded in a concern about radiological safety, it put the cart before the horse. Entergy made the decision to cease operating the plant *before* the Agencies issued a proposed BTA determination that would have lowered the flow limits by the date chosen *by Entergy* and to levels *Entergy told the Agencies it*

[50] Furthermore, the AEA also provides that "[n]othing in [the AEA] shall be construed to affect the authority or regulations of any Federal, State, or local agency with respect to the generation, sale, or transmission of electric power produced through the use of nuclear facilities licensed by the Commission: Provided, That this section shall not be deemed to confer upon any Federal, State, or local agency any authority to regulate, control, or restrict any activities of the Commission." 42 U.S.C. § 2018.

required. The flow conditions in the Draft Permit flowed from Entergy's decisions, not the other way around. Moreover, as has been stated many times, the Agencies recognized in the Fact Sheet that they would revisit the BTA analysis should Entergy change its decision.

There was no indication that NRC objected to Entergy's plans and intended to require Entergy to continue to operate PNPS beyond June 1, 2019. Entergy informed NRC that it "plans to permanently cease operations of PNPS no later than June 1, 2019." Letter from Brian R. Sullivan, Site Vice President, Entergy Nuclear Operations, Inc., to NRC (Dec. 8, 2017). It even told NRC that "PNPS *will* permanently cease operation prior to" June 30, 2019. *Id.* (emphasis added). In fact, NRC granted Entergy's request to defer actions that would otherwise be required at PNPS, based on Entergy's decision to cease power generation at the plant by June 1, 2019. Letter from Jane E. Marshall, Nuclear Regulatory Comm'n, to John Dent, Jr., Entergy Nuclear Operations, Inc. (Apr. 17, 2017). The flow limits in the Draft Permit that were proposed to become applicable following the cessation of electricity generation, or by June 1, 2019, reflected Entergy's decision and, as we have indicated, could have been revisited if that decision were to change. FS, Att. D at 86. Furthermore, NRC administrative case law recognizes the role of EPA and the states in selecting water pollution control criteria applicable to a nuclear plant as proper under the CWA and AEA. Thus, this provision would not have precluded Entergy from changing its decision to operate beyond June 1, 2019, and the comment does not demonstrate that it would have conflicted with any particular NRC safety requirement. On May 31, 2019, Entergy in fact did what it had publicly stated it would do by that date—it shut down electrical generation at PNPS. Further, on June 9, 2019, Entergy "permanently removed" the fuel "from the PNPS reactor vessel and placed [it] in the spent fuel pool." Letter from Brian Sullivan, Site VP, Entergy Nuclear Operations, Inc., to NRC (June 10, 2019). Consequently, pursuant to NRC regulations, Entergy may no longer operate the reactor. 10 C.F.R. § 50.82(a)(2). Thus, if any agency or regulations can be said to have "mandated" shutdown of the facility, it would be NRC and its regulations, not EPA or MassDEP.

Only one case cited in the comment interpreted a perceived overlap between two federal statutes (*i.e.*, the CWA and the AEA). *See Train v. Colorado Public Interest Research Group, Inc.*, 426 U.S. 1 (1976) (hereinafter, *Train*). In *Train*, the Supreme Court addressed EPA's refusal to regulate the discharge of "special nuclear materials," "by-product," and "source materials" on the basis that they were not encompassed in the CWA's definition of "pollutant." Although the Court agreed with EPA that these materials are not "pollutants" within the meaning of the CWA and, thus, not within EPA's authority to regulate, the Court did not issue the broad holding offered by the comment that "EPA's general authority under CWA to regulate discharges of pollutants does not trump NRC's exclusive authority under AEA to regulate handling of radionuclides." Comment at 23 n.152. Moreover, consistent with *Train*, the Fact Sheet explicitly notes that the permit does not regulate special nuclear materials, by-product, and source materials, since these are not "pollutants" under the CWA. Fact Sheet at 37, 44; *see also* Draft Permit, Part I.D.15. *Train* and the years of NPDES permitting of nuclear power plants across the country support the view that Congress intended that effect be given to both the CWA and the AEA, where possible, and that nuclear power plants would be regulated under the CWA insofar as they use cooling water intake structures and discharge pollutants within the meaning of CWA. The CWA and the AEA are quite clearly capable of co-existence, and PNPS itself has operated with a NPDES permit for over 40 years.

As noted above, EPA *has* indicated that it will defer to NRC where a permittee demonstrates that the BTA determination would result in a conflict with a safety requirement established by NRC, *see* 40 C.F.R. § 125.94(f), but, again, the comment cites no particular conflict or safety requirement. Furthermore, Entergy points to nothing in the AEA that expressly "forbids or limits" the CWA from regulating flows at cooling water intake structures at nuclear power plants, *POM Wonderful*, 134 S.Ct. at 2237, or that overrides EPA's authorization under the CWA to include flow conditions in a NPDES permit to further the objectives of the CWA, *see* CWA § 402(a)(2); 40 C.F.R. §§ 122.4(a), 122.43(a). Here, the permittee decided on its own to cease power operations "no later than June 1, 2019."[51] *See* AR-688, AR-691. Relying on Entergy's decision, the section 316(b) analysis determined that no additional entrainment controls were warranted based on the relatively short remaining useful life of the plant as determined by Entergy. EPA, in furtherance of the objectives of, and to ensure compliance with, the CWA and its implementing regulations, included permit conditions to regulate the withdrawal of seawater via the facility's CWIS by a date certain based entirely on the date chosen by Entergy and by which it certified to NRC that it would cease power operations. NRC did not reject that certification or otherwise indicate that PNPS would be required to operate beyond that date for safety, or other, reasons.[52] Moreover, during the public comment period, NRC did not submit any comments on the draft permit opposing the flow conditions (or any other aspect of the permit). Nor did it contact EPA after the close of the comment period to object to the flow limits proposed in the Draft Permit that were to become applicable by June 1, 2019. Entergy asserts with little, if any, explanation that the flow limits in the permit are beyond EPA authority, yet points to no specific "difficulty in fully enforcing each statute according to its terms." *POM Wonderful*, 134 S.Ct. at 2240. As the NRC itself has recognized, the CWA "leav[es] to EPA and the States the decision as to the water pollution control criteria to which a facility's cooling system [will] be held." *In re Philadelphia Elec. Co. (Peach Bottom Atomic Power Station, Unit 3)*, ALAB-523, 9 N.R.C. 279 (1979); *accord In re Pub. Serv. Co. of New Hampshire (Seabrook Station, Units 1 and 2)*, ALAB-366, 5 N.R.C. 39, 51-52 (1977); *see also In re Consolidated Edison Co. of New York*, 13 N.R.C. 448 (1981) (citing 33 U.S.C. § 1371(c)(2)). Thus, regulation of PNPS may proceed as it always has, with the permit regulating the facility's operations with respect to withdrawal of cooling water and discharges of pollutants and NRC regulating other aspects of its operations.

The permittee's comments could suggest that its objection over including intake flow limits in the Final Permit was more about *when* those limits would go into effect, rather than with their absolute inclusion. For instance, Entergy repeatedly emphasized in its written comments that June 1, 2019, was its "planned," "expected," "anticipated," or "targeted" shutdown date, suggesting that there was at least some concern on its part that that date might not be achieved, *see, e.g.*, Comments III.1.0, .3.0, .3.3, .5.2, .8.1, .9.0, .9.1; Entergy Redline attachment, *passim*, although, again, it has actually been achieved. Entergy's comments also suggest that it supported

[51] The Agencies note that, although Entergy objected to intake flow limits that would take effect "no later than June 1, 2019," *see e.g.*, Draft Permit Part I.B.1, Entergy used this particular phrase when informing NRC of its decision to shut down. Specifically, Entergy stated: "it has decided to permanently cease power operations at [PNPS] no later than June 1, 2019." [*See* AR-515]. It then suggested to NRC that the actual shutdown could, in fact, happen sooner. *Id*.

[52] NRC apparently acquiesced to Entergy's decision to close no later than June 1, 2019. *See* Letter from Jane Marshall, NRC, to John Dent, Entergy Nuclear Operations, Inc. (Apr. 17, 2017).

the use of the date in the development of the permit. For instance, Entergy did not object to the Agencies' use of the date in the BTA analysis and states in its comments that it "appreciates the incorporation into the Draft Permit of conditions relating to Pilgrim's planned cessation of electricity generation ('shutdown') in 2019." Comment III.1.0. Further, Entergy also suggested that Section 8.0 of the Fact Sheet (relating to 316(b) requirements) be revised to state that "[f]low reduction is commonly used to reduce impingement and entrainment," that "[u]nit closures provide clear reductions in flow," and that "*[f]low reductions resulting from PNPS's anticipated closure are reasonably included* as part of PNPS's impingement mortality and entrainment reductions strategy." Entergy Redline at 59 (emphasis added). In addition, Entergy's comments note the timing of the intake flow limits in the Draft Permit "may be intended merely to reflect what Entergy has announced." Comment IV.3.0 n.147. In oral comments offered at the public hearing, an Entergy representative requested that the permit be flexible, stating that "our shut down is targeted for June of 2019," but that "shutting down a major electricity supplier is a complicated matter" and that, consequently, "the exact timing of that shut down in 2019 depends on a variety of factors." The Agencies have no reason to disagree that shutting down PNPS is a "complicated matter," but to the extent the comment is actually an objection to when the flow limits were to go into effect, the comment is moot; the Agencies have not carried forward to the Final Permit the language regarding the effective date of the flow limits because Entergy has already shut PNPS down.

In short, the Draft Permit conditions were based on the BTA determination, which depended in large part on Entergy's decision and self-imposed shutdown date and were structured around this date. Before, during, and after the public comment period, Entergy repeatedly represented to the public, federal regulators, and the energy market that it did not intend to operate beyond this date, and, on its chosen date, Entergy actually did shut the facility down. The Agencies did not "mandate" the closure of PNPS.

<u>"Immediate" Decommissioning</u>

The Agencies do not view the Draft Permit as containing a "decommissioning condition" that would have required the permittee to begin decommissioning—as the commenter uses the term in the comment or as the term might suggest specific activities under the Atomic Energy Act (AEA)—by June 1, 2019. The Draft Permit and Fact Sheet used the words "decommissioning activities" in the sense that use of the CWIS following shutdown would involve withdrawals and discharges of significantly lower volumes of seawater to cool spent fuel rods and dilute nuclear materials regulated by the AEA that PNPS may discharge pursuant to NRC authorization. The Draft Permit did not, and was not intended to, require that decommissioning begin "immediately" after shutdown, but recognized that use of the CWIS would change significantly when PNPS shut down. As the references to decommissioning highlighted in the comment resulted in some confusion and were not clear, the Agencies have removed them from the CWIS Requirements of the Final Permit (now at Part I.C, previously Part I.F of the Draft Permit). Furthermore, as explained elsewhere, the Final Permit does not authorize certain pollutant discharges that may result from specific activities associated with decommissioning (e.g., demolition of buildings, dismantlement and decontamination of plant systems and structures) because Entergy did not characterize or provide details of the discharges that would result. *See also* Response to Comment IV.5.1.

3.1.3 There Is No Environmental Rationale For A Mandatory-Shutdown Mandate

Under EPA's Final 316(b) Phase II Rule, different BTA performance standards can be imposed to redress I&E that rises to the level of an adverse environmental impact.[156] We further agree with EPA that the existence of I&E precipitates the application of Section 316(B) and the Rule.[157] Here, as detailed in Section I.A.2.i below, we respectfully submit that Pilgrim satisfies the impingement mortality standard, particularly given that the Rule expressly provides for *de minimis* exceptions to the impingement mandates.[158]

With respect to entrainment (and where the impingement controls for the facility already meet the Rule, as is the case for Pilgrim), the Rule is designed to reflect a flexible, rationale approach that does not stand on technology forcing for its own sake. Thus, for instance, EPA recognizes that flows that are less than 5% of the waterbody in question are unlikely to have a demonstrable adverse environmental impact.[159] Similarly, EPA acknowledges the existence of impingement and entrainment survival, when adequately demonstrated.[160] Finally, EPA acknowledges that natural mortality cannot be improperly ascribed to CWIS.[161]

In this instance, where Pilgrim has in place sufficient impingement controls, EPA should consider the following scientific support for the absence of entrainment impacts. First, Pilgrim's withdrawal is far less than 5% of the source waterbody.[162] Second, Pilgrim's embayment, with its extremely low flows (of less than 0.05 fps), limit access to the intake structure.[163] Third, Pilgrim's leading national experts have demonstrated survival of many entrained species.[164] Finally, Pilgrim's entrainment is dominated by eggs, the fertilization of which is not demonstrated and which exhibit the highest natural mortality, with the result that there is ample evidence that Pilgrim's CWIS actual, causative mortality is at best limited.[165] These considerations are particularly provided for where remaining useful life of a facility is limited.[166]

Even if an additional BTA condition were appropriate here (it is not), the mandatory-shutdown mandate is legally unsupported because it is not a "technology" within the meaning of § 316(b) of the Clean Water Act.

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156 40 C.F.R. § 125.94(a)(2), (c), (d).

157 *See, e.g.*, 79 Fed. Reg. at 48,303 ("In CWA section 316(b) and in this rulemaking, these impacts are referred to as adverse environmental impact (AEI)," an undefined term.).

158 *See, e.g.*, 40 C.F.R § 124.95 (*de minimis* exception, impingement context).

159 *See, e.g.*, 79 Fed. Reg. at 48,309 ("EPA acknowledges that there may be circumstances where flexibility in the application of the rule may be called for and the rule so provides. For example, some low flow facilities that withdraw a small proportion of the mean annual flow of a river may warrant special consideration by the Director. As an illustration, if a facility … withdraws less than 5 percent of mean annual flow of the river on which it is located (if on a river or stream), and is not co-located with other facilities with CWISs such that it contributes to a larger share of mean annual flow, the Director may determine that the facility is a candidate for consideration under the de minimis provisions contained at § 125.94(c)(11).").

160 *See, e.g.*, *id.* at 48,330 ("Impingeable organisms are generally not very small fish or early life stages (*e.g.*, those that can pass through 3⁄8-inch mesh screens), but typically are fish with fully formed scales and skeletal structures and well- developed survival traits such as behavioral responses to avoid danger. EPA's data demonstrate that, under

the proper conditions, many impinged organisms can survive."); *id*. at 48355 ("With regard to entrainment survival, EPA does allow for consideration of entrainment survival."); 40 C.F.R § 125.92(i) ("Entrainment mortality means death as a result of entrainment through the cooling water intake structure, or death as a result of exclusion from the cooling water intake structure by fine mesh screens or other protective devices intended to prevent the passage of entrainable organisms through the cooling water intake structure.").

161 *See, e.g.*, *id.* at 48,355 ("Finally, EPA is clear in the Rule's preamble that natural mortality is not be unreasonably attributed to CWIS.").

162 *See* Enercon Services, Inc., *Engineering Response to United States Environmental Protection Agency CWA § 308 Letter, Pilgrim Nuclear Power Station*, 8 (June 2008) ("Engineering Report"), at 2; AEI Report at 16.

163 *See, e.g.*, Scherer ASLB Aff. ¶¶ 10-11; NRC, NUREG-1437, Supplement 29 to Generic Environment Impact Statement for License Renewal of Nuclear Plants Regarding Pilgrim Nuclear Power Station, Vol. 1, Final Report (July 2007) ("FSEIS"), at 2-7.

164 *See supra*, "Environmental Context."

165 *See supra*, "Environmental Context."

166 *See, e.g.*, 79 Fed. Reg. at 48,332 ("A number of facilities are nearing the end of their useful life. Considering the long lead time to plan, design, and construct closed-cycle cooling systems, EPA determined that the Director should have the latitude to consider the remaining useful plant life in establishing entrainment mortality requirements for a facility. The remaining useful plant life, along with other site-specific information, will affect the entrainment reduction of closed-cycle cooling at a facility. For example, retrofitting to a closed-cycle system at a facility that is scheduled to close in three years will result in little entrainment reduction as compared to retrofitting to closed-cycle at a facility that will continue to operate for a significantly longer period.").

Response to Comment 3.1.3:

The comment argues that additional BTA conditions are not appropriate at PNPS because it already satisfies the impingement mortality standard, flows that are less than 5% of the waterbody are unlikely to have a "demonstrable" adverse environmental impact, impingement and entrainment survival has been adequately demonstrated, and that causative mortality from the CWIS is "at best, limited." Entergy also appears to argue that low flow velocities at the entrance to the embayment limit access to the cooling water intake structure, which EPA should consider as "scientific support for the absence of entrainment impacts" at PNPS. This last argument completely ignores the 30-plus years of entrainment reports demonstrating annual mean entrainment of 2.8 billion eggs and 354 million larvae, which plainly illustrate that PNPS has an adverse environmental impact through entrainment, and the comment fails to point to any deficiency in the summary of the entrainment impacts in Fact Sheet (Att. D at 15-19). Finally, Entergy reiterates that "the mandatory shutdown mandate is legally unsupported because it is not a 'technology' within the meaning of § 316(b)." EPA has explained that the Draft Permit did not include a "mandatory shutdown mandate" in Response to Comment 3.1.1 and 3.1.2, above. In later responses, the Agencies address Entergy's comments about the existing traveling screens and impingement survival, (Response to Comment III.3.1.4), entrainment (Response to Comment III.3.1.5), and the "mandatory shutdown mandate" (Responses to Comments III.3.1.6 and 3.1.7).

With respect to BTA, Entergy's comment appears to be that no additional controls for impingement or entrainment at PNPS are necessary because impingement is de minimis and the level of entrainment mortality at PNPS does not rise to an adverse environmental impact. Entergy raised similar views in Comment III.2.0 and III.2.1, above. As in those comments, Entergy does not provide any explanation or evidence to dispute the determination of adverse impact in the Fact Sheet, nor does the comment raise any new arguments or evidence which would alter EPA's determination since the issuance of the Draft Permit. On the contrary, the Fact Sheet demonstrates and these responses to comments confirm, that entrainment and impingement

at PNPS's CWIS constitute adverse environmental impact to the waterbody even after considering the natural mortality of the organisms. *See* Response to Comment III.2.1.

According to Entergy, Pilgrim has no entrainment impact and does not need to implement additional controls for entrainment, because its withdrawal is less than 5% of the source waterbody and EPA purportedly acknowledges in the Final Rule that "flows that are less than 5% of the waterbody in question are unlikely to have a demonstrable adverse environmental impact." First, the references in the Final Rule to withdrawals less than 5 percent apply to the mean annual flow of a river, not a coastal waterbody like Cape Cod Bay. Second, the discussion in the preamble to the Final Rule about the mean annual flow example applies to impingement, not entrainment. EPA specifies that a permitting authority may determine that such a facility "is a candidate for consideration *under the de minimis provisions contained at § 125.94(c)(11)*," 79 Fed. Reg. at 48,309 (emphasis added), which does not apply to entrainment. *See also* 79 Fed. Reg. at 48,322 ("EPA notes that these provisions for impingement mortality [including the § 125.94(c)(11) "*De minimis rate of impingement*" provision] would not apply to entrainment."). Third, contrary to the comment, the Final Rule does not say that flows below the 5% level are "unlikely to have a demonstrable adverse environmental impact." *See* 79 Fed. Reg. at 48,309; *see also id.* at 48,371 ("The Director *may* want to consider facility withdrawal rates in relation to the mean annual flow of the river…when making a de minimis determination.") (emphasis added). Finally, a flow below 5% is unlikely to be definitive. For instance, in the benefits analysis for the Final Rule, EPA estimated that 30 percent of facilities on freshwater streams or rivers have actual intake flow (AIF) greater than 5 percent of the mean annual flow (MAF) of the source waters, meaning that 70 percent of these facilities have AIFs below 5 percent MAF. *See* 79 Fed. Reg. at 48,402. If EPA intended for a withdrawal rate of less than 5% of the MAF of the river to be a threshold for *de minimis*, most of the facilities on freshwater rivers would be excluded from having to address impingement mortality. Indeed, this is not borne out in the analysis of the Final Rule, which specifically provides that the *de minimis* provision may be applied "[i]n limited circumstances." 40 C.F.R. § 125.94(c)(11).

3.1.4 PNPS's Current Impingement Control Technology Meets The 316(b) BTA Standard

With respect to impingement, an existing facility presumptively satisfies Section 316(b), if its CWIS has the control technologies that EPA has established as the "best technology available" for impingement reduction on a nationwide basis.[167] Those technologies include, among others, "modified traveling screens,"[168] "such as modified Ristroph screens and *equivalent modified traveling screens* with fish-friendly fish returns."[169]

There is no serious question that PNPS's CWIS includes "modified traveling screens," as defined in the Final 316(b) Phase II Rule. Specifically, PNPS's CWIS incorporates "vertical traveling screens to prevent entrainment" of the requisite slot size, as well as dual "fish-return sluiceways," discharging primarily to the embayment that is separated from Cape Cod Bay by two breakwaters.[170]

EPA's seeming conclusion that "the existing traveling screens at PNPS are not consistent with the definition of modified traveling screens" in the Final 316(b) Phase II Rule[171] appears to

suffer from various misperceptions. First, EPA suggests that screens may be too abrasive, when the 2014 Engineering Response Supplement explains that stainless steel is a "smooth" material that was selected and is used to prevent abrasion.[172] Second, EPA suggests that the fish returns may be rough or abrasive, when the 2014 Engineering Response Supplement establishes that "water-based epoxy resin emulsions" are used in the sluiceway to provide the requisite smooth surfaces.[173] Third, EPA suggests that Pilgrim's screens are not continuously rotating. The Rule, in fact, requires "continuous *or near continuous* rotation of screens and operation of fish collection equipment *to ensure any impinged organisms are recovered as soon as practicable.*"[174] Pilgrim's screens rotate in response to pressure from loading, and thereby necessarily return impinged organisms to the waterbody "as soon as practicable" consistent with the rule.[175] Further, EPA's Draft Permit, albeit needlessly, requires continuous rotation of the screens moving forward, thus countering EPA's conclusion that Pilgrim's screen and fish return system, as contemplated by the Draft Permit, would not satisfy the Rule, even if EPA were to wrongly assume that continuous rotation is required. Fourth, EPA suggests that Pilgrim's traveling screens may use "narrow shelves" to carry away the fish that do not "minimize turbulence or prevent loss of fish from the collection system," but this is not correct. Indeed, Entergy is not aware of any turbulence in the screen baskets. Finally, EPA suggests that returning fish within the breakwater embayment may not be ideal because it could result in re-impingement.[176] Within the embayment, "average intake velocity is 0.05 ft. per second (fps)," velocities slower than the ambient surrounding tidal dynamic in Cape Cod Bay.[177] Indeed, the embayment velocity is an order on magnitude lower than the EPA Rule concludes is *automatic evidence* of compliance with the Rule's impingement standards, because such velocities are so readily avoided by impingeable fish.[178] For all of these reasons, Entergy respectfully submits that Pilgrim's modified travelling screens and fish returns satisfy the Final 316(b) Phase II Rule.

This is the case, even without regard to the fact that the Rule's impingement standard excludes fragile species: "The impingement mortality performance standard … requires that a facility must achieve a 12-month impingement mortality performance of all life stages of fish and shellfish of no more than 24 percent mortality, including latent mortality, *for all non- fragile species* that are collected or retained in a sieve with maximum opening dimension of 0.56 inches 39 and kept for a holding period of 18 to 96 hours."[179] Pilgrim's demonstrated impingement survival for fragile species also satisfies the Rule, particularly given that "EPA does not intend for such naturally occurring mortality," particularly cold shock that results in later impingement, "to be counted against a facility's performance in reducing impingement mortality."[180] Indeed, as discussed below in Section VI.C, the overwhelming majority of Pilgrim's historic impingement, and virtually all large-scale impingement events, are associated with natural mortality, *e.g.*, cold shock and predation.[181]

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[167] 40 C.F.R. § 125.94(c).

[168] *Id.* § 125.94(c)(5); 79 Fed. Reg. at 48,321 n.38 ("EPA has defined modified traveling screen at 40 CFR 125.92 to mean *any traveling water screen* that incorporates the specified measures that are protective of fish and shellfish. In this preamble, modified traveling water screen with a fish handling and return system is often referred to more simply a modified traveling screen.") (emphasis added).

[169] 79 Fed. Reg. at 48,337 (emphasis added).

[170] 40 C.F.R. § 125.92(s) (defining "modified traveling screen"); 79 Fed. Reg. at 48,321 n.39 ("Though less common, the EPA recognizes that 1⁄2 by 1⁄4 inch mesh are used in some instances and perform comparably to the 3⁄8 inch square mesh. Therefore, today's rule allows for facilities to apply a 1⁄2 by 1⁄4 inch sieve (diagonal opening of 0.56 inches) or a 3⁄8 inch sieve (diagonal opening of 0.53 inches) when discerning between impinged and

entrained organisms.").*see also* FSEIS at 2-7.
171 Fact Sheet at 88.
172 2014 Engineering Response Supplement at 48.
173 *See* Engineering Report.
174 40 C.F.R. 125.92(s) (emphasis added).
175 Engineering Report at 6.
176 *See* Fact Sheet at 89.
177 FSEIS at 2-7; *see* ENSR (2000), at 4-3 to -4 (reporting results of previous hydrodynamic investigations finding that nearshore surface velocities of up to 16.9 feet per minute (or 0.282 fps), offshore surface velocities of up to 30.4 feet per minute (or 0.51 fps), and velocities at a depth of 25 feet of up to 5.3 feet per minute (or 0.09 fps)).
178 79 Fed. Reg. at 48,321 (describing 0.5 fps, through screen velocity as "essentially pre-approved technologies requiring no demonstration or only a minimal demonstration that the flow reduction and control measures are functioning as EPA envisioned").
179 *Id.* (emphasis added); *see also id.* at 48,323 ("EPA included a definition for ''fragile species'' at § 125.92(m), as a species of fish or shellfish that has an impingement survival rate of less than 30 percent."); 40 CFR § 125.94(c)(5) ("(5) Modified traveling screens. A facility must operate a modified traveling screen that the Director determines meets the definition at § 125.92(s) and that, after review of the information required in the impingement technology performance optimization study at 40 CFR 122.21(r)(6)(i), the Director determines is the best technology available for impingement reduction at the site. As the basis for the Director's determination, the owner or operator of the facility must demonstrate the technology is or will be optimized to minimize impingement mortality of all nonfragile species.") and § 125.92(m) ("(m) Fragile species means those species of fish and shellfish that are least likely to survive any form of impingement. For purposes of this subpart, fragile species are defined as those with an impingement survival rate of less than 30 percent, including but not limited to alewife, American shad, Atlantic herring, Atlantic long-finned squid, Atlantic menhaden, bay anchovy, blueback herring, bluefish, butterfish, gizzard shad, grey snapper, hickory shad, menhaden, rainbow smelt, round herring, and silver anchovy."); Final 316(b) Phase II Rule at 48326 ("The Director must determine, based on a demonstration by the facility to the Director, that the system of technologies or operational measures, in combination, have been optimized to minimize impingement mortality of all non-fragile species.").
180 79 Fed. Reg. at 48,364. *See, e.g.*, *supra*, "Environmental Context," Section A.
181 If EPA doubted that the optimization of Pilgrim's screens and fish return had been achieved, its obligation under the Rule was to ask for additional study to achieve optimization sometime over the last 21 years, not to await the facility's closure to only then pronounce the system inadequate. *See, e.g.*, 79 Fed. Reg. at 48,321 ("In the case of Option (5), the facility must submit a site-specific impingement technology performance optimization study that must include two years of biological sampling demonstrating that the operation of the modified traveling screens has been optimized to minimize impingement mortality."); *id.* at 48321 n.38 ("Therefore EPA has defined modified traveling screen at 40 CFR 125.92 to mean any traveling water screen that incorporates the specified measures that are protective of fish and shellfish. In this preamble, modified traveling water screen with a fish handling and return system is often referred to more simply a modified traveling screen."); *id.* at 48321 n.39 ("Though less common, the EPA recognizes that 1⁄2 by 1⁄4 inch mesh are used in some instances and perform comparably to the 3⁄8 inch square mesh. Therefore, today's rule allows for facilities to apply a 1⁄2 by 1⁄4 inch sieve (diagonal opening of 0.56 inches) or a 3⁄8 inch sieve (diagonal opening of 0.53 inches) when discerning between impinged and entrained organisms.").

Response to Comment 3.1.4:

According to the comment, the Fact Sheet erroneously concludes that the existing traveling screens are not consistent with modified traveling screens as defined in the Final Rule at 40 C.F.R. § 125.92(s). *See e.g.*, Fact Sheet Attachment D at 35, 88. EPA maintains that the existing traveling screens are not consistent with the Final Rule's definition of modified traveling screens and, as such, the current operation of the traveling screens does not comply with any of the BTA standards for impingement mortality under the Final Rule. Having said that, EPA has not required PNPS to alter its existing traveling screen because EPA determined that an actual intake velocity no greater than 0.5 fps is the BTA for impingement. This requirement is met upon shutdown of the facility.

Entergy first argues that the existing traveling screens are not abrasive and references the 2014 Engineering Response Supplement (at 48) (AR-494), which, according to Entergy "explains that stainless steel is a 'smooth' material that was selected and is used to prevent abrasion." EPA could not find this reference on page 48 of the 2014 Response Supplement, which describes criteria for a re-designed fish return trough, one of which is that "all conveyance structures shall be smooth to prevent abrasion to the fish." For Modified Fish Handling and Return Option 1, Enercon selected fiber reinforced polymer pipe and high-density polyethylene pipe to provide a "smooth conveyance surface." *Id*. Neither the 2008 Engineering Response (AR-489) or the 2014 Response Supplement (AR-494) comment on the choice of stainless steel mesh for fish protection. At most, the screen material is described as "stainless steel oblong-shaped mesh with ¼-inch wide by ½-inch tall spacing[53] and are framed in a fiberglass support structure." *See* AR-494 at 6. The *Technical Development Document for the 2014 Final Rule* (the "TDD") (AR-535) at 6-27 discusses the benefits of screen mesh material of modified traveling screens such as woven wire mesh and SmoothTex flat wire, and contrasts these materials with stainless steel welded mesh screens. A more accurate description of the existing screen materials at PNPS in comparison to the definition of modified traveling screens (at 40 C.F.R. § 125.92(s) "screen panel materials with smooth woven mesh, drilled mesh, molded mesh, or similar materials that protect fish from descaling and other abrasive injury") has not been provided to date, nor does the comment and its supporting references clarify if the screen mesh is consistent with the smooth materials required for compliance with modified traveling screens under the Final Rule. As the Fact Sheet (Attachment D at 35) states, "it is not clear if the mesh panels adequately protect fish from descaling." Based on the comment, EPA cannot confirm if the stainless steel mesh of the existing screens is consistent with a "modified traveling screen" as defined in the Final Rule. At the same time, EPA has not required PNPS to replace the screen material of the existing traveling screens to meet the BTA for impingement mortality.

Next, Entergy indicates that the 2014 Engineering Response Supplement establishes that "water-based epoxy resin emulsions" are used in the sluiceway to provide the requisite smooth surfaces. The Fact Sheet (Attachment D at 35) describes an "epoxy-coated, corrugated metal sluiceway," which is consistent with this description. EPA could not find, nor did Entergy provide a reference for, any suggestion in the Fact Sheet that questions if the fish return is abrasive or that this aspect of the existing fish return system is inconsistent with the definition of "modified traveling screen" under the Final Rule.

The Fact Sheet (Attachment D at 35 and 89) expressed concern that the return location for the fish troughs (in the embayment near the CWIS for Outfall 003 and into the discharge canal for Outfall 012) may not satisfy the requirement for the outfall location to enable fish to avoid re-impingement and may not promote survival if fish are exposed to high temperatures in the discharge canal (where the delta-Ts may be up to 32°F). Enercon acknowledged in its 2014 Supplemental Response that it is not known "if re-impingement of live fish occurs among those

[53] EPA notes that in several footnotes in the comment Entergy appears to justify the mesh size of the screens. EPA has not contested the mesh size as inconsistent with the Final Rule nor does the Draft Permit propose any modification to the mesh size of the existing traveling screens to comply with BTA standards for impingement mortality.

individuals returned via the current sluiceway." AR-494 at 46. The permittee suggests that the approach velocity in the embayment at Outfall 003 is 0.05 fps, which is lower than the velocity threshold for intake velocity in the Final Rule.[54] The permittee goes too far, however, in concluding that this velocity "is *automatic evidence* of compliance with the Rule's impingement standards, because such velocities are so readily avoided by impingeable fish." If the approach velocity in the embayment were "readily avoidable" such that no fish in the vicinity of the outfall would be exposed to re-impingement, it follows that no fish in the embayment would be impinged at the CWIS. In 2017, PNPS impinged 151,658 fish, all of whom were exposed to the embayment velocities in the vicinity of Outfall 003. *See* AR-713. The comment neither confirms nor refutes the potential for re-impingement or temperature-related stress with the current fish returns; however, the Draft Permit does not require the facility to make any changes to the current fish returns.

Third, Entergy comments on the proposed requirements related to continuous rotation of the existing traveling screens. The traveling screens at PNPS do not rotate continuously but rather "routinely, preemptively, and in response to an alarm" and are scheduled to rotate six times each week. See AR-489 at 6 and Fact Sheet Attachment D at 34. The Fact Sheet (Attachment D at 94) supports the decision to require continuous rotation in the Draft Permit, including that the site-specific impingement survival studies from 1980-1983 indicated that continuous rotation resulted in the greatest improvement in survival of non-fragile species at PNPS and that a 2005 PNPS impingement study observed greater initial survival for all impinged species combined when traveling screens were continuously rotated as compared to rotating on an 8-hour schedule. Improved survival was particularly notable for Atlantic silversides, which is a species that is considered non-fragile under the Final Rule, but which Entergy excluded as a fragile species in its biological evaluations of survival.

The comment does not contest EPA's analysis that continuous rotation would improve survival of impinged fish. Rather, the permittee argues that the Final Rule does not require continuous monitoring and that because PNPS's screens rotate in response to pressure from loading, the current operation is consistent with the requirement to return fish "as soon as practicable." As Entergy points out, the definition of modified traveling screens in the Final Rule includes "continuous or near continuous rotation of screens and operation of fish collection equipment to ensure any impinged organisms are recovered as soon as practicable." The TDD (AR-535 at 6-31) explains continuous rotation as it is used in the Final Rule:

> Evaluations at many different facilities over the last 30 years have generally shown that impingement mortality rates are lowest when traveling screens are rotated continuously at a fixed speed instead of the intermittent rotation schedule more common with conventional traveling screens. Continuous rotation ensures that any impinged fish will be caught on the screens for a minimum time period, but in some cases may not be necessary, at least for all seasons. Periodic full rotation cycles may be sufficient (i.e., some number of complete rotations per hour) when impingement is dramatically lower or non-existent during certain times of the year (e.g., seasonal migrations may limit the critical time period to a few weeks or

[54] The Final EIS (AR-321 at 2-7) states that the average intake velocity at the east fish-return sluiceway is 0.15 fps while the average velocity at the breakwaters during mid-tide is 0.05 fps.

> months of the year). Additionally, new designs use composite materials to frame the traveling screens which weigh less and reduce wear on chains and drives.

This description of rotation speed from the TDD provides context for the language in the Final Rule and suggests that Entergy's interpretation of "as soon as practicable" is overly broad. Continuous rotation is clearly preferred for ensuring survival of impinged fish; however, in some cases (*e.g.*, where impingement has a seasonal component) continuous rotation may not be necessary. Even in these cases, EPA provides an example of periodic rotation as "some number of complete rotations per hour." Contrast this description with the existing schedule of one rotation every 6 to 8 hours at PNPS and it is clear that the current rotation schedule is not consistent with the Final Rule's definition for modified traveling screens. *See* AR-321 at 2-10. The comment attempts to justify the existing rotation schedule by explaining that screens are rotated in response to pressure from loading, yet provides no explanation of how much loading is necessary to trigger rotation and demonstrate that fish are transported to the source waterbody "as soon as practicable." If the screens respond to pressure from a single fish, or a few fish, it is possible that this operational mode would satisfy the Final Rule in that the impingement duration of fish would be minimized. In the Final EIS (AR-321 at 2-9), Entergy states that the alarm set point is triggered "when the difference in water level on each side of the screen reaches a specified threshold…typically set at 6 in. This level difference signifies that too much debris has collected on the screen. Level differences are rare and usually the result of a storm event." Based on this description, the alarm set point clearly targets debris and is not intended for fish protection. In the context of this comment, EPA maintains that the current operation of the traveling screens is not continuous or near-continuous as included in the definition of modified traveling screens in the Final Rule. EPA addresses to additional comments from the permittee about the necessity of continuous rotation in Response to Comment 3.2, below.

Fourth, Entergy disputes EPA's characterization of the "narrow shelves" on the traveling screens as not minimizing turbulence or preventing loss of fish from the collection system. Entergy is not aware of any turbulence in the screen baskets. Under the definition at 40 C.F.R. § 125.92(s) modified traveling screens must include "screens with collection buckets or equivalent mechanisms designed to minimize turbulence to aquatic life; additional of a guard rail or barrier to prevent loss of fish from the collection system…" which, taken together, are similar to the improvements pioneered by Fletcher for fish protection at traveling screens. *See* AR-535. The TDD (AR-535 at 6-28) describes collection buckets as "one of the more critical elements" of modified traveling screens. Collection buckets should extend across the screen's panel and the size and depth of the bucket should reflect target species. Fletcher's design improved on earlier collection buckets which were found to cause significant turbulence and, as a result, high mortality by including an additional lip on the bucket's leading edge and rail or guard that extends above the water surface before the rest of the bucket to prevent fish from escaping before being transferred to the fish return trough. Exhibit 6-13 of the TDD (AR-535 at 6-26) illustrates the differences between the original Ristroph fish bucket design and the Fletcher modifications. The TDD clearly associates collection buckets with the Ristroph design, which are buckets containing water that catch organisms as they are sprayed off the screen and into a collection trough.

The existing traveling screens at PNPS do not include either the Ristroph or Fletcher collection buckets. The 2008 Engineering Response explains that each of the screens includes "53 basket segments (or panels)" and alternately refers to "wire mesh panels" and describes the operation as follows:

> Under normal operation, seawater passes first through the ascending, and then the descending, screen baskets. The ascending basket is located on the upstream portion of the screen, and collects fish and/or debris as it passes up through the water. The aquatic life and/or debris are retained on the upstream face of the wire mesh panels as well as on the horizontal surface of the basket frame and the lifting lip that forms the lower, or trailing, edge of the mesh frame. The basket continues to rotate and descends into the water on the downstream side. Aquatic life and/or debris not washed off the screen basket may be washed off in the flow of water.

AR-489 at 6. The description of the screenwash system continues "a low pressure jet of water is used to wash living organisms from the screen and lifting shelves." *Id*. at 7. The turbulence that EPA describes in the Final Rule in reference to modified traveling screen occurs in the collection buckets located on the lower edge of the traveling screen panels. Entergy has not observed turbulence because the lifting shelves likely do not hold enough material or water to cause turbulence independent of the mesh panels. Indeed, the 2008 Engineering Response evaluated upgrading the existing screens at PNPS with "Ristroph buckets," which makes clear that the existing screens are not equipped with the technology. Enercon concluded that, because most of the impinged organisms are Atlantic menhaden or Atlantic silversides and are not expected to survive impingement regardless of the screening technology, the addition of Ristroph buckets would not reduce impingement mortality. AR-489 at 36. The traveling screen at PNPS lack collection buckets as required by the Final Rule and, as such, do not meet the definition of modified traveling screens.

Finally, Entergy argues that the demonstrated impingement survival for fragile species satisfies the impingement mortality standard in the Final Rule. Normandeau excludes Atlantic silversides from its evaluation of impingement survival at PNPS, although this species is not defined as a fragile species in the Final Rule. Including Atlantic silversides in the calculation of impingement mortality would prevent PNPS from complying with this standard. *See* Fact Sheet Attachment D at 91-92. Second, ongoing monitoring is required to demonstrate compliance with the impingement mortality performance standard under the Final Rule (at 40 C.F.R. § 125.94(c)(7)) for at least the first full permit term. *See also* 79 Fed. Reg. 48376. The Draft Permit does not require impingement monitoring once the facility ceases energy production and will comply with the actual intake velocity BTA standard for impingement mortality at 40 C.F.R. § 125.94(c)(3).

At the close of Comment III.3.1.4, Entergy includes a footnote claiming that "if EPA doubted the optimization of Pilgrim's screens and fish return had been achieved, its obligation under the Rule was to ask for additional study to achieve optimization sometime over the last 21 years, not to await the facility's closure to only then pronounce the system inadequate." The Final Rule which put forth standards for modified traveling screens was promulgated in August 2014 and became effective in October 2014, just 20 months prior to public notice of the Draft Permit. EPA did not have a standard over the last 21 years to compare to the operation of traveling screens at PNPS.

Moreover, the Final Rule has several options by which to comply with the BTA standards for impingement mortality which would not require changes to the existing traveling screens. Finally, the Final Rule dictates that the BTA for entrainment shall be established on a site-specific basis first, after which the facility must come into compliance with one of the impingement mortality standards as soon as practicable. 40 C.F.R. § 125.94(b)(1). Aligning the compliance deadlines for entrainment and impingement controls in this way allows a facility to take advantage of entrainment controls that may also satisfy one of the impingement compliance alternatives. In fact, this is the case at PNPS, where the facility's substantial reduction in seawater withdrawals will be commensurate with the flow reduction achieved by closed-cycle cooling and, at which time PNPS will be able to comply with the impingement mortality standard for actual through-screen velocity under most conditions without any additional upgrades to the traveling screens.

In sum, the comment lists several reasons why the existing traveling screens meet the definition of modified traveling screens consistent with the BTA standard for impingement mortality at 40 C.F.R. § 125.94(c)(5), all of which EPA has countered. EPA maintains that the traveling screens are not modified traveling screens as defined in the Final Rule. Having said that, neither the Draft Permit nor the Final Permit require PNPS to make any physical alterations to the existing screens and has instead, determined that the BTA for impingement at PNPS is an actual through screen velocity of no more than 0.5 fps.

3.1.5 Based On A Site-Specific Assessment, PNPS Does Not Require Further Entrainment Controls To Meet The BTA Standard

With respect to entrainment reductions, EPA did not set a nationwide BTA standard in the Final 316(b) Phase II Rule, as it did with impingement, but instead established a procedure for determining entrainment controls "for each intake on a site-specific basis." The site-specific determination may consider, *inter alia*, the "[e]ntrainment impacts on the waterbody," "thermal discharge impacts," credits for prior flow reductions, and impacts on energy reliability.[183] Application of the mandated site-specific assessment does not warrant further entrainment controls for Pilgrim.

As detailed above in the "Environmental Context" Section, nearly five decades of environmental monitoring data and object-specific studies have demonstrated that Pilgrim's historic operations, including specifically its water withdrawals and thermal discharges, have produced no more than *de minimis* adverse impacts on the aquatic community of Cape Cod Bay.[184] Indeed, EPA previously concluded, in connection with the 2004 version of its Section 316(b) rule for existing facilities, that PNPS "already meet[s] otherwise applicable performance standards based on existing technologies and measures." [185] The Fact Sheet contains no information that supports a different conclusion, including with respect to any particular species.[186]

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[182] 40 C.F.R. § 125.94(d).

[184] *See supra*, "Environmental Context."

[185] *See* 69 Fed. Reg. 41,576, 41,646, 41677 (July 9, 2004) (listing PNPS as being among facilities that "already meet otherwise applicable performance standards based on existing technologies and measures," and for which EPA "projected zero compliance costs"). *See also* 68 Fed. Reg. 13522, 13567 and n.23 (Mar. 19, 2003); *Case Study*

Analysis for the Proposed Section 316(b) Phase II Existing Facilities Rule (EPA-821-R-02-002), Part G: Seabrook and Pilgrim Facilities Case Study (Feb. 2002).
186 *See supra*, "Environmental Context," Section A.6, and *supra*, note 76.

Response to Comment 3.1.5:

The Draft Permit did not propose any additional entrainment control requirements at PNPS beyond what the Facility would achieve based on Entergy's self-imposed plan to shut the facility down by June 1, 2019, and the drastic reduction in flow as of that action. *See* Fact Sheet at 85-86. Accordingly, the Final Permit, like the Draft Permit, does not include any additional entrainment control requirements. EPA does not agree, however, with the comment that Pilgrim's water withdrawals "have produced no more than *de minimis* adverse impacts on the aquatic community of Cape Cod Bay." *See* Response to Comment III.2.1 and 2.3

EPA agrees that the 2014 CWA § 316(b) Final Rule requires EPA to "establish BTA standards for entrainment for each intake on a site-specific basis." 40 C.F.R. § 125.94(d). The rule also provides that these standards must reflect the permitting authority's determination of "the maximum reduction in entrainment warranted after consideration of the relevant factors as specified in §125.98." *Id.* EPA notes, however, that the comment only recites factors in section 125.98 on which a permitting authority *may* base its BTA determination, and even then only some of those factors. *See id.* § 125.98(f)(3)(i)-(vi). The comment omits the factors on which a permitting authority *must* base its BTA determination, including "[n]umbers and types of organisms entrained," "impact of changes in particulate emissions or other pollutants," "land availability," "[r]emaining useful plant life," and "[q]uantified and qualitative social benefits and costs of available entrainment technologies when such information on both benefits and costs is of sufficient rigor to make a decision." *Id.* § 125.98(f)(2)(i)-(v). In other words, the Final Rule sets forth a framework for a site-specific analysis that includes a number of factors beyond those listed in the comment, some of which are mandatory and others of which are discretionary. For this permit, as has been explained previously, EPA undertook a site-specific analysis and determined that three potentially available entrainment technologies (closed-cycle cooling, assisted recirculation, and VFDs) were not warranted, based in large part on Entergy's representations regarding the facility's limited remaining useful life. For this reason, EPA generally agrees that, based on the site-specific analysis, no additional entrainment control requirements are warranted at PNPS beyond what the Facility will achieve based on Entergy's self-imposed shut down.

Next, EPA addresses the comment that "EPA previously concluded, in connection with the 2004 version of its Section 316(b) rule for existing facilities, that PNPS 'already meet[s] otherwise applicable performance standards based on existing technologies and measures.'" As an initial matter, the preamble to the 2004 regulations does not state that EPA "concluded" that PNPS already meets "otherwise applicable performances standards . . . ."[55] Rather, the full sentence from the preamble reads: "These are facilities for which EPA *projected* that they would already meet otherwise applicable performance standards based on existing technologies and measures." 69 Fed. Reg. at 41,646 (emphasis added). And neither the preamble nor the other documents cited by the commenter include a detailed analysis documenting the comment's purported

[55] Nor do the other citations in footnote 185 of the comment include any such statements about PNPS.

conclusion by EPA. But more importantly, in 2007, EPA suspended the 2004 regulations, including the "performance standards" referred to in the quoted sentence, following judicial review by the U.S. Court of Appeals for the Second Circuit in *Riverkeeper, Inc. v. United States EPA*, 475 F.3d 83 (2d Cir. 2007).[56] 72 Fed. Reg. 37,107 (July 9, 2007). Moreover, the "measures" mentioned in the quoted sentence seemingly would encompass a provision of the 2004 regulations that allowed for compliance with § 316(b) through the use of habitat "restoration measures,"[57] —a provision the Second Circuit expressly invalidated. *Id.* at 108-10 (finding that compliance with section 316(b) via restoration measures is not authorized under the Act). Furthermore, the 2004 regulations were replaced by a new set of regulations in 2014 that includes neither the 2004 performance standards nor any habitat restoration measures, but rather establishes a framework for a site-specific BTA determination based on a number of relevant factors in 40 C.F.R. § 125.98(f), as explained earlier.[58] EPA's BTA determination for PNPS in this permit was established pursuant to the 2014 regulations. Thus, even if EPA had concluded that PNPS already met the "otherwise applicable performance standards" established in the 2004 regulations, "based on existing technologies and measures," those performance standards and (at least some of those) measures are no longer legally applicable. In other words, an EPA statement that a facility is "projected" to meet "performance standards" that are no longer in effect, potentially based in part on measures that a court has since invalidated, is not equivalent to a statement that the facility complies with currently applicable § 316(b) requirements (*i.e.*, the 2014 regulations). Nor does the comment provide any explanation why it should be.

In addition, the comment quotes a statement from the preamble that appeared in the context of a provision of the 2004 regulations that provided a so-called cost-cost variance, which the Second Circuit also expressly invalidated and remanded to the agency. *Riverkeeper, Inc. v. United States EPA*, 475 F.3d 83, 111-13 (2d Cir. 2007). The Court remanded this variance provision in part because it was "expressly premised on the validity of the BTA determination [in the Phase II Rule]," which the court had also remanded, but also because EPA "did not afford adequate notice of the costs associated with specific facilities promulgated in the final Rule" and an opportunity to comment on the basis for a particular facility's cost figures that EPA established. *Id.* In other words, the court specifically found that the cost projections in Appendix A—including the projection that PNPS would incur costs of $0 to comply with the 2004 regulations and the corollary projection that PNPS "would already meet otherwise applicable performance standards based on existing technologies and measures"—must be remanded because they had been improperly promulgated. In essence, the court remanded the projection that PNPS "would already meet" the performance standards. The court expressly noted that, "[b]ecause the Agency has calculated the costs it believes specific facilities will incur in adopting the appropriate BTA technologies (*as currently defined*) and then promulgated these costs in the final Rule, *any*

[56] The only applicable provision that remained, section 125.90(b), provides that CWISs previously subject to the suspended Phase II regulations would continue to be subject to CWA § 316(b), but that permitting authorities would establish such requirements on a case-by-case, BPJ basis.

[57] Former 40 C.F.R. § 125.94(c) provided "With the approval of the [permitting authority], you may implement and adaptively manage restoration measures that produce and result in increases of fish and shellfish in your facility's watershed in place of or as a supplement to installing design and control technologies and/or adopting operational measures that reduce impingement mortality and entrainment."

[58] Moreover, the 2014 regulations include no specific projections (or conclusions) about whether PNPS currently employs the best technology available for minimizing entrainment.

change in the selection of BTA on remand will necessarily alter these costs." *Id.* at 111 n.23 (emphases added). Of course, "the selection of BTA on remand" did change, and the 2014 regulations include no conclusion, or even a projection, that PNPS would already meet the new BTA requirements.[59] For all of the above reasons, the Region does not find the statement quoted in the comment to be of particular relevance to the BTA determination in this permit proceeding.

Lastly, EPA notes that Entergy states elsewhere in its comments regarding CWA § 316(b) requirements that "courts have properly recognized . . . 'the most salient characteristic of th[e Clean Water Act's] statutory scheme' [to be] its 'technology-forcing' character, which contemplates that a 'series of progressively more demanding technology-based standards' would 'stimulate' and 'press development of new, more efficient and effective technologies." Comment IV.3.1.6, *infra*. Under this interpretation, even if EPA had "concluded" (which it did not) in 2004 that no entrainment technologies were needed at PNPS, that would not by itself mandate the same conclusion in 2018. *See Entergy Corp. v. Riverkeeper, Inc.*, 556 U.S. 208, 235 (2009) (Breyer, J., concurring); *see also* 2014 316(b) Regulations RTC at 15 (Essay 10).

3.1.6 Even If Some BTA Measure Were Necessary For PNPS, The Mandatory-Shutdown Mandate Would Still Be Unlawful Because It Is Not A "Technology"

On its face, Section 316(b) requires a CWIS's "location, design, construction, and capacity" to "reflect the best *technology* available for minimizing adverse environmental impact."[187] EPA's Final 316(b) Phase II Rule further defines a CWIS as a discrete portion of the facility that comprises "the total physical structure and any associated constructed waterway used to withdraw cooling water from the waters of the U.S.," and that "extends from the point at which water is withdrawn from the surface water source up to, and including, the intake pumps."[188] As a matter of this plain language, a permit condition must reflect a "technology," and also must "have [some]thing to do with the location, the design, the construction, or the capacity of cooling water intake structures," *i.e.*, cannot be "unrelated to the structures themselves."[189] Courts have accordingly held that Section 316(b) does not license EPA's efforts to reduce I&E by any means available, but instead authorizes the agency to use only *particular* means in pursuing that goal, *viz.*, technology related to the "location, design, construction, and capacity of the cooling water intake structure."[190]

A mandatory-shutdown condition does not fall within the category of authorized I&E mitigation measures that Section 316(b) authorizes EPA to mandate. It is plainly not a CWIS "technology." On the contrary, it is a *prohibition against making use of the CWIS technology* for cooling water. It is also inconsistent with what courts have properly recognized as "the most salient characteristic of th[e Clean Water Act's] statutory scheme," namely its "technology-forcing" character, which contemplates that a "series of progressively more demanding technology-based standards" would "stimulate" and "press development of new, more efficient and effective technologies."[191] No such "technology-forcing" incentives attend a mandatory-shutdown

[59] In fact, the preamble to the 2014 regulations emphasized that EPA could not "estimate, with any level of certainty, what site-specific determinations will be made based on the analyses that will be generated as a result of the national BTA standard for entrainment decision-making established by" the 2014 regulations. 79 Fed. Reg. at 48,304.

requirement. Nor can a mandatory-shutdown requirement be fairly described as being related to the "location, design, construction, and capacity" of the CWIS, all of which will remain unchanged (but merely go unused) as a result.[192]

We recognize that EPA has taken the position that "flow reductions, seasonal operations, [and] unit closures" may be part of a "system of technologies, management practices, and operational measures" that together can serve as the best technology available ("BTA") for a facility.[193] Even setting aside whether EPA's interpretation can survive judicial scrutiny as a matter of Section 316(b)'s plain language and "technology-forcing" structure,[194] nothing in EPA's Final 316(b) Phase II Rule suggests that the *permanent shutdown* of the facility as a whole can be imposed on a facility as a BTA requirement, as opposed to merely a means by which the facility, *at its sole election*, can claim credit for purposes of minimizing I&E as a result of planned unit closures.[195] To the extent EPA implicitly concludes otherwise by incorporating a permanent mandatory-shutdown requirement as BTA, it is in error.

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[187] 33 U.S.C. § 1326(b) (emphasis added).
[188] 40 C.F.R. § 125.92(f).
[189] *Riverkeeper, Inc. v. EPA*, 358 F.3d 174, 189 (2d Cir. 2004).
[190] *ConocoPhillips Co. v. EPA*, 612 F.3d 822, 839 (5th Cir. 2010) (holding that CWA Section 316(b) does not license the regulation of a facility's "location," "design," "construction," or "capacity" generally, but only insofar as they relate to the "cooling water intake structure"); *Robertson Cnty.: Our Land, Our Lives v. Tex. Comm'n on Envtl. Quality*, No. 03-12-00801-CV, 2014 WL 3562756, at *4-6 (Tex. Ct. App. July 17, 2014) (holding that BTA requirement did not apply to a water-transfer pump which did not constitute part of the "cooling water intake structure" as defined under EPA regulations); *Surfrider Found. v. Cal. Reg'l Water Quality Control Bd.*, 211 Cal. App. 4th 557, 579-80 (4th Dist. 2012) ("[B]y referring solely to the 'location, design, construction and capacity of cooling water intake structures,' section 316(b) … specifically focuses *only* on the nature of the intake structures themselves, *to the exclusion of other measures for limiting environmental harm*.") (emphasis added); *see also Dir., Office of Workers' Comp. Programs v. Newport News Shipbuilding & Dry Dock Co.*, 514 U.S. 122, 136 (1995) ("Every statute purposes, not only to achieve certain ends, but also to achieve them by particular means.").
[191] *Nat. Res. Def. Council v. USEPA*, 822 F.2d 104, 123-24 (D.C. Cir. 1987).
[192] *See, e.g.*, Webster's Third New Int'l Dictionary 330 (2002) ("capacity" defined to mean ""the *power or ability* to hold, receive, or accommodate" something, or "the measured *ability* to contain" something (emphasis added)).
[193] 79 Fed. Reg. at 48,326.
[194] *But see, e.g.*, *Utility Air Regulatory Group v. EPA*, 134 S. Ct. 2427, 2443 (2014) ("[A]n agency interprestation that is 'inconsisten[t] with the design and structure of the statute as a whole,' … does not merit deference." (citation omitted))
[195] *See* 79 Fed. Reg. at 48,331-32, 48,342 (allowing EPA to take account of flow reductions resulting from unit closures and remaining life of the facility as part of the BTA analysis).

Response to Comment 3.1.6:

As a preliminary matter, EPA does not agree that the permit includes a "prohibition against making use of the CWIS technology for cooling water." To the contrary, the permit authorizes, among other things, the continued use of the cooling water intake structure. Entergy has ceased generating power at PNPS, but it continues to use the CWIS, though at a reduced capacity. Furthermore, EPA disagrees that the permit includes a mandatory shutdown condition or incorporates shutdown as a technology. Rather, EPA's BTA analysis concludes, based in large part on Entergy's representations regarding the remaining useful life of the PNPS, that no additional entrainment control requirements are necessary, provided that Entergy followed through on its public pronouncements to cease cooling water withdrawals at PNPS for the main

condenser by May 31, 2019, which EPA expected to result in an approximately 92% reduction in entrainment. Because this conclusion relies to a large extent on Entergy's own decision to cease electricity generation permanently by May 31, 2019, the Draft Permit reasonably incorporated that decision and included a corresponding reduction in the flow limit that reflects the basis for EPA's determination that no additional entrainment controls are warranted.[60] *See also* Response to Comments III.3.0, III.3.1, III.3.1.1, III.3.1.2. Nowhere in the comment does the commenter suggest that the agencies improperly relied on the remaining useful life factor, or weighed it too heavily, in the BTA determination. Nor does the commenter suggest that the agencies should have considered a different time period to represent the remaining useful life of the plant. Indeed, the commenter reiterates in several places in its comments that "shutdown is expected to occur no later than June 1, 2019." Entergy Comments at 22.[61] Furthermore, Entergy followed through with its decision and stopped generating electricity at the plant on May 31, 2019. Entergy May 2019 Press Release. With respect to impingement, EPA's BTA analysis concludes that, following Entergy's self-imposed shutdown, PNPS will likely comply with the impingement mortality standard of 0.5 fps or lower actual through-screen velocity, and that improvements necessary to install alternative impingement control technologies prior to shutdown would, therefore, likely have been rendered obsolete before, or only a short time after, becoming operational. Similar to the BTA analysis for entrainment, EPA's conclusion is heavily influenced by Entergy's decision to cease electricity generation at PNPS on or before May 31, 2019, which Entergy publicly attributed to conditions other than EPA or MassDEP regulation under the NPDES permit program. *See* Oct. 2015 Press Release; *see also* Pilgrim Closure FAQs (last visited January 13, 2017) ("Why was the decision made to close Pilgrim? The economics simply do not support continued operation. Pilgrim's revenues continue to be significantly impacted by low wholesale energy prices driven by historically low natural gas prices. The decision to close Pilgrim was based not on operational issues, but financial factors."). Accordingly, EPA's BTA analysis concludes that compliance with the BTA for impingement mortality would be achieved on June 1, 2019. Thus, as explained in the Responses above, EPA disagrees that the permit mandates a permanent shutdown. Moreover, Entergy shut the plant down on its own before the Final Permit was issued.

