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July 13, 2012

VIA EMAIL AND FEDEX

Tom Chapman
Supervisor
United States Department of the Interior
Fish and Wildlife Service
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087

Re: **EcoLaw's Letters Regarding Pilgrim Nuclear Power Station, ESA § 7 Consultation with Nuclear Regulatory Commission Regarding Roseate Tern**

Dear Mr. Chapman:

We write on behalf of Entergy Nuclear Generating Company and Entergy Nuclear Operations, Inc. ("Entergy") to respond to EcoLaw's[1] April 17, 2012 request ("First Letter") to the United States Fish and Wildlife Service ("FWS") to reinitiate consultation under Section 7 of the Endangered Species Act ("ESA") with respect to the roseate tern, as well as EcoLaw's June 28, 2012 repetition of that request ("Second Letter").[2] Briefly, EcoLaw's request is procedurally incorrect, substantively meritless, and incomprehensively untimely regarding a determination made by FWS in 2005 (and confirmed in 2006). As such, and as detailed more fully below, there is no legal or factual basis for FWS to consider EcoLaw's belated invitation to reinitiate consultation on the roseate tern, and every reason to decline to do so.

As an initial matter, EcoLaw's request that FWS "reinitiate consultation under Section 7 of the [ESA] with regard to the Roseate Tern, for the relicensing of [PNPS]," Second Letter at 1, or otherwise "reconsider[] [its] [2006] finding . . . that relicensing [PNPS] . . . is 'not likely to adversely affect' the roseate tern," First Letter at 1, is procedurally infirm and should be rejected for that reason alone.[3] On May 23, 2006, FWS officially determined (under an informal consultation procedure established by federal regulations at 50 C.F.R. § 402.13) that PNPS's

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1 EcoLaw purports to represent "a network of groups," but neglects to identify those entities by name. *See* Letter at 1. Nevertheless, it appears that Jones River Watershed Association ("JRWA") and Pilgrim Watch ("PW") are among the groups on whose behalf the First Letter and Second Letter were authored.

2 For your convenience, EcoLaw's First Letter is attached as Exhibit A, and its Second Letter is attached as Exhibit B.

3 To begin with, EcoLaw can identify no statute or regulation that either requires or allows FWS's ESA consultation to be subject to public notice or comment. Indeed, FWS's regulations, as well as its Consultation Handbook, speak only of participation by FWS, the relevant federal agency, and the applicant, never even hinting that the consultation process is a matter for public debate or participation. *See, e.g.*, 50 C.F.R. § 402.14(g)(5); Final ESA Section 7 Consultation Handbook, March 1998, pp. 1-14.

continued operations under a license renewal application that NRC already has granted (and under which PNPS already has commenced operation) were unlikely to adversely affect listed species, including the roseate tern. *See* Letter from M. Amaral, FWS, to R. Franovich, dated May 23, 2006, with Enclosure (Ex. C). That concurrence "terminated" the consultation process under section 7 of the ESA under those same regulations, with the result that "no further action is necessary" as *a matter of law*. *See* 50 C.F.R. § 402.13(a).

To the extent that EcoLaw wishes FWS to "reinitiate" its ESA § 7 consultation, it offers no credible regulatory basis for doing so; FWS's regulations speak only and expressly to the re-initiation of *formal* consultation under 50 C.F.R. § 402.15 , which was not and need not have been undertaken here. *See* 50 C.F.R. § 402.16. Even in the event that the "reinitiation of formal consultation" procedures were applied to *informal* consultation,[4] FWS's regulations discourage, if not prohibit, re-initiation of consultation under these circumstances. Specifically, FWS's explanation of its regulations provide that "where a permit or license ha[s] been granted," as PNPS's license has been here, "reinitiation [is] *not* appropriate," except in the limited circumstances where the federal licensing agency, here NRC, has "retained jurisdiction over the matter under the terms of the permit or license or as otherwise authorized by law," 51 Fed. Reg. 19,956 (June 3, 1986) (emphasis added). With NRC having issued a renewed operating license to PNPS (which occurred on May 29, 2012), re-initiation of consultation is presumptively "not appropriate" under FWS's regulations. Further, while a motion to reopen relating to consultation on the roseate tern was pending before the NRC when it issued Pilgrim's renewed license, that motion has now been denied by the NRC's Atomic Safety Licensing Board ("ASLB").[5] *See* ADAMS Accession No. ML12160A439.

In any case, even if FWS believed that the re-initiation provision applied in this circumstance, and were inclined to consider EcoLaw's request at this late juncture, that request is without merit and should be denied. FWS's regulations make clear that the reinitiation of consultation under ESA § 7 is required only in limited circumstances, the only one implicated by EcoLaw's request here being the existence of "new information [that] reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered." 50 C.F.R. § 402.16(b). Literally nothing that EcoLaw has offered in support of its request, either in

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[4] *Cf. Forest Guardians v. Johanns*, 450 F.3d 455, 465 (9th Cir. 2006) (applying 50 C.F.R. § 402.16 to informal consultation under distinguishable circumstances).

[5] Likewise, EcoLaw's request fails to take account of the fact that, as FWS has long recognized, "the Service . . . lack[s] . . . authority to require Federal agencies," like NRC, "to reinitiate consultation if they choose not to do so." 51 Fed. Reg. at 19,956. The most that FWS can do is to "request reinitiation when it believes that any condition described in [50 C.F.R. § 402.16] applies." *Id.* Given not only that those conditions are inapplicable, but also that NRC has affirmatively demonstrated its view that there is no significant environmental issue with respect to the roseate tern, EcoLaw's request here falls flat, and may equate to a lack of standing.

its First Letter or in its Second Letter, is "new information," as Entergy has previously explained in its responses to identical claims regarding the roseate tern and related issues which have been made by EcoLaw's constituent groups, JRWA and PW, to many other federal and state agencies, including the ASLB and the Massachusetts Office of Coastal Zone Management ("MOCZM"). As Entergy has demonstrated in its submissions to those agencies, which are attached for your consideration as Exhibits D and E, these claims are also both factually and legally baseless, and fall far short of "reveal[ing] effects . . . that may affect [the roseate tern] . . . in a manner or to an extent not previously considered" by FWS. They certainly do nothing to call into question FWS's previous determination that PNPS's continued operation is "unlikely to adversely affect" the roseate tern,[6] a finding to which FWS should continue to adhere.

Importantly and in the final analysis, no re-initiation of consultation is necessary here to protect roseate terns. In the highly unlikely event that PNPS's future operations ever should adversely affect roseate terns, PNPS will take the necessary and appropriate measures under the ESA pursuant to FWS's direction and guidance.

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For all of the above reasons, and as confirmed by the information provided in Exhibits D and E, FWS can and should decline EcoLaw's Letters as both improper and groundless.

Very truly yours,

Elise N. Zoli (by JMD)

Elise N. Zoli

Enclosures

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6 EcoLaw in its Second Letter at 1-2 also takes out of context certain language from the ASLB's June 18, 2012 decision in an attempt to suggest that a biological assessment was also required under the ESA, and that FWS was never provided with any such assessment or with an FSEIS. That is inaccurate on both scores. First, as FWS well knows, its regulations expressly establish that informal consultation, which was used here, may be used in lieu of the preparation of a biological assessment as a substitute for formal consultation under ESA § 7. *See* 50 C.F.R. §§ 402.13(a) and 402.14(b)(1). For that reason alone—and also because PNPS's relicensing involves no "major construction activity," *see Water Keeper Alliance v. U.S. Dep't of Def.*, 271 F.3d 21, 25 (1st Cir. 2001)—no biological assessment was required. Second, while it may be unclear whether FWS ultimately received a paper copy of the PNPS FSEIS during the informal consultation process, that document has long been publicly available, including via the Internet, for all, including FWS, to see. *See* http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1437/supplement29/v1/sr1437s29v1.pdf.

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cc: Margaret E. Sheehan, Esq.
EcoLaw
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Cambridge, MA 02238

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Chief Environmental Review and Guidance Update Branch
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Office of Nuclear Reactor Regulation
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July 13, 2012

VIA E-MAIL AND U.S. MAIL

Margaret E. Sheehan, Esq.
EcoLaw
P.O. Box 380083
Cambridge, MA 02238

Re: Pilgrim Nuclear Power Station, Plymouth, Massachusetts
Request for Courtesy Copies

Dear Margaret:

We write on behalf of Entergy Nuclear Generating Company and Entergy Nuclear Operations, Inc. (collectively, "Entergy") in response to your correspondence to the United States Fish and Wildlife Service ("USFWS" or the "Service") dated June 28, 2012, in which you request, among other things, that EcoLaw be kept regularly informed of any communications among and between Entergy, USFWS, and the Nuclear Regulatory Commission ("NRC") (collectively, the "Agencies") with respect to those Agencies' Section 7 consultation under the federal Endangered Species Act ("ESA") for Pilgrim Nuclear Power Station ("PNPS" or the "Station") located in Plymouth, Massachusetts.

While we must defer to the Agencies on their respective practices and protocols for distribution of official correspondence and documentation, we welcome this opportunity to address the matter on Entergy's behalf. More specifically, we write to advise, in the spirit of cooperation and openness, that we will provide EcoLaw with copies on a going-forward basis of any correspondence that we send to a federal or state regulatory agency or tribunal which addresses or otherwise responds to any claims or contentions raised by EcoLaw, Jones River Watershed Association ("JRWA") or Pilgrim Watch ("PW") (both of which we understand to be constituents of EcoLaw) with respect to continued PNPS operations. In return, we ask only that EcoLaw and its constituent members reciprocate in kind, so that we may keep the lines of communication open in a way that benefits all sides.

We thank you in advance for your professional courtesy and cooperation in this matter, and look forward to your response.

GOODWIN | PROCTER

Very truly yours,

Elise N. Zoli (by JMD)

Elise N. Zoli

ENZ

cc: Mr. Tom Chapman
Supervisor
United States Department of the Interior
Fish and Wildlife Service
New England Field Office
70 Commercial Street-Suite 300
Concord, New Hampshire 03301-5087

Andrew S. Imboden
Chief Environmental Review and Guidance Update Branch
Division of License Renewal
Office of Nuclear Reactor Regulation
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Washington, DC 20555-0001

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EXHIBIT A

ECOLAW

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April 17, 2012

Mr. Tom Chapman
Supervisor
United States Department of the Interior
Fish and Wildlife Service
New England Field Office
70 Commercial Street
Suite 300
Concord, New Hampshire 03301-5087

Re: Pilgrim Nuclear Power Station, Plymouth MA: ESA § 7 Consultation with Nuclear Regulatory Commission Regarding Roseate Terns

Dear Mr. Chapman,

On behalf of Pilgrim Watch and Jones River Watershed Association, Inc., this is to provide additional information warranting a reconsideration of your office's finding under the Endangered Species Act, 16 U.S.C. §§ 1531 *et seq.,* that relicensing the Power Station Pilgrim Nuclear Power Station (PNPS) in Plymouth, Massachusetts is "not likely to adversely affect" the roseate tern, *Sterna dougallii.* Your office provided this concurrence to the Nuclear Regulatory Commission (NRC) in a letter dated May 23, 2006.

PNPS is a 715-megawatt nuclear power station that has operated since 1972 using least 510 million gallons per day of once-through cooling water from Cape Cod Bay. Throughout its' 40-year operating history, the PNPS cooling water intake system (CWIS) and pollutant discharges have impacted a range of species, ecosystems, and habitats. Entergy Nuclear Generation Company and Entergy Nuclear Operations Inc. (Entergy) seek to renew the PNPS operating license for another 20 years, through 2032, using the same once-through CWIS. By the NRC's own estimates, PNPS has already used the entire volume of Cape Cod Bay as cooling water for the reactor.

In 2006, USFWS provided a "not likely to adversely affect" determination to the NRC for all species under USFWS jurisdiction, including the roseate tern. New information shows that this determination for the roseate tern was based on information that is no longer valid, as well as new scientific data, and that the NRC should have prepared a biological assessment.

Some of the background is as follows. By letter dated May 23, 2006 to the NRC, the USFWS confirmed a statement made in an earlier letter from March 9, 2005 in which USFWS concurred with Entergy's claim that PNPS relicensing is "not likely to adversely affect federally-listed species," including the roseate tern. Yet, Entergy's own letter to USFWS dated February 3, 2005, states that "Several listed terrestrial species are known to occur in the general vicinity of the PNPS site, however, and cannot be ruled out as occasional visitors to the PNPS site and environs....These include the roseate tern."[1] Since the tern "may be present," in areas to be affected directly or indirectly by PNPS, the NRC was required by the ESA, § 1531(c)(1), to prepare a biological assessment "for the purpose of identifying any endangered or threatened species which is likely to be affected by such action." *See also*, 50 C.F.R. § 402.12, and the definition of "action area" in 402.02.[2]

To our knowledge, the NRC Staff did not prepare a biological assessment for the roseate term. Instead, USFWS concurred with Entergy's conclusion in its February 3, 2005 letter that PNPS operations would have "no effect" on ESA-listed species, and dismissed the tern's presence as "probably transient in nature" and "unlikely to be adversely affected."[3] We are unaware of any scientific data in the record supporting the

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[1] This letter is contained in Attachment B to Entergy's NRC relicensing application, available at: http://www.nrc.gov/reactors/operating/licensing/renewal/applications/pilgrim.html. The PNPS EIS is at: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1437/supplement29/index.html

[2] PNPS relicensing is a "major construction activity" as defined by 50 CFR § 402.12(b) because it is an undertaking which is a "major Federal action significantly affecting the quality of the human environment" as referred to in the National Environmental Policy Act, 42 U.S.C. § 4332(2)(C). The NRC prepared an environmental impact statement under NEPA for PNPS, thus acknowledging that relicensing is a "major Federal action significantly affecting the quality of the human environment."

[3] The February 3, 2005 letter from Entergy to USFWS states,

> Several listed terrestrial species are known to occur in the general vicinity of the PNPS site, however, and cannot be ruled out as occasional visitors to the PNPS site and environs. These include the bald eagle, piping plover, and roseate tern. Bald eagles are present year-round in Massachusetts and congregate in significant numbers in wintering areas along the coast of Cape Cod and Buzzard's Bay. Bald eagles have been observed foraging in the general vicinity of PNPS, but are not believed to nest in the area... Like the piping plover, the roseate tern nests in colonies along the Massachusetts coast in summer. The roseate tern nests in dune areas with thick vegetative cover, always in association with the common tern. Although suitable nesting habitat has not been identified at PNPS, migrating terns may move through the site in late spring (en route to nesting areas in Maine and Nova Scotia) and late summer (en route to wintering areas in the West Indies and Latin America).
>
> ....
>
> We therefore request your concurrence with our determination that license renewal would have no effect on threatened or endangered species (including candidate species and species proposed for listing) and that formal consultation is not necessary.

USFWS statement in its 2005 and 2006 letters. If such data exists, we request that it be made publicly available.

The following information shows that the USFWS statement that the roseate tern is "unlikely to be adversely affected" was erroneously made without a biological assessment from the NRC staff, and lacks a credible scientific basis. We request that you consider the following facts and revisit your 2006 statement.

1. PNPS cooling water operations are in an area that would be used by the roseate tern for foraging. Roseate terns are documented by the Massachusetts Natural Heritage and Endangered Species Program as nesting on Plymouth Beach annually in small numbers (1 to 3 pairs). They are known to forage for sand lance, herring, and other small fish in shallow waters within about 20 miles of nesting areas.[4] Roseate terns also gather in large staging migratory flocks (hundreds and up to about 4,000) at the tip of Plymouth Beach from late July through most of September. Plymouth Beach is about 2.5 miles from PNPS. The roseate terns tend to stage on sand bars and tidal flats close to important food resource areas and are not believed to fly more than a few miles from these areas for food. Thus, for both nesting roseate terns and staging flocks, PNPS is within their nesting, foraging and staging range.[5]

2. The predominant prey species of roseate terns in New England has been found to be American Sand Lance (*sammodytes americanus),* Hake, and Atlantic Herring

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The USFWS March 9, 2005 reply letter to Entergy states "..... roseate terns are known to occur on Plymouth beach just north of PNPS but "[a]ccording to our records, none of the above-listed species [including the roseate tern and bald eagle] are known to frequent the immediate vicinity of PNPS and, therefore, the presence of these species near the power station is probably transient in nature...Since no expansion of existing facilities is planned and no additional land disturbance is anticipated, we concur with your determination that license renewal for PNPS is not likely to adversely affect federally-listed species...." This statement was confirmed in the May 23, 2006 USFWS letter to the NRC Staff.

[4] *Carribean Roseate Tern and North Atlantic Roseate Tern, 5-Year Review: Summary and Evaluation,* USFWS, Sept. 2010, p. 40. http://ecos.fws.gov/docs/five_year_review/doc3588.pdf

See also, *Roseate Tern, Northeast Population Recovery Plan* First Update, prepared by Northeast Roseate Tern Recovery Team for Northeast Region, USFWS, Nov. 5, 1998 http://ecos.fws.gov/docs/recovery_plan/981105.pdf

Roseate Tern Recovery in Buzzards Bay, http://www.buzzardsbay.org/roseates.htm

[5] "In the only foraging study of roseate terns within the Northeast population that utilized telemetry, Rock *et al.* (2007) found that while roseate terns nesting at Country Island, Nova Scotia, sometimes foraged as far as 7.2 miles (24 km) from the colony, on average they foraged much closer, 2.1 mi (7 km), and especially in locations within 6 miles (10 km) of the colony, at water depths less than 16.5 ft. (5 m). The authors recommended that critical foraging habitat for the roseate terns at County Island, *i.e.*, shallow areas (< 5 m depth) within 10 km of the colony, should be protected (Rock *et al.* 2007)."

(*clupea harengus*).[6] The NRC's environmental impact statement for PNPS identifies Atlantic Herring, Hake, and Atlantic Sand Lance as having designated essential fish habitat under the Magnuson Stevens Fisheries Conservation Act in the vicinity of PNPS. PNPS EIS, p. 2-33.[7] Other small fish and juvenile fish such as other species of herring and menhaden are also food species for the roseate tern.

American Sand Lance, Hake, and Atlantic Herring, as well as other roseate tern food species, are impinged and entrained at PNPS, and subject to its point source and non-point source pollutant discharges. See, e.g. PNPS EIS, p. 2-36 ("Juveniles and/or adults [of Atlantic herring] have been consistently collected in the PNPS impingement sampling program. Over the last 25 years they have been one of the numerically dominant impinged species"; p. 2-49 and Table 4-4 (in 2005 there were 9,860,824 Atlantic herring larvae entrained; p. E-57 (here have been "significant entrainment events involving Atlantic herring). Other herring species, such as the river herring, and menhaden are also impinged and entrained at PNPS and subject to its point source and non-point source discharges. Eggs and larvae of the Red Hake and silver hake are entrained at PNPS, and juveniles and adults are impinged. PNPS EIS, p. 2-56; p. 2-60.

3. Pollution of Buzzards Bay, habitat for roseate terns, has been called a "significant threat to the species".[8] There has been no assessment of the affect on roseate terns and their food source from the pollutant discharges from PNPS, including radioactive effluent, chlorine, biocides, and thermal releases.

4. Since 1999, Entergy has been in violation of its Clean Water Act NPDES permit because it has failed to obtain state and federal approval of its Biological Monitoring plans, and has failed to conduct any monitoring it did do, under the oversight of the Pilgrim Advisory Technical Committee, in violation of NPDES Permit, Part A.8 and Part A, 8.d.

Entergy's NPDES permit expired in 1996 but has been administratively extended since that time. EPA and MassDEP do not have the capacity to complete the CWA § 316 review and issue a new NPDES permit before June 8, 2012, the NRC relicensing deadline.

Entergy claims it its February 3, 2005 letter to USFWS that PNPS relicensing will have "no effects," in part because a report by its consultant, ENSR, done in the year 2000

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[6] *Carribean Roseate Tern and North Atlantic Roseate Tern, 5-Year Review: Summary and Evaluation*, USFWS, Sept. 2010, pp. 50, 51, 59. http://ecos.fws.gov/docs/five_year_review/doc3588.pdf

[7] Yet, the NRC has not completed an EFH consultation but has attempted to put that off into the indefinite future, at such time as U.S. EPA renews the PNPS NPDES permit, which is now overdue by 16 years. The NPDES permit review is not scheduled to be completed for at least one year from now, if then.

[8] *Carribean Roseate Tern and North Atlantic Roseate Tern, 5-Year Review: Summary and Evaluation*, USFWS, Sept. 2010, p. 40. http://ecos.fws.gov/docs/five_year_review/doc3588.pdf p. 62.