3.1.7 A Mandatory-Shutdown Mandate Is Not Necessary To Meet The MWQS

Massachusetts law, in particular Massachusetts's surface water quality standards ("MWQS"),

[60] "Generally, two basic approaches can be used to reduce impingement mortality and entrainment. The first approach is flow reduction, where the facility installs a technology *or operates in a manner to reduce or eliminate the quantity of water being withdrawn*." 79 Fed. Reg. at 48,331 (emphasis added). "Flow reduction is commonly used to reduce impingement and entrainment. . . . Some common flow reduction technologies are variable frequency drives and variable speed pumps, seasonal operation or seasonal flow reductions, unit retirements, use of alternate cooling water sources, water reuse, and closed-cycle cooling systems." *Id.* "EPA expects flow reductions due to unit closures could be reasonably included as part of a facility's impingement mortality and entrainment reductions strategy." *Id.* at 48,332.

[61] *See also, e.g.*, Entergy Comments at 1 ("Entergy further appreciates the incorporation in the Draft Permit of conditions relating to Pilgrim's planned cessation of electricity generation ('shutdown') in 2019."), 25 (referring to the remaining useful life of the facility as "limited"), 27 n.181 (referring to "the facility's closure" as being contemporaneous with the issuance of the Draft Permit), 33 (referring to PNPS "equipment transitioning to and through shutdown. *i.e.*, at the end of its useful life . . . ."), 35-41 and 51-58 (referring to various post-shutdown operations expected to occur within the term of the reissued Final permit),

likewise provides no basis for either EPA or DEP to impose technology-forcing conditions on the use of PNPS's CWIS under its NPDES/MCWA permit, beyond any that may be imposed by virtue of the federal CWA.[196] There are several reasons for this.

First, although the MWQS claim that DEP "has the authority" under the MCWA "to assure compliance of the withdrawal activity with" the MWQS, including "compliance with narrative and numerical criteria and protection of existing and designated uses,"[197] that provision, as the Supreme Judicial Court of Massachusetts has held, is not self-executing.[198] On its face, the provision is not action- or technology-forcing. As the Supreme Judicial Court has held, it "not only … ha[s] no self-executing effect, [but it] purport[s] not to regulate at all," its "literal terms … go[ing] no further than declaring that [DEP] has the *authority* to regulate CWISs."[199] In short, DEP lacks any "self-executing, enforceable regulations" establishing limitations on CWISs.[200]

Second, the CWA Section 401 water quality certification ("WQC") process likewise provides an inadequate basis to impose limiting conditions on the use of PNPS's CWIS. Section 401 authorizes DEP to deny or to impose conditions on the grant of a WQC only if doing so is necessary to comply with "applicable" water quality standards.[201] Water quality standards, however, are not "applicable" under the CWA unless and until EPA has approved them under Section 303.[202] The provision of the MWQS concerning CWISs, however, is still being reviewed by EPA, as the agency's website reflects.[203] It therefore is not an "applicable" water quality standard for purposes of the Section 401 WQC process, and thus provides no basis for imposing conditions on PNPS's use of its CWIS.[204]

Even if the MWQS provision concerning CWISs were somehow "applicable," it still would be insufficient to impose action- or technology-forcing requirements in PNPS's NPDES/MCWA permit. The only "authority" that the provision claims for DEP is that of impos[ing] conditions on CWISs in order to "assure compliance of the withdrawal activity with … narrative and numerical criteria and protection of existing and designated uses" as elsewhere prescribed by the MWQS.[205] With respect to impingement and entrainment ("I&E"), however, there are no limiting "narrative and numerical criteria" under the MWQS.[206] Further, the "designated uses" of a waterbody cannot impose any action- or technology-forcing requirements with respect to I&E or thermal discharges that are more stringent than those set by Section 316, *i.e.*, satisfaction of the federal standards under Section 316 of the CWA necessarily also satisfies the MWQS. That is because the MWQS provision under which DEP asserts its ostensible "authority" to regulate PNPS's CWIS purports on its face to be a "Temperature" standard.[207] Under Section 303(g) the CWA, "[w]ater quality standards relating to heat shall be consistent with the requirements of [Section 316]," which necessarily includes those provided Section 316(b).[208] Because the CWA thus mandates that DEP apply the MWQS consistent with the federal standards that apply under Section 316(b), any attempt to apply the MWQS in a manner that attempts to impose a different standard on PNPS's CWIS would conflict with the federal CWA and necessarily be preempted.[209] Accordingly, the MWQS provide no basis for imposing more stringent requirements on the use of PNPS's CWIS than those that exist under federal law.

Finally, even if the MWQS could provide a basis for imposing more stringent requirements on the use of PNPS's CWIS, there is no evidence that more stringent requirements are necessary to achieve the narrative standard. In relevant part, the MWQS provide that conditions may be

imposed on CWISs located in Class SA waters such as Cape Cod Bay in order to "assure compliance of the withdrawal activity with 314 CMR 4.00, including but not limited to, compliance with narrative and numerical criteria and protection of existing and designated uses,"[210] *i.e.*, "excellent habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation."[211] The lack of adverse impact on aquatic species in the vicinity of PNPS obviates the imposition of final Permit conditions ensuring the "reproduction, migration, growth and other critical functions" of aquatic life under the SWQS.[212] That is because the lack of any demonstrated harm to the populations of fish and other aquatic species in the vicinity of PNPS over its 40+-year operating history demonstrate that the protection of those species' biological functions already is assured, as the Fact Sheet concludes.[213]

* * *

In sum, there is no legal or biological rationale for imposing a mandatory-shutdown condition – or any modification to PNPS's CWIS – pursuant to Section 316(b) or MWQS.[214] Further, upon shutdown, the vast majority of PNPS's cooling water withdrawals and discharges will be further reduced, to in excess of 97%. It follows that no BTA or similar limitations on water withdrawals via PNPS's CWIS are necessary or appropriate in order to comply with Section 316(b) or MWQS after PNPS has shut down, either.

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196 *See* 314 Code Mass. Regs. Part 4.00.
197 314 Code Mass. Regs. § 4.05(4)(a)(2)(d).
198 *Entergy Nuclear Generation Corp. v. Dep't of Envtl. Prot.*, 944 N.E.2d 1027, 1035 & n.14 (Mass. 2011).
199 *Id.* at 1035.
200 *Id.* at 1035 n.14.
201 *See* 33 U.S.C. § 1341(a)(1), (d).
202 *See id.* § 1313(c)(3).
203 *See* EPA, *Water Quality Standards Regulations: Massachusetts, State Standards in Effect for CWA Purposes*, https://www.epa.gov/wqs-tech/water-quality-standards-regulations-massachusetts (last visited July 22, 2016) (providing copy of MWQS, effective Sept. 19, 2007), which contains annotations noting that as of Dec. 1, 2010, "EPA is still reviewing … [r]evisions concerning the applicability of Mass DEP's water quality standards to cooling water intake structures at 314 CMR … 4.05(4)(a)(2)(d)").
204 The Supreme Judicial Court's decision in *Entergy*, *supra*, is not to the contrary. The Court addressed only the general permissibility of using the MWQS to regulate CWISs through the federal WQC process; it did not consider or decide the specific issue whether the MWQS provision at issue in that case, and here, is "applicable" for purposes of that process because it has not yet been approved by EPA under Section 303's review process. *See Entergy*, 944 N.E.2d at 1039.
205 314 Code Mass. Regs. § 4.05(4)(a)(2)(d).
206 *See id.* § 4.05(4)(a)(1)-(8), (5)(a)-(e).
207 *Id.* § 4.05(4)(a)(2).
208 33 U.S.C. § 1313(g).
209 *See* 33 U.S.C. § 1370 (preserving state authority to adopt or enforce more stringent water quality standards and effluent limitations than provided for under the CWA, "*[e]xcept as expressly provided in this chapter*…." (emphasis added)).
210 314 Code Mass. Regs. § 4.05(4)(a)(2)(d).
211 *Id.* § 4.05(4)(a).
212 *See* 314 Code Mass. Regs. § 4.05(4)(a)(2)(d).
213 *See supra*, "Environmental Context."
214 *See generally* 2014 Update; AEI Report; Normandeau Associates, Inc., *Entrainment and Impingement Studies Performed at Pilgrim Nuclear Power Station, Plymouth, Massachusetts from 2002 to 2007* (June 2008) ("I&E Report"); Letter from Elise N. Zoli to Damien Houlihan, EPA (July 1, 2008); *see also, generally*, Economics

Report; Engineering Report.

Response to Comment 3.1.7:

Entergy comments that Massachusetts surface water quality standards ("MWQS") "likewise provide[] no basis for either EPA or DEP to impose technology-forcing conditions on the use of PNPS's CWIS under its NPDES/MCWA permit, beyond any that may be imposed by virtue of the federal CWA." The comment heading identifies a "Mandatory Shutdown-Mandate" as a particular condition that Entergy believes may not be imposed. Although the comment specifically calls out 314 CMR 4.05(4)(a)(2)(d) as inadequate, it includes a broad assertion that nothing at all in 314 CMR 4.00, "Massachusetts Surface Water Quality Standards," provides a basis for any CWIS-related condition at PNPS before the shutdown or after. The comment then provides several "reasons" for its broad claim.

As an initial matter, the Agencies do not agree that the permit includes a "Mandatory Shutdown-Mandate." See Response to Comments III.3.0, 3.1, 3.1.1, and 3.1.2. Moreover, Entergy has already shut PNPS down on its own, making any comment that the Agencies "mandated" a shutdown incorrect and irrelevant. Furthermore, contrary to the basic premise of the comment, the permit does not impose conditions on the facility's CWIS "beyond any that may be imposed by virtue of the federal CWA." *Id.* Nor does Part I.L of the Draft Permit (State Permit Conditions) include any additional conditions on the CWIS.[62] Although the lack of a "shutdown mandate" or any conditions on the CWIS "beyond" those that "may be imposed by virtue of the federal CWA" renders irrelevant the "reasons" listed in the comment, EPA and MassDEP choose here to address them because the comment mischaracterizes state and federal law.

First, the Supreme Judicial Court of Massachusetts (hereinafter, "Massachusetts SJC") did not hold in *Entergy Nuclear Generation Co. v. Massachusetts Department of Environmental Protection*, 944 N.E.2d 1027 (Mass. 2011) (hereinafter "*Entergy v. MassDEP*") that MassDEP "lacks <u>any</u> 'self-executing, enforceable regulations' establishing limitations on CWISs." (emphasis added). The Massachusetts SJC was not reviewing <u>all</u> Massachusetts WQS in that case; the only provisions at issue were 314 CMR 4.05(4)(a)(2)(d) and similar paragraphs.[63] *Id.* at 1030-31. To the extent the commenter is suggesting that the Massachusetts SJC was commenting on the full panoply of Massachusetts WQS, it is mistaken.

More importantly, even if the Massachusetts SJC had ruled that way, the comment does not explain how an absence of self-executing WQS would support a claim that Massachusetts' WQS "provide[] no basis" for EPA or MassDEP to impose conditions on PNPS' CWIS. Water quality standards need not be self-executing. A permitting authority looks to a state's WQS to determine whether conditions must be added to a particular permit to ensure compliance with the standards

[62] The comment seems to view permit conditions added pursuant to the CWA § 401 certification process as "conditions beyond any that may be imposed by virtue of the federal CWA." The federal CWA, however, provides a process whereby conditions may be imposed pursuant to § 401. In other words, such conditions may be imposed "by virtue of the federal CWA." In any event, the permit does not include any conditions on the CWIS pursuant to § 401.

[63] *I.e.*, 314 CMR 4.05(3)(b)(2)(d), 4.05(3)(c)(2)(d), 4.05(4)(a)(2)(d), and 4.05(4)(c)(2)(d).

and, if so, what those conditions should be. In other words, the permit is the means by which such WQS are executed. Thus, whether a particular WQS is self-executing has no bearing on whether it may form the basis for conditions in a NPDES permit.[64] The state provisions directly at issue in *Entergy v. MassDEP* recite that MassDEP "has the authority . . . to condition the CWIS to assure compliance of the withdrawal activity with 314 CMR 4.00 [entitled "Massachusetts Surface Water Quality Standards"], including, but not limited to, compliance with narrative and numerical criteria and protection of existing and designated uses." *See id.* at 1030. The Massachusetts SJC agreed that MassDEP has such authority under state law and correctly observed that "[t]here is nothing improper" with the state exercising that authority in permitting actions. *Id.* at 1039; *see also id.* at 1035 & n.14.

The comment also asserts that Massachusetts' WQS may not be used to establish CWIS-related permit conditions because 314 CMR 4.05(4)(a)(2)(d) is not an "applicable" water quality standard for purposes of CWA § 401 and because it "purports on its face to be a 'Temperature' standard." The Agencies first reiterate that the permit does not impose conditions on the CWIS pursuant to CWA § 401; thus, whether 314 CMR 4.05(4)(a)(2)(d) is "applicable" for that purpose is irrelevant. Moreover, 314 CMR 4.05(4)(a)(2)(d) is not the source of MassDEP's authority. MassDEP interpreted its WQS to apply to CWISs even before it promulgated this provision. *See, e.g.*, Brief for Amicus Curiae Massachusetts Dep't of Envtl. Prot. at 5-12, *In re Dominion Energy Brayton Point, LLC*, 12 E.A.D. 490 (EAB 2006) (NPDES Appeal No. 03-12). The later additions to the state regulations merely "put the regulated community on notice" of that authority. *Entergy v. MassDEP*, 944 N.E.2d at 1035 n.14. There would be nothing improper about MassDEP exercising its authority through the CWA § 401 certification process based on WQS that have been approved by EPA. *See id.* at 1039. As the comment seems to recognize, WQS are comprised not only of water quality criteria (numeric or narrative), but also of designated uses. *In re Chukchansi Gold Resort*, 14 E.A.D. 260, 262 (EAB 2009) (citing CWA § 303(c)(2)(A), 40 C.F.R. §§ 131.10-12); *In re Carlota Copper Co.*, 11 E.A.D. 692, 698-99 (EAB 2004). Thus, whether there are "narrative and numerical criteria" expressly applicable to impingement and entrainment is an incomplete inquiry into whether Massachusetts WQS are applicable to CWIS—designated uses may also form the basis for NPDES permit conditions. *PUD No. 1 of Jefferson Cty. v. Washington Dep't of Ecology*, 511 U.S. 700, 715 (1994). And, the Environmental Appeals Board has expressly held that Massachusetts' designated uses—including the designated use of Cape Cod Bay, *i.e.*, "excellent habitat for fish and other aquatic organisms"—may be relied upon to develop permit conditions applicable to impingement and entrainment. *In re Dominion Energy Brayton Point, LLC*, 12 E.A.D. 490, 628 (EAB 2006) (citing *PUD No. 1 v. Washington Dep't of Ecology*, 511 U.S. 700 (1994)); *see also United States Steel Corp. v. Train*, 556 F.2d 822, 838 (7th Cir. 1977) ("It is clear from §§ 301 and 510 of the [Clean Water] Act, and the legislative history, that the states are free to force technology."); *In re Gov't of D.C. Mun. Separate Sewer Sys.*, 10 E.A.D. 323, 343 n.23 (EAB 2002); *Entergy v. MassDEP*, 944 N.E.2d at 1038 ("In areas with a designated use as aquatic habitat (such as Cape Cod Bay where Pilgrim's CWIS operates), therefore, CWISs hinder the attainment of water quality standards.").

[64] The Massachusetts SJC made the statements regarding self-executability in the context of whether the plaintiff (Entergy) had standing to challenge the Massachusetts regulations at issue in that case—not as any comment on whether Massachusetts' WQS could form the basis for permit conditions. *Entergy v. MassDEP*, 944 N.E.2d at 1035 n.14.

As to the commenter's view that even the designated uses cannot be used to establish permit conditions that would be more stringent than the standards set in the CWA for cooling water withdrawals, the commenter apparently contends that the mere appearance of 314 CMR 4.05(4)(a)(2)(d) under the heading "Temperature" in MassDEP's regulations renders that provision a "[w]ater quality standard[] relating to heat" and that the Commonwealth has ceded any and all authority it otherwise had under the CWA to impose CWIS-related conditions in a § 401 certification simply by placing it under such a heading. The comment presents an overly strained reading of Massachusetts regulations and CWA § 303(g). More importantly, the comment is beside the point; it is immaterial whether 314 CMR 4.05(4)(a)(2)(d) appears under the heading "Temperature" because the designated uses do not, *see* 314 CMR 4.05(4)(a), and they are a part of the WQS under which CWIS regulation may undeniably occur,[65] *Dominion Energy*, 12 E.A.D. at 628 (citing *PUD No. 1*, 511 U.S. at 715). In any event, as we have noted, the state regulation at 314 CMR 4.05(4)(a)(2)(d) simply "put the regulated community on notice" of MassDEP's already existing authority to regulate CWISs. *Entergy v. MassDEP*, 934 N.E.2d at 1035 n.14. It makes little sense to conclude that 314 CMR 4.05(4)(a)(2)(d) becomes a WQS "relating to heat" merely by organizing it under the heading "Temperature," and the comment offers no real justification for its contrary view. The plain language of the provision makes clear that it is not a WQS "relating to heat" any more than <u>any</u> state regulation related to cooling water intake structures is a WQS "relating to heat." Such a reading of 314 CMR 4.05(4)(a)(2)(d) and § 303(g) would contradict the "policy of the Congress" established in the Act "to recognize, preserve, and protect the primary responsibilities and rights of States to prevent, reduce, and eliminate pollution [and] to plan the development and use (including restoration, preservation, and enhancement) of . . . water resources. CWA § 101(b), 33 U.S.C. § 1251(b); *see also* CWA § 301(b)(1)(C), 33 U.S.C. § 1311)b)(1)(C). Nor is there any reason or authority offered in the comment to read state regulations related to cooling water intake structures as WQS "relating to heat" and thereby prohibited by § 303(g). Indeed, such a reading would directly contradict EPA regulations that provide for the establishment of "more stringent requirements as best technology available for minimizing adverse environmental impact if the [permitting authority] determines that compliance with the applicable requirements of this section would not meet the requirements of applicable State . . . law, <u>including compliance with applicable water quality standards (including designated uses</u>, criteria, and antidegradation requirements)." 40 CFR § 125.94(i) (emphasis added).

Turning to the language of section 303(g), it provides that "Water quality standards relating to heat shall be <u>consistent with</u> the requirements of section [316]" of the Act. 33 U.S.C. § 1313(g) (emphasis added). The comment in effect argues that this can only mean that 314 CMR 4.05(4)(a)(2)(d) must be <u>equivalent to</u> the requirements of § 316(b), although the comment provides no explanation for this view. Of course, the Agencies do not agree that the applicable designated uses or 314 CMR 4.05(4)(a)(2)(d) are WQS "relating to heat" and, thus, that § 303(g) is applicable, *see supra*, but, in any event, the CWA is generally not structured in the way the commenter advocates. Rather, the Act sets a federal floor and allows the states to develop more stringent requirements, should they so choose. CWA § 510, 33 U.S.C. § 1370; 40 CFR § 131.4; *see also* CWA § 301(b)(1)(C), 33 U.S.C. § 1311(b)(1)(C). The comment suggests in a footnote

[65] The comment does not assert that the designated uses have not been approved by EPA or are somehow "[w]ater quality standards relating to heat" within the meaning of CWA § 303(g).

that CWA § 510 should not apply to impingement and entrainment conditions, because § 303(g) "expressly provide[s]" otherwise, but the comment fails to elaborate or explain this point in any meaningful way. To interpret § 303(g) in this case as prohibiting the application of any more stringent impingement and entrainment requirements pursuant to a state's WQS would conflict with the statute and established case law. *See* CWA § 316(b) (cross-referencing CWA § 301), 33 U.S.C. § 1326(b); *Riverkeeper, Inc. v. EPA*, 358 F.3d 174, 200-02 (2d. Cir. 2004); *Dominion Energy*, 12 E.A.D. at 626-28. To reiterate, the permit does not apply any more stringent impingement or entrainment requirements pursuant to Massachusetts' WQS, but we do not agree with the comment that the Agencies would be prohibited from doing so in an appropriate situation.

Finally, to the extent the comment asserts that operation of PNPS' CWIS did not result in adverse environmental impact within the meaning of § 316(b), the Agencies disagree. *See* Response to Comment III.2.1.

3.2 The Final Permit Should Not Require Continuous Rotation Of Traveling Screens

PNPS does not currently rotate its traveling screens on a continuous basis. Instead, they are rotated when necessary, *e.g.*, based on pressure representing the presence of impinged organisms or debris) or "for 8 hours prior to conducting the impingement sampling,"[215] where appropriate.[216] Nonetheless, the Draft Permit proposes that PNPS continuously operate and rotate the traveling screens when circulating water is in use and monitor the through-screen velocity, which EPA maintains –without rationale – would ensure that it is no greater than 0.5 feet per second in most circumstances in post-shutdown conditions.[217]

These new requirements are not supported by any stated biological or engineering calculations. Further, they are a dubious mandate for equipment transitioning to and through shutdown, *i.e.*, at the end of its useful life, particularly when the technology was not designed for continuous rotation. Again, as detailed above in Section I.A.2.i, Pilgrim's modified traveling screens and fish returns satisfy the letter and spirit of the Final 316(b) Phase II Rule, obviating the need for more. The post-shutdown reduced water usage at PNPS further decreases the credible basis for continuous rotation.[218] Indeed, EPA and DEP have not imposed such mandates on other recent NPDES/MCWA permit applicants. Thus, for example, the final NPDES/MCWA permit issued for Canal Generating Station on August 1, 2008 contains neither a continuous screen-rotation requirement, nor any requirement to monitor through-screen velocities, despite the fact that the permit authorizes water withdrawals via its once-through CWIS of up to 518 MGD.[219]

In lieu of continuous screen rotation and/or monitoring of through-screen velocity, Entergy requests that Part I.F.1 and .2 of the Draft Permit be revised so as to provide for operation of the traveling screens in the manner currently managed (defined as proposed below in Section VI.C below).

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[215] FSEIS at 4-28; *see also* Engineering Report at 5-6.
[216] *Id.*; *see also* Normandeau Associates, Inc. ("NAI"), Impingement of Organisms on the Intake Screens at Pilgrim Nuclear Power Station, Report No. 67, January through December 2005 (Apr. 30, 2005).
[217] *See* Draft Permit at 33. Of course, this through-screen velocity is one third of Pilgrim's current calculated

through-screen velocity, which would otherwise exempt Pilgrim from the Rule's impingement mandates. 40 C.F.R. § 125.94(c)(3).

218 *See Nat. Res. Def. Council v. EPA*, 859 F.2d 156, 170 (D.C. Cir. 1988) (EPA "is powerless to impose permit conditions unrelated to the discharge itself"); 314 Code Mass. Regs. § 3.11(2)(a), (2)(a)(5) (DEP is authorized to impose permit conditions that "provide for and assure compliance with all applicable requirements of the [G. L. c. 21, §§ 26-53] and the [CWA]," including "monitoring requirements *and other means of verifying the compliance of the discharge with a permit*" (emphasis added)).

219 *See, e.g.,* Mirant Canal, LLC, Permit No. MA0004928, Part I.A.2, .12.a (providing only that permittee "shall rotate and visually inspect the intake screens of the cooling water intake structures for Units 1 and 2 at least every eight hours that the unit circulation pumps are operated," similar to the requirement under PNPS's current permit); *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009).

Response to Comment 3.2:

In this comment, Entergy continues the discussion from Comment 3.0, above, that the Draft Permit conditions that PNPS continuously rotate the traveling screens and monitor through-screen velocity during post-shutdown dilution water usage are factually unsupported, lack any environmental rationale, and should be deleted from the Final Permit. According to Entergy, these new requirements are not supported by any stated biological or engineering calculations and are a "dubious mandate" for equipment at the end of its useful life, particularly when the technology was not designed for continuous rotation.

Entergy's core issue in this comment appears to be that the post-shutdown impingement requirements in the Draft Permit are unnecessary. See also Comment 3.3 in which Energy proposed deleting all Draft Permit requirements associated with post-shutdown operation of the traveling screens. In fact, as the Fact Sheet clearly explains (Attachment D at 6-7), the permittee must comply with the BTA standards for impingement mortality under the Final Rule, even after the facility ceases generation of electricity, for as long as the CWIS withdraws water from Cape Cod Bay and uses a portion of this water (at least 25%) for cooling. The BTA determination for PNPS is proceeding under 40 C.F.R. § 125.98(g) because EPA determined that sufficient information has already been collected and the permit proceeding was already in progress at the time the Final Rule was promulgated. Having said that, EPA sought to be consistent with the BTA standards for impingement mortality at 40 C.F.R. § 125.94(c) in its determination. The post-shutdown requirements to maintain an actual intake velocity of 0.5 fps or less, which will be demonstrated through monitoring or calculation. PNPS can achieve this velocity because of the substantial decrease in cooling water withdrawals after shutdown. When the actual through-screen velocity exceeds 0.5 fps, for instance, during limited operation of one of the circulating water pumps, the Permittee must also continuously rotate the screens. These requirements, which will minimize the adverse environmental impacts of impingement, are established on a site-specific basis pursuant to 40 C.F.R. § 125.98(g) and informed by the BTA standards for impingement mortality at § 125.94(c). In other words, the requirements are necessary to comply with the regulations for CWISs at existing facilities. EPA explains that factual and biological basis for the Draft Permit requirements below.

Entergy comments that the existing traveling screens at PNPS are modified traveling screens and satisfy "the letter and spirit" of the Final Rule without any additional requirements.[66] EPA explained in the Fact Sheet (Attachment D at 34-36) and in Response to Comment 3.1.3, above, that the existing traveling screens are not consistent with the BTA standard for modified traveling screens at 40 C.F.R. § 125.94(c)(5) because the existing screens do not include the elements required of a modified traveling screen as defined at 40 C.F.R. § 125.92(s). EPA determined that the BTA for impingement mortality is an actual through-screen velocity of no greater than 0.5 fps, consistent with 40 C.F.R. § 125.94(c)(3). *See* Fact Sheet Attachment D at 87. The Permittee will comply with this standard under most circumstances now that it has permanently shut down.[67] This technology is more protective than the existing traveling screens which, based on analysis provided by the permittee's own consultant, do not protect the majority of individuals impinged at PNPS. *See* AR-489 at 35. A through-screen velocity sufficiently low to allow most fish to escape impingement is protective even of fragile species that are not likely to survive impingement (*e.g.*, rainbow smelt, alewife, and Atlantic menhaden), as well as Atlantic silversides, which is not considered a fragile species under the Final Rule but has demonstrated low site-specific survival upon contact and transport through the fish return system at PNPS. Atlantic menhaden, alewife, and Atlantic silversides were three of five species that comprised over 98% of total impingement in 2017.

Part I.C.1.b of the Draft Permit requires monitoring of the through-screen velocity or, alternatively, calculation of the intake velocity, in order to demonstrate compliance with the BTA standard. The actual through-screen velocity BTA standard at 40 C.F.R. § 125.94(c)(3) specifies that "[t]he owner or operator of the facility must submit information to the Director that demonstrates that the maximum intake velocity as water passes through the structures components of a screen measured perpendicular to the screen mesh does not exceed 0.5 feet per second" and continues that "[i]n lieu of velocity monitoring at the screen face, you may calculate the through-screen velocity using water flow, water depth, or the screen open areas." In addition, 40 C.F.R. § 125.96(a) authorizes the permitting authority to establish monitoring requirements in addition to those specified at § 125.94(c) including intake velocity and flow measurements. Finally, 40 C.F.R. § 125.96(e) requires permittees to conduce either visual inspections or employ remote monitoring devices during the period the cooling water intake structure in in operation to ensure that any technologies operated to comply with § 125.94 are maintained and operated to function as designed. Thus, the rationale for the monitoring requirements for the through-screen velocity is to ensure compliance with the BTA standard for impingement mortality at 40 C.F.R. §

[66] The Final Rule establishes requirements for minimizing impingement and entrainment mortality at CWISs at existing facilities that withdraw more than 2 MGD and which use 25 percent or more of this water exclusively for cooling, which includes PNPS. 40 C.F.R. §§ 125.90(a) and 125.91(a). Pursuant to 40 C.F.R. § 125.94(c), all facilities subject to the Final Rule must comply with one of the alternatives in paragraphs (c)(1) through (7); Entergy claims to satisfy the "letter and spirit" of the Final Rule but has failed to identify a BTA standard for impingement mortality with which it complies.

[67] In footnote 217, Entergy's statement that a through-screen velocity of 0.5 fps "would otherwise exempt Pilgrim from the Rule's impingement mandates" is inaccurate. A design or actual through-screen velocity of 0.5 fps are two possible means of complying with the BTA standards for impingement mortality under the Final Rule. In other words, a low through-screen velocity does not *exempt* a facility from the mandates of the Final Rule; rather, a facility achieving a through-screen velocity of 0.5 fps is *in compliance with* the Final Rule. 40 C.F.R. § 125.94(c).

125.94(c)(3), which informed the determination at PNPS which proceeds under 40 C.F.R. § 125.98(g).

Compliance with the actual through-screen velocity standard at 40 C.F.R. § 125.94(c)(3) will be achieved when the facility ceases production of electricity, which occurred on May 31, 2019. However, even after cessation of electricity generation, the actual through-screen velocity will be exceeded for limited periods when the circulating water pump is operating, which the permittee is authorized to do for up to 48 hours during any calendar month. For this reason, EPA sought to establish additional controls post-shutdown for the existing technology (traveling screens) to minimize impingement mortality for non-fragile species during these limited periods when the circulating water pumps are operated.[68] *See* Fact Sheet Attachment D at 92-93. EPA evaluated available data, including the relative costs and benefits, and determined that no additional technology would be warranted for impingement given that the facility will comply with the BTA standards in the Final Rule within a short period of time from the effective date of the permit under most circumstances. However, when the circulating pump operation will cause PNPS to exceed the actual through-screen intake velocity of 0.5 fps post-shutdown, EPA determined that continuous rotation of the existing traveling screens is a minimum step that is both feasible and will likely provide additional benefits for impinged fish.

In Comment 3.1.3, Entergy presents an argument, which is repeated in the comment above, that rotating the traveling screens "when necessary, (*e.g.*, based on pressure representing the presence of impinged organisms or debris) or 'for 8 hours prior to conducting the impingement sampling' where appropriate" is "as soon as practicable" consistent with the Final Rule. In this comment, Entergy also argues that the requirement for continuous rotation was not supported by any biological or engineering calculations. EPA has addressed this first point about the rotation schedule in Response to Comment 3.1.3 and maintains that the current operation of the traveling screens does not comply with the "as soon as practicable" mandate of the Final Rule.

Regarding biological justification for the rotation requirements, the Fact Sheet (Attachment D at 93-95) presents laboratory, field, and site-specific data from PNPS indicating that survival of non-fragile species impinged at PNPS could be improved with operational changes. Site-specific impingement survival studies from 1980-1983 indicated that continuous rotation resulted in the greatest improvement in survival of non-fragile species (*e.g.*, grubby, winter flounder) at PNPS. *See* AR-460. In addition, a 2005 PNPS impingement study observed greater initial survival for all impinged species combined when traveling screens were continuously rotated as compared to

[68] Although the circulating water pumps does not withdraw seawater for cooling, by its terms, section 316(b) applies to "cooling water intake structures," and Entergy's comments establish that PNPS will continue to use its CWIS. The Final Rule applies to point sources that use a CWIS with a cumulative design intake flow greater than 2 MGD to withdraw water from a water of the U.S., and which use 25 percent or more of the withdrawal on an actual intake flow basis exclusively for cooling. 40 C.F.R. § 125.91(a). It is this last requirement at 40 C.F.R. § 125.91(a)(3) that clarifies that the Final Rule establishes BTA requirements for the CWIS, which may withdraw water for purposes other than cooling, so long as at least 25 percent of the actual intake flow is used for cooling. *See also* 79 Fed. Reg. 48,300 at 48,306 (Aug. 15, 2014) ("Once water passes through the intake, water can be apportioned to any desired use, including uses that are not related to cooling. However, as long as at least 25 percent of the water is used exclusively for cooling purposes, the intake is subject to the requirements of today's rule."); *see also Cooling Water Intake Structure Coal. v. EPA*, 905 F.3d 49, 83, 84 (2d. Cir 2018) (finding that the EPA reasonably determined that "an intake structure that withdraws some amount of cooling water is a 'cooling water intake structure'" that may be regulated pursuant to CWA § 316(b)). *See also* Response to Comment III.4.1.

rotating on an 8-hour schedule. *See* AR-449. In this study Atlantic silversides, which is a species that is impinged in high numbers at PNPS, experienced an increase in initial survival from 15% with 8-hour rotations to 62% with continuous rotation. *Id*. A similar improvement in survival would have resulted in an average of 4,683 additional Atlantic silversides saved annually based on the mean annual impingement from 1980 through 2015. AR-722 at 81. EPA maintains that the biological data, including site-specific data from PNPS, support a requirement for continuous rotation in order to improve survival of non-fragile species. Entergy has not contested the Fact Sheet's biological analysis or conclusion that continuous rotation will improve survival of non-fragile species.

Entergy comments that the post-shutdown reduced water usage at PNPS further decreases the basis for continuous rotation. To the extent that the reduction in post-shutdown water usage enables PNPS to comply with an actual through-screen velocity of 0.5 fps, EPA agrees that continuous rotation is unnecessary and is not required in the Draft Permit. Part I.F.1.e of the Draft Permit *only* requires continuous rotation of traveling screens post-operation when one of the circulating water pumps is operating, because the actual through-screen velocity will exceed 0.5 fps. Based on the parameters provided in the 2008 Engineering Response (AR-489 at 6) and the anticipated post-shutdown circulating water flows, the actual through-screen velocity at a maximum daily intake flow of 13,500 gallons per minute (gpm) (19.4 MGD) over 4 screens will be 0.07 fps. During a 48-hour period each month, the maximum daily intake flow will increase to 169,000 gpm (13,500 gpm + one circulating pump at 155,500 gpm) resulting in a calculated actual through-screen velocity of 0.82 fps, which is less than the current velocity of 1.56 fps but still higher than the BTA standard. Because the BTA standard for impingement mortality will be exceeded during this time, and because, as explained above, biological data collected by PNPS suggests that continuous rotation will improve survival of non-fragile fish, the Draft Permit establishes an additional requirement for PNPS to continuously rotate the traveling screens for the 48-hour period each month when the actual through-screen velocity exceeds 0.5 fps.

Entergy comments that the requirement is a "dubious mandate" for equipment at the end of its useful life, particularly when the technology was not designed for continuous rotation. Entergy does not comment or demonstrate that continuous rotation is infeasible at PNPS, only that the requirement is "dubious." The 2008 Engineering Response indicates that the existing traveling screens do operation continuously when the water temperature drops below 30°F, which demonstrates that, at least for limited time periods, the screens can be operated continuously. *See* AR-489 at 6. *See also* Fact Sheet Attachment D at 34. The commenter does not explain or provide support from the statement that the technology is at the end of its useful life. The plant could be considered at the end of its useful life because it was scheduled to, and indeed did, shutdown in 2019. However, the fact that the plant is shutting down due to, as Entergy has stated in the past, changes in the energy market, does not mean that the traveling screens (the technology at issue here) are necessarily at the end of their physical life.

Finally, in support of its request to remove the traveling screen requirements from the Final Permit, Entergy references a final NPDES permit issued for Canal Generating Station (MA0004928) in 2008, which was issued many years prior to October 2014 when the Final Rule and its new requirements for CWISs at existing facilities became effective. The Final Permit was appealed by the permittee and has not yet gone into effect pending the resolution of the appeal.

Entergy states that the 2008 Final Permit for Mirant Canal contains neither a continuous screen-rotation requirement, nor any requirement to monitor through-screen velocities, even though cooling water withdrawals up to 518 MGD are authorized. The provisions of the Final Permit to which Entergy refers (Part I.A.12) are requirements for Unusual Impingement Events. In fact, the Final Permit requirements for operation of Canal Station's CWIS, listed at Part I.A.13, are similar to the definition of modified traveling screens at 40 C.F.R. § 125.92(s), and include improvements to the fish buckets (at I.A.13.b), low pressure spray (at I.A.13.c), reconfigured fish return (at I.A.13.e), and *continuous operation of the traveling screens when the corresponding circulating water pumps are in operation* (at I.A.13.f). Entergy is correct that no velocity monitoring is required in the 2008 Final Permit; velocity monitoring was not necessary because the through-screen velocity at Mirant Canal's traveling screens does not meet the BTA standard for impingement mortality and, as such, through-screen velocity is not a technology this facility employs to minimize the adverse impacts of impingement. Thus, EPA has included similar requirements for continuous rotation in other NPDES permits to minimize adverse impacts from impingement, including in the 2008 Mirant Canal Station Final Permit.

3.3 Suggested Revisions To The Language Of Part I.F Of The Draft Permit

For all the reasons detailed above, Entergy proposes the following changes to Part I.F of the Draft Permit:

Section 316(b) of the CWA, 33 U.S.C. § 1326(b), dictates that this permit must require that the cooling water intake structure's (CWIS) design, location, construction, and capacity reflect the best technology available for minimizing adverse environmental impact (BTA), including the CWIS's entrainment and impingement of various life stages of aquatic organisms (*e.g.*, eggs, larvae, juveniles, and adults). Accordingly, EPA has determined the BTA for PNPS' CWIS and has specified requirements reflecting this BTA below in Parts I.F.1 and I.F.2 of this permit.

> The permittee has informed EPA and MassDEP that it ~~will~~**is expected to** terminate **electricity-generating** operations at PNPS **no later than June 1, 2019,** ~~and enter a~~ **and ultimately to decommission the facility under the direction of the U.S. Nuclear Regulatory Commission**~~ing phase no later than June 1, 2019. As of this date~~ **Following the termination of electric-generating operations ("shutdown")**, PNPS will terminate ~~cooling~~ **circulating** water withdrawals for main condenser **cooling, except that** will be authorized to continue withdrawing ~~cooling~~ water ~~only~~ as necessary to support ~~decommissioning activities and to cool the spent fuel rods for a limited period of time following~~ **post-**shutdown ~~of PNPS~~ **operations at PNPS, *e.g.*, dilution or fire-protection water**. The BTA requirements in this permit reflect the current operations of PNPS prior to shut down ~~or June 1, 2019, whichever comes first and~~**, and** the anticipated operations from **and after shutdown** ~~June 1, 2019~~ through the ~~end of the decommissioning phase or the~~ expiration of this permit~~, whichever comes first~~.
>
> 1. Upon termination of generation of electricity ~~or no later than June 1, 2019~~ **and solely to the extent of continued periodic operation of the circulating water system as**

provided herein, the permittee shall~~:~~ **cease water withdrawals for the circulating water system, except that the permittee shall be authorized, *e.g.*, for the purpose of providing dilution water consistent with the facility's Off-Site Dose Calculation Manual, to operate one (1) circulating water pump of the permittee's choosing once every rolling twenty-eight (28) day period for up to forty-eight (48) hours per calendar month, for an average monthly maximum of 16 MGD.**

~~a. Operate the traveling screens with a maximum through-screen intake velocity no greater than 0.5 feet per second. Limited exceedances of the maximum through-screen velocity are authorized for the purposes of maintaining the CWIS and when the circulating water pumps are required to withdraw water to support decommissioning activities not to exceed five (5) percent of the time on a monthly basis.~~

~~b. Monitor the through-screen velocity at the screen at a minimum frequency of daily. Alternatively, the permittee shall calculate the daily maximum through-screen velocity using water flow, depth, and screen open area. For this purpose, the maximum intake velocity shall be calculated during minimum ambient source water surface elevations and periods of maximum head loss across the screens. The average monthly and maximum daily through-screen intake velocity shall be reported each month on the DMR. See Part I.B.1. of this permit.~~

~~c. Cease cooling water withdrawals for the main condenser and reduce total cooling water withdrawals to an average monthly rate of 7.8 MGD. Cooling water withdrawals at the salt service water pumps shall be limited to a maximum daily flow of 15.6 MGD.~~

~~d. Withdrawal of seawater using a single circulating water pump not to exceed five (5) percent of the time on a monthly basis is authorized to support decommissioning activities.~~

~~e. Continuously rotate the traveling screens when operating the circulating water pumps.~~

2. From the effective date of the permit until termination of generation of electricity~~, no later than June 1, 2019~~**and solely to the extent of continued periodic operation of the circulating water system as provided herein**, the permittee shall ~~continuously rotate~~ **operate** the traveling screens **during circulating water use to the extent necessary or appropriate to mitigate UIEs, as defined above in Part I.D.12, or to reduce debris loading**.

3. Upon termination of generation of electricity and in the absence of nuclear safety considerations, service water withdrawals at the service water pumps shall be limited to a maximum daily flow of 19.4 MGD and an average monthly flow of 15.6 MGD.

~~3~~4. Any change in the location, design, or capacity of any CWIS, except as expressed in the above requirements, must be approved in advance and in writing by the EPA and MassDEP.

Response to Comment 3.3:

As part of its comments on the Draft Permit, Entergy has suggested revised permit conditions for Part I.F. EPA has addressed comments that request these revisions in the responses to the comments in Section III of this document. Part I.C of the Final Permit establishes the BTA requirements to minimize impingement mortality and entrainment at the cooling water intake structure at PNPS. The Agencies have justified any changes to the BTA requirements from the Draft to the Final Permit in responding to Entergy's comments. *See* Responses to Comments III.2, III.3, III.4, and III.8.

4.0 The Final Permit's Volumetric Flow Limitations With Respect To Dilution Water and Service Water Must Be Revised To Reflect Post-Shutdown Needs

The Draft Permit provides, in Part I.F.1.c, that PNPS shall, post-shutdown, "[c]ease cooling water withdrawals for the main condenser and reduce total cooling water withdrawals to an average monthly rate of 7.8 MGD."[220] In Part I.F.1.d, "[w]ithdrawal of seawater using a single circulating water pump" is further limited so that it may not "exceed five (5) percent of the time on a monthly basis … to support decommissioning activities."[221] With respect to service water withdrawals, Part I.F.1.c of the Draft Permit limits such withdrawals via the "salt service water pumps … to a maximum daily flow of 15.6 MGD."[222]

As detailed below, these limits reflect calculation errors and do not fully account for PNPS's post-shutdown operational needs. As such, they should be revised, consistent with the proposed revisions provided above in Section I.D and below in Sections II.A and II.B.

[220] Draft Permit, Part I.F.1.c, at 33.
[221] *Id.*, Part I.F.1.d, at 33.
[222] *Id.*, Part I.F.1.c, at 33.

Response to Comment 4.0:

The commenter states that the Draft Permit's post-shutdown flow limits at Outfalls 001 and 010 reflect calculation errors and do not fully account for the post-shutdown operational needs of the Facility. EPA disagrees that the Draft Permit limits include calculation errors, and the comment does not provide any support for its statement. Regarding the operational needs of the Facility, the Draft Permit limits at Part I.F.1.c reflect the communication from the permittee (J. Egan) to EPA (G. Papadopoulos) in an email of October 28, 2015 (AR #521). Since this communication, and after review of the Draft Permit, Entergy has provided more detail on the anticipated flow requirements at PNPS. See Comments and Responses 4.1 and 4.2, below. Part I.A.1 of the Final Permit authorizes a maximum daily limit of 224 MGD at Outfall 001, which reflects the operation of a single circulating water pump. The Permittee must report the average monthly flow, and operation of the single circulating water pump may not exceed 48 hours over a single calendar month. *See* Part I.C.4. Part I.A.3 of the Final Permit authorizes a maximum daily flow of 19.4 MGD at Outfall 010. Entergy has stated that these requirements will meet its anticipated post-shutdown requirements for the Facility. Moreover, these limits will still result in a flow reduction greater than 97% at Outfall 001 and an overall reduction of nearly 93% (based on the maximum cooling water flows at Outfall 010 and limited operation of a circulating water pump

for a full 48 hours every 28 days). These flow reductions, which the Facility will achieve as a result of ceasing generating operations, are commensurate with the best technology available to minimize adverse environmental impact from the operation of PNPS's cooling water intake structure.

4.1 Circulating Water Withdrawal Limits

The Draft Permit contemplates operation of a single historic circulating water pump, primarily to supply dilution flow for the facility's NRC-authorized liquid radiological waste disposal system, and on an emergency basis for fire protection. Thus, this former circulating water will no longer serve a cooling function and therefore will not constitute cooling water pursuant to Section 316(b).[223]

Further, this dilution water will not contain any pollutants subject to EPA's or DEP's jurisdiction.[224] To the contrary, it will contain only liquid radioisotopes ("radiological wastes"), at NRC-approved discharge levels.[225] More specifically, at PNPS, "[t]he function of the liquid radioactive waste system is to collect, treat, store, and/or dispose of all radioactive liquid wastes."[226] Such wastes are initially "collected in sumps and drain tanks at various locations throughout the plant and … then transferred to the appropriate receiving tank for processing."[227] Liquid radiological wastes are classified and processed for disposal "as either clean (liquids having a varying amount of radioactivity and low conductivity), chemical (liquids having low concentrations of radioactive impurities and high conductivities), or miscellaneous radwastes (liquids having a high detergent or contaminant level, but with a low radioactivity concentration)."[228] Once processed, "[v]ery low levels of radioactivity may be released in plant effluents if they meet the limits specified in the [NRC] regulations"; "[t]hese releases are closely monitored and evaluated for compliance with NRC restrictions in accordance with the PNPS ODCM [Offsite Dose Calculation Manual]."[229] "If it is determined that the liquid radioactive waste meets the ODCM criteria for controlled release, it can be discharged on a controlled basis into the circulating water discharge canal through the liquid radioactive waste discharge header."[230] During this process, "the radioactivity level is continuously monitored," and "[a]ccidental discharge is protected against by instrumentation for detection and alarm of abnormal and administrative controls," so that "the discharge is automatically terminated if the activity exceeds preset levels."[231] That will remain the case when PNPS ultimately begins the decommissioning process, during which "any radioactive liquids from operation of decommissioning activities in the facility will be processed and disposed of" via the liquid radioactive waste system, again consistent with the "[c]ontrols for limiting the release of radiological liquid effluents [that] are described in the facility's ODCM" and NRC regulations.[232]

In sum, the post-shutdown use of circulating water at PNPS for dilution purposes will not be cooling water and will contain no otherwise regulated "pollutants," as defined under the federal CWA or the MCWA. Because this is so, as a legal matter, the post-shutdown use of circulating water at PNPS consists, from EPA's and DEP's perspective, merely of the withdrawal and immediate release (without any legally meaningful alteration) of seawater. That activity is no different in principle from the type of water transfers that hydroelectric dams and some municipal water systems perform, for which no NPDES permit is necessary.[233] As the Supreme

Court has repeatedly acknowledged, because the scope of the NPDES program covers only "discharges of pollutants," no permit is required for a water usage that is equivalent to merely "tak[ing] a ladle of soup from a pot, lift[ing] it above the pot, and pour[ing] it back into the pot," without more.[234] That analogy applies perfectly to PNPS's post-shutdown use of circulating water, meaning that it is unnecessary for that discharge to be covered by any NPDES permit authorization at all.[235]

It also bears repeating that there is no biological rationale for requiring a more stringent limit on post-shutdown water withdrawals and discharges, including of dilution water, than has been applied to PNPS during its electric-generating operations. As detailed above in the "Environmental Context" section, nearly 50 years of consistent, extensive and robust environmental monitoring has demonstrated that PNPS's historic permitted intakes and discharges, which are much greater in volume than those contemplated once Pilgrim shuts down, have had no demonstrable adverse impact on aquatic species. As such, it follows that PNPS's much smaller-volume post-shutdown discharges also will continue to result in no adverse impact. Accordingly, the volumetric limitation on the use of dilution water, via Outfall 001, that is imposed in Part I.B.1 and also reflected in Part I.F.1.d of the Draft Permit should be deleted.[236]

Even if the Draft Permit's volumetric limitation on post-shutdown circulating water use is not deleted from the final Permit, the limitation needs to be adjusted and the relevant language of the Draft Permit, which refers to this discharge variously as "cooling water" and "circulating water," revised to avoid potential confusion.[237] More specifically, Part I.B.1 of the Draft Permit imposes a limitation on post-shutdown "discharge of cooling water to support shutdown operations through Outfall Serial Number 001" of no more than an average monthly volume of 11.2 million gallons per day ("MGD"), with a maximum daily flow of 224 MGD.[238] This limitation is apparently meant to be reflected also in Part I.F.1.d of the Draft Permit, which states that "[w]ithdrawal of seawater using a single circulating water pump not to exceed five (5) percent of the time on a monthly basis is authorized to support decommissioning activities," equating to 11.2 MGD given the design flow capacity of a single circulating water pump of 155,500 gallons per minute ("gpm").[239]

The language of both these provisions is potentially confusing, because it describes the discharge as "cooling water" and "circulating water," even though this water usage will serve neither of these purposes during PNPS's post-shutdown activities, but instead will be used solely for dilution water. To the extent this limitation is retained in the final Permit, Entergy therefore respectfully requests referring to this discharge consistently as "dilution water," as reflected in the proposed revisions provided in Section I.D above.[[69]] Part I.B.1 also should be revised to make clear that the volumetric limits provided there are solely those related to dilution water use, and are exclusive of the flows that are separately authorized under the remainder of Part I.B, all of which ultimately empty through the same physical outfall as Outfall 001, even though they carry different Outfall Serial Numbers.

With respect to the volumetric limits themselves, Entergy agrees that the maximum daily flow of 224 MGD is adequate for dilution water – provided, again, that this limitation is meant to reflect

[69] There is no "Section I.D" in Entergy's comments. This is probably a reference to Section 1.C of Entergy's comments, which appears in the Agencies' Response to Comments as Comment III.3.3.3 above.

only dilution water flow, and no other flows that will discharge via the same physical outfall, *e.g.*, service water, etc.

With respect to the average monthly flow, however, Entergy respectfully requests that they be revised to allow for the provision of dilution flow, consistent with the facility's ODCM, that reflects the use of up to one circulating water pump for a period not to exceed 48 hours, no more frequently than once each rolling 28-day period (to account for the short month of February, which allows for fewer days over which dilution water use can be averaged). In most circumstances, Entergy expects that it would need to run that single pump for only 24 hours or less to achieve the dilution level that NRC mandates for the relevant liquid radiological waste. However, unforeseen circumstances may arise during the post-shutdown phase – a new operational dynamic for the PNPS facility – that may require up to an additional day of pump use, for conservatism. Likewise, while not expected, Entergy would like to retain the ability to withdraw and discharge seawater on an emergency basis for fire-protection purposes. On a monthly average basis, this flow dynamic equates to approximately 16 MGD.[240]

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[223] *See* 40 C.F.R. 125.92(e) (defining "cooling water" as "water used for contact or non-contact cooling").
[224] *See Train*, 426 U.S. at 25 (holding that "the 'pollutants' subject to regulation under the [Clean Water Act] do not include source, byproduct, and special nuclear materials"); *see also PG&E*, 461 U.S. at 207 (NRC retains "exclusive jurisdiction to license the transfer, delivery, receipt, acquisition, possession, and use of nuclear materials…. Upon these subjects, no role was left for the States." (citation omitted)).
[225] *See* 10 C.F.R. Part 20, Appendix B, Table 2.
[226] FSEIS at 2-13.
[227] *Id.*
[228] *Id.*
[229] *Id.*; *see also* Pilgrim Nuclear Power Station Offsite Dose Calculation Manual, Rev. 9 (2003) ("PNPS ODCM"), at 3/4-11 to -15 (providing radiation dosage limits at and beyond site boundary for radiological liquid effluents); 10 C.F.R. Part 20, Appendix B, Table 2 (providing NRC mandated radiological dose limits for members of public as well as facility personnel).
[230] FSEIS at 2-14; *see also* PNPS ODCM at 6-1.
[231] FSEIS at 2-14; *see also* PNPS ODCM at 3/4-3 ("The radioactive liquid effluent monitoring instrumentation channels shown in Table 3.1-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Controls 3.2.1 are not exceeded during periods when liquid wastes are being discharged via the radwaste discharge header.").
[232] NRC, NUREG-0586, Supplement 1, Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Vol. 1, Final Report (Nov. 2002) ("Decommissioning GEIS"), at 3-10.
[233] *See, e.g.*, 73 Fed. Reg. 33,697, 33,699 (June 13, 2008) ("[T]he agency concludes that water transfers, as defined by the rule, do not require NPDES permits because they do not result in the 'addition' of a pollutant."); *see also L.A. County Flood Control Dist. v. Nat. Res. Def. Council*, 133 S. Ct. 710, 712-13 (2013) (holding that "a 'discharge of pollutants' [does not] occur when polluted water 'flows from one portion of a river that is navigable water of the United States, through a concrete channel or other engineering improvement in the river,' and then 'into a lower portion of the same river'").
[234] *See L.A. County Flood Control Dist.*, 133 S. Ct. at 713 (quoting *Catskill Mountains Chapter of Trout Unlimited, Inc. v. New York*, 273 F.3d 481, 492 (2d Cir. 2001)); *S. Fla. Water Mgmt. Dist. v. Miccosukee Tribe*, 541 U.S. 95, 109-10 (2004) (same).
[235] *See, e.g.*, *Waterkeeper Alliance, Inc. v. EPA*, 399 F.3d 486, 504 (2d Cir. 2005) ("Unless there is a 'discharge of any pollutant,' there is no violation of the Act, and point sources are, accordingly, neither statutorily obligated to comply with EPA regulations for point source discharges, nor are they statutorily obligated to seek or obtain an NPDES permit.").
[236] *See* Draft Permit, Part I.B.1, at 11; *id.*, Part I.F.1.d, at 33.
[237] *See* Draft Permit, Part I.B.1, at 11; *id.*, Part I.F.1.d, at 33.
[238] *See* Draft Permit, Part I.B.1, at 11.

[239] *Id.*, Part I.F.1.d, at 33; *see also, e.g.*, FSEIS at 2-7 (providing design flow capacity of each circulating water pump).
[240] 155,500 gpm * 60 min/hr * 24 hr/day = 223.9 MGDD * 2 days = 447.8 MGD over 48 hours or 2 days. 447.8 MGD divided by 28 days is approximately equal to 16 MGD.

Response to Comment 4.1:

In the Draft Permit at Part I.F.1.d, the Agencies proposed to authorize limited operation of a single circulating water pump not to exceed five percent of the time on a monthly basis to support post-shutdown activities. As the Fact Sheet explains, the limited use of the circulating pump to support shutdown operations was based on communications with PNPS staff. *See* AR-520, AR-521. In an October 2015 email (AR-521), a PNPS representative responded to an EPA question about whether the seawater intake via the circulating water pump would be used for cooling by saying that the pump would be "run for *more than just* cooling water" (emphasis added).[70] The Draft Permit included provisions based on the best available information at the time, which indicated that the circulating water pump would be necessary to supply water for cooling and other purposes to support shutdown operations. In the comment above Entergy has provided new information about the purpose of this intake water.

According to the comment, the seawater withdrawn via the circulating water pump will not be used for cooling but will be used "primarily to supply dilution flow for the facility's NRC-authorized liquid radiological waste disposal system, and on an emergency basis for fire protection." Consequently, comments Entergy, the water withdrawn via the circulating pump is not subject to regulation under the CWA. The water withdrawn via the service water pumps, which is withdrawn via the same intake structure, is used for cooling purposes, however. *See* Comment III.4.2. The fact that a portion of the seawater withdrawal is not used for cooling does not exempt that intake volume from requirements under CWA § 316(b) or the Final Rule. By its terms, section 316(b) applies to "cooling water intake structures," and Entergy's comments establish that PNPS will continue to use its CWIS. The Final Rule applies to point sources that use a CWIS with a cumulative design intake flow greater than 2 MGD to withdraw water from a water of the U.S., and which use 25 percent or more of the withdrawal on an actual intake flow basis exclusively for cooling. 40 C.F.R. § 125.91(a). It is this last requirement at 40 C.F.R. § 125.91(a)(3) that clarifies that the Final Rule establishes BTA requirements for the CWIS, which may withdraw water for purposes other than cooling, so long as at least 25 percent of the actual intake flow is used for cooling. *See also* 79 Fed. Reg. 48,300 at 48,306 (Aug. 15, 2014) ("Once water passes through the intake, water can be apportioned to any desired use, including uses that are not related to cooling. However, as long as at least 25 percent of the water is used exclusively for cooling purposes, the intake is subject to the requirements of today's rule."); *see also Cooling Water Intake Structure Coal. v. EPA*, 905 F.3d 49, 83, 84 (2d. Cir 2018) (finding that the EPA reasonably determined that "an intake structure that withdraws some amount of cooling water is a 'cooling water intake structure'" that may be regulated pursuant to CWA § 316(b)). PNPS withdraws seawater through its CWIS for cooling via the service water pumps and, based on the comment, for dilution via the circulating water pumps. Both volumes are included in the calculation of actual intake flow, defined as:

[70] In AR-521, the permittee states that it is "trying to obtain more information regarding this subject" although more information was not provided prior to issuance of the Draft Permit in May 2016.

> [T]he average volume of water withdrawn on an annual basis by the cooling water intake structures over the past three years. After October 14, 2019, Actual Intake Flow means the average volume of water withdrawn on an annual basis by the cooling water intake structures over the previous five years. Actual intake flow is measured at a location within the cooling water intake structure that the Director deems appropriate. The calculation of actual intake flow includes days of zero flow. AIF does not include flows associated with emergency and fire suppression capacity.

40 C.F.R. § 125.92(a). Whether actual intake flow is calculated over three years or five years, pre-shutdown or post-shutdown, PNPS is a point source and uses a CWIS with a design flow greater than 2 MGD, through which more than 25 percent of the flow on an annual basis is used exclusively for cooling. *See id.* § 125.91(a).[71] Thus, the CWIS at PNPS is subject to BTA requirements based on § 316(b) and the Final Rule regardless of whether some of the intake volume is used for purposes other than cooling water.

Entergy further comments that there is no biological rationale for limiting post-shutdown withdrawals because the greater volumes withdrawn during PNPS's operation over the decades "have had no demonstrable adverse impact on aquatic species." The Agencies fundamentally disagree with the premise; the Agencies maintain that the PNPS's historically permitted intake of seawater constituted an adverse environmental impact under § 316(b) of the CWA and reject Entergy's arguments that environmental impact must be observed at the population level before it may be considered adverse. *See* Response to Comment III.2.1. The Agencies agree that reduced withdrawals post-shutdown will likely reduce the adverse environmental impact from PNPS' CWIS, but it does not follow that the adverse environmental impact will disappear altogether, and the comment provides no evidence to support such a conclusion. The volumetric limitation on seawater intake via the circulating water pump in Part I.B.1 and operating conditions in Part I.F.1.d of the Draft Permit are warranted to ensure that impingement mortality and entrainment are minimized post-shutdown. *See* 40 CFR §§ 122.4(a), 122.43(a).

Having established that the CWIS is subject to impingement and entrainment controls, EPA turns to Entergy's comment that the circulating pump volume is dilution water and will not contain any pollutants subject to EPA's or MassDEP's jurisdiction. The comment states that the dilution water pumped via the circulating water pumps and discharged at Outfall 001 will contain "only liquid radioisotopes" and explains that these isotopes are regulated by the NRC and are not considered pollutants under the CWA.[72] EPA agrees that radioactive materials regulated under

[71] A point source is defined as "any discernable, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged." 40 C.F.R. § 122.2; *see also* CWA § 502(14). . On an annual basis, the post-shutdown seawater intake volumes will still include 46% for the service water system, which is used for cooling.

[72] The comment confusingly states that the dilution water discharged at Outfall 001 will contain "liquid radioisotopes ('radiological wastes'), but then suggests that such wastes are actually discharged from a separate outfall—referred to in the comment as the "liquid radioactive waste discharge header." *See also* FS at 11 (noting that "liquid radioactive waste" is released "into the circulating water discharge canal through the liquid radioactive waste

the Atomic Energy Act of 1954, as amended, are not considered "pollutants" under the CWA. *See* 40 C.F.R. § 122.2 (definition of "pollutant" and accompanying Note); *Train v. Colorado Pub. Interest Research Grp.*, 426 U.S. 1, 25 (1976); *see also* Responses to Comments I.2.2 and I.2.5; Fact Sheet at 37, 44. The Draft Permit did not include any limitations or conditions for radioactive wastes, including the radioactive isotopes discussed in the comment. The post-shutdown Draft Permit conditions for Outfall 001 were based on the information provided by PNPS at the time the Draft Permit was prepared, which indicated that at least a portion of the circulating pump intake volume would be used for cooling and to support shutdown activities. The comment provides more information about the nature of the effluent from Outfall 001.

As the comment points out, the Final EIS for NRC's Relicensing of PNPS (AR-321) describes the radioactive waste management systems and effluent control systems, including the processing system and procedures for liquid radiological waste. These systems are designed and operated to meet the dose design objectives of 10 C.F.R. Part 20 and Part 50 (Appendix I). Liquid radioactive waste with very low levels of radioactivity may be released in plant effluents if they meet the limits specified by the NRC. See Fact Sheet at 44. The comment explains that post-shutdown, the circulating pump intake volume will be used to dilute discharges of liquid radiological waste for PNPS to achieve these limits. Again, the Agencies have not included any limitations or conditions associated with radioactive isotopes in the plant's effluents.

In short, the comment asserts that PNPS will stop discharging cooling water or any "pollutants" (within the meaning of the CWA) via Outfall 001 once PNPS stops generating electricity and that the discharge from Outfall 001 "will be used solely for dilution water." As previously noted, PNPS stopped making electricity on May 31, 2019. The Agencies agree that without the discharge of heat or other "pollutants" added to the intake water discharged via Outfall 001, the effluent limitations included in the Draft Permit applicable to Outfall 001 should be removed because there would not be a "discharge of a pollutant" within the meaning of the CWA. *See* CWA §§ 301(a), 402(a)(1), 502(12). Consequently, the Agencies have not included in the Final Permit the limits for heat and pH that were included in the Draft Permit for post-shutdown operation of 001. *Compare* Draft Permit at Part I.B *to* Final Permit at I.A.1. As a result, the permittee is not authorized to discharge any "pollutants" within the meaning of the CWA from Outfall 001. Having said that, the Agencies note that volumetric limitations and other conditions related to the intake of seawater via the CWIS and subsequent release to the discharge canal via Outfall 001 are still required under the Act and appropriate, as explained earlier in this Response.

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header"), 12 (noting that "liquid radioactive waste . . . can be discharged on a controlled basis into the circulating water discharge canal through the liquid radioactive waste discharge header"), 44 (noting that the "discharge of radiological waste water ('Radwaste Effluents') directly into the discharge canal occurs via a diffuser pipe submerged at the upstream (proximal) end of the canal, adjacent to the discharge structure"); Entergy's Redline of the FS at 15 ("Radioisotopes that meet the facility's Offsite Dose Calculation Manual (ODCM) criteria for controlled release can be discharged on a controlled basis into the circulating water discharge canal through the liquid radioactive waste discharge header."), 24 (describing the discharge from Outfall 001 with no mention of radiological wastes), 51 ("The discharge of radiological waste water ("Radwaste Effluents") directly into the discharge canal occurs via a diffuser pipe submerged at the upstream (proximal) end of the canal, adjacent to the discharge structure"). This would suggest that the discharge from Outfall 001 does not actually include liquid radioactive waste.

The Agencies further agree that the permit language related to this intake and release can be clarified based on the new information provided in the comment about the use of post-shutdown circulating water. We have eliminated the reference to post-shutdown cooling water in Part I.A.1 of the Final Permit and clarified that the permitted volume applies to the discharge from Outfall 001 prior to combining with any other wastestream in the discharge canal. EPA has also granted Entergy's request to authorize the use of up to one circulating water pump for a period not to exceed 48 hours in a calendar month. The comment requests that operation of the circulating water pumps be authorized for 48 hours no more frequently than once each rolling 28-day period (to account for the short month of February, which allows for fewer days over which dilution water use can be averaged). However, a rolling 28-day period is not consistent with the monthly reporting period established in the NPDES permit and may introduce reporting conflicts for the additional (up to) 3 days per month. EPA expects that Entergy's request was intended to allow additional flexibility that the Draft Permit's proposed limit (5 percent of time on a monthly basis) does not. As Entergy points out, a limitation of the percentage of time that the circulating water pumps can operate would be more stringent in February (34 hours) than in August (37 hours). The Final Permit condition that authorizes operation of one circulating water pump for a period not to exceed 48 hours in a calendar month maintains consistency in the limit from month to month and is more consistent with the monthly DMR reporting period than a rolling 28-day period.

As explained above, there was some uncertainty about the circulating pump operation during development of the Draft Permit. The change in circulating pump operation from 5% of the time on a monthly basis to no more than 48 hours per month will still enable PNPS to achieve a 92% reduction in seawater withdrawals as compared to the current permit, which is a reduction in flow commensurate with what the facility would achieve with closed-cycle cooling and does not alter the BTA determination. In addition, Entergy expects that that operation up to 48 hours would only be necessary in the event of "unforeseen circumstances" related to its new post-shutdown "operational dynamic" and that operation of a single circulating pump will likely be less than 48 hours per month in most circumstances resulting in actual flow reductions even greater than 92% which is based on the maximum circulating pump withdrawal. Because the Final Permit limits the operation of the circulating water pump, EPA has eliminated the average monthly flow limit and instead has included a requirement to report average monthly flow, which is sufficient to ensure that the restrictions on operating time have been met.

4.2 Service Water Withdrawal Limits

Post-shutdown, PNPS also will need to make withdrawals from Cape Cod Bay for the service water system. As NRC has explained, during operation, this system serves "an essential role [during normal operations] in the mitigation of and recovery from accident scenarios involving the potential for core-melt," and thus it fulfills a vital nuclear-safety function.[241] NRC also has explained that service water remains necessary to ensure nuclear safety once a nuclear power plant shuts down and begins the decommissioning process. More specifically, after PNPS has ceased generating electricity, Entergy will be obligated to permanently remove all nuclear fuel from the reactor vessel and store it, initially, in PNPS's spent fuel pool. The spent fuel pool is "a specially designated water-filled basin" where spent fuel is placed before being moved to a different storage location, *e.g.*, dry-cask storage in an independent spent fuel storage installation

("ISFSI"), "[a]fter the fuel has cooled adequately."[242] Spent fuel pool cooling is necessary because "[e]ven after the nuclear reactor is shut down, the fuel continues to generate decay heat from the radioactive decay of fission products."[243] "Storing the spent fuel in a pool of water provides an adequate heat sink for the removal of heat from the irradiated fuel."[244] "Typically, transfer of spent fuel to an ISFSI occurs after the fuel has cooled for 5 years,"[245] which is also the maximum NPDES/MCWA renewal term allowed under federal and Massachusetts law.[246] Use of the service water system may remain necessary during that time in order to provide "spent fuel pool cooling" essential for safe and effective nuclear-fuel management.[247] Service water supports spent-fuel pool cooling.

PNPS's service water system consists of five service water pumps, each with a design flow capacity of up to 2,700 gallons per minute, providing for a maximum service water capacity of 13,500 gpm or approximately 19.4 MGD, employing all five pumps.[248] During PNPS's current electric-generating operations, up to four of the pumps are typically in use at one time, with the fifth kept in reserve.[249] Historically and currently (including under PNPS's current, administratively continued, 1994-amended NPDES permit), therefore, service water usage has been authorized up to 19.4 MGD, but typically involved lower flows.[250]

As proposed in Part I.B.3 and further reflected in 1.F.1.c, the Draft Permit scrambles this history, and proposes to limit PNPS's service water withdrawals to a monthly average limit of 7.8 million gallons per day, with a daily maximum limit of only 15.6 million gallons per day.[251] These limits reflect a limitation that PNPS use no more than four service water pumps,[252] which reportedly is based on predictions by PNPS personnel that up to four service water pumps may be needed during post-shutdown operations at any given time.[253] While this may be correct, given the absence of operational experience in shutdown and the essential nuclear safety functions served by service water, Entergy respectfully requests that the final Permit authorize, on a maximum daily limit basis, all of them to be used, and allow four pumps to be used on a monthly average basis.

There also is no biological or other environmental rationale for reducing PNPS's currently allowed service-water usage during the post-shutdown period. As detailed above in the Environmental Context Section and in Sections I.A.2.a and I.A.2.b, the available scientific evidence, including data and object-specific studies amassed during nearly fifty years of biological monitoring, demonstrates the absence of demonstrable adverse impact to aquatic species in the vicinity of the Station reasonably attributable to its operations. If PNPS's current and historic water withdrawals and discharges have been sufficient to assure the protection of the aquatic ecosystem, then there is no basis for paring back its water usage after the facility has ceased its electric-generating operations and eliminated approximately 97% percent of its current water usage.

For all of these reasons, Entergy requests that the maximum daily limitation on service water use be revised in the final Permit to allow for the use of all five pumps, resulting in a maximum daily flow of up to 19.4 MGD. With respect to the average monthly limitation, Entergy requests that it be revised so as to allow for the use of up to four service water pumps each day, for an authorized average monthly flow of 15.6 MGD. Entergy anticipates that PNPS's actual service water needs may turn out in practice to be substantially lower than these conservatively large

flow authorizations may suggest. To that end, Entergy also recommends that EPA and DEP allow PNPS to operate under the service water usage authorizations proposed here for up to two years following shutdown, at the end of which period Entergy may propose to modify the permit to align the monthly averages to reflect PNPS's actual post-shutdown experience.[254]

Similar to its concern, stated above, with respect to dilution water, Entergy also recommends that the language of Part I.F.1.c the Draft Permit with respect to service water be revised to avoid potential confusion.[255] Specifically, that portion of the Draft Permit directs that PNPS "shall … [c]ease cooling water withdrawals for the main condenser and reduce total cooling water withdrawals to an average monthly rate" that reflects the average monthly rate provided for service water usage in Part I.B.3 of the Draft Permit.[256] This language is confusing because service water is not "for the main condenser," only circulating water (which will become dilution water during the post-shutdown period) is. As such, it is unclear whether the average monthly limitation is meant to apply to service water or to dilution water. Proposed revisions are provided above in Section I.E.[[73]]

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241 NRC, NUREG/CR-5379, PNL-6560, RM, R9, Nuclear Plant Service Water System Aging Degradation Assessment, Phase I, Vol. 1 (June 1989), at iii.
242 Decommissioning GEIS at 3-12 to -13.
243 *Id.* at 3-12.
244 *Id.*
245 *Id.* at 3-13.
246 *See* 40 C.F.R. § 122.46(a); G. L. c. 21, § 43(7); 314 Code Mass. Regs. § 3.11(8).
247 *See* Decommissioning GEIS at 3-9.
248 *See* FSEIS at 2-22.
249 *See id.* at 2-9.
250 *See* Modification of Authorization to Discharge Under the National Pollutant Discharge Elimination System, Federal Permit No. MA0003557 (Aug. 30, 1994) ("1994 Amended NPDES Permit"), Part I, at 6, 8-12.
251 *See* Draft Permit, Part I.B.3, at 14; *id.*, Part I.F.1.c, at 33; *see also* Fact Sheet at 34.
252 *See* Draft Permit, Part I.F.1.c, at 33; *see also id.*, Part I.B.3, at 14; Fact Sheet at 34.
253 *See* Fact Sheet at 34 (citing telephone discussion with PNPS Senior Environmental Engineer Joe Egan on Dec. 21, 2015).
254 *See* 40 C.F.R. § 124.5(a); G. L. c. 21, § 43(10); 314 Code Mass. Regs. § 3.13(1).
255 *See* Draft Permit, Part I.F.1.c, at 33.
256 *Id.*; *see also id.*, Part I.B.3, at 14.

Response to Comment 4.2:

The Fact Sheet states that PNPS (pre-shutdown) "typically operates a maximum of 4 of the 5 [service water] pumps at a time under most conditions" and that DMR data for the facility reveal a "highest recorded flow for Outfall 010 of 14.5 MGD during the monitoring period." Fact Sheet at 34. Similarly, the comment states: "During PNPS's current electric-generating operations, up to four of the pumps are typically in use at one time, with the fifth kept in reserve." After Entergy's 2015 announcement to shut the facility down, EPA communicated with a representative of PNPS to determine the facility's expected post-shutdown volumetric needs for service water, and was told that the Permittee expected PNPS would use up to two SSW pumps for the majority of the time (average monthly limit of 7.8 MGD) and a maximum of four SSW

[73] There is no "Section I.E" in Entergy's comments. This is probably a reference to Section 1.C of Entergy's comments, which appears in the Agencies' Response to Comments as Comment III.3.3.3 above.

pumps (maximum daily limit of 15.6 MGD). *See* Fact Sheet at 34. Thus, it is not clear why the commenter concludes that "the Draft Permit scrambles this history." The pre-shutdown flow "history" recounted in the comment appears to agree with that in the Fact Sheet, and the post-shutdown flow limits in the Draft Permit for Outfall 010 reflect the flows that PNPS told EPA would meet PNPS' post-shutdown needs. These flows result in a substantial reduction in overall cooling water intake consistent with closed-cycle cooling technology—which is the best performing technology to minimize adverse environmental impact under CWA § 316(b)—and were determined to be the BTA for PNPS.

In any event, in its comment, Entergy expresses concern that, while the "predictions by PNPS personnel that up to four service water pumps may be needed during post-shutdown operations at any given time. . . may be correct," these limits are not based on operational experience during shutdown and should be increased in light of this uncertainty and "the essential nuclear safety functions served by service water." Given that post-shutdown operations are new to PNPS and that service water needs may be difficult to predict with certainty at this time, the Agencies agree that an increase in the SSW flow limits in the Draft Permit is reasonable. PNPS ceased operations as of May 31, 2019, and began transferring the fuel from the reactor shortly thereafter. AR-691 (certifying to NRC that, on June 9, 2019, Entergy permanently removed the fuel from the reactor vessel and placed it in the spent fuel pool). The cooling requirements of the spent fuel pool were likely highest during the summer of 2019, when the spent fuel was first transferred to the pool and residual heat in the fuel was highest. The cooling needs will decrease over time as the fuel rods cool, as there is no other source of heat remaining at the Facility. *See* AR-714 at 3-12. As mentioned in the comment, the NRC has stated that spent fuel is typically removed from the spent fuel pool "after the fuel has cooled for 5 years." *Id*. at 3-13 Moreover, both Entergy and Holtec have filed Post-Shutdown Decommissioning Activities Reports ("PSDAR") with the NRC stating that the transfer of spent fuel from the spent fuel pool is expected to occur before then, with Entergy estimating that it would "be complete by mid-year 2022," Entergy PSDAR at 11 (Nov. 16, 2018) (AR-692), and Holtec estimating that it would occur in 2021, Holtec PSDAR at 17 (Nov. 16, 2018) (AR-696).

In the comment, Entergy requests that the maximum daily flow of 15.6 MGD proposed in the Draft Permit be increased to 19.4 MGD. A maximum daily flow limit of 19.4 MGD will still achieve an overall flow reduction commensurate with closed-cycle cooling, and the increase from the proposed limit in the Draft Permit is relatively small compared to the overall flow reduction achieved by reducing the flow at the circulating water pumps. Because PNPS will still achieve a 96% reduction in flow during the post-shutdown operation of the circulating water pumps, and because, if necessary, the duration of operation of all five salt service water pumps is likely to be relatively short-lived[74] and reflects potential nuclear safety needs for the spent fuel pool that were not well understood during development of the Draft Permit and remain difficult for the permittee to predict with certainty, the Final Permit establishes a post-shutdown, maximum daily flow limit of 19.4 MGD for the salt service water pumps at Outfall 010 (equivalent to five pumps operating).

[74] *See* AR-692 at 22; Letter from Louise Lund, NRC, to Brian Sullivan, Entergy (July 5, 2019) (noting that "within a few months following permanent shutdown of the reactor, the decay heat levels present in the pool become very low").

In the comment, Entergy also requests that the average monthly flow of 7.8 MGD proposed in the Draft Permit be increased to 15.6 MGD, which represents operation of 4 (rather than 2) of the 5 salt service water pumps. According to the comment, during pre-shutdown operations "up to four of the pumps are typically in use at one time, with the fifth kept in reserve." The comment also states that pre-shutdown service water usage, while authorized up to 19.4 MGD, has "typically involved lower flows." *See also* AR-321 at 2-9. DMR data from 2000 through 2018 bear this out—indicating that average monthly flows at Outfall 010 did not exceed 15.6 MGD. Thus, the comment requests an increase in the post-shutdown flow limits that were in the Draft Permit similar to use during normal pre-shutdown operations. The Agencies find that the requested increase in the average monthly limit from 7.8 MGD to 15.6 MGD is reasonable, for the same reasons given above for the maximum daily limit. In a letter to EPA sent May 20, 2019, well after the public comment period had ended, however, Entergy requested that the average monthly flow limit at Outfall 010 be increased even further—to 19.4 MGD (equivalent to operation of all 5 salt service water pumps and higher than average monthly flows seen during normal pre-shutdown operations). *See* AR-687. The Agencies note, however, that in November 2018, Entergy filed the above-referenced PSDAR with NRC, which states in relevant part that, "after the plant is shut down and defueled, the amount of water used by the service water system *will be much less than during normal operation of the plant*." AR-692 at 22 (emphasis added); *see also* AR-696 at 21 ("The amount of water used by the service water system after shutdown will also be reduced."). As explained above, "normal" operation of the plant was up to four service water pumps in operation, and PNPS has now shut down and defueled. The higher average monthly limit requested in the untimely comment letter, therefore, appears to contradict the statement noted above that Entergy made to NRC in its PSDAR (and the similar statement Holtec made in its PSDAR). Entergy's late comment letter neither acknowledges these earlier statements nor clearly explains why PNPS requires a higher average monthly flow limit than Entergy requested in its timely comments on the Draft Permit.[75] On August 8, 2019, EPA asked a representative for PNPS to explain the apparent contradiction between the statements to NRC and Entergy's untimely request to EPA, AR-723, but the representative responded on September 19, 2019, by simply repeating verbatim the May 20, 2019, request, without addressing the apparent contradiction, AR-756. On September 25th, EPA contacted the PNPS representative to notify him that his September 19th response did not address the apparent contradiction in any way and once more asked the PNPS representative to reconcile the May 20th request with the PSDARs, AR-760. On October 3, 2019, during a phone call with EPA, the PNPS representative again merely reiterated the May 20th request without offering any explanation. AR-757. Based on Entergy's contradictory statement to NRC in the November 2018 PSDAR and Entergy's failure to clarify the apparent contradiction when expressly given several opportunities to explain why the higher limit is nonetheless necessary, we cannot reasonably conclude based on the record that Entergy has justified its late request for an average monthly flow limit of 19.4 MGD. The Agencies recognize that Entergy's statement in the PSDAR (and Holtec's similar statement in its PSDAR) that, after defueling, service water use will *decrease* also does not completely align with Entergy's request in its timely comments for limits consistent with previous levels associated with normal operations (*i.e.*, the limits do not reflect a decrease, which Entergy and

[75] To the extent Entergy is asserting in the May 2019 letter that an average monthly limit lower than 19.4 MGD "runs afoul of NRC mandates," it is not clear from the record why, if that were the case, Entergy would tell the NRC that, once defueled, the plant's service water use would decrease. We are not aware that NRC objected to this statement in Entergy's PSDAR, and the May 2019 letter provides no explanation for any such assertion.

Holtec separately report in their PSDARs). Neither PSDAR, however, quantifies the expected decrease and, unfortunately, representatives for the facility did not provide additional explanation. DMRs submitted since the shutdown report that, at least initially, maximum daily and average monthly flows have decreased, which supports statements that the salt service cooling water use will decline after shutdown. The Agencies acknowledge, however, that there may still be uncertainty associated with exactly how much, and how consistent, a decrease to expect. Consequently, the Agencies have conservatively selected a post-shutdown, average monthly flow limit in the Final Permit of 15.6 MGD for the salt service water pumps at Outfall 010 (four pumps operating) in the interest of nuclear safety and for all the other reasons explained herein.

In its comment and in its 2019 Letter, Entergy recommends that the Agencies allow PNPS to operate with higher service water flow limits than those proposed in the Draft Permit for up to two years following shutdown, at the end of which period it may propose to modify the permit to align the monthly averages to reflect PNPS's actual post-shutdown experience. The Agencies and the Permittee may discuss modifying the permit to impose more stringent flow limits for Outfall 010 based on new information from the Permittee or the Agencies' review of flow data over the next two years of post-shutdown operations to align the flow limitations with actual operating data. *See* 40 C.F.R. § 122.62.

EPA disagrees with Entergy's statements that there has been no demonstrable adverse impact to aquatic species in the vicinity of the Station attributable to operation of the CWIS and that PNPS's current and historic water withdrawals have been sufficient to assure the protection of the aquatic ecosystem. In fact, EPA maintains that the withdrawal of seawater through the CWIS when PNPS was operating resulted in the impingement and entrainment of billions of aquatic organisms each year, which is an adverse environmental impact. *See also* Response to Entergy's Comment 2.1. However, even with a moderate increase in SSW flows, the Final Permit generally maintains a flow reduction from 324,500 gallons per minute (gpm) at the circulating water and 13,500 gpm at the SSW pumps to a maximum flow of 13,500 gpm at the SSW pumps (and average monthly rate of 10,800 gpm), with an additional limitation to operate the circulating water pumps no more than 48 hours in a single calendar month. On a monthly basis, PNPS will achieve greater than a 92% reduction in flow, which is commensurate with the projected flow reduction that would be achieved with closed-cycle cooling.[76] In other words, by ceasing generation of electricity in PNPS as of June 1, 2019, the facility achieved flow reductions commensurate with the best performing technology for minimizing impingement and entrainment. This conclusion is also consistent with the determination of BTA made in the Draft Permit and, as such, the moderate increase in permitted service water withdrawals, had it been proposed in the Draft Permit, would not have altered the BTA determination. Further, the continued cooling water withdrawals of seawater via the SSW pumps will cease when the spent fuel is transferred to dry cask storage, which is anticipated to occur within 5 years from shutdown (*i.e.*, in 2nd quarter of 2024). At that time, all cooling water withdrawals, and associated impingement and entrainment, at PNPS will be eliminated.

[76] EPA understands that the seawater intake via the circulating water pump is not for cooling purposes; however, for the purposes of calculating the *actual intake volume* under the Final Rule, EPA includes all seawater withdrawals. See 40 C.F.R. § 125.92(a) and Response to Entergy's Comment 4.1, above.

Entergy also recommends revising the language at Part I.F.1.c the Draft Permit ("shall … [c]ease cooling water withdrawals for the main condenser and reduce total cooling water withdrawals to an average monthly rate") to clarify the average monthly limits that apply to the circulating water and salt service water. The limitation for operation of the circulating water pump is based on hours of operation, rather than flow. For this reason, EPA has revised the permit to replace an average monthly flow limit at Outfall 001 with a limit on hours of pump operation. The average monthly flow limits for both Outfalls have been revised to require reporting only. Part I.A.1 of the Final Permit requires the Permittee to report the average monthly flow and the number of hours of operation for the circulating water at Outfall 001, and Part I.A.3 of the Final Permit requires the Permittee to report the average monthly flow at Outfall 010. Part I.C.4 of the Final Permit limits the operation of the circulating water pump to no more than 48 hours in a calendar month. As Entergy notes, the service water is for cooling the spent fuel and to ensure nuclear safety, while the additional seawater withdrawals via the circulating water pump are to support other functions (e.g., dilution of the radiological waste disposal system and fire protection) and will not be used for cooling water for the main condenser. As of June 9, 2019, PNPS permanently shut down the reactor and removed the fuel rods, thereby eliminating the need for condenser cooling. *See* AR-691. Consequently, Part I.C of the Final Permit eliminates the phrase "cease cooling water withdrawals for the main condenser."

5.0 The Final Permit's Thermal Limitations And Authorizations For Backwashing Must Be Revised

5.1 The Draft Permit's Authorization Of The Use Of "Thermal" And "Non-Thermal" Backwash Requires Revision

Parts I.A.2 and I.B.2 of the Draft Permit expands the current permit's regulation of "thermal backwashes" to regulate so-called "non-thermal backwashes" as well, both before and after shutdown.[257] "Thermal backwash" refers to a process used to control biofouling in the CWIS via non-chemical means: the plant is reduced to 50 percent power, seawater is heated to approximately 105°F, and two of PNPS's traveling screens are rotated in reverse to allow this heated seawater to flow back over the screens and into the intake embayment.[258] Under PNPS's current permit, thermal backwashes are authorized at a frequency of up to 3 hours per day, twice a week, subject to a maximum daily flow of 255 MGD and a maximum daily temperature of 120°F.[259] These thermal backwashes are typically conducted only 3 to 5 times per year, and scheduled so as to be coordinated with the highest tide.[260] Additionally, the current permit allows for additional backwashes ("unscheduled backwashes") as necessary to address "[i]nfrequent, abnormal environmental conditions" that would not be adequately addressed by the regularly scheduled thermal backwashes, *e.g.*, as a result of storm events, and requires that "[t]hese conditions will be described in the subsequent monthly DMR submittal."[261]
As mentioned, the Draft Permit expands the coverage of the discharge limitations provided with respect to Outfall Serial Number 002 to include "thermal and non-thermal backwash."[262] For the pre-shutdown period, both are authorized, provided that they are limited to a duration of no more than 3 hours per day, and a frequency of no more than once per week, with a maximum daily effluent temperature limitation of no more than 115°F and a daily maximum flow limitation of 28 MGD.[263] For the post-shutdown period, thermal backwashing is prohibited, but non-thermal backwashing continues to be authorized, subject to the same frequency and daily maximum flow

limits.[264]

Neither the Draft Permit nor the Fact Sheet, however, defines the term "non-thermal backwash," except insofar as the Fact Sheet states that these are "occasional" and "conducted as necessary," but "which do not use heated water."[265] To the extent that the term "non-thermal backwashes" is meant to refer to the unscheduled backwashes authorized under the current permit to address "[i]nfrequent, abnormal environmental conditions," it is incorrect to describe them as "nonthermal backwashes" that "do not use heated water." Unscheduled backwashes in fact do involve the use of heated seawater to control biofouling, except that the water typically is heated to a level below that normally which is used for regularly scheduled thermal backwashes, *i.e.*, below 105°F.

Entergy therefore recommends that the final Permit delete all references to "non-thermal backwashes" in Part I.A.2 and Part I.B.2. Instead, with respect to Part I.A.2, the final Permit should limit regularly scheduled thermal backwashing as currently specified in the Draft Permit – *i.e.*, with the same frequency, duration, daily maximum flow and daily maximum temperature limitations as currently appear in Part I.B.2 – but restore the current permit's authorization to conduct more frequent, unscheduled backwashing, as necessary to respond to infrequent, abnormal environmental conditions. Such restoration is necessary, because of the continued potential that more frequent backwashing may be necessary due to events, such as storms, that may occur shortly after a regularly scheduled thermal backwash. We therefore suggest revising footnote 4 of Part I.A.2 (addressed to "Discharge Duration") as follows:

> The discharge from a thermal backwash shall not be more frequent than three hours per event and not more frequent than once per week per intake bay. In addition, the time between thermal backwash events shall be at least seven (7) consecutive calendar days. For example, if a thermal backwash occurred on a Tuesday, the next thermal backwash could occur no earlier than on the following Tuesday. **More frequent unscheduled backwashes, at a temperature not to exceed 105°F, shall be authorized to the extent necessary to respond to infrequent, abnormal environmental events.** The permittee shall record the backwash duration for each event and the backwash frequency on a monthly basis. **Such reports shall also describe the conditions necessitating any unscheduled backwashes that were undertaken at a frequency in excess of once per week during the reporting month**~~The permittee shall explain any exceedance of the discharge frequency and/or duration on the DMR cover letter. The frequency and duration of non-thermal backwashes shall be reported in an attachment to the DMR for each month~~.[266]

Importantly, as the Fact Sheet acknowledges, PNPS's current and historic practices with respect to backwashing have been determined by both EPA and DEP to have resulted in no appreciable harm to the balanced indigenous population or community of fish, shellfish and wildlife in and on Cape Cod Bay.[267] Revising Part I.A.2, as suggested above, will not represent any change to

PNPS's historic and current use of backwashing for the purpose of biofouling control in the CWIS, and thus finds ample legal support under both Section 316(a) of the CWA and the MWQS.[268]

With respect to the post-shutdown period, Part I.B.2 of the Draft Permit should be revised, consistent with the procedure that PNPS uses and historically has used for the type of unscheduled backwashes that will be the only type of backwash authorized during this period.[269] Specifically, rather than specifying a "Discharge Duration" of only once per week, Part I.B.2 should include the following footnote, which is modeled on the revised language suggested above for footnote 4 to Part I.A.2:

> The discharge from a backwash shall not be more frequent than once per week per intake bay. In addition, the time between scheduled backwash events shall be at least seven (7) consecutive calendar days. For example, if a scheduled backwash occurred on a Tuesday, the next scheduled backwash could occur no earlier than on the following Tuesday. More frequent unscheduled backwashes shall be authorized to the extent necessary to respond to infrequent, abnormal environmental events. The permittee shall record the backwash duration for each event and the backwash frequency on a monthly basis. Such reports shall also describe the conditions necessitating any unscheduled backwashes that were undertaken at a frequency in excess of once per week during the reporting month.

Finally, Part I.B.2.a of the Draft Permit must be revised, consistent with the Comments provided in Section I.A. Specifically, consistent with our comments above in Section I.A, the words "and not later than June 1, 2019" that follow the phrase "beginning on the date following termination of electricity generation" should be deleted.[270]

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257 *See id.*, Part I.A.2, at 5; *id.*, Part I.B.2, at 13; Fact Sheet at 25.
258 *See* FSEIS at 2-11.
259 *See* 1994 Amended NPDES Permit, Part I, at 8.
260 *See* FSEIS at 2-11.
261 1994 Amended NPDES Permit, Part I, at 8.
262 *See* Draft Permit, Part I.A.2, at 5; *id.*, Part I.B.2, at 13; Fact Sheet at 25.
263 *See* Draft Permit, Part I.A.2, at 5.
264 *Id.*, Part I.B.2, at 13.
265 Fact Sheet at 11.
266 *See* Draft Permit, Part I.A.2, at 6 n.4; *see* 1994 Amended NPDES Permit, Part I, at 8.
267 *See* Fact Sheet at 50; *id.*, Attach. C, at 33.
268 *See* 40 C.F.R. § 125.73(a), (c); 314 Code Mass. Regs. § 4.05(4)(a)(2)(c).
269 *See* Draft Permit, Part I.B.2, at 13.
270 *See id.*

Response to Comment 5.1:

In the comment, Entergy requests clarification of the permit conditions for the discharge of screen backwash water via Outfall 002. Regarding the issue of pre-shutdown backwashes, Part

I.A.2, footnote 4 has been eliminated from the Final Permit because PNPS ceased electricity production as of May 31, 2019. As a result, and as explained in the Introduction and elsewhere in this Responses to Comment document, the conditions and limitations of the Draft Permit that would have applied prior to shutdown at PNPS have been eliminated from the Final Permit. The comment also requests that Part I.B.2.a be revised to eliminate the phrases "and not later than June 1, 2019" that follows the phrase "beginning on the date following termination of electricity generation." Both quoted phrases have been deleted from the Final Permit because PNPS has ceased generating electricity. *See* Response to Comment III.3.1.

Turning to post-shutdown backwash conditions, EPA drafted the permit with the understanding that non-thermal or unheated (that is, ambient temperature) backwashes will be necessary. This is an excerpt from a 10/28/15 email from Joe Egan (Pilgrim) to George Papadopoulos (EPA):

> While there will be no thermal backwashes (post-shutdown), it is possible that some regular (unheated) backwashes of the Circ. Water system will be necessary.

AR-521. Therefore, while drafting the permit, it was EPA's understanding that "non-thermal" discharges did not involve heated water.

Although the comment suggests that heated backwashes will continue post-shutdown, in a 5/17/19 phone conversation, Mr. Egan confirmed that EPA's original understanding was correct and that only unheated backwashes would occur. *See* AR-715. Mr. Egan also explained that the Facility will no longer be capable of conducting a thermal backwash, because intake water cannot be heated once the reactor has shut down. Therefore, only occasional, unheated backwashes are authorized and would occur in order to assure that the intake of cooling water for the spent fuel pool via the SSW cooling system is not impeded by any buildup of debris or aquatic organisms. For the purposes of this permit, only unheated or non-thermal backwashes can occur and are authorized post-shutdown since the Facility is no longer capable of heating the intake water which is then run back through each of the intake bays as necessary.

The comment requests that the Final Permit authorize more frequent, unscheduled backwashing, as necessary to respond to infrequent, abnormal environmental conditions similar to the 1991 Permit. According to Entergy, backwashing more than once per week may be necessary, for example, to respond to a storm that occurs during the same week as a regularly scheduled backwash. Post-shutdown backwashing will use ambient temperature water and will not have a thermal impact on the receiving water. In addition, there is a potential that, if the Permittee is unable to conduct a backwash when a large amount of debris is occluding the screen (such as after a storm), the traveling screens could be damaged or the cooling water flow necessary to cool the spent fuel pool could be disrupted. Backwashing the screens in this event will also ensure that a protective through-screen velocity is maintained. For these reasons, the Final Permit includes a condition in Part I.A.2 (footnote 4) authorizing the backwash frequency to exceed once per week in order to respond to infrequent, abnormal events.

5.2 The Final Permit's Thermal Discharge Limits With Respect To Post-Shutdown Service Water Discharges And Pre-Shutdown Circulating Water Discharges Must Be Revised

Prior to PNPS's anticipated shutdown, the Draft Permit maintains the thermal limitations for circulating water discharges contained in PNPS's current NPDES permit, which allows PNPS to discharge heated effluent with a maximum daily temperature of 102°F and a temperature rise or "delta T" (as measured by the difference between the intake and the discharge water temperatures) of up to 32°F.[271] Consistent with this current NPDES permit, there are no thermal limitations on service water discharges prior to shutdown.[272]

After PNPS's anticipated shutdown, however, the Draft Permit proposes more restrictive limits for service water discharges that may be problematic for PNPS's post-shutdown operations. As to circulating water, the Draft Permit reduces the effluent temperature limits to an average monthly cap of 80°F, with a maximum daily limit of 85°F and a delta T of 3°F.[273] Entergy expects that these limitations should be manageable under PNPS's post-shutdown regime, provided that reduced flows throughout the system do not contribute to increased effluent temperatures and delta Ts.

With respect to service water discharges, the Draft Permit conditions are not sufficiently supported in at least two respects. First, it is unclear whether an 85°F maximum daily cap on effluent temperature for service water can reasonably support the use of service water for necessary nuclear-safety functions post-shutdown, particularly given that this period will represent a greatly reduced flow dynamic compared to PNPS's historic electric-generating operations. Effluent temperature is a function of many variables, including flow, which in turn is a function of the number of service water pumps available to generate that flow. As discussed above in Section II.B, the Draft Permit proposes to limit the number of service water pumps available for PNPS's use compared to historic operations, while at the same time imposing thermal limits on service water discharge for the first time in the facility's history. Such a regime may present a needlessly challenging dynamic for Pilgrim. The Draft Permit's limitations also need to be set in a manner that properly accounts for the fact that PNPS's instruments have inherent limitations on their accuracy, in that they can accurately measure temperature only within 1°F of the actual water temperature.

Further, there is substantial uncertainty concerning what the typical effluent temperature of a service water discharge alone likely will be. Historically separate temperature monitoring has not been required for the service water discharge at PNPS, in recognition of the fact that this discharge has almost always been commingled with, and heavily diluted by, the much larger circulating water discharge.[274] As a result, there is only limited temperature monitoring data that reflects that reflects the discharge associated with service water alone: such data would be from periods when PNPS has taken an outage, which tend to be highly infrequent, typically occurring on a 24-month cycle.[275] Accordingly, the maximum daily temperature limit for post-shutdown service water discharges must be revised; given the paucity of useful historic temperature monitoring data for service water alone that can serve as a baseline, Entergy suggests a limit of 90°F, subject to reduction upon review after a year of post-shutdown operations.

The 3°F delta T limitation for service water is as, if not more, unsupported. As a matter of physics, the temperature rise or delta T for a fluid heating system is, in large part, a function of volumetric flow. More specifically, delta T (or ΔT) is a function of both the volumetric flow rate (Q) and the heat flow or heat rejection rate (H), as represented by the following equation:

$$\Delta T = \frac{H}{Q C_p \rho}$$

where C_p and ρ represent the specific heat capacity and density of the fluid (*i.e.*, water), values that are essentially constant. As can be seen from the equation above, delta T and volumetric flow have an inverse relationship such that, all else equal, the delta T will always be greater if the flow rate is less. Yet the Draft Permit proposes to impose the same delta T limitation on service water discharges as it does on circulating water discharges, even though the allowed volumetric flow of circulating water discharges post-shutdown is more than 15 times greater (244 million gallons per day versus only 15.6 million gallons per day).[276]

The only basis cited in the Fact Sheet for imposing the same thermal limitations on two discharges that are so dissimilar is a single e-mail message from PNPS personnel stating that PNPS expects the delta T of an effluent that EPA "assumed" to be service water discharge likely "will be up to 3°F above the intake temperature, presumably due to [the] fact that even after the shutdown there will be some ongoing equipment cooling discharges associated with the [service water] system."[277] The Fact Sheet admits, however, that service water, as opposed to circulating water, is "not specified" in the e-mail being relied upon.[278] Even assuming that the 3°F applies to service water, the Fact Sheet omits the fact that PNPS has also stated in conversations with EPA that (1) 3°F represents the low end of an expected range of 3°F to 5°F for delta T post-shutdown, and (2) the range is necessarily uncertain given the paucity of historic temperature monitoring data reflecting only service water discharges, as discussed above.

The Fact Sheet makes no attempt to show that the 3°F delta T for post-shutdown service water discharges is technically grounded or otherwise rational. This is particularly true given the Fact Sheet's acknowledgement that "EPA concludes … that a continued § 316(a) variance for temperature allowing a delta T of 32°F during normal (pre-shutdown) operations will assure the protection and propagation of a balanced, indigenous population (BIP) of shellfish, fish and wildlife in and on the body of water into which the discharge is made."[279] The Fact Sheet points to no basis for concluding that the much more stringent 3°F limit for service water is necessary post-shutdown, given that the health of the biota already is "assured" by a 32°F limit.[280] Accordingly, the 3°F delta T limit for post-shutdown service water discharges must be revised; given the paucity of useful historic temperature monitoring data for service water alone that can serve as a baseline, Entergy suggests a limit of 10°F, subject to reduction upon review after a year of post-shutdown operations.

Finally, the Draft Permit should be modified in one final respect: for the remainder of PNPS's electricity-generating operations, *i.e.*, pre-shutdown, Part I.C.11 carries forward conditions limiting the rate of change in delta T for circulating water discharges (Outfall 001), which also are found in the 1994 Amended NPDES Permit, but which never have had any application to PNPS's generating activities and still do not. Specifically, Part I.C.11.a provides that the rate of

change in delta T shall not exceed "[a] 3°F rise or fall in temperature for any sixty (60) minute period during normal steady state operation," while Part I.C.11.b limits the rate of change in delta T to 10°F over the same period "during normal load cycling."[281]

Under "normal steady state operations," however, there are no circumstances in which the delta T for the circulating water discharge would rise or fall by more than 3°F in an hour. Such changes in delta T can be reasonably expected only under special circumstances, such as a scheduled refueling outage, *i.e.*, *not* during "normal steady state operations." "[N]ormal load cycling" is even more confusing. As a nuclear power plant, PNPS is a "baseload" facility, meaning that it normally generates and supplies electricity to the grid on a constant basis, with the only exceptions being scheduled refueling outages.[282] It therefore does not "cycle" its load – *i.e.*, increase or decrease the amount of electricity supplied in response to changes in demand – as, say, a peaking unit does. While the conditions carried forward in Part I.C.11 of the Draft Permit have no possible application to PNPS's operations, they have recently served to breed confusion concerning the scope of PNPS's obligations under its current 1994 Amended NPDES Permit.[283] In the interest of avoiding such confusion and promoting clarity, therefore, Entergy recommends the deletion of Part I.C.11 of the Draft Permit.

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271 *Compare* Draft Permit, Part I.A.1, at 3 *with* 1994 Amended NPDES Permit, Part I, at 6.
272 *Compare* Draft Permit, Part I.A.4, at 9 *with* 1994 Amended NPDES Permit, Part I, at 10.
273 *See* Draft Permit, Part I.B.1, at 11.
274 *See* 1994 Amended NPDES Permit, Part I, at 10.
275 *See* FSEIS at 2-13, 2-100.
276 *Compare id.* at 11 *with id.*, Part. I.B.3, at 14.
277 *See* Fact Sheet at 23-24 (citing e-mail from Joe Egan of PNPS dated Oct. 28, 2015).
278 *Id.* at 24.
279 Fact Sheet at 24; *see also generally* Fact Sheet, Attach. C (presenting DEP's species-by-species analysis of effects of pre-shutdown thermal discharge on marine organisms, and ultimately concluding that effects are either *de minimis* or otherwise do not warrant alteration of the discharge).
280 *See* 33 U.S.C. § 1326(a).
281 Draft Permit, Part I.C.11, at 31; *see also* 1994 Amended NPDES Permit, Part I, at 3.
282 *See, e.g.*, FSEIS at 8-7 n.(d), 8-44.
283 *See* Letter from Elise N. Zoli, on behalf of PNPS, to Margaret Sheehan, Ecolaw (Dec. 7, 2012), at 13.

Response to Comments 5.2:

The comment identifies issues with effluent limitations and conditions from the Draft Permit that apply prior to and following the cessation of power generation at PNPS (the "pre-shutdown" and "post-shutdown" limits, respectively). The Agencies have reviewed and considered comments on both the pre- and post-shutdown limits. However, as explained in the Introduction to this Responses to Comments, PNPS ceased operating as of May 31, 2019. Therefore, the permit conditions and effluent limitations from the Draft Permit specific to operation of the facility prior to the shutdown date, including the condition related to the rate of temperature change in Part I.C.11, are no longer applicable. Consequently, the pre-shutdown effluent limitations and conditions identified in the comment have been eliminated from Final Permit. As such, the Agencies do not provide further responses to the comments specific to the pre-shutdown limits that were removed from the Final Permit except where a concern or issue about the pre-shutdown limit would also be relevant to the post-shutdown limit.

The comment indicates that the proposed, post-shutdown limits for service water discharges may be problematic for PNPS's post-shutdown operations, although Entergy indicates that it expects that the temperature limits (including a monthly average limit of 80°F, maximum daily limit of 85°F, and a delta T of 3°F) "should be manageable under PNPS's post-shutdown regime, provided that reduced flows throughout the system do not contribute to increased effluent temperatures and delta Ts." In other words, Entergy suggests that it could potentially meet the more restrictive temperature limits proposed in the Draft Permit, but, given the scarcity of temperature data on the existing salt service water operation and Entergy's uncertainty about the post-shutdown cooling needs of the spent fuel pool, Entergy requests moderate increases in the maximum daily temperature limit (from 85°F to 90°F) and delta T (from 3°F to 10°F) at Outfall 010.

According to Entergy, it is unclear whether an 85°F maximum daily limit for service water can reasonably support the use of service water for necessary nuclear-safety functions post-shutdown, particularly given that this period will represent a greatly reduced flow dynamic compared to PNPS's historic electric-generating operations. When the Facility was operating, the circulating water pumps provided cooling water for the condenser at a flow of 447 MGD and delta T of 32°F. Following shutdown of the reactor, the salt service pumps will operate with a maximum daily flow of 19.4 MGD. EPA acknowledges Entergy's considerable uncertainty regarding the anticipated flow and temperature requirements for cooling the spent fuel pool, as this represents an entirely new operating regime as compared to operations under the current permit.[77] In addition, the cooling water from the salt service water pumps serves a critical function to maintain nuclear safety. Finally, the cooling requirements at PNPS will be at a maximum during the first year after the reactor is shutdown, which occurred on May 31, 2019, and the cooling needs will decrease as the residual heat in the fuel rods decay. In other words, the heat load to Cape Cod Bay from the remaining thermal effluent at Outfall 010 will decrease over time.

As discussed in Response to Comment III.4.2., the Draft Permit post-shutdown temperature limits at Outfall 010 reflect the flows that Entergy indicated to EPA during development of the permit would meet PNPS' post-shutdown needs. *See* AR-519 and Fact Sheet at 36. In its comments on the Draft Permit, Entergy has requested higher temperature limits at Outfall 010 given that it is uncertain of the actual thermal load and to ensure that the Permittee is authorized to operate with sufficient cooling water flow to meet the nuclear safety demands of cooling the

[77] In its comment, Entergy asserts that the Draft Permit imposes thermal limits at Outfall 010 "for the first time in history." The Draft Permit imposes thermal limits at Outfall 010 only *after* cessation of electrical generating activities. Prior to shutdown, the cooling water at Outfall 010, which included flows from the turbine building cooling water and the reactor building cooling water systems, combined with the condenser cooling water flow in the discharge canal upstream of the monitoring location for Outfall 001. The volume of effluent at 010 was substantially less than the volume at Outfall 001 and, as such, the overall contribution of heated effluent to Cape Cod Bay from Outfall 010 was much less. The temperature limits at Outfall 001, which were recorded after combining with other wastestreams, including heated effluent from Outfall 010, were sufficient to protect Cape Cod Bay. Post-shutdown, effluent at Outfall 010 represents the non-contact cooling water flow from the spent fuel pool, which according to Entergy is the sole remaining source of heated effluent at the Facility. The circulating water effluent from Outfall 001 operates intermittently and has no source of heat. Therefore, it is appropriate to regulate the temperature at Outfall 010 to reflect an entirely new operating scheme in which the thermal effluent to Cape Cod Bay originates at this outfall.

spent fuel pool. Under the current permit limits, which reflect operating conditions for generating electricity at PNPS, the total heat load to Cape Cod Bay from the circulating water pumps is about 14,336 mmBTU/day. EPA and MassDEP determined that the proposed pre-shutdown delta-T limit of 32°F, upon which the calculation is based, is protective of the balanced indigenous population. *See* Fact Sheet Attachments B and C. After shutdown and under the Draft Permit temperature and flow limits for Outfall 010 (maximum daily flow of 15.6 MGD and delta-T of 3°F), the heat load to Cape Cod Bay is decreased by 99.7% to 46.8 mmBTU/day. The limits proposed by Entergy in its comments on the Draft Permit (maximum daily flow of 19.4 MGD and delta-T of 10°F) still result in a 98.6% decrease (to 194 mmBTU/day) in the heat load to Cape Cod Bay.

The post-shutdown Draft Permit temperature limits at Outfall 010 were based on communications with staff at PNPS about the anticipated cooling requirements of the spent fuel pool. Upon further analysis of the likely post-shutdown cooling needs, and considering the relatively high uncertainty of post-shutdown operations, Entergy has requested new thermal limits that are slightly less stringent than the Draft Permit's proposed limits, but which are still far more stringent than the current permit and Draft Permit's pre-shutdown limits, which were based on a § 316(a) variance and determined to be sufficiently protective of the balanced indigenous population. Entergy's proposed limits will still achieve a heat load reduction greater than 98%. Because the cooling requirements represent a critical nuclear safety element, and given Entergy's professed uncertainty of the actual cooling requirements of the spent fuel pool, Part I.A.3 of the Final Permit establishes a maximum daily temperature limit of 90°F, an average monthly temperature of 80°F, and maximum delta-T of 10°F at Outfall 010. These limits, which still represent a substantial decrease in the overall heat load to Cape Cod Bay, will ensure protection of the balanced, indigenous population.

6.0 The Draft Permit's Proposed Changes To PNPS's Effluent Discharge Concentration Limits For Chlorine And Boron Lack Technical Support, Interfere With NRC Mandates, And Must Be Revised

With respect to PNPS's pre- and post-shutdown operations, the Draft Permit proposes limits on the allowable concentrations of certain contaminants – in particular chlorine and boron – in effluent discharged via Outfalls 001 (circulating water), 010 (service water), 011 (internal outfall for demineralizer reject water, station heating and service water systems), and 014 (various process and wastewaters from the waste neutralization sump). As detailed below, the pre- and post-shutdown limits imposed with respect to the use of chlorine in circulating water and/or service water are technically unsupported, have the potential to create inconsistency with NRC nuclear-safety mandates, and therefore must be revised. With respect to boron, the limits imposed by the Draft Permit appear to be manageable, but the Draft Permit's characterization of the relevant discharges for Outfalls 011 and 014 must be clarified to be consistent with the Water Flow Diagram provided in the Fact Sheet, and the monitoring requirements specified in the Draft Permit for boron must be revised to make them internally consistent with the sampling requirements specified in footnote 6 to Parts I.C.4 and I.C.5 of the Draft Permit.

6.1 Legal Framework

In general, NPDES permit limits are based on applicable technology- and/or water-quality based requirements.[284] More specifically, with respect to technology-based effluent limitations, EPA has promulgated national effluent guideline limitations ("ELGs") applicable to various industrial categories, which establish such limits for various pollutant discharges from individual facilities within the relevant industrial category.[285] In the absence of an applicable ELG, technology-based limits are established case-by-case on the basis of EPA's best professional judgment, considering the factors identified in EPA's regulations as being relevant.[286] In addition to technology-based limits, more stringent water-quality-based limits also may be imposed to the extent necessary to ensure that the receiving waterbody will meet applicable water quality standards, including the MWQS, which are allowed to be more stringent than the national water quality standards that EPA has set under the CWA.[287] Finally, the "antibacksliding" provisions of the CWA provide that a NPDES permit generally may not be renewed, reissued or modified with limitations or conditions less stringent than those contained in the previous permit unless certain conditions are met.[288]

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[284] *See* 33 U.S.C. § 1311(b); 40 C.F.R. § 125.3.
[285] *See* 40 C.F.R. §§ 122.43(a) & (b), 122.44(a)(1).
[286] *See* 40 C.F.R. § 125.3(c)(3), (d).
[287] *See* 33 U.S.C. § 1311(b)(1)(C).
[288] *See* 33 U.S.C. §§ 1313(d)(4), 1342(o); 40 C.F.R. § 122.44(*l*).

Response to Comments 6.0 and 6.1:

Comment 6.0 generally summarizes Entergy's more detailed comments in Comment 6.2 that the effluent limits for chlorine (i.e., total residual oxidants in seawater) in the permit are technically unsupported and potentially inconsistent with NRC requirements. The Agencies respond to these comments in Responses to Comments 6.2.1 and 6.2.2. In Comment 6.0, Entergy also comments that the boron limits in the permit "appear to be manageable" but summarizes what Entergy views as inconsistencies with other information or requirements in the permit. The Agencies respond in detail to these comments in Response to Comment 6.3.

Finally, Comment 6.1 briefly explains how permit effluent limits may be either technology-based or water quality-based and the general process for deriving them. The comment also mentions the provisions at CWA §§ 402(o) and 303(d) and in federal regulations at 40 C.F.R. § 122.44(*l*) related to anti-backsliding. The Agencies generally agree with the characterizations in Comment 6.1. Technology-based treatment requirements represent the minimum level of control that must be imposed under CWA §§ 301(b) and 402. The Act and its implementing regulations establish criteria and standards for their imposition in permits, including the application of EPA promulgated Effluent Limitation Guidelines (ELGs) by category or subcategory. In the absence of ELGs, the permit writer is authorized under CWA § 402(a)(1)(B) to establish effluent limitations on a case-by-case basis using best professional judgment (BPJ). The CWA and implementing regulations further require that permit limits and conditions based on water quality considerations be established when less stringent technology-based requirements would interfere with the attainment or maintenance of water quality standards in the receiving water, including designated uses. *See* CWA § 301(b)(1)(C); 40 C.F.R. §§ 122.44(d)(1), 122.44(d)(5), 125.94(i).

The Act's anti-backsliding requirements prohibit a permit from being renewed, reissued or modified to include less stringent limitations or conditions than those contained in a previous permit except in compliance with one of the specified exceptions to those requirements. *See* CWA §§ 402(o), 303(d)(4); 40 C.F.R. § 122.44(*l*). Anti-backsliding provisions apply to effluent limits based on technology, water quality, and/or state certification requirements.

6.2 Chlorine

The Draft Permit's limitations with respect to chlorine in PNPS's pre-shutdown circulating water discharge and post-shutdown service water discharge require revision, as explained below. These limitations are particularly inappropriate considering the role that chlorination plays in nuclear operations, particularly with respect to the service water system. As explained above, the service water system at PNPS, as at all nuclear power plants, is a vital system necessary to ensure nuclear and radiological safety, and remains so even after the facility shuts down and begins the decommissioning process.[289] Because of its nuclear-safety function, ensuring that the service water system and all of its components are kept properly maintained and functioning is likewise of critical importance. To that end, "[t]he service water system is continuously chlorinated in order to control nuisance biological organisms, such as mollusks, barnacles, algae and other organisms, in the service water system,"[290] and continuous chlorination to prevent such biofouling is necessary as long as the service water system continues to withdraw seawater on a regular basis.[291] Historically, such chlorination has been allowed, including under PNPS's current 1994 Amended NPDES Permit, provided that the concentration of chlorine in the service water discharge (represented in the permit as "Total Residual Oxidants" or "TRO") does not exceed an average monthly limit of 0.5 mg/L or a daily maximum of 1.0 mg/L, which then would be diluted by the larger circulating water discharge to a concentration no higher than 0.1 mg/L prior to being discharged to Cape Cod Bay.[292] The service water system also is equipped with diffusers designed to ensure that these limits are not exceeded.[293]

[289] *See supra* Section II.B.
[290] *See* FSEIS at 2-9.
[291] *See* NRC Generic Letter No. 89-13 (July 18, 1989), Enclosure 1, at 1 ("The service water system should be continuously … chlorinated … whenever the potential for a macroscopic biological fouling species exists….").
[292] 1994 Amended NPDES Permit, Part I, at 2, 10.
[293] *See* FSEIS at 2-9.

6.2.1 Pre-Shutdown Limits

Circulating Water

With respect to pre-shutdown chlorine limits for circulating water, the Draft Permit proposes reducing the TRO limits[294] for PNPS's pre-shutdown circulating water usage to a daily maximum of 13 µg/L and an average monthly limit of 7.5 µg/L, on the basis that, "[t]o EPA's knowledge, there has not been any prior hydrodynamic modeling conducted that would provide an estimate of dilution for the discharge from the discharge canal" sufficient to assure that the current TRO limit of 0.1 mg/L is supported.[295]

Entergy respectfully requests that its current permit limit – *i.e.*, a daily and average monthly

maximum of 0.1 mg/L – be retained for at least the next two years, *i.e.*, through 2018, as this level of chlorination has been demonstrated to be adequate, in PNPS's operational experience, to control biofouling. The following information supports the continued retention of these TRO limits.