(12 years ago) shows no "adverse impact on the integrity of Cape Cod fish and shellfish populations…." This report was done for purposes of demonstrating compliance with the Clean Water Act 316(a) and (b) requirements for thermal discharges and CWIS. As noted, Entergy's current permit is 16 years out of date. Most importantly, U.S. EPA has not accepted the conclusions in the 12-year old ENSR report, and even the PNPS EIS states, "EPA Region 1, in discussions with the NRC staff, indicated that there was some debate over the conclusions of the report." PNPS EIS, p. 4-21. Moreover, MCZM staff comments on the ENSR 2000 report forcefully states the 2000 ENSR CWA 316 report failed to demonstrate that MCZM standards were met.[9]

Further, there has been a substantial difference in the operations of PNPS between 1994, the date of an NPDES permit modification, and 2008: in 1994 the reactor average output was 65.2% while in 2008 it was 98%. This increase in operating output means that the facility is running its once-through cooling water system more frequently, meaning more impingement, entrainment, and pollutant discharges including thermal releases.

Thus, to the extent USFWS relied upon Entergy's 2000 report and statements that its CWIS operations "has not resulted in adverse impacts to the integrity of Cape Cod Bay fish and shellfish populations," USFWS was in error.

5. Entergy has not demonstrated compliance with MassDEP's 2006 CWIS standards, upheld by the Massachusetts Supreme Judicial Court in April 2011, following a legal challenge by Entergy. Entergy Nuclear Generation Company v. Department of Environmental Protection, 459 Mass. 319 (2011). These regulations are designed, *inter alia*, to minimize impacts on aquatic life through entrainment, impingement and thermal discharge. See, 314 CMR § 4.05(b)(2)(d), 4.05(3)(c)(2)(d), 4.05(4)(a)(2)(d), 4.05(4)(b)(2)(d), 4.05(4)(c)(2)(d).

Each of the five factors above requires reconsideration of USFWS' 2006 decision that PNPS relicensing is "not likely to affect" the roseate tern. Given this new

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[9] In 2000, MCZM staff provided comments to U.S. EPA on Entergy's § 316 Demonstration Report. These comments are highly critical of Entergy's § 316 Demonstration Report. For example, the letter states,

- In 1997 and 1998, Entergy killed almost "40% of the annual total recreational and commercial catch" of winter flounder.
- "…the Demonstration Report does not adequately support the conclusion of no significant impact to the species inhabiting the waters surrounding Entergy-Pilgrim Station."
- "…at least one modeling study predicts that hundreds of acres of Cape Cod Bay may increase by one degree Celsius or more due to thermal loading from the discharge. The Demonstration Report does not provide adequate evidence to determine 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."
- "…it has yet to be determined how large single-day losses of these important prey species [e.g. schooling species] affect food web dynamics in the region of Cape Cod Bay near the Entergy-Pilgrim Station."
- "Of most concern is the entrainment of eggs and planktonic larvae by the cooling water intake structures."

information, USFWS should require a biological assessment and proper ESA § 7 consultation to determine whether relicensing of PNPS roseate terns.

Please feel free to contact me if you have questions. I can be contacted at cell 508-259-9154 or meg@ecolaw.biz, or by mail at the above address.

Thank you for your attention to this matter.

Very truly yours,

Electronically signed

Margaret E. Sheehan, Esq.

Cc: Pilgrim Watch
Rep. Ed Markey
Goldenrod Foundation
Jones River Watershed Association, Inc.
Maxwell Smith, Nuclear Regulatory Commission

EXHIBIT B

ECOLAW

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June 28, 2012

By Email and Federal Express

Mr. Tom Chapman
Supervisor
United States Department of the Interior
Fish and Wildlife Service
New England Field Office
70 Commercial Street-Suite 300
Concord, New Hampshire 03301-5087

Re: Pilgrim Nuclear Power Station, Plymouth, Massachusetts:

Request to Reinitiate ESA § 7 Consultation with Regard to Roseate Tern

Dear Mr. Chapman,

Jones River Watershed Association (JRWA) and Pilgrim Watch (PW) request that the U.S. Fish and Wildlife Service (FWS) reinitiate consultation under Section 7 of the Endangered Species Act, 16 USC § 1536, with regard to the Roseate Tern, for the relicensing of the Pilgrim Nuclear Power Station (PNPS) owned and operated by Energy Nuclear Generating Corporation (Entergy).

Under 50 CFR § 402.16, consultation must be reinitiated under certain circumstances, which are present here. Forest Guardians v. Johanns, 450 F.3d 455 (9th Cir June 13, 2006). Greenpeace Found. v. Daley, 122 F. Supp. 2d 1110 (D. Haw. June 5, 2000). The circumstances warranting reinitiation of consultation include substantive concerns identified in the new information provided with this letter, and the NRC's failure follow required procedures.

In a letter dated April 17, 2012, we requested reconsideration of the FWS's conclusion that PNPS relicensing is "not likely to adversely affect" the roseate tern. We have not received a response to that letter.

On June 18, 2012, the Atomic Safety Licensing Board (ASLB) of the Nuclear Regulatory Commission rejected a request by Pilgrim Watch and Jones River Watershed Association to reopen the relicensing proceeding for PNPS and for a hearing on compliance with the Endangered Species Act with regard to the Roseate Tern. The three judges stated, however,

> But we remind the NRC Staff that it is ultimately their obligation to comply with

> NEPA and the ESA. Petitioners have raised genuine concerns that appropriate procedures were not followed in this case. For example, although the NRC Staff may be correct that the FSEIS is the functional equivalent of a BA, there is no evidence that the FSEIS was ever submitted to USFWS as required by the ESA regulations. In addition, although the roseate tern population nesting at the LBP site has increased in recent years, Dr. Nisbet (who clearly has significant expertise on the roseate tern and how it may be affected by environmental considerations) presents extensive additional information and considerations that may warrant further attention by the NRC Staff.

See, ASLB Docket No. 50-293-LR, ASLBP No. 12-920-07-LR-BD01, p. 10.

We attach to this letter Dr. Nisbet's testimony, cited approvingly by the ASLB as containing relevant and important information and a June 15, 2012 letter to Massachusetts Coastal Zone Management for your consideration. The ASLB has affirmed what we have stated to you and others previously; that proper review procedures were not followed and important facts may not have been considered.

We request to be kept regularly informed of communications among and between the NRC staff, Entergy, and FWS. Please direct any response to Meg Sheehan, meg@ecolaw.biz, cell 508 259-9154 or to the mailing address listed at the top of this letter. Please feel free to contact us if you have questions.

Sincerely,

Electronically signed

Margaret E. Sheehan, Esq.

Cc:
Andrew S. Imboden
Chief Environmental Review and Guidance Update Branch
Division of License Renewal
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attached:
6/15/2012 Letter to CZM
Affidavit of Ian Nisbet, PhD

EXHIBIT C

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087

May 23, 2006

Rani Franovich
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Ms. Franovich:

We are in receipt of your April 25, 2006 letter regarding the license renewal process for the Pilgrim Nuclear Power Station, Plymouth, Massachusetts. This office received and responded to a letter dated February 3, 2005 that requested an informal consultation with regard to federally-threatened and endangered species from the applicant, Entergy Nuclear Generation Company. Enclosed is a copy of our response, dated March 9, 2005. In addition, we have no comments with regard to the Fish and Wildlife Coordination Act.

Thank you for your coordination. Please contact Anthony Tur at 603-223-2541 if we can be of further assistance.

Sincerely yours,

Michael J. Amaral

Michael J. Amaral
Endangered Species Specialist
New England Field Office

Enclosure

05-244

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087

March 9, 2005

Stephen Bethay
Entergy Nuclear Generation Company
600 Rocky Hill Road
Plymouth, MA 02360

Dear Mr. Bethay:

We are in receipt of your February 3, 2005 letter regarding the license renewal process for the Pilgrim Nuclear Power Station (PNPS), Plymouth, Massachusetts. The following comments are provided in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

The federally-threatened piping plover (*Charadrius melodus*) and federally-endangered roseate tern (*Sterna dougallii*) are known to occur along Plymouth Beach, just north of the PNPS. Occasional wintering bald eagles (*Haliaeetus leucocephalus*) are also sometimes present in the area. According to our records, none of the above-listed species are known to frequent the immediate vicinity of PNPS and, therefore, the presence of these species near the power station is probably transient in nature.

As stated in your letter, the PNPS-to-Snake Hill Road transmission corridor crosses critical habitat for the endangered red-bellied cooter (*Pseudemys rubriventris*). We concur with your determination that the area crossed by the transmission line does not provide the specific biological habitat needs for the red-bellied cooter. However, turtles may traverse the transmission line corridor and the area is considered critical based on its value to buffer against activities that may degrade water quantity and quality in ponds occupied by the species.

Information was provided regarding several marine mammals and turtles. Jurisdiction for those species resides with the National Marine Fisheries Service. We suggest you contact them at their Gloucester, Massachusetts office at 978-281-9300 with regard to the relicensing of the PNPS.

Since no expansion of existing facilities is planned and no additional land disturbance is anticipated, we concur with your determination that license renewal for PNPS is not likely to adversely affect federally-listed species subject to the jurisdiction of the U.S. Fish and Wildlife Service, and that formal consultation with us is not required.

Thank you for your coordination. Please contact us at 603-223-2541 if we can be of further assistance.

Sincerely yours,

Michael J. Amaral

Michael J. Amaral
Endangered Species Specialist
New England Field Office

EXHIBIT D

May 16, 2012

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
Entergy Nuclear Generation Company and	)	Docket No. 50-293-LR
Entergy Nuclear Operations, Inc.	)	ASLBP No. 06-848-02-LR
	)	
(Pilgrim Nuclear Power Station)	)	

ENTERGY'S ANSWER OPPOSING JONES RIVER WATERSHED ASSOCIATION'S AND PILGRIM WATCH'S MOTION TO REOPEN HEARING REQUEST ON CONTENTION RELATED TO THE ROSEATE TERN

I. Introduction

Entergy Nuclear Generation Company and Entergy Nuclear Operations, Inc. (collectively "Entergy") hereby oppose the late-filed motion to reopen the record that Jones River Watershed Association and Pilgrim Watch (collectively, "JRWA/PW" or "Petitioners") filed on May 2, 2012[1] seeking to raise a new contention challenging the assessment of the roseate tern in the July 2007 final Supplemental Environmental Impact Statement ("FSEIS")[2] for license renewal of the Pilgrim Nuclear Power Station ("Pilgrim" or "PNPS"). This is the seventh such motion filed by Pilgrim Watch, now joined by JRWA, and like the preceding six, it is untimely and meritless.

II. Statement of the Case

Entergy has previously summarized the relevant procedural history of this case in its response opposing the JRWA/PW contention concerning Endangered Species Act- ("ESA-")

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1 Jones River Watershed Association and Pilgrim Watch Motion to Reopen, Request for Hearing and Permission to File New Contention in the Above-Captioned License Renewal Proceeding on Violations of the Endangered Species Act with Regard to the Roseate Tern (May 2, 2012) ("JRWA/PW Motion").

2 NUREG-1437, Supplement 29, Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Pilgrim Nuclear Power Station (July 2007) ("FSEIS").

listed aquatic species,[3] and that summary will not be repeated here. This proceeding, now in its seventh year, involves the application submitted by Entergy in January 2006 seeking renewal of the operating license for Pilgrim ("Application").[4] Prior to submitting the Application to the NRC, Entergy contacted the U.S. Fish and Wildlife Service ("FWS") in order to facilitate the ESA Section 7 consultation process that would later occur between FWS and NRC. By letter dated February 3, 2005, Entergy submitted a letter to FWS requesting information on threatened or endangered species in the vicinity of the Pilgrim plant in order to assess the impact of Pilgrim's license renewal on any such species.[5] Entergy stated that "no Federally listed terrestrial species occur on the PNPS site proper," but noted that "[s]everal listed terrestrial species are known to occur in the general vicinity of the PNPS site," including the roseate tern, and that those species "cannot be ruled out as occasional visitors to the PNPS site." Entergy Feb. 2005 Letter to FWS at 1, 2. Entergy's letter further explained that

> [t]he roseate tern nests in colonies along the Massachusetts coast in summer. The roseate tern nests in dune areas with thick vegetative cover, always in association with the common tern. Although suitable nesting habitat has not been identified at PNPS, migrating terns may move through the site in late spring (en route to nesting areas in Maine and Nova Scotia) and late summer (en route to wintering areas in the West Indies and Latin America).

Id. at 2. Entergy's letter also explained that it "has no plans to alter current operations over the license renewal period," "[a]ny maintenance activities necessary to support license renewal would be limited to previously disturbed areas," and that "[n]o expansion of existing facilities is planned, and no additional land disturbance is anticipated in support of license renewal." Id. at 3. Accordingly, Entergy requested that FWS concur with its "determination that license renewal

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[3] Entergy's Answer Opposing Jones River Watershed Association's and Pilgrim Watch's Motion to Reopen and Hearing Request (Mar. 19, 2012) at 6-10.

[4] See 71 Fed. Reg. 15,222 (Mar. 27, 2006).

would have no effect on threatened or endangered species . . . and that formal consultation is not necessary." Entergy Feb. 2005 Letter to FWS at 3.

By letter dated March 9, 2005, FWS responded to Entergy's February 3, 2005 letter and concurred with Entergy's determination that formal consultation was not required.[6] FWS stated that the "federally-endangered roseate tern . . . [is] known to occur along Plymouth Beach, just north of the PNPS," but that "none . . . are known to frequent the immediate vicinity of PNPS and, therefore, the presence of [this] species near the power station is probably transient in nature." FWS Mar. 2005 Letter to Entergy at 1. Thus, FWS concluded that,

> [s]ince no expansion of existing facilities is planned and no additional land disturbance is anticipated, we concur with your determination that license renewal for PNPS is not likely to adversely affect federally-listed species subject to the jurisdiction of the [FWS], and that formal consultation with us is not required.

Id. at 2 (emphasis added).

In January 2006, Entergy submitted the Application. The Application included an Environmental Report ("ER"), which provided an assessment of ESA-listed species that may occur in the vicinity of the station. ER, §§ 2.5, 4.10. With respect to the roseate tern, the ER noted that the species is "known to occur in the general vicinity of the PNPS site . . . and cannot be ruled out as [an] occasional visitor[] to the PNPS site and environs." ER at 2-9. More specifically, the ER stated:

> [T]he roseate tern nests in colonies along the Massachusetts coast in summer . . . . The roseate tern nests in areas with thick vegetative cover, always in association with the common tern. Although suitable nesting habitat has not been identified at PNPS, migrating terns may move through the site in late spring (en route to nesting areas in Maine and Nova Scotia) and late summer (en route to wintering areas in the West Indies and Latin America).

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[5] Pilgrim Nuclear Power Station, Applicant's Environmental Report ("ER") Attachment B, Special Status Species Correspondence at 1 ("Entergy Feb. 2005 Letter to FWS").

[6] Pilgrim Nuclear Power Station, ER Attachment B, Special Status Species Correspondence at 6 ("FWS Mar. 2005 Letter to Entergy").

Id. at 2-10. The ER further explained that:

> Entergy has no plans to conduct refurbishment or construction activities at PNPS during the license renewal term. Therefore, there will be no impact to threatened or endangered species from refurbishment activities.

Id. at 4-18. Entergy's assessment concluded:

> Renewal of the operating license for PNPS is not expected to result in the taking of any threatened or endangered species. Renewal of the license is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modifications of any critical habitat.

Id. The ER included copies of the correspondence between Entergy and FWS. See ER Attachment B.

By letter dated April 25, 2006,[7] the NRC notified FWS that it was reviewing the Application and preparing a supplemental environmental impact statement analyzing "pertinent environmental issues, including endangered or threatened species and impacts to fish and wildlife." NRC April 2006 Letter to FWS at 1. The NRC letter noted that the "Pilgrim industrial facility covers approximately 140 acres" and that the "proposed action would include the use and continued maintenance of existing plant facilities and transmission lines," id., and did not indicate that renewal of Pilgrim's operating license would result in any expansion of existing facilities, or construction of new facilities. The NRC requested "a list of species and information on protected, proposed, and candidate species and critical habitat that may be in the vicinity of Pilgrim" in order to "support the SEIS preparation process and to ensure compliance with Section 7 of the [ESA]." Id. at 2.

[7] Letter from Mr. Rani Franovich, NRC, to Mr. Michael Bartlett, U.S. Fish and Wildlife Service, Subject: Request for a List of Protected Species Within the Area Under Evaluation for the Pilgrim Nuclear Power Station License Renewal Application Review (Apr. 25, 2006) (ADAMS Accession No. ML061160303) ("NRC April 2006 Letter to FWS").

By letter dated May 23, 2006, FWS responded to the NRC's request by transmitting its March 9, 2005 response to Entergy's February 3, 2005 letter, which provided the FWS determination that "license renewal for PNPS is not likely to adversely affect federally-listed species subject to the jurisdiction of the [FWS] and that formal consultation . . . is not required."[8]

On May 25, 2006, Pilgrim Watch filed a petition to intervene requesting a hearing on five proposed contentions, none of which sought to raise any issue concerning impact on ESA-listed species, including the roseate tern.[9] JRWA did not seek to intervene in the proceeding.

In December 2006, the NRC published its draft supplemental environmental impact statement ("DSEIS").[10] The DSEIS identifies the roseate tern as a Federally-listed endangered species that nests in Massachusetts on coastal beaches, and is "known to occur along Plymouth Beach just north of PNPS" and "may pass through the PNPS site during northward migration in late spring or southward migration in early fall." DSEIS at 2-96; see also id. at 2-92, 4-58. Although the northeastern U.S. roseate tern population has declined by approximately 70% since 1935 "due to factors such as alteration of nesting habitats, displacement from nesting areas by gulls, erosion, flooding, and human predation on their wintering grounds," id. at 2-96, the roseate population in Massachusetts has been increasing during the period in which PNPS has been operating – from 1600 breeding pairs in 1978 to 1810 breeding pairs in 1999. Id. at 4-58. The NRC Staff found that "there is no evidence that these species have been adversely affected by previous operation of the PNPS facility" and concluded that, "[g]iven that no expansion of existing facilities or disturbance of additional land is anticipated," the roseate tern and other

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[8] Letter from Michael J. Amaral, Endangered Species Specialist, New England Field Office, US FWS, to Rani Franovich, NRC (May 23, 2006) (ADAMS Accession No. ML061650016) ("FWS May 2006 Letter to NRC").

[9] Request for Hearing and Petition to Intervene by Pilgrim Watch (May 25, 2006).

Federally- and State-listed species are "unlikely to be adversely affected during the renewal period." Id. Because FWS had already determined that formal consultation was not required, the NRC Staff did not prepare a separate biological assessment ("BA") on the roseate tern or any other terrestrial or freshwater aquatic species. Id. at 4-59.

With respect to cumulative impacts, the NRC Staff found that "operation of PNPS is not likely to have a detectable effect on terrestrial or freshwater aquatic species located in the vicinity of the PNPS" and that "[n]o other Federal or non Federal activities have been identified that would have an adverse effect on terrestrial and freshwater aquatic species in the area." Id. at 4-70. The Staff concluded that the "incremental contribution to cumulative impacts on terrestrial and freshwater aquatic resources resulting from continued operation of PNPS and its associated transmission line ROW would be SMALL and that no additional mitigation would be warranted." Id.

The Staff published the FSEIS in July 2007, and the information, data, and conclusions provided therein with respect to the roseate tern are identical to those presented in the DSEIS. See FSEIS at 2-92, 2-96, 4-64 – 4-65 (the roseate tern is "unlikely to be adversely affected during the renewal period"), 4-77 (cumulative impacts are "SMALL"). The FSEIS states that "[n]o Federally or State-listed threatened or endangered terrestrial species have been observed on the PNPS site," and that although the roseate tern and other "Federally listed birds occur in the vicinity of" PNPS, "they are not dependent on habitats within the facility and are unlikely to be affected by facility operations." Id. at 4-64. In response to a comment received on the DSEIS concerning the need to "resolve[]" any issues with Federally-listed species, including the roseate

[10] NUREG-1437, Supplement 29, Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Pilgrim Nuclear Power Station – Draft Report for Comment (Dec. 2006) (ADAMS Accession No. ML063260173) ("DSEIS").

tern, related to continued operation of Pilgrim, the Staff summarized its conclusion that impacts to Federally-listed species would be small, stated that it had consulted with FWS under ESA Section 7, and noted that FWS had concurred with the NRC's conclusion and informally concluded the consultation. Id. at A-104 – A-105. The Staff reiterated its ultimate conclusions and determination not to prepare a BA. Id. at 4-64 – 4-66 ("[g]iven that no expansion of existing facilities or disturbance of additional land is anticipated," the roseate tern and other Federally- and State-listed species are "unlikely to be adversely affected during the renewal period"; and the impacts on ESA-listed species "of an additional 20 years of operation and maintenance of PNPS . . . would be SMALL, and no additional mitigation would be warranted").