Under the Steam Electric Power Generating ELGs that are applicable to PNPS's pre-shutdown operations, the technology-based TRO limit for an electric-generating facility such as PNPS is 0.2 mg/L.[296] PNPS's current TRO limits for pre-shutdown circulating water usage are half of that, and therefore already more stringent than the applicable technology-based limit.[297] With respect to water-quality based limits, the narrative criteria and designated uses of Cape Cod Bay provide, respectively, that in Cape Cod Bay the concentration of chlorine must not "interfere with the propagation of fish or shellfish, or adversely affect populations of non-mobile or sessile benthic organisms,"[298] must not be "toxic to humans, aquatic life or wildlife,"[299] and must not otherwise compromise the designated use of Cape Cod Bay as "excellent habitat for fish, other aquatic life and wildlife, including their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation."[300] For the reasons detailed above in the "Environmental Context" Section, there is no basis to believe that PNPS's current TRO limits do not already assure compliance with these standards, as continuous investigation and monitoring of the aquatic community of Cape Cod Bay have detected no demonstrable impact on RIS from PNPS's more than four decades of operation, during which time the current TRO limits have continued in place.[301] Further, EPA's and DEP's prior approval of PNPS's current TRO limits necessarily reflects a determination that compliance with those limits are sufficient to comply with MWQS, including narrative criteria and designated uses. Any change of position by the agencies with respect to that determination must therefore be explained, otherwise it constitutes arbitrary and capricious agency action.[302]

The current TRO limits also satisfy the MWQS's numeric water quality criteria for chlorine. As noted above, the MWQS adopt EPA's National Recommended Water Quality Criteria for Aquatic Life,[303] which provide for an acute limit in marine waters of no more than 0.013 mg/L and a chronic limit in marine waters of no more than 0.0075 mg/L.[304] Using the same methodology as EPA and DEP recently used in the renewal of Canal Generating Station's NPDES/MCWA permit, PNPS's existing TRO limit of 0.1 mg/L is "more stringent than any limit that would be derived based on the State of Massachusetts' acute water-quality standard for chlorine in marine water and the dilution provided by the receiving water."[305] As explained in the Canal permit's fact sheet, the necessary stringency of a TRO limit of 0.1 mg/L is supported if the receiving waterbody (here, Cape Cod Bay) can be assured to provide a minimum dilution factor of at least 7.7 (0.1 mg/L divided by 0.013 mg/L).[306] In order for the circulating water effluent of PNPS to be diluted by a factor of 7.7, approximately 5,336 cubic feet per second ("cfs") of dilution flow is needed in Cape Cod Bay near the discharge point, given the circulating water discharge volume of 447 MGD, or 693 cfs (693 cfs * 7.7 = 5,336 cfs).[307]

Volumetric flows in Cape Cod Bay near the discharge point were studied in connection with winter flounder larval transport studies that are relied on by the AEI Report, discussed above in the "Environmental Context" section.[308] In those studies, the volumetric flow across a transect of Cape Cod Bay along the coast near PNPS was estimated, over periods of approximately one month, for the purpose of estimating the transport rate of larvae potentially susceptible to

entrainment by the Station.[309] These studies estimated volumetric flows in Cape Cod Bay across the transect defined by the study area that range from 1,141 m^3/s (approximately 40,294 cfs), which appears to be an outlier, to 86,141 m^3/s (over 3 million cfs); the average of all the estimates is 50,636.8 m^3/s (approximately 1.8 million cfs).[310] Even if the dilution flow available to PNPS's circulating water discharge in Cape Cod Bay were only 0.3 percent of the average flows as estimated by these studies, it would still be more than enough to assure achievement of the requisite level of dilution necessary for compliance with the acute marine chlorine standard.[311] Moreover, as was the case for Canal Generating Station, retention of the 2-hour per day limit on chlorination of PNPS's circulating water system during the pre-shutdown period, consistent with the applicable Steam Electric ELGs, is sufficient to ensure that there will be no chronic chlorine exposure to aquatic life, rendering the chronic marine chlorine standard also satisfied.[312]

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[294] TRO is used as the sampling parameter for PNPS's effluent limitations on chlorine, rather than total residual chlorine ("TRC"), because PNPS withdraws and discharges seawater, which naturally contains bromide compounds. *See* 40 C.F.R. § 423.11(a).
[295] *See* Draft Permit, Part I.A.1, at 3; Fact Sheet at 22-23.
[296] *See* 40 C.F.R. § 423.13(b)(1).
[297] *See* 1994 Amended NPDES Permit, Part I, at 2.
[298] 314 Code Mass. Regs. § 4.05(5)(b).
[299] *Id.* § 4.05(5)(e).
[300] *Id.* § 4.05(4)(a).
[301] *See supra*, "Environmental Context."
[302] *See Fox Television Stations, Inc.*, 556 U.S. at 515; *Alliance to Protect Nantucket Sound, Inc. v. Energy Facilities Siting Bd.*, 448 Mass. 45, 56 (2006) (recognizing that "[a] party to a proceeding before a regulatory agency … has a right to expect and obtain reasoned consistency in the agency's decisions" (citation omitted)).
[303] *See* 314 Code Mass. Regs. § 4.05(5)(e).
[304] *See* EPA, *National Recommended Water Quality Criteria – Aquatic Life Criteria Table*, https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table (last visited July 23, 2016).
[305] *See* EPA, Fact Sheet, Draft National Pollutant Discharge Elimination System (NPDES) Permit to Discharge to Waters of the United States, NPDES Permit No. MA0004928 ("Canal Fact Sheet"), at 15.
[306] *Id.* at 16.
[307] *See id.*
[308] *See* AEI Report at 11; Entergy Nuclear Generation Company ("ENGC"), *Study of Winter Flounder Larval Transport in Coastal Cape Cod Bay and Entrainment at Pilgrim Nuclear Power Station* (Spring 2004) ("ENGC (2004)"); ENGC, *Study of Winter Flounder Larval Transport in Coastal Cape Cod Bay and Entrainment at Pilgrim Nuclear Power Station* (Dec. 2002) ("ENGC (2002)").
[309] *See* ENGC (2004), at 2-3 to -5, 4-1 to -3; ENGC (2002), at 2-1 to -6, 4-1 to -9.
[310] ENGC (2004), at 4-3 (Table 4-1); ENGC (2002), at 4-6 (Table 4-1).
[311] *See* Canal Fact Sheet at 16 (supporting acute marine chlorine limit using similar analysis).
[312] *Id.* at 16-17.

Service Water

The current permit allows the service water system to be chlorinated continuously, provided that TRO concentration does not exceed a daily maximum of 1.00 mg/L or a monthly average of 0.5 mg/L prior to mixing with any other streams.[313] The propriety of these limits, which the Draft Permit has retained, is fully supported.[314]

With respect to technology-based limitations, the current daily TRO limit for service water of 1.0 mg/L is nominally higher than the 0.2 mg/L daily maximum limit provided for under the ELGs,

and the duration of chlorination exceeds the ELG limit of up to 2 hours per day.[315] As the current permit recognizes however, the TRO concentration of PNPS's service water discharge typically meets or is more stringent than the ELG daily maximum limit due to dilution flow provided by the much larger circulating water discharge during PNPS's normal electricity-generating operations: in order to ensure dilution of TRO from 1.0 mg/L to 0.1 mg/L, a minimum dilution factor of 10 is needed, and given that circulating water discharge flow volume of 447 MGD is more than 23 times that of the maximum service water discharge volume of 19.4 MGD (assuming all five pumps operating), that level of dilution is assured provided that circulating water is flowing. The only circumstances in which the necessary level of dilution may not be assured is during reactor shutdowns, when circulating water flow is absent. As the NRC has provided, however, chlorination of the service water system remains necessary during those times for nuclear-safety reasons, which EPA and DEP lack authority to countermand.[316]

With respect to water-quality based limits, the same reasons detailed above support the retention of PNPS's current TRO limits for service water as they do for circulating water. EPA and DEP's prior determination that achievement of these limits (including the maximum limit prior to release into Cape Cod Bay of 0.1 mg/L for all discharges) suffices to ensure compliance with the MWQS, combined with the demonstrated absence of environmental harm, establishes that narrative water quality criteria and designated uses of Cape Cod Bay are protected. Further, with respect to numeric criteria, the minimum amount of dilution flow needed to assure a dilution factor of at least 7.7 for the combined maximum circulating and service water discharge volumes of 466.4 MGD is 866.6 cfs, still less than 2 percent of average Cape Cod Bay flows past the station as estimated by prior studies.[317] Thus, the existence of the requisite amount of dilution flow in Cape Cod Bay for the combined discharge is reasonably assured and retention of the current permit's TRO limits for service water prior to shutdown is supported.

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[313] *See* 1994 Amended NPDES Permit, Part I, at 2.
[314] *See* Fact Sheet at 35.
[315] 40 C.F.R. § 423.13(b).
[316] *See* NRC Generic Letter No. 89-13 (July 18, 1989), Enclosure 1, at 1; *English*, 496 U.S. at 84-85.
[317] *See supra*, Section IV.B.1.a.

Response to Comment 6.2.1:

Since PNPS ceased electricity-generating operations on May 31, 2019, all pre-shutdown limits, including the maximum daily and average monthly total residual oxidants (TRO) limits at Outfall 001, have been eliminated from the Final Permit. Because the permit conditions and limits at issue in the comment are not included in the Final Permit, EPA has not addressed these comments on the Draft Permit, except where a comment above is also relevant to the post-shutdown limits addressed in Response to Comment 6.2.2, below.

6.2.2 Post-Shutdown Limits

Circulating Water

The Draft Permit proposes prohibiting chlorination of the circulating water system after PNPS shuts down.[318] Entergy does not object to this change, as it expects continued chlorination of this

system will not be necessary during the post-shutdown period, when one pump will be used only on an intermittent basis for providing radiological waste dilution water.[319] Thus, there will be no chlorine discharge associated with Outfall 001 post-shutdown.

Service Water

With respect to the post-shutdown period, the Draft Permit proposes a significant reduction in the allowable concentration of chlorine in PNPS's service water discharge, limiting TRO to an average monthly concentration limit of only 7.5 µg/L and a daily maximum concentration of only 13 µg/L.[320] Under PNPS's current permit, the service water system may be continuously chlorinated such that TRO does not exceed a daily maximum limit of 1.0 mg/L and an average monthly limit of 0.5 mg/L prior to mixing with any other streams.[321] During PNPS's electricity-generating operations, these streams would include the dominant circulating water discharge, which would be sufficient to dilute the concentration of all TRO being discharged to Cape Cod Bay to a concentration at or below 0.1 mg/L, as detailed above.[322] The Fact Sheet's explanation for the Draft Permit's proposed reduction is that the termination of most circulating water discharge via Outfall 001 may mean that compliance with the current permit limits is no longer assured, and so the Fact Sheet welcomes the submission of additional information that would support a different effluent limit.[323]

Entergy respectfully requests that EPA revise the final Permit's TRO limitations for PNPS's post-shutdown service water discharges to reflect a monthly average of 0.25 mg/L and a daily maximum of 0.5 mg/L, prior to discharge to Cape Cod Bay. PNPS can comply with these limits, even in the absence of circulating water, for example, by alternating the chlorination of service water pumps while using other pumps to provide dilution flow: *e.g.*, two pumps may be chlorinated to a maximum of 1.0 mg/L, the current TRO limit, while two other pumps provide a dilution factor of 2, diluting the total discharge from all four pumps to 0.5 mg/L. The propriety of the 0.5 mg/L daily maximum and 0.25 mg/L average monthly TRO limitations is supported by the following information.

First, with respect to applicable technology-based limits, and contrary to EPA's analysis in the Fact Sheet, the Steam Electric ELGs no longer apply during the post-shutdown period of PNPS.[324] During that period, PNPS will no longer be "a generating unit … whose generation of electricity results primarily from a process utilizing … nuclear fuel in conjunction with a thermal cycle employing the steam water system as the thermodynamic medium," as PNPS will no longer generate electricity by any process or using any fuel, so the Steam Electric ELGs will be facially inapplicable.[325] Indeed, EPA's promulgation of the Steam Electric ELGs implicitly recognizes that units that have shut down are not properly made subject to them, as EPA specifically excluded data pertaining to such units from its consideration in formulating the ELGs, on the ground that such data was not representative of the relevant types of facilities.[326] Because the Steam Electric ELGs do not properly apply to PNPS after it has shut down, and in the absence of any other category of ELGs that are applicable, EPA must set technology-based effluent limitations for PNPS's post-shutdown period using its best professional judgment.[327] Given the nuclear-safety-related function of service water cooling and EPA and DEP's lack of authority to limit that function, discussed above, continuous chlorination will continue to be required.[328]

With respect to water-quality based limits, the TRO limits that Entergy requests represent a substantial reduction in total chlorine loading from the level that, as discussed above, EPA and DEP already have approved as being sufficient to assure compliance with applicable narrative and numeric criteria and designated uses of Cape Cod Bay, and that has been shown to have had no negative impact on Cape Cod Bay's aquatic community over the past 40+ years of PNPS's operations.[329]

More specifically, EPA and DEP previously have determined that, even accounting for the volume and timing of PNPS's chlorination of its circulating and service water discharge, the TRO limit reflected in the current permit – *i.e.*, a daily maximum and average monthly concentration, prior to discharge to Cape Cod Bay, of no more than 0.1 mg/L – satisfies the MWQS. Under that limit, and given the volume and chlorination treatment of PNPS's circulating and service water discharges, the total amount of chlorine that is released to Cape Cod Bay is approximately 21,500 g per day, calculated as follows, assuming daily maximum flows:

Circulating Water (chlorinated for 2 hours per day)

(311,000 gpm / 0.264 L/min) * 120 min/day = 141,363,636.4 L of flow per day
141,363,636.4 L * (0.1 mg/L / 1,000 mg/g) = 14,136.4 g Cl released per day

Service Water (continuously chlorinated)

(13,500 gpm / 0.264 L/min) * 60 min/hr * 24 hr/day = 73,636,363.6 L of flow per day
73,636,363.6 L * (0.1 mg/L / 1,000 mg/g) = 7,363.6 g Cl released per day

Total Current Daily Release of Cl: 21,500 g

Accounting for the reduction in chlorination post-shutdown due to discontinued chlorination of circulating water, the total amount of chlorine released to Cape Cod Bay under the TRO limits that Entergy proposes for its service water discharge will be substantially reduced – *i.e.*, reduced to a level *below* that which EPA and DEP have previously blessed as compliant with water quality standards. For example, assuming those limits are achieved using the four-pump alternating dilution plan suggested above, the amount of chlorine discharged to Cape Cod Bay from the post-shutdown use of service water would be less than 5,900 g on a daily basis, as follows:

(10,800 gpm / 0.264 L/min) * 60 min/hr * 24 hr/day = 58,909,090.9 L of flow per day
58,909,090.9 L * (0.5 mg/L / 1,000 mg/g) = 5,890.9 g Cl released per day

Thus, under the TRO limits that Entergy has suggested for post-shutdown service water, total pollutant loading for chlorine would be less than 30 percent of the amount of pollutant loading for chlorine that exists under PNPS's current operations, which, again, EPA and DEP have already determined are in compliance with water quality standards.

Setting these limitations in the final Permit would not violate statutory or regulatory prohibitions against backsliding. Under Section 303(d)(4)(B) of the CWA, an effluent limitation may be

revised to be less stringent than that reflected in a prior permit if the quality of the receiving waters is in attainment with water quality standards – as Cape Cod Bay is with respect to chlorine[330] – and the proposed limitation is both consistent with the state's antidegradation policy and continues to assure compliance with applicable water quality standards.[331] Independently, Section 402(o) of the CWA prohibits backsliding only in cases where the new effluent limitation is "less stringent than the comparable effluent limitations established" in the previous permit, and even in such cases allows backsliding where, *inter alia*, "material and substantial alterations or additions to the permitted facility … justify the application of a less stringent effluent limitation."[332]

Viewed under any of these frameworks, the TRO limitations for post-shutdown service water discharges that Entergy requests here meet these standards. The revised TRO limits that Entergy proposes are not "less stringent" than the current permit limits, because the current permit limits are not in fact "comparable" within the meaning of Section 402(o) due to the substantial differences in the volumes of the effluents being discharged under each, which more than makes up for the difference in the allowable concentration of TRO.[333] Further, because the TRO limits that Entergy proposes result in a net reduction of chlorine being discharged to Cape Cod Bay, it necessarily assures continued attainment of federal and Massachusetts water quality standards, and results in no "increased" discharge that might trigger Massachusetts's antidegradation regulations,[334] with the result that Section 303(d)(4)(B) of the CWA also is satisfied.[335]

In short, there is an adequate factual and legal basis for EPA and DEP to set the post-shutdown TRO limits for service water usage at a daily maximum of 0.5 mg/L and an average monthly maximum of 0.25 mg/L. Entergy respectfully requests that these limits be incorporated into Part I.B.3 of the final Permit. In all events, we stress again that chlorination of the nuclear-safety-related service water system must, and therefore will, be ultimately governed by nuclear-safety needs, irrespective of NPDES/MCWA permit limits.

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318 *See* Draft Permit, Part I.B.1.a, at 11.
319 *See supra*, Section II.A.
320 *See* Draft Permit, Part I.B.3, at 14.
321 *See* 1994 Amended NPDES Permit, Part I, at 2.
322 *See id.*
323 Fact Sheet at 23.
324 *See* Fact Sheet at 14-15; 40 C.F.R. Part 423.
325 40 C.F.R. § 423.10.
326 *See* 80 Fed. Reg. 67,838, 67, 870 (Nov. 3, 2015).
327 *See* 40 C.F.R. § 125.3(c)(3).
328 *See supra*, Sections II.B and IV.A.1.b.
329 *See supra*, Sections IV.A.1.a. and IV.A.1.b.
330 *See* DEP, *Massachusetts Year 2014 Integrated List of Waters: Final Listing of the Condition of Massachusetts' Waters Pursuant to Sections 305(b), 314 and 303(d) of the Clean Water Act* (December 2015) (listing no impairment of any waterbody with respect to chlorine); Letter from Kenneth Moraff, EPA, to Martin Suuberg, DEP (Feb. 23, 2016), at 1 ("[B]y this letter, EPA hereby approves Massachusetts' 2014 Section 303(d) list.").
331 33 U.S.C. § 1313(d)(4)(B).
332 *Id.* § 1342(o)(1), (2)(A); *see also* 40 C.F.R. § 122.44(*l*)(2), (2)(i)(A) (providing for anti-backsliding prohibitions comparable to Section 402(o)'s).
333 *See, e.g.*, *Cmtys. for a Better Envt. v. State Water Res. Control Bd.*, 132 Cal. App. 4th 1313, 1331 (Cal. App. 1st Dist. 2005) (holding, consistent with determination by EPA, that new limit which provides for "no net loading" of dioxin did not violate anti-backsliding prohibitions).

[334] *See* 314 Code Mass. Regs. § 4.04.
[335] *See* 33 U.S.C. § 1313(d)(4)(B).

Response to Comment 6.2.2:

Entergy comments on the post-shutdown limitations on chlorine, reported as total residual oxidants, in the Draft Permit at both Outfalls 001 and 010. At Outfall 001, Entergy accepts the proposed prohibition on chlorination of the circulating water system after PNPS shuts down and expects continued chlorination of this system will not be necessary during the post-shutdown period. EPA acknowledges this comment and confirms that the Final Permit retains the prohibition on chlorination of the circulating water.

Turning to the post-shutdown limitations for TRO at Outfall 010, the Draft Permit proposed end-of-pipe, water quality-based limits (average monthly concentration limit of 7.5 µg/L and a daily maximum concentration of 13 µg/L). These limits would represent a substantial reduction from the current permit and the proposed, pre-shutdown Draft Permit limits. The Fact Sheet (at 35-36) explains that, during operation, the current TRO limits of 0.5 mg/L average monthly and 1.0 mg/L maximum daily met water quality standards at the discharge because the flow from Outfall 010 combined with 447 MGD cooling water flow from Outfall 001 prior to discharge. *See* Draft Permit at Part I.A. Post-shutdown, the cooling water flow from Outfall 001 has been largely terminated, and as a result, the source of dilution water that contributed to PNPS to achieving an estimated concentration of 0.04 mg/L at the monitoring point for Outfall 001 has disappeared. EPA proposed end-of-pipe, water quality-based TRO limits but noted that such limits would typically consider the available dilution in the receiving water—in this case, Cape Cod Bay. Fact Sheet at 39. EPA also noted that it was unaware of any prior hydrodynamic modeling providing an estimate of available dilution in Cape Cod Bay, but that it would consider less stringent limits in the Final Permit based on acceptable dilution model of Cape Cod Bay in the vicinity of the discharge. *Id*. At the same time, EPA does not dispute that chlorination of salt service water is necessary to ensure nuclear safety by managing biofouling in the system supplying cooling water for the spent fuel pool.

In its comment, Entergy requests that the Final Permit include TRO limits at Outfall 010 at a daily maximum of 0.5 mg/L and an average monthly maximum of 0.25 mg/L. In a letter to EPA and MassDEP dated May 20, 2019 (AR-687), Entergy restated the nuclear safety implications of the service water flow and need for continuous chlorination of this flow to control nuisance biological organisms such as mollusks, barnacles, algae, and other organisms. In the letter, Entergy requests that the current permit's TRO average monthly limit of 0.5 mg/L and maximum daily limit of 1.0 mg/L be retained in the Final Permit for approximately two-and-a-half years following shutdown (until December 31, 2021).

Entergy first comments that, with respect to applicable technology-based limits, the Steam Electric ELGs no longer apply during the post-shutdown period of PNPS. Discharges resulting from the operation of a generating unit by an establishment whose generation of electricity is the predominant source of revenue or principal reason for operation and whose generation of electricity results primarily from a process utilizing fossil-type fuel, fuel derived from fossil fuel, or nuclear fuel in conjunction with a thermal cycle employing the steam water system as the thermodynamic medium are subject to the Steam Electric ELGs. 40 C.F.R. § 423.10. Since

PNPS stopped operating on May 31, 2019 and no longer generates electricity, EPA agrees that the Steam Electric ELGs do not apply. Having said that, EPA may establish technology-based limits based on best professional judgement and may look to the Steam Electric ELGs as guidance for such limits given that many of the post-shutdown discharges are similar to those associated with the operation of a steam electric generating facility. In the case of the Draft Permit's TRO limitations, however, the proposed, post-shutdown limits are water quality-based, not technology-based. The Draft Permit does not establish new, technology-based limitations on the frequency or duration of chlorination at Outfall 010. At the same time, EPA must also consider the water quality resulting from the post-shutdown discharge of continuously chlorinated effluent from Outfall 010.

Entergy comments that the Draft Permit proposes "a reduction in total chlorine loading from the level that, as discussed above, EPA and DEP already have approved as being sufficient to assure compliance with applicable narrative and numeric criteria and designated uses of Cape Cod Bay." First, the TRO limits are and have always been expressed as a concentration, not as a load.[78] Concentration based limits are appropriate where applicable standards and limitations are expressed as concentrations. *See* 40 C.F.R. § 122.45(f)(ii). EPA and MassDEP were satisfied that the 1991 Permit limits (and the pre-shutdown Draft Permit limits) at Outfall 010 would meet the water quality standards in Cape Cod Bay based on 1) the available dilution of the flow from Outfall 010 (at 19.4 MGD) after combining with the flow from Outfall 001 (at 447 MGD) [79] and 2) the existence of a limit of 0.1 mg/L at Outfall 001 downstream of where the two wastestreams combine. As both conditions have changed - PNPS no longer continuously operates the circulating water pumps and the Draft Permit did not establish a post-shutdown TRO limit at Outfall 001 – the basis for any prior approval of the limits has also changed.

Entergy also suggests that the proposed reduction in the TRO limits is not necessary because the discharge of TRO "has been shown to have had no negative impact on Cape Cod Bay's aquatic community over the past 40+ years of PNPS's operations." Water quality-based limitations are necessary to control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the permitting authority determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality. *See* 40 C.F.R.

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[78] Entergy's comment includes an analysis of the reduction in chlorine load and suggests that the total post-shutdown load will only be 30% of the pre-shutdown load. As EPA explained, the water quality standard is based on exposure to a concentration of chlorine, not a load. PNPS could discharge only 1 pound of chlorine in a single day, but if it is discharged at a concentration that exceeds the acute water quality standard than there is potential for the discharge to cause toxicity, regardless of the total load. In addition, Entergy's calculations are incorrect. The daily total pre-shutdown load at Outfall 010 should be calculated using the permitted limit of 1.0 mg/L, not 0.1 mg/L (which applies downstream of where 001 and 010 combine), which results in a total load of 73,636 g/day (162 lbs/day). The post-shutdown value of 5,890.9 is calculated based on a limit of 0.1 mg/L, not 0.5 mg/L as indicated. In fact, under Entergy's proposal to continue the current TRO limits and increase the flow to 13,500 gpm, the resulting decrease in load would equal the loss of 14,136 g/day (31 lbs/day) from eliminating the chlorination of the CW pumps, which is a 16% reduction.

[79] The Fact Sheet (at 33) states that, when PNPS was operating, "[t]he SSW system is not chlorinated during refueling outages because the CW [circulating water] pumps are shut down and there is not adequate dilution to allow continuous release of effluent water with detectable residual chlorine from the SSW system into Cape Cod Bay" providing further support for concerns about the dilution of residual chlorine in the effluent without the available dilution from the CW pumps.

§ 122.44(d)(1)(i). The basis for establishing water quality-based limitations in a permit is not the presence of a negative impact on the aquatic community but the potential that the discharge would cause or contribute to an excursion of the water quality standard. Regardless of whether there has been any demonstrated negative impact on the aquatic community, EPA and MassDEP must determine that the discharge of TRO from Outfall 010, without the dilution previously supplied from the circulating water pumps but considering available dilution in the receiving water, will meet the water quality standard. *See id*. §§ 122.4(d), 122.44(d)(1)(ii).

The Fact Sheet (at 36) indicated that the Agencies would consider establishing less stringent TRO limits in the Final Permit if hydrodynamic modeling demonstrated adequate dilution for the post-shutdown discharge. Entergy did not provide a new dilution study for the Final Permit, nor did Entergy demonstrate in Comment 6.2.2 that there is adequate dilution for the post-shutdown discharge. A targeted dilution study is particularly important because the discharge from 010 at the limits requested in the comment and those requested in the 2019 letter will usually no longer be diluted in the discharge canal by the discharge from Outfall 001, as compared to pre-shutdown conditions. Even though the numeric limits have not changed, the potential to cause or contribute to an excursion of water quality standards may have changed because the 1991 limits at Outfall 010 are based on dilution of the SSW effluent in the circulating water effluent from Outfall 001.

Although Entergy did not comment specifically on dilution as it relates to the requested, post-shutdown TRO limits, Entergy did present an assessment of available dilution in Cape Cod Bay in Comment 6.2.1, above, which could apply here. That assessment is based on net volumetric flows from the larval transport modeling completed in 2000 through 2004. *See* AR-100, AR-424, AR-448. Entergy identifies that a minimum dilution factor of at least 7.7 is necessary to dilute the circulating water effluent to meet the acute water quality standard (0.1 mg/L divided by 0.013 mg/L). Following this example, post-shutdown, a maximum daily TRO limit of 1.0 mg/L would require a dilution factor of 77 to meet the acute chlorine criterion of 0.013 mg/L and a dilution factor of 67 is necessary to meet the chronic criterion of 0.0075 mg/L at an average monthly TRO limit of 0.5 mg/L. A dilution factor of 38 would be required to meet the acute criterion at a maximum daily TRO limit of 0.5 mg/L and 33 to meet the chronic criterion at an average monthly limit of 0.25 mg/L. At an average monthly flow limit of 15.6 MGD (24 cfs) and maximum daily flow limit of 19.4 MGD (30 cfs) for Outfall 010, minimum flows in Cape Cod Bay must be in the range of 790-2,310 cfs to ensure sufficient dilution for TRO in the effluent.

According to Entergy, the larval transport studies demonstrate that "a fraction of the dilution flow available to PNPS's discharge in Cape Cod Bay is more than enough to assure achievement of the requisite level of dilution necessary for compliance with the water quality standards during pre-shutdown conditions." Comment 6.2.1; *see also* AR-424, AR-448. However, as each of the studies notes, the larval transport analysis, which estimates flow across a transect extending 5 nautical miles from the shore, was intended to measure the total volumetric flowrate of water along the Plymouth coast and the amount of winter flounder larvae passing PNPS in offshore Cape Cod Bay waters. *See* AR-100 at 1-1; AR-448 at 221. The larval transport models were not intended to estimate available dilution of the effluent upon discharge. Net volumetric flow over a total area that extends 5 nautical miles (30,380 feet) into Cape Cod Bay over depths ranging from about 27 feet to about 132 feet is not an appropriate study for calculating dilution. Entergy

comments that, if the dilution flow available at the discharge canal is a small percentage of the volumetric flows estimated by these studies, it would still be more than enough to assure achievement of the requisite level of dilution necessary for compliance with water quality standards. However, Entergy never provides an estimate of the area of this assumed mixing zone. Because the overall study area is so large, even a small percentage could extend hundreds or even thousands of feet into the Bay, depending on the depth and the flow. Without a more precise estimate of the area of initial dilution, or a hydrodynamic study applicable to the water quality-based limits at issue, the Agencies are not persuaded to accept Entergy's proposed limits.

At the same time, the end-of-pipe, water quality-based limits for Outfall 010 do not account for any dilution, even though dilution was a consideration when establishing the current limits. The 1991 Fact Sheet (at 4) states "continuous chlorination of the service water system is allowed provided that the TRO limitation of 0.1 mg/L is not exceeded at the point of discharge into Cape Cod Bay" and "[t]he TRO concentration at the point of discharge into Cape Cod Bay should not exceed the State requirement of 0.1 mg/L during the continuous chlorination of the service water system." AR-9. The 2015 Fact Sheet (at 35) also explains that the continuous chlorination of the SSW system and the proposed pre-shutdown TRO limits (which are consistent with the 1991 limits and the limits requested in Entergy's May 2019 letter), are based, in part, on the dilution of the circulating water pumps and the effluent limitation of 0.1 mg/L at Outfall 001.

PNPS no longer operates the circulating water pumps on a consistent basis because the Facility no longer operates as a generating station. The Final Permit limits operation of the circulating water pumps to no more than 48 hours in a single calendar month. This limitation results in a significant decrease in water withdrawals and corresponding reduction in impingement and entrainment mortality. This flow reduction is warranted to minimize adverse environmental impact on the aquatic community in Cape Cod Bay consistent with the requirements of § 316(b) of the CWA. *See* Response to Comment III.2.0. In other words, to minimize impingement and entrainment mortality, the Final Permit limits operation of the circulating water pumps consistent with the post-shutdown operating needs of PNPS. At the same time, by no longer operating the circulating water pumps except for limited periods of time, PNPS has also lost the source of dilution water that ensured that continuous chlorination of the SSW pumps did not cause or contribute to an excursion of water quality standards in Cape Cod Bay. It is possible that dilution at the discharge into Cape Cod Bay is sufficient to enable PNPS to meet water quality standards at, or within a short distance of, the end of the discharge canal. However, Entergy has not provided an acceptable hydrodynamic study that demonstrates the extent of the initial zone of dilution. Finally, in its May 2019 letter (AR-687), Entergy re-emphasizes the critical role of the SSW system for nuclear safety and requests that the ability to use continuous chlorination be retained to meet NRC mandates related to service water systems and biofouling. EPA recognizes that chlorination is a key component to manage biofouling in the SSW system and ensure a consistent supply of cooling water for the spent fuel pool.

Under the current permit, MassDEP determined that a discharge of TRO at 0.1 mg/L will meet water quality standards upon mixing with the receiving water. The Final Permit establishes an average monthly TRO limit of 0.5 mg/L and maximum daily limit of 1.0 mg/L at Outfall 010. The Final Permit also establishes maximum daily and average monthly TRO limits of 0.1 mg/L at the compliance monitoring location at Outfall 001, consistent with the limit in the 1991 Permit

(although applied now to the commingled discharges, including Outfall 010). A maximum daily TRO concentration of 0.1 mg/L in the discharge canal will ensure consistency with the allowable receiving water concentration of 0.01 mg/L established in MassDEP's *Implementation Policy for the Control of Toxic Pollutants in Surface Waters* (February 23, 1990) with an available dilution of 10:1 when mixed with the receiving water in Cape Cod Bay. The Agencies conclude this limit will ensure that the discharge does not cause or contribute to an excursion of water quality standards. The Permittee could, as it indicates in the comment, cycle chlorination of the pumps to minimize TRO concentrations or potentially dechlorinate a portion of the SSW discharge. Alternatively, the Permittee could conduct a dilution study to demonstrate in-stream chlorine concentrations at the point of discharge. If the Permittee conducts an acceptable dilution study demonstrating that water quality standards will be met within a short distance from the discharge canal and provides monitoring data to support its demonstration, the Agencies will consider modifying the permit.

6.3 Boron

With respect to boron, its importance to nuclear safety cannot be overstated – boron is employed as an emergency shutdown control on reactivity, in the event the control rod and related reactivity control systems are rendered inoperable or are otherwise dysfunctional. The system for which sodium pentaborate is employed must therefore be tested monthly, and that is where the sodium pentaborate solution is generated. As the Fact Sheet itself recognizes, boron in the form of sodium pentaborate is used at PNPS (and indeed most nuclear power plants) as a neutron poison to control (*i.e.*, reduce) the level of activity of the nuclear fuel.[336] Thus, the use of boration in PNPS's operations, and therefore the need to discharge borated effluent, is a vital component of ensuring nuclear and radiological safety at PNPS, and the conditions ultimately imposed by the NPDES renewal permit must not be allowed to compromise those functions. For this reason, and to be clear, limits on boron at any given time in emergency circumstances will be determined by the nuclear safety needs and must be accounted for in the Draft Permit.

With respect to the concentration limits applicable to boron, no technology-based limits are established by the Steam Electric ELGs,[337] and there are no numeric water-quality criteria at the federal or Massachusetts state levels for marine waters, although it has been noted that that the naturally occurring concentration of boron in seawater is 4.5 mg/L, which is presumed to have no effect on aquatic life.[338] The Draft Permit imposes an effluent concentration limit of no more than 5.6 mg/L, which the Fact Sheet describes as consistent with the limitation on boron discharges via the circulating water system (Outfall 001) that historically limited PNPS to an increment of 1.0 mg/L above the background ambient concentration of boron in seawater (typically 4.6 mg/L).[339] This incremental limitation is derived from Water Quality Guidelines issued for boron by the Canadian provincial government of British Columbia in 1992.[340] The Draft Permit also requires monthly reporting of background ambient concentrations of boron to ensure that the 1.0 mg/L incremental limit is maintained.[341]

Insofar as these boron limitations remain consistent with the historic, incremental limitation that PNPS not discharge boron at a concentration greater than 1.0 mg/L above the ambient level naturally found in Cape Cod Bay, Entergy expects that these limitations should be manageable, with the caveat that, again, the ultimate decision as to the level of boration at PNPS must, and

therefore will, ultimately be dictated by nuclear-safety considerations.

The Draft Permit's descriptions in Part I.C.4 and Part I.C.5, however, of Outfalls 011 and 014, as they relate to PNPS's other discharges, are inaccurate and must be revised. Specifically, Part I.C.4 of the Draft Permit authorizes PNPS to "discharge station heating system water, closed cycle cooling water from heat exchangers of the Turbine Building Closed Cooling Water (TBCCW) system and Reactor Building Closed Cooling Water (RBCCW) system, drainage from the floor drains in the boiler room (station heating water), SSW system chlorinated salt water from various sumps in the Turbine and Reactor buildings, and reject water from the demineralizer system through **Internal Outfall Serial Number 011** which is directed through the drain line associated with Outfall 005 and discharged to the discharge canal and ultimately to Cape Cod Bay."[342] Part I.C.5 of the Draft Permit states that PNPS is authorized to discharge water from the same sources "through **Outfall Serial Number 014** to the discharge canal and ultimately to Cape Cod Bay."[343]

Read together, these descriptions are inaccurate, potentially confusing, and inconsistent with the Water Flow Diagram included in the Fact Sheet, which was supplied by Entergy. To begin, the inclusion of "closed-cycle cooling water" as a source in both Part I.C.4 and I.C.5 is erroneous and thus should be deleted, as PNPS has no closed-cycle cooling system to generate such water. Further, and as reflected in the Water Flow Diagram, not all waters discharged via Outfall 011 are directed to storm drain Outfall 005 prior to being discharged into the Bay. Instead water from the standby liquid control, TBCCW, RBCCW, and other systems are gathered in a "waste neutralizing sump" before being directed to Outfall 011, and from there these radiologically contaminated waters are then directed to Outfall 014 prior to being discharged into Cape Cod Bay.[344] All other source waters discharged via Outfall 011, which are free of potential radiological contamination, are directed to storm drain Outfall 005 before being discharged to Cape Cod Bay.[345]

Accordingly, Entergy suggests the following revisions to the relevant language of Part I.C.4 and I.C.5 of the Draft Permit:

> **Part I.C.4**
>
> During the period beginning on the effective date and lasting through the expiration date, the permittee is authorized to discharge station heating system water, ~~closed-cycle~~ cooling water from heat exchangers of the Turbine Building Closed Cooling Water (TBCCW) system and Reactor Building Closed Cooling Water (RBCCW) system, **reject water from the emergency standby liquid control (SLC) system,** drainage from the floor drains in the boiler room (station heating water), SSW system chlorinated salt water from various sumps in the Turbine and Reactor buildings, and reject water from the demineralizer system * through **Internal Outfall Serial Number 011,** which **(with the exception of TBCCW, RBCCW, and SLC water from the waste neutralizing sump)** is directed through the drain line associated with Outfall 005 and discharged to the discharge canal and ultimately to Cape Cod Bay. Such discharges shall be limited and monitored by the permittee as specified below[.][346]

Part I.C.5

During the period beginning on the effective date and lasting through the expiration date, the permittee is authorized to discharge ~~station heating system water, closed-cycle~~ cooling water from heat exchangers of the Turbine Building Closed Cooling Water (TBCCW) system and Reactor Building Closed Cooling Water (RBCCW) system, ~~drainage from the floor drains in the boiler room (station heating water),~~ SSW system chlorinated salt water from various sumps in the Turbine and Reactor buildings, and reject water from the emergency standby liquid control system***** **from the waste neutralizing sump and Outfall 011** through **Outfall Serial Number 014** to the discharge canal and ultimately to Cape Cod Bay. Such discharges shall be limited and monitored by the permittee as specified below[.][347]

Finally, the monitoring requirements for boron specified in Part I.C.4 and I.C.5 of the Draft Permit are internally inconsistent and should be revised for clarification. Specifically, in both places, the Draft Permit specifies that monitoring for boron should be conducted via "grab" sampling once per month, but goes on in footnote 6 to provide that "the permittee shall provide the concentration of boron in the tank before release, and the *calculated* boron concentration in the discharge canal before mixing with Cape Cod Bay water," and that "boron concentration shall not exceed 1.0 mg/l above background, *by calculation*, in the discharge from the discharge canal."[348] Footnote 6 goes on to provide the method by which the permittee is "[t]o *calculate* the estimated concentration of boron in the discharge canal."[349]

According to footnote 6 to Part I.C.4 and I.C.5, therefore, the concentration of boron in the discharge canal that PNPS is required to report for purpose of its monitoring obligation is plainly intended to be derived by calculation, not measured via "grab" sampling, although sampling still will be required in order to demonstrate the ambient concentration of boron in seawater, as footnote 6 reflects.[350] To avoid confusion, and to align the reporting obligation as reflected in Part I.C.4 and I.C.5 of the Draft Permit with the obligations as described in more detail in footnote 6 thereto, Entergy recommends that the description of the "Sample Type" in each place be changed from "Grab" to "Grab/Calculated."

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336 *See* Fact Sheet at 41.
337 *See* 40 C.F.R. Part 423.
338 *See* EPA, *National Recommended Water Quality Criteria – Aquatic Life Criteria Table*, https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table (last visited July 23, 2016); EPA, *Quality Criteria for Water* (1986); 314 Code Mass. Regs. § 4.05(5)(e).
339 *See* Draft Permit at 24, 28; Fact Sheet at 42; 1994 Amended NPDES Permit at 5.
340 *See* Fact Sheet at 42.
341 *See* Draft Permit at 26 n.6.
342 *Id.*, Part I.C.4, at 24.
343 *Id.*, Part I.C.5, at 28.
344 *See* Fact Sheet, Fig. 4.
345 *Id.*
346 *Compare id. with* Draft Permit, Part I.C.4, at 24.
347 *Compare* Fact Sheet, Fig. 4, *with* Draft Permit, Part I.C.5, at 28.

348 Draft Permit, Part I.C.4, at 26 n.6 (emphases added). The Draft Footnote incorporates this footnote by reference in Part I.C.5 as well. *See id.*, Part I.C.5, at 28 ("See pages 25 to 27 for explanation of footnotes.").
349 Draft Permit, Part I.C.4, at 26 n.6 (emphasis added).
350 *See id.* ("In order to confirm that the background concentration of boron is approximately 4.6 mg/l, the permittee shall sample the ambient water at the intake for boron once per month during the same day that the batch discharge of boron occurs.").

Response to Comment 6.3:

In its comment, Entergy demonstrates that the use of boronated water is critical to ensure the safety of the nuclear process associated with electricity generation. According to Entergy, boron is "employed as an emergency shutdown control on reactivity, in the event the control rod and related reactivity control systems are rendered inoperable or are otherwise dysfunctional… is used at PNPS (and indeed most nuclear power plants) as a neutron poison to control (*i.e.*, reduce) the level of activity of the nuclear fuel…and is a vital component of ensuring nuclear and radiological safety at PNPS…" EPA notes that Entergy's description appears most relevant to the use of boron associated with operation of a nuclear power plant, rather than for post-shutdown activities. EPA recognizes that there may still be discharges containing boron at Outfalls 011 and 014 but expects that the use of boron for emergency circumstances is likely to be rare.

The Final Permit maintains a maximum daily boron limit of 5.6 mg/L consistent with the Draft Permit, which Entergy comments is manageable. The Final Permit includes the addition of periodic monitoring of ambient boron to confirm that the background level is consistent with the assumed level of up to 4.6 mg/l. Entergy comments on the inconsistency in the sample type for boron and the boron footnote in Parts I.C.4 and I.C.5 of the Draft Permit. As Entergy points out, effluent boron is calculated; the Final Permit at Part I.A.8 and I.A.9 corrects the sample type as "calculated." The ambient boron samples reported under Outfalls 011 and 014 will be taken as grab samples. The sample type for ambient monitoring in the Final Permit is listed as "grab."

Regarding the wastewaters that discharge to Outfalls 011 and 014, EPA has corrected the descriptions as suggested by the Permittee in the Final Permit. *See* Final Permit Parts I.A.8 and I.A.9, respectively.

7.0 The Definition Of "Toxic Pollutants" Should Be Clarified To Ensure That It Excludes Radioisotopes

The Draft Permit, in Part I.C.8, imposes various conditions with respect to discharges of "any toxic pollutant."[351] That term is defined in Part II of the Draft Permit to mean "any pollutant listed as toxic under Section 307(a)(1) or, in the case of 'sludge use or disposal practices' any pollutant identified in regulations implementing Section 405(d) of the CWA."[352] On its face, this definition does not exclude radioisotopes, and some of the elements listed as "toxic pollutants" pursuant to Section 307(a)(1) of the Clean Water Act potentially may exist as radioisotopes, *e.g.*, antimony.[353]

The Fact Sheet acknowledges, however, that consistent with the discussion above concerning NRC's exclusive role in regulating radiological safety matters,[354] the CWA does not authorize

EPA to regulate discharges of radioisotopes to the waters of the United States from NRC-regulated facilities.[355] Indeed, the Fact Sheet disclaims any such intent to regulate radioisotope discharges, stating that "the draft permit addresses only the chemical aspects of water quality and does not regulate radioactive materials encompassed within the [AEA's] definitions of source, byproduct, or special nuclear materials."[356] Consistent with this recognition, the term "toxic pollutant" should therefore be defined in the Draft Permit in a manner that excludes radioisotopes.

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[351] *See* Draft Permit, Part I.C.8, at 30.
[352] *Id.*, Part II.E.1, at 16; *see also* 40 C.F.R. § 401.15 (listing toxic pollutants).
[353] *See* 40 C.F.R. § 401.15.
[354] *See supra*, Part I.A.2.
[355] *See* Fact Sheet at 37; *see also Train*, 426 U.S. at 25.
[356] Fact Sheet at 37; *see also id.* at 44.

Response to Comment 7.0:

The permittee comments that "regulating radiological safety matters" is exclusively the role of NRC and that "the CWA does not authorize EPA to regulate discharges of radioisotopes to the waters of the United States from NRC-regulated facilities." The permittee asserts that the Final Permit should define the term "toxic pollutant" "in a manner that excludes radioisotopes."

The Draft Permit defines "toxic pollutant" as "any pollutant listed as toxic under Section 307(a)(1) or, in the case of 'sludge use or disposal practices' any pollutant identified in regulations implementing Section 405(d) of the CWA." Draft Permit Part II.E.1. This definition is consistent with EPA regulations, *see* 40 C.F.R. § 122.2, and with CWA § 307(a)(1), which provided an initial list of "pollutants" to be considered "toxic pollutants" under the CWA and authorized the EPA Administrator to add or remove "any pollutant" from that list, under certain conditions. 33 U.S.C. § 1317(a)(1). Section 307 further provides that "each toxic pollutant listed in accordance with paragraph (1) of this subsection shall be subject to effluent limitations resulting from the application of the best available technology economically achievable for the applicable category or class of point sources established in accordance with section 301(b)(2)(A) and 304(b)(2) of this Act. *Id.* § 1317(a)(2). The current list of toxic pollutants is provided in 40 C.F.R § 401.15.

As the commenter points out, "some of the elements listed as 'toxic pollutants' pursuant to [CWA § 307(a)(2)] potentially may exist as radioisotopes, *e.g.*, antimony." As noted above, however, EPA regulations provide in relevant part that "[*t*]*oxic pollutant* means any pollutant listed as toxic under section 307(a)(1)." 40 CFR § 122.2 (underlining added). The definition of "pollutant" at 40 C.F.R. § 122.2 in turn expressly includes "radioactive materials," "*except* those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)." (emphasis added). *See also* CWA § 502(6) (defining "pollutant" to include "radioactive materials"); *Train v. Colorado Pub. Interest Research Group*, 426 U.S. 1 (1976) (hereinafter, "*Train*") (interpreting the term "pollutant" at CWA § 502(6) consistent with the definition at 40 CFR § 122.2). In other words, the statutory and regulatory terms "pollutant" and "toxic pollutant" do not exclude all radioisotopes. As the Fact Sheet (at 37) explains:

> EPA and the NRC, in the past, have signed a Memorandum of Understanding (MOU) which specifies that EPA will be responsible for the water quality aspects of the discharge in concert with the State, and the NRC will be responsible for the levels of radioactivity in the discharge. Thus, the draft permit addresses only the chemical aspects of water quality and does not regulate radioactive materials encompassed within the Atomic Energy Act's definitions of source, byproduct, or special nuclear materials. *See Train v. Colorado Public Interest Research Group*, 426 U.S. 1, 25 (1976) (holding that "the 'pollutants' subject to regulation under the [CWA] do not include source, byproduct, and special nuclear material.") All NRC radioactive discharge requirements will continue to be in effect, as required, in 10 C.F.R. Part 20 and plant technical specifications.

EPA intends that the Final Permit regulate radioactive materials consistent with the definition of "pollutant" in the Act and regulations and with the U.S. Supreme Court's decision in *Train*—that is, to exclude radioactive materials encompassed within the Atomic Energy Act's definitions of source (Chapter 7), byproduct (Chapter 8), or special nuclear materials (Chapter 6). Therefore, to the extent that any of the radioisotopes to which the comment refers are identified as source, byproduct, or special nuclear materials, these parameters are not regulated under the CWA or the Final Permit. This definition is made clear in the Fact Sheet and again in this Response to Comment and is consistent with the regulatory definition of pollutant at 40 C.F.R. § 122.2, the Clean Water Act, and *Train*. As such, EPA sees no need to further clarify the definition of "pollutant" in the Final Permit.

In its comment, Entergy appears to seek a broader exclusion of the term "toxic pollutant" with respect to radioactive materials than that specified by the regulatory definitions because the definition of "toxic pollutants" under CWA § 307(a)(1) and listed in 40 C.F.R. § 401.15 may include elements that may exist as radioisotopes (*e.g.*, antimony). Because the definition of "pollutant" at 40 C.F.R. § 122.2, however, includes radioactive materials "*except* those regulated under the Atomic Energy Act of 1954, as amended" (emphasis added)—again, consistent with *Train*—to limit the definition to exclude *any* element that may exist as a radioisotope, other than those excluded under the MOU or at 40 C.F.R. § 122.2 would be overbroad, and the comment does not provide a rationale for going beyond the Supreme Court's interpretation of "pollutant." Consequently, EPA has not changed the definition of "toxic pollutant" in the Final Permit.

8.0 The Final Permit's Biological Monitoring Requirements Require Revision

8.1 The Draft Permit Should Not Require Continued Biological Monitoring After PNPS Has Shut Down

Attachment B to the Draft Permit, which details the biological monitoring requirements provided for in Part I.G thereof,[357] imposes a series of impingement and entrainment sampling obligations on PNPS, many of which simply carry forward already-existing obligations to the final years of PNPS's electricity-generating operations; others, however, impose new obligations that are unsupported. More specifically, Attachment B provides for continued impingement and entrainment sampling *even after* PNPS has shut down and terminated the vast majority of its historic water usage. Post-shutdown entrainment monitoring is proposed to be conducted on a

twice-monthly basis, with 3 entrainment samples being collected during each sampling week, representing morning, afternoon and evening, respectively.[358] With respect to post-shutdown impingement sampling, Attachment B proposes once-weekly sampling during those weeks in which circulating (or more accurately, dilution) water is used, again with 3 samples being collected, each to represent morning, afternoon, and evening, respectively.[359]

To the extent that the Draft Permit seeks to impose biological monitoring requirements on PNPS even after it has ended the primary circulating water withdrawals that precipitated those monitoring requirements in the first place, those conditions are impermissible as a matter of law. It is well-established that NPDES permit conditions, to be valid, must be related to the "discharge of [some] pollutant" from a point source that requires NPDES authorization in the first instance.[360] Thus, courts have held that EPA "is powerless to impose permit conditions unrelated to the discharge itself."[361] With respect to Massachusetts law, DEP's authority to impose permit conditions is similarly limited: the agency is authorized to impose conditions that "provide for and assure compliance with all applicable requirements of the [G. L. c. 21, §§ 26-53] and the [Clean Water Act]," including "monitoring requirements *and other means of verifying the compliance of the discharge with a permit*."[362]

In short, once PNPS shuts down and discontinues the vast majority of its historic water usage, it no longer will be making more than negligible use of dilution water.[363] As such, there will be no environmental impact *related to its withdrawal and/or discharge* for which either EPA or DEP may require continued biological monitoring. That is especially true here given the fact that, as detailed above in the "Environmental Context" section and below in Part VII, more than 40 years of biological monitoring to date has failed to show any harm to the biota as a result of PNPS's operations in all that time. The requirements in Attachment B to the Draft Permit that PNPS undertake continued biological monitoring even after shutdown therefore must be deleted.

In addition, Entergy also proposes that, in the years prior to PNPS's anticipated shutdown date, the Draft Permit gradually reduce the frequency of monitoring year by year, as follows:

Year (Operating Status)	**Entrainment Sampling**	**Impingement Sampling**	**Area Swept/Bay Monitoring.**
2016	Current framework, *i.e.*, 3x/wk.	Current framework, *i.e.*, 3x/wk.	Current framework.
2017, unless shutdown*.	Reduction in current framework to 1x/wk.	Reduction in current framework to 1x/wk.	Discontinued.
2018, unless shutdown*.	Reduction in then current framework to 1x/mth.	Reduction in then current framework to 1x/mth.	Discontinued.

2019.	Discontinued.	Discontinued.	Discontinued.

*Upon shutdown, all I&E monitoring is discontinued.

EPA has authority to set (including by reducing) the appropriate level of I&E monitoring.[364] The gradual reduction in sampling during what are expected to be the last years of PNPS's predominant water withdrawals is supported by the fact that, as discussed above in the "Environmental Context" section and in Sections I.A.2.a and I.A.2.b of the "Discussion of Draft Permit Language" Section, PNPS's existing CWIS already complies with Section 316(b) standards for I&E applicable to existing facilities, and it has been demonstrated that no more than *de minimis* adverse environmental impacts attributable to I&E at PNPS have resulted to the Cape Cod Bay ecosystem. Given the demonstrated stability of the ecosystem, and the short amount of time remaining on PNPS's continuing use of circulating water, the benefits of continued I&E monitoring at the same level of intensity as it has historically been done are *de minimis*, and therefore outweighed by their likely costs.

357 *See* Draft Permit, Part I.G, at 33-34.
358 *See id.*, Attach. B, § 2.
359 *See id.* § 1.
360 *See* 33 U.S.C. §§ 1311(a), 1342(a).
361 *Nat. Res. Def. Council v. EPA*, 859 F.2d 156, 170 (D.C. Cir. 1988).
362 314 Code Mass. Regs. § 3.11(2)(a), (2)(a)(5) (emphasis added).
363 *See supra*, Part II.A.
364 *See* 40 C.F.R. § 125.94(c)(7), (g); § 125.96(a), (b), (f).

Response to Comment 8.1:

As discussed in the Introduction to this Response to Comments and in response to other comments, PNPS ceased electrical generating operations as of May 31, 2019. As such, the pre-shutdown conditions have been eliminated from the Final Permit, including those related to biological monitoring. The issues raised in the comment with respect to pre-shutdown monitoring requirements will not be addressed because they are not in the Final Permit and will not go into effect.

Entergy comments that biological monitoring should not be required during the post-shutdown period for several reasons. Entergy argues first that post-shutdown biological monitoring is impermissible because, in Entergy's view, EPA may only impose permit conditions "related to the 'discharge of [some] pollutant' from a point source that requires NPDES authorization in the first instance," (quoting CWA § 301(a) and citing CWA § 402(a)), and that "courts have held that EPA 'is powerless to impose permit conditions unrelated to the discharge itself,'" (quoting *NRDC. Inc. v. EPA*, 859 F.2d 156, 170 (D.C. Cir. 1988). Entergy essentially argues that its post-shutdown water withdrawals are not "related to the discharge" and that the preceding authorities, therefore, would prevent the Agencies from imposing any post-shutdown impingement and entrainment monitoring requirements. Entergy ignores its continued withdrawal of cooling water and discharge of heated effluent post-shutdown, however, and mischaracterizes both the Act and the court's holding in the cited case. It also ignores the 2014 § 316(b) regulations, which have

been upheld by the federal judiciary as a reasonable interpretation of the CWA. *Cooling Water Intake Structure Coal. v. EPA*, 905 F.3d 49 (2d Cir. 2018).

The Final Permit authorizes PNPS to use the cooling water intake structure to withdraw water using the circulating water pumps during 48 hours in a calendar month. The permit also authorizes PNPS to operate the five salt service water pumps continuously to ensure a sufficient volume of cooling water for the spent fuel pool. The salt service water pumps also withdraw from the cooling water intake structure. In short, PNPS continues to use a cooling water intake structure,[80] and section 316(b) of the CWA authorizes the EPA to regulate point sources that use cooling water intake structures and discharge pollutants.[81] EPA has recognized that this provision is unique among CWA provisions because it addresses the adverse environmental impact caused specifically by the intake of cooling water, in contrast to other provisions of the Act that regulate the discharge of pollutants into waters of the United States. *See, e.g.*, 79 Fed. Reg. 48,300, 48,313 (Aug. 15, 2014). EPA has historically used the NPDES permitting program to establish conditions to implement the requirements of section 316(b). Moreover, courts have approved of this practice, going so far as to hold that "section 402 implicitly requires permitting authorities to ensure compliance with section 316(b) as a permit condition."[82] *Riverkeeper, Inc. v. U.S. E.P.A.*, 475 F.3d 83, 123 (2d Cir. 2007) (emphasis added), *rev'd on other grounds sub nom. Entergy Corp. v. Riverkeeper, Inc.*, 556 U.S. 208 (2009); *U.S. Steel Corp., v. Train*, 556 F.2d 822, 850 (7th Cir. 1977), *overruled on other grounds by City of West Chicago, Ill. v. U.S. Nuclear Regulatory Comm'n*, 701 F.2d 632, 644 (7th Cir.1983). Section 402(a)(2) of the Act, in turn, authorizes a permitting authority to "prescribe conditions for [NPDES] permits to assure compliance with the requirements of [section 402(a)(1)], including conditions on data and

[80] EPA regulations define a cooling water intake structure as "the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the United States." 40 C.F.R. § 125.92(f). (emphasis added).

[81] In addition, 40 C.F.R. § 125.91 provides that an existing facility is subject to EPA's 2014 CWA § 316(b) regulations if it is a point source; uses a CWIS with a cumulative DIF of greater than 2 MGD to withdraw water from waters of the United States; and uses 25% or more of that water on an AIF basis exclusively for cooling purposes. Entergy does not dispute that, even after shutdown, PNPS continues: to be a point source; to use a CWIS with a DIF greater than 2 MGD to withdraw water from waters of the United States; and to use more than 25% of the water withdrawn exclusively for cooling. And, as has been noted previously, *see* Response to Comment III.3.1.7, the Massachusetts SJC has held that that MassDEP has the authority under state law to regulate CWISs and that "[t]here is nothing improper" with the agency exercising that authority in permitting actions. *Entergy v. MassDEP*, 944 N.E.2d 1027, 1039 (Mass. 2011); *see also id.* at 1035 & n.14.

[82] *Natural Resources Defense Council v. EPA* does not hold otherwise. 859 F.2d 156, 169-71 (D.C. Cir. 1988). First, this case did not specifically consider CWA § 316(b), *see id.*, and therefore its focus on "discharge" is understandable, *see* 79 Fed. Reg. at 48,313. The portion of the case cited in the comment considered a challenge to regulations promulgated by EPA in furtherance of the agency's obligations under the National Environmental Policy Act ("NEPA") and whether NEPA or the CWA authorized EPA to establish "non-water quality permit conditions" in NPDES permits based on a NEPA review. *Nat. Res. Def. Council v. EPA*, 859 F.2d at 169. Thus, the case stands for the proposition that "NEPA does not expand an agency's substantive powers" and that conditions in NPDES permits must be based on authority granted to EPA under the CWA. *Id.* There is no indication in the opinion that the DC Circuit Court had occasion in that case to consider the "unique" authority granted to EPA pursuant to section 316(b). Moreover, the US Supreme Court has recognized EPA's authority under the CWA to regulate CWISs. *See, e.g.*, *Entergy Corp. v. Riverkeeper, Inc.*, 556 US 208 (2009). Thus, there is no reason to read the DC Circuit Court's statements in *Natural Resources Defense Council v. EPA* regarding "discharge" as narrowly as the comment suggests.

information collection, reporting and such other requirements as [the permitting authority] deems appropriate." (emphasis added). Thus, the comment that, under the CWA or state Clean Waters Act, the Agencies may not include entrainment or impingement monitoring requirements because they are "unrelated to the discharge" is simply incorrect. Furthermore, as the comment later concedes, EPA regulations explicitly authorize permitting authorities to establish monitoring requirements. 40 C.F.R. § 125.96. To the extent the comment asserts that post-shutdown monitoring is not authorized, because PNPS has decreased its cooling water usage,[83] we remind the commenter that "an intake structure that withdraws some amount of cooling water is a 'cooling water intake structure,'" and, therefore, still subject to regulation under the Act. *Cooling Water Intake Structure Coal. v. EPA*, 905 F.3d at 83. The comment appears to ignore PNPS' continuing withdrawal of cooling water for the spent fuel pool and the impingement and entrainment mortality that may be associated with this withdrawal. *See also* Responses to Comments III.4.1, III.4.2.