Although Pilgrim Watch was an admitted party to the proceeding when the DSEIS and FSEIS were published, Pilgrim Watch never sought to challenge the adequacy of the ESA Section 7 consultation between the NRC and FWS, or the information, data, and conclusions reached with respect to the roseate tern at those times. Similarly, the publication of those documents did not prompt any hearing request from JRWA. In addition, neither Pilgrim Watch nor JRWA submitted any comments relating to the Staff's consultation and assessment concerning the roseate tern.

Now, nearly five years later, after this Board has terminated the proceeding[11] and the NRC Staff has requested Commission authorization to issue the renewed license,[12] JRWA/PW have filed the seventh motion to reopen the proceeding, this time claiming that (1) the NRC Staff failed to prepare a BA on the roseate tern and should be required to do so; (2) FWS erroneously consented to the NRC Staff's decision to not prepare a BA; (3) information contained in the

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[11] LBP-12-01, 75 N.R.C. __, slip op. at 2, 27 (Jan. 11, 2012)

[12] SECY-12-0062, Renewal of Full-Power Operating License for Pilgrim Nuclear Power Station (Apr. 20, 2012).

Application and the FSEIS concerning the roseate tern is materially incomplete and inaccurate; and (4) "there is significant potential for adverse effects on the roseate terns during the relicensing period." JRWA/PW Motion at 5-6.

III. The NRC Was Not Required to Prepare a Biological Assessment for the Roseate Tern

Because the JRWA/PW Motion focuses on the question of whether the NRC was required to prepare a BA on the roseate tern, this Answer will first provide a short overview of when a Federal agency must prepare a BA under ESA Section 7 before addressing the Motion's multiple failures to comply with the Commission's requirements reopening the record, late-filed contentions, and admissible contentions.

Entergy has previously summarized portions of the requirements under Section 7 of the ESA.[13] Relevant to the claims made in the JRWA/PW Motion on the roseate tern, under ESA Section 7, the NRC is required, in consultation with FWS,[14] to ensure that any NRC action is not likely to jeopardize the continued existence of any threatened or endangered terrestrial and freshwater aquatic species, or result in the destruction or adverse modification of habitat critical to such species. 16 U.S.C. § 1536(a)(2). To facilitate compliance with the consultation requirements, ESA Section 7(c) calls on Federal agencies to prepare a BA only if ESA-listed species may be present in the area of proposed projects involving construction authorized by the agency. 16 U.S.C. § 1536(c). The statute does not, however, specify how a federal agency should determine whether its actions are likely to affect ESA-listed species in other types of

[13] Entergy's Answer Opposing Jones River Watershed Association's and Pilgrim Watch's Motion to Reopen and Hearing Request (Mar. 19, 2012) at 3-5.

[14] The ESA refers to the Secretary of Commerce and the Secretary of the Interior, but these Departments have delegated their authority to the National Marine Fisheries Service ("NMFS") and FWS. Because the roseate tern falls under the jurisdiction of FWS, this Answer will refer only to FWS.

proceedings that do not involve major construction activities (such as renewing the operating license of a nuclear plant).

The FWS regulations implementing ESA Section 7 mirror the requirements of the statute: in the case of "major construction activities," the Federal agency authorizing the construction activity must prepare a BA. 50 C.F.R. § 402.12(b). But for Federal actions that do not involve major construction activities, no BA is required. When promulgating Part 402, FWS explicitly stated that it

> will not require biological assessments for actions that do not involve construction or activities having physical impacts similar to construction, such as dredging, blasting, etc. This limitation derives support from the 1979 Conference Report reference to actions designed *primarily to result* in the building or erection of various projects.

Final Rule, Interagency Cooperation, Endangered Species Act of 1973, 51 Fed. Reg. 19,926, 19,936 (June 3, 1986) (emphasis in original). A "major construction activity" "encompasses dams, buildings, pipelines, roads, water resource developments, channel improvements, and other such undertakings which significantly modify the physical environment." Id. The Statement of Considerations is clear that a BA is required only for major Federal actions that are also construction projects. Id.

Federal Courts have held that a BA be prepared only for major construction activities. In Water Keeper Alliance v. U.S. Dep't of Defense, 271 F.3d 21 (1st Cir. 2001), the First Circuit ruled that "[w]hat triggers the requirement of a biological assessment is that the action is a major construction activity." 271 F.3d at 31. At issue in that case were military exercises on the island of Vieques off Puerto Rico, specifically short term exercises using inert ordinance, and a request for a preliminary injunction to stay those exercises. Id. at 24, 33. The First Circuit noted some ambiguity in the regulations as to who decides whether an agency action is a major construction activity, but pointed to the Statement of Considerations for the regulation, which suggests that the Federal agency authorizing the action at issue makes the determination. Id. at 33, n.8 (quoting 51 Fed. Reg. at 19,946 ("The biological assessment process begins when a Federal agency decides that its action is a major construction activity")). The First Circuit concluded that the petitioner had failed to show the required probability of success on the merits to require a preliminary injunction in light of the Navy's conclusion that the activities at issue did not constitute a major construction activity necessitating a BA. Id. at 33.[15]

Applying the requirements of ESA Section 7 and its implementing regulations, and Federal case law interpreting those provisions to the circumstances here, the NRC was not required to prepare a BA for the renewal of Pilgrim's operating license. The record is clear that, during the license renewal term, Entergy planned "[n]o expansion of existing facilities" and anticipated "no additional land disturbance." Entergy Feb. 2005 Letter to FWS at 3. See also FWS Mar. 2005 Letter to Entergy at 2; DSEIS at 4-58; FSEIS at 4-64. Thus, renewal of Pilgrim's operating license does not involve "major construction activities." Consequently, the NRC was not required to prepare a BA.

The cases on which Pilgrim Watch relies for support are inapposite because, unlike renewal of Pilgrim's operating license, they concern activities involving the building of new facilities, the expansion or existing facilities, or land disturbances. Thomas v. Peterson, 753 F.2d 754 (9th Cir. 1985) (cited at JRWA/PW Motion at 8, 10-12, 25-27, 35, 39, 56) concerned the "construction of timber road in formal national forest roadless area." 753 F.2d at 755. City of Sausalito v. O'Neill, 386 F.3d 1186 (9th Cir. 2004) (cited at JRWA/PW Motion at 8) concerned

[15] Similarly, the Eighth Circuit has held that the requirement to prepare a BA does not apply to timber sales because such sales are not "major construction activities" under 50 C.F.R. § 402.12. Newton Cnty. Wildlife Ass'n v. Rogers, 141 F.3d 803, 811 (8th Cir. 1998).

the "development and rehabilitation of Fort Baker," including the establishment of a 350 guest-room conference and retreat center, expansion of certain buildings, the relocation and expansion of parking facilities, and beach restoration. 386 F.3d at 1194, 1196.

In any event, the existing NRC Staff NEPA analysis satisfies the requirements established for a BA. ESA Section 7 expressly provides that a BA "may be undertaken as part of a Federal agency's compliance with the requirements of section 102" of NEPA (42 U.S.C. § 4332), i.e., the preparation of an environmental impact statement. 16 U.S.C. 1536(c)(1). The statute does not prescribe the contents of a BA other than to say that it must be based on the "best scientific and commercial data available." Id. The FWS regulations, however, make clear that "[t]he contents of a biological assessment are at the discretion of the Federal agency and will depend on the nature of the Federal action," and "may" include (among other things) whether "listed . . . species are present or occur seasonally," "[a] review of the literature and other information," and "an analysis of the effects of the action on the species and habitat, including consideration of cumulative effects." 50 C.F.R. § 402.12(f) (emphasis added).

Here, the NRC Staff found that renewal of Pilgrim's operating license will not involve any "expansion of existing facilities or disturbance of additional land," and that the roseate tern is "not dependent on habitats within the facility and [is] unlikely to be affected by facility operations." FSEIS at 4-64 – 4-65. Thus, the Staff determined that the roseate tern was "unlikely to be adversely affected during the renewal period." Id. at 4-66. With respect to cumulative impacts, the NRC Staff found that "operation of PNPS is not likely to have a detectable effect on terrestrial or freshwater aquatic species located in the vicinity of the PNPS" and that "[n]o other Federal or non Federal activities have been identified that would have an adverse effect on terrestrial and freshwater aquatic species in the area." Id. at 4-77.

Accordingly, even if a BA were required for the roseate tern, the Board should find the NRC Staff's existing NEPA analysis on the roseate tern sufficient for that purpose. See Water Keeper Alliance, 271 F.3d at 33 (finding that, although not required to prepare a separate BA, the documents prepared by the Navy met "the functional equivalent of a [BA]").

IV. The Board Should Reject the Contention

A. Applicable Legal Standards for Reopening the Record, Late Contentions, and Admissible Contentions

The NRC does not look with favor on amended or new contentions filed after the initial filing. Dominion Nuclear Connecticut, Inc. (Millstone Nuclear Power Station, Units 2 and 3), CLI-04-36, 60 N.R.C. 631, 638 (2004). As the Commission has repeatedly stressed,

> our contention admissibility and timeliness rules require a high level of discipline and preparation by petitioners "who must examine the publicly available material and set forth their claims and the support for their claims at the outset." There simply would be "no end to NRC licensing proceedings if petitioners could disregard our timeliness requirements" and add new contentions at their convenience during the course of a proceeding based on information that could have formed the basis for a timely contention at the outset of the proceeding. Our expanding adjudicatory docket makes it critically important that parties comply with our pleading requirements and that the Board enforce those requirements.

AmerGen Energy Co., LLC (Oyster Creek Nuclear Generating Station), CLI-09-7, 69 N.R.C. 235, 271-72 (2009) (emphasis added) (citations omitted).

Where, as here, the adjudicatory record has been closed, the Commission's rules specify that a motion to reopen that record to consider additional evidence – including evidence on a new contention (see 10 C.F.R. § 2.326(d)) – will not be granted unless the following criteria are satisfied:

> (1) The motion must be timely. However, an exceptionally grave issue may be considered in the discretion of the presiding officer even if untimely presented;
>
> (2) The motion must address a significant safety or environmental issue; and

> (3) The motion must demonstrate that a materially different result would be or would have been likely had the newly proffered evidence been considered initially.

10 C.F.R. § 2.326(a). Further, under the NRC rules,

> The motion must be accompanied by affidavits that set forth the factual and/or technical bases for the movant's claim that the criteria of paragraph (a) of this section have been satisfied. Affidavits must be given by competent individuals with knowledge of the facts alleged, or by experts in the disciplines appropriate to the issues raised. Evidence contained in affidavits must meet the admissibility standards of this subpart. Each of the criteria must be separately addressed, with a specific explanation of why it has been met. When multiple allegations are involved, the movant must identify with particularity each issue it seeks to litigate and specify the factual and/or technical bases which it believes support the claim that this issue meets the criteria in paragraph (a) of this section.

10 C.F.R. § 2.326(b) (emphasis added). "All of the factors in section 2.326 must be met in order for a motion to reopen to be granted." Entergy Nuclear Generation Co. (Pilgrim Nuclear Power Station), CLI-12-03, 75 N.R.C. __, slip op. at 15 (Feb. 22, 2012) ("CLI-12-03").

Further, the Commission repeatedly has emphasized that "[t]he burden of satisfying the reopening requirements is a heavy one." Oyster Creek, CLI-09-7, 69 N.R.C. at 287 (citing Louisiana Power & Light Co. (Waterford Steam Electric Station, Unit 3), CLI-86-1, 23 N.R.C. 1, 5 (1986)). "[P]roponents of a reopening motion bear the burden of meeting all of [these] requirements." Id. (citing Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), CLI-90-10, 32 N.R.C. 218, 221 (1990)). "Bare assertions and speculation . . . do not supply the requisite support." Id. (citing AmerGen Energy Co., LLC (Oyster Creek Nuclear Generating Station), CLI-08-28, 68 N.R.C. 658, 674 (2008)). Evidence contained in the Section 2.326(b) affidavits must meet the admissibility standards in 10 C.F.R. § 2.337. Entergy Nuclear Generation Co. (Pilgrim Nuclear Power Station), CLI-12-06, 75 N.R.C. __, slip op. at 18 (Mar. 8, 2012) ("CLI-12-06"). In other words, the evidence must be relevant, material, and reliable. Id.

In addition, where a motion to reopen relates to a contention not previously in controversy, as is the case here, a motion to reopen must also satisfy the standards for non-timely contentions in 10 C.F.R. § 2.309(c). 10 C.F.R. § 2.326(d); Pilgrim, CLI-12-03 at 9.[16] Section 2.309(c) provides that non-timely contentions will not be entertained, absent a determination by the Board that the contentions should be admitted based upon a balancing of the following factors:

> (i) Good cause, if any, for the failure to file on time;
>
> (ii) The nature of the requestor's/petitioner's right under the Act to be made a party to the proceeding;
>
> (iii) The nature and extent of the requestor's/petitioner's property, financial or other interest in the proceeding;
>
> (iv) The possible effect of any order that may be entered in the proceeding on the requestor's/petitioner's interest;
>
> (v) The availability of other means whereby the requestor's/petitioner's interest will be protected;
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> (vi) The extent to which the requestor's/petitioner's interests will be represented by existing parties;
>
> (vii) The extent to which the requestor's/petitioner's participation will broaden the issues or delay the proceeding; and
>
> (viii) The extent to which the requestor's/petitioner's participation may reasonably be expected to assist in developing a sound record.

10 C.F.R. § 2.309(c)(1).

In keeping with the Commission's disfavor of contentions after the initial filing, these factors are "stringent." Oyster Creek, CLI-09-7, 69 N.R.C. at 260, citing Florida Power & Light Co. (Calvert Cliffs Nuclear Power Plant, Units 1 and 2, et al.), CLI-06-21, 64 N.R.C. 30, 33

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[16] See also Dominion Nuclear Connecticut, Inc. (Millstone Nuclear Power Station, Unit 3), CLI-09-5, 69 N.R.C. 115, 125 (2009); Oyster Creek, CLI-08-28, 68 N.R.C. at 668.

(2006). "Late petitioners properly have a substantial burden in justifying their tardiness." Nuclear Fuel Services, Inc. (West Valley Reprocessing Plant), CLI-75-4, 1 N.R.C. 273, 275 (1975).

Commission case law places most importance on whether the petitioner has demonstrated sufficient good cause for the untimely filing. Tennessee Valley Authority (Watts Bar Nuclear Plant, Unit 2), CLI-10-12, 71 N.R.C. 319, 323 (2010); Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation), CLI-00-02, 51 N.R.C. 77, 79 (2000); Millstone, CLI-09-5, 69 N.R.C. at 125. Indeed, failure to demonstrate good cause requires the petitioner to make a "compelling" showing with respect to the other factors. Texas Utilities Electric Co. (Comanche Peak Steam Electric Station, Unit 2), CLI-93-4, 37 N.R.C. 156, 165 (1993). In other words,

> A petitioner's showing must be highly persuasive; it would be a rare case where [the Commission] would excuse a non-timely petition absent good cause.

Watts Bar, CLI-10-12, 71 N.R.C. at 323 (footnote omitted).

Finally, any new contention must also satisfy the strict standards for admissibility in 10 C.F.R. § 2.309(f)(1). These standards also are enforced rigorously. "If any one . . . is not met, a contention must be rejected." Arizona Public Service Co. (Palo Verde Nuclear Generating Station, Unit Nos. 1, 2, and 3), CLI-91-12, 34 N.R.C. 149, 155 (1991) (citation omitted); USEC, Inc. (American Centrifuge Plant), CLI-06-9, 63 N.R.C. 433, 437 (2006) ("These requirements are deliberately strict, and we will reject any contention that does not satisfy the requirements." (footnotes omitted)). A licensing board is not to overlook a deficiency in a contention or assume the existence of missing information. Palo Verde, CLI-91-12, 34 N.R.C. at 155; Oyster Creek, CLI-09-7, 69 N.R.C. at 260 (the contention admissibility rules "require the petitioner (not the board) to supply all of the required elements for a valid intervention petition" (emphasis added) (footnote omitted)).

B. The JRWA/PW Motion Fails to Meet the Reopening Standards

The JRWA/PW Motion fails to satisfy all of the standards for reopening a closed record in 10 C.F.R. § 2.326. As a threshold matter, the JRWA/PW Motion should be rejected out of hand because its supporting affidavits fail to meet the Section 2.326(b) requirement that such affidavits specifically address why each one of the Section 2.326(a) reopening standards has been met. Despite Petitioners' assertion that their affiants have addressed the relevant criteria, JRWA/PW Motion at 36, the affiants fail to do so. The affidavit from E. Pine duBois nowhere addresses the Section 2.326(a) criteria. Indeed, Ms. DuBois' affidavit never mentions the roseate tern. While the affidavit from Dr. Nisbet pays lip service to two of the Section 2.326(a) criteria, he fails to separately address each criterion and provide "a specific explanation of why [each] has been met" or "specif[ies] the factual and/or technical bases" why each of the Section 2.326 criteria has been met for <u>each</u> of the multiple allegations raised in the JRWA/PW Motion. 10 C.F.R. § 2.326(b). Dr. Nisbet nowhere asserts that the issues raised in the Contention are timely under Section 2.326(a)(1). With respect to the other two reopening criteria, Dr. Nisbet provides a conclusory assertion that the Contention raises significant environmental issues and that a materially different result would have been likely if those issues had been considered initially. Nisbet Aff. at ¶ 21. Such bare assertions and speculation are insufficient to meet the requirements of Section 2.326. <u>Oyster Creek</u>, CLI-09-7, 69 N.R.C. at 287. The JRWA/PW Motion's failure to meet the requirements of Section 2.326(b) alone is sufficient grounds to reject the Motion. <u>Texas Utilities Electric Co.</u> (Comanche Peak Steam Electric Station, Units 1 and 2), CLI-92-12, 36 N.R.C. 62, 76 (1992), citing Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), CLI-89-1, 29 N.R.C. 89, 93-94 (1989).[17]

1. JRWA/PW's Claims Are Untimely

Neither JRWA/PW nor their affiants demonstrate that the issues raised in the JRWA/PW Motion are timely, nor could they. The bases for JRWA/PW's challenges are not new information and could have been raised long ago.

Except in certain circumstances inapplicable here, the NRC rules allow new contentions to be filed only with the leave of the presiding officer upon a showing that:

> (i) The information upon which the amended or new contention is based was not previously available;
>
> (ii) The information upon which the amended or new contention is based is materially different than information previously available; and
>
> (iii) The amended or new contention has been submitted in a timely fashion based on the availability of the subsequent information.

10 C.F.R. § 2.309(f)(2)(i)-(iii). In essence, a proponent of a new contention must show that it could not have raised its contention earlier. "[T]he unavailability of [a] document does not constitute a showing of good cause for admitting a late-filed contention when the factual predicate for that contention is available from other sources in a timely manner." Duke Power Co. (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 N.R.C.1041, 1043 (1983). Consequently, an intervenor cannot establish good cause for filing a late contention when the information on which the contention is based was publicly available "for some time" prior to the filing of the contention. Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), ALAB-828, 23 N.R.C. 13, 21 (1986). The NRC typically applies a "30-day clock" to the filing

[17] See also Pilgrim, CLI-12-03 at 16 (ruling that Pilgrim Watch failed to meet the Section 2.326 reopening standards because it did "not demonstrate, with the level of support required under section 2.326(b), that a materially different result would have been likely") (emphasis added).

of a new contention based on new information,[18] and this has been the standard established in this proceeding.[19]

JRWA/PW's claim that the NRC Staff was required to prepare a BA on the roseate tern, e.g., JRWA/PW Motion at 5, could have been brought as early as December 2006 when the Staff issued the DSEIS. Likewise, the claim that FWS inappropriately acquiesced to the NRC's conclusions with respect to the roseate tern, e.g., id., could have been brought at that same time, if not in July 2007 with the Staff's publication of the FSEIS. The NRC Staff made public its determination that a BA was not required with the publication of the DSEIS in December 2006. DSEIS at 4-59. The FWS May 2006 Letter to NRC transmitting FWS's determination from the year prior that "license renewal for PNPS is not likely to adversely affect federally-listed species subject to the jurisdiction of the [FWS], and that formal consultation . . . is not required" was both referenced and included in the December 2006 DSEIS (at 2-92, 2-140, E-11). In addition, the FSEIS expressly states that the Staff concluded "that impacts on [ESA-listed species within the jurisdiction of FWS] during the license renewal period would be small," and that FWS concurred with that conclusion on May 23, 2006. FSEIS at A-105. Thus, any challenge to the NRC Staff's determination not to prepare a BA, or FWS's concurrence with the NRC Staff's conclusions with respect to the lack of significant impacts on the roseate tern, could have been brought years ago.

None of the claims made by JRWA/PW attempting to challenge the sufficiency of the Entergy, NRC Staff, and FWS determinations with respect to impacts on the roseate tern is timely raised. Indeed, the untimeliness of these claims is evident on the face of the JRWA/PW

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[18] Southern Nuclear Operating Co. (Vogtle Electric Generating Plant, Units 3 and 4), CLI-11-08, 74 N.R.C. __, slip op. at 3 n.8 (Sept. 27, 2011).

[19] See Order (Establishing Schedule for Proceeding and Addressing Related Matters) (Dec. 20, 2006) at 6-7.

Motion. JRWA/PW purport to rely on information that predates or is contained in the DSEIS and FSEIS, or otherwise could have been raised many months if not years ago. For example, JRWA/PW and their witness purport to rely on (1) "widely available scientific data available in 2006 and 2007," JRWA/PW Motion at 7; (2) a paper published in 1999 and information dating back to 1988 on the existence the roseate tern at Long Point Beach ("LPB"), id. at 16, 18, 19, 29, citing Nisbet Aff. at ¶¶ 4, 14, 16; (3) information contained in the July 2007 FSEIS concerning the location of Pilgrim, the impingement and entrainment of small fish prey for the roseate tern, and cooling water discharges, id. at 20-21; (4) a September 2010 FWS Study, id. at 21 n.15; (5) a September 2008 EPA publication on guidance for renewing nuclear power plant environmental impact statements, id. at 22 n.19; (6) Pilgrim NPDES permit limit violations occurring in 2010-2011, id. at 21-23 & n. 20; and (7) a 2007-2009 Massachusetts Audubon Society study, id. at 33, citing Nisbet Aff. at ¶ 11. Obviously none of this information is new. In some cases, the information is more than a decade old.

Further, none of Petitioners' claims are made timely by their receipt of the year 2000 ENSR report in mid-April 2012. JRWA/PW Motion at 23, 31, 34, 45-46. As JRWA/PW acknowledge, the ENSR 2000 report was referenced in Entergy's ER and the NRC Staff's FSEIS. Id. at 23; see ER at 2-36, 3-20, 4-54; see, e.g., FSEIS at 2-137. Further, the NRC Staff's Environmental Audit Summary identified ENSR 2000 as one of the documents that the NRC had obtained during the audit and provided an ADAMS accession number.[20] While JRWA/PW apparently had to ask the NRC's public document room for a copy, the reality is that JRWA/PW simply made no attempt to do so until recently. Their failure to request this document does not make their present claims timely.

Moreover, JRWA/PW do not in fact rely on the ENSR 2000 document to support their claims, but instead disavow its "sweeping" "no 'adverse impact'" and "no [adverse] effect" conclusion. JRWA/PW Motion at 23, 23 nn.21-22, 34. Thus, JRWA/PW cannot claim that this document provides timely support for their allegations. Finally, JRWA/PW fail to show that the information contained in the document is any different, let alone materially different, than information previously available under Section 2.309(f)(2)(ii). As summarized by JRWA/PW, the ENSR 2000 document discusses impingement and entrainment of aquatic species at Pilgrim, the temperature of Pilgrim's water discharges, and the impact of Pilgrim's cooling water system. JRWA/PW Motion at 23. All of this information is discussed in Entergy's ER and the Staff's DSEIS and FSEIS, see, e.g., ER §§ 4.2-4.4, FSEIS § 4.1. In fact, the ENSR 2000 report is often referenced to support the information contained in the ER and FSEIS.

Because Petitioners' claims are untimely, in order to reopen the record Petitioners must demonstrate that their issues are "exceptionally grave." 10 C.F.R. § 2.326(a)(1).[21] When promulgating the "exceptionally grave" standard to consider untimely claims, the Commission made clear that "exceptionally grave" means that an in issue presents "a sufficiently grave threat to public safety."[22] None of the allegations in the JRWA/PW Motion or its supporting affidavits raises any issue that could be characterized as a sufficiently grave threat to public safety. JRWA/PW present no evidence that continued operation of Pilgrim during the license renewal term will endanger any roseate tern. JRWA/PW claim that they have raised an "exceptionally grave" issue only by speculating that a "significant potential for adverse impacts" on the roseate

[20] Summary of Environmental Site Audit Related to the Review of the License Renewal Application for Pilgrim Nuclear Power Station (July 25, 2006), Encl. 2 at 3 (available at ADAMS Accession No. ML062070305).

[21] Vogtle, CLI-11-08 at 14 n.44 ("when a motion to reopen is untimely, the § 2.326(a)(1) 'exceptionally grave' test supplants the § 2.326(a)(2) 'significant safety or environmental issue' test") (citation omitted).

tern exists, and that they have "proffered evidence of potential effects" on the roseate tern. JRWA/PW Motion at 5, 33, 34 (emphasis added), citing Nisbet Aff. at ¶ 19. These allegations simply cannot be characterized as presenting any threat, let alone a "sufficiently grave" threat, to public safety. Furthermore, such speculation is insufficient to meet the stringent Section 2.326 reopening requirements. Oyster Creek, CLI-09-7, 69 N.R.C. at 287. Consequently, JRWA/PW have failed to raise any exceptionally grave issue.

2. JRWA/PW's Claims Do Not Address any Significant Environmental or Safety Issue

In addition to being untimely, JRWA/PW's claims fail to demonstrate the existence of a significant environmental or safety issue. The Commission has directly held that "bare assertions and speculation . . . do not supply the requisite support" to satisfy the Section 2.326 standards.[23] Merely asserting that something "might turn up" to support an intervenor's concerns does not raise a significant issue sufficient to restart the hearing process.[24] In order to demonstrate the existence of a significant environmental issue, the information Petitioners present must paint a "seriously different picture of the environmental landscape."[25]

None of JRWA/PW's claims (or their affiants' assertions) raises any significant environmental issue. JRWA/PW have come forward with no credible evidence that the roseate tern will be adversely affected by Pilgrim's continued operation. Nor have they provided any

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[22] Final Rule, Criteria for Reopening Records in Formal Licensing Proceedings, 51 Fed. Reg. 19,535, 19,536 (May 30, 1986), quoting Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station), ALAB-124, 6 A.E.C. 358, 365 n.10 (1973).

[23] Oyster Creek, CLI-09-7, 69 N.R.C. at 287 (citing Oyster Creek, CLI-08-28, 68 N.R.C. at 674).

[24] Oyster Creek, CLI-08-23, 68 N.R.C. 461, 486 (2008) (rejecting a motion to reopen where movants provided only mere speculation that the contention might materially alter conclusions in the final safety evaluation report) (emphasis in original).

[25] See Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation), CLI-06-03, 63 N.R.C. 19, 28-29 (2006) ("PFS") (holding that claimed additional environmental impacts were "not so significant or central to the FEIS's discussion of environmental impacts that an FEIS supplement (and the consequent reopening of our adjudicatory record) is reasonable or necessary").

evidence disputing the NRC Staff's conclusion that the roseate tern is "unlikely to be adversely affected during the renewal period." FSEIS at 4-64 – 4-65. Indeed, JRWA/PW never assert that there will be any adverse impact to the roseate tern, and their expert, Dr. Nisbet, never provides any expert opinion that there will be any adverse impact.

Rather, JRWA/PW and Dr. Nisbet erroneously suggest that Entergy, the NRC Staff, and FWS have overlooked information concerning the existence of the roseate tern near Pilgrim. JRWA/PW Motion at 16-20, 35; Nisbet Aff. at ¶¶ 7-9, 14, 17, 18. As a result, JRWA/PW claim that the Entergy, Staff, and FWS environmental documents addressing impacts to the roseate tern are materially incomplete, inaccurate, or inadequate. JRWA/PW Motion at 5-6. These manufactured claims are both unseemly and baseless. For example, JRWA/PW assert that Entergy, the NRC Staff, and FWS ignored the existence of the roseate tern at specified locations within two to four miles of the Pilgrim site, and considered only that roseate tern appeared in the area "exclusively" during migration. JRWA/PW Motion at 16-18. These assertions mischaracterize information plainly stated by Entergy, the NRC Staff, and FWS. Entergy's February 2005 letter to FWS stated that "[s]everal listed terrestrial species are known to occur in the general vicinity of the PNPS site," including the roseate tern, and that those species "cannot be ruled out as occasional visitors to the PNPS site." Entergy Feb. 2005 Letter to FWS at 1, 2. The March 2005 FWS response to Entergy stated that the "federally-endangered roseate tern . . . [is] <u>known to occur along Plymouth Beach, just north of the PNPS</u>," but that "none . . . are known to frequent the <u>immediate</u> vicinity of PNPS and, therefore, the presence of [this] species near the power station is probably transient in nature." FWS Mar. 2005 Letter to Entergy at 1 (emphasis added). The NRC Staff stated that the roseate tern is "<u>known to occur along Plymouth Beach just north of PNPS</u>" and "may pass through the PNPS site during northward migration in late spring or southward migration in early fall." DSEIS at 2-96 (emphasis added). JRWA/PW's mischaracterizations of clear statements in the record cannot raise a significant environmental issue. Pilgrim Watch nowhere explains (nor can it explain) how information concerning the existence of the roseate tern on LPB 2-4 miles away from the Pilgrim site is any different, let alone seriously different, than the information presented by Entergy, the NRC Staff, and FWS.

JRWA/PW speculate about the "significant potential for adverse effects" on the roseate tern's food sources that might result from entrainment, impingement, and cooling water discharges. JRWA/PW Motion at 20-23, 22 n.20, 34 (emphasis added). JRWA/PW also raise potential adverse impacts from a limited number of incidents where Pilgrim has exceeded the chlorine-related discharge limits in its NPDES permit. Id. at 22 & n.20. Notably absent from Dr. Nisbet's Affidavit is any discussion of the potential impacts on the roseate tern from operation of the Pilgrim cooling water system, including chlorination exceedance incidents. Rather, Dr. Nisbet claims only that Entergy has failed to consider the "potential for adverse effects" on roseate tern, or its fish prey, resulting from impingement, entrainment, and alleged pollutant discharges. Nisbet Aff. at ¶ 19. As previously noted, such speculation is not sufficient to meet the very high standards for reopening a closed record. Pilgrim, CLI-12-03 at 23-24.

The attached Affidavits from Drs. Scherer and Barnum of Normandeau Associates,[26] and Mr. Scheffer from Pilgrim[27] demonstrate that JRWA/PW's claims raise no significant issue:

- 95% of the roseate tern breeding population in Massachusetts can be found on Bird Island and Ram Island in Buzzards bay, which are in a geographically

[26] Affidavit of Michael D. Scherer, Ph.D. and Sarah A. Barnum, Ph.D., in Support of Entergy's Answer Opposing Jones River Watershed Association's and Pilgrim Watch's Motion to Reopen, Request for Hearing and Permission to File New Contention (May 16, 2012) ("Scherer & Barnum Aff.").

distinct subgroup with little connection to any roseate terns that might be present near PNPS. Scherer & Barnum Aff. at ¶ 8.

- The bulk of the roseate tern diet in Massachusetts is comprised of American sand lance, hake, and Atlantic herring. At times, sand lance make up 95 % of the roseate tern's fish prey. Scherer & Barnum Aff. at ¶¶ 12, 18.

- There is no indication that any lack of prey fish availability during the summer months – if any such lack of prey fish availability exists – when roseate tern are present in Massachusetts has caused or contributed to the decrease in roseate tern nesting sites or the decline in the northeastern roseate tern population. Scherer & Barnum Aff. at ¶ 14.

- Impingement and entrainment of the roseate tern's main fish prey species will have no discernible impact in on the availability of these fish species as prey for the roseate tern. Scherer & Barnum Aff. at ¶¶ 17-28.

- In an average year, approximately 1,648 pounds of age 1 equivalent sand lance are impinged and entrained at Pilgrim each year. Conservatively assuming 100 % mortality of impinged and entrained individual sand lance, this is less than the amount that two humpback whales concentrating their foraging efforts on sand lance would consume in one day. In addition, annual consumption of sand lance by North American seals, approximately 831 million pounds per year, dwarfs impingement and entrainment losses at PNPS. Thus, it is not scientifically

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[27] Affidavit of Jacob J. Scheffer in Support of Entergy's Answer Opposing Jones River Watershed Association's and Pilgrim Watch's Motion to Reopen and Hearing Request on Contention Related to the Roseate Tern (May 16, 2012) ("Scheffer Aff.").

credible to suggest that the annual magnitude of impingement and entrainment mortality at PNPS could potentially affect the availability of sand lance as prey for the roseate tern. Scherer & Barnum Aff. at ¶¶ 19-23.

- Atlantic herring and hake may also make up a portion of the roseate tern's diet. On average, again conservatively assuming 100 % impingement and entrainment mortality, Atlantic herring losses at PNPS average 296 pounds per year. This is a minute fraction of the estimated hundreds of millions of pounds of Atlantic herring available for predation by the roseate tern. The annual combined estimate of age 1 hake impingement and entrainment losses at PNPS, assuming 100 % mortality, is approximately 14,070 pounds, which is a minute fraction of the more than 50 million of pounds of hake estimated in the Cape Cod area. Thus, impingement and entrainment losses of Atlantic herring and hake at PNPS cannot reasonably be expected to affect the availability of such prey for the roseate tern. Scherer & Barnum Aff. at ¶¶ 24-28.

- The asserted turbulence associated with PNPS's cooling water discharge is not expected to bring an abundance of sand lance to the surface where they can be captured, and thus the area near the cooling water discharge is unlikely to provide desirable foraging conditions for the roseate tern. Moreover, to the extent any roseate terns might be attracted to the turbulence created by PNPS's cooling water discharge, if prey fish are absent from the water, any such attractiveness would likely be short lived, as the roseate tern's flexible foraging strategy would allow it to either move or concentrate its feeding efforts where prey are abundant. Scherer & Barnum Aff. at ¶¶ 29-30.

- Contrary to Petitioners' assertion (JRWA/PW Motion at 21), the Pilgrim NPDES permit has been administratively continued during the pendency of permit renewal proceedings, and, as a result, the conditions and limitations of the most recent NPDES permit remain valid and in full force and effect. Scheffer Aff. at ¶ 7.

- As allowed under its NPDES permit, Pilgrim uses chlorine as a biocide for the Circulating Water System ("CWS") and (Salt) Service Water System ("SWS"). Chlorination of the CWS is limited to a maximum of two hours per day, with the frequency of chlorination ranging from once a day to once a week, and to a Total Residual Oxidant ("TRO") concentration of 0.1 mg/L, stricter than the federal effluent limitation guideline of 0.2 mg/L. The NPDES permit allows constant chlorination of the SWS system, with an average monthly limit of 0.5 mg/L and an instantaneous maximum limit of 1.0 mg/L. Scheffer Aff. at ¶¶ 8-9.

- Pilgrim samples CWS and SWS water to ensure compliance with their respective TRO concentration limits. Water discharged from the CWS is sampled in the discharge canal at least 8 times during each chlorination period, assuming a 2 hour run. Pilgrim samples SWS water (downstream of the heat exchanges and prior to entering the discharge canal) for chlorine twice daily when chlorination is in service. These sampling results are documented in Pilgrim's Discharge Monitoring Reports ("DMRs"). Scheffer Aff. at ¶¶ 10-12.

- Chlorination permit exceedances are extraordinarily rare. Over the past ten years, PNPS has documented only two instances in which the chlorine concentration exceeded the CWS's maximum permitted level of 0.1 mg/L, each resulting from minor and unanticipated equipment malfunctions, and each lasting less than 20 minutes in duration. Both exceedances, while over the NPDES permit limit, were less than the 0.2 mg/L federal effluent limitation guideline, and the amount of residual chlorine discharged into Cap Cod Bay is expected to have been minimal. Scheffer Aff. at ¶¶ 12-13.

- Similarly, over the past ten years, PNPS has documented only 6 instances (out of thousands of sampling events) in which the chlorine concentration of SWS water (measured prior to entering the discharge canal) exceeded the daily maximum permitted limit of 1.0 mg/L. Because SWS water is substantially diluted when mixed with the CWS stream prior to the point of discharge into Cape Cod Bay, and "chlorine demand" further reduces TRO concentration, even where an SWS exceedance has occurred, the concentration is typically undetectable prior, and is always at or below the 0.1 mg/L limit for CWS discharges set in the station's NPDES permit. Scheffer Aff. at ¶ 14.

- Heavy metals such as zinc, copper, and chromium are believed to be absent from the Pilgrim Station's regularly discharged effluent. The use of the corrosion inhibitor Tolyltriazole in Pilgrim systems has been authorized by the U.S. EPA. When Tolyltriazole has been discharged, it has been in diluted concentrations well below EPA approved limits and reported in the Station's DMRs. Scheffer Aff. at ¶¶ 18-19.

- The chlorine discharge limitations set forth in Pilgrim's NPDES permit are considered protective of marine organisms in Cape Cod Bay. Although PNPS has, on rare occasion experienced exceedances of its chlorine discharge limits at certain outfall locations, it is highly unlikely that those exceedances would affect the environment, or have any impact on the biota in Cape Cod Bay. Thus, there is no credible scientific evidence that discharges from PNPS have any adverse effect on roseate tern. Scherer & Barnum Aff. at ¶¶ 15, 31.

For all of the reasons set forth above, JRWA/PW's claims fail to raise a significant environmental or safety issue as required under Section 2.326(a)(2).

3. JRWA/PW Have Failed to Demonstrate That a Materially Different Result Would Be Likely

JRWA/PW and their affiants fail to "demonstrate" that a materially different result would have been likely had their newly proffered evidence been considered initially, as required by 10 C.F.R. § 2.326(a)(3) (emphasis added). Petitioners have a "deliberately heavy" burden to demonstrate that a materially different result would be likely. Oyster Creek, CLI-08-28, 68 N.R.C. at 674; see also Pilgrim, CLI-12-03 at 8; Oyster Creek, CLI-09-7, 69 N.R.C. at 287. At this late stage of the proceeding, is it not sufficient simply to raise an issue. "The level of support required for a motion to reopen is greater than that required for a contention under the general admissibility requirements of 10 C.F.R. § 2.309(f)(1)." Pilgrim, CLI-12-06 at 18. "'[N]o reopening of the evidentiary hearing will be required if the [documents] submitted in response to the motion demonstrate that there is no genuine unresolved issue of fact.'" PFS, CLI-05-12, 61 N.R.C. 345, 350 (2005), citing Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station), ALAB-138, 6 A.E.C. 520, 523-24 (1973). A petitioner will fail to demonstrate that a materially different result will be likely where the petitioner seeks to litigate issues outside the scope of a proceeding, or fails to challenge pertinent information contained in the existing licensing documents. See Pilgrim, CLI-12-06 at 26-27.

The sole claim that JRWA/PW make with respect to this criterion is that, had their information been considered initially, "a materially different result would have been likely because there would be a biological assessment as to whether PNPS relicensing would be likely to effect [sic] the roseate tern," which would include "information cited in the Nisbet Affidavit and Petitioners' documents and this information would be taken into account in the balance of alternatives under NEPA." JRWA/PW Motion at 36. Dr. Nisbet merely asserts his opinion that "a materially different result would have been likely" if the information in his affidavit had been considered previously, Nisbet Aff. at ¶ 21, but nowhere explains what would be different, and why that difference would be material. JRWA/PW and Dr. Nisbet are incorrect.

As previously discussed, no BA is required where, as here, the Federal action does not involve any "major construction activities." 16 U.S.C. § 1536; 50 C.F.R. § 402.12(b); 51 Fed. Reg. at 19,936; Water Keeper Alliance, 271 F.3d at 31. As FWS explained,

> The Service will not require [BAs] for actions that do not involve construction or activities having physical impacts similar to construction, such as dredging, blasting, etc. This limitation derives support from the 1979 Conference Report reference to actions designed primarily to result in the building or erection of various projects.

51 Fed. Reg. at 19,936 (some emphasis added). Renewal of Pilgrim's operating license involves no such "building or erection of various projects." Entergy Feb. 2005 Letter to FWS at 3. ("[n]o expansion of existing facilities" is planned and "no additional land disturbance" is anticipated). See also FWS Mar. 2005 Letter to Entergy at 2; DSEIS at 4-58; FSEIS at 4-64.

Further, even if a BA were required, the NRC Staff's existing NEPA analysis satisfies the requirement. 16 U.S.C. 1536(c)(1) (permitting that a BA "may be undertaken as part of" the NRC's preparation of an environmental impact statement). In addition, as discussed supra, FWS regulations provide that the contents of a BA are discretionary, and the Staff's analysis already contains discussion on multiple items recommended for inclusion in a BA. 50 C.F.R. § 402.12(f); see FSEIS at 4-64, 4-66, 4-70. Petitioners' claim (JRWA/PW Motion at 18-19) that the NRC has overlooked certain studies developed since 2006/2007, i.e., after the time period when NRC and FWS made their determinations, does not violate the ESA's procedural requirements. Water Keeper Alliance, 271 F.3d at 33. Consequently, Petitioners can not demonstrate that their claims are likely to succeed on the merits.