Finally, referencing other of its comments, Entergy argues that biological monitoring is unnecessary because, in Entergy's view, "more than 40 years of biological monitoring to date has failed to show any harm to the biota as a result of PNPS's operations in all that time." The Agencies respond to Entergy's referenced comments regarding adverse environmental impact elsewhere in this document. *See* Responses to Comments III.2.0, III.2.1. In any event, biological monitoring may be established to ensure compliance with the technology-based limitations established under § 316(b) and consistent with the 2014 Final Rule. The regulations do not require a demonstration of "harm to the biota" in order to establish biological monitoring requirements.

Having said that, in consideration of this and other comments on biological monitoring, the Agencies have re-examined the Draft Permit's biological monitoring requirements. Part I.C of the Final Permit establishes requirements to minimize impingement and entrainment at PNPS. In this case, following shutdown of PNPS effective as of May 31, 2019, Parts I.A.1, I.A.2, and I.C require the Permittee to meet flow limits that will achieve a flow reduction of greater than 92% as compared to the current permit. This flow reduction is commensurate with operation of closed-cycle cooling had the Facility continued to operate. In addition, the Permittee must maintain an actual through-screen velocity of no greater than 0.5 fps, except when operating the circulating water pumps. When operating the circulating pumps, which occurs for a limited time on a monthly basis, the Permittee must continuously rotate the existing traveling screens and return impinged fish to the receiving water via Outfall 012.

The Draft Permit (Attachment B) required impingement monitoring three times per week when the Facility was operating over three, non-consecutive 8-hour periods. Following shutdown, the proposed monitoring frequency was reduced to once per week and limited to only those weeks in which PNPS operates one of the circulating water pumps. The Draft Permit (Attachment B) required entrainment monitoring weekly from March through October and twice per month from November through February. Following shutdown, entrainment monitoring was reduced to twice per month. In its comments, Entergy explained that it anticipates operating a circulating water pump infrequently (but up to 48 hours per month) and that the frequency and duration of

[83] According to the comment, "once PNPS shuts down and discontinues the vast majority of its historic water usage, it no longer will be making more than negligible use of dilution water."

operation is currently unknown. Thus, it is possible that PNPS may not need to operate the circulating water pumps for eight consecutive hours. Ultimately, the goal is to minimize the operation of the circulating water pumps; it is counter-intuitive then, to operate a pump solely for monitoring purposes. The Agencies have determined that part of the BTA to minimize impingement mortality (in addition to meeting a through-screen velocity no greater than 0.5 fps when operating only the SSW pumps) includes limiting operation of the circulating water pumps to no more than 48 hours in a calendar month and continuously rotating the screens when a circulating water pump is in operation. The Final Permit requires impingement monitoring of the traveling screens once per month when operating a circulating pump. See Part I.C.6 and Attachment B of the Final Permit. The Draft Permit required weekly post-shutdown impingement monitoring; however, after considering Entergy's comments, the Agencies have determined that monthly monitoring is a sufficient frequency based on the anticipated operation of the screens and the permit limits. Given the uncertainty in how PNPS will operate the pumps over the calendar month, the Final Permit requires one 8-hour collection per month *to the extent practicable* and requires the Permittee to provide an explanation in the Annual Biological Monitoring Report when impingement sampling was fewer than 8 hours in a single month. In other words, the Agencies do not intend for the Permittee to operate a circulating water pump solely to meet the 8-hour monitoring period requirement if it does not otherwise need to operate a pump for that long to meet its operational needs. In addition, EPA typically recommends that impingement monitoring captures three time periods: morning, afternoon, and night and in fact, the Draft Permit did require monitoring over three time periods. The Final Permit requires that, to the extent practicable, impingement monitoring be conducted such that a morning, afternoon, and night sample are collected over three consecutive months. The Permittee must provide an explanation in the Annual Biological Monitoring Report when collection over three time periods in three months is not practicable, however. The Final Permit also includes a new requirement that the traveling screens be visually inspected daily and retains the Draft Permit's conditions for continuous operation of the traveling screens and reporting in the event of an unusual impingement event. *See* Part I.A.20 of the Final Permit. Finally, the Final Permit allows the Permittee to request elimination or a reduction in frequency of impingement monitoring after a minimum of two years.

Monitoring requirements for impingement mortality in compliance with the 2014 Final Rule are established at 40 C.F.R. §§ 125.94(c) and 125.96(a). Monitoring requirements for entrainment are determined on a site-specific basis to meet the requirements established for minimizing entrainment at 40 C.F.R. § 125.94(d). *See* 40 C.F.R. § 125.96(b). Additional monitoring requirements may be required under certain conditions, pursuant to 40 C.F.R. § 125.96(c). To demonstrate compliance with the flow reduction requirements to minimize entrainment, the Permittee must monitor flow daily at each pump and report the average monthly and maximum daily flows for each monitoring period. See Final Permit Parts I.A.1 and I.A.2. The flow reductions reflected in the Final Permit compared to the 1991 permit are similar to closed-cycle cooling, and entrainment performance commensurate with a closed-cycle recirculating system can be determined by reducing a baseline level of entrainment (E_B) by the percentage of flow reduced through the use of a closed-cycle cooling system. 79 Fed. Reg. at 48,378. To demonstrate compliance with the actual through-screen velocity, the Permittee must monitor the through-screen velocity at the intake screens daily. In lieu of monitoring actual through-screen velocity, the Permittee may calculate the maximum through-screen velocity using water flow,

depth, and open screen area. *See* Part I.C.2 of the Final Permit. *See also* 40 C.F.R. § 125.94(c)(3). Facilities complying with an actual through-screen velocity of 0.5 fps in compliance with the BTA standard for impingement mortality under 40 C.F.R. § 125.94(c)(3) are not subject to biological compliance monitoring for impingement unless otherwise specified by the permitting authority. *See* 79 Fed. Reg. at 48,373. *See also* 2014 Final Rule Response to Comments at 271 ("biological compliance monitoring is no longer required for pre-approved and other approvable technologies in 40 CFR 125.94(c)(1) through (5) of today's rule beyond that required for the permit application, and monitoring may be greatly reduced for facilities choosing other compliance alternatives"), 277.

PNPS shutdown operations as of May 31, 2019 and, as a result, the pre-shutdown biological monitoring requirements have been eliminated from the Final Permit. The effective BTA requirements upon issuance of the Final Permit include reducing cooling water intake structure withdrawals by 92% compared to pre-shutdown volumes (for entrainment) and, for the majority of time, maintaining an actual through-screen velocity at the existing traveling screens of 0.5 fps or less (for impingement mortality). Under the Final Rule, the actual through-screen velocity requirement requires no biological compliance monitoring; rather, compliance is demonstrated by monitoring or calculating the actual through-screen velocity. However, during the limited period when a circulating water pump is operating (up to 48 hours per month), the through-screen velocity at the CWIS will exceed 0.5 fps. During this period, the Permittee must continuously rotate the traveling screens and return fish to the receiving water via Outfall 012. The Final Permit establishes monthly impingement monitoring requirements when a circulating water pump is operating and the screens are continuously rotating. The Final Rule requires the permitting authority to establish appropriate monitoring requirements for entrainment. *See* 40 C.F.R. § 125.96(b). PNPS must monitor flow continuously and report the average monthly and maximum daily flows at Outfalls 001 and 010, which will ensure compliance with the requirement to achieve the 92% reduction in flow. As the comment states, there is an extensive record of entrainment data for PNPS's CWIS dating back to 1980. The baseline entrainment density under the pre-shutdown flow regime is well documented. PNPS has reduced its flow commensurate with closed-cycle cooling. Because the Agencies believe that the existing record of entrainment data (including data through 2018) is sufficient to characterize the representative entrainment densities at the CWIS, entrainment at the reduced flows can be calculated using the existing record of entrainment and the actual flow at PNPS without additional biological monitoring. For these reasons, the Final Permit includes only limited biological monitoring to demonstrate compliance with the post-shutdown impingement mortality BTA requirements related to continuous operation of the traveling screens.

8.2 The Draft Permit Should Not Require Entrainment Sampling To Be Conducted In The Intake Bays

Attachment B provides that, irrespective of whether sampling occurs before or after PNPS shuts down, "[e]ntrainment samples shall be collected from a representative location within the intake structure if feasible."[365] Requiring sampling to be conducted from within the intake bay is unprecedented for this facility, which currently and historically has conducted such sampling "by suspending a 60-centimeter … diameter plankton net (with flowmeter) in the discharge canal approximately 30 meters … from the headwall."[366] That is for good reason, as sampling in the

intake bay itself poses numerous logistical challenges. Neither the Fact Sheet nor any of its Attachments provides any reason why sampling within the intake bay should now be required. Entergy submits that the requirement that entrainment sampling be conducted in the intake bays themselves be deleted, and that such sampling be permitted to be conducted in the discharge canal (as Attachment B itself contemplates in the event that intake-bay sampling "is not feasible," which is the case here).[367]

[365] Draft Permit, Attach. B, § 2.
[366] FSEIS at 4-14.
[367] *See* Draft Permit, Attach. B, § 2.

Response to Comment 8.2:

Entergy requests that, if entrainment sampling is required, sampling should be conducted from the discharge canal, rather than from within the intake structure, as the Draft Permit requires. According to Entergy, sampling at the intake bays poses "numerous logistical challenges," although the comment fails to elaborate or provide any examples of the "numerous" challenges or otherwise explain why sampling within the intake structure would not be achievable. Other facilities have been required or have elected to sample from the intake bay or from the condenser side of the pumps, and it is not clear to the Agencies from the comment why PNPS in particular would have challenges that other facilities do not. *See, e.g.*, AR-728, AR-729. Nevertheless, after reviewing the monitoring requirements in the Final Permit, the Agencies have eliminated post-shutdown entrainment monitoring, and thus the requirement to sample from the intake bay, from the Final Permit. *See* Response to Comment III.8.1.

8.3 The Draft Permit's Definition Of "Unusual Impingement Events" Is Over Inclusive

Part I.D.12 of the Draft Permit proposes changes to the condition of PNPS's current 1994 Amended NPDES Permit that requires PNPS to account for "Unusual Impingement Events" ("UIEs").[368] Specifically, Part I.D.12 of the Draft Permit proposes defining UIEs to mean "the impingement of twenty (20) or more total fish of all species impinged per hour … includ[ing] fish in the traveling screens and the intake bays."[369] Upon learning of a UIE, Part I.D.12 of the Draft Permit requires PNPS to notify DEP and EPA of the event within 12 hours, and to follow up within 5 business days by providing a written report detailing (1) the number, species and size ranges of fishes impinged, including measurement to the nearest centimeter of the total length of a "representative sample of 25% of fish specimens from each species, up to a maximum of 50 total fish specimens"; (2) the date and time of occurrence; (3) PNPS personnel's "opinion … as to the reason the incident occurred"; and (4) "remedial action that [PNPS] recommends to reduce or eliminate this type of incident in the future."[370]

These conditions are problematic in multiple respects and require revision. First, the definition of UIEs as being every impingement event where 20 or more fish are impinged within an hour is over inclusive. Such events are not at all "unusual" at PNPS, since most of the fish species that have been found impinged at the facility travel in large schools. Instead, if UIEs should be defined by a numerical threshold – they currently are not in the 1994 Amended NPDES Permit,

presumably leaving it to the best professional judgment of PNPS personnel[371] – Entergy suggests that the threshold be defined as the impingement of 1,000 or more total fish over the course of the continuous impingement event. That definition is consistent with historical data, which show that such events have tended to occur only infrequently – on average less than once per year over PNPS's 40+-year operating history, and in many years, not all.[372]

Second, the condition requiring PNPS to develop a remediation plan for UIEs is inappropriate insofar as it imposes that obligation even with respect to UIEs for which PNPS's operations are not responsible. As EPA has recognized, Section 316(b) is not concerned with minimizing the "impingement" of dead or "naturally moribund" fish (*i.e.*, fish that already are close to death for reasons unrelated to the facility's operations), and such impacts are therefore excluded from the Section 316(b) analysis.[373] There is every reason to believe that most if not all of the historic UIEs at PNPS are of dead or "naturally moribund" fish.

It is well documented and established in scientific literature that many large impingement events at power plants are due to natural causes and have nothing to do with the operation of the power plants' cooling systems. Specifically, multiple studies have confirmed that large impingement events, particularly those involving clupeid fish, are a common occurrence at many power plants during the colder months, and have identified "cold shock," as a function of out-of-season migration, as the culprit.[374] "Cold shock" is the "acute decrease in ambient temperature that has the potential to cause a rapid reduction in body temperature, resulting in a cascade of physiological and behavioural responses," and may be caused by, among other things, "rapid changes in seasonal temperatures."[375] The "physiological and behavioural responses" that cold shock induces in fish may include reduced swimming ability that tends to "compromise foraging and impede predator evasion,"[376] rendering fish that sustain cold shock essentially moribund, and thus far more likely to be impinged as a result, although the fish likely would have succumbed to predators or to starvation in any event.[377]

The timing and makeup of PNPS's historic large impingement events suggest that most of them likely were due to cold shock, or perhaps secondary consequences of predation. Notably, as summarized in Attachment D to the Fact Sheet, more than half of these events were dominated by the impingement of clupeids, predominantly Atlantic menhaden.[378] Clupeids, including menhaden and alewife in particular, have been shown to be particularly susceptible to natural mortality and subsequent impingement by cooling water intake systems, due not only to cold shock, but also (at least in the case of menhaden) to anoxia caused by crowding as a result of "large schools being chased into small confined embayments by predators such as bluefish and striped bass."[379] Also consistent with cold shock as the explanation is the fact that, with few exceptions, nearly all of these large impingement events occurred in the autumn months of September through November, times when unexpectedly large shifts in ambient temperatures giving rise to cold shock might reasonably be expected to occur.[380]

Both of these facts suggest that cold shock, not PNPS's cooling system, has been behind the majority of historic large impingement events at PNPS since it began operating, and is likely to be responsible for additional large impingement events in the future. With respect to such events, "remedial action" is neither warranted nor possible, contrary to the requirement imposed by Part I.D.12.d.[381] Entergy therefore proposes that the Part I.D.12.d of the Draft Permit be

revised so as to provide that investigation and remedial action should be undertaken only in the event that impingement is not a function of natural events, such as cold shock, but instead related to PNPS's operations.

Entergy also proposes, in lieu of the new requirement under Part I.D.12.a that PNPS personnel must measure the length of as many as 50 impinged fish – a change the Fact Sheet makes no attempt to explain – that the requirement of the current permit that "[t]he kinds, sizes, and approximate number of fish involved in the incident" be recorded be retained instead.[382] Such report should also be allowed to be made based on visual observation, if properly documented and recorded.

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[368] *Compare* Draft Permit at 31 *with* 1994 Amended NPDES Permit at 13.
[369] Draft Permit, Part I.D.12, at 31.
[370] *Id.*
[371] *See* 1994 Amended NPDES Permit, Part I, at 13.
[372] *See* Fact Sheet, Attach. D, at 21-22 & Table 2; *see also* NAI, Marine Ecology Studies: Pilgrim Nuclear Power Station, January – December 2014 (2015).
[373] *See, e.g.*, 40 C.F.R. §§ 125.92(o), 125.94(a)-(c) (setting standards with which existing facilities must comply to minimize "impingement mortality," which is defined to mean "death *as a result of impingement*" (emphasis added)); EPA, Technical Development Document for the Final Section 316(b) Phase II Existing Facilities Rule (May 19, 2014), at 11-4 (excluding studies that reported only instantaneous impingement mortality, in part because they "might reflect already injured, nearly dead, or already dead fish ('naturally moribund') that were impinged by the screen").
[374] *See, e.g.*, B.A. Fost, *Physiological & Behavioral Indicators of Shad Susceptibility to Impingement at Water Intakes* (Univ. of Tenn. 2006), at 33 (concluding that threadfin and gizzard shad that suffer from cold shock are rendered moribund and therefore more susceptible to impingement); *see generally* EPRI, *The Role of Temperature and Nutritional Status in Impingement of Clupeid Fish Species* (Mar. 2008); EPRI, *Bioindicators of Performance and Impingement Susceptibility of Gizzard and Threadfin Shad* (July 2011).
[375] M.R. Donaldson, *et al.*, *Cold Shock and Fish*, 73 J. Fish. Biol. 1491, 1492 (2008).
[376] *Id.* at 1508.
[377] *See* Fost, *supra* note 283, at 33 ("It is assumed that moribund fish would not recover and die regardless of impingement," because they are "more susceptible than healthy [fish] to natural predation").
[378] *See* Fact Sheet, Attach. D, at 21-22, Table 2.
[379] EPRI 2008, at 2-10 (also noting cold shock as a potential cause of natural mass-mortality in clupeids, including menhaden).
[380] *See* Fact Sheet, Attach. D, at 21-22, Table 2.
[381] *See* Draft Permit, Part I.D.12, at 31.

Response to Comment 8.3

Entergy comments that the Draft Permit's proposed unusual impingement event requirements are problematic in multiple respects and require revision. According to Entergy, the threshold of 20 fish/hour is overbroad and the condition "requiring PNPS to develop a remediation plan" is inappropriate.

Energy suggests that the definition of UIEs in Part I.D.12.d of the Draft Permit as being an event where 20 or more fish are impinged within an hour is over inclusive and requests that the threshold be defined as the impingement of 1,000 or more total fish over the course of the continuous impingement event, which is "consistent with historical data." EPA reviewed unusual impingement event requirements in other permits and consistently found thresholds equivalent to or even less than that proposed for PNPS in the Draft Permit. *See*, for example, MA0040304

University of Massachusetts Boston, MA0004898 GenOn Kendall Cogeneration Station, and MA0028193 Wheelabrator Saugus. In addition, a threshold of 20 fish per hour is not entirely inconsistent with historical data, although Entergy does not report hourly rates for unusual events under the 1991 Permit. As an example, an impingement event in December 2014 reported an impingement rate of 33 fish per hour. See Fact Sheet Attachment D at 20 and AR-684. Among the unusual impingement events reported between 1973 and 2010 (Table 2 in Attachment D of the Fact Sheet), the calculated hourly impingement rate ranges from 11 fish per hour to 1,486 fish per hour with an average of 210 fish per hour. Finally, in its EIS for NRC relicensing (AR-322 at 2-10), Entergy described when the traveling screens are operated, including "[w]hen there is an indication that fish are being impinged at a rate exceeding 20 fish per hour, at which time the traveling screens are turned continuously until the impingement rate drops below 20 fish per hour for two consecutive sampling events."

At the same time, PNPS has ceased electricity-generating operations and, as a result, maintains an actual through-screen velocity of no greater than 0.5 fps more than 90% of the time on a monthly basis. This should ensure that most fish are able to avoid impingement. 79 Fed. Reg. 48,336-7. For the limited periods when PNPS operates a circulating water pump—thereby increasing the through-screen velocity above 0.5 fps—the Final Permit requires continuous rotation of the traveling screens. In other permits, unusual impingement events trigger a requirement to continuously rotate the traveling screen until the hourly impingement rate drops below a set threshold. See, for example, MA0040304 University of Massachusetts Boston and MA0028193 Wheelabrator Saugus. PNPS is already required to continuously rotate the screens regardless of an unusual event when operating a circulating water pump. When the circulating pumps are not operating, and the through-screen velocity is no greater than 0.5 fps, PNPS will likely rotate the screens as it currently does (routinely and in response to a pressure differential). See AR-489. Under these conditions, where the screens do not rotate on an hourly basis, an hourly impingement rate may not be the most representative measure of impingement. The number of fish impinged during a single 12-hour shift may be more representative of screen inspection and rotation when the circulating water pumps are off and is consistent with unusual impingement event requirements at other CWISs. See, for example, MA0028193 Wheelabrator Saugus. In this case, an unusual impingement event would require the Permittee to continuously rotate the screens until the impingement rate declines and which, according to the EIS (AR-322), PNPS already does as a routine measure. At the same time, the PNPS would already be operating with one of the most effective technologies to minimize impingement mortality (a through-screen velocity no greater than 0.5 fps). The Agencies have changed Part I.A.20 of the Final Permit to define an unusual impingement event as more than 250 fish in a single 12-hour period (which is slightly more than 20 per hour and consistent with historical data) *or* more than 1,000 fish in a single impingement event and require the Permittee to continuously rotate the screens until the hourly impingement rate is less than 5 per hour. The Final Permit's definition of UIE is slightly different than the Draft Permit but now triggers an action that is likely to reduce impingement mortality (continuous rotation of traveling screens).

Entergy also comments that requiring PNPS to develop a remediation plan for UIEs is inappropriate and that there is every reason to believe that the historic UIEs at PNPS are mostly of dead or "naturally moribund" fish. First, the Draft Permit does not require a "remediation plan" as the comment suggests but rather requires only that the Permittee report a recommended

remedial action to reduce or eliminate this type of unusual impingement event. Second, this reporting requirement is not new. The 1991 Permit at Part I.A.8.a(5) required the permittee to report "the remedial action the company will take to prevent a reoccurrence of the incident," and applied to "[a]ny incidence . . . of unusual number of fish impinged on the intake traveling screens" (and also to "fish mortality associated with the thermal plume"). The Final Permit includes requirements for operation of the CWIS consistent with the BTA to minimize impingement mortality. It is not clear what additional action the Permittee would take to further minimize impingement during a UIE other than to continuously rotate the traveling screens. Part I.A.20 of the Final Permit eliminates the requirement to recommend a remedial action, though it does not prevent the Permittee from providing one should it be appropriate and retains the requirement to report the suspected reason the incident occurred.

Finally, Entergy requests that, in lieu of the new requirement under Part I.D.12.a that PNPS personnel measure the length of as many as 50 impinged fish, the Final Permit retain the 1991 Permit requirement to report "[t]he kinds, sizes, and approximate number of fish involved in the incident," which could be made based on visual observation. The requirement to count, identify, and measure fish during an unusual impingement event is commonly included in NPDES permits with UIE requirements. Entergy offers no justification for eliminating this requirement and has not explained why it could not be achieved at PNPS where similar requirements are routinely implemented at other facilities. The 1991 Permit requirement essentially requires the same information (species, size ranges, and approximate number of organisms) but is not as precise and will potentially result in data that are less reliable. At most, the proposed condition in the Draft Permit requires the Permittee to measure a portion of the impinged fish (up to 50 per species). Part I.A.20.a of the Final Permit retains the requirement to count and measure impinged fish during a UIE.

9.0 Irrespective Of Whether PNPS Shuts Down In 2019, Its Operations Will Not Have Significant Impacts On Listed Species Or Essential Fish Habitat

The Fact Sheet, in its discussion of the potential impacts of PNPS's CWIS on threatened and endangered species ("listed" species) and essential fish habitat ("EFH"), states several times that Entergy expects to terminate electricity generation at PNPS as of June 1, 2019.[383] In addition, as specified below, the Fact Sheet includes language that could be understood as predicating EPA's determination that continued operation of PNPS's CWIS will have no significant adverse impacts on listed species or EFH on PNPS's expected shutdown. Entergy respectively submits that the Fact Sheet should make clear that EPA's conclusion that renewal of PNPS's NPDES permit is appropriate is based on *status quo* operation, and is not contingent on the plant's shutdown in 2019.

The Fact Sheet and its attachments provide a thorough analysis of the potential impacts from operation of PNPS's CWIS on listed species and EFH, both during continued operations and after shutdown.[384] With respect to listed species, the Fact Sheet presents a robust summary of information for each of eight listed species[385] identified by the National Marine Fisheries Service ("NMFS") as potentially inhabiting the area of Cape Cod Bay affected by PNPS operations (the "action area"), including on a seasonal basis. The Fact Sheet also incorporates the conclusions previously reached by NMFS in its 2012 Endangered Species Act ("ESA") consultation with NRC.[386] In that consultation, which was completed before Entergy announced its intention to

cease electric-generation at PNPS, NMFS conducted a comprehensive review of potential direct and indirect impacts of PNPS's continued operation on listed species during the 20-year license renewal term.

382 *See* Draft Permit, Part I.D.12, at 31; 1994 Amended NPDES Permit, Part I, at 13.
383 *See*, *e.g.*, Fact Sheet at 55, 63, 64, 65, 68-70.
384 *See id.* at 54-71 and Attachs. B, C and D.
385 Specifically, Atlantic Sturgeon, North Atlantic Right Whale, Humpback Whale, Fin Whale, Kemps Ridley Sea Turtle, Leatherback Sea Turtle, Loggerhead Sea Turtle, and Green Sea Turtle.
386 *See id.* at 65 (citing Letter from Daniel S. Morris, NMFS, to Andrew S. Imboden, NRC (May 17, 2012) ("2012 ESA Consultation letter")).

Response to Comment 9.0:

The comment suggests that the mention of the proposed shutdown date, June 1, 2019, in the Fact Sheet sections describing the impacts of the Draft Permit on essential fish habitat and on threatened and endangered species, as well as designated critical habitat, could "be understood as predicating EPA's determination that continued operation of PNPS's CWIS will have no significant adverse impacts on listed species or EFH on PNPS's expected shutdown. Entergy requests that EPA clarify here that its conclusion as it pertains to the potential impacts of continued operation on EFH and ESA species is appropriate is based on *status quo* operation, and is not contingent on the plant's shutdown in 2019."

In Section 12 of the Fact Sheet, EPA concluded that the conditions and limitations in the Draft Permit will adequately protect all aquatic life, including those with designated EFH in Cape Cod Bay, and that further mitigation is not warranted. EPA clearly described its justification for this reasoning in the Fact Sheet (at 70), including that permit limits are as stringent as or more stringent than the current permit, that numeric limits for pH, oil and grease, total residual oxidants, tolyltriazole, sodium nitrate, and total suspended solids are consistent with surface water quality standards, and that the thermal plume is relatively small compared to the size of the receiving water and dissipates rapidly.

EPA also considered that the substantial reduction in the intake of cooling water and the discharge of heated water as a result of the shutdown would protect EFH for managed species in Cape Cod Bay. *See* Fact Sheet at 70-71. In other words, EPA concluded that EFH species would be adequately protected based on the limitations and conditions of the Draft Permit, which includes limitations and conditions on the CWIS that represent the BTA for PNPS: a 92% reduction in water withdrawals and a through-screen velocity no greater than 0.5 fps (except for when operating a circulating water pump no more than 48 hours per month).

PNPS shutdown on May 31, 2019 and can meet conditions that are representative of the BTA for the protection of aquatic species, including those with designated EFH. EPA did not require PNPS to install or operate any additional technologies to reduce impingement or entrainment on the basis that, because the useful life of the plant is limited, no available technologies would be operational prior to the shutdown. Many of the species with designated EFH are impinged and entrained by the CWIS at PNPS, including many of the species discussed in Response to Comment III.2.1. However, EPA's consideration of the post-shutdown conditions precluded the need for a more thorough examination of potential available technologies to minimize

impingement and entrainment of EFH species because the BTA requirements that PNPS can meet upon shutting down are more stringent and more effective than many of the alternatives that EPA was considering prior to Entergy's announcement of the shutdown. For example, EPA did not assess whether the existing traveling screens and once-through cooling system at its current intake volume would be protective of EFH over the long-term without additional mitigation because this is not what is required by the Final Permit. The fact is, PNPS has shutdown, and the shutdown, as it relates to the remaining useful life of the plant, was a primary consideration in setting effluent and intake requirements for PNPS. EPA cannot, at this point, make a definitive statement that the continued operation of PNPS would have adequately protected EFH species because it did not undertake this analysis on the basis that the Facility was shutting down. This is not to say that EFH species would *not* be protected, only that EPA did not assess the impacts of continued operation.

In Section 11 of the Fact Sheet, EPA found that the proposed action as authorized by the Draft Permit will not adversely affect ESA listed species or their critical habitat. This finding is consistent with the National Marine Fisheries Service's (NMFS) conclusion during the ESA consultation completed for the 2012 relicensing of PNPS. See AR-465. NMFS' assessment was based on the current operating conditions at PNPS. In its correspondence with NMFS for the issuance of the Draft Permit, EPA found that because the Draft Permit is as stringent as, or in some cases more stringent than, the permit conditions upon which NMFS' 2012 finding of "not likely to adversely affect," the issuance of the Draft Permit does not trigger re-initiation of the ESA Section 7 consultation. *See* AR-698. NMFS concurred with EPA's assessment. *See* AR-694. Thus, EPA's assessment that the proposed action (the reissuance of the NPDES permit) may affect, but is not likely to adversely affect, ESA listed species and designated critical habitat in the action area is consistent with NMFS' same finding for the operation of the Facility under the current permit and operating conditions.

9.1 NMFS's Findings Confirm PNPS's Operations Do Not Affect Listed Species Or Essential Fish Habitat

NMFS's review found that PNPS's thermal discharge is unlikely to adversely impact listed species or their prey, due to its limited size relative to Cape Cod Bay, its rapid dissipation, and the ease with which it is avoided.[387] NMFS also found that, because early life stages of listed species are either not present or too large to be entrained, and sub-adult and adults are likely strong enough swimmers to avoid becoming impinged, impingement or entrainment of any Atlantic sturgeon, whales, or sea turtles is extremely unlikely to occur.[388] After reviewing the best available scientific evidence on the potential direct impacts of PNPS's impingement and entrainment and discharge of thermal effluent (and other pollutants) on the eight listed species, as well as the potential indirect impacts on those species' prey, NMFS concluded:

> based on information from NRC, Entergy, and other sources, all effects to listed species will be insignificant or discountable. Therefore, the *continued operation* of PNPS under the terms of a renewed operating license is not likely to adversely affect any listed species under NMFS jurisdiction.[389]

Importantly, NMFS's review included an assessment of the potential for migratory sea turtles to remain unseasonably long in the Action Area due to the presence of the thermal discharge, thereby becoming vulnerable to "cold stunning" in the fall.[390] Based on its review, NMFS concluded:"[g]iven the transient nature of the thermal plume, its presence at the surface, and the small size of the area that would have temperatures that would support sea turtles, it is extremely unlikely that sea turtles would seek out and use the thermal plume for refuge from falling temperatures in the Bay" and therefore "extremely unlikely that the discharge of heated effluent increases the vulnerability of sea turtles in the action area to cold stunning."[391] With respect to whales, NMFS also found that, although Cape Cod Bay is designated as right whale critical habitat, PNPS's thermal effluent is no longer detectable within that habitat, and other discharged pollutants are no longer distinguishable from background, such that "*continued operation* of PNPS will have no effect on right whale critical habitat."[392] Thus, NMFS's conclusion that PNPS's CWIS is "not likely to adversely affect" listed species is premised on PNPS's *continued operation* (*i.e.*, generation of electricity) throughout the 20-year license renewal period; it is not contingent on the cessation of electric-generation in 2019 or in any other year prior to the expiration of the license renewal term.

The Fact Sheet states that, "consistent with the conclusion NMFS reached in 2012," renewal of PNPS's NPDES permit "is not likely to adversely affect . . . any species listed as threatened or endangered by NMFS or any designated critical habitat."[393] However, in contrast to NMFS's conclusion, the Fact Sheet includes statements that could be interpreted as making EPA's determination contingent upon the expected cessation of electric-generation in 2019. In particular, the Fact Sheet states that "[i]t is EPA's opinion that the operation of this facility, *as governed by this permit action*, is not likely to adversely affect the listed species or any of their critical habitat . . . ."[394] The Fact Sheet also states that "[b]ecause the draft permit includes effluent limitations and conditions that are *as stringent as or more stringent than* the conditions assessed in the 2102 consultation, the effects of the draft permit on threatened and endangered species and critical habitat, as described above, have already been considered and EPA has determined that re-initiation of consultation is not necessary at this time."[395]

Because the Draft Permit currently includes a mandatory shutdown provision, the phrase "*as governed by this permit action*" could be interpreted as conditioning EPA's "not likely to adversely affect" determination on PNPS's shutdown. Likewise, because the Fact Sheet includes effluent limitations and conditions that apply post-shutdown, the reference to permit effluent limitations and conditions that are "*more stringent than*" the conditions assessed by NMFS could be taken as premising EPA's determination that "re-initiation of consultation is not necessary" on PNPS's expected termination of electric-generation in 2019. Neither of these interpretations is correct.

As explained above, NMFS's conclusion that PNPS's CWIS is "not likely to adversely affect" listed species assumed PNPS's continued operation for the 20-year duration of its renewed operating permit. Therefore, any interpretation of EPA's determinations as being contingent on cessation of electric-generation would be directly *contrary* to NMFS's conclusion. Entergy therefore requests that EPA revise the Fact Sheet to make it clear that, consistent with NMFS's conclusion, its determination that PNPS's continued operation is "not likely to adversely affect"

listed species is not contingent upon the expected cessation of electric-generation.

With respect to EFH, the Fact Sheet states that

> EPA and MassDEP have concluded that the *current permit limits* will assure the protection and propagation of the balanced, indigenous population and that there are likely to be no adverse effects from the thermal plume on benthic flora, benthic fauna, and pelagic fish, including species for which EFH has been designated.[396]

This conclusion is supported by EPA's and DEP's comprehensive analysis of PNPS's *existing* thermal discharge limits in Section 7 of the Fact Sheet and in Attachments B and C. As explained in the Fact Sheet "[t]he thermal plume from [PNPS] is relatively small compared to the receiving water and dissipates rapidly. *Over 40 years of biological monitoring data demonstrate that the variance-based limits will assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife*."[397]

However, similar to its conclusions regarding impacts to listed species, EPA includes two rationales among its reasons for this conclusion that would appear to premise this determination on PNPS's shutdown:

> Following termination of electrical generation at PNPS, the facility will cease discharges of non-contact cooling water from the main condenser, which will drastically reduce the maximum effluent temperature and rise in temperature compared to the existing conditions.
>
> The draft permit establishes requirements related to the CWIS that reduce cooling water withdrawals from Cape Cod Bay by 96%, prohibit cooling water withdrawals for the main condenser, and require the facility to achieve a through-screen velocity no greater than 0.5 fps. These conditions become effective upon terminating electrical generation at the plant and no later the June 1, 2019 and are expected to reduce impingement and entrainment of all aquatic life by 96%. These conditions will also significantly reduce the temperature differential and extent of the thermal plume.[398]

As explained above in the Environmental Context Section and reflected in the Fact Sheet, the best available evidence demonstrates that current discharge limits have assured, and will in the future continue to assure, the "protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife."[399] Therefore, Entergy requests that the Fact Sheet be revised to make clear that, even if the more stringent thermal discharge limits associated with the expected shutdown do not come into play, PNPS operations would continue to "adequately protect all aquatic life, including those with designated EFH in Cape Cod Bay."[400]

With respect to operations beyond shutdown, the Fact Sheet correctly notes that any impacts on listed species (and EFH) from PNPS's operations would only be further reduced.[401] Importantly,

while both EPA and NMFS acknowledge in their analyses that minimal impacts to listed species may occur beyond shutdown, neither agency found the need for an incidental take permit.

387 *See* 2012 ESA Consultation Letter at 15-24.
388 *See id.* at 7-9.
389 *Id.* at 30 (emphasis added).
390 *Id.* at 20-21.
391 *Id.*
392 *Id*. at 30 (emphasis added).
393 Fact Sheet at 65.
394 *Id*. (emphasis added).
395 *Id*. (emphasis added).396 *Id*. at 70.
397 *Id*.
398 *Id*. at 70-71.
399 *Id*. at 70.
400 *See id.* at 71.
401 *Id*. at 64, 70-71.

Response to Comment 9.1:

In its comment, Energy suggests that "any interpretation" of EPA's determinations as being contingent on cessation of electric-generation would be directly *contrary* to NOAA Fisheries' conclusion that the CWIS is "not likely to adversely affect" listed species from its consultation with the NRC on renewal of PNPS's operating permit in 2012. As in the comment above, Entergy requests that EPA revise the Fact Sheet to make it clear that, consistent with NMFS's conclusion, its determination that PNPS's continued operation is "not likely to adversely affect" listed species is not contingent upon the expected cessation of electric-generation. In addition, Entergy requests that EPA revise the Fact Sheet to make clear that PNPS operations, even without the more stringent thermal discharge limits associated with the expected shutdown, will continue to adequately protect all aquatic life, including those with designated EFH in Cape Cod Bay. The Fact Sheet will not be re-issued and will not be revised. This Response to Comment document, prepared by EPA, serves as a record of how the Final Permit addresses any issues raised with the Fact Sheet.

EPA found that the proposed action as authorized by the Draft Permit will not adversely affect ESA listed species or their critical habitat. See Fact Sheet at 54-65. As the comment indicates, this finding is consistent with NOAA Fisheries' conclusion during the 2012 relicensing of PNPS and was based on the current operating conditions at PNPS at the time of re-licensing. See AR-465. In its correspondence with NOAA Fisheries for this permit, EPA found that because the Draft Permit conditions are as stringent as, or in some cases more stringent than, the permit conditions upon which NMFS' 2012 finding of "not likely to adversely affect," the issuance of the Draft Permit does not trigger re-initiation of the ESA Section 7 consultation. *See* AR-698. NMFS concurred with EPA's assessment. *See* AR-694. Thus, EPA's assessment that the proposed action (the reissuance of the NPDES permit) may affect, but is not likely to adversely affect, ESA listed species and designated critical habitat in the action area is consistent with NMFS' same finding for the operation of the Facility under the current permit and operating conditions while PNPS was generating electricity. PNPS has ceased operations on May 31, 2019, resulting in a substantial decrease in the seawater intake and heated effluent, and a reduction in the impacts from thermal impacts, impingement, and entrainment. Although EPA's finding, and

NOAA Fisheries' concurrence were not contingent upon the shutdown, the post-shutdown impacts on listed species are also not likely to adversely affect listed species.

With respect to EFH species, Entergy maintains that best available evidence demonstrates that the discharge limits of the current permit have assured, and will in the future continue to assure the protection and propagation of a balanced, indigenous community of shellfish, fish, and wildlife. As the Fact Sheet (at 70) states, "the thermal plume from PNPS is relatively small compared to the receiving water and dissipates rapidly." EPA agrees that, as stated in the Fact Sheet, the variance-based thermal limits in the current permit and reflected in the pre-shutdown Draft Permit limits would protect the balanced, indigenous population (BIP), including those species with designated EFH in Cape Cod Bay and listed in the Fact Sheet at 66-7.

The Fact Sheet (at 70) provides two additional reasons why EFH will be protected that, according to Entergy, wrongly premise the determination on PNPS's shutdown, including that the Facility will cease discharges of non-contact cooling water from the main condenser, which will reduce the maximum effluent temperature and rise in temperature compared to the existing conditions, and the requirements related to the CWIS that reduce cooling water withdrawals from Cape Cod Bay by 96%, prohibit cooling water withdrawals for the main condenser, and require the facility to achieve a through-screen velocity no greater than 0.5 fps. The Final Permit eliminates the language about the main condenser in response to Entergy's comments. EPA and MassDEP clearly concluded that the existing, pre-shutdown variance-based thermal limits, which were consistent with the current permit, are protective of the BIP and of EFH species. Having said that, the post-shutdown thermal limits in the Final Permit, which reflect a substantial decrease in the volume and magnitude of heated effluent as of June 1, 2019, offer even more protection of the BIP and of species with designated EFH.

Entergy's other comment is that EPA appears to premise its conclusions about the impacts of the CWIS on the Draft Permit's requirements associated with the shutdown. See Fact Sheet at 70. As explained in Response to Comment III.9.0, above, PNPS shutdown on May 31, 2019. EPA did not require PNPS to install or operate any additional technologies to reduce impingement or entrainment on the basis that, because the useful life of the plant is limited, no available technologies would be operational prior to the shutdown. Many of the species with designated EFH are impinged and entrained by the CWIS at PNPS, including many of the species discussed in Response to Comment III.2.1. However, EPA's consideration of the post-shutdown conditions precluded the need for a more thorough examination of potential available technologies to minimize impingement and entrainment of EFH species because the BTA requirements that PNPS can meet upon shutting down are more stringent and more effective than many of the alternatives that EPA was considering prior to Entergy's announcement of the shutdown. The fact is, the remaining useful life of the plant (i.e., the proposed shutdown), while not required, was a primary consideration in setting effluent and intake requirements for PNPS. EPA cannot, at this point, make a definitive statement that the continued operation of PNPS would have adequately protected EFH species because it did not undertake this analysis on the basis that the Facility was shutting down. This is not to say that EFH species would *not* be protected, only that EPA did not assess the impacts of continued operation.

9.2 Additional Evidence Confirms The Lack Of Any Credible Evidence That PNPS's Operations Have Had Or May Be Expected To Have An Effect On Cape Cod Bay's Aquatic Ecosystem, Including With Respect To Endangered Species

In 2012, in the context of proceedings before NRC, Dr. Michael Scherer, a leading fisheries biologist who has managed aspects of PNPS's biological monitoring programs since 1973 and supervised or otherwise participated in the aquatic studies conducted as part of that program since 1974, provided sworn testimony.[402] Dr. Scherer's analysis further confirms that "the continued operation of PNPS [would] have no discernible effects on [species protected under the federal Endangered Species Act, or 'ESA']," or on non-listed species including river herring and winter flounder.[403] Specifically, Dr. Scherer evaluated eleven (11) listed species, including shortnose sturgeon and Atlantic sturgeon, four different species of sea turtles and five different species of whales.[404] With respect to sturgeon, shortnose sturgeon "generally do not migrate beyond the estuary associated with their natal river," and the nearest such river to PNPS is 62 miles away, with the result that shortnose sturgeon are unlikely ever to encounter PNPS's CWIS.[405] While Atlantic sturgeon are potentially present in Cape Cod Bay, they would likely be present only in their adult life stages, whose size makes them not susceptible to entrainment and whose swimming abilities make them not susceptible to impingement.[406] Confirming this analysis, historic entrainment and impingement data from PNPS reflect that no Atlantic sturgeon or sturgeon remains have ever been observed to be entrained, impinged, or seen by dive teams charged with clearing the trash racks at PNPS.[407]

With respect to sea turtles, prevailing currents in Cape Cod Bay are such that loggerhead, green, and leatherback turtles are unlikely to encounter PNPS's CWIS, and no remains from these species or the Kemps Ridley turtle have ever been found impinged on the trash racks of PNPS's CWIS.[408] As for the five endangered whale species – North Atlantic right whales, humpback whales, fin whales, sei whales and sperm whales – the only potential impacts from PNPS's CWIS are indirect impacts to these species' foraging of other aquatic species, and such impacts are likely to be trivial. Four of the whale species (all except for the sperm whale) feed in dense areas populated by small, planktonic organisms, which tend to be located in the northeast and southern portion of Cape Cod Bay away from PNPS's CWIS, or small schooling fish – neither of which is entrained or impinged at PNPS in numbers great enough to have any noticeable impact on the amount of forage available to these species.[409] With respect to sperm whales, data reported by the National Oceanographic and Atmospheric Administration ("NOAA") indicate that this species is rarely cited in Cape Cod Bay, and the species it forages tend to be deep-water species or those with swimming abilities that render them not susceptible to impingement or entrainment.[410]

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[402] Scherer ALSB Aff. ¶¶ 3-4.
[403] *Id.* ¶ 5.
[404] *Id.* ¶ 17.
[405] *Id.* ¶ 20.
[406] *Id.* ¶¶ 27-28.
[407] *See* 2014 Update at 17-18.
[408] Scherer ASLB Aff. ¶¶ 29-47.
[409] *Id.* ¶¶ 49-67.

410 *Id.* ¶¶ 68-70.

Response to Comment 9.2

In its comment, Entergy appears to reiterate the testimony for the NRC Relicensing of its biologist, Dr. Micheal Scherer. There is no comment on how this testimony relates to the Draft Permit or any request for a change to the Final Permit based on this comment. EPA addressed comments on ESA species in Responses to Comments I.5.4 and III.9.1. Both USFWS and NMFS have determined that the operation of PNPS in compliance with the Final Permit is not likely to adversely affect federally listed species or designated critical habitat in the action area. See AR-694, AR-700.

10.0 Certain Requirements For Electrical Vaults Are Unsupported.

As detailed below, a number of new permit requirements related to stormwater discharges are unwarranted because they are duplicative of other monitoring and reporting requirements, and/or do not reflect PNPS's NRC-regulated cable inspection program and prior representative electrical vault sampling. These proposed requirements for stormwater monitoring appear to be premised on the notion that cables can be submerged to an extent, degree and frequency that results in breaking of wire coatings, allowing stormwater to come into contact with wires. In fact, this is incorrect because PNPS's electrical vault cabling is subject to an NRC-regulated program that ensures cables are not degrading.411 The effectiveness of the NRC-regulated program is demonstrated by the lack of non-naturally occurring pollutants in representative sampling of stormwater from electrical vaults.412 For these reasons, and those provided below, Entergy requests that certain stormwater effluent limitations and sampling be removed from the final Permit.

411 *See infra*, Part VIII.A.3.
412 *See infra*, Part VIII.A.4.

10.1 Background

10.1.1 Description of PNPS's Electrical Vaults

The twenty-five (25) electric vaults located at PNPS have been there since the facility was initially constructed. They are single-component, concrete systems with iron lids, and therefore designed to be protective of cabling and watertight.413 Given their configuration, groundwater intrusion from and into the bottom of the vaults would not be expected, and has not been observed in the past. By way of confirmation of this, iron staining is visible at the top and along the sides of slide 11 referenced in footnote 413, showing the intrusion of stormwater via the lids and lid margin into the vaults. Nine (9), or over 1/3, of the vaults are equipped with automatic dewatering pumps.414

413 *See* Goodwin Procter, Discussion Regarding PNPS Manholes, p.11 (May 13, 2015) (presented to EPA on May 13, 2015 and provided to DEP on July 20, 2016) (provided herewith) (providing photograph of one of PNPS's electrical vaults).

414 *See* Correspondence from Elise N. Zoli, Goodwin Procter, LLP to George Papadopoulos, EPA (June 30, 2015).

10.1.2 History of Communications With EPA On Electrical Vaults

Within the last two years, Entergy has responded to EPA's questions on stormwater discharges from PNPS's electrical vaults. In February 2015, Entergy provided EPA with a letter clarifying the historic record and current framework for managing stormwater discharges at the site.[415] Most recently, in response to EPA's March 24, 2015 Section 308 information request, Entergy provided EPA with: (1) detailed information on its NRC-regulated program for monitoring electrical vaults, and (2) water quality sampling results from representative electrical vaults.[416] Together, these submissions have established that PNPS's stormwater vaults are appropriately monitored and that effluent discharges from these vaults do not cause or contribute to a violation of water quality standards or otherwise violate applicable discharge limits.

10.1.3 NRC Effectively Regulates Electrical Vault Cabling

NRC directly regulates PNPS's electrical vault cabling in a manner designed to ensure that this equipment is maintained in a condition that ensures functionality, including for nuclear safety purposes. To do so, vault cabling submergence is not authorized, but rather effectively managed under NRC regulation, and PNPS's NRC-mandated protocols. Specifically, 10 C.F.R §§ 50.65 and 50.49, and associated NRC directives, require affirmative written maintenance and monitoring procedures to protect against conditions that could result in degradation.

In 2007, NRC issued a generic letter requesting industry-wide review of cabling management and monitoring to avoid conditions that compromise functionality of those systems (*e.g.*, avoiding various failures, such as arcing and shorting equated to submergence).[417] In 2010, NRC issued an information letter setting industry-wide expectations for how the fleet will manage and monitor cables pursuant to NRC regulations, including its expectation that licensees, including PNPS, will:

- Perform a site-wide review of existing cabling sufficient to identify conditions that could reasonably contribute to cabling degradation, chiefly submergence;
- Take prompt corrective action to correct any such conditions, including through the removal of water via installation of sump pumps;
- Test cables to verify that degradation has not occurred; and
- Establish a monitoring program sufficient to ensure against recurrence, despite corrective action, of identified conditions and to identify new conditions.[418]

Compliance with NRC mandates is verified through annual NRC inspections of representative cabling installations, which have resulted in no adverse findings.[419] For these reasons, no submergence, and no submergence-related pollutants, are reasonably expected. This is known to EPA, because (as described below) EPA directed PNPS to perform representative sampling, which identified no relevant pollutants.

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415 *See* Correspondence from Elise N. Zoli, Goodwin Procter, LLP to George Papadopoulos, EPA (Feb. 11, 2015).
416 *See* Correspondence from Ken Moraff, EPA to David E. Noyes, Entergy, 3 (Mar. 24, 2015); Correspondence from Ken Moraff, EPA to David E. Noyes, Entergy (June 9, 2015); Correspondence from Elise N. Zoli, Goodwin

Procter, LLP to George Papadopoulos, EPA (June 30, 2015).
417 *See* NRC, Generic Letter 2007-01 (Feb. 7, 2007) (requesting information on "inspection, testing and monitoring programs to detect the degradation of inaccessible or underground power cables").
418 *See* NRC, Information Notice 2010-26 (Dec. 2, 2010).
419 *See, e.g.*, NRC, Pilgrim Nuclear Power Station - Integrated Inspection Report (2012); NRC, Pilgrim Nuclear Power Station - Integrated Inspection Report (2013); NRC, Pilgrim Nuclear Power Station - Integrated Inspection Report (2014); NRC, Pilgrim Nuclear Power Station - Integrated Inspection Report (2015). The integrated inspection reports are available at http://adamswebsearch.nrc.gov/webSearch2/view?AccessionNumber=ML152 24A489.

10.1.4 Recent EPA-Requested Sampling Shows No Exceedances

In its March 24, 2015 Section 308 Information Request, EPA requested the following information from Entergy in order to obtain a "representative" characterization of stormwater discharged from electrical vaults:

- "collect one sample of water from at least (7) seven different electrical vaults on the [PNPS] property and have it analyzed for [twenty-six (26)] parameters" at a specified Minimum Level of Detection ("MLD"); and
- "provide a map showing the general location of all electrical vaults that can accumulate stormwater, specifying which specific electrical vaults were sampled as well as the location of the four (4) existing NPDES-permitted stormwater outfalls, designated serial numbers 004, 005, 006, and 007."[420]

To ensure representative sampling, the seven vaults sampled, which represent just under 30% of the twenty-five vaults on the property, were to "vary in their contents, size and location [and] …be among the deepest and among those that have the greatest amount of electrical wiring and associated equipment."[421] The twenty-six parameters selected for monitoring were based on a subset of the monitoring requirements for EPA's remediation general permit that EPA determined could potentially be present at PNPS.[422]

From June 9 to 12, 2015, water samples were collected from seven electrical vaults at PNPS, specifically CP-1, CP-4, MH-2, MH-4, MH-5, MH-L and MH-Q, including a field duplicate from MH-Q.[423] In the calendar week prior to testing approximately 0.9 inches of rain fell in Plymouth, Massachusetts, which was specifically retained after the storm event to facilitate submergence testing that ordinarily would not be authorized, *e.g.*, MH-Q was immediately pumped after sampling.

The sampling and analytical results demonstrate that these vaults contain only naturally occurring contaminants. Specifically, for all samples taken, only three (3) of the twenty-six (26) parameters, all metals unrelated to wire insulation – iron, zinc and copper − were detected without qualification at or above the Minimum Level of Detection ("ML").[424] Iron, zinc and copper are naturally occurring metals that are known to occur in Massachusetts's soils at the following natural background concentrations: iron − 20,000 mg/kg; zinc −100 mg/kg; and copper − 40 mg/kg.[425] The concentrations detected in PNPS's electrical vaults are far below these natural background concentrations. The detection of iron and zinc in all samples collected further indicates that these detections likely are a result of natural background concentrations. Accordingly, the presence of iron, zinc and copper in the electrical vault samples is consistent

with the collection of stormwater ubiquitous in manholes.

The remaining twenty-three (23) parameters appropriately should be considered to be absent from the samples because they were observed below the method detection limit ("MDL") and/or ML, and therefore, as EPA acknowledges, are unreliable and not true detections.[426]

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[420] *See* Correspondence from Ken Moraff, EPA to David E. Noyes, Entergy, 3 (Mar. 24, 2015); Correspondence from Ken Moraff, EPA to David E. Noyes, Entergy (June 9, 2015).
[421] Correspondence from Ken Moraff, EPA to David E. Noyes, Entergy, 3 (Mar. 24, 2015).
[422] *See* Correspondence from Ken Moraff, EPA to David E. Noyes, Entergy, 3 (Mar. 24, 2015); Correspondence from Ken Moraff, EPA to David E. Noyes, Entergy (June 9, 2015).
[423] *See* ERM, *Summary of Manhole Sampling Activities* (June 30, 2015) ("ERM Report").
[424] In addition to the iron, zinc and copper, sampling detected total phenols in the MH-2 sample above the ML; however, that detection was qualified because the sample fell outside acceptable matrix spike/matrix spike duplicate (MS/MSD) recovery limits, which is an element of the laboratory quality control program. If the matrix spike recovery does not fall within the method acceptance criteria, it indicates the sample matrix is interfering with the analysis. Matrix interference typically is associated with complications caused by constituents in the sample itself. For this reason, the detection of total phenol in MH-2 above the ML should not be considered an accurate detection. *See* ERM Report at 2.
[425] Massachusetts Department of Environmental Protection, Technical Update: Background levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil (May 23, 2002), *available at*: http://www.mass.gov/eea/docs/dep/cleanup/laws/backtu.pdf.
[426] An MDL is the "the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero." 40 C.F.R. Part 136 Appendix B. EPA has determined the MDL for various analytical tests and reported them in the Massachusetts Remediation General Permit, Permit No. MAG910000, Appendix VI. An ML "is the lowest level at which the analytical system gives a recognizable signal and acceptable calibration point for the analyte. The ML represents the lowest concentration at which an analyte can be measured with a known level of confidence." Correspondence from Ken Moraff, EPA to David E. Noyes, Entergy (June 9, 2015); *see also* 40 C.F.R. Part 136 Appendix B; Remediation General Permit under the National Pollutant Discharge Elimination System (NPDES) for Discharges in Massachusetts, Massachusetts General Permit, Permit No. MAG910000, Appendix VI at 7, notes (Aug. 26, 2010). EPA's Section 308 information request specified the ML to be used for each of the twenty-six (26) parameters. *See* Correspondence from Ken Moraff, EPA to David E. Noyes, Entergy (June 9, 2015) (setting ML for each testing parameter).

Response to Comment 10.1:

As the commenter notes, EPA and Entergy have worked together to characterize the stormwater discharges from PNPS's electrical vaults since late 2014. *See* AR-501, AR-506, AR-507. PNPS has identified 25 electrical vaults from which accumulated stormwater may be pumped to one of the authorized stormwater outfalls (004, 005, 006, and 007). Nine of these vaults are equipped with automated pumps that are activated when the stormwater in the vault reaches a pre-determined level. Fact Sheet at 30. In February 2015, Entergy sent EPA a letter describing its historic and current framework for managing stormwater discharges at the site. *See* AR-496. In March 2015, EPA sent an information request, pursuant to CWA Section 308, requiring sampling of a representative subset of the electrical vaults for a suite of parameters. *See* AR-501. In the information request, EPA stated that sampling was necessary because the water in the vaults comes "into contact with electrical wires and associated equipment" and, therefore, could contain pollutants not representative of other stormwater discharges at the site. *Id.* at 2. At Entergy's request, EPA amended its request in June 2015, including revising the suite of

parameters required. *See* AR-506. Entergy provided the results of the sampling of 7 electrical vaults in June 2015. *See* AR-507. Based on these results, the Draft Permit included certain vault-related monitoring requirements. In addition, the Draft Permit includes non-numeric, technology-based limits, including best management practices, aimed to minimize pollutant discharges resulting from the discharge of stormwater associated with industrial activity.

Entergy comments that PNPS's stormwater vaults are already appropriately monitored through its NRC-regulated program for monitoring electrical vaults and that the water quality sampling results from the seven electrical vaults demonstrate that effluent discharges from these vaults do not cause or contribute to a violation of water quality standards or otherwise violate applicable discharge limits.

Turning first to the NRC-regulated inspection program, Entergy did not provide any support for its argument that this inspection program adequately monitors the stormwater discharges from the vaults to ensure that there will be no discharge of pollutants that would cause or contribute to an excursion of the water quality standards. The NRC-regulated inspection program requires that the NRC licensee monitor the performance or condition of structures, systems, or components in a manner sufficient to provide reasonable assurance that these structures, systems, and components are capable of fulfilling their intended functions. 10 C.F.R. § 50.65(a)(1). In other words, the monitoring program is designed to ensure that all components, including electrical wiring, are functioning. This may include monitoring to ensure components are not submerged in water for an amount of time that would compromise their integrity, but there is no indication in the comment that it requires sampling the vaults for the pollutants listed in the 2015 308 letter (or for other pollutant parameters) or that it prohibits submergence. Entergy comments that "vault cabling submergence is not authorized, but rather effectively managed under NRC regulation," and that "no submergence, and no submergence-related pollutants, are reasonably expected." Stormwater infiltration and submergence are known to occur at PNPS,[84] and nine of the vaults are fitted with automated pumps to ensure that stormwater that does collect in the vaults does not interfere with the integrity of the cables. NRC regulations do not prohibit submergence; rather, they require that submergence be included as one of the components of the monitoring program to ensure the integrity and function of the electric equipment. Entergy's own comment states that one of the corrective actions required to effectively manage cables is "the removal of water via installation of sump pumps." Thus, Entergy has confirmed that, in compliance with NRC regulations, there may be periodic discharges of stormwater from the electrical vaults to the stormwater outfalls. The stormwater that collects in the vaults is likely exposed to different pollutants than stormwater otherwise discharged from the authorized outfalls, including electrical cables whether or not those cables are degraded. Moreover, it is not clear that the NRC-regulated inspection program even continued to apply to PNPS once it submitted certification to NRC of its determination to permanently cease power operations. *See* 10 CFR § 50.49(a). The discharges have not been routinely monitored to date, and the monitoring required in the Final Permit will

[84] The comment concedes that "the intrusion of stormwater . . . into the vaults" occurs. *See also* Letter from Elise Zoli, Goodwin Procter, to George Papadopoulos, EPA Region 1, at Exhibit A (June 30, 2015) (noting that "several manholes receive rainwater and are pumped to permitted storm water drains"). Moreover, as noted in the comment, only 9 of the 25 vaults are reportedly equipped with automatic pumps. *See also id.* at Exhibit B; Fact Sheet at 30; NRC Inspection Report attached to Letter from Donald E. Jackson, NRC, to Robert Smith, Entergy (July 28, 2011) (documenting an NRC inspection that found "that Entergy allowed non-safety related medium voltage cables to remain submerged in water for extended periods of time").

ensure that the pollutants discharged from these vaults are sufficiently characterized. To-date, Entergy has provided the Agencies with pollutant monitoring results for only 7 of the 25 vaults. In short, the comment fails to support the claim that the monitoring requirements of the NPDES permit "are duplicative of other monitoring and reporting requirements, and/or do not reflect PNPS's NRC-regulated cable inspection program."

Entergy also comments that the water quality sampling results from representative electrical vaults demonstrate that effluent discharges from these vaults do not cause or contribute to a violation of water quality standards or otherwise violate applicable discharge limits. Entergy's assertion is based on a single sampling event that occurred in June 2015 from 7 of the 25 total electrical vaults that discharge stormwater. The single sampling event of 7 of the vaults observed detectable levels of several metals as well as detectable levels of PCBs, phenols, cyanide, and phthalates. Lead concentrations in five of the seven vault samples from 2015 exceeded the chronic marine water quality criterion for aquatic life; copper concentrations in three of the seven samples exceeded the acute and chronic criteria; and zinc concentrations in three of seven samples exceeded the chronic and acute criteria. As the Fact Sheet (at 31) explains, a one-time sampling requirement for all of the electrical vaults that were not sampled in 2015, analyzed for the same suite of parameters, is warranted to characterize these discharges based on the fact that the vaults are located throughout the property and due to the presence of several pollutants in the initial sampling events. The comment does not support the claim that the monitoring requirements of the NPDES Permit "do not reflect" prior sampling.

The purpose of effluent characterization is to determine whether a discharge causes, has the reasonable potential ("RP") to cause, or contributes to an excursion of numeric or narrative water quality criteria. The objective is to project receiving water concentrations based on existing effluent quality to determine whether or not an excursion above ambient criteria occurs or has the reasonable potential to occur. EPA has not at this point concluded that any of these discharges violate WQS, in part because of the limited data available to assess the variability of the effluent (*e.g.*, only one sample from seven vaults was collected). In addition, the dilution associated with stormwater discharges from the vaults has not been quantified but could be substantial. The vaults may be pumped regardless of flow in the stormwater outfalls (*i.e.*, during dry weather); however, the discharges from Outfalls 004 and 005 would still combine with flows in the discharge canal (*e.g.*, diluted by cooling water from Outfall 010) and the discharges from Outfalls 006 and 007 would be diluted when combining with the receiving water in the intake embayment. The monitoring requirements in the Final Permit are based on the results of the initial monitoring of the seven vaults and reasonable to continue to assess the levels of pollutants present and allow a more statistically significant analysis to be conducted to determine whether there is potential to violate WQS.

Notably, the Permittee has not provided any reasonable potential analysis to support its claim that the discharges from the vaults will not cause or contribute to a violation of water quality standards or otherwise violate applicable discharge limits. Instead, Entergy claims that sampling and analysis of the seven sampled vaults demonstrate that discharges contain "only" naturally occurring contaminants such as iron, zinc, and copper, and references, in support of its statement, the natural background concentrations of these metals in soil. While iron, zinc, and copper are naturally occurring, the presence of these metals in soils does not prove that the presence of these

contaminants in the stormwater that accumulates in the vaults is from natural background sources. In addition, PCBs are not naturally occurring and, while cyanide can be naturally occuring, the comment does not explain why the levels of cyanide observed in the effluent would be expected to be naturally occurring.

Part 6.2.1.2 of EPA's 2015 Multi-Sector General Permit (MSGP) for stormwater associated with industrial activity considers the presence of natural background pollutant levels with regards to benchmark monitoring. Benchmark monitoring is performed to determine the overall effectiveness of the control measures on site and to assist permittees' in determining when additional corrective actions may be needed to minimize pollutants in stormwater. A permittee may determine that exceedance of a benchmark is attributable solely to the presence of that pollutant in the natural background. In the MSGP, monitoring for the natural background pollutant is not required provided that (1) the average concentration of the benchmark monitoring result is less than or equal to the concentration of that pollutant in the natural background and (2) the permittee documents (in its SWPPP) the rationale for concluding that benchmark exceedances are attributable solely to natural background pollutant levels, including any data previously collected by the permittee or others that describe the levels of natural background pollutants in the stormwater discharge. Entergy has provided only a reference to levels of metals in the soils in Massachusetts. Stormwater at PNPS, either from the vaults or discharged from the stormwater outfalls, has not been analyzed enough to demonstrate the natural background levels of zinc, iron, and copper in the discharge. The Final Permit requires quarterly monitoring to enable statistical analyses of RP to exceed the water quality criteria for iron, lead, copper, and zinc (taking into account both the variability in the effluent and available dilution) but may also enable the Permittee to characterize the natural background levels of metals in the discharge.

Entergy comments that parameters other than copper, zinc, and iron (i.e., the remaining 23 parameters analyzed in 2015) "should be considered to be absent from the samples because they were observed below the method detection limit ('MDL') and/or ML, and therefore, as EPA acknowledges, are unreliable and not true detections." First, Entergy appears to have confused method detection limit (MDL) with the EPA required Minimum Level of Detection (MLD) listed in Table 2 of its Report. AR-507. The MLD in Table 2 is the minimum level (ML), which is the lowest level at which the laboratory analytical testing method provides a detectable concentration of the target analyte in a sample. *See* EPA Region 1's Remediation General Permit (RGP) (MAG910000), Appendix VI (at 1). The RGP (Appendix VI at 1) also defines "detection limit" as the lowest concentration that can be reliably measured within specified limits of precision and accuracy for a specific laboratory analytical method during routine laboratory operating conditions (i.e., the level above which a value is reported for an analyte, and the level below which an analyte is reported as non-detect.). This is not the same as the MDL, which, as Entergy points out, in footnote 426, is the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. *See also* 40 C.F.R. Part 136 Appendix B. Contrary to Entergy's assertion in the comment, EPA does not acknowledge in the RGP or in the other documents cited in the comment that samples observed below the ML are "unreliable and not true detections" or that parameters observed below the ML are assumed to be absent. In fact, the RGP specifically defines a detection level which can be less than the ML and defines the MDL as identifying with 99% confidence that the true

concentration is greater than zero. The Draft Permit includes quarterly monitoring requirements for total phenols, total PCBs, total phthalates, total cadmium, and total lead because each was detected above the MDL in a least one of the vaults during the 2015 sampling, which suggests to EPA that the parameter may be present, rather than indicates that the parameter is absent. The Final Permit does not require quarterly monitoring for at least 15 additional parameters that were consistently observed below the MDL. See rationale for excluding certain parameters from additional monitoring in Response to Comment I.3.6.

Finally, Entergy comments that groundwater intrusion would not be expected and has not been observed in the vaults. In its initial characterization of the vaults, EPA stated "it is unknown, but possible, that some of these vaults may be deep enough so as to possibly contain some groundwater through infiltration of the vaults themselves as well as salt spray." AR-501 at 2. However, the Fact Sheet (at 30) discusses only the stormwater discharges from these vaults. Regardless of whether groundwater could infiltrate any of these vaults, it is clear that stormwater accumulates in the vaults and periodically needs to be pumped out either manually or with automated pumps to an authorized stormwater outfall. As a result, stormwater from the vaults is discharged via the stormwater outfalls to the intake bay or discharge canal and then to Cape Cod Bay.

10.2 Certain Of The Draft Permit's Effluent Limitations And Sampling Requirements For Electrical Vaults Are Unsupported

10.2.1 Part I.C.3 Monitoring And Reporting Requirements

Part I.C.3 of the Draft Permit requires monitoring and reporting of, *inter alia*, phenol, PCBs, phthalates, cadmium and lead from five electrical vaults on the PNPS site.[427] PNPS's representative electrical vault sampling results for phenol, PCBs, cadmium and lead were below the ML and in most instances the MDL.[428] For this reason, these results do not and cannot support monitoring and reporting requirements for these pollutants.[429] Further, phenols, phthalates, PCBs, and cadmium are not expected to occur at the PNPS site because of prohibitions on submergence of cabling. Finally, the permit writer has provided no explanation for selecting these pollutants for increased monitoring making the selection arbitrary and capricious. Entergy, therefore, requests that Part I.C.3 be revised to remove monitoring and reporting of total phenol, PCBs, total phthalates, total cadmium and total lead.

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[427] Draft Permit, Part I.C.3, at 22-23.
[428] *See* ERM Report at Table 2.
[429] *See supra*, Part VIII.A.4.

10.2.2 Stormwater Pollution Prevention Plan ("SWPPP") Ongoing Monitoring

Part I.H.5 of the Draft Permit requires that "[a]ll areas with industrial materials or activities exposed to stormwater and all structural controls used to comply with effluent limits in this permit, [] be inspected, at least once per month, **including all electrical vaults that are required to be routinely pumped out to a stormwater outfall**," and that samples "shall be collected within the first sixty (60) minutes of discharge from a storm event" and examined for

"color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of pollution."[430] The monthly sampling of electrical vaults in the SWPPP are unnecessary in light of stormwater sampling required in Parts I.C.1 through I.C.3 of the Draft Permit. Parts I.C.1 and I.C.2 of the permit require monthly sampling from stormwater outfalls during a storm event for flow rate, TSS, oil and grease and pH.[431] Part I.C.3 requires quarterly sampling of electrical vaults that EPA "consider[s] representative of the discharges"[432] from electrical vaults, and further mandates that samples be "representative of water that has collected . . . and discharged to a permitted outfall."[433] EPA has provided no basis for requiring additional sampling of stormwater in the SWPPP.

Further, monthly monitoring within the first sixty (60) minutes of a storm event is impractical and potentially dangerous, given site conditions and personnel requirements. There are 25 electrical vaults at the PNPS facility and inspection of all of them within the first (60) minutes of a storm event is impractical. Collecting samples from all 25 would present serious feasibility challenges. Entering these vaults during a storm event also is potentially dangerous, because it is difficult to access the confined space during storms. Entergy previously communicated these same concerns with respect to sampling stormwater outfalls, and EPA acknowledged them by altering the stormwater effluent monitoring requirements in Parts I.C.1 and I.C.2 of the Draft Permit.[434]

Finally, based on Entergy's prior extensive submissions to EPA,[435] the 60-minute stormwater inspection and sampling requirement is unnecessary and unsupported. As the Fact Sheet acknowledges, PNPS already undertakes NRC-regulated regular inspections of electrical vaults which ensure that cables are not degrading such that they would contaminate stormwater.[436] The Fact Sheet and Draft Permit provide no explanation for why this inspection regime, already in place, is supposedly inadequate. Indeed, sampling results from electrical vaults confirmed the absence of non-naturally occurring pollutants at detectable levels (*i.e.*, above the ML and/or MDL).[437] In light of these quantitative results and the NRC-regulated inspection program, EPA has provided no basis for requiring monthly qualitative sampling for "color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, or other indicators of pollution."[438]

For all of these reasons, Entergy requests that the requirement to inspect and sample all electrical vaults within sixty (60) minutes of a storm event be removed from the permit.

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430 Draft Permit, Part I.H.5, at 35.
431 *See id.*, Part I.C.1 and I.C.2, at 18-21.
432 Fact Sheet at 30.
433 Draft Permit, Part I.C.3, at 23 n.2.
434 *See* Fact Sheet at 29 ("The permittee has noted that some required stormwater sampling over the last few years was not conducted due to the difficulty in accessing stormwater outfalls . . . . Therefore, the draft permit allows for sampling to be conducted in a manhole hydraulically connected to a particular stormwater outfall, *if feasible and in particular if more easily accessible than the actual outfall during a storm event*." (emphasis added)).
435 *See supra*, Part VIII.A.2.
436 *See supra*, Part VIII.A.3.
437 *See supra*, Part VIII.A.4.
438 Draft Permit, Part I.H.5, at 36.

10.2.3 Cumulative Additional Sampling Of Stormwater Vaults Is Unsupported And Unnecessary

Part I.J of the Draft Permit requires that PNPS "shall conduct a one-time sampling for all of the electrical vaults which were not sampled pursuant to EPA's March 24, 2015 CWA Section 308(a) letter."[439] The Draft Permit, in other words, requires PNPS to conduct sampling for the vaults that EPA staff indicated just last year need not be sampled, and requires the results of that sampling be submitted within 180 days of the effective permit date, for the same 26 pollutant parameters previously sampled.

In the Fact Sheet, EPA states that "a characterization of water collected in all of the vaults is warranted because these vaults are located throughout the property and the initial sampling showed the presence of several pollutants."[440] The explanation in the Fact Sheet is not supported. First, EPA has already determined that the prior sampling was representative of all 25 electrical vaults. As EPA explains in the Fact Sheet, the five electrical vaults selected, for quarterly monitoring are "considered representative of the discharges from the twenty five (25) electrical vaults."[441] Four (4) of these five (5) vaults were previously sampled for all 26 parameters.[442]

Second, as explained above, with the exception of naturally occurring zinc, iron and copper, pollutants were not observed above the ML and/or MDL in the sampled electrical vaults, which mean that those observations are not accurate or meaningful.[443] For this reason, EPA is incorrect when it states that the "initial sampling showed the presence of several pollutants."[444] In sum, the requirement to sample every electrical vault is inadequately supported, indeed contradicted, by the Fact Sheet's own discussion of the sampling results and instead has the aura of punitive action.

For these reasons, Entergy requests that Part I.J of the Draft Permit be removed from the final Permit.

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[439] *See id.*, Part I.J, at 37.
[440] Fact Sheet at 31.
[441] *Id.* at 30.
[442] *Compare* Draft Permit, Part I.C.3, at 22 *with* ERM Report, Table 1.
[443] *See supra*, Part VIII.A.4.
[444] Fact Sheet at 31.

Response to Comment 10.2

Entergy comments that several of the Draft Permit's limitations and conditions for sampling and inspecting the electrical vaults are unsupported. Entergy requests that the Final Permit eliminate or revise provisions at Part I.C.3 (electrical vault sampling), Part I.H.5 (visual inspections of electrical vault stormwater discharges), and Part I.J (one-time sampling of additional vaults). EPA addresses each of these points below, but we first clarify that there is no "right to pollute" the nation's waters. A person may only discharge a pollutant within the meaning of the CWA in adherence with a valid NPDES permit issued by the EPA or delegated state or if the discharge is

otherwise authorized by the statute.[85] The permitting authority in such a case must ensure that the permit authorizing such a discharge does so in a manner consistent with the requirements of the Act. Discharges from the electrical vaults have never been fully assessed to determine the pollutants that the facility actually discharges from these vaults via its stormwater outfalls. As described above, the only sampling results ever provided to the Agencies are from a one-time event in 2015 wherein the Permittee sampled water in just 7 of the 25 vaults that the Permittee pumps to its NPDES permitted outfalls. The NRC-regulated inspection program may include monitoring to ensure components—including electrical wiring—are not submerged in water for an amount of time that would compromise their integrity, but it does not prohibit submergence. Moreover, Entergy's comments do not provide or otherwise point to any pollutant data it has collected pursuant to the NRC inspection program. In other words, the Permittee asks the Agencies to remove the vault monitoring requirements from the permit based mainly on the results of one sampling event that examined less than one-third of the sources that the facility pumps to its outfalls to Cape Cod Bay and that revealed detectable amounts of certain pollutants in the sampled sources. It is entirely reasonable for the permit to include monitoring requirements to enable the Agencies to assess whether and how the continued discharge of the contents of these vaults, most of which have never been characterized, may occur in a manner consistent with the requirements of the Act and state law.

According to Entergy, the 2015 sampling results from the electrical vaults do not support the quarterly monitoring requirements for total phenol, PCBs, total phthalates, total cadmium and total lead in Part I.C.3 of the Draft Permit. The Fact Sheet explains that the parameters selected for sampling in Part I.C.3 of the Draft Permit were those that were detected in a least one of the vaults during the single 2015 sampling event. As the Jones River Watershed Association pointed out in Comment I.3.6, in addition to these parameters, antimony, cyanide, nickel, and hexavalent chromium were also detected in the samples but no monitoring was included in the Draft Permit. The Final Permit includes monitoring for all parameters detected in at least one of the vaults during the single sampling event. *See* Response to Comment I.3.6. Entergy argues that quarterly monitoring for phenol, PCBs, total phthalates, total cadmium and total lead should not be required because this single sampling event—of less than one-third of the electrical vaults from which the Permittee discharges pollutants to Cape Cod Bay—detected these parameters below the ML and *in most instances* the MDL. Entergy appears to argue that a parameter detected below the ML should be presumed to be absent, even from vaults that Entergy did not sample. EPA disagrees and has addressed Entergy's comments about ML and MDL in Response to Comment III.10.1. Each of these parameters was detected above the MDL (that is, with 99% accuracy that the true concentration is greater than zero) in at least one vault during what was, again, a single sampling event of less than one-third of the electrical vaults. Entergy's only support for its statement that these parameters are absent is based on its interpretation of the definition of ML and MDL, which is not consistent with EPA's interpretation in other permits. *See* EPA's Remediation General Permit (MAG910000), Appendix IV. The potential for the presence of these parameters, as reflected in the one known sampling of these vaults, warrants additional sampling.

[85] The comment does not argue that the discharge of stormwater from the electrical vaults does not require a NPDES permit.

Entergy also comments that phenols, phthalates, PCBs, and cadmium (but evidently not lead)[86] are not expected to occur in the vaults because of prohibitions on submergence of cabling. To the extent that the NRC-regulated monitoring programs could be interpreted as "prohibiting" the submergence of cabling—an interpretation that Entergy has not adequately supported—the facility nonetheless discharges stormwater that accumulates in the electrical vaults to the receiving water through stormwater outfalls 004, 005, 006, and 007. *See* Response to Comment III.10.1. Entergy does not explain why the presence of these particular parameters would be eliminated from the discharge if cables are not submerged nor does it adequately support its statements that cables cannot be submerged. In any event, the initial vault characterization monitoring detected these parameters.

Entergy requests that the requirement at Part I.H.5 of the Draft Permit to inspect and sample all electrical vaults within sixty minutes of a storm event should be removed. Entergy comments that such additional sampling is unnecessary in light of stormwater sampling required in Parts I.C.1 through I.C.3 of the Draft Permit, that there is no basis for requiring additional sampling of stormwater in the SWPPP, and that monthly monitoring within the first sixty minutes of a storm event is impractical and potentially dangerous, given site conditions and personnel requirements. Entergy appears to extend the requirement for visual assessment of stormwater to the electrical vaults where the Agencies intended for this provision to apply only to the stormwater outfalls. Part I.H.5 of the Draft Permit (at 35) states:

> All areas with industrial materials or activities exposed to stormwater and all structural controls used to comply with effluent limits in this permit shall be inspected at least once per month, including all electrical vaults that are required to be routinely pumped out to a stormwater outfall, by qualified personnel with one or more members of the stormwater pollution prevention team. Inspections shall begin during the 1st full calendar month after the effective date of this permit. Each inspection must include a visual assessment of stormwater samples (*from Outfalls 004, 005, 006 and 007 as required by the permit*), which shall be collected within the first 60 (6) minutes of discharge from a storm event…(emphasis added)

The Agencies clarify that the collection of stormwater samples for visual assessment under the permit applies only to the permitted stormwater outfalls (004, 005, 006, and 007). To the extent that the comments above pertain to the feasibility and/or justification for requiring additional sampling of the electrical vaults under Part I.H.5 of the Draft Permit, neither the Draft nor the Final Permit require collection of a stormwater sample during the first 60 minutes of a storm from the electrical vaults.

Regarding the requirement to conduct a visual assessment of samples from the four stormwater outfalls (004, 005, 006, and 007), the basis for including the visual assessment is EPA's 2015 Multi-Sector General Permit (MSGP) for stormwater discharges associated with industrial activity. The 2015 MSGP (at Part 3.2) requires quarterly visual assessment of stormwater discharges, including inspection for color, odor, clarity, floating solids, settled solids, suspended

[86] As noted in Response to Comment III.10.1, lead concentrations in five of the seven vault samples from 2015 exceeded the chronic marine water quality criterion for aquatic life.

solids, foam, oil sheen, and other obvious indicators or stormwater pollutions. The results of each visual assessment should be recorded and documentation maintained in the Stormwater Pollution Prevention Plan (SWPPP). The visual inspection can be performed on the same grab sample collected for compliance with the limitations and monitoring requirements under Parts I.A.5 and I.A.6 of the Final Permit (formerly Parts I.C.1 and I.C.2 of the Draft Permit). The visual inspection is a requirement of the MSGP and supports the additional monitoring that is completed for the stormwater outfalls.

As further support for its request to remove from the permit the requirement to inspect and sample all electrical vaults within 60 minutes of a storm event, Entergy maintains, as in Comment III.10.1, that the NRC-regulated inspection program will "ensure that cables are not degrading such that they would contaminate stormwater." This requirement of the permit has been clarified, as discussed above, and only requires inspection of the electrical vaults, not collection of additional samples. In any event, EPA has no reason to disagree that regular inspections of the vaults to ensure the integrity of the electrical equipment will lessen the potential for degraded equipment to be exposed to stormwater for long periods of time. EPA maintains, however, that whether or not the equipment is degraded, the vaults will continue to discharge stormwater, and there is potential that these vaults contribute different pollutants than other stormwater discharged via the permitted stormwater outfalls. *See also* Response to Comment III.10.1. Additional monitoring of these discharges is warranted to adequately characterize discharges that, to date, have been subject to a single sampling event from a subset of just 7 of 25 vaults. To the extent that the NRC-regulated monitoring program fulfills the monitoring requirements of Part I.H.5 of the Draft Permit (now Part I.D.2.c of the Final Permit), the Permittee need not complete a second inspection in a single month. In addition, in order to be more consistent with the MSGP, the Final Permit has changed the frequency of the visual inspection requirement for the electrical vaults to quarterly from monthly.

Finally, Entergy requests that Part I.J of the Draft Permit, requiring one-time sampling of all electrical vaults not sampled in 2015, be removed from the Final Permit. According to Entergy, EPA already determined that the prior sampling was representative of all 25 electrical vaults. Entergy also argues "EPA is incorrect when it states that the 'initial sampling showed the presence of several pollutants'" because, according to Entergy, detected pollutants are either "naturally occurring" (e.g., zinc, iron and copper) or detections are "not accurate or meaningful" because concentrations observed were below the ML and/or MDL in the sampled electrical vaults. EPA has already addressed Entergy's comments about the presence of pollutants in the discharge from the electrical vaults in Response to Comment III.10.1, above. The Permittee has not demonstrated that the concentrations of zinc, iron, and copper in the stormwater samples from the vaults are consistent with natural background levels. In addition, Entergy misrepresents detections at the ML and MDL. Observations of pollutants above the MDL (even when below the ML) indicate with 99% accuracy that the true concentration of the constituent in the effluent is greater than zero. Detection of parameters above the MDL in a single sample from 7 vaults warrant additional monitoring.

Entergy comments that monitoring of the additional vaults that were not sampled in 2015 is unnecessary because "EPA has already determined that the prior sampling was representative of all 25 electrical vaults." The Fact Sheet (at 30) explains that the Draft Permit requires routine,

quarterly sampling for a select list of parameters at a subset of 5 vaults. These five vaults were chosen because they are spread throughout the property and therefore representative of the *locations* of the various vaults for the purposes of this routine monitoring. The Agencies did not indicate that the quarterly sampling of 5 vaults would satisfy an initial characterization of the effluent from the complete suite of vaults. To the contrary, EPA stated that "a characterization of water collected in all vaults is warranted because these vaults are located throughout the property and the initial sampling showed the presence of several pollutants." Fact Sheet at 31. Entergy comments that "EPA staff indicated just last year" that additional vaults need not be sampled but provides no reference for this statement. The Fact Sheet and the results from sampling of the initial 7 vaults that stormwater discharges from the electrical vaults have the potential to contain metals and other toxic pollutants. Routine, quarterly sampling from a subset of vaults is reasonable to continue to characterize levels of detected pollutants in the effluent without overly burdensome monitoring. One-time sampling of all vaults is warranted given that most of the vaults have never been sampled and those that have indicate variability in the pollutants detected and their concentrations among the vaults. Should results of the routine or one-time monitoring indicate that additional parameters should be sampled or that monitoring otherwise be revised, the Agencies may request/require additional sampling, modify the permit, or both.

10.3 There Is No Basis For Requiring Whole Effluent Toxicity Testing Given The Limits Of EPA's And DEP's Regulatory Authority With Respect To The Relevant Effluents And The Small Concentrations Of Contaminants Involved

Part I.C.4 of the Draft Permit and Attachment A thereto proposes requiring PNPS to undertake "whole effluent toxicity" ("WET") testing, twice each year, in accordance with specified testing protocols, with respect to two small aquatic species, the Inland Silverside and the Mysid Shrimp.[445] According to the Fact Sheet, the purpose of requiring WET testing is "to assess the effects of the combination of pollutants" found in PNPS's discharges via internal Outfalls 011 and 014, which comprise various process waters and other sources, including service water systems and demineralizer reject water, both NRC-regulated discharges.[446] Adding to the confusion, the identified pollutants of interest for purposes of the WET testing, as proposed in the Draft Permit, include ammonia, organic carbon, cadmium, lead, copper, zinc, and nickel.[447]

The Fact Sheet does not state, nor are we aware, of any conceivable basis for believing that these substances would be added to the process water streams that comprise the discharges via Outfalls 011 and 014. Some of these substances (*i.e.*, copper and zinc) appear to have been included in the proposed WET testing protocol only by virtue of the fact that they were detected in certain of the electrical vaults that were sampled.[448] As discussed above, however, the concentrations detected in these were all below naturally occurring background levels, so there is no apparent basis for supposing that toxic concentrations of these materials occur, alone or in combination.[449] The remaining pollutants were not even detected in the electrical vault sampling data, and we again know of no basis for believing that either would be added to the process waters associated with Outfalls 011 and 014 in any biologically significant amounts, and the Fact Sheet identifies none but instead confesses that EPA and DEP have only "limited data" as to the composition of the waste streams in question.[450] The Draft Permit's provisions for WET testing should therefore be deleted from the final Permit as being factually unsupported.

445 *See* Draft Permit, Part I.C.4, at 25-27 & Attach. A.
446 *See* Fact Sheet at 44.
447 *See* Draft Permit, Part I.C.4, at 25.
448 *See supra*, Section VIII.A.4 (electric vault sampling detected presence zinc and copper consistent with background levels, while other pollutants were below minimum level of detection and therefore could not be confirmed as being present at all).
449 *See supra*, Section VIII.A.4.
450 *See* Fact Sheet at 43.

10.3(A) Supplementation of WET Testing Comments

In reviewing its Initial Comments on the appropriateness and need for WET testing, we believe that we may have misapprehended EPA or DEP's rationale for such testing. As such, these Comments provide additional information relevant to Section VIII.C of Entergy's Initial Comments on the narrow question of the appropriateness of WET testing.194 By way of further background, the WET testing is focused on two Outfalls, 011 and 014,195 which are both related to service water support systems,196 and the latter of which may contain radioisotopes that are monitored by NRC,197 as well as subject to post-process, pre-discharge treatment, *e.g.*, filtration and for pH.198 To the extent WET testing of these samples cannot differentiate the effects of radioisotopes, it cannot isolate a chemical consideration within EPA's or DEP's scope of authority, and instead encroaches on NRC's sole authority,199 as well as raises questions about whether there are laboratories capable of receiving the exempt quantity of radioisotopes and performing WET testing.

This dynamic is exacerbated by the improper dilution metrics provided for in the WET testing plan contained within the Draft Permit. Below are the last three years' approximate discharge volumes from the 011 and 014 Outfalls, measured in gallons, *on an annual basis*:

	011	**014**
2013	0	74,733
2014	11,000	6,012
2015	12,400	20,040

Thus, the maximum current annual discharges from the combined Outfalls are 74,733 gallons or approximately 205 gallons per day. Actual flow through the system, solely as a function of service water, is a minimum of 7.9 MGD. In other words, the actual minimal dilution factor for the system – before contact with the environment – is more than 38,500 gallons for every single gallon of the maximum combined gallons discharged from Outfalls 011 and 014. Viewed in this light, the WET testing – which provides for a dilution of only 5x instead of at least 38,500x – has no correlation to actual concentrations experienced by the organisms in question within the discharge canal. Dilution in the environment is even greater. As such, Entergy respectfully requests that the final permit be revised to reflect a minimum dilution of 10,000x, representing an order of magnitude below expected minimal dilution within the discharge canal before mixing with Cape Cod Bay. This would provide for an appropriate degree of conservatism, as a matter of science and law.

[194] See Entergy Initial Comments at 74-75.
[195] *See* Draft Permit, Part I.C.4, at 24-27; Fact Sheet at 43.
[196] *See* Fact Sheet at 5, 36-37 & Fig. 4 (describing Outfall 014 as a "new outfall" that encompasses "[d]ischarges" from [the] waste neutralization sump [the] TBCCW [turbine building closed cycle cooling water] and RBCCW [reactor building closed cycle cooling water] systems, [and the] standby liquid control (SLC) system"). As Entergy noted in its Initial Comments and exemplary revisions to the Fact Sheet, the Fact Sheet's description of the source waters that feed Outfalls 011 and 014 contains material factual discrepancies, including insofar as the Fact Sheet describes those discharges as comprising "closed cycle cooling water." *See* Entergy Initial Comments at 1, 56. Entergy continues to suggest that a meeting with EPA and DEP to reconcile those discrepancies prior to issuance of the final NPDES/MCWA permit would be beneficial to all concerned. *See id.* at 1 n.2.
[197] *See* Fact Sheet at 37 ("The low level radioactive effluent associated with Outfalls 011 and 014 shall continue to meet all the Nuclear Regulatory Commission (NRC) requirements as specified in 10 C.F.R. Part 20. These limits are detailed in the PNPS Technical Specifications which define facility operational conditions…. [T]he draft permit addresses only the chemical aspects of water quality and does not regulate radioactive materials encompassed within the Atomic Energy Act's definitions of source, byproduct, or special nuclear materials…. All NRC radioactive discharge requirements will continue to be in effect, as required, in 10 C.F.R. Part 20 and plant technical specifications.").
[198] *See, e.g.*, FSEIS at 2-13 to -15 (describing operation of liquid radiological waste disposal systems at PNPS).
[199] *See Train*, 426 U.S. at 25.

Response to Comment 10.3

Entergy submitted Comment 10.3 on the Draft Permit's requirements for Whole Effluent Toxicity (WET) testing with its initial, timely comments. As discussed in the Introduction to this Responses to Comment, Entergy also submitted "supplemental comments" on October 31, 2016, primarily for the purpose of responding to timely comments submitted by others, rather than raising new issues on the Draft Permit. The October 2016 Supplemental Comments did, however, raise new issues about the WET requirements that warrant consideration, so as to avoid potential issues regarding dilution and radiological contamination, as explained more below. In this response, the Agencies address comments submitted with Entergy's initial submission (Comment 10.3) and its supplemental comments on WET from October 2016 (reproduced here as Comment 10.3A).

Entergy requests that the requirement to conduct twice yearly WET testing be removed from the Final Permit. EPA first clarifies that the Draft Permit proposed WET testing requirements at Part I.C.4, which only apply to the effluent from Outfalls 011 and 014 under footnote 7 of this Part. The electrical vaults were not considered when developing the requirements.

The Fact Sheet (at 43-4) explains that WET testing is required to identify, evaluate and address any potential water quality impacts from the effluent at Outfalls 011 and 014, which is likely to have a high degree of complexity given the various low volume wastewater sources that comingle in the discharge. *See* 40 C.F.R. § 423.11(b). Multiple waste streams combine prior to the discharging from Outfalls 011 and 014; some of these wastestreams contain pollutants such as boron, copper, oil & grease, as well as the corrosion inhibitors tolytriazole and sodium nitrite. All of these pollutants are subject to water quality standards or criteria. Since these corrosion inhibitors are used in the RBCCW and TBCCW systems, they can reasonably be expected to be present in some of the discharges to Outfalls 011 and 014. Although the facility has shut down, Entergy expects that it will continue to discharge from Outfalls 011 and 014. Entergy has not provided any comments that would suggest that the constituents of the discharge via this outfall

have been substantially altered following shutdown that would warrant eliminating the requirement for twice yearly WET testing. Entergy's red-line strikeout version of the Fact Sheet, submitted with its comments, did not indicate any changes to the post-shutdown discharges at Outfalls 011 or 014. Finally, under §§ 301, 303, and 402 of the CWA, EPA and States may establish toxicity-based limitations to implement narrative water quality standards calling for "no toxics in toxic amounts." *See also* 40 C.F.R. § 122.44(d)(1). Massachusetts water quality standards state "All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life, or wildlife." 314 CMR 4.05(5)(e). EPA maintains that due to the combination of parameters that are present in these discharges and the uncertainties with any additive or synergistic effects of these parameters, WET testing is warranted.

In its initial comment, Entergy comments that there is no basis in the Fact Sheet for the requirement or for believing that pollutants, including ammonia, organic carbon, cadmium, lead, copper, zinc, and nickel, would be added to the process waters associated with Outfalls 011 and 014 in "any biologically significant amounts." Entergy initially supposes that the WET requirements were based on detection of some pollutants, including copper and zinc, in stormwater samples collected from the electrical vaults and argues that these levels were all below naturally occurring background levels. Protocols for WET testing for NPDES permits are consistent among all Region 1 facilities and developed in accordance with EPA guidance.[87] The WET protocols include chemical analysis of both the effluent and receiving water for the parameters included in Part I.C.4 of the Draft Permit: pH, salinity, TRC, TSS, Ammonia, TOC, and metals. In other words, the list of pollutants in Part I.C.4 comes from the standard marine acute toxicity protocol; the parameters were not selected as "pollutants of interest for purposes of the WET testing" as Entergy suggests. For the same reason, the inclusion of copper and zinc in the WET testing is based on the standard protocol and the electrical vault sampling results had no bearing on either the decision to establish WET testing for Outfalls 011 and 014 or the parameters included for analysis.

Entergy's supplemental comment from 2016 raises several new issues associated with WET testing: (1) that effluent from Outfall 014 may contain radioisotopes that could complicate the understanding of WET test results; (2) whether there are laboratories capable of receiving the exempt quantity of radioisotopes and performing WET testing; and (3) that the dilution of these wastestreams has not been appropriately considered. EPA acknowledges that the contribution of radioisotopes in the WET samples is likely to complicate the analysis and interpretation of results. There may be laboratories that can accept and dispose of radioisotopes, but contaminated samples will likely add considerable cost and complexity to the collection, transportation, and handling of these samples. The commenter identifies several challenges with analyzing and addressing WET testing at Outfall 014. Outfalls 011 and 014 are, however, substantially similar. Both are comprised of low volume wastes including station heating water, cooling water, drainage from floor drains and sumps, and reject water. In other words, the two outfalls are substantially similar, and, according to Entergy, the issues related to radiological contamination apply only to Outfall 014. To address these issues, the Final Permit WET requirements apply

[87] For example, the most recent version of the Marine Acute Toxicity WET Protocol is available at https://www3.epa.gov/region1/npdes/permits/generic/marinewateracutetoxtest-rev.pdf

only to the effluent from Outfall 011. Limiting WET testing to Outfall 011 will avoid the new issues raised about radiological contamination (i.e., new issues (1) and (2), above).

Finally, Entergy comments that the WET requirements do not account for dilution of the internal wastestreams. Entergy suggests that the maximum current annual discharge from the combined Outfalls is 74,733 gallons, which is equivalent to 205 gallons per day. At a discharge of 7.9 MGD from Outfall 010, Entergy asserts that the actual minimal dilution factor in the discharge canal is more than 1:38,500. First, discharges from Outfalls 011 and 014 are intermittent and, as such, calculating a daily discharge of 205 gpd and dilution of 1:38,500 is not representative of the actual discharge from these outfalls. *See* Fact Sheet Attachment A. Practically, PNPS likely discharges from Outfalls 011 and 014 on an intermittent basis at flows considerably higher than 205 gpd (e.g., the maximum daily permitted flow from Outfall 011 is 60,000 gallons), which would result in a lower dilution factor when combined with the effluent from Outfall 010. According to Entergy, "the WET testing – which provides for a dilution of only 5x instead of at least 38,500x – has no correlation to actual concentrations experienced by the organisms in question within the discharge canal." EPA generally collects effluent for WET testing representative of the combined discharges from a Facility. In this case, the combined discharge would include effluent from Outfall 010 (cooling water for the spent fuel pool). For this reason, WET requirements at Part I.C.4 of the Draft Permit have been moved to a compliance point within the discharge canal in the Final Permit. WET testing requirements are included under the compliance monitoring location at Part I.A.1 of the Final Permit. The Final Permit specifies that twice yearly sampling must be conducted on an outgoing tide during dry weather when Outfall 010 and Outfall 011 are discharging and when Outfall 014 is not discharging. In this way, the WET samples will be representative of the combined discharges from Outfalls 011 and 010, but will not include any dilution from seawater intrusion in the discharge canal or stormwater and will not include radiological contamination from Outfall 014.

10.4 Non-Substantive Corrections Related To Stormwater Discharge Requirements.

Entergy also requests that the following non-substantive inconsistencies in Part I.C.3 of Draft Permit be corrected in the final Permit:

- The "Discharge Limitation" column should remove sub-columns "Average Monthly" and "Maximum Daily" to reflect the fact that monitoring is only to be conducted quarterly.[451]
- In footnote 2, the first sentence should be removed because it conflicts with footnote 1. Footnote 2 appropriately recognizes that "[s]ampling may be conducted in wet or dry weather and does not need to be at a time when the vault contents are being discharged," while footnote 1 would require the sampling to occur during a discharge.[452]

If Part I.J of the Draft Permit is not removed from the final Permit, then Entergy requests that Part I.J of the final Permit be corrected to reflect that seven (7) as opposed to six (6) electrical vaults were previously sampled.[453]

[451] *See* Draft Permit, Part I.C.3, at 22.
[452] *See id.*, Part I.C.3, at 23 n.1.
[453] *See id.*, Part I.J, at 37.

Response to Comment 10.4:

Entergy repeats its request from Comment 10.2.4 to clarify and/or change specific language in Part I.C.3. EPA has made some of these changes to the Final Permit and explained its reason for accepting or rejecting Entergy's proposal below.

Entergy requests that EPA remove the sub-columns "Average Monthly" and "Maximum Daily" in Part I.C.3 of the Draft Permit to reflect the fact that monitoring is only to be conducted quarterly. Although stormwater sampling is required once per quarter, for the purposes of these effluent limits pages, the sampling results would be considered a daily maximum value, which in effect would be the value of the quarterly sample, as it would be the only sample during this period. The Final Permit retains these columns.

Entergy also requests that the first sentence of footnote 2 in Part I.C.3 of the Draft Permit be removed because it conflicts with footnote 1. According to Entergy, Footnote 2 states that "[s]ampling may be conducted in wet or dry weather and does not need to be at a time when the vault contents are being discharged" while Footnote 1 would require the sampling to occur during a discharge. Footnote 1 in Part I.C.3 of the Draft Permit (at 23) states "Manhole designations are provided by the permittee in the June 30, 2015 CWA Section 308(a) information request letter submittal to EPA." EPA fails to see how this footnote is in conflict with the sampling requirement in footnote 2.

Footnote 2 states "sampling shall be representative of the water that has collected in each electrical vault and prior to being pumped out and discharged to a permitted outfall. Sampling may be conducted in wet or dry weather and does not need to be at a time when the vault contents are being discharged to a stormwater outfall." In other words, sampling may occur during either wet or dry conditions and whether the vault is actively discharging to the permitted stormwater outfall, but the sample collected must be representative of the effluent from the vault prior to mixing with any stormwater in the permitted stormwater outfalls. The Final Permit retains the footnotes from the Draft Permit.

Finally, Entergy correctly states that seven (7) instead of six (6) electrical vaults were sampled in 2015 and requests that the Final Permit reflect this number. Part I.G (formerly I.J.) of the Final Permit identifies that 7 vaults were sampled are requires sampling of the remaining 18 vaults within 180 days of the effective date of the permit.

11.0 Authorization For The Discharge Of Untreated Sea Foam Suppression Water Should Not Be Eliminated.

As the Fact Sheet reflects, the Draft Permit has removed a prior authorization for the discharge of untreated sea foam suppression water from Outfall 008.[454] EPA bases the removal on statements made by Entergy employees that sea foam suppression had not been necessary during the current permit term and was not anticipated in the future.

While sea foam suppression may not be anticipated, however, the facility still must have the option of using sea foam suppression, if necessary. Excessive sea foam can blow onto electrical

equipment at the facility leading to dangerous conditions, including arcing of electrical equipment – an occurrence that has been known to happen at PNPS historically.[455] For this reason, Entergy respectfully requests that the untreated sea foam suppression discharge authorization remain in the final NPDES permit.

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[454] *See* Fact Sheet at 33.

[455] *See, e.g.*, NRC, *Information Notice 93-95: Storm-Related Loss of Offsite Power Events Due to Salt Buildup on Switchyard Insulators* (Dec. 13, 1995), *available at:* http://www.nrc.gov/reading-rm/doc-collections/gencomm/info-notices/1993/in93095.html (hereinafter "NRC Information Notice") ("Since 1982, the Boston Edison Company Pilgrim station has also experienced several loss of offsite power events when *heavy ocean storms* deposited salt on the 345 kV switchyard causing the insulators to arc to ground.") (emphasis added); Enercon Services, Inc., *Enercon Response to Tetra Tech's Indian Point Closed-Cycle Cooling System Retrofit Evaluation Report,* prepared for Entergy Nuclear Indian Point 2, LLC, and Entergy Nuclear Indian Point 3, LLC (Dec. 2013), p. 28-29 ("Periodic salt deposition *during storm events has* caused electrical arcing at several plants," including PNPS), Figure 7-1 (providing picture of arcing) (excerpt enclosed) (emphasis added); NRC & EPRI, *EP RI/NRCRES Fire PRA Methodology for Nuclear Power Facilities,* Final Report, NUREG/CR-6850 (Sept. 2005) (examining fires caused by, *inter alia*, arcing).

Response to Comment 11.0:

According to EPA's trip report that was dated January 24, 2013 for a January 17, 2013 site visit of the facility, it was noted that Outfall 008 "has not been used over the course of the current permit and will not be used in the future." Based on this statement, the EPA determined that Outfall 008 was no longer necessary and did not include it in the Draft Permit. See Fact Sheet at 33.

One of the changes in the 1992 permit modification was the addition of Outfall 008, which resulted from the permittee's request to use potable fresh water for sea foam suppression as necessary. The permit modification limited the use of this water to a flow of 0.73 MGD and required daily measurement of this flow, for the days when it would be used for this purpose.

However, since the facility terminated its generation of electricity as of May 31, 2019, the Facility no longer uses electrical equipment associated with the generation or transmission of electricity, with the exception of that required to maintain the plant after shutdown, the authorization to use sea foam suppression water is not necessary. This was confirmed by email from Joe Egan to George Papadopoulos on 8/16/19. Therefore, the Final Permit does not authorize use of sea foam suppression.

IV. COMMENTS SUBMITTED BY OTHERS

1.0 Procedural Comments on Draft Permit Issuance

1.1 General Comments on Permitting Process

Public Hearing Comment from Ms. Azarovitz: We are fully aware of the fact that the EPA has allowed the Entergy Corporation, without oversight or regard to the damage being done to the waters of Cape Cod Bay, is allowing Entergy to operate with an NPDES permit…A point not to be overlooked is that there were no inspections, there were not changes in the methods on intake and discharge, the on[c]e through cooling system, which causes great harm to our environment. This damage is documented by EPA itself as well as many other published studies. But obviously, not taken seriously in allowing this permit to lapse and to be rewritten in order for Pilgrim Nuclear Power Station to continue to do damage.

This damage includes impingement of larvae and other forms of microscopic life, destruction of thousands upon thousands of fish, including federally protected herring and alewife. Citizens who fish would have to pay a fine if one herring were taken from our waters.

What happened to the mandate of this agency? Decisions being made to reduce environmental risk based on the best available scientific information, working with federal laws protecting human health and the environment enforced fairly and effectively. Should our trust be gone in an agency that had such amazing beginnings such as the EPA has years ago. Is this another agency that can be influenced by corporate lobbying?

Written Comment Submitted by Ms. Azarovitz on 7/25/2016: Numerous state and federal laws such as the Clean Water Act, the Magnuson-Stevens Fisheries Conservation Act, the Endangered Species Act, and the Coastal Zone Management Act require Entergy to eliminate or at least mitigate Pilgrim's impacts on the Bay. These laws are not being enforced. The Massachusetts Department of Environmental Protection and the U.S. Environmental Protection Agency (EPA) are unable or unwilling to update Entergy's NPDES permit. It is unlikely that the cumulative impacts of Pilgrim's decades of marine destruction and pollution will be studied, even if the NPDES permit is renewed. For years, calls from the public for prompt action have been left unanswered.

Public Hearing Comment from Mr. Agnew (of Pilgrim Legislative Advisory Coalition): I believe the Clean Water Act is a law and that it was passed by Congress. And I don't believe that EPA has done much of anything to ensure that Entergy has been in compliance with the Clean Water Act for the last 21 years. The twenty year lapse offered Entergy no incentive whatsoever to upgrade even though much needed technology was available in order to reduce impacts to the environment. I question the timing of this new draft permit coming at a time when it had become apparent that Entergy was losing money and would soon be forced to shut down the plant.

The public did not benefit from the 20 years of inaction that continues unabated today. So, I've really got to wonder if you were paid off by Entergy or by the Nuclear Energy Institute, or perhaps by its bedmate, the Department of Energy. And like I say, I'm not just trying to make a sound bite. I just really can't understand why this would happen. It's my opinion that you have

conspired, and a conspiracy is when two or more people plan to violate the law. And the Clean Water Act is a law, and I believe it's been violated. So, I believe that you, and those at the EPA who have come up with this inaction, have conspired to defraud the public and injure the Cape Cod Bay ecosystem.

Public Hearing Comment from Ms. Carpenter (of Cape Downwinders): I have been to NRC hearings. This is my first hearing with you (EPA). It seems that there's a tendency of all the government alphabet agencies to put the interests of the corporate aspect of this before the safety of the people. And that very much concerns me. The NRC, you know, anything that Entergy wants, they grant. And I'm hoping that the EPA will not just approve whatever Entergy wants, that you will literally go over everything and put the interests of the people, the citizens of Massachusetts first. Our health and safety depends on this.

Written Comments Submitted by Ms. Bassett: The plant's use and discharge of water permit expired 20 years ago. This is totally unacceptable. New technology and new information, and new standards have come in for 20 years without any updated as to how better to run this PNPS. How come the neglect? How come the delay?

Response to Comment 1.1:

The PNPS NPDES Permit is one of the most complicated permits that EPA Region 1 has reissued. EPA is required to issue NPDES Permits to conform with State and Federal Law. These permits must be consistent with Massachusetts Surface Water Quality Standards and Massachusetts Coastal Zone Management requirements. Permit conditions are applied to all dischargers, whether they are corporations, municipalities, or small companies. EPA did not conspire with the permittee to delay the reissuance of this Permit. Even though the Permit expired years ago, its conditions and effluent limitations will remain in force until the effective date of this reissued Permit.

As already noted, PNPS stopped generating electricity on May 31, 2019. The Final Permit establishes limitations and requirements, consistent with this shutdown of operations, that result in a 92 % reduction in cooling water intake and 98% reduction in heat load as compared to the full operation of the plant. In addition, the Final Permit establishes effluent limitations and monitoring requirements on discharges of miscellaneous "low-volume" type wastes, stormwater, and stormwater that accumulates in electrical vaults. In all, the Final Permit includes a suite of effluent limitations, non-numeric limitations, and monitoring requirements that represents a significant advancement from the 1991 Permit and that will ensure that the aquatic community and designated uses of Cape Cod Bay are protected.

EPA and MassDEP have been in communication with the permittee during this permitting process, mainly to gain a better understanding and clarification of facility operations and their associated discharges. There was no corporate lobbying during this process that influenced the outcome of this draft permit. EPA acknowledges that the public has questioned why this permit took so long to be reissued and the various reasons are enumerated in the response to comment I.2.1 above.

One commenter suggests that state and federal laws are not being enforced but does not explain either how the Draft Permit fails to enforce the referenced laws or specify any changes that should be required in the Final Permit based on this comment. Both the Draft and Final Permits were developed in collaboration with MassDEP and after consultation with other agencies, including NMFS, Massachusetts Coastal Zone Management (MassCZM), and NRC and reflects Federal and State WQS and complies with all applicable regulations for industrial discharges as well as for the cooling water intake structure (CWIS) and discharge of heated effluent. As noted earlier, the facility shut down as of May 31, 2019 and the volume of the seawater intake and discharge of heat is substantially less than when PNPS was operating. MassDEP has certified under § 401 of the CWA that the Final Permit is consistent with its surface water quality standards, and MassCZM has provided its consistency review concluding that the Final Permit complies with the Massachusetts Coastal Zone Management Program. See 40 C.F.R. § 122.49(d).

Enforcement of regulations to ensure public safety from operation of the plant and radiological releases is the responsibility of the NRC. EPA and MassDEP's responsibility is to establish permit limits and conditions pursuant to water quality standards, effluent limitation guidelines, and other requirements to ensure that discharges of pollutants from PNPS are protective of the public health and the environment of Cape Cod Bay. The Final Permit establishes limitations and requirements consistent with this shutdown of operations, which result in a 92% reduction in cooling water intake and 98% reduction in heat load as compared to the full operation of the plant. In addition, the Final Permit establishes effluent limitations and monitoring requirements on discharges of miscellaneous "low-volume" type wastes, stormwater, and stormwater that accumulates in electrical vaults. In all, the Final Permit includes a suite of effluent limitations, non-numeric limitations, and monitoring requirements that represents a significant advancement from the 1991 Permit and that will ensure that the aquatic community and designated uses of Cape Cod Bay are protected. Also see Responses to I.2.1, I.2.2, and IV.3.

1.2 Transfer of Permit

Written Comment from PilgrimWatch Letter Submitted 7/25/16; Written Comment from J. Nichols submitted 7/20/16: EPA should specify that the permit must not be transferred to another company without public review process. This should apply to any transfer, including for another use at the site.

Response to Comment 1.2

The commenters request that transfer of this permit be prohibited. EPA and MassDEP regulations recognize, however, that a permitted facility may change ownership during the term of a NPDES permit and, in such a case, provide for the transfer of a permit after notice to the permitting authority. 40 CFR §§ 122.41(*l*)(3) and 314 CMR 3.19(25). For instance, the automatic transfer of permits is authorized where the current permittee notifies the permitting authority at least 30 days in advance of the proposed transfer date and the notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage and liability between them. 40 C.F.R. § 122.61(b) and 314 CMR 3.19(25)(c). A permit may also be transferred to a new owner or operator through a minor

modification of the permit after notice to the permitting authority. 40 C.F.R. § 122.62(b)(2). Neither an automatic transfer nor a transfer pursuant to a minor modification requires public participation. *See* 40 C.F.R. §§ 122.61, 122.62, 122.63. EPA does not see a reason at this time to prejudge a theoretical transfer of the permit, but rather, reserves the right, pursuant to NPDES regulations, to determine in the future whether and how any proposed transfer of the permit may proceed.

By letter of August 23, 2019, Entergy notified EPA that this NPDES Permit was transferred to Holtec Decommissioning International (Holtec). Entergy has satisfied the automatic transfer provision noted above. *See also* Response to Comment I.2.5.

1.3 PNPS Should Shut Down Immediately

Written Comment Submitted by Ms. Azarovitz on 7/25/2016: Given the failure to act by EPA and MassDEP and the massive scale of Entergy's environmental destruction and pollution, termination of Entergy's NPDES permit is the only option. Entergy's operation of the CWIS under the expired permit should be suspended until the citizens are guaranteed that no further environmental destruction will occur. This means that Pilgrim should stop operating until a current, valid, and updated NPDES permit is in place.

Public Hearing Comment from Ms. Vale (of Cape Downwinders); Written Comments submitted by Cape Downwinders on 7/25/16: We agree with the state of New Jersey in their similar efforts to protect Barnegat Bay with their call for shut down of Oyster Creek Nuclear Power Reactor. And this is a quote from the state of New Jersey "Close Oyster Creek Nuclear Power Plant. Shut down of the plant is the best technology available to ensure that Oyster Creek withdrawals from Barnegat Bay for cooling purposes and discharges from the plant do not damage the ecological health of the bay. Closure of the plant will have a significantly more beneficial environmental impact that requiring the installation of cooling towers, which, under the best case scenario, would take seven or more years to be installed, and unlike plant closure, would result in significantly greater water withdrawals and discharges." We agree with the state of New Jersey. The EPA has responsibility for the citizens and the environment.

There is now the opportunity with this review to issue a new permit to prevent ongoing damage for another three years. In order for the EPA to perform its statutory duty, Cape Downwinders calls for the immediate shut down of Pilgrim as the best technology available in order to protect Cape Cod Bay and the marine environment from any further damage by Entergy.

Written Comments from Ms. Frantin and Mr. Edwards Submitted on 7/25/16: We request that our EPA deny attempts by Pilgrim to extend its already 20 plus year overdue permit, end the EPA expansion (lowering) of water quality standards and increasing threats to our environment and health and by abrogation of duty and law allow the profits of filthy, dangerous, and outmoded energy corporations such as Entergy of Louisiana – even while green energy alternatives are available and are the only option to halt climate change – be put ahead of the health, safety, and welfare of the people of Massachusetts and the nation, that these awful and irrational actions be immediately stopped. We need responsible government and responsible

agency members now more than ever. We hope you will abide by law, morality, and common sense.

If our safety & health of our environment and threats from climate change cannot be promised through existing permits, they should be revoked –not extended- and Pilgrim should be closed now. Think about your responsibility and power to deny this extension and to enforce all laws and requirements to shut Pilgrim, make it safe while it closes, clean up the site for future usage, make the corporation pay for it, and provide publicly funded programs training for green renewable energy jobs in our state.

Written Comment Submitted by Ms. Sands on 6/21/16: Since EPA is charged with protecting the environment it is hard to understand why Entergy is allowed to continue to operate this accident about to happen. We cannot wait until the planned closing date of 2019. Too much is at stake.

Public Hearing Comment from Dr. Muramoto (of APCC): There is no guarantee that the plant will close by 2019 other than Entergy's stated intention. The plant's license expires in 2032. So there is potential for more than a decade of operation without BTA.

Written Comment from Ms. Holt Submitted 7/16/16: I cannot fathom the rationale behind allowing the Pilgrim Nuclear Power Station to continue operating with a totally outdated once-through cooling system. Like the NRC, you seem to be basing permit renewal on the financial interest of the plant owner – that En[t]ergy shouldn't be forced to spend money on cooling towers and other safety upgrades when they will be shutting down altogether in three years. I thought that you were supposed to be protecting the environment. If Pilgrim is in any way compromising the water quality of Cape Cod Bay, it should have to shut down now. You should not be granting them even a day's leeway to continue releasing heated and contaminated water into our Bay.

Written Comment from Ms. Sharaga Submitted 7/16/16: I am very concerned about the level of pollution in Cape Cod Bay due to the antiquated practices of the Pilgrim Nuclear Power Plant. Pilgrim's NPDES permit should not allow the continued use of antiquated "once-through cooling system" technology. The new permit should require any power production activities that harm Cape Cod Bay to cease prior to any re-fueling in 2017, and focus entirely on controlling and monitoring pollution and marine impacts related to post-power production activities.

Written Comment from Mr. Nichols Submitted 7/20/16: Pilgrim's current permit allowing use of its outdated 'once-through cooling system' should be terminated. Stricter conditions and a strengthened NPDES permit should apply for the remaining years of operation and throughout decommissioning. The new permit should require power production to cease prior to any re-fueling, and emphasize regulation of site decommissioning and decontamination after power production. The new permit should become effective as soon as possible, no later than spring 2017. EPA must prevent not only ongoing pollutant discharges into Cape Cod Bay, but also the increased pollutant discharges expected because of climate change. Warming seas, sea level rise, storms, flooding, and increased precipitation are likely to cause further pollutant discharges into Cape Cod Bay and/or exacerbate the effects of thermal pollution and impingement/entrainment.

Response to Comment 1.3:

EPA received a series of comments requesting termination of PNPS's NPDES permit prior to the Facility's planned closure date of June 2019. As noted earlier, PNPS shut down, as declared, on May 31, 2019, prior to issuance of the Final Permit. The Final Permit reflects the post-shutdown intake and discharges at PNPS, which are substantially reduced in magnitude from the pre-shutdown conditions. The Agencies did not mandate closure under the NPDES permit and do not agree that closure itself is BTA. *See* Response to Comment III.3.1. Rather, the Final Permit reflects the post-shutdown operating conditions at PNPS (including maintaining sufficient non-contact cooling water flow for the spent fuel rods) and includes technology-based and water quality-based effluent limitations and conditions which ensure the protection of Cape Cod Bay. The Final Permit includes operating requirements consistent with implementation of the BTA, including flow limits that will result in a 92% reduction in flow with a commensurate reduction in the impacts to aquatic life. See Response to Comment I.4.2.

2.0 Impacts of Power Plant Operation on Cape Cod Bay

2.1 Environmental Impact

Written Comment Submitted by Mr. Nichols on 7/20/16: EPA needs to stop the annual killing of billions of aquatic organisms by Pilgrim's cooling water withdrawals. This killing has indirect, ecosystem-level effects, including disruption of aquatic food webs, nutrient cycles, biodiversity, and other effects. Entergy incorrectly claims that this mortality is not of a magnitude to constitute an adverse environmental impact.

Written Comment Submitted by Representative Keating on 7/21/16; Public Hearing Comment from Mr. Jackman (representing Representative Keating): I respectfully encourage EPA to continue incorporating current data on climate change and ocean acidification in its review of PNPS. Given that the EPA is considering decades old data that may not reflect the most recent sea level rise and ocean temperature information, and that PNPS, under the variance proposed by the NPDES, will be discharging significantly heated water into Cape Cod Bay for three more years, I urge EPA to reconsider whether a closed cycle system would provide significant environmental benefits and contribute to safe guarding of Cape Cod Bay.

Written Comment Submitted by Ms. Beck on 6/21/16: PNPS has been operating on an expired water discharge system in which the plant draws in 500 million gallons of water daily and increases the temperature by 32 degrees which is highly radioactive heating is destroying our fish and marine life and is a travesty of criminal negligence. This nuclear plant failed to follow best practices. It has an outmoded cooling system and requires a recirculating one, not a single pass one.