Finally, the attached Affidavits from Drs. Scherer and Barnum and Mr. Scheffer demonstrate that JRWA/PW's claims do not demonstrate that a materially different outcome would be likely because continued operation of Pilgrim is not likely to result in any discernible impacts on the roseate tern. As previously summarized, Petitioners have failed in their obligation to raise any significant environmental issue warranting supplementation of the FSEIS, or otherwise undermining the FWS determination that no consultation was required, and the Staff determination that it would not prepare a BA. There is no evidence suggesting that PNPS will have any credible indirect impact on the roseate tern through impacts on the availability of fish prey due to impingement and entrainment mortality, or the impacts of pollution. Scherer & Barnum Aff. at ¶¶ 15, 31. Average annual estimates of the annual impact to sand lance, the roseate tern's main fish prey, from impingement and entrainment are comparable to one day's consumption by just two whales. Id. at ¶ 22. The estimates of impingement and entrainment impacts to the roseate tern's other significant prey species, Atlantic herring and hake, are miniscule when compared to the total available stocks for those fish species. Id. at ¶¶ 25-28. Over the past ten years, there are only two documented instances where chlorinated water discharges into Cape Cod Bay from the CWS exceeded the 0.1 mg/L limit prescribed in Pilgrim's (currently valid) NPDES permit. Scheffer Aff. at ¶ 13. Those exceedances will have little, if any, potential for adverse impact on roseate tern fish prey. Scherer & Barnum Aff. at ¶¶ 15, 31.

For all of the reasons set forth above, JRWA/PW's claims fail to demonstrate that a materially different outcome would be likely under Section 2.326(a)(3).

C. The Contention fails to meet 10 C.F.R. § 2.309(c) standards for considering a late-filed contention

JRWA/PW's belated contention should not be admitted because Petitioners have shown no good cause for their extreme tardiness, and a balancing of the remaining factors in 10 C.F.R. § 2.309(c) does not outweigh this failure to timely file the Contention.

To demonstrate good cause, the first and most important late-filed factor, JRWA/PW must establish that the information on which their Contention is based is new information not already in the public domain that could not have been presented earlier. Comanche Peak, CLI-92-12, 36 N.R.C. at 69-73; Millstone, CLI-09-5, 69 N.R.C. at 126. Petitioners have failed to demonstrate good cause under Section 2.309(c)(1) for the same reasons that their Contention is untimely under Section 2.326(a) and 2.309(f)(2), discussed supra. All of Petitioners' claims (such as sitings and observations of the roseate tern on LPB dating back to 1988) could have been raised years ago. JRWA/PW's reliance on a document they received a few weeks ago, JRWA/PW Motion at 45-46, does not show good cause. The ENSR 2000 report was referenced numerous times in the ER, the DSEIS, and the FSEIS. Thus, JRWA/PW could have requested it years ago. Moreover, JRWA/PW do not rely on any information contained in that document, but instead disavow its contents. And they nowhere show that the ENSR 2000 report's discussion of impingement, entrainment and cooling water impacts is any different than information already available.

Having failed to show good cause, the demonstration regarding the other factors must be "compelling" in order to justify admitting the Contentions. Dominion Nuclear Connecticut, Inc. (Millstone Nuclear Power Station, Units 2 and 3), CLI-05-24, 62 N.R.C. 551, 565 (2005); Comanche Peak, CLI-92-12, 36 N.R.C. at 73. In balancing the remaining late-filed contention factors, the Commission grants considerable weight to factors seven and eight.

> We regard as highly important the intervenor's ability to contribute to the development of a sound record on a particular contention. We also are giving significant weight to the potential delay, if any, which might ensue from admitting a particular contention.

Consumers Power Co. (Midland Plant, Units 1 and 2) LBP-82-63, 16 N.R.C. 571, 577 (1982) (citations omitted), citing South Carolina Electric & Gas Co. (Virgil C. Summer Nuclear Station, Unit 1), ALAB-642, 13 N.R.C. 881, 895 (1981); see also Commonwealth Edison Co. (Braidwood Nuclear Power Station, Units 1 and 2), CLI-86-8, 23 N.R.C. 241, 246-47 (1986). JRWA/PW cannot make a compelling showing on the remaining factors because factors seven and eight heavily weigh against admitting the Contention.

Factor seven, the extent to which admission of the Contention will broaden the issues or delay the proceeding, weighs heavily against admitting the Contention. All admitted contentions have been resolved, and the proposed Contention pending before the Board concerns ESA-listed aquatic species and thus has little, if any, relation to the roseate tern Contention. The Commission has made clear that "the introduction of a new contention, well after the contested proceeding closed, would broaden the issues and delay the proceeding." Vogtle, CLI-11-08 at 18. Where, as here, the proceeding has been ongoing for over six years, the NRC's Staff's view has long since been complete, all admitted contentions have been resolved, and there is less than one month before the expiration of the Pilgrim license, there can be no question that admission of the Contention would broaden the issues and delay the proceeding.

Factor eight, the ability to contribute to a sound record, also weighs heavily against admitting the Contention. As explained throughout this Answer, JRWA and their affiants provide no information, let alone significant information, demonstrating the existence of any significant environmental issue calling into question the conclusions reached by Entergy, the NRC Staff, and FWS concerning impacts to the roseate tern. Further, Entergy has demonstrated that no materially different result would be likely were JRWA/PW's claims considered. Petitioners have thus failed to demonstrate any ability to contribute to a sound record.

Thus, factors one (good cause), seven (broaden and delay proceeding), and eight (contribution to a sound record) – the three most significant factors – count heavily against Petitioners. The other factors in 10 C.F.R. § 2.309(c)(1) are less important (see, e.g., Pacific Gas & Electric Co. (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), CLI-08-1, 67 N.R.C. 1, 6 (2008); Comanche Peak, CLI-93-4, 37 N.R.C. at 165), and therefore cannot outweigh Petitioners' failure to demonstrate good cause or meet the criteria in factors seven and eight.

V. The Roseate Tern Contention is Inadmissible

Even if JRWA/PW had met the standards for reopening a closed record and the standards for a late contention (which they have not), their contention would still be inadmissible because it does not satisfy the pleading requirements in 10 C.F.R. § 2.309(f)(1). Petitioners are still required to demonstrate that their contention satisfies the admissibility standards in 10 C.F.R. § 2.309(f)(1)(i)-(vi). Sacramento Municipal Utility District (Rancho Seco Nuclear Generating Station), CLI-93-12, 37 N.R.C. 355, 362-63 (1993). Petitioners' Contention does not meet these standards.

JRWA/PW's claim that the NRC failed to prepare a BA on the roseate tern is not material to the findings the NRC must make, and fails to raise a genuine dispute on any material issue. 10 C.F.R. §§ 2.309(f)(1)(iv), (vi). As previously discussed, the NRC Staff was not required to prepare a BA because renewal of Pilgrim's operating license involves no "major construction activities."

Also immaterial, as well as beyond the scope of this proceeding, is JRWA/PW's claim that FWS "unlawfully ignored the requirement for a biological assessment and without a scientific basis declared the roseate tern to be 'probably transient.'" 10 C.F.R. §§ 2.309(f)(1)(iii), (iv). The Commission has long held that the scope of a licensing proceeding does not include litigating issues that are the primary responsibility of other agencies. The Commission has made clear that licensing boards "should narrowly construe their scope to avoid where possible the litigation of issues that are the primary responsibility of other agencies and whose regulation is not necessary to meet [the Commission's] statutory responsibilities."[28] Congress gave the Commission "no roving mandate to determine other agencies' permit authority." Id. Thus, any claim that FWS failed to adequately perform its functions is beyond the purview of the Licensing Board.

The Contention is also inadmissible because it is not supported by sufficient information to show that a genuine dispute exists on a material issue of law or fact, as required by 10 C.F.R. § 2.309(f)(1)(v), (vi). Under the NRC's Rules of Practice, "a protestant does not become entitled to an evidentiary hearing merely on request, or on a bald or conclusory allegation that such a dispute exists. The protestant must make a minimal showing that material facts are in dispute, thereby demonstrating that an 'inquiry in depth' is appropriate." Rules of Practice for Domestic

Licensing Proceedings – Procedural Changes in the Hearing Process, 54 Fed. Reg. 33,168, 33,171 (Aug. 11, 1989) (quoting Conn. Bankers Ass'n v. Bd. of Governors, 627 F.2d 245, 251 (D.C. Cir. 1980)). JRWA/PW make multiple assertions that fall far short of this strict standard.

First, JRWA/PW mischaracterize the information on which Entergy, the NRC Staff, and FWS relied when concluding that continued operation of Pilgrim would likely result in no adverse impact to the roseate tern. Despite the claim to the contrary, JRWA/PW Motion at 15-17, Entergy did not describe the roseate tern as being near Pilgrim "exclusively" during its migration. Entergy stated that, although no "suitable nesting habitat" for the roseate tern had been identified at the Pilgrim site, it was "known to occur in the general vicinity of the PNPS site . . . and cannot be ruled out as [an] occasional visitor[] to the PNPS site and environs." Entergy Feb. 2005 Letter to FWS at 1, 2; ER at 2-9. Likewise, both FWS and the NRC acknowledged the existence of the roseate tern on "Plymouth Beach, just north of the PNPS." FWS Mar. 2005 Letter to Entergy at 1; DSEIS at 2-96. JRWA/PW nowhere show any material difference between these statements and the information they raise in the Contention, i.e., the existence of the roseate tern on LPB. Petitioners' mischaracterizations of information plainly evident in the Entergy, Staff, and FWS documents cannot create a genuine dispute.

In addition, Petitioners provide no expert support for their claims that continued operation of Pilgrim will result in adverse impacts to the roseate tern's food sources by impingement, entrainment, and waste water discharges. Dr. Nisbet merely suggests that such impacts ought to be further investigated, e.g., Nisbet Aff. at ¶ 19, without providing any information indicating that the roseate tern's food sources would be adversely impacted. Neither

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[28] Hydro Resources, Inc. (2929 Coors Road, Suite 101, Albuquerque, NM 87120), CLI-98-16, 48 N.R.C. 119, 121-22 (1998) (footnote omitted).

Petitioners nor their expert challenge the fact that the roseate tern population near Pilgrim has been increasing during its operation, and provide no evidence disputing the NRC Staff's determination that "there is no evidence that these species have been adversely affected by previous operation of the PNPS facility" FSEIS at 4-64. Petitioners' and Dr. Nisbet's "bare assertions are insufficient to demonstrate a genuine dispute on a material issue of law or fact under . . . section 2.309(f)(1)(vi)." Pilgrim, CLI-12-03 at 23-24.

VI. Conclusion

For the reasons set forth above, JRWA/PW's Motion should be denied.

Respectfully Submitted,

/signed electronically by David R. Lewis/

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Counsel for Entergy

Dated: May 16, 2012

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of **Entergy Nuclear Generation Company** **Entergy Nuclear Operations, Inc.** **(Pilgrim Nuclear Power Station)**	**Docket No. 50-293-LR**

AFFIDAVIT OF MICHAEL D. SCHERER, Ph.D. AND SARAH A. BARNUM, PH.D. IN SUPPORT OF ENTERGY'S ANSWER OPPOSING JONES RIVER WATERSHED ASSOCIATION'S AND PILGRIM WATCH'S MOTION TO REOPEN, REQUEST FOR HEARING AND PERMISSION TO FILE NEW CONTENTION

We, Michael D. Scherer, Ph.D. and Sarah A. Barnum, Ph.D., do hereby depose and say on the basis of personal knowledge and our professional opinion, and under penalties of perjury, that:

BACKGROUND AND QUALIFICATIONS

1. My name is Dr. Michael D. Scherer. I am a Vice President and Senior Marine Scientist with Normandeau Associates, Inc. ("Normandeau"), a professional consulting firm that specializes in ecological, environmental and natural resources management services. I hold a Ph.D. degree with a Fisheries Biology major and Biometrics minor from the University of Massachusetts, a Master of Science degree in Fisheries Biology from the University of Massachusetts, and a Bachelor of Science degree in Fisheries Biology from Cornell University. My most recent curriculum vitae, and additional detail regarding my qualifications, are described in and attached to my March 19, 2012 Declaration, also submitted in this proceeding and hereby incorporated by reference as if set forth fully herein. *See* 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.

2. My name is Dr. Sarah A. Barnum. I am a Senior Wildlife Ecologist with Normandeau. I hold a Ph.D. degree from the School of Architecture and Planning with a concentration in Conservation Planning from the University of Colorado, a Master of Science degree in Wildlife Ecology from Utah State University, and a Bachelor of Science degree in Wildlife Biology from the University of Vermont. My most recent curriculum vitae is attached hereto as **Exhibit 1**. I have over 15 years experience as a wildlife ecologist, with a focus on avian ecology, and I have significant experience in assessing the potential impacts of energy facilities and technologies on birds, including the roseate tern and other seabirds that may occur in portions of Cape Cod Bay and, more generally, the Gulf of Maine. In particular, I have worked as an avian biologist and project manager assessing potential impacts of proposed wind turbine projects in Massachusetts (e.g., the Madaket Wind Turbine Project and the Saugus Community Wind Project) on avian resources, including terns and other shorebirds. In addition, from 2005-2007, I was a Conservation Program Manager for New Hampshire Audubon, where I oversaw multiple on-going research and conservation programs, including the Tern Restoration Project.

PURPOSE AND METHODOLOGY

3. This Declaration is made in response to the Jones River Watershed Association's and Pilgrim Watch's Motion to Reopen, Request for Hearing and Permission to File New Contention (collectively, "the Petition"), dated May 2, 2012. The Petition alleges certain deficiencies in the NRC's evaluation of the potential impacts of continued operation of Pilgrim Nuclear Power Station ("PNPS") on the roseate tern (*Sterna dougallii*) which is listed as

endangered under the federal Endangered Species Act ("ESA"). 16 U.S.C. § 1531 *et seq*. In this Declaration, we will offer our expert opinion that the continued operation of PNPS will have no discernible effects on the northeast population of roseate tern, its habitat or recovery goals.

4. The opinions expressed in this Declaration are in part based on our review of the sources identified in **Exhibit 2**. To the best of our knowledge, the factual statements in this Declaration are true and accurate, and the opinions expressed therein are based on our best professional judgment.

DISCUSSION

Description of PNPS and its Environment

5. A description of PNPS and its location and environment is provided in paragraphs 7 through 16 of Dr. Scherer's previous Declaration submitted in this proceeding. Additional information on the operation of PNPS is provided in the Declaration of Mr. Jacob J. Scheffer, which we have reviewed and understand is being submitted contemporaneously with this Declaration.

Relevant Biology and Ecology of the Roseate Tern

6. The roseate tern, a medium sized, fish eating, shore bird, is a migratory species that spends at least half the year in tropical latitudes with a scattered distribution primarily in the tropical and sub-tropical Atlantic, Indian, and Pacific Oceans. Gochfeld et al., 1998. During the summer, a subpopulation of roseate terns breeds in the northeast region of North America, from New York to Nova Scotia. *Id.*

7. Roseate terns arrive in Massachusetts from late-April to mid-May to nest at several coastal locations, typically on islands (as discussed below). Mostello 2007. These birds then abandon their breeding locations in late-July and August, although they temporarily may

congregate in "staging areas" around Cape Cod and the Islands of Nantucket and Martha's Vineyard, before departing by mid- to late-September for wintering grounds in the West Indies and off the northern and eastern coasts of South America, where they will remain for upwards of six months out of the year. *See* US FWS. 1998 (Hereinafter, "Recovery Plan"). Roseate terns appear to disperse throughout the breeding range in July and August, re-aggregating at staging areas primarily on outer Cape Cod in late August and early September prior to southward migration. US FWS 2010 (Hereinafter, "5-Year Review"); Trull et al., 1999; Blake 2010. Staging areas are transitory relative to breeding colonies, and individuals may remain in one place foraging for as little as a few hours or overnight (i.e., roosting) before moving on to the next spot. *See* e.g., Trull et al. 1999. In short, because staging roseate terns are not "anchored" to a single area by the presence of a nest, they are free to move to alternative staging areas if the fishing or other ambient conditions are not advantageous in a particular area.

8. Roseate terns typically nest in colonies on sandy, gravelly, or rocky islands (which are less likely than the mainland to have mammalian and certain avian predators) and, less commonly, in small numbers at the ends of long barrier beaches. Recovery Plan; Mostello 2007. In Massachusetts, the roseate tern invariably nests in association with common terns, forming clusters or sub-colonies within larger common tern colonies. Mostello 2007. Compared to the common tern, the roseate tern selects nest sites with denser vegetation, such as seaside goldenrod and beach pea, which provide cover for eggs and chicks. *Id.* In Massachusetts, significant nesting colonies of roseate terns are found at Bird Island and Ram Island, in Buzzards Bay, with 735 and 584 breeding pairs in 2010, respectively, which accounts for 95% of the Massachusetts breeding population. MADEP 2011. Birds in these two colonies are not expected to be influenced by PNPS, as they belong to a subgroup of the northeast population that is

separate from birds near PNPS. Specifically, a long-term banding study of roseate terns indicates that the northeast population is split into two separate subgroups: a "cold water" subgroup nesting north and east of Cape Cod, which would include any birds nesting near Plymouth, Massachusetts; and a "warm water" subgroup nesting south and west of Cape Cod, which includes the major colonies in Buzzards Bay. 5-Year review. The interchange of individual birds between these two groups is thought to be limited. *Id.*

9. Long Beach, in Plymouth, Massachusetts has historically been a minor nesting site. Recovery Plan Appendix B; 5-Year Review). From 1999 through 2009, only a single nesting pair was recorded, in 2008. 5-Year Review. Dr. Nisbet states in his Affidavit that three pairs of roseate tern nested at Long Beach in 2011, though the source of this information is not stated and does not appear to have been published. Nisbet Aff. ¶ 8.

10. Roseate terns are highly mobile foragers, flying much faster than common terns (Recovery Plan), which allows them to forage over large areas. In Massachusetts, roseate terns may forage 25-30 km (about 15 to 18 miles) away from the breeding colony. Mostello 2007; Recovery Plan. Published data on the roseate tern's foraging range from staging areas are not available, due to the difficulty in monitoring the movements of individuals that are not anchored to a single location for a significant period of time, as is the case for nesting birds. However, there is nothing that would indicate that roseate tern's foraging range from staging areas is smaller than from breeding colonies. In fact, because they are not anchored to a nest, they may be able to forage over a larger range.

11. Roseate terns also exhibit a flexible foraging strategy, adapting to foraging conditions within their range by concentrating their feeding efforts in areas where prey are more abundant. *See* Heinemann 1992. For example, Heinemann (1992) observed over the course of a

summer the foraging behaviors of individuals nesting in the breeding colony located at Bird Island, Massachusetts. He reported significant variation in foraging intensity over the course of the summer at different locations around Buzzards Bay, separated by distances of more than 20 km (12.5 miles). *See id.* The flexible foraging strategy exhibited by this colony demonstrates the ability of roseate terns to adapt to local conditions and to concentrate their feeding efforts in areas within their relatively large foraging range where prey are more plentiful.

12. The roseate tern is a fairly specialized forager, usually feeding over shallow sandbars, shoals, inlets, tide rips, which bring prey fish close to the surface, making them easier to catch. Recovery Plan; 5-yr Review. They feed almost exclusively on small, schooling marine fish, though occasionally they include crustaceans in their diet. *See* Gochfeld et al., 1998. Although the composition of their diet varies from year to year and with location, the bulk of the roseate tern diet in Massachusetts is comprised of sand lance (*Ammodytes spp.*), hake (*Urophycis* spp.), and Atlantic herring (*Clupea harengus*). 5-Year Review. The roseate tern captures prey fish mainly by plunge-diving from heights of up to 20 m and often submerging 50 cm or more, but also by surface-dipping and contact-dipping. Mostello 2007; Recovery Plan.

13. The northeastern population of the roseate tern was listed as endangered under the federal ESA in 1987, principally due to contraction of the population into a small number of breeding sites and secondarily because of its declining numbers. Recovery Plan; *see also* DOI 1987. From the 1920s through the 1970s, roseate terns were displaced from at least 30 nesting colonies, due primarily to occupation of those sites by herring gulls and great black-backed gulls, and secondarily to animal predation (which may have intensified as terns were displaced by gulls to sites closer to the mainland), and erosion of the shoreline. Recovery Plan. By 1979, the northeast population (i.e., from New York to Nova Scotia) was estimated to be approximately

2,500 pairs. Mostello 2007. Following two decades of fairly steady increase, the northeast population peaked at 4,310 pairs in 2000 (*id.*) and is currently estimated at approximately 3,000 nesting pairs. 5-Year Review. The cause of this more recent population decline has not been identified, but data suggest that this decline is likely related to mortality at the wintering grounds in South America. Mostello 2007.

14. The primary range-wide threats to the northeastern roseate tern population include habitat displacement by gulls, predation of eggs and chicks by a number of birds and mammals, including owls, black crowned night herons, great black-backed gulls, peregrine falcons, mink, raccoon, rats and other rodents and fox, as well as physical human disturbance of, and activities in, staging areas (i.e., habitat loss). 5-Year Review. There is no indication that a lack of prey fish availability in Massachusetts during the summer months (even assuming any such lack of availability exists) has caused or contributed to the decrease in nesting sites or the decline in the northeastern roseate tern population.

Absence of Potential Impacts of PNPS on the Roseate Tern

No Credible Evidence of Direct Impacts

15. Based on available information, PNPS is not expected to have any direct impact on the roseate tern. There clearly is no risk to the roseate tern of impingement or entrainment in PNPS's cooling water intake system ("CWIS"). Furthermore, although JRWA does allege and infer that discharges of chlorine, corrosion inhibitors, and "heavy metals" from PNPS to Cape Cod Bay could directly affect the roseate tern, as explained in the Declaration of Mr. Scheffer: (i) heavy metals (such as chromium, zinc, and copper) are believed to be absent from the Station's regularly discharged effluent (Scheffer Aff. at ¶ 18); (ii) periodic discharges of corrosion inhibitors are subject to and well below EPA-authorized effluent limitations (Scheffer Aff. at ¶

19); and (iii) chlorination of PNPS's CWS and SWS is conducted subject to and with the benefit of a NPDES permit (Scheffer Aff. at ¶ 9), the federal chlorine effluent limitations for which are considered protective of marine organisms in Cape Cod Bay. While PNPS has, on rare occasion, experienced exceedances of its chlorine discharge limits at certain outfall locations, it is well-established that chlorine decays rapidly in sea water following a predictable relationship (*see* e.g., Wang et al., 2008; Høstgaard-Jensen, et al., 1977) such that, irrespective of dilution, it is highly unlikely that chlorine discharges from even occasional exceedances would affect the environment. In short, the chlorine discharges from PNPS are small, infrequent, and decay quickly and there is no expectation they will have any impact on the biota in Cape Cod Bay. Consequently, there is no credible scientific evidence that discharges from PNPS have any adverse effect on roseate terns. Indeed, because PNPS is not expected to directly (or, as discussed below, indirectly) impact the roseate tern, the PNPS property in fact may provide especially suitable nesting or staging habitat, as human entry is restricted and the birds would likely be protected from human disturbance.

No Credible Evidence of Indirect Impacts

16. Based on available information, PNPS is not expected to have any indirect impact on the roseate tern. Although JRWA also alleges that PNPS's operation has potential indirect impacts on the roseate tern through: 1) impacts on the availability of fish prey due to impingement and entrainment ("I&E") mortality; and 2) impacts of "pollution" on their fish prey, there is no technical evidence to suggest that either alleged impact is scientifically credible (or even plausible).

No Impacts on Roseate Tern Prey Species

17. In its Petition, JRWA refers to statements in the PNPS Final Supplemental Environmental Impact Statement ("FSEIS") regarding historical I&E of the roseate tern's main fish prey species by PNPS's CWIS (*see* Petition at 20-21) and, based on these statements, suggests that PNPS may adversely impact the roseate tern's food supply. Petition at 34. While PNPS does result in some I&E of the roseate tern's main fish prey species, as explained below, the evidence indicates that PNPS I&E will have no discernable impact on the availability of these fish species as prey for the roseate tern.

Sand Lance

18. As discussed above, roseate terns eat almost exclusively small marine fish that they capture by plunge diving, feeding primarily on sand lance, which at times represents 95% of the bird's diet. *See* Uttley et al., 1989, Safina 1990, Heinemann 1992, Shealer and Kress 1994, Goyert 2010. Sand lance typically occur in dense schools, with individual fish reportedly numbering from 500 to tens of thousands. Meyer et al., 1979. Because they do not support a commercial or recreational fishery, estimates of sand lance populations in the Gulf of Maine, such as the spawning stock assessments conducted by the National Marine Fisheries Service ("NMFS") for many other species, are not available. However, a thorough review of the available literature reveals no indication that the abundance of sand lance in the Gulf of Maine is low or declining, and they remain a significant proportion of the diet of a number of marine predators, including piscivorous fish, various shorebirds, and several species of seals and whales. Robards, et al., 1999. Moreover, PNPS monitoring indicates that the number of sand lance has been relatively stable over the past decade. Entergy 2012.

19. Sand lance are known to be impinged at PNPS, though in low numbers, and primarily during November and December, well after roseate terns have migrated to their southern winter habitat. Setting aside a single year reflecting an aberrational event, the annual average number of sand lance impinged is only 147 individuals. Even including the aberrational year (2003, in which a three-day impingement of 13,758 sand lance resulted an anomalous annual estimate of 30,765 fish that year), the annual average over the last decade is only 3,209 sand lance per year impinged at PNPS. Although the age of impinged sand lance is not known, the size range of those impinged corresponds to age 1 and age 2 fish. If impinged sand lance are assumed to be age 1 fish, which weigh on average 0.00384 pounds (EPA 2004), the annual average of 147 fish would weigh a total of 0.56 pounds. Indeed, even if one includes the anomalous year (2003) in these calculations, the annual average weight of 3,209 fish is only 12.3 pounds.

20. Sand lance eggs are demersal and adhere to the ocean bottom, and are therefore rarely subject to entrainment at PNPS, as evidenced by eggs being found in entrainment samples in only one year – 1979 – over the last three decades. Entergy 2012. Sand lance larvae do appear in PNPS entrainment samples during their winter spawning season. Over the last decade, the number of sand lance larvae entrained, expressed in terms of age 1 fish, averaged approximately 426,000 individuals each year, which, applying the same per fish weight of 0.00384 pounds, converts to an estimated total weight of 1,636 pounds of fish annually. Thus, absent a declining population, entrainment of sand lance at PNPS cannot reasonably be considered to have a potential impact, even indirectly, on roseate tern.

21. Moreover, the I&E losses reported above (and below) are conservative because they assume 100% mortality. In a review of entrainment mortality studies conducted at 21

power plants, the Electric Power Research Institute ("EPRI") concluded "it is clear that for most species survival can be quite high. The available data do not support the assumption that all entrained organisms are killed." EPRI (2000). Considering an array of species, EPRI found that entrainment survival rates ranged from approximately 25% for sensitive species to greater than 50% for hardier ones. *Id.* Likewise, impingement studies conducted at PNPS indicate that latent survival rates (56 hours after being impinged) ranged from 0 to 25% depending on species (MRI 1983). Accordingly, the I&E losses reported in this Declaration likely overstate actual losses.

22. As a reference point, humpback whales, which are known to feed on sand lance in New England waters (Weinrich et al., 1992; Overholtz and Nicolas 1979; Payne et al., 1990; Weinrich et al., 1997; Friedlaender et al., 2009), are estimated to consume food at the rate of approximately 471 kg/day (1,036 lbs/day). Roman and McCarthy 2010. In addition, humpback whales in Cape Cod Bay are known to employ specialized feeding behaviors, known as "bubble net" feeding or the similar "lobtail" feeding, that allow the whales to increase their foraging efficiency by concentrating schooling fish near the surface. Weinrich et al., 1992; Hain et al., 1982; Hazen et al., 2009. When employing these behaviors, humpbacks may target schools of sand lance. *Id.* Indeed, in some areas of the Gulf of Maine, humpback whales are known to specialize in feeding on sand lance, and their spatial distribution is highly correlated with sand lance density. Payne et al., 1986. Based on their daily consumption, when humpback whales are concentrating on sand lance, two whales would eat more sand lance in one day than would be impinged and entrained at PNPS in an average year. It is, therefore, simply not scientifically credible to suggest that the annual magnitude of I&E mortality at PNPS could potentially affect the availability of sand lance as prey for the roseate tern.

23. Another reference point for appreciating the miniscule scale of I&E losses at PNPS, as well as the general abundance of sand lance in the North Atlantic is provided by Hammill and Stenson (2000), who estimated the number of fish of various species that are consumed by the seal population in Atlantic waters of Canada. Over a seven-year period (1990-1996), an average of 5.4 million seals consumed 831 million pounds of sand lance annually, which would be equivalent to 216.5 billion age 1 sand lance. Thus, the consumption of sand lance by seals in the North Atlantic dwarfs I&E losses at PNPS. Further, where seals presumably consume only a fraction of the sand lance present in their foraging area, these data illustrate the overall abundance of sand lance.

Atlantic Herring and Hake

24. In addition to sand lance, Atlantic herring (*Clupea harengus*) as well as three species of hake in the genus *Urophycis* may make up a portion of the roseate tern's diet. Heinemann 1992.

Atlantic Herring

25. Young-of-the-year Atlantic herring are impinged in minimal numbers at PNPS, with an annual average (again, expressed in terms of age 1 fish) of 140 individuals per year over the last decade. Atlantic herring eggs are not entrained at PNPS because they are spawned on offshore banks and, like the sand lance, are demersal and adhesive. Larval Atlantic herring are subject to entrainment at PNPS, with annual losses (expressed in terms of age 1 fish) of 9,294 individuals per year over the last decade. Entergy 2012. Conservatively assuming 100% I&E mortality, annual mortality of Atlantic herring at PNPS averages 9,434 fish. Where an age 1 Atlantic herring weighs on average 0.0314 pounds, this represents an annual loss of 296 pounds of fish. EPA 2004.

26. By comparison, the Atlantic herring spawning stock biomass of the Gulf of Maine-Georges Bank herring complex was estimated to be 400,000 metric tons, or 900 million pounds, of adult fish in 2008. TRAC 2009. Spawning stock biomass consists of fish age 3 and older. Based on these estimates and accounting for the additional mortality experienced between age 1 and age 3 (to adult), the number of Atlantic herring entrained and impinged at PNPS is a minute fraction of the northeast population available for predation by roseate terns, and cannot reasonably be expected to impact the availability of these fish or the feeding success of the roseate tern.

Hake

27. Three species of hake – red hake (*Urophycis chuss*), white hake (*U. tenuis*), and spotted hake (*U. regia*) – are impinged and entrained at PNPS. Early life stage hake are impinged at PNPS in minimal numbers, with an annual average over the last decade for all three species combined of 150 fish (Entergy 2012), which is the equivalent of 35 pounds, per year. Eggs and larvae of the three species cannot readily be distinguished from one another, and so their entrainment numbers are combined. The average annual entrainment rate for hake over the last decade, expressed as age 1 fish, is 60,759 per year, which represents an annual total of 14,035 pounds. Thus, the annual combined estimate of hake entrainment and impingement losses at PNPS, again conservatively assuming 100% I&E mortality, is approximately 14,070 pounds.

28. Stock assessments are completed periodically by NMFS for both red and white hake. The latest stock assessment in 2010 for red hake alone provided a stock estimate of 4,706 metric tons or 10,374,000 pounds (spring and fall estimates averaged) for the northern stock defined as the Gulf of Maine to Northern Georges Bank region. NEFSC 2011. The most recent

spawning stock biomass assessment for white hake was completed in 2007, at which time the Gulf of Maine to Northern Georges Bank population was estimated to be 19,800 metric tons or 43,651,100 pounds. NEFSC 2008. Based on these data, which do not include the spotted hake, losses due to I&E at PNPS are a minute fraction of the hake population in the Cape Cod area, and the continued operation of PNPS cannot reasonably be expected to affect the availability of hake prey to roseate terns.

Miscellaneous Responses

29. The Petition also asserts that "turbulent water around [PNPS's] two breakwaters," and "turbulence created by regular and periodic cooling water discharges" are "expected to be prime locations for foraging roseate terns" and goes so far as to state that "PNPS is thus an attractive nuisance" for the roseate tern. Petition at 20. These assertions are erroneous. First, the currents flowing past PNPS's two intake embayment breakwaters are relatively slow, even during thermal backwashing, and do not result in any additional turbulence that is not already associated with the shoreline generally (i.e., during storms). Second, as discussed above, while roseate terns often forage over turbulent waters, such turbulence is associated with shoreline hydrodynamic features, such as tide rips, that act to bring fish in these areas to the surface, making them more easily preyed upon by diving birds. Although roseate tern prey such as sand lance do occur in the vicinity of PNPS, as evidenced by their appearing in I&E samples, the sea floor in the vicinity of Rocky Point, where PNPS is located, is rocky, and therefore is not suitable habitat for sand lance, which prefer substrates into which they can burrow such as clean sand, sand and shell, and fine gravel. Meyer 1979. Thus, the asserted turbulence associated with PNPS's cooling water discharge is not expected to bring an abundance of sand lance to the

surface where they can be captured, and should therefore not provide desirable foraging conditions for the roseate tern.

30. Moreover, to the extent any roseate terns might be attracted to the turbulence created by PNPS's cooling water discharge, if prey fish are absent from the water, any such attractiveness would likely be short lived, as the roseate tern's flexible foraging strategy, as described above, would allow it to either move or concentrate its feeding efforts where prey are abundant. *See* Heinemann 1992. Consequently, even if PNPS did adversely affect local prey fish abundance (which there is no evidence that it does) there is no credible evidence that, were significant numbers of roseate terns to nest or stage in areas near PNPS in the future, their ability to forage adequately would be impaired by continued operation of PNPS.

31. JRWA also alleges that discharges of pollution from PNPS potentially affect the roseate tern through their fish prey. For the reasons discussed above in ¶ 15, and as explained in Mr. Scheffer's Declaration, there is no credible scientific evidence such discharges have any adverse effect on roseate tern fish prey.

32. Finally, JRWA alleges that "thermal releases" from PNPS, including "backwash operations," may adversely affect the roseate tern's prey fish. *See* Petition at 21. First, there is no evidence that the thermal plume created by PNPS's CWIS, as authorized by its NPDES permit, adversely affects roseate tern prey fish in Cape Cod Bay. Moreover, as explained in Mr. Scheffer's Declaration, backwash operations are performed infrequently – 3 to 5 times per year – and, due to the low volume of water discharged, the temporal and spatial extent of the thermal plume associated with backwashing is very limited – occurring for only a few hours in 3 to 5 feet of water at the surface of the intake embayment. Scheffer Aff. ¶ 16. Consequently, there is no

credible scientific evidence that thermal discharges from PNPS have any adverse effect on roseate tern prey fish.

I declare under penalty of perjury that the foregoing is true and correct.
Executed in Accord with 10 C.F.R. § 2.304(d)

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I declare under penalty of perjury that the foregoing is true and correct.
Executed in Accord with 10 C.F.R. § 2.304(d)

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EXHIBIT ONE

SARAH A. BARNUM, Ph.D.
Senior Wildlife Ecologist

Dr. Barnum is a Senior Wildlife Ecologist at Normandeau with over 15 years of professional experience. Her background includes providing expertise to the transportation and energy sectors, as well as a variety of general development projects. She has hands-on experience with a with a wide range of species including forest birds, waterfowl, raptors, small mammals, large mammals, amphibians, and reptiles. Dr. Barnum's projects have emphasized examining habitat relationships, impact assessment for threatened and endangered species, mitigation planning, and Federal ESA compliance. Dr. Barnum also has extensive experience in project planning, project management, experimental design, and data analysis.

EDUCATION

Ph.D.	2003, Conservation Planning, University of Colorado
M.S.	1993, Wildlife Biology, Utah State University
B.S.	1988, (cum laude) Wildlife Biology, University of Vermont

PROFESSIONAL EXPERIENCE

2007-Present	Normandeau Associates
2005-2007	New Hampshire Audubon, Concord, NH
2004-2005	Baystate Environmental Consultants, East Longmeadow, MA
2001-2003	Environmental Planning and Policy Unit, Colorado DOT, Denver, CO
1998-2000	Office of Environmental Services, Colorado DOT, Denver, CO
1996-1998	Dames & Moore, Denver, CO
1993-1994	Bio-Resources, Inc., Logan, UT

SELECTED PROJECT EXPERIENCE

Confidential (2011- present) – Wind Development, Northern MA. Avian and acoustic bat surveys to support environmental permitting for a proposed six turbine project. Avian surveys include raptor surveys and breeding bird surveys. Project Manager and Avian Biologist.

Confidential (2011- present) – Wind Development, Down East ME. Avian and acoustic bat surveys to support environmental permitting for a proposed 20 plus turbine project. Avian surveys include raptor surveys and eagle surveys. Wildlife Task Manager and Avian Biologist.

Confidential (2011) – Wind Development, Northern ME. Avian and acoustic bat surveys to support environmental permitting for a proposed six turbine project. Avian surveys include raptor surveys, eagle surveys, and breeding bird surveys. Wildlife Task Manager and Avian Biologist.

First Wind (2010-2011) - Post-Construction Mortality Monitoring, Stetson Wind Power Facility, Washington County, Maine. Managed personnel to search all turbines on-site for bird and bat fatalities from April-October, 2010, and conduct searcher efficiency trials and scavenger trials to estimate true number of fatalities; report writing. Project Manager.

Northern Pass (2010- Present) - HVDC Power Line Upgrade. Conduct wildlife assessments in support of state and federal permitting for installation of a new, 200-mile long HVDC line in New Hampshire. Tasks include consultation with state and federal agencies (ESA, NEPA), desktop analysis, and design and coordination of field surveys. Species of interest include forest carnivores, bats, raptors, song birds, turtles, snakes, and lepidopterons. Task Manager.

Town of Nantucket (2010-2011) – Madaket Wind. Assessment of avian and T&E resources in the project area to determine potential impacts and permitting requirements. Specie of interest included long-tailed duck, northern harrier, and night migrants. Work includes both desktop and field assessment. Project Manager

MA Clean Energy Center (2009-2010) – Avian Impact Assessment for Madaket Wind. Desktop analysis of biological and permitting issues associated with a proposed wind development in Nantucket, MA. Project Manager and Avian Biologist.

First Wind (2009-2010) – Brimfield Wind. Avian and acoustic bat surveys to support environmental permitting for a proposed 20 MW project in southwestern MA. Avian surveys include raptor surveys and breeding bird surveys. Project Manager and Avian Biologist.

Federal Highway Administration (2009-2011) – Analysis of Methods to Identify Deer-Vehicle Collision Hotspots. Qualitative and quantitative methods to identify DVC hotspots will be compared based on data needs, ease of implementation, expertise required, and relevancy to solving safety and ecological issues. Project responsibilities include review of methods through literature review and interviews with DOT staff, creating and implementing comparison protocols, staff management and report writing. Project Manager.

Confidential (2007-Present) - Maine Wind Energy Developer. Wildlife surveys to support environmental permitting for a proposed 50 MW project in western Maine. Permit currently in preparation include a Site Location of Development Act permit, a Natural Resources Protection Act permit, and likely a Corps Section 404 individual permit. Task Manager.

Federal Highway Administration (2008-2010) – Mitigation Wetland Functional Assessment. Wetlands constructed to mitigate for highway project-related impacts were surveyed and compared, and levels of invasive cover and wildlife functions were compared to natural wetlands. Project responsibilities included identifying and selecting study sites, conducting surveys, semi-quantitative analysis, report writing, and managing staff. Project Manager.

Florida Power and Light (2008-2010) - Seabrook Nuclear Facility Relicensing. Review and summarize all terrestrial ecology issues associates with facility construction and operations with a focus on threatened and endangered species, and impact assessment; results presented in an Environmental Report to support relicensing. Task Manager.

The Mount Washington Resort (2007-2008) – Dartmouth Brook Habitat Assessment. Provided expert opinion regarding the suitability of the resort's property for Canada lynx and American marten. Tasks included field assessment of the property, review of current literature, producing a written report detailing analysis approach and findings, and ongoing consultation with regulating agencies. Senior Wildlife Ecologist.

U.S. Navy (2008) - Casco Bay Fuel Line Removal. Wildlife studies to support Corps 404 and Maine NRPA permitting in Brunswick and Harpswell, ME. Conducted habitat survey of project area, wildlife habitat mapping, field review and impact assessment, with a focus of identifying suitable habitat for and presence of species listed by the State of Maine and /or USFWS. Compiled results in a report to support all local and federal permitting efforts. Senior Wildlife Ecologist.

Mount Snow Resort (2008) – Review all threatened and endangered species issues associated with a snow making upgrade; analyze impacts and summarize results in a Forest Service Biological Assessment and a NEPA Environmental Assessment. Senior Wildlife Ecologist.

Waste Management (2008) – Crossroads Landfill Deer Wintering Habitat Assessment. Survey of deer wintering areas associated with the Crossroads landfill to determine value of habitat. Compile results in letter report suitable for reference in future expansion planning and permitting. Senior Wildlife Ecologist.