Written Comment Submitted by Ms. Crumbler: Pilgrim has been operating with an expired water discharge permit for 20 years. Pilgrim draws in 500 million gallons of water daily, increases its temperature by 32 degrees, and discharges back into Cape Cod Bay. Your data

indicates a rise in the bay temperature of 4 degrees between 1977 and 2012. The water which is sucked in brings with it large numbers of marine organisms. The cooling system is outmoded and outdated. Best practices require a recirculating system which is not a single pass system which is what they have. With the stated plant to close in three years they are not going to make the necessary changes. Our lives and property values are at stake. It is your job to ensure our safety.

Written Comment Submitted by Mr. Crumbler: The Pilgrim Plant has been operating with an expired water discharge permit for 20 years. The plant's discharge has raided the bay temperature around the plant by over 4 degrees. Given its discharge permit is 20 years expired, I urge EPA to follow through on its mandate to protect our environment and demand Entergy to either rebuild its cooling system to a recirculating one or shut down before 2019.

Written Comment Submitted by Mr. Barocas on 6/21/16: It has already been announced that closure of the facility will occur in 4 years. Right now we are concerned about unsafe running because it has been operating with an expired water discharge permit for over 20 years. Pilgrim draws in 500 million gallons of water daily. It then increases its temperature by 32 degrees and discharges it back into the bay. Cape Cod Bay has already seen an increase of 4 degrees between 1977 and 2012. In addition, an enormous amount of marine organisms are being sucked in each day. Please inspect Pilgrim and make sure that they follow best practices in order to protect our lives, our property, our health.

The Pilgrim Nuclear Facility has been operating with an expired water discharge permit for 20 years in defiance of your organization's regulations. The damage to our environment on Cape Cod continues. They are slated to close in 2019. It is reasonable to expect the modifications be made now to stop further damage.

Written Comment Submitted by Ms. Perry on 6/21/16: It is my understanding that the Pilgrim Nuclear Power Station has been operating for twenty years with an expired water discharge permit. The plant regularly raises the temperature of the bay and, with its daily intake of 500 million gallons of water, it also sucks in untold number of marine organisms. You are charged with ensuring that the nuclear power plants follow best practices. Best practices require a recirculating system, not a single pass system such as the one operating at Pilgrim. Please follow through on your mandate to protect the public, our waters, and our marine life by demanding that Entergy rebuild its cooling system to meet current standards.

Written Comment Submitted by Ms. Weegan on 6/21/16: Pilgrim Nuclear Power Station, a mere 23 miles from my town, has been operating with an expired water discharge permit for over 20 years. The EPA has the duty, is charged with the responsibility, to protect the environment of the United States. Why haven't you insisted that a new permit be obtained? The on-going discharge of heated water into Cape Cod Bay is putting marine life at risk and causing harm to our planet.

Written Comment Submitted by Ms. Carpenter on 7/25/16: Global warming is causing sea levels to rise and raising water temperatures around the globe including our bay. Pilgrim is an unnatural force now in play. If the EPA had been doing its job and using readily available data, En[t]ergy should have been required to abandon their once through cooling system decades ago.

With this outdated system, most of the energy produced by Pilgrim is discharged into the bay as heat causing a measurable rise, approximately thirty degrees, in water temperature. If the EPA has been doing its job, Energy would have been cited for violating the Clean Water Act for using this outdated technology.

Our bay is home to many species which have been impacted. The river herring, or alewife and bluebacks, once an important food source for the early settlers, have significantly decreased in numbers. I did not realize until the recent hearing that Entergy had a captive breeding program for flounder. There would be no need for such an undertaking if there were not a devastating impact on the native flounder. Additionally, the reactor acts as an oversized Cusinart pureeing all marine life sucked into the cooling system.

Written Comments from Ms. Frantin and Mr. Edwards Submitted on 7/25/16: EPA has allowed the owners of this monstrous plant to bypass laws put on the books to protect air, water, and the environment from exactly the pollution – toxins, radioactivity, cesium, tritium, and raised temperature of Cape Cod Bay that EPA has allowed to be used as Pilgrim's dump, mutilation and destruction of marine life, fish, and the commercial value of our area.

The amount of cancer producing radioactivity (highest cancer rate in Massachusetts, shame on every bureaucratic federal and state "health and safety watchdog" committee), the amount of death and destruction and mutilation of fish and marine life from life-giving plankton to the fish that provide livelihood to fishermen and the tourist industry that depends on clean, safe Cape Cod Bay fishing, bathing, etc., the needless environmental hazards produced by profit mongering Entergy and its deadly Pilgrim plant cannot stand.

We demand the EPA deny this extension and require "best technology' in all current facets of operation to be immediately put into practice at Pilgrim and if our safety cannot be ensured because of inadequate prior enforcement and lack of time to build and install the required safe storage, a safer closed system rather than the current pass-thru system that allows heat, toxins, mutilation of fish and plant life insanely used to cool an outdated, 50 year old flawed Fukushima design death-plant where even that design has been compromised to allow 3200 rods to be stored in containment built for 800.

Written Comment Submitted by Ms. Azarovitz on 7/25/16: Entergy's CWIS harms Cape Cod Bay in many ways including: killing tens of millions of fish and billions of planktonic organisms every year; dumping roughly 500 million gallons of hot water mixed with pollutants into the Bay each day, which disrupts and destroys ecosystem processes; most of the energy produced is wasted.

Written Comment Submitted by Dr. Garb on 6/10/16: Every day, Pilgrim sucks 500 million gallons of water from Cape Cod Bay into its reactor, heats it by approximately 32°F and discharges it back into the Bay. Your data document a rise in temperature of the Bay of 4°F from 1977 to 2012, which is significant and contributes to the global ocean warming that the world is trying hard to prevent. This has been shown to scour the ocean floor near the discharge from Pilgrim and has a deleterious effect on bivalve marine life. Every day, fish, fish roe and other organisms are sucked into the water intake and killed. The entrainment of seaweed in the intake

screens has been described as a serious potential threat to the critical cooling and safe operation of the reactor.

Pilgrim is an outdated, poorly designed facility. Today, best practice would be a recirculating cooling system rather than Pilgrim's single pass system. It is a travesty that Pilgrim has been allowed to operate with an expired NPDES permit for 20 years. I urge you to either require Entergy to install a recirculating cooling system at Pilgrim or to close the reactor down immediately.

Public Hearing Comment from Ms. Azarovitz: Ultimately, there is thermal pollution which negatively impacts marine life by affecting metabolic rates, feeding behavior, reproduction and distribution of the organism as well as changing the physical habitat, its plant life as do the other factors resulting in climate change. And with this, only a third of Pilgrim's thermal energy is converted to electricity. The rest, the two-thirds remaining of that thermal energy is discharged into Cape Cod Bay.

If Pilgrim Nuclear Power Station were outfitted with a closed cycle cooling system, its operations would, through all of these years, have reduced damage to Cape Cod Bay.

Public Hearing Comment from Dr. Muramoto (of APCC): Entergy is costing tax payers millions of dollars by impacting regional fisheries and adding thermal pollution to Cape Cod Bay which is already experiencing warming due to climate change. The Draft Permit allows Entergy to continue shifting the cost of pollution to the tax payers. In short, APCC feels that the Draft NPDES Permit promotes additional degradation and violates federal and state Clean Water Acts. It should not be issued as a Final Permit.

Public Hearing Comment from Ms. Vale (of Cape Downwinders); Written Comments submitted by Cape Downwinders on 7/25/16: To be successful, there needs to be management and oversight of a serious regulation to achieve that goal. The EPA must enforce the law. Not to do so raises serious questions about accountability and responsibility. Entergy is in violation of the Clean Water Act by using outdated cooling technology. Is this why the EPA allowed 20 years to lapse before reviewing Entergy's permit to pollute and damage the Cape Cod Bay? To avoid implementing the law? Has EPA effectively stonewalled the Clean Water Act progress while Entergy exploits and damages the public's natural resources?

For over 44 years, the once through cooling water intake system at Pilgrim has clearly damaged our treasured Cape Cod Bay and the marine life that inhabits it.

Public Hearing Comment from Ms. Sheehan: This is a permit to pollute. And its allowed Entergy to use Cape Cod Bay as a free source of cooling water for over 40 years. And it's a dump for pollution, including radioactive materials that are discharged, that are not regulated under this permit, and they're allowed by NRC limits. In addition to the radioactive material that's discharged into the bay every day during operations, Pilgrim is leaking cesium, tritium, etc. into the groundwater, into the sole source aquifer. This is flowing into Cape Cod Bay. There has been inadequate, if any, monitoring of this. We know that Entergy has not been monitoring the stormwater discharges where a lot of this is flowing into.

Entergy has been allowed to massively destroy Cape Cod Bay. It has taken over a mile of shoreline. This shoreline and the bay belongs to everyone. It's not Entergy's to pollute and destroy. The permit should never have been issued as a once through cooling water system back in the 90's and it should be terminated immediately now. Please stop using Cape Cod Bay as a dump.

Public Hearing Comment from Ms. Dubois (of Jones River Watershed Association): The continuation of the once through cooling Pilgrim now has is a violation of law. It's our opinion that the re-licensing should not have occurred without the permit being reissued in 2012. It's our opinion, when Entergy purchased the facility in 1999 and 2000 and disbanded the Pilgrim Technical Committee that was basically responsible for monitoring that intake, and creating an adaptive management plan every six months so that the effect on Cape Cod Bay marine species would not occur to the degree that they have.

In fact, they [Entergy] were allowed to upgrade in 2004. That wasn't even mentioned in your permit. They were producing more power in 2004 than they were in 2000. In fact, they were producing more power through the 2000s than they every produced, because they were never very consistent.. it was a bigger impact on Cape Cod Bay.

It's wrong for you to think that 1970's studies, or you know, hit and miss applications or highly paid consultants are really giving you the truth about what's happening in Cape Cod Bay. If you have to have a nursery to create more flounder, to replace the flounder you've killed in Cape Cod Bay, that should be an indication that things aren't so good.

Our concern is sea level rising, groundwater is rising. That's going to affect your discharges. It's going to affect your discharges especially post 2019. But if you extend the permit…it extends this whole stockpiling of nuclear waste for an additional five years. They're going to have to have it in the spent fuel pool. They're going to have their FLEX strategy. They're going to postpone clean up and decommissioning on site, whatever that clean up and decommissioning in the PSDAR might say.

I want EPA to be ready to say to Entergy, time's up. Enough's enough. The impact on the bay is very serious. You want all that nuclear waste sitting on the shoreline bleeding all that crap into the bay? It's not okay. I want you to really step it up EPA. We want you to really look at the water quality standards. We want you to look at what DOE is doing. We want you to look at where the spent fuel is actually stored 150 feet from the bay. We want you to look at the cooling water and the integrated nature of all this that affects the discharges. And then the fact that they're going to shut off in 2019, then they're going to rubblize the site. You don't think that's going into the drains? You didn't really address that and you really need to.

Public Hearing Comment from Mr. Sollog: Cape Cod Bay is an invaluable resource. We can't lose it. You can't mistreat it any further. You should protect it. That's what you're charged with. And you're charged to protect that for the people, please, not for the companies. For the people.

Response to Comment 2.1:

EPA received a number comments about the environmental impact of the intake and discharges from PNPS on Cape Cod Bay, including requests for PNPS to install and operate closed-cycle cooling as the best technology available, comments about radioisotopes in the groundwater, and comments about the continued impacts that could occur during decommissioning.

The Agencies agree with the commenter that stated "Entergy incorrectly claims that this mortality is not of a magnitude to constitute an adverse environmental impact." The Fact Sheet (Attachment D at 13-30) summarizes the impacts from impingement mortality and entrainment at the cooling water intake structure and clearly identifies these as adverse environmental impacts. For example, the Fact Sheet states "PNPS is responsible for the loss of billions of eggs and larvae, and millions of fish and other aquatic organisms annually as a result to the operation of its CWIS. Consistent with the Final Rule, these losses represent an adverse environmental impact to Cape Cod Bay." Attachment D at 24. The Final Permit includes operational requirements (flow limits, limits on operation of certain pumps, requirements for operation of the traveling screens) that together constitute the BTA at PNPS. In particular, the flow limits will result in a 92% reduction and flow (and thus, entrainment) and enable PNPS to achieve a through-screen velocity that will minimize impingement mortality. These requirements are consistent with the best performing technologies in the industry to minimize adverse environmental impacts from cooling water intake structures.

EPA received a number of comments requesting that PNPS be required to install a recirculating system, such as closed-cycle cooling, as BTA and suggesting that a once-through cooling system is outdated and cannot be BTA. First, closed-cycle cooling is the best performing technology for minimizing impingement and entrainment and is likely the best technology available to address the discharge of heat from power plants. See Fact Sheet Attachment D at 38 and Fact Sheet at 46-7. At the same time, there is no statute or regulation that requires a facility to implement closed-cycle cooling as the only option to minimize adverse impacts of the discharge of pollutants.

CWA Section 316(a) allows that any effluent limitation proposed for the control of the thermal component of any discharge from such source will require effluent limitations more stringent than necessary to assure the projection and propagation of a balanced, indigenous population of shellfish, fish , and wildlife in and on the body of water into which the discharge is to be made, the Administrator (or if appropriate, the State) may impose an effluent limitation under such sections for such plant, with respect to the thermal component of such discharge (taking into account the interaction of such thermal component with other pollutants), that will assure the projection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on that body of water. See also 40 C.F.R. § 125 Subpart H (especially § 125.73(a) "thermal discharge effluent limitations or standards established in permits may be less stringent than those required by applicable standards and limitations if the discharger demonstrates to the satisfaction of the director that such effluent limitations are more stringent than necessary to assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in an don the body of water into which the discharge is made"). CWA Section 316(b) requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. For existing facilities, such

as PNPS, the implementing regulations for establishing effluent limitations and conditions for CWISs are found at 40 C.F.R. § 125 Subpart J. The fact that the Draft Permit did not require closed-cycle cooling as the BTA is not, at the outset, inconsistent with federal statute or regulations. There is no national standard that power plants operate a closed-cycle recirculating system as the best technology for either the discharge of heat or the intake of cooling water. In this way, the Draft Permit is not inconsistent with federal regulations and operation of a once-through cooling system is not a violation of the CWA.

EPA received many comments on the Section 316(a) variance and the requirements for the CWIS, including that the permittee's demonstration was inadequate to support this variance and that closed-cycle cooling is available and feasible. See, for example, Comments I.2.2, I.3.1, I.3.4, I.4.2, and II.1.0. The Final Permit's limitations and conditions result in a 92% reduction in flow, which is consistent with the best technology available to minimize adverse environmental impacts from CWISs under CWA § 316(b). In addition, the Final Permit's temperature limits result in a 98% reduction in heat load to Cape Cod Bay, which is consistent with reductions in heat achievable with the use of cooling towers. The Agencies have addressed comments about effluent limits and permit conditions for thermal discharges as well as entrainment and impingement in Responses to Comments I.2.2, I.3.1, I.3.4, I.4.2, and II.1.0.

One commenter raised concerns about discharges of cesium, tritium, and other radioactive material into the groundwater and the sole source aquifer. Radioactive discharges that are regulated separately under the Atomic Energy Act of 1954 are not also regulated as pollutants through NPDES permits. The definition of "pollutant" at 40 C.F.R. § 122.2 in turn expressly includes "radioactive materials," "*except* those regulated under the Atomic Energy Act of 1954 (AEA), as amended (42 U.S.C. 2011 et seq.)." (emphasis added). *See also* CWA § 502(6) (defining "pollutant" to include "radioactive materials"); *Train v. Colorado Pub. Interest Research Group*, 426 U.S. 1 (1976) (hereinafter, "*Train*") (interpreting the term "pollutant" at CWA § 502(6) consistent with the definition at 40 CFR § 122.2). The NRC is responsible for ensuring that any release of radioactive material is consistent with EPA's standards for radiation releases and doses to the public from normal operation of nuclear power plants and other uranium fuel cycle facilities. *See* 40 C.F.R. Part 190. *See also* 42 Fed. Reg. 2860 (January 13, 1977). EPA has responded to similar comments regarding discharges of radioactive materials in Responses to Comments I.2.6, II.1.0, III.7.0, and IV.3.0.

At the same time, EPA recognizes the public health concern raised in the comment regarding discharges of radioactive material, including tritium, to the groundwater. The Massachusetts Department of Public Health (MassDPH) oversees a monitoring program for nuclear power station emergency planning zones, including at PNPS. MassDPH's Bureau of Environmental Health monitors radiation at a series of stationary monitors surrounding PNPS. These data are transmitted to DPH, which ensures real-time environmental monitoring of radiation from PNPS. The Radiation Control Program also monitors radiation levels in surface water, sediment and biota, and fish and shellfish around PNPS. *See* AR-701. Entergy began routine monitoring of groundwater wells for tritium in 2007. Well and surface water samples are sent by Entergy to an independent analytical lab and duplicate samples are provided to MassDPH for analysis at the Massachusetts Environmental Radiation Lab. MassDPH provides quarterly updates on

groundwater and surface water results.[88] Neither Entergy, nor MassDPH has indicated that the groundwater monitoring program at PNPS will be discontinued now that PNPS has shutdown. *See* Response to Comment II.1.0.

Finally, several commenters raised concerns about decommissioning, including the location of the spent fuel storage area, the method of storing spent fuel, and discharges that could result from demolition of buildings on the site. The Agencies have addressed similar concerns about decommissioning in Response to Comment IV.5.1, below. The NRC is the primary authority for overseeing the decommissioning of nuclear power plants, including decisions about the location of the ISIFI and the method of storing nuclear waste. According to the November 16, 2018 PSDAR submitted by Holtec Decommissioning International (Holtec), the planned method for PNPS is DECON, which is expected to be completed sooner than the SAFSTOR method initially proposed by Entergy. *See* AR-696. The Final Permit includes monitoring requirements, effluent limitations, and non-numeric, technology-based requirements for stormwater discharges associated with industrial activity as described in this Response to Comments and in the Fact Sheet. However, discharges of stormwater associated with construction activity and certain other discharges that may be related to decommissioning (e.g., pipeline and tank dewatering) or to dismantling and demolition of plant buildings and structures are not authorized. *See* Parts I.B and I.H.6 of the Final Permit and Condition 4 of MassDEP's Water Quality Certificate. If, during decommissioning and site restoration, the Permittee expects to discharge pollutants not covered by the Final Permit, the Permittee may be required to modify its individual permit or seek additional coverage another NPDES permit (for example, EPA's Construction General Permit).

2.2 Species of Concern

Written Comment Submitted by PilgrimWatch on 7/25/16; Public Hearing Comment from Ms. Lampert (of PilgrimWatch): EPA's analysis needs to be expanded regarding the impact on protected species, including endangered shore birds such as Rosette Terns, over the next 60 or so years. It is likely that species distribution and composition in Cape Cod Bay has changed due to human activity, climate change and other factors and EPA should take this into account when assessing Pilgrim's impacts. Also, the likely species distribution and composition in Cape Cod Bay is likely to change, has changed, due to human activity, climate change, and other factors. That has to be analyzed and then taken account of.

Written Comment Submitted by Mr. Nichols on 7/20/16: Section 7 re-initiation by NOAA Fisheries would be appropriate given that EPA is revising Pilgrim's NPDES permit, the newly established, expanded critical habitat area for North Atlantic right whales in Cape Cod Bay, the fact that endangered right whales are being sighted in the western part of the Bay with more frequency, the current special concern status of rainbow smelt, and the on-going monitoring of river herring.

Response to Comment 2.2:

[88] Monitoring data are available to the public at https://www.mass.gov/lists/environmental-monitoring-data-for-tritium-in-groundwater-at-pilgrim-nuclear-power-station.

The Draft Permit considered the impacts of impingement mortality, entrainment, thermal discharges, and discharges of other pollutants on aquatic life in the vicinity of the discharge, including specific species know to be present (e.g., river herring and rainbow smelt). The commenters request that EPA consider impacts to endangered shore birds and the North Atlantic Right Whale in its consultation with the Services under the Endangered Species Act (ESA). The Agencies responded to similar concerns in Response to Comment I.5.4.

EPA proposed that the re-issuance of the NPDES Permit for PNPS is not likely to adversely affect listed species or critical habitat in the action area, which includes Cape Cod Bay. In addition, EPA proposed that because the Draft Permit limits are as stringent or more stringent that the permit in effect at the time of the 2012 consultation with NRC, in which NOAA Fisheries found that the impacts of the proposed relicensing were unlikely to adversely affect listed species or designated critical habitat (including the continued operation in compliance with the administratively continued permit), re-initiation of formal consultation is not necessary at this time. *See* AR-698, AR-465. *See also* Fact Sheet at 54-65. NOAA Fisheries concurred with EPA's finding that re-initiation of consultation is not necessary for the Final Permit. *See* AR-694. All effects of the proposed action on listed species and designated critical habitat have been previously considered in the 2012 consultation and the analysis remains valid. In particular, the 2012 consultation already considered the effects to designated critical habitat for the North Atlantic right whale in Cape Cod Bay. In other words, the analysis remains valid even as the area of critical habitat was expanded in 2016 because the 2012 consultation already considered the impacts to designated critical habitat.

The comment also requests that EPA consider additional species in the ESA assessment, including rainbow smelt and river herring. The Fact Sheet (at 54-56) explains that Section 7(a) of the ESA requires Federal agencies, in consultation with and with the assistance of the Secretary of Interior, to ensure that any action that the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. Rainbow smelt and river herring were not included in the ESA assessment because neither species is listed as federally threatened or endangered species. In other words, Section 7(a) does not apply to these species. Having said that, EPA did consider the potential impacts of the CWIS and effluent discharges on both species for the Draft Permit and again in responding to comments on the Draft Permit. *See*, *e.g.*, Fact Sheet Attachment D at 26-27 and Response to Comment III.2.1.6. If a new species is listed (including either river herring or rainbow smelt), or critical habitat is designated or revised, and the species or habitat may be affected by the action, EPA will re-initiate consultation with the Services.

Finally, the comment requests that EPA consider impacts to roseate terns. The roseate tern is a federally threatened species under the jurisdiction of the United States Fish and Wildlife Service (USFWS). EPA notified USFWS of the public notice for the Draft Permit but did not receive any comments. In response to this comment, EPA corresponded with USFWS regarding the potential impacts of the permit reissuance on roseate tern (*Charadrius melodus*) and red knot (*Calidris canutus rufa*). *See* AR-699. USFWS concurred with EPA's assessment that renewal of the PNPS NPDES permit may affect, but is not likely to adversely affect, any listed species or critical habitat under USFWS' jurisdiction. *See* AR-700.

2.3 Pilgrim Should Fund Mitigation for Past Ecological Damage

Written Comment Submitted by Mr. Nichols on 7/20/16: EPA should require Entergy to fund a mitigation account for restoration and monitoring work in Cape Cod Bay and nearby estuaries throughout the decommissioning process, to monitor for ecosystem changes due to global warming and climate change and adjust its operations to fully protect those waters. Entergy should be required to study and mitigate impacts from Pilgrim's 40-plus years of operations, including at least 10 years after shutdown and until decommissioning is complete (up to 60 years after shutdown).

Written Comment Submitted by PilgrimWatch on 7/25/16: EPA should require Entergy to fund a mitigation account for restoration and monitoring work in Cape Cod Bay to "pay back" for the 20+ year delay is reissuing the permit and the consequent environmental harm due to Pilgrim's continued use of a once-through cooling system when better technology was available. Mitigation and monitoring must occur throughout the decommissioning process. (Pilgrim Watch)

Written Comment Submitted by Mr. Nichols on 7/20/16: EPA (and MassDEP) must hold Entergy accountable for past violations and ensure compliance with all requirements of the new permit in order to effectively reduce impacts from Pilgrim's activities and to protect Cape Cod Bay. Entergy's noncompliance with the current permit has included exceeding effluent limits for a variety of pollutants, disbanding the required Pilgrim Administrative-Technical Committee (PATC) that watched over marine impacts, and not carrying out required storm drain testing for nearly a decade. Enforcement of requirements has been mostly nonexistent.

Public Hearing Comment from Ms. Lampert (of PilgrimWatch): You should require Entergy to fund a mitigation account for 20 years of damage. And I've brought up the tricky question of who really should be paying. And I think that is an important legal question that should be looked at. Is it Entergy for not doing what they were not required to do? Or is it the agency's for not requiring that the law be followed? That is a very interesting question.

Response to Comment 2.3:

Several commenters requested that the NPDES permit include a requirement for Entergy to fund mitigation efforts in Cape Cod Bay. The Agencies responded to similar concerns in Response to Comment I.2.3.

The commenters do not identify any provision under the federal CWA, the Massachusetts Clean Waters Act, or their respective implementing regulations as requiring such a permit condition. Nor do the comments identify any other NPDES permits that include any such condition. Notably, in responding to public comments on the § 316(b) Final Rule, EPA disagreed with comments that requested additional permit requirements based on organism losses that occurred in the past. *See* Final Rule RTC at 108.

EPA also noted the potential difficulty in accurately calculating the effects of such past losses on current abundances of organisms and thereby determining an appropriate level of response. *Id.* Furthermore, in general, as part of a negotiated settlement to address past violations of a NPDES permit, the Agencies may require a Permittee to conduct supplemental environmental projects, which could include efforts to mitigate past environmental harm as described in the comment, but such a requirement occurs in the context of an enforcement action to resolve permit violations, not a permitting action.

The Agencies do not disagree with the comment that PNPS's cooling water intake has removed and killed billions of aquatic organisms in Cape Cod Bay since 1972 and indirectly impacted the aquatic environment as a result. Indeed, the Agencies closely examined environmental impacts associated with the facility's intake and discharge of cooling water in determining the appropriate BTA for the facility under CWA § 316(b) and temperature variance under § 316(a), as well as other effluent limitations. The past withdrawal and discharge of cooling water, however, occurred in the context of a permitted activity sanctioned by the Agencies under previous permits issued pursuant to federal and state law. The comment does not allege that the impacts resulted from violations of past permits. As such, the Agencies do not agree that including the requested mitigation fund permit condition in the Final Permit is appropriate here. As to the period after May 31, 2019, when the facility stopped generating electricity, the Final Permit contains more stringent flow and temperature limits that are expected to coincide with a roughly 92% reduction in losses from impingement and entrainment and 98% reduction in heat load. These reductions in flow and temperature will significantly reduce the impacts from PNPS' withdrawals and discharges.

3.0 Discharges of radioactive wastewater

Written Comment Submitted by Mr. Nichols on 7/20/16: Radionuclides in the discharge water, not mentioned in the draft permit, need to be eliminated or sharply reduced before water is discharged to be eliminated. EPA needs to take jurisdiction seeking legislation if necessary.

Public Hearing Comment from Dr. Muramoto (of Association to Preserve Cape Cod): Radioactive discharges from Pilgrim pose a regional threat to environmental quality, human health and the health of Cape Cod Bay's ecosystems. Discharges of radioactive tritium into groundwater pose a threat to Plymouth's sole-source aquifer and to Cape Cod Bay's water quality and ecosystems. APCC believes that Pilgrim's discharge of radioactive materials should cease and that permits allowing for discharge should be terminated.

Public Hearing Comment by Ms. Sheehan (of Cape Cod Bay Watch): In addition to the radioactive material that's discharged into the bay every day during operations, Pilgrim is leaking cesium, tritium, etcetera, into the groundwater, into the salt source aquifer. This is flowing into Cape Cod Bay. There has been inadequate, if any, monitoring of this. We know that Entergy has not been monitoring the storm water discharges where a lot of this is flowing into.

Response to Comment 3.0:

Several commenters raised concerns about the discharge of radioactive materials to surface water and the discharge of tritium, a nuclear byproduct material, to groundwater. The Agencies responded to similar concerns in Responses to Comments I.2.6, II.1.0, III.7.0, and IV.2.1.

While EPA has the authority under the Atomic Energy Act ("AEA") to *establish* generally applicable environmental standards for the protection of the general environment from radioactive material—which it has done at 40 C.F.R. part 190—the NRC has the responsibility to *insure adherence* to EPA standards in the NRC's regulation of individual nuclear power plants. *See* Reorganization Plan No. 3, § 2(a)(6); 10 C.F.R. parts 20, 50; 35 Fed. Reg. 15,623 (Oct. 6, 1970); *see also* 79 Fed. Reg. 6509 (Feb. 4, 2014); 42 Fed. Reg. 2860 (Jan. 13, 1977). Radioactive discharges that are regulated under the AEA are not regulated under the Clean Water Act. *Train v. Colorado Pub. Interest Research Group*, 426 U.S. 1 (1976). For this reason, the definition of "pollutant" in EPA's NPDES regulations at 40 C.F.R. § 122.2 includes "radioactive materials," "*except* those regulated under the Atomic Energy Act of 1954 (AEA), as amended (42 U.S.C. 2011 et seq.)." (emphasis added). *See also Train v. Colorado Pub. Interest Research Group*, 426 U.S. 1 (interpreting the term "pollutant" at CWA § 502(6) consistent with the definition at 40 CFR § 122.2). Thus, the permit does not regulate discharges of radioactive materials regulated under the AEA.

The Massachusetts Department of Public Health's (MassDPH) Radiation Control Program (RCP) conducts environmental radiation monitoring within the Emergency Planning Zones (EPZs) of operating nuclear power stations in or near the Commonwealth as part of its regulating responsibilities. The EPZ for PNPS has environmental radiation sampling programs. The Massachusetts Bureau of Environmental Health monitors radiation at a series of stationary monitors surrounding PNPS. These data are transmitted to MassDPH, which ensures real-time environmental monitoring of radiation from PNPS. The RCP also monitors radiation levels in surface water, sediment and biota, and fish and shellfish around PNPS. *See* AR-701. Entergy began routine monitoring of groundwater wells for tritium in 2007. Well and surface water samples are sent by Entergy to an independent analytical lab and duplicate samples are provided to MassDPH. MassDPH provides quarterly updates on groundwater and surface water results.[89] Neither Entergy, nor MassDPH has indicated that the groundwater monitoring at PNPS will be discontinued now that PNPS has shutdown.

4.0 Stormwater Monitoring

4.1 Stormwater BMPs

Written Comment Submitted by Mr. Nichols on 7/20/16: Stormwater yard drains should be fitted with backflow prevention to avoid flushing of contaminants into the sea and will require proper monitoring, particularly because pollutants are likely to increase due to climate-change caused increased flooding, sea levels, and groundwater rise, thus increased runoff.

Response to Comment 4.1:

[89] Monitoring data are available to the public at https://www.mass.gov/lists/environmental-monitoring-data-for-tritium-in-groundwater-at-pilgrim-nuclear-power-station.

The commenter requests that the Final Permit include a requirement to fit stormwater yard drains with backflow prevention to avoid flushing of contaminants into Cape Cod Bay. EPA is not clear what the commenter means by "backflow prevention." The catch basins capture stormwater runoff from the site and the Final Permit authorizes the discharge of stormwater to Cape Cod Bay through Outfalls 004, 005, 006, and 007. Parts I.A.5 and I.A.6 of the Final Permit authorize stormwater discharges and include effluent limitations and monitoring requirements to ensure that discharges of stormwater are sufficiently monitored. Stormwater outfalls are designed to drain water away from buildings and infrastructure and fitting any of these stormwater outfalls with backflow prevention would allow water to build up on the site and may present safety and operational concerns.

In addition, Part I.D of the Final Permit (Special Conditions) includes non-numeric, technology-based requirements to address stormwater associated with industrial activity consistent with EPA's 2015 Multi-Sector General Permit (MSGP). The Permittee must implement best management practices (BMPs), consistent with the 2015 MSGP, to minimize pollutant discharges from stormwater associated with industrial activity. The Final Permit includes a brief description of each of the BMPs and refers the Permittee to Part 2.1.2 of the 2015 MSGP, which includes a more detailed discussion of potential control measures to address each of the BMPs. These include minimizing exposure of stormwater to processes and material storage areas, good housekeeping measures, preventative maintenance programs, spill prevention and response, erosion and sediment controls, runoff management practices, proper handling, and minimizing generation of dust associated with industrial activity. The Final Permit also requires the Permittee to implement employee training to ensure personnel understand the stormwater related requirements of the permit, including staff responsible for stormwater controls, staff responsible for storage and handling of materials that may be exposed to stormwater, and staff responsible for inspections. The Permittee must also develop a stormwater pollution prevention plan (SWPPP) to document how the BMPs are implemented. Together, the numeric limits, monitoring requirements, and non-numeric limits in the Final Permit will ensure that pollutants being discharged directly into Cape Cod Bay via stormwater discharges are minimized.

4.2 Stormwater in Electrical Vaults

Written Comment Submitted by Mr. Hoopingarner on 7/12/16: The water in the station's electrical vaults, which has been found to contain cyanide, phenols, phthalates, PCBs, antimony, iron, copper, zinc, lead, nickel, cadmium, and hexavalent chromium; not all of these are reflected under the current permit, which omits cyanide, antimony, nickel and hexavalent chromium. The new permit should address all of these contaminants.

Written Comment Submitted by Ms. Burgess (of Cape Cod National Seashore Advisory Commission) on 7/23/16: There are 25 electrical vaults on-site that were never monitored before now – these drain to the stormwater outfalls. Testing in 7 of the 25 found total suspended solids, cyanide, phenols, phthalates, PCBs, antimony, iron, copper, zinc, lead, nickel, cadmium, and hexavalent chromium. Lead, copper, and zinc were all exceeding marine water quality criteria. EPA is only requiring a 1-time test of all 25 vaults, and only making Entergy regularly test 5 of the 25 vaults, and the substances that Entergy has to monitor for is not even the full list of pollutants they already found (cyanide, antimony, nickel, and hexavalent chromium appear to be

omitted). EPA needs to test all 25 vaults, develop a complete list of parameters, then the complete list of parameters should be included in the final permit. And there should be numerical limits not just monitoring whether pollutants are present.

Written Comment Submitted by Mr. Nichols on 7/20/16: EPA needs to require sampling of all water to be discharged into Cape Cod Bay and removal of all known contaminants prior to discharge, including total suspended solids, cyanide, phenols, phthalates, PCBs, antimony, iron, copper, zinc, lead, cadmium, and hexavalent chromium. The draft permit needs to be amended to include all these contaminants. EPA should test all 25 electrical vaults (contaminants were found in seven), develop a complete list of parameters, then this complete list should be included in final permit.

Response to Comment 4.2:

Several commenters noted concerns with the stormwater that accumulates in 25 electrical vaults on the property and requested that the Final Permit include monitoring requirements for all 25 electrical vaults on the property. The Agencies responded to similar concerns in Responses to Comments I.3.6 and II.1.0. The Agencies also responded to comments from the Permittee regarding permit conditions for the electrical vaults in Response to Comment III.10.

During the permit term, PNPS informed the Region that stormwater discharged from the four storm water outfalls includes stormwater that accumulates in various electrical vaults on the property and that is periodically pumped out to the closest stormwater outfall in order to assure proper working condition of electrical cables and associated equipment in the vaults. The permittee indicated that the NRC requires the inspection of these vaults on a regular basis to assure that electrical equipment and wires are not submerged in water for extended periods of time. *See* United States Nuclear Regulatory Comm'n, *NRC Information Notice 2010-26: Submerged Electrical Cables* (Dec. 2, 2010). Consequently, facility personnel routinely inspect these vaults, especially after storm events. With the exception of those vaults that have automatic pumping capability, the water that has collected in these vaults are pumped out manually by facility personnel in order to comply with the NRC guidance.

One commenter noted that stormwater discharges from all of these vaults needed to be characterized. In order to assess the constituents of the water in these vaults, EPA sent PNPS a CWA Section 308 (information request) letter on March 24, 2015 requiring water sampling from seven (7) of the electrical vaults on the property for a variety of pollutants that could possibly be found. The results of this sampling, which were submitted with a letter of June 30, 2015 by PNPS, found that the sampled pollutants were either often not detected or detected at low levels and further detailed in the fact sheet.

In the Draft Permit, quarterly monitoring is required for water that has collected in five (5) specific electrical vaults, which are located throughout the property. Since each of these 5 vaults discharges to a nearby, permitted stormwater outfall, they have been designated as internal outfalls and numbered 004A, 005A, 005B, 007A and 007B, reflecting the existing stormwater outfall to which they discharge. This sampling is required quarterly and does not need to be conducted during wet weather, since the pumping out of water from the vaults can occur in wet

or dry conditions. The parameters to be sampled include TSS, cyanide, total PCBs, total copper, total iron, total lead, total zinc, and pH. This listing reflects parameters that were detected in at least one of the vaults in the initial, single sampling event in 2015. The Jones River Watershed Association pointed out in its comments that the Draft Permit neglected to include several parameters that were detected in the 2015 samples, including antimony, cyanide, nickel, and hexavalent chromium. These parameters have been included in Part I.A.7 of the Final Permit. *See* Response to Comment I.3.6.

The Final Permit establishes a one-time sampling requirement for all of the electrical vaults that were not sampled in 2015. These samples shall be analyzed for the same parameters that were required in 2015 (listed in Permit Attachment C). A characterization of water collected in the previously unsampled vaults is warranted because these vaults have not yet been sampled, are located throughout the property, and the initial sampling showed the presence of several pollutants. Depending on results from this new monitoring regime, the Agencies may request/require additional monitoring data from the Permittee, modify Part I.A.7 of the Final Permit to revise monitoring requirements for certain vaults, or both. *See* 40 C.F.R. § 122.62. The results of any additional or revised monitoring would also inform future NPDES permitting at the site.

4.3 Stormwater Monitoring

Written Comment Submitted by Ms. Burgess (of Cape Cod National Seashore Advisory Commission) on 7/23/16: For the past 10 years, Entergy has barely done any stormwater drain testing, despite it being a permit requirement. These stormwater drains are where the electrical vaults (and the long list of pollutants mentioned above) drain to. No enforcement actions have been taken for this lack of sampling. EPA has to start enforcing limits and conditions it imposes in order to protect the resources and qualities of Cape Cod Bay upon which we all depend.

Written Comment Submitted by Mr. Nichols on 7/20/16: EPA should monitor storm drain testing with heightened scrutiny and be prepared to enforce when testing is not done or limits are exceeded. That is particularly needed because Entergy failed to test storm drains for about 10 years. Penalties should be pre-determined and automatically assessed, with particular attention to egregious exceedances or unpermitted discharges. Although EPA's design of the storm drain sampling regime and increased frequency of sampling is appropriate, Entergy's lack of adherence needs to be ended.

EPA needs to require sampling of all water to be discharged into Cape Cod Bay and removal of all known contaminants prior to discharge, including total suspended solids, cyanide, phenols, phthalates, PCBs, antimony, iron, copper, zinc, lead, nickel, cadmium, and hexavalent chromium. The draft permit needs to be amended to include all these contaminants.

Written Comment Submitted by Mr. Hoopingarner on 7/12/16: Storm drains in the facility overall should be more heavily considered, and represent another reason that the current, expired permit should be terminated and replaced with a stronger NPDES permit for the remainder of its operational life. Regular sampling of storm drains, extraction of all harmful pollutants

(especially triazoles) from water before discharge and installing backflow prevention in the storm sewers should be some priorities under this new permit.

Response to Comment 4.3:

Several commenters raised concerns about the current frequency of stormwater monitoring but did not identify any specific issues with the proposed monthly stormwater monitoring or effluent limitations at Outfalls 004, 005, 006, or 007 in the Draft Permit. The Agencies also responded to similar comments about stormwater monitoring in Responses to Comments I.3.5 and I.3.6.

The Final Permit requires monthly monitoring of the four stormwater outfalls, includes language defining when sampling must occur, and authorizes sampling to be conducted at upstream locations of the outfall where appropriate. These Final Permit includes permit limits for TSS, pH, and oil and grease. In addition, the Final Permit requires quarterly monitoring of stormwater at five electrical vaults, as well as a one-time sampling requirement for stormwater from certain electrical vaults which have not yet been analyzed (See Parts I.C.3 and I.J. of the permit). The Final Permit also contains new, non-numeric limitations to develop and implement best management practices (BMPs) to identify and minimize the sources of pollution from stormwater discharged to Cape Cod Bay. The Permittee must document the implementation and inspection of these BMPs in a stormwater pollution prevention plan (SWPPP). The non-numeric limitations are consistent with EPA's 2015 Multi-Sector General Permit (MSGP) for stormwater discharges associated with industrial activity.

4.4 Stormwater Outfall 013

Written Comment Submitted by Mr. Hoopingarner on 7/12/16: As the process of climate change continues, warming seas, harsher storms, and sea level rise will introduce even more vectors for pollution coming from the plant. For this reason, Outflow 013, which drains in cases of extreme storms, should also be considered in the permit analysis.

Written Comment Submitted by Mr. Nichols on 7/20/16: Outfall 013, which drains to Cape Cod Bay during extreme storm events, should be included in the final permit and effluent limits should apply. This is essential given consensus that more intense storms and flooding will increasingly impact the Northeast, and therefore Pilgrim.

Response to Comment 4.4:

Several commenters raise concerns that Outfall 013 has not been adequately considered in the Draft Permit. The Agencies also responded to similar comments about Outfall 013 in Response to Comment I.3.5 and I.3.6.

As explained in the Fact Sheet, Outfall 013 may discharge only during extreme storm events and this discharge is believed to be representative of the other stormwater discharges at Outfalls 004, 005, 006 and 007. EPA has not established effluent limits and monitoring conditions at Outfall 013 because, under most storm conditions, stormwater at this outfall infiltrates the soil prior to discharge to the intake embayment meaning that there is not typically a discharge from this

outfall. In addition, Outfall 013 is located at an inaccessible location between a concrete wall and security fence (AR-516). Monitoring at Outfall 013, will, except under extreme circumstances, result in reporting of "C" for no discharge or "F" for insufficient flow. The Final Permit authorizes stormwater discharges from Outfall 013 but has not established any monitoring requirements for this discharge. See Part I.A.6 of the Final Permit. In addition, the non-numeric, technology-based effluent limitations at Part I.C of the Final Permit are designed to minimize the discharge of pollutants in stormwater discharges associated with industrial activity at PNPS, including in the event of stormwater discharges from Outfall 013. These include best management practices (BMPs) to address exposure of stormwater to industrial activities, spill prevention, runoff management, proper materials handling, training, and specific BMPs for steam electric generating facilities.

It is not unusual for EPA to require monitoring of a limited number of outfalls as representative of stormwater and other industrial discharges. See, for example, Parts 6.1.1 and 6.2.2.2 of EPA's 2015 Multi-Sector General Permit. The Agencies may decide in a future permit proceeding to establish limits for Outfall 013 if the results from required monitoring of Outfall 006 warrant such a decision. Furthermore, the Agencies understand that Outfall 013 does not typically discharge directly to Cape Cod Bay. In short, the Agencies have not added limits or monitoring requirements for Outfall 013, because Outfall 013 drains an area that is similar in character to that drained by a monitored outfall and other permit conditions are applicable to both areas that are designed to minimize the discharge of pollutants in stormwater discharges, and because the permittee reports that Outfall 013 is inaccessible and rarely discharges directly to Cape Cod Bay.

5.0 Decommissioning

5.1 Decommissioning Process

Written Comments Submitted by PilgrimWatch on 7/25/16: The decommissioning process allowed by NRC greatly increases the probability of contamination of pollutants flowing into Cape Cod Bay. Therefore EPA must fine tune its draft to account for challenges presented by decommissioning; and EPA and DEP must be vigilant during this long decommissioning period, spanning potentially 60 years, and commit to adhering to the 5-year schedule for reissuing the permit in order to reassess and enact appropriate new requirements.

Pilgrim announced that it will follow the decommissioning option SAFSTOR- mothball the plant for up to 60 years, to 2079. During those years, there will be ample opportunity for contaminants to migrate offsite unless EPA expands its monitoring program and provide public reports. Simply consider the facts that: (1) Contamination is onsite now. There is historical evidence of oil spills, for example. (2) Pilgrim was built from 1967-1970. Some of Pilgrim's buried structures, pipes and tanks are original and that makes those components over 46 years old today. Fifty years post shutdown, they will be 100 years old or more. Corrosion is a function of age. Many of those components contain hazardous materials and are constructed of concrete and steel- both materials corrode. Pilgrim's site specific environment is corrosive.

After closure, Entergy will issue a post shutdown report but it does not include impacts associated with non-radiological contaminants and the generation and storage of non-radiological wastes. Thus, the PSDAR fails to provide sufficient information to allow EPA, the

State, and the public to assess all of the environmental impacts associated with Entergy's decommissioning activities. EPA must step in here and "fill in the blanks" as they relate to pollutant discharge into Cape Cod Bay. After issuance of Entergy's PSDAR, EPA must get to work on a re-issued permit. Many radioactive components, such as the reactor vessel, steam generators, or other components that are comparably radioactive are removed, other structures will remain. Structures that are removed are only removed to 3 feet below grade. Rubbilization is permitted. These facts indicate a very high likelihood of pollutant discharge. The discharge will go into Cape Cod Bay due to the slope of the property.

Will Entergy be required to perform an environmental assessment following shutdown? It is unlikely that NRC will require Entergy to perform a NEPA analysis at the outset of the decommissioning process; instead, based on lessons learned from Vermont Yankee, NRC will allow Entergy to rely on environmental impacts addressed in its environmental analyses done during the license renewal process. Those analyses are outdated and do not bound all the environmental impacts associated with decommissioning. Actual characterization of Pilgrim's site is not required to be submitted until 2 years before license termination, perhaps as late as 2077. How much pollution will have the opportunity to "escape" over those intervening years? In order to protect against pollutant discharges into Cape Cod Bay, EPA must push for a NEPA analysis at the outset of the decommissioning process and include in its NPDES more robust monitoring requirements.

Written Comments Submitted by Ms. Bassett: While the Pilgrim Nuclear Power Station is decommissioning it is imperative that the standards of environmental protection be upheld instead of being relaxed to the point of disaster. Already it has severely compromised the environment. We need the strictest laws.

The plant's use and discharge of water permit expired 20 years ago. This is totally unacceptable. New technology and new information, and new standards have come in for 20 years without any updated as to how better to run this PNPS. How come the neglect? How come the delay?

Written Comment Submitted by Ms. Burgess (of Cape Cod National Seashore Advisory Commission) on 7/23/16: We are very concerned that decommissioning activities, e.g., disturbing soils in combination with climate change issues such as rising seas and groundwater tables and stronger storms could cause even more pollutants to end up in storm drains and EPA isn't considering this.

Public Hearing Comment from Ms. Lampert (of PilgrimWatch): NRC gives Entergy 60 years to close, to decommission, the whole process, 60 years. And they announced they're going into this so to speak SAFESTOR, moth balling the reactor, because simply, they don't have the money. During that time, there will be ample opportunity for contaminants on site that you're responsible to look at, chemical contaminants, oils, etcetera, to migrate off site, if there isn't active monitoring by the state and EPA. NRC, as was mentioned, they don't require EIS when they shut down if the licensee can show, as they did in Entergy's Vermont plant, we already did that during license renewal. It's outdated and those analysis did not bound all the things that you are responsible and interested in.

Entergy will give a PSDAR. However, the PSDAR does not deal with chemical contaminations. You have to do your own equivalent to deal with an analysis of what's there, what we're going to deal with, how we're going to deal with it, how we're going to monitor, what there is now.

They're [Entergy] only required to take down radioactive contaminated buildings like the reactor, etcetera. They don't have to take down all the buildings. And they only have to take them down three feet below grade. Then, they can rubblize unless that state prohibits that process of allowing, once it's scraped down to NRC's allowable radioactive, and that's not talking about other stuff, too, scrunch it up and dump it in the hole, which is clearly going to have an impact eventually on Cape Cod Bay and the flow of contaminants.

Public Hearing Comment from Mr. Romeo (of Entergy): Our shut down is targeted for June 2019. It will not surprise you that shutting down a major electricity supplier is a complicated matter. As a result, the exact timing of that shutdown in 2019 depends on a variety of factors, including further discussions with the New England Independent System Operator, our fuel design, and our fuel loading considerations. For this reason, the permit must be flexible about shut down dates.

Shut down will result in cessation of the overwhelming majority of Pilgrim's existing cooling water use. The remaining cooling water systems consist of service water which have four 2700 gallon per minute service water pumps and a fit standby pump. This system will add up to a daily flow of less than 3.5 percent of the current maximum flows. In addition, some use of circulating water may occur for approximately one or two days to support nuclear operation, but not as cooling water.

The Pilgrim shut down and the subsequent decommissioning process will be overseen by the Nuclear Regulatory Commission, the NRC, in a separate public process. That separate NRC public process is expected to begin in the near term, at the earliest, within several months and no later than two years from Pilgrim's shut down. Specifically, the first major decommissioning submission to NRC, known as the post shut down decommissioning activities report, or PSDAR, is due to NRC no later than two years after Pilgrim's shut down. That document will also address the costs of decommissioning. It's worth stating that nuclear stations such as Pilgrim set aside substantial funds to manage the decommissioning. This ensures that sites like Pilgrim do not become orphaned or Superfund sites requiring taxpayers's support at clean up as occurs so frequently in other industries across the United States. That document will include, among other things, a description and schedule for future decommissioning activities at the site. We are working on it now and will continue to do so for many months. It will be submitted on a timely basis. For these reasons, there will be ample opportunity to obtain answers to questions about the nuclear aspects of shut down and decommissioning which should be reserved for the NRC process.

For more than a quarter century, Pilgrim has taken in and discharged cooling water under its permit. Throughout that time, EPA and MassDEP have required and continue to require that our operations do not adversely affect the fish communities in Cape Cod Bay. We know this is the case because we study the aquatic environment, we evaluate the effects of our operations

continuously, we provide annual reports that are defined, overseen, and reviewed by EPA and MassDEP staff. For this renewed permit, and because Pilgrim will continue to operate during the renewed term, EPA and MassDEP focused on Pilgrim's cooling water use. EPA did so to ensure its past permitting decision, including its best technology available decision on our cooling water, remains current, correct and consistent with EPA's recent Final Rule, the rule for existing steam electric generation facilities. MassDEP did so to fulfill its obligations under applicable Commonwealth water quality standards.

There are relatively minor issues and errors in the draft report. We fully expect those to be readily resolved with EPA and MassDEP during the written comment period. Most of them relate to matters that are squarely within NRC's oversight, such as the appropriate service water or dilution limits necessary to support nuclear operations in a compliant, safe, and effective manner. The fundamental terms and conditions of the draft renewed NPDES permit, when corrected to redress inadvertent errors and omissions will ensure that the balanced aquatic populations, not to mention the best usage of Cape Cod Bay waters, are maintained. Further, the permit does so without compromising Pilgrim's ability to provide reliable and cost effective electricity to its customers through 2019 and manage to shut down and subsequent decommissioning.

Response to Comment 5.1:

Several commenters raised concerns about environmental impacts of discharges during the decommissioning process for PNPS. The Agencies also responded to similar comments about decommissioning in Responses to Comments I.2.2, I.2.5, II.1, and II.2.

On July 30, 2018, Entergy entered into an Equity Purchase and Sale Agreement with Holtec Decommissioning International (Holtec) for the sale of PNPS. Closing of this sale occurred on August 26, 2019. *See* AR-727. On November 16, 2018, both Entergy and Holtec submitted PSDARs for the decommissioning of PNPS. At the same time, Entergy submitted to NRC its application for a license transfer from Entergy to Holtec. *See* AR-692, AR-696, AR-727. NRC Staff issued an order approving the transfer of the NRC licenses for PNPS from Entergy to Holtec on August 22, 2019.[90] *See also* Response to Comments I.2.5, IV.1.2. In its PSDAR, Holtec proposes to move forward with accelerated decommissioning of PNPS under DECON, which is a substantial departure from SAFSTOR, the option mentioned in the comment and proposed by Entergy in its PSDAR. *See* AR-696. Under SAFSTOR, the facility would be placed in a storage condition for safe storage and deferred decontamination after the plant is shut down and defueled. The site may be maintained intact for close to 60 years. Under DECON, the equipment, structures, and portions of the facility and site that contain radioactive contaminants are removed or decontaminated to a level that permits termination of the NRC license within the immediate years after cessation of operations. *See* AR-714 Section 3.2. According to the PSDAR, Holtec plans to release all portions of the site excluding the ISFSI within 8 years after license transfer. If the license were not transferred, decommissioning would proceed under

[90] Both PilgrimWatch and the Massachusetts Attorney General (AG) filed motions with the NRC asking the NRC to stay, among other things, the NRC Staff Order approving the transfer of the NRC licenses from Entergy to Holtec. In addition, on September 25, 2019, the Massachusetts AG petitioned the United States Court of Appeals for the District of Columbia Circuit to review the NRC's approval. This litigation is still pending.

Entergy's SAFSTOR PSDAR, which anticipated releasing the site in 60 years. One commenter raised concerns about the corrosion of equipment during the lengthy SAFSTOR process. Holtec's accelerated decommissioning option may serve to reduce risks due to corrosion as the equipment at issue may be dismantled and removed relatively soon. At the same time, the accelerated pace of decommissioning under the DECON option raises other issues and concerns related to the discharge of pollutants at the site that could occur over the term covered by the reissued permit that would not have occurred during this period under SAFSTOR. These issues are addressed below.

First, it is important to establish that the decommissioning process is overseen and regulated by the NRC. However, licensees are required to comply with the Clean Water Act (CWA) and implementing regulations related to release of pollutants within the meaning of the CWA (i.e., not including special nuclear materials, by-product, and source materials) in effluent discharges to waters of the U.S. *See* AR-714. The Agencies have considered comments on the decommissioning process as they relate to authority under the CWA and the NPDES permit at issue.[91] In addition to the CWA, the investigation and clean-up of contamination from non-radiological, hazardous materials at the site may also be addressed by EPA and/or MassDEP under the Resource Conservation and Recovery Act (RCRA) (*see* 42 U.S.C. 6901 et seq.) and by MassDEP under other state environmental laws.

Several commenters raised concerns about the release of contaminants during decommissioning. One commenter requested that EPA "fine tune its draft to account for challenges presented by decommissioning." Neither Entergy nor Holtec, however, provided sufficient information by which to characterize decommissioning-related discharges. Both companies' PSDARs include a brief discussion of non-radiological water quality (AR-692 at 22-3 and AR-696 at 22-3) but the discussions provide no detail about the possible non-radiological pollutants that may be discharged related to various decommissioning activities (*e.g.*, draining, flushing, and liquid processing, decontamination and dismantlement activities, water spraying for dust suppression). The NRC's GEIS (AR-714, Appendix E) provides some limited additional information about the decommissioning activities and issues related to water quality, including transfer of fuel to the spent fuel pool, draining the primary system, processing liquid, draining and flushing the system, high-pressure water sprays, demolition, and removal of structures. Because Entergy did not provide the Agencies with information about discharges associated with decommissioning activities (with the exception of expected post-shutdown water withdrawals and associated discharges related to the CWIS) and because certain decommissioning activities and discharges may now occur sooner under Holtec's ownership (pursuant to DECON) than was anticipated under Entergy's ownership (pursuant to SAFSTOR), the Agencies clarify here whether and how the NPDES Permit would address these potentially uncharacterized discharges.

The Draft Permit proposed to authorize specific post-shutdown discharges that were disclosed by Entergy at the time of permit development including, as the commenter from Entergy points out,

[91] While one comment requests that EPA require the Permittee complete a National Environmental Policy Act (NEPA) analysis "at the outset of the decommissioning process," it does not cite any specific statutory or regulatory basis requiring EPA to do so. The decommissioning process is overseen by NRC, whereas in the current proceeding, EPA is re-issuing a NPDES permit under the CWA. This permit re-issuance action is not subject to NEPA, because EPA is not issuing a permit for a "new source." *See* CWA §§ 306(a)(2), 511(c)(1); 40 C.F.R. § 122.29(c)(1).

cooling water discharges. Post-shutdown withdrawals and discharges include non-contact cooling water (Outfall 010), circulating pump water (Outfall 001), non-thermal backwash water (Outfall 002), various low volume wastes and waste from the neutralizing sumps (Outfalls 011 and 014), screenwash water (Outfall 012), stormwater associated with industrial activity (Outfalls 004, 005, 006, 007, and 013), and stormwater that collects in electrical vaults on the property (via stormwater Outfalls 004, 005, 006, and 007). In its comments on the Draft Permit, Entergy included minor clarifications for these discharges but did not disclose any new discharges related to shutdown or decommissioning.[92]

According to the NRC's GEIS, decommissioning activities that may influence water use include fuel removal, staffing changes, large component removal, decontamination and dismantlement, and structure dismantlement. Surface waters are most likely to be impacted by these activities through stormwater runoff (*e.g.*, an increase in suspended sediment) or by releases of substances (*e.g.*, from potential disposal of concrete onsite). *See* AR-714 at 4-9, 4-12. Establishing continued monitoring of the discharges associated with these activities under an NPDES permit will ensure that water quality is protected by demonstrating that levels of pollutants are not likely to impact water quality or by establishing effluent limitations. Discharges related to activities such as dismantlement and decontamination may contain pollutants at levels not evaluated in the Draft Permit. Neither Entergy nor Holtec has provided information to the Agencies to characterize discharges related to the dismantlement of plant structures at this time. Therefore, the Final Permit authorizes the post-shutdown discharges as they were characterized by Entergy, subject to the limitations and conditions therein.

The shift from SAFSTOR to DECON raises concerns that pollutants in discharges resulting from decommissioning could occur during this permit term. As one commenter notes, the Agencies are left to "fill in the blanks" as they relate to certain undisclosed pollutant discharges into Cape Cod Bay that were not discussed during the development of the Draft Permit, nor subsequently described to the Agencies by Entergy or Holtec. Holtec, who has proposed the DECON option, has not provided any additional information to characterize discharges that might occur during decommissioning. For example, under SAFSTOR, dismantling and decontamination of plant systems, components, and buildings, and thus the potential discharge of pollutants associated with these activities, was expected to begin in 2074, nearly 56 years from cessation of operations at PNPS. *See* AR-692 (Attachment 1, Table 1). In contrast, the DECON option favored by Holtec anticipates completing dismantling and decontamination by March 2025. *See* AR-696 Enclosure 1, Table 2-1. Transfer of the fuel from the spent fuel pool to the ISFSI is expected to occur by 2022 under DECON (AR-696 Figure 5-1).