Noble (2007) – Granite Reliable Wind Breeding Bird Surveys. Oversaw design and implementation of breeding bird surveys at project area. Managed staff and conducted quality assurance tasks for field activities and report writing. Managing Principal.

New Hampshire Audubon (2005-2007) – NH Route 2 Wildlife Crossing Investigation. Designed, implement and managed a tracking study to indentify the locations where wildlife crossed the highway, and to determine the characteristics of preferred crossing locations. Tasks included extensive quantitative and qualitative analysis of GIS based data sets. Principle Investigator and Project Manager.

EXHIBIT TWO

Sources Reviewed

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of **Entergy Nuclear Generation Company** **Entergy Nuclear Operations, Inc.** **(Pilgrim Nuclear Power Station)**	**Docket No. 50-293-LR** **ASLBP No. 06-848-02-LR**

AFFIDAVIT OF JACOB J. SCHEFFER
IN SUPPORT OF ENTERGY'S ANSWER OPPOSING JONES RIVER WATERSHED ASSOCIATION'S AND PILGRIM WATCH'S MOTION TO REOPEN HEARING REQUEST ON CONTENTION RELATED TO THE ROSEATE TERN

I, Jacob J. Scheffer, do hereby depose and state, on the basis of personal knowledge, and under penalties of perjury, that:

1. I am Chemistry Supervisor for Entergy Nuclear Operations, Inc., the operating entity for the Pilgrim Nuclear Power Station ("PNPS" or "the Station"), which is located in Plymouth, Massachusetts and is owned by Entergy Nuclear Generation Company (collectively, "Entergy"). I have held this position since June 2008. Prior to that time, I served as Superintendent of Environmental Protection for PNPS (October 1999-June 2007), a position in which I held substantially the same responsibilities as my current role. From 1970 until October 1999, when Entergy acquired PNPS, I was employed by Boston Edison Company ("BECO"), where, for close to three decades, I served in a variety of environmental and engineering roles at various BECO facilities, including at PNPS.

2. As Chemistry Supervisor, I oversee PNPS's compliance with local, state and federal environmental regulations, including, without limitation, all environmental monitoring performed in accordance with the Federal Clean Water Act, 33 U.S.C. § 1251 *et seq.*, the

Massachusetts Clean Water Act, M.G.L. ch. 21, 26-53, and the Station's National Pollution Discharge Elimination System permit (the "NPDES Permit" or the "Permit"), as well as all reporting provided to the United States Environmental Protection Agency ("USEPA"), the Massachusetts Department of Environmental Protection ("MADEP"), and any other local, state and federal regulators in connection with same. As such, I have personal knowledge regarding the Station's operations, its NPDES Permit, the effluent limitations, monitoring requirements, and other conditions authorized or required under that Permit, and any relevant discharge monitoring reports that may be submitted in connection with same.

3. I have reviewed the Motion to Reopen, Request for Hearing and Permission to File New Contention in Above-Captioned License Renewal Proceeding on Violations of the Endangered Species Act with Regard to the Roseate Tern (the "Motion"), which was filed by Jones River Watershed Association and Pilgrim Watch (collectively, "JRWA") on May 2, 2012, and which alleges certain deficiencies in the Nuclear Regulatory Commission's ("NRC") evaluation of the potential impact (assuming any) of continued PNPS operations on the roseate tern, an ESA-listed species, during the relicensing period. In support of this Motion, JRWA makes certain incomplete and/or erroneous statements concerning the Station's operations, its NPDES-regulated discharges, and the NPDES Permit itself. I am providing this Affidavit to correct and clarify those statements, including those concerning the incidence and perceived magnitude of any chlorine discharges by PNPS into Cape Cod Bay (alternatively, the "Bay").

Description of PNPS and Its Cooling Water Intake System

4. PNPS is a nuclear power generating facility consisting of a single boiling water reactor and associated steam-electric and auxiliary systems. PNPS continuously generates power at a rated capacity of approximately 680 net MWe (711 gross MWe), which is enough electricity for approximately 550,000 homes in Massachusetts.

5. PNPS was designed for and actually utilizes once-through cooling This means that sea water is drawn from an intake embayment created by two large breakwaters, the walls of which effectively separate the embayment from the open waters of Cape Cod Bay at all points except an approximate 800 foot opening to the inlet. Once water is drawn into the Station through an intake structure, a series of pumps direct the water to either the Station's Circulating Water System ("CWS") or its (Salt) Service Water System ("SWS").[1] As its name suggests, the purpose of the CWS is to remove heat from the Station's condenser; the primary purpose of the SWS, on the other hand, is to provide cooling water for the Station's heat exchangers, which act as the Station's safety-related ultimate heat sink (though the SWS is also one of the two water sources for PNPS's marine screen wash system). Once it has passed through the SWS or CWS, effluent from both systems flows to a 900-foot long discharge canal located northwest of the intake structure. Like the intake embayment, the discharge canal is created by two man-made breakwaters (one of which is shared with the intake embayment). Upon entry into the discharge canal, effluent from the CWS and SWS systems merge and become fully mixed prior to discharge into the Bay, though the CWS is the larger of the two systems, and therefore typically discharges approximately thirty (30) to sixty (60) times the water volume discharged by the much smaller SWS, depending on the number of circulating and service water pumps in service at any given time.[2] The temperature of the effluent upon discharge to Cape Cod Bay is typically between 85-95 degrees Fahrenheit in the summer, but in any event below the 102 degrees Fahrenheit limit authorized by the Station's NPDES Permit. NPDES Permit at Part A.2.a (NRC ADAMS Accession No. ML061420166).

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1 The intake structure houses two circulating water pumps and five service water pumps, though the number of service water pumps in operation at any given time is dictated by operational needs and ambient environmental conditions.

2 Indeed, even under those infrequent circumstances when CWS flow is at its lowest (*e.g.*, during an outage, when only one circulating water pump and five service water pumps might be in service), the discharge volume from the CWS still outpaces SWS discharge volume by a full 12.5 to 1.

<u>The NPDES Permit and Relevant NPDES-Regulated Discharges</u>

6. Since at least 1975, PNPS continuously has conducted its operations subject to an NPDES Permit jointly issued (and repeatedly renewed) by USEPA and MADEP. The current NPDES Permit (Permit No. MA0003557), like its predecessors, sets out a variety of operational, monitoring, and reporting requirements that, consistent with the federal Clean Water Act (33 U.S.C. § 1251 *et seq.*) and applicable Massachusetts law, regulate the Station's discharge of effluent into Cape Cod Bay, satisfy Massachusetts water quality standards, and safeguard the aquatic ecosystem and biota of the Bay. *See* NPDES Permit at 1. In furtherance of those goals, PNPS's NPDES Permit sets forth, among other things, maximum daily and average monthly concentration limits for any residual chlorine which may be discharged from the CWS (referenced in the NPDES Permit as Outfall # 001) and/or the SWS (referenced in same as Outfall # 010). NPDES Permit at Parts A.2.a and A.5.a. The Permit further regulates the Station's thermal backwashes (as discussed more fully below). *Id.* at Part A.3.

7. JRWA alleges in its Motion that the Station's "Clean Water Act NPDES permit expired 16 years ago." Motion at 21. This statement – which implies, either purposefully or inadvertently, that PNPS has been operating in violation of the Clean Water Act – is incomplete and misleading. To the contrary, and as confirmed by USEPA via written correspondence on multiple occasions, the Station's NPDES Permit has been administratively continued during the pendency of permit renewal proceedings, which USEPA acknowledges have been delayed through no fault of the Station's despite having filed a timely renewal application. *See* Correspondence from Jane Downing, USEPA to E.T. Boulette, Boston Edison (Mar. 1, 1996) (attached hereto as Exhibit 1); Correspondence from Olga Vergara, USEPA to Jacob Scheffer, Entergy (Dec. 2 1999) (attached hereto as Exhibit 2); Correspondence from David M. Webster, USEPA to Jacob Scheffer, Entergy (Oct. 25, 2004) (attached hereto as Exhibit 3); *see also* 5

U.S.C. § 558(c) ("When the licensee has made timely and sufficient application for a renewal or a new license in accordance with agency rules, a license with reference to an activity of a continuing nature does not expire until the application has been finally determined by the agency."). As such, the conditions and limitations of the most recent NPDES Permit remain valid and in full force and effect.

a. NPDES-Regulated Chlorination of the CWS and SWS

8. In order to control biofouling, PNPS utilizes chlorine (sodium hypochlorite) as a biocide for its CWS and SWS. No other biocide is used in the operating systems at PNPS. Sodium hypochlorite is intended to and actually rapidly dissipates during its use, with dissipation accelerated through heat and sunlight. Nonetheless, the use, and subsequent discharge, of any *residual* chlorine concentration in PNPS's effluent is conducted subject to and with the benefit of its NPDES Permit.

9. Specifically, pursuant to the Station's NPDES Permit, chlorination of the CWS is limited to a maximum of two hours per day (although the chlorination schedule is variable and dependent on environmental and operational conditions, ranging from once a day to once a week). Chlorination is further limited to a Total Residual Oxidant ("TRO") concentration of 0.10 mg/L in the Station discharge prior to release into Cape Cod Bay, and is stricter than the federal effluent limitation guideline of 0.20 mg/L set by USEPA. *See* 40 C.F.R. § 423.13(b)(1). While continuous chlorination of the SWS is permitted in accordance with the NPDES Permit, the Station is limited to a monthly average TRO of 0.50 mg/L, as well as a maximum daily concentration of 1.0 mg/L.

10. In compliance with its NPDES monitoring and reporting requirements, PNPS carefully monitors TRO concentrations in the CWS and SWS. For example, during CWS chlorination, personnel at the Station take baseline measurements both before and after

chlorination in order to ensure the TRO concentration is undetectable (*i.e.*, <0.02 mg/L) except during the period of chlorine injection. They also take grab samples at the discharge canal every ten (10) to fifteen (15) minutes during chlorination, to monitor compliance with NPDES Permit limits. As such, the Station takes no less than eight (8) analytical chlorine readings during a typical CWS chlorination period (assuming a maximum two-hour run).

11. Similarly, Station personnel monitor chlorine levels in the SWS closely. In fact, the water used in that system is tested no less than twice daily when chlorination is in service, with sampling performed downstream of the heat exchangers (*i.e.*, before the service cooling water has left the auxiliary building or mixed with cooling water from the CWS in the discharge canal) in compliance with the NPDES Permit. *See* Correspondence from Jane Downing, USEPA to E.T. Boulette, Boston Edison re: Pilgrim Nuclear Power Station, NPDES Permit No. MA0003557, Sampling of Service Salt Water System (Aug. 26, 1998) (attached hereto as Exhibit 4) (authorizing twice daily sampling during chlorination at the SWS).

12. Pursuant to its NPDES Permit, Entergy documents the results of all chlorine discharge monitoring performed at PNPS in its Discharge Monitoring Reports ("DMRs"), which are submitted to USEPA and MADEP on a monthly basis.[3] These DMRs are organized by discharge/outfall point, and also contain a written summary of the Station's discharge data. As such, these reports provide a reliable snapshot of the sampling performed at PNPS on a daily and monthly basis. A review of those reports confirms, contrary to JRWA's assertions (Motion at 22 & n. 20), that NPDES Permit exceedances of chlorine concentrations discharged from the CWS and SWS are exceedingly rare.

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[3] For ease of reference, a representative example of a DMR for PNPS is attached hereto as Exhibit 5. Copies of additional DMRs, as discussed in this Affidavit, will be provided upon request.

13. Indeed, in the last ten years (2002-2011),[4] and as summarized in the attached Exhibit 6, PNPS has documented only two (2) instances in which the chlorine concentration in the CWS exceeded the instantaneous maximum permitted level of 0.1 mg/L. Those two exceedances, which occurred on February 3, 2005 (peak TRO of 0.14 mg/L) and December 14, 2011 (peak TRO of 0.18 mg/L), were each the result of minor and unanticipated equipment malfunctions, and each was less than twenty (20) minutes in duration. *See* Exhibit 6. Furthermore, it is worth noting that both exceedances, while over the NPDES Permit limit, were well under the 0.2 mg/L federal effluent limitation guidelines set by USEPA. *See* 40 C.F.R. § 423.13(b)(1) (providing the federal standard for total residual chlorine). Given the brief duration and low concentrations involved with these two exceedances, the amount of residual chlorine discharged into the Bay is expected to have been minimal.

14. In that same ten year period, and as summarized in Exhibit 6, PNPS has documented only six (6) individual instances (out of literally thousands of sampling events) in which the chlorine concentration, as measured at the SWS, exceeded the daily maximum authorized limit of 1.0 mg/L. However, while those measurements reflect the chlorine concentration at the time of testing inside the SWS (*i.e.*, an internal stream), they do not correlate to actual discharge levels into the Bay, which were in compliance with end point TRO limits during each of these occurrences. First, as mentioned above, prior to emptying into the Bay, water from the SWS (outfall # 010) must first travel to and through the main discharge canal, where it mixes with – and is substantially diluted by – the much more voluminous flow from the CWS (outfall # 001). As such, even assuming the Station were operating under maximum SWS and minimum CWS flow conditions, any residual chlorine concentration in the SWS would be

4 As evidenced by the Station's DMRs, there have been no chlorine concentration exceedances from the SWS or CWS outfalls in 2012.

reduced by a minimum factor of 12.5 to 1 prior to the point of discharge into Cape Cod Bay. In actual operations, and as a function of the variability of the Station's service pump needs (which can further reduce the volume of water circulating through the SWS), however, the dilution factor is typically much greater, ranging from 30:1 to 60:1. Furthermore, upon mixing with water from the CWS, any residual chlorine concentration in the service water is subject to "chlorine decay" or "chlorine demand," whereby chlorinated water reacts with substances in unchlorinated water and spontaneously accelerates the TRO concentration reductions. As a result of these two factors, any residual chlorine in the SWS water stream is effectively reduced or eliminated before the point of discharge into Cape Cod Bay, such that the concentration prior to entering the Bay is typically undetectable, and is always at or below the stricter 0.1 mg/L ceiling set for circulating water in the Station's NPDES Permit. This is equally true for each of the six (6) chlorination Permit exceedances reported from the SWS outfall in the past decade.[5] *See e.g.,* Exhibit 5; *supra* Footnote 3.

b. Thermal Backwashes

15. JRWA also implies in its Motion, without precise citation, that the Station's backwash operations may pose a "significant threat to roseate terns." Motion at 21. But, in fact, this is incorrect. As an initial matter, thermal backwashes are performed as a further prophylactic measure to control biofouling in the intake structure, and thereby reduce the Station's chlorination needs. During a thermal backwash, the flow of water through the CWS is re-routed such that water is taken in on one side and discharged through the other side of the intake structure. All thermal backwashes are conducted in accordance with PNPS's NPDES

[5] It is worth noting that the Station has also occasionally experienced non-conformances with the NPDES requirement to dechlorinate the fish sluice water (outfall #003) as discussed in its DMRs and the Supplemental Final Environmental Impact Statement ("FSEIS"). NRC, Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants, Supplement 29 Regarding Pilgrim Nuclear Power Station, Final Report, Docket 5-293, at p. 4-5 (2007); *see* Exhibit 6.

Permit, which provides limitations on frequency, effluent temperature and flow (NPDES Permit MA 0003557 at Part A.3).

16. Furthermore, the conditions created by a thermal backwash are not only environmentally limited, but actually represent a net reduction in thermal discharges. Thermal backwashes are a relatively infrequent occurrence at PNPS, conducted only three to five times per year. They are also relatively short in duration, typically lasting only two hours each from start to finish. Importantly, while effluent temperatures are elevated to approximately 110 degrees (and always less than 120 degrees) Fahrenheit during a thermal backwash, the flow is reduced by half, such that it results in an overall reduction in the total thermal effluent load released from the Station. Studies further indicate that the thermal plume created by the Station's backwashing operations is highly localized and surface-oriented in nature. Specifically, a thermal survey performed in 1977 to determine the effects of thermal backwashes at PNPS found that the procedure produced a relatively thin thermal plume at the surface, averaging three (3) to five (5) feet in depth, that spread from the intake structure across the western end of the intake embayment and along the breakwater, and completely dissipated within a few hours. Normandeau Associates, Inc. (1977) Thermal Surveys of Backwashing Operations at Pilgrim Station During July 1977.

c. Allegations Concerning "Other Pollutants"

17. JRWA also raises allegations in its Motion concerning the discharge of metals and corrosion inhibitor by PNPS. Motion at 21. More specifically, JRWA asserts, without citation to a source document, that "[s]ince PNPS uses a corrosion inhibitor, and had to almost entirely replace corroded pipes in about 1984, corrosion of metal piping is obviously an issue at the facility." *Id.* at 21-22. The metals about which JRWA purports to raise concern are copper, zinc and chromium. *Id.*

18. As an initial matter, the tubing in PNPS's cooling water condenser system is comprised entirely of elemental titanium, and has been since 1977, when the entire tubing configuration in the condenser was replaced. Titanium is highly resistant to sea water corrosion, and in any event, does not contain copper, zinc, or chromium. Furthermore, JRWA's reference to the replacement of certain other metal piping in 1984 is wholly inapposite, as the piping in question was used for internal water recirculation only, and as such did not make contact with or discharge into Cape Cod Bay or any other surface water in or around PNPS. Entergy also is not aware of any corrosion issues relative to its SWS system. Indeed, as stated in the Station's NPDES Permit Renewal Application, zinc, copper, and chromium are all believed to be absent from the Station's regularly discharged effluent. *See* Correspondence from J.F. Alexander, Entergy to Kevin McSweeney, USEPA, re: NPDES Permit Renewal Application – Pilgrim (Dec. 1, 1999) (NRC ADAMS Accession No. ML993430072); Correspondence from E.T. Boulette, Boston Edison to Kevin McSweeney, USEPA re: NPDES Permit Renewal Application (Oct. 25, 1995) (cover letter for which is attached hereto as Exhibit 7). There have been no substantive changes or modifications to PNPS operations that would alter this conclusion since the time of that submission.

19. Pursuant to and as authorized by the USEPA, *see* Correspondence from Edward K. McSweeny, USEPA to E.T. Boulette, Boston Edison re: Pilgrim Nuclear Power Station, NPDES Permit No. MA0003557, Use of Tolytriazole [sic] as a Corrosion Inhibitor (June 30, 1995) (attached hereto as Exhibit 8), the Station does utilize Tolyltriazole (a corrosion inhibitor) in the facility's heating system, however that is largely an internal, processed water system which does not circulate to the discharge canal, save for once annually during planned, routine maintenance. In the past, and as reported in the DMRs, Tolyltriazole was occasionally discharged in diluted concentrations well below USEPA approved limits through either outfall

011 (the neutralizing sump) or outfall 010 (the SWS) as a result of minor, erosion-related leaks from the Station's Turbine Building Closed Cooling Water ("TBCCW") and Reactor Building Closed Cooling Water ("RBCCW") systems, each of which has been corrected.

I declare under penalty of perjury that the foregoing is true and correct.

<u>Executed in Accord with 10 C.F.R. § 2.304(d)</u>
Jacob J. Scheffer
Chemistry Supervisor
Pilgrim Nuclear Power Station
600 Rocky Hill Road
Plymouth, MA 02360
Phone: 508-830-8323
E-mail: jscheff@entergy.com

EXHIBIT ONE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

MAR - 1 1996

E. T. Boulette, PhD
Senior Vice President - Nuclear
Boston Edison
Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360

Re: Pilgrim Nuclear Power Station,
NPDES Permit No. MA0003557 - Reissuance

Dear Dr. Boulette:

This letter confirms a telephone conversation between Robert Anderson of your staff and Nick Prodany of EPA-New England on February 12, 1996.

As explained to Bob Anderson, the NPDES permit for Pilgrim Nuclear Power Station, which expires April 29, 1996, will remain in effect (see 40 CFR §122.6, concerning the continuation of expiring permits), since you have filed a timely and complete application. Furthermore, Boston Edison is hereby notified that the application is considered to be administratively and technically complete.

Permit conditions and effluent limitations of the soon-to-expire permit will remain unchanged. This also includes the process of submitting monthly Discharge Monitoring Reports (DMRs).

The reissuance of the NPDES permit, however, will be delayed due to no fault of Boston Edison. Under the direction of the Secretary of Environmental Affairs, Massachusetts has adopted a watershed approach to managing water resources. The State and EPA-New England have made a joint decision to adhere to the watershed initiative. Under this initiative, the strategy is "resource-based" using the watershed as the management unit rather than singling out a specific portion of the receiving waterbody (or a facility discharging into it). The program schedule of the Office of Watershed Management, specifies the reissuance of South Coastal-Basin NPDES permits, which includes Pilgrim Nuclear Power Station, for the year 1998.