A recent permit for a decommissioned nuclear facility in Massachusetts, the Yankee Rowe NPDES permit (MA0004367), included specific effluent conditions for authorization of discharges related to certain decommissioning activities, including test tank water, demolition activities, construction dewatering, and spent fuel pool water. Entergy, however, did not provide

[92] At the public hearing, Mr. Romeo also commented that the Draft Permit and Fact Sheet contained "minor issues and errors" related to service water and dilution limits. The Agencies disagree with Entergy's characterization of certain aspects of the Draft Permit and Fact Sheet as "errors" but, as the commenter anticipates, we address these issues in this Response to Comment. See, for example, Responses to Comments III.4.0.

the Agencies prior to the issuance of the Draft Permit with any explanation for how it would dispose of spent fuel pool water or whether other discharges of pollutants similar to those regulated in the NPDES permit for Yankee Rowe (e.g., boron) would occur at PNPS. Nor have Entergy or Holtec subsequently notified the Agencies of specific plans for such discharges or characterized such discharges. Moreover, the Agencies acknowledge the confusion expressed by several commenters about the role of the NPDES permit in the decommissioning of the site. We clarify, therefore, that the Final Permit does not authorize the discharge of pollutants associated with the spent fuel pool water. Similarly, the Final Permit does not authorize the discharge of pollutants associated with other activities related to the decommissioning at PNPS, including, but not limited to, contaminated site dewatering, pipeline and tank dewatering, collection structure dewatering, dredge-related dewatering, or dismantlement and decontamination of plant systems and structures. If pollutants in these or similar wastestreams, or other wastestreams not expressly authorized by the Final Permit are expected to be discharged, the Permittee must either seek coverage for such discharges under another NPDES permit (i.e., an applicable General Permit)[93] or obtain a modification to the Final Permit. *See also* Fact Sheet at 55-56. Pursuant to 40 C.F.R. § 122.62(a), EPA may modify a NPDES permit if material and substantial alterations or additions to the facility or activity occurred after permit issuance which justify the application of new or different permit conditions. Alternatively, the Permittee may choose to collect and dispose of previously undisclosed or unknown discharges off site (i.e., without discharge to waters of the United States) under other applicable laws. Pursuant to NPDES Standard Conditions in Part II.D.1.a of the permit, *see also* 40 C.F.R. § 122.41(*l*) and 314 CMR 3.19(20)(c), a permittee has a duty to provide the permitting authority with notice as soon as possible of any planned physical alterations or additions to the permitted facility when the alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. A permitting authority may also modify a permit if it receives new information not available at the time of permit issuance that would have justified the application of different permit conditions. In addition, Part II.A.3 in the Standard Conditions of the Final Permit, in accordance with 40 C.F.R. § 122.41(h) and 314 CMR 3.19(8), requires the Permittee to furnish to the permitting authority, within a reasonable time, any information which the permitting authority may request to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit or to determine compliance with the permit. EPA or MassDEP may request additional information about decommissioning activities and/or potential changes at PNPS which may result in changes to the discharge of pollutants to Cape Cod Bay, including information associated with new or increased discharges of pollutants authorized under the Final Permit as well as those listed as unauthorized discharges at Part I.B of the Final Permit.

Several commenters raise concern about the likelihood of discharges related to soil disturbance and demolition of buildings and structures. Under the SAFSTOR option, these disturbances were not likely to occur within the next five years of the permit term. In contrast, Holtec's DECON option anticipates decontamination and dismantlement of plant systems and structures within the next five years. That option, however, was never raised with the Agencies during development of

[93] EPA's 2017 General Permit for Remediation Activity Discharges (RGP) (MAG910000) provides authorization for discharges of site dewatering, pipeline and tank dewatering, and dredge-related dewatering for volumes less than 1 million gallons per day. However, discharges to ocean sanctuaries are not eligible for coverage under the RGP. The Massachusetts Ocean Sanctuaries Act, M.G.L. c. 132A § 13 establishes the Cape Cod Bay Ocean Sanctuary as the body of water known as Cape Cod Bay seaward of the mean low water line.

the Draft Permit or during the public comment period. Nor has Holtec subsequently provided the Agencies with information about discharges at PNPS under DECON. As described above, the Final Permit authorizes only those discharges that were disclosed and adequately characterized to the Agencies in support of permit reissuance and expressly authorized in the Final Permit. For clarity, Part I.B of the Final Permit has been revised to clarify that several specific discharges are not authorized under the Final Permit, including stormwater associated with construction activity. According to the PSDARs, the stormwater runoff and drainage paths will be maintained in their current configuration. *See* AR-692 at 22 and 696 at 22. In developing the Draft Permit, EPA looked, in part, to the 2015 Multi-Sector General Permit (MSGP) for guidance on the stormwater conditions to include in the individual permit for PNPS. *See* Fact Sheet at 29. Stormwater discharges associated with construction activity disturbing one acre or more, however, are not eligible for coverage under the 2015 MSGP. *See* 2015 MSGP Part 1.14.2. The conditions and effluent limitations in the Draft Permit, therefore, were not intended to cover discharges associated with construction activity which, in this case, would include discharge related to the dismantlement of plant structures, systems, and buildings, as well as dust suppression water. Holtec correctly recognizes in its PSDAR that discharge of pollutants in stormwater related to construction activities would require additional NPDES permit coverage. *See* AR-696 at 22 ("[A]reas of one acre or more disturbed during decommissioning that are not covered by the existing permit will require stormwater permits from the MSDEP or USEPA.").[94] Because the Draft Permit did not consider the potential contribution of pollutants in stormwater discharges related to the dismantling and demolition of plant systems and structures, in part because under SAFSTOR such discharges were not expected to occur for many years, the Final Permit likewise does not authorize the discharge of pollutants associated with construction activities, including demolition, decontamination, and dismantlement of plant structures, systems, and buildings. The Permittee may request a permit modification to authorize coverage for construction-related stormwater discharges. Any request must be accompanied by a sufficiently detailed characterization of the types of activities, effluent, and outfalls that the request for authorization covers. Alternatively, the Permittee may seek authorization for construction-related stormwater discharges under an applicable NPDES General Permit, such as the Construction General Permit, if appropriate.

In summary, several commenters raised concerns about the discharge of pollutants related to activities expected to be performed during decommissioning. Although Entergy informed the Agencies of anticipated changes in CWIS withdrawals and discharges due to the shutdown, it did not indicate to the Agencies its plans for other decommissioning activities and potentially associated certain discharges, such as site dewatering, pipeline and tank dewatering, disposal of spent fuel pool water, stormwater runoff from demolition and/or decontamination activities, and dust suppression. *See also* AR-761; AR-762. Furthermore, because Holtec has proposed the DECON decommissioning option, many of the activities that may contribute pollutants are expected to occur much sooner than was expected with the SAFSTOR option initially indicated by Entergy, especially decontamination, dismantlement, and demolition of plant systems and structures and the transfer of spent nuclear fuel from the spent fuel pool to the ISFSI. Discharges of pollutants that result from these activities have not been adequately characterized. For these

[94] Holtec's PSDAR also recognizes that it must maintain compliance with its MassDEP groundwater discharge permit (SE #2-329) and may require remedial activities to meet the Massachusetts Contingency Plant (MCP) and other applicable state environmental response and remediation requirements. *See* AR-696 at 22.

reasons, the Agencies are clarifying that the NPDES Permit only authorizes the discharge of pollutants associated with the wastestreams named in Part I.A of the Final Permit and that the discharge of pollutants in other wastestreams are not authorized. In accordance with Parts II.D.1.a and II.D.1.b of the Standard Conditions of the Final Permit, the Permittee must report any planned physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants or which could result in noncompliance with permit requirements. *See also* 40 C.F.R. § 122.41(*l*) and 314 CMR 3.19(20)(c). The Permittee may request a permit modification to authorize coverage for such discharges or potentially seek coverage under a separate NPDES permit. Any request must be accompanied by a sufficiently detailed characterization of the types of activities, effluent, and outfalls that the request for authorization covers. See Parts I.B and I.H.6 of the Final Permit and Condition 4 of MassDEP's Water Quality Certificate. Alternatively, wastestreams from unauthorized discharges may potentially be transported offsite for disposal, pursuant to appropriate authorization under other applicable laws. Additionally, to emphasize the importance of prompt notice of any discharges to surface water that may endanger public health or the environment, MassDEP has included Part I.H.1 in the Final Permit and Condition 1 in its Water Quality Certificate.

5.2 Corrosion and Contamination From Buried structures

Written Comment Submitted by Representative Keating on 7/21/16; Public Hearing Comment from Mr. Jackman (representing Representative Keating): Recently I hosted a conference on ocean and coastal acidification where I heard from many experts concerned by the effects that lower pH levels have had on shellfish and other marine organisms in Cape Cod Bay, Buzzards Bay, etcetera. I remain concerned that the increasing acidity in Cape Cod Bay waters will result in increased corrosion of affected components of the plant, including the outfall systems and buried pipes and tanks. Increased corrosion can lead to leaks of onsite chemicals such as oil and gasoline. And I would urge EPA to taken these factors into consideration in the NPDES permit.

Written Comments Submitted by PilgrimWatch on 7/25/16: EPA's analysis does not consider, but must, the impact of increased levels of acidity in ocean water due to pollution. The increased acidity adds to the other site specific factors that cause corrosion of buried components on site and hastens leakage that absent vigorous monitoring will end up in the bay.

These structures are subject to corrosion. Pilgrim was built 1967-1970. Many of these buried components are over 40 years old now. They likely will remain onsite for 50 years post shutdown making them over 100 years old at that date; and some will remain onsite indefinitely. The inevitable result is increased contamination of Cape Cod Bay. Absent a vigorous monitoring system the damage is likely to be extensive. Consider for example that there are 6 fuel oil tanks and their associated lines to send the oil into buildings underground at PNPS. There are 2 for the heating boilers, 2 for the emergency diesel generators, and 2 for the station blackout diesel. They can and most likely will leak with time and when they do they would cause an environmental mess.

Buried structures and components are made of corrosive materials (concrete and carbon steel). All metals corrode. Aging and corrosion go together. The older the component or tanks/pipes are

the more likely it is that corrosion will occur. Pilgrim was built from 1967-1970. Many components are original. Engineers explain the aging phenomenon by using what is known as the "Bathtub Curve." The curve is a graph of failure rate according to age. The failure rate is relatively high at the beginning (due to unidentified leaks), flattens out in the middle, and rises again at the "wear-out" phase. Evidence shows that most of Pilgrim Station's buried components would be in the wear-out phase now and well beyond decommissioning.

Pilgrim's site specific environment is corrosive. For example, the soil is wet and will increasingly be so due ot the impacts of climate change (increased severe storms, more frequent and severe precipitation, rising sea levels, and groundwater tables) all resulting in flooding. Cathodic depolarizers are in the soil. An important condition for corrosion is chloride. Pilgrim sites on the shoreline and chloride is naturally abundant is seawaters. Underground corrosion is amplified by stray currents which are present in one degree or another at power generating statins. Pilgrim's soils are sandy. Sand and soil particles move in the subsurface and are abrasive; the buried pipes were initially packed in a sand bed. Corrosion occurs on the inside of components. The rate of degradation on interior surfaces is a function of aggressive chemicals, pH level, dissolved oxygen, and biological elements.

The Buried Piles and Tanks Aging Management Program during license renewal 2012-2019 is inadequate. Buried components are inspected when excavated during maintenance – leaving inspection to happenstance. A focused inspection will be performed within the first 10 years of the period of extended operation, unless an opportunistic inspection (or an inspection via a method that allows assessment of pipe condition without excavation) occurs within this 10-year period. A one-time inspection in ten years incorrectly assumes that corrosion is gradual, linear, and predictable. Consider that the vast majority of the buried pipes and tanks will be more than 47 when operations cease in 2019; and approximately 97 years old fifty years after operations cease and cleanup begins. EPA must assure more frequent inspections and monitoring.

During license renewal proceedings, Entergy claimed that the chemistry and service water programs are effective in preventing internal corrosion. If they were effective, leaks would not occur throughout the industry and at Pilgrim historically. The program will not continue into the lengthy post shutdown period.

Industry experience nationwide shows that there has been a proliferation of leaks from buried components around the country and will continue during operations and following shutdown. Lessons learned from Entergy's Vermont Yankee reactor.

Public Hearing Comments from Ms. Lampert (of PilgrimWatch): There also has to be analysis of increased levels of acidity in the ocean due to pollution. This is particularly important because of the corrosion factor of buried structures, pipes and tanks, many of which are now 50 years old, and at the end of license renewal, rather the end of decommissioning, could well be over 100 years old. There is no material, whether it be carbon, steel, whether it be concrete, that doesn't corrode.

The buried structures, buried pipes, buried tanks, most were put in place when Pilgrim was built, that is 67' to 70'. So they're not young. One of the main factors of corrosion is age. You're

talking about components that have been buried for maybe almost 50 years, and potentially 100. They are also buried in a site specific environment that is conducive to corrosion. It's wet. You have chlorine. There are all these factors that will contribute to corrosion. Plus the aging management program that was put in place at license renewal only required one inspection of these components during a 10 year period. Unless they happen to excavate for some reason. In other words, an aging management program is happenstance. For all these reasons, you would expect to find significant corrosion of these structures, the DEP and EPA have to get ahead of, because we know where it's going to go, because the pitch of the land is into the bay.

Response to Comment 5.2:

Several commenters raised concerns related to the corrosion of pipes and other buried structures at PNPS. The Agencies addressed similar concerns in Response to Comment IV.5.1. The Draft Permit contains requirements to implement best management practices (BMPs) and to establish a stormwater pollution prevention plan (SWPPP). The goal of the BMPs is to reduce or prevent the discharge of pollutants through the stormwater drainage system. The permittee is required to amend and update the SWPPP periodically for any changes at the facility that result in a significant effect on the potential for the discharge of pollutants to the waters of the United States. To the extent that post-shutdown activities discharge pollutants that are authorized by the Final Permit into the stormwater drainage system, the Permittee must revise its SWPPP to reflect such changes and explain measures it will take that will reduce or prevent the discharge of pollutants through the storm water drainage system as a result of these site changes.

At the same time, the Agencies have clarified that neither Entergy nor Holtec have characterized all of the post-shutdown pollutants that could potentially be discharged, particularly those associated with the demolition of plant structures and buildings and which may be discharged sooner under the proposed, accelerated decommissioning timeline. As described in Response to Comment 5.1, above, the Agencies are clarifying that the NPDES Permit authorizes the discharge of pollutants associated with the wastestreams named in Part I.A of the Final Permit and that the discharge of pollutants in other wastestreams are not authorized. In particular, Parts I.B.3 and 4 of the Final Permit do not authorize the discharge of pollutants in stormwater associated with construction activity (such as demolition of buildings) or other discharges of pollutants associated with the dismantlement and decontamination of plant systems and structures and/or the demolition of buildings. The Permittee must seek a permit modification or alternative NPDES permit coverage for these discharges. In accordance with Parts II.D.1.a and II.D.1.b of the Standard Conditions of the Final Permit, the Permittee must report any planned physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants or which could result in noncompliance with permit requirements. *See also* 40 C.F.R. § 122.41(*l*) and 314 CMR 3.19(20)(c). The Permittee may request a permit modification to authorize coverage for such discharges or potentially seek coverage under a separate NPDES permit or potentially a separate permitting program.[95] Any request must be accompanied by a detailed characterization of the types of activities, effluent,

[95] Oil tanks, for example, are regulated by EPA's RCRA Program and are subject to SPCC plans. If there is evidence of a leak from any of these oil tanks, the facility would need to go through the MassDEP's site waste cleanup (21E) program and possibly need additional NPDES permit coverage to address the remediation of such leaks.

and outfalls that the request for authorization covers. See Parts I.B and I.H.6 of the Final Permit and Condition 4 of MassDEP's Water Quality Certificate.

6.0 Determination of Best Technology Available

6.1 Closed-Cycle Cooling is the BTA

Written Comment Submitted by Ms. Burgess (of Cape Cod National Seashore Advisory Commission) on 7/23/16: EPA is not requiring updated technology. The Clean Water Act (Section 316(b)) requires dischargers to update to BTA (best technology available) to reduce impacts to the environment, but the new permit is allowing the continued use of a once-through cooling system, not BTA. We support closed-cycle cooling to minimize importing water from Cape Cod Bay.

Written Comment Submitted by Mr. Delaney (of Center for Coastal Studies) on 7/25/16: Although none of CCS's regular monitoring stations are in the proximity of the Pilgrim Nuclear Power Station, nor are our monitoring efforts targeted towards documenting environmental changes that may result from operation of Pilgrim, the CCS data do show that humans are having an impact on our coastal waters.

The CCS urges the EPA to apply the precautionary principle in its upcoming decision on the renewal of the NPDES permit for Entergy's Pilgrim Nuclear Power Plant including a requirement to use a closed cycle cooling system to reduce impact on the Cape Cod Bay midwater ecosystem.

Written Comment Submitted by Mr. Nichols on 7/20/16: Pilgrim's once through cooling system is not the best technology available and should no longer be permitted. EPA should require shutdown until a closed-cycle cooling system is installed.

Written Comment Submitted by Mr. Hoopingarner on 7/12/16: Seeing as Pilgrim Nuclear Power Station is using an outdated "once-through" cooling system that pollutes Cape Cod Bay and kills large amounts of marine life each year, it is not at all reasonable to allow them to continue operating on the same water pollution permit that expired 20 years ago. As long as it's necessary to keep the intake and cooling systems online, it would be preferable by any standard of reasoning to update the cooling system to a closed-loop, or at the very least a Beaudrey water intake protection system.

Written Comment Submitted by Ms. Carpenter on 7/25/16: Your callous disregard of safety and the environment is exemplified by EPA's looking at "the cost and benefits and feasibility." This clearly works in favor of the Corporation and is detrimental to public health and safety and to the environment. EPA further stated that in looking "at estimated plant life, we thought the time to put these technologies in place would go beyond operation time." The fact is that the plant has already exceeded its planned lifetime. Its permit to operate should not have been renewed in 2012 with outdated technology in place. It has deteriorated and is deteriorating further as Entergy no longer has an incentive to invest in any upgrades or repairs choosing, instead, to coast along until the announced closing date in 2019. This permit should not be issued

as written. EPA must put its mandate to ensure environmental protection ahead of its sympathies for any financial burdens incurred by the Entergy Corporation.

Public Hearing Comment from Mr. Agnew: The Clean Water Act requires the best available technology. And as you pointed out, Entergy probably couldn't put the cooling towers in place before they shut down in 2019. Although, I'm not sure that's true. Brayton Point did it pretty quickly. But, I believe that cooling towers have been around since at least the '70s. So, they were available back then. So, you know, basically, there's been no compliance with the Clean Water Act. So, after 20 years of allowing Pilgrim to operate in violation of the Act, you're now requiring some changes, most of which will take effect just after the reactor closes, when stopping the daily misuse of a half million gallons of Cape Cod Bay won't cut into Entergy's profits. That's what really matters here.

Public Hearing Comment from Ms. Vale (of Cape Downwinders); Written Comments submitted by Cape Downwinders on 7/25/16: Pilgrim is a GE Mark 1 reactor built by Bechtel in the late 1960s. It went online in 1972. The 1960s technology is outdated and is not the "best technology available" as now required by the CWA:

"Any standard established pursuant to section 1311 of this title or section 1316 of this title and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse impact."

This GE Mark 1 boiling water reactor has already shown the world through the Fukushima catastrophe the tragically failed design that does not withstand the test of time. The current cooling system used at Pilgrim is part of that outdated design. We should not rely on 60's technology to protect the public health and safety, nor consider it capable of protecting the environment. GE didn't care about the repercussions of a known defect in their containment design that threatens public health and safety. Fukushima was not an accident but a predicted tragic event. Does the EPA think Bechtel was concerned about the damage to the environment from the cooling system back then? It was not designed with those considerations.

Cape Cod Bay is Entergy's dump. The NPDES permit that EPA is recommending allows Entergy to continue to use the damaging once through cooling system through the closing date of 2019 and after shut down. In Vermont, even though Entergy was closing Vermont Yankee in December of 2014, the Vermont utility directors issued a new thermal discharge permit in March of 2014 and changed the terms of that permit to hold Entergy accountable. So, the changes can be done now. Three more years of knowingly damaging the environment is both unacceptable and irresponsible. After 20 years of a free pass, action to end the destruction is needed today.

Public Hearing Comment from Dr. Muramoto (representing the Association for Preservation of Cape Cod): The EPA should require implementation of BTA such as closed cycle cooling system technology for limiting discharges and minimizing harm to fisheries. The economic analysis is flawed and should be based on 23 years of return on investment, not just the remaining three years of plant operations. EPA noted that a decade without BTA would result in loss of another 15,000,000,000 fish from Cape Cod Bay. Allowing this to occur would be

inexcusable. The permit should require the plant to close by 2019 or implement a BTA cooling system.

Since 2014 we have become even more concerned about Pilgrim's risk to the environment and Entergy's declining performance that poses risks to public safety and the environment. NPDES permits allow EPA to require best technology available or BTA to minimize and eliminate pollutant discharges and environmental damage. The Draft NPDES Permit for Pilgrim merely protects the status quo and does nothing to eliminated pollutant discharges or require BTA to protect fish and shellfish.

The EPA should require implementation of BTA such as closed cycle cooling system technology for limiting discharges and minimizing harm to fisheries. The economic analysis is flawed and should be based on 23 years of return on investment, not just the remaining three years of plant operations.

There is no guarantee that the plant will close by 2019 other than Entergy's stated intention. The plant's license expires in 2032. So there is potential for more than a decade of operation without BTA. EPA noted that a decade without BTA would result in loss of another 15,000,000,000 fish from Cape Cod Bay. Allowing this to occur would be inexcusable. The permit should require the plant to close by 2019 or implement a BTA cooling system.

Public Hearing Comment from Ms. Lampert (of PilgrimWatch): The draft, like others have said here, should not allow the continuation of once through cooling. It's in violation of the law. And when you're doing a cost benefits analysis, cost is not only how much it would cost Entergy to replace it. The real costs are 20 years of damage. The real costs are also unknown, because there has been over reliance on Entergy's assessments. There have not been studies on what value of putting in other flounders, are they [breeding] and reacting with what was taken out. And so, you don't know. You only know the surface of the damage. So, therefore, you require it. If you can't obey the law then shut down.

Public Hearing Comment from Ms. Vale (of JRWA): Continuing to allow the once through cooling system is in no way requiring updated technology or minimizing harm to the environment as required by the Clean Water Act.

Response to Comment 6.1:

Many commenters raised concerns about the once-through cooling system and requested that the Final Permit require closed-cycle cooling as the best technology available (BTA) for the cooling water intake structure (CWIS) consistent with Section 316(b) of the CWA. The Agencies responded to similar concerns about the CWIS and the BTA in Responses to Comments I.4.2, II.1, II.2., and IV.2.1. The Agencies responded to the Permittee's comments on BTA and the Draft Permit's CWIS requirements in Response to Comments III.8.

The BTA requirements at Part I.C of the Final Permit are consistent with the *Final Regulations to Establish Requirements for Cooling Water Intake Structures at Existing Facilities* (79 Fed. Reg. 48,300 August 14, 2014) at 40 C.F.R Part 125, including consideration of the relevant

factors in determining the BTA for entrainment. *See* 40 C.F.R. § 125.98(f)(2) and (3). The post-shutdown flow limits in the Final Permit for Outfall 010, which is the primary intake and discharge during shutdown, result in a 96% reduction in cooling water flow as compared to the current permit limits. The Final Permit also authorizes the operation of the circulating water pumps to support shutdown operations (though Outfall 001 will not supply cooling water) for no more than 48 hours over a single calendar month. Together, the total flow at the intake for Outfalls 001 and 010 on an average monthly basis represent a 92% reduction in flow as compared to the current permit, which equates roughly to a 92% reduction in entrainment. The expected net reduction in flow in PNPS had installed closed-cycle cooling would have been 91%. See Fact Sheet Attachment D at 45. The Final Permit requires the Permittee to meet flow limits that are consistent with operation of closed-cycle cooling at PNPS as the BTA for entrainment and which is one of the approved BTA standards to minimize impingement mortality under the Final Rule. *See* 40 C.F.R. § 125.94(c)(1). That PNPS did not install closed-cycle cooling to meet the flow reductions, as a result of the shutdown, does not diminish the environmental benefits gained by reducing impingement mortality and entrainment under the new flow limits.[96] EPA maintains that the BTA performance standards in the Final Permit, which require PNPS to achieve a flow reduction greater than 92% as a monthly average and achieve a through-screen velocity of 0.5 fps, represent the BTA for impingement and entrainment at PNPS. This site-specific determination was made under 40 C.F.R. § 125.98(g) in consideration of the relevant factors at § 125.98(f)(2) and (3) and the impingement mortality BTA standards at § 125.94(c). As such, this determination is consistent with CWA § 316(b).

6.2 Alternative Available Technologies Were Not Considered

Written Comment Submitted by Mr. Nichols on 7/20/16: If EPA is unwilling to require closed-cycle cooling under the new permit, than a Beaudrey WIP system should be designed to retrofit Pilgrim and be installed at the earliest opportunity. This system could be required for the period post-shutdown.

Written Comment Submitted by PilgrimWatch on 7/25/16: The draft permit should not allow the continuation of Pilgrim's once-through cooling system. It is harmful to the marine environment and not the best technology available, as required. If EPA does not require a closed cooling system, as it should, then a Beaudrey WIP system should be installed during the refueling outage 2017.

[96] One commenter suggests that installing closed-cycle cooling at PNPS should be able to completed in a timely manner because "Brayton Point Station did it pretty quickly." EPA notes that although the actual construction of the cooling towers at Brayton Point Station was achieved in three years, the Final NPDES Permit requiring the technology was issued in 2003 and construction did not begin until 2009, fully 6 years after the permit was issued and more than a year after EPA and Dominion Energy reached an agreement to end the permit litigation. Even had PNPS began construction in 2016 (when the Draft Permit was issued), the cooling towers would only have been operable for, at most, a few months before the Facility shut down. Entergy did shut down PNPS on May 31, 2019 and the Facility is achieving flow reductions commensurate with operation of closed-cycle cooling and consistent with the Final Permit flow limits.

Public Hearing Comment from Ms. Lampert (of PilgrimWatch): You did not even require something like that Beaudrey WIP system, which would reduce at least going forward the amount of intake of fish and creation of bouillabaisse and all that stuff.

You should require Entergy to fund a mitigation account for 20 years of damage. And I've brought up a tricky question of who should really be paying. And I think that is an important legal question that should be looked at. Is it Entergy for not doing what they were not required to do? Or is it the Agency's for not requiring that the law be followed?

Public Hearing Comment from Ms. Vale (of JRWA): There are other technologies out there. So, this Beaudrey system was mentioned back in 2008. It was an Entergy report to EPA. I think, it was in response to a 308 letter to EPA. And it seems like the system was disregarded fairly quickly, and in our opinion, somewhat improperly. For example, according to Entergy, the Beaudrey system is infeasible at Pilgrim because it hadn't been used yet in the United States and also because of the fragility of the species that are found near Pilgrim. However, the system is, in fact, used worldwide, including here in the US. And there's been additional studies that have come out fairly recently that look at the impacts of this type of system on the species found near Pilgrim. River herring was one of those. I think it was alewife. The point is that, EPA needs to really and fully vet systems like this using the most updated information that's available.

Response to Comment 6.2:

Many commenters recommended that EPA require a Beaudrey Water Intake Protection (WIP) screen as the best technology available (BTA) for the cooling water intake structure (CWIS), presumably because this technology is more effective than the proposed Draft Permit limits for minimizing impingement mortality and entrainment. The Agencies responded to similar comments about the feasibility of WIP screens in Responses to Comment I.4.2. EPA notes that the comments above do not identify how WIP screens would result in greater reductions in impingement mortality or entrainment than the Draft Permit limits, nor have any comments presented any specific information to suggest that WIP are feasible or particularly effective at minimizing impingement and entrainment for species present at PNPS. [97]

In the Draft Permit, EPA did not consider traveling screens, including the WIP screen, as an available technology for entrainment because this technology is not considered effective for reducing entrainment. Screens must consist of fine mesh to prevent entrainment of eggs and larvae, and fine mesh screens may lead to increased morality of impinged eggs and larvae that would have otherwise been entrained. See *Technical Development Document for the § 316(b) Existing Facilities Rule* (TDD) at 6-23 and 6-45 to 48. WIP screens have been shown to be as effective or even more effective than modified traveling screens for reducing impingement mortality for many species. *See Id*. at 6-40 to 41. However, WIP screens to reduce entrainment at PNPS would likely have to be fitted with mesh sizes in the range of 0.5 to 1.0 mm. In addition,

[97] Entergy evaluated traveling screens in its 2008 Engineering Response (AR-489 at 35) and concluded that upgrading the traveling screens, including to a WIP screen, would not measurably reduce impingement mortality because the majority of mortality at PNPS (89%) involves Atlantic menhaden and Atlantic silversides, which are not expected to survive screen impacts associated with impingement regardless of the screening technology employed.

there are technical challenges to the installation of WIP screens that must be considered in an evaluation of this technology for PNPS.

According to the manufacturer, WIP screens can be installed in the existing traveling screen bays, which can make for easier and more cost-effective installation. However, because of the design, the WIP screen has a smaller dimension that the conventional traveling screen (see Figure 1). If the same number of screen bays are replaced with the WIP screens, the through-screen velocity will increase because the flow rate will be withdrawn through a smaller screen area. If PNPS were to install WIP screens without increasing the existing through-screen velocity (or to achieve, as the comment suggests, through screen velocities of no greater than 0.5 fps), the existing intake structure would have to be expanded to accommodate additional screens. Similarly, because the screen mesh affects the velocity, decreasing the mesh size of WIP screens to exclude early life stages of marine fish (*e.g.*, less than 1 mm) would also necessitate additional screens to accommodate the required cooling water volume, which would require expansion of the existing intake structure. Expanding the intake structure would be more costly and would likely add a significant amount of time to the project as compared to simply installing new WIP screens in the existing bay. From a technical standpoint, while a WIP screen may be feasible for PNPS, it is not likely that it would meet the BTA requirements indicated in the comment without significant expansion of the CWIS. Moreover, the technology is not as effective as reducing impingement mortality and entrainment as the flow and intake velocity BTA requirements that can be achieved with the shutdown.

6.3 Justification for BTA Determination

Written Comment Submitted by J. Nichols on 7/20/16: In the revised permit, water use if reduced form 510 MGD to 447 MGD before shutdown. This reduction is appropriate, but there should be an established end date for water withdrawals. Prior to refueling in spring 2017 is a prudent time. After Pilgrim shuts down, the draft permit reduces intake to a maximum of 224 MGD daily, and an average of 11.2 MGD monthly. EPA must provide a justification for the large maximum daily withdrawal limit.

Response to Comment 6.3:

One commenter requested that EPA justify post-shutdown the maximum daily withdrawal limit for Outfall 001. JRWA has a similar comment about the post-shutdown discharge volume at Outfall 001. The Agencies responded to that comment in Response to Comment I.3.1. The Agencies responded to the issues that the Permittee raised related to the intake and discharge from Outfall 001 in Response to Comment III.4.1.

PNPS ceased operations on May 31, 2019 and as such, no longer operates the circulating water pumps to withdraw cooling water for the condenser on a continuous basis. Circulating water flow is necessary to support shutdown operations for purposes other than cooling the spent fuel pool. Because the circulating water pumps are not connected to the spent fuel pool, this water will not be used for that purpose. According to Entergy, the circulating water is primarily used for dilution to meet the NRC's requirements for the liquid radiological waste disposal system and

for fire protection purposes, as well as for backflushing the circulating water pump lines to manage biofouling.

The Draft Permit authorized limited operation of a single circulating water pump, which has a design flow of 155,500 gallons per minute (gpm), or 224 million gallons per day (MGD), not to exceed 5% of the time on a monthly basis. These limits were based on pre-Draft Permit communications with Entergy about the anticipated need for circulating water after shutdown. During the comment period, Entergy provided additional explanation for running the circulating water pumps and clarified its need to operate a circulating water pump for up to 48 hours on a monthly basis. Part I.C.4 of the Final Permit authorizes the Permittee to operate one circulating water pump at a time (at 155,500 gpm or 224 MGD) for up to 48 hours during a single calendar month. The Final Permit requires the Permittee to report the average monthly flow at Outfall 001and the hours of circulating pump operation. Based on the maximum daily flow and authorized period of operation, the average monthly flow at Outfall 001 could increase to 16 MGD (based on 28 days in February). These permit conditions result in a 96% reduction in water withdrawals through the circulating water pumps as compared to the current permit, which the Agencies believe represents the BTA for minimizing impingement and entrainment.

7.0 Temperature Effluent Limitations and Thermal Impacts

7.1 Thermal Impacts

Written Comment Submitted by PilgrimWatch on 7/25/16: EPA's analysis does not consider, but must, the impacts of climate change – warming seas, sea level rise, storms, flooding and increased precipitation that likely will cause further pollutant discharges into Cape Cod Bay and heighten the effects of thermal pollution.

Written Comment from Mr. Pappalardo (of Cape Cod Commercial Fishermen's Alliance) submitted 7/22/16: The Cape Cod Commercial Fishermen's Alliance is concerned about any activity that could negatively impact fish stocks and the marine environment in Cape Cod Bay. We have concerns that Pilgrim's outdated 'once through cooling' systems jeopardize the marine life that thousands of Massachusetts commercial fishermen rely upon. For example, New England is already seeing faster ocean warming than other parts of the country and does not need additional thermal pollution contributing to the rate of ocean warming.

We encourage the EPA to protect Cape Cod Bay's environment and require the Pilgrim Nuclear Power Station to use the best technology available and protocols to protect our waters, for today's fishermen and for generations to come.

Written Comment Submitted by Representative Keating on 7/21/16; Public Hearing Comment from Mr. Jackman (representing State Congressman Keating): I respectfully encourage EPA to continue incorporating current data on climate change and ocean acidification in review of PNPS draft permit. Given that EPA is considering decades old data that may not reflect the most recent sea level rise and ocean temperature information, and that PNPS, under the variance proposed the NPDES, will be discharging significantly heated water into Cape Cod

Bay for three more years, I urge the EPA to reconsider whether a closed-cycle system would provide significant environmental benefits and contribute to the safeguarding of Cape Cod Bay.

Response to Comment 7.1:

Several commenters raised concerns about thermal impacts from the operation of PNPS and recommended that EPA consider the most updated thermal data, including data that reflects warming temperatures in Cape Cod Bay due to climate change when making its determination on the Final Permit's thermal limits. The Agencies responded to similar comments about thermal impacts in Response to Comments I.2.2, I.3.1, I.3.4, and II.1.

In its Assessment of Impacts to Marine Organisms from the PNPS Thermal Discharge (Attachment C to the Fact Sheet), MassDEP evaluated the long-term warming trend in Cape Cod Bay and the potential effect this warming trend could have on the thermal impacts from the PNPS discharge. MassDEP also evaluated whether the thermal discharge from PNPS had resulted in any impacts of local populations for a number of resident species, including commercially and recreationally important fisheries and species of concern. MassDEP found that the thermal impacts were not likely to have measurably impacted any of the resident fish populations in Cape Cod Bay. EPA, in Attachment B to the Fact Sheet, determined that the pre-shutdown operation of PNPS at the proposed Draft Permit limits would assure the protection and propagation of a balanced, indigenous population of fish, shellfish, and wildlife.

PNPS shutdown on May 31, 2019 and ceased operation of the main condenser, which was the primary source of heated effluent at the Facility. As a result of the shutdown, the Permittee can achieve much lower temperature limits than when PNPS was operating, which results in a 98% reduction in the heat load to Cape Cod Bay. The Final Permit includes temperature limits at Outfall 010, which is the remaining source of heated effluent, that assures this reduction in heat load will be maintained.

7.2 Justification for Granting Thermal Variance

Written Comment Submitted by M. Burgess (of Cape Cod National Seashore Advisory Commission) on 7/23/16: Pilgrim is discharging water hotter than allowed by the State Water Quality Standards, so it requires a variance. The variance was based on old, insufficient Demonstration Report, and is definitely insufficient today. EPA should deny the variance, and require Entergy to re-characterize the thermal plume impacts based on current trends and data on global warming issues.

Written Comment Submitted by J. Nichols on 7/20/16: The 32°F allowed temperature range, based on a previous variance is excessive and should be denied. That variance is based on a flawed 'Demonstration Report' that relies on outdated and incomplete data, an outdated list of "representative important species," and does not consider changes in Cape Cod Bay such as invasive species, northern migration of species, and ocean warming and acidification. Until thermal impacts are reassessed in light of current information and new thermal plume modeling is done, the variance should be denied.

In order to effectively set thermal limits, EPA should clearly determine and outline which activities will create thermal effluent at Outfall 001.

Public Hearing Comment from Ms. Vale (of JRWA): I wanted to bring up Pilgrim's variance that allows for discharging hotter water than is allowed by the state's water quality standards. The problem that we see with this is that, some of the temperature limits allowed in the draft permit, and that goes for the delta limits as well as the daily and monthly limits, are allowed based on a previous variance. And I know you said earlier that there's a new variance. But, from my understanding, from reading the permit, it's essentially reusing the old variance. I think, you called it prospectively using the old variance. And that old variance relies on an older demonstration report. And we think that that demonstration report has a lot of problems.

For example, the demonstration report relies largely on what would be considered now to be really outdated information. A lot of the studies were from the 1970s. There was one study from 1995 that was incorporated into the 2000 updated version of the demonstration report. But, that study was cut short. They had storms that came in. Pilgrim had to shut down unexpectedly. So, that study that cited quite a bit while actually only collected two and a half days worth of data. So, there's a problem with the limited data as well.

And lastly I think, one of the most important issues, the warming water temperatures in Cape Cod Bay, was not considered. In a demonstration report, you're trying to demonstrate that there's no impacts from thermal effluent. And if you don't look at the warming of Cape Cod Bay, I don't see how that's possible.

There's just not enough updated evidence to prove that there's no harm from those thermal effluent limits that are in the draft permit. EPA needs to reassess the thermal impacts using more current data, considering more modern trends in Cape Cod Bay. Until this is done, we think that the variance should be denied or otherwise make sure that all the thermal limits in the draft permit meet state standards.

Response to Comment 7.2:

Several commenters raised concerns about the pre-shutdown temperature limits, which are based on a variance under Section 316(a) of the CWA. Under Section 316(a), a less stringent thermal limit may be authorized where the Permittee demonstrates to the satisfaction of the permitting authority (EPA and MassDEP) that the otherwise applicable technology-based and water quality-based limits are more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of fish, shellfish, and wildlife in and on the receiving water. Entergy sought renewal of the 316(a) variance from the 1991 permit and, in support of its request, provided a retrospective demonstration that past thermal discharges have not appreciably harmed the balanced, indigenous population of Cape Cod Bay. Many commenters have raised concerns with the demonstration provided, notably that it is outdated and fails to adequately account for the rising water temperature in Cape Cod Bay. The Agencies also received similar comments on the thermal variance from other parties. See Comments I.2.2, I.3.1. and II.1.

MassDEP and EPA evaluated the thermal impacts from the pre-shutdown discharge of heat under the current variance in Attachments B and C to the Fact Sheet. After considering the information provided by Entergy, recent intake temperature data, and assessing the potential impacts on communities and individual species, the Agencies determined that the surface-oriented thermal plume is relatively small compared to the size of the receiving water and dissipates rapidly. Considering impacts over 40 years of operation, the Agencies concluded that the current variance will assure the protection and propagation of the balanced, indigenous population and proposed renewing the variance in the Draft Permit. On May 31, 2019, before the Final Permit was issued, PNPS ceased operating and shutdown the reactor. Therefore, the permit conditions and effluent limitations from the Draft Permit specific to operation of the electric generation facility and which would have been effective prior to the shutdown date, including the variance-based temperature limits (maximum daily temperature of 102°F and delta-T of 32°F), are not included in the Final Permit.

Following shutdown, PNPS no longer operates the condenser, which required a large volume of cooling water and was the primary source of heated effluent. The only remaining source of heated effluent is the cooling water withdrawn for cooling the spent fuel pool, which requires far less cooling water and discharges less residual heat. In addition, the residual heat from the spent fuel pool will decay over time and, as a result, the heated effluent from Outfall 010 will decrease. Holtec plans to move the spent fuel to dry cask storage by 2022, at which time there will be no heated effluent from PNPS remaining. *See* AR-696.

The Final Permit limits the remaining thermal discharge from Outfall 010 to a maximum daily flow of 19.4 MGD and delta-T of 10°F. These limits, which reflect operations following shutdown, result in a substantial reduction in the heat load to Cape Cod Bay. Under the current permit, which reflects operating conditions for generating electricity at PNPS, the total heat load to Cape Cod Bay from the circulating water pumps was about 14,304 mm BTU/day. The Final Permit limits result in a 98.6% decrease in the heat load to Cape Cod Bay. This reduction in heat load will ensure protection and propagation of a balanced, indigenous population in Cape Cod Bay and is consistent with the reduction in heat load that would be achieved through operation of closed-cycle cooling as the best available technology. Temperature monitoring at Outfall 001 will confirm the extent to which the effluent from Outfall 010 is mixed prior to discharge. See also Responses to Comments I.2.2, I.3.1, and I.3.4.

7.3 Post-Shutdown Temperature Limits

Written Comment Submitted by PilgrimWatch on 7/25/16: EPA must require that thermal discharge temperature readings are electronic and continuous and public access to those readings available online. Entergy must be required to report the highest level recorded each month - not simply an average. EPA should consider restrictions. Thermal backwash discharges restricted to high tides if harmful impacts are shown to increase at low tide.

Written Comment Submitted by J. Nichols on 7/20/16: For backwash operations, until shutdown the temperature limit should not be allowed to be 115°F, but should meet the lower MA SWQS. If Pilgrim cannot meet that, impacts from its thermal effluent should be reassessed

in light of global warming and more current information. A new Demonstration Report should be required before a variance is granted.

For outfall 010, EPA decision to set temperature limits that meet the MA SWQS is supported, but EPA should use 1.5°F instead of 3°F as the allowed temperature rise. After shutdown, temperature rise is reduced from 32°F to 3°F. This reduced limit seems arbitrary and should instead meet MA State Water Quality Standards (MA SWQS) limit of 1.5°F. EPA does not present evidence of the cause of a 3°F increase.

Response to Comment 7.3:

Several commenters raised questions about the post-shutdown thermal limits at Outfall 002 (backwash) and Outfall 010 (non-contact cooling water). The Agencies have responded to similar comments in Responses to Comments I.3.2 and I.3.4.

One commenter requested that the maximum daily temperature limit for the thermal backwash operation at Outfall 002 and the post-shutdown, rise in temperature limit at Outfall 010 should both be lowered to meet water quality standards. At Outfall 002, the source of heat for the backwash effluent was the condenser. Since PNPS has shutdown, there is no longer any source of heat for this discharge and the effluent will be at ambient temperature. Part I.A.2 of the Final Permit authorizes only non-thermal backwashes and does not include a temperature limit.

Federal regulations at 40 C.F.R. § 122.44(d) require establishing effluent limitations more stringent than technology-based effluent limitations or standards if necessary to achieve water quality standards, including State narrative criteria for water quality. More stringent limitations are necessary to control pollutants or parameters that may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including narrative criteria. *See* 40 C.F.R. § 122.44(d)(1)(i). When determining if there is reasonable potential to cause or contribute to an excursion of water quality standards, the permitting authority must consider, among other things, the dilution of the effluent in the receiving water. *See* 40 C.F.R. § 122.44(d)(1)(ii). In other words, the water quality standards apply as in-stream limits to be met in the receiving water taking into account any available dilution between the outfall discharge location and the receiving water. In this case, the comingling of discharges in the discharge canal and the mixing of the discharge in the receiving water offer potential additional sources of dilution which would ensure that a higher end-of-pipe limit will still meet water quality standards in the receiving water. In addition, temperature limits may be based on a variance under Section 316(a), under which, as described in Response to Comments IV.7.2 (above) and I.3.4, a less stringent thermal limit may be authorized where the Permittee demonstrates to the satisfaction of the permitting authority (EPA and MassDEP) that the otherwise applicable technology-based and water quality-based limits are more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of fish, shellfish, and wildlife in and on the receiving water.

Post-shutdown, Outfall 010 will discharge non-contact cooling water used for the spent fuel pool, which consists of substantially less heat at a lower volume that the once-through cooling

water discharged from Outfall 001 when PNPS was operating. The Draft Permit proposed a post-shutdown, rise in temperature limit of 3°F, average monthly temperature limit of 80°F, and maximum daily temperature limit of 85°F at Outfall 010. These limits were based on communication with Entergy about the anticipated need for cooling water after shutdown. *See* AR-520. During the comment period, Entergy provided additional explanation about cooling water needs after ceasing electrical generation, including that an 85°F maximum daily limit for service water may not reasonably support the use of service water for necessary nuclear-safety functions post-shutdown, particularly given that this period will represent a greatly reduced flow dynamic compared to PNPS's historic electric-generating operations. See Comment III.5.2 and corresponding response. Part I.A.3 of the Final Permit retains the average monthly temperature of 80°F but raises the maximum daily temperature limit from 85°F to 90°F and the maximum delta-T from 3°F to 10°F at Outfall 010. Even at a maximum daily flow of 19.4 MGD and delta-T of 10°F, the thermal effluent from Outfall 010 is expected to mix quickly with the receiving waters in the discharge canal and will be protective of the aquatic community of Cape Cod Bay. As described in Response to Comment IV.7.2 (above) and I.3.4, the total heat load to Cape Cod Bay from the circulating water pumps has been reduced by about 98.6% due to the shutdown. A delta T of 10°F will assure the protection and propagation of the BIP after shutdown, since the volume and overall rise in temperature have both substantially decreased, resulting in a substantial decrease in the heat load to Cape Cod Bay.

The Permittee is required to submit monthly discharge monitoring reports (DMRs) on which it must report the average monthly temperature, maximum daily temperature, and maximum rise in temperature at Outfalls 001 and 010 based on continuous temperature monitoring. The data reported in the NetDMR are publicly available through the Enforcement and Compliance History Online website at https://echo.epa.gov/.

8.0 Impacts of Closing Plant on Regional Electrical System

Written Comment Submitted by Mr. Campbell on 7/19/16: The Draft NPDES Permit complies with the Clean Water Act. Pilgrim Nuclear Power Plant provides 79% of Massachusetts' green, emission-free power. Massachusetts needs Pilgrim and more nuclear power, not less. Closing Pilgrim WILL violate the RGGI treaty.

The bigger factor in the rise of carbon emissions in the New England region was probably the 2014 closing of the Vermont Yankee nuclear plant, specialists said (*Boston Globe,* David Abel, May 16, 2016). The uptick comes as Massachusetts works to curb carbon emissions in nearly every sector of its economy, in hopes of reaching its 2020 targets. Massachusetts is legally required to reduce greenhouse gases 25 percent below 1990 levels by that date — part of a national effort to stave off global warming.

Written Comment Submitted by Dr. Garb on 6/10/2016: Pilgrim's energy contribution to the New England power grid is relatively small, and there is enough excess capacity in the grid to not cause power disruptions should Pilgrim close sooner than anticipated. Other, more environmentally friendly sources of power will be developed in Massachusetts and New England over the next several years.

Response to Comment 8.0:

Several commenters raised issues related to the role of PNPS is the regional power grid. One commenter supported the operation of PNPS because it factors in the region's ability to meet carbon-free power, while the second supported shutting down PNPS and maintains that its closure will not negatively impact the regional power supply.

The ISO-New England is responsible for operation of the regional power generation and transmission system, for regional power system planning, and for developing and administering the region's wholesale electricity markets. In response to Entergy's request to retire PNPS, ISO-New England conducted a study to see how the retirement could affect the overall reliability of the region's bulk power system and, if the impact is expected impact reliability, ISO-New England may ask the retiring resource to remain online. In this case, ISO-New England did not find that retirement of PNPS will impact reliability of the region's bulk power system and PNPS shutdown as announced on May 31, 2019. *See* AR-725.

9.0 Comments on Miscellaneous Discharges

Written Comment from Mr. Nichols Submitted 7/20/16: EPA must prevent not only ongoing pollutant discharges into Cape Cod Bay, but also the increased pollutant discharges expected because of climate change. Warming seas, sea level rise, storms, flooding, and increased precipitation are likely to cause further pollutant discharges into Cape Cod Bay and/or exacerbate the effects of thermal pollution and impingement/entrainment. Effluent limits should be reduced and new limits set for pollutants not in the previous permit.

Public Hearing Comment from Ms. DuBois: Our concern is sea level is rising, groundwater is rising. That's going to affect your discharges. It's going to affect your discharges especially post 2019. But, if you allow them -- if you extend the permit, basically, that's what you're doing; right? You're saying, okay. We believe you Entergy. We believe that another three years is not such a big deal. We're going to let you run the same way that you've run for the last 42 years for the next three years, because it doesn't matter. Well, it does matter, because it extends this whole stockpiling of nuclear waste for an additional five years. They're going to have to have it in the spent fuel pool. They're going to have to have their damn FLEX strategy that's so stupid, I can't even begin to tell you. Please learn about it. They're going to postpone the clean up and decommissioning on site, whatever that clean up and decommissioning in the PSDAR might say.

Response to Comment 9.0:

Several commenters raised concerns about the potential impacts of rising sea level and climate change on future discharges from PNPS. The Agencies responded to similar concerns about climate change in Response to Comment I.2.2. The Final Permit's monitoring requirements and effluent limits will adequately characterize and/or limit the pollutants present in the site's discharges through the next permit term.

10.0 Monitoring and Assessment

10.1 Effluent Monitoring

Written Comment from PilgrimWatch Letter Submitted 7/25/16; Written Comment from J. Nichols submitted 7/20/16: EPA should explicitly require all effluent testing be reported publicly in monthly discharge monitoring reports so that EPA and the public are able to assess whether requirements are being met.

Written Comment Submitted by Representative Keating on 7/21/16; Public Hearing Comment from Mr. Jackman (representing Representative Keating): I encourage EPA to expand its monitoring of discharges of all of the plant's outfalls. Effluent limits and thermal discharge measurements should be made as frequently as feasible, and resulting data should be made available to the public in an easily accessible format. As we look toward the decommissioning of Pilgrim Station, it is critical that EPA provide for vigorous post-closure monitoring and environmental assessments to ensure that contaminants do not migrate off of the plant and into Cape Cod Bay.

Response to Comment 10.1:

Several commenters requested that the Final Permit require monitoring at all authorized outfalls and that the data be made publicly available. The Final Permit includes post-shutdown effluent limits and monitoring requirements at all authorized outfalls and specifies the frequency of monitoring for each listed parameter for as long as the permit remains effective. When the Final Permit becomes effective, the Permittee will use NetDMR to report monitoring results at each outfall on a monthly basis. The data are publicly available through the Enforcement and Compliance History Online website at https://echo.epa.gov/.

10.2 Biological Monitoring

Written Comment Submitted by Mr. Delaney (of Center for Coastal Studies) on 7/25/16: If the permit is renewed, CCS recommends that extensive ecosystem monitoring be required and that an independent science advisory panel be established, with functions similar to those of the MWRA Outfall Monitoring Science Advisory Panel.

Written Comment Submitted by Mr. Nichols on 7/20/16: EPA should require the PATC to be reinstated immediately so that it may provide much needed oversight for marine impacts, and help guide practical adjustments and mitigation efforts during the remainder of operations as well as during decommissioning.

Public Hearing Comment from Ms. Vale (of JRWA): The draft permit does not acknowledge the Pilgrim administrative technical committee, or the PATC. The PATC was disbanded by Entergy in 2001. We feel that the PATC is a really important part of the permit and of the monitoring program and that it or something similar to the PATC should be reinstated and required in the new permit to provide independent oversight of re-monitoring efforts, as well as the results that come from those monitoring efforts. And that includes up until shut down as well as during the decommissioning years as well.

Written Comment Submitted by Mr. Nichols on 7/20/16: Impingement/entrainment monitoring should be required until the spent fuel pool is no longer used, and the intake system is shut down permanently; winter flounder studies should be mandated to continue after shutdown to monitor improvements to populations. Rainbow smelt studies should be reestablished. Entergy no longer carries out rainbow smelt studies, despite Pilgrim continuing to impinge and entrain them with impunity. One study estimates that more than 1,300,000 rainbow smelt are killed each year. Entergy should be required to monitor for ecosystem changes due to global warming and climate change to fully understand the impact of Pilgrim's operations.

Written Comment Submitted by Mr. Hoopingarner on 7/12/16: Entergy needs to fund restoration, further study on the ecological impacts of Pilgrim's 40+ years of operations, and immediate reestablishment of studies on rainbow smelt and other aquatic life. Additional study on the impacts of global warming and climate change should accompany these regional studies.

Response to Comment 10.2:

Several commenters requested that the Final Permit require ongoing biological monitoring at PNPS following shutdown and recommended that an advisory committee, similar to the former Pilgrim Technical Advisory Committee (PTAC), be formed to oversee biological monitoring. The Agencies responded to similar comments about biological monitoring and the PATC in Responses to Comments I.4.1, I.5.2 and I.5.5.

Parts I.A.1, I.A.2, and I.C of the Final Permit requires the Permittee to meet flow limits that will achieve a flow reduction greater than 92% as compared to the current permit. This flow reduction is commensurate with or better than the flow reduction that could have been achieved through the operation of closed-cycle cooling system. In addition, the Permittee must maintain an actual through-screen velocity of no greater than 0.5 fps except when operating the circulating water pumps. EPA has determined that this velocity will enable most adult and juvenile fish to avoid impingement, including rainbow smelt. This technology is particularly appropriate for PNPS because many of the species that had been impinged in the past, including rainbow smelt, river herring, and Atlantic silversides, were observed to suffer high mortality when impinged and returned to the source water via the traveling screens. When operating the circulating pumps, which occurs for a limited time on a monthly basis, the Permittee must continuously rotate the existing traveling screens. The Draft Permit proposed a reduced biological monitoring frequency following shutdown, including impingement monitoring once per week only when PNPS operates one of the circulating water pumps, and entrainment monitoring twice per month.

In response to this and other comments on the proposed biological monitoring in the Draft Permit, EPA looked to the compliance monitoring requirements in the 2014 Final Rule. Monitoring requirements for impingement mortality in compliance with the 2014 Final Rule are established at 40 C.F.R. §§ 125.94(c) and 125.96(a). Monitoring requirements for entrainment are determined on a site-specific basis to meet the requirements established for minimizing entrainment at 40 C.F.R. § 125.94(d). *See* 40 C.F.R. § 125.96(b). To demonstrate compliance with the flow reduction requirements, the Permittee must monitor flow daily at each pump and

report the average monthly and maximum daily flows for each monitoring period. *See* Final Permit Part I.A.1, I.A.2. To demonstrate compliance with the actual through-screen velocity, the Permittee must monitor the through-screen velocity at the intake screens daily. In lieu of monitoring, the Permittee may calculate the maximum through-screen velocity using water flow, depth, and open screen area. *See* Final Permit Part I.A.2, I.C.2; *see also* 40 C.F.R. § 125.94(c)(3). Facilities complying with an actual through-screen velocity of 0.5 fps in compliance with the BTA standard for impingement mortality under 40 C.F.R. § 125.94(c)(3) are not subject to biological compliance monitoring under the Final Rule unless otherwise specified by the permitting authority. *See* 79 Fed. Reg. at 48,325, 48,373. In addition, the Final Rule does not explicitly require facilities operating closed-cycle cooling to conduct biological compliance monitoring unless otherwise specified by the permitting authority. *See* 40 C.F.R. § 124.94(c)(1). While the Agencies did not determine closed-cycle cooling to be the BTA for PNPS, the facility has reduced its flows to those that would be similar to closed-cycle cooling had it continued to operate.

The compliance monitoring required by the Final Permit will ensure that the Permittee meets the BTA requirements, including the flow limits, operating restrictions, and the intake velocity limitations. In addition, there is an extensive record of entrainment at PNPS's CWIS dating back to 1980 and the baseline entrainment density under the pre-shutdown flow regime is well documented. EPA established in the Fact Sheet that the BTA for PNPS is a flow reduction commensurate with closed-cycle cooling. The benefit of this requirement can be calculated using the existing record of entrainment and the anticipated flow reductions at PNPS without additional biological monitoring. For this reason, the Final Permit does not require biological monitoring to demonstrate compliance with entrainment BTA requirements. The Agencies have determined that part of the BTA to minimize impingement mortality (in addition to meeting a through-screen velocity no greater than 0.5 fps when operating only the SSW pumps) includes limiting operation of the circulating water pumps to no more than 48 hours in a calendar month and continuously rotating the screens when a circulating water pump is in operation. The Final Permit requires impingement monitoring of the traveling screens once per month when operating a circulating pump. See Part I.C.6 and Attachment B of the Final Permit.

V. LIST OF COMMENTERS

A) Goodwin Proctor, on behalf of Entergy (permittee) – also at Public Hearing (PH)

B) Congressman Keating's office – (PH)

C) Association to Preserve Cape Cod (Ed Witt) and at PH (Dr. JoAnn Muramoto)

By email, 18 commenters attached the following comment:

I fully support the comments submitted by the Association to Preserve Cape Cod (APCC) concerning the NPDES draft permit for the Pilgrim Nuclear Power Station. I am very concerned that the draft NPDES permit violates the Clean Water Act.

D) Letter requesting public hearing from Jones River WA and CapeCod Bay Watch – 6/2/16

E) Pilgrim Watch (Mary Lampert) by email and at PH

F) Jones River Watershed Association (Pine Dubois and Karen Vale) email comments of 7/25/16 and at PH

G) Email comment from Ian Hoopingarner - 7/12/16

H) Individual letter from Terry Bassett

I) Joan Holt and Paul Sharaga email comments of 7/16/16

J) Brian Campbell – email comments of 7/19/16

K) John Nichols – email comments of 7/20/16

L) Mary Lampert (Pilgrim Watch) email of 7/25/16

M) Cape Cod Fisherman's Alliance (Pappalardo) letter of 7/22/16

N) Janet Azarovitz – 7/25/16 email comments and PH

O) Center for Coastal Studies – 7/25/2016 letter

P) Susan Carpenter – email comments of 7/25/16

Q) Lillia Frantin – email comments of 7/25/16

R) Cape Cod Downwinders – (Diane Turco/Susan Carpenter) email comments of 7/25/16 & PH

S) Cape Cod National Seashore Advisory Commission (Burgess)

T) David Agnew (PH)

U) Steve Sollog – at PH

V) Meg Sheehan – at PH

W(1) to W(9) Nine letters to Gina McCarthy in June that were replied to by Region 1 notifying of upcoming public hearing and reiterating that all comments would be responded to in RTC document.