At the present time, EPA-New England will reissue NPDES permits which are out-of-phase with the watershed cycle, only if it can be demonstrated that the issued permit significantly benefits the environment. Should Boston Edison have overriding reasons for permit reissuance, such as significant changes to their operations, EPA and the State should be apprised, such that an environmental impact evaluation can be constituted.

Should you have any questions, please contact N. W. Prodany of my staff at 617-565-3513.

Sincerely,

Jane Downing

Jane Downing, Director
Massachusetts State Program Unit
Office of Ecosystem Protection

cc: BECO, Attn: R. Anderson
MA DWPC, Attn: Paul Hogan
EPA, Attn: C. Chow

LMA3557.L02

EXHIBIT TWO

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
December 2, 1999

Mr. Jay Schaeffer
Entergy Nuclear Generation Company
Rocky Hill Road
Plymouth, MA 02630

Re: Transfer of Ownership

Dear Mr. Schaeffer:

This letter is a follow-up to the information you provided following your receipt of correspondence from us dated October 12 relative to the transfer of ownership of the Boston Edison (Pilgrim Nuclear Power Station) facility. I apologize for our shortsightedness in sending the transfer of ownership based on the 1991 permit as opposed to, the more recent 1994 modification. Enclosed please find the correct cover page delineating the transfer to Entergy Nuclear Generation Company (Entergy Nuclear), please disregard the previous and erroneous first version.

As was stated in the October 12 letter the current permit has expired, however, the conditions of this permit will continue in force until a new permit is issued and becomes effective since Boston Edison filed a timely and complete application. Prior to drafting a new permit for your facility you will be contacted for any information needed to clarify or supplement previously submitted data.

Again, I apologize for any inconvenience this error caused. Please do not hesitate to contact me should you have any questions or concerns regarding this permit transfer. I can be reached at (617) 918-1519.

Sincerely,

Olga Vergara

Olga Vergara
Environmental Protection Specialist
Municipal Assistance Unit
Office of Ecosystem Protection

Enclosure

cc: Sandra Little, Boston Edison
MA Department of Environmental Protection (MA DEP)

EXHIBIT THREE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

October 25, 2004

Mr. Jacob Scheffer, Superintendent Environmental Protection
Entergy Nuclear Generation Company
Pilgrim Nuclear Power Station
600 Rocky Hill Road
Plymouth, MA 02360

RE: Pilgrim Station's National Pollutant Discharge Elimination System (NPDES) Permit (# MA0003557)

Dear Mr. Sheffer,

On July 21, 2004, EPA received a letter from Goodwin Proctor LLP on behalf of Entergy Nuclear Generation Company (Entergy). Entergy requests to be placed on a schedule for submitting the information required for Entergy's Pilgrim Nuclear Power Station (Pilgrim or the Station) to apply for an NPDES permit under new regulations under Section 316(b) of the Clean Water Act. EPA agrees to do so and in the text below both details a specific schedule and addresses several important related issues.

Background

Pilgrim's current NPDES permit expired on April 4, 1996. The permit was administratively continued, however, because the Station submitted its permit application package in a timely manner. As a result, Pilgrim remains subject to the existing permit until EPA issues it a new one.

In the meantime, EPA has promulgated new regulations applicable to large existing power plants that govern the development of permit requirements under Section 316(b) of the Clean Water Act (CWA § 316(b)), which requires that the location, construction, capacity and design of cooling water intake structures reflect the best technology available (BTA) for minimizing adverse environmental impacts. These new CWA § 316(b) regulations addressing large existing power plants are referred to as the "Phase II Regulations," were published in the Federal Register on July 9, 2004, and became effective on September 7, 2004. *See* 40 C.F.R. Part 125, Subpart J. (The "Phase I Regulations" apply to new facilities and were promulgated in December 2001.) Pilgrim is subject to the Phase II Regulations based on the applicability provisions of 40 C.F.R. § 125.91.

The Phase II Regulations identify five different options from which a regulated facility may choose an approach for achieving compliance with the regulations. Permit application requirements vary based on the compliance alternative(s) selected and, for some facilities, include development of a Comprehensive Demonstration Study. *See* 40 C.F.R. § 125.95. The

Phase II Regulations establish performance standards for the reduction of impingement mortality and, under certain circumstances, for the reduction of entrainment (e.g., reduce impingement mortality by 80 to 95 percent, and reduce entrainment by 60 to 90 percent). The applicability of the performance standards is determined by several factors, including the type of water body on which the facility is located and the facility's capacity utilization rate. Under the rule, the performance standards can be met by design and construction technologies, operational measures, restoration measures, or some combination thereof. *See* 40 C.F.R. § 125.94 (discussion of compliance alternatives).

Information Submission Requirements, and the Determination of Permit Limits, Under the Phase II Regulations

As stated above, Pilgrim asks EPA to set a timetable for the Station's submission of the information required to apply for a permit that will include cooling water intake limits under the new Phase II Regulations. The new regulations authorize EPA to prescribe such a schedule, with certain restrictions. Setting timetables for information submissions under the Phase II Regulations is governed by 40 C.F.R. § 125.95(a)(2)(ii), which states the following:

> (ii) If your existing permit expires before July 9, 2008, you may request that the Director establish a schedule for you to submit the information required by this section as expeditiously as practicable, but not later than January 7, 2008. Between the time your existing permit expires and the time an NPDES permit containing requirements consistent with this subpart is issued to your facility, the best technology available to minimize adverse environmental impact will continue to be determined based on the Director's best professional judgment.

In this case, the Station's permit expired in 1996 and, as the Station acknowledges in its letter, it has not to date submitted all of the information required by the Phase II Regulations. Thus, under the terms of the above-quoted regulation, EPA can establish a schedule for the submission of the required information as soon as practicable, but no later than January 7, 2008.

This conclusion is further supported by the analysis provided by EPA in the "316(b) Phase II Implementation Question and Answer Document" (August 19, 2004), which is posted on the Agency's website (www.epa.gov/waterscience/316b). In Section 2 of that document, Question & Answer No. 3 explains how to address permitting circumstances like those of Pilgrim:

> Q3: The draft permit is proposed after the 316(b) Phase II rule takes effect. At the time of permit issuance, the facility has not submitted the comprehensive demonstration study and other information needed to determine limitations under the 316(b) Phase II rule. What is the basis for the 316(b) limitations in the permit?

A3: The 316(b) limitations in the proposed and final permit would be based on BPJ under authority of 40 C.F.R. § 125.95(a)(2)(ii). The permit would also need to include a schedule requiring the facility to submit the comprehensive demonstration study and other information required by 40 C.F.R. § 125.95 as expeditiously as practicable but not later than January 7, 2008.

This discussion confirms what the language of the regulation quoted above clearly states: that EPA may set a schedule requiring the Station to submit the information required by the Phase II Regulations as expeditiously as practicable but by no later than January 7, 2008.

Below EPA details a schedule with specific milestones for Pilgrim, but before presenting that schedule it is important to address whether a new NPDES may be issued to the Station in the interim period before the required information submissions and their review are completed. As per the Phase II Regulations, EPA may issue Pilgrim a new NPDES permit during this time period with § 316(b) permit limits based on best professional judgment (BPJ). As quoted above, 40 C.F.R. § 125.95(a)(2)(ii) provides, in pertinent part, that:

> Between the time your existing permit expires and the time an NPDES permit containing requirements consistent with this subpart is issued to your facility, the best technology available to minimize adverse environmental impact will continue to be determined based on the Director's best professional judgment.

The EPA Question & Answer Document quoted above also confirms that under these circumstances a permit's § 316(b) limits would be "based on BPJ under authority of 40 C.F.R. § 125.95(a)(2)(ii)." Furthermore, contrary to the apparent implication of Entergy's letter, there is nothing in the provisions of Pilgrim's current permit that would preclude development of a new permit with BPJ-based cooling water intake limits under CWA § 316(b), consistent with applicable law and regulation.

If EPA were to issue the Station a permit with BPJ-based § 316(b) limits, the Agency anticipates that the permit would also include an appropriate schedule by which the Station would be required to complete and submit the information required by the Phase II Regulations. The propriety of including such a schedule in the permit is also suggested by the Question & Answer quoted above.

EPA has not, however, presently determined whether it is likely to develop a new NPDES permit for Pilgrim soon enough that § 316(b) limits would be based on BPJ, or whether, instead, a new permit is likely to be delayed long enough that it will make more sense to await the information submissions required under the Phase II Regulations and to develop the permit's new § 316(b) limits on that information and the substantive requirements of the new regulations. Although the Station's permit expired in 1996 (i.e., approximately 8 years ago) and, ideally, EPA would like to issue a new permit expeditiously, the reality is that the Agency is faced with a significant backlog of expired NPDES permits requiring reissuance. These include many complex permits such as the Station's. EPA recognizes that it will be unable to issue all of these new permits in the near future and that it will have to choose which ones to address first. Whether or not EPA decides to issue Pilgrim's new permit in the relatively near-term based on a BPJ determination of § 316(b) limits will depend on a number of factors, including but not limited to:

- the existing permit's expiration date;
- the expected environmental benefits of a renewed permit;
- the amount and adequacy of the information available to serve as the basis for the renewed permit;
- the potential environmental impacts from the existing cooling water intake and associated pollutant discharges;
- economic and energy considerations;
- operational changes at your plant;
- technological considerations;
- the level of government resources needed to reissue your permit and competing work priorities for those resources; and
- an overall assessment of public interest.

EPA is currently assessing these factors in the context of your facility and will remain open to reconsidering these issues as time goes by and circumstances evolve. Further, EPA will communicate the results of this assessment to the Station when the Agency has determined how to proceed with respect to Pilgrim's new permit.

<u>**Schedule for Information Collection**</u>

Consistent with your request, this letter establishes a schedule by which Pilgrim can proceed to comply with the information collection and submission requirements of the CWA § 316(b) Phase II Regulations.

1. Pilgrim shall submit the Proposal for Information Collection (PIC) required by 40 C.F.R. §125.95(b)(1) as expeditiously as practicable and prior to the start of biological monitoring and/or information collection activities, but not later than October 7, 2006. *See* 69 Fed. Reg. 41631 (discussion of sequencing of submission of the PIC relative to submission of the Comprehensive Demonstration Study (CDS)). The PIC includes a description of the information that will be used to support the CDS. The Station shall submit its PIC to EPA prior to starting information collection activities, but it may initiate such activities prior to receiving comments on the PIC from EPA. *See* 40 C.F.R. §§ 125.95(a)(1) and (b)(1).

2. The Station shall submit a CDS pursuant to 40 C.F.R. § 125.95 as expeditiously as practicable, but not later than January 7, 2008. The purpose of the CDS is to characterize impingement mortality and entrainment by Pilgrim's cooling water intake structures, to describe the operation of the facility's cooling water intake structures, and to confirm that

the technologies, operational measures, and/or restoration measures already installed, or that the Station proposes to install, at the facility meet the applicable compliance requirements of 40 C.F.R. § 125.94.

3. Consistent with 40 C.F.R. § 125.95(a)(2), the Station shall also submit to EPA by January 7, 2008, the information required by 40 C.F.R. §§ 122.21(r)(2), (3) and (5), which includes:

    a) Source Water Physical Data
    b) Cooling Water Intake Structure Data
    c) Cooling Water System Data

4. In accordance with 40 C.F.R.§ 125.94, Pilgrim must select and implement, or have already implemented, one of the five compliance alternatives for providing the best technology available for minimizing adverse environmental impact at the Station. Beyond the PIC and the CDS, the particular studies and information that are required depend on which of the five compliance alternatives will be the basis of Pilgrim's permit. EPA requests that the Station submit a preliminary compliance alternative selection with its PIC (to be submitted no later than October 7, 2006) and a final compliance alternative selection with the CDS (to be submitted no later than January 7, 2008).

Additional Issues

Although EPA has agreed to Entergy's request to provide a schedule by which the information submissions required by the Phase II Regulations must be submitted for Pilgrim, certain of Entergy's arguments in favor of such a schedule bear a response by EPA.

One of the justifications provided by Pilgrim for its requested schedule for information submissions under the Phase II Regulations is that Entergy has not decided whether or not it will seek an extension of its current license from the Nuclear Regulatory Commission (NRC) authorizing Pilgrim's operations. Indeed, Entergy points out that it has asked the NRC to "defer" consideration of a license-extension request for Pilgrim. EPA asks that Entergy inform the Agency as to when Entergy expects that it will determine whether or not it plans to seek to extend the current NRC license for Pilgrim. Once Entergy makes that decision, EPA asks that Entergy also inform EPA regarding the nature of the decision.

Another justification offered by the Station for the requested schedule is that, according to Pilgrim, scientific evidence developed by its consultants indicate that the current cooling water intake structure as currently operated "is not likely to create an 'adverse environmental impact' to the representative fish populations." While EPA is reserving judgment on this claim by the Station, the Agency notes that it has interpreted the entrainment and impingement of fish and other marine organisms to constitute "adverse environmental impacts" under CWA § 316(b) regardless of the particular effect on "representative fish populations." *See Riverkeeper v. U.S.*

Environmental Protection Agency, 358 F.3d 174, 196-97 (2d Cir. 2004). Of course, the adverse impact would be more severe to the extent that measurable percentages of fish populations are being taken by an intake structure.

Finally, EPA is presently reserving comment and judgment on the several other issues that the Station touches on in its letter (e.g., the Station's winter flounder hatchery, questions concerning past correspondence related to Pilgrim's NPDES permit, and Entergy's possible challenge to the Phase II Regulations).

EPA looks forward to working with you on the development of a new NPDES permit for Pilgrim under the new CWA § 316(b) Phase II Regulations. If you have questions, please contact Sharon Zaya at 617-918-1995. (In addition, as always, you may have your attorneys contact Mark Stein of EPA Region 1's Office of Regional Counsel at 617-918-1077.)

Sincerely,

David M. Webster

David M. Webster
Manager, Massachusetts State Program Office
Office of Ecosystem Protection

cc. Glen Haas, MA DEP

EXHIBIT FOUR

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
JOHN F. KENNEDY FEDERAL BUILDING
BOSTON, MASSACHUSETTS 02203-0001

RECEIVED
AUG 28 1998

August 26, 1998

E.T. Boulette, PhD
Senior Vice President-Nuclear
Boston Edison
Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, MA 02360-5599

Re: Pilgrim Nuclear Power Station, NPDES Permit No. MA0003557,
Sampling of Service Salt Water System

Dear Dr. Boulette:

This letter is in response to your letter of October 3, 1997, relating to Boston Edison Company's (BECo) request to permanently substitute a daily-grab sampling procedure in place of the existing continuous chlorination sampling procedure for Pilgrim Nuclear Power Station's (PNPS) service salt water system (SSWS).

According to your letter, PNPS is requesting this change in sampling procedure for the following reasons:

- The use of continuous flow from the SSWS piping which supplies the continuous chlorination monitoring system has been noted to be a seismic integrity concern in accordance with the guidelines of the USNRC Generic Letter #89-13. This concern has been addressed by cutting and capping the pipes which constitute the SSWS/continuous chlorine monitor interface.

- Samples for permit compliance are taken in the SSWS prior to commingling the service water with the non-contact cooling water (NCCW). The system is not chlorinated unless, at a minimum, one (1) circulating water system (CWS) pump [which supplies approximately a 15:1 dilution ratio] is running; more often, however, two (2) CWS pumps (which supply approximately a 30:1 dilution ratio] are operating. Upon commingling with the NCCW, the chlorine (or TRO) concentration in the service water is reduced substantially below the permit effluent discharge limit of 0.1 ppm.

Based on the information you have provided and the existing NPDES permit limits and conditions, the requested change in sampling procedure will not cause any changes in the environmental impact of Discharge 010 or of Discharge 001. Therefore, EPA approves the change in sampling procedure on the condition that a minimum of two (2) grab samples are taken daily, when the service water system/discharge is in use.

EPA does not have the resources to immediately initiate the administrative procedures for this minor modification to the permit at this time; however, you may implement this change in operations at your convenience.

This approved change will be included in the next reissuance of the NPDES permit for PNPS.

Should you have any questions concerning this letter, please call Nick Prodany of my staff at 617-565-3513.

Sincerely,

Jane Downing

Jane Downing, Director
Massachusetts Office of Ecosystem Protection

cc: C. Chow, EPA
Roger Janson, EPA
Leigh Bridges, MA DMF
Robert Lawton, MA DMF
B. Firmin, MA DEP
Robert Anderson, BECo

EXHIBIT FIVE

Entergy

Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
600 Rocky Hill Road
Plymouth, MA 02360

Stephen J. Bethay
Director, Nuclear Assessment

ENV 1.10-005

April 20, 2010

U.S. Environmental Protection Agency
Water Enforcement, OES4-SMR
5 Post Office Square, Suite 100
Boston, MA 02109-3912

Massachusetts Department of Environmental Protection
Southeast Regional Office
20 Riverside Drive
Lakeville, MA 02347

Subject: Discharge Monitoring Report — March 2010
NPDES Permit Number MA0003557

Dear Sir or Madam:

Enclosed is the March 2010 Discharge Monitoring Report (DMR) for Pilgrim Nuclear Power Station, NPDES Permit Number MA0003557 (Federal) and Number 359 (State). Also included is a summary of the discharge data for the month with any notes or additional information (Attachment 1). During the time period March 1 through 31, 2010, there was one exceedance related to service water chlorination that is described in Attachment 1.

Should you have any questions about this report, please direct them to Mr. Joseph Egan, Chemistry Department (Environmental), Pilgrim Nuclear Power Station, (508) 830-8915.

Sincerely,

Stephen J Bethay

Stephen J. Bethay

JWE/

Attachments: 1. Summary – Additional Information for March 2010 DMR
2. Discharge Monitoring Report (completed DMR forms)

ATTACHMENT 1 to Letter ENV 1.10-005

Summary — Additional Information for March 2010 D.M.R.

Pilgrim Nuclear Power Station – Discharge Monitoring Report

In accordance with the Federal Clean Water Act, as amended (33 USC 1251 et seq.), and the Massachusetts Clean Water Act, as amended (M.G.L.; Chap. 21, 26-53), regarding effluent limitations, monitoring requirements and other conditions set forth in the Pilgrim NPDES permit (Federal Permit Number MA0003557 and State Permit Number 359), Parts I and II, the following information is submitted.

I. Discharge Points Covered in this Report

Outfall No.	Discharge Identification
001-1	Condenser Cooling Water (or Circ. Water System)
002-1	Thermal Backwash for Biofouling Control
003-A	Intake Screen Wash
004, 005, 006, and 007	Yard (Storm) Drains – Spring and Fall only
008-A	Sea Foam Suppression
010-A	Service Cooling Water (or Salt Service Water System)
011-A	Makeup Water and Demineralizer Waste Discharge (Neutralizing Sump or others)

II. Summary and Notes of Discharge Report

A. The flows from discharge points 001, 002, 003, 008 and 010 are calculated from estimated pump capacity and cumulative hours of pump operation. The flow from point 001 is estimated assuming a Circulating Water pump capacity of 155,000 GPM (as described in Pilgrim's "§308 Response" letter dated July 1, 2008 from Goodwin Procter to U.S. EPA). The flow from point 011 is estimated from the volume discharged.

B. The temperatures at points 001 and 002 are measured by resistance temperature detectors (RTDs) and compiled as one minute values.

C. Grab samples for the four storm water outfalls are to be collected and analyzed twice per year in accordance with 40 CFR 136. Semi-annual NPDES storm drain sampling was not scheduled to occur during this period.

D. During occasional periods of increased debris-loading in the intake cooling water, the sluice water from the traveling screens (point #003) is diverted to the discharge canal.

E. Chlorination of the condenser cooling water (discharge point #001) occurred on 8 days this month, for no more than 2 hours per day.

II. Summary and Notes of Discharge Report (continued)

F. The concentration of chlorine (or total residual oxidants, TRO) in the service water system exceeded the daily maximum limit on March 31, 2010. At 11:46 pm, the effluent concentration from outfall point 010 was determined to be 1.03 mg/L TRO, just over the limit of 1 mg/L. The chlorine (sodium hypochlorite) injection rate was immediately reduced when this result was obtained. Samples analyzed one hour later confirmed the chlorine level was back to normal (0.50 mg/L TRO at 12:55 am on April 1).

The elevated concentration is believed to have resulted from an unintentional change in one of the two chemical feed pumps' actual injection rate caused by a mechanical problem with the injection pump's control knob not being fully tight. While being manipulated, the frequency knob slipped on its shaft, which inadvertently allowed injection of too much hypochlorite, given what appeared to be the same pump setting that had previously yielded acceptable chlorine concentrations. Actions have been taken to preclude recurrence.

Because the service water system (outfall 010) empties into the main discharge canal, which had full flow from outfall 001, the dilution factor of 58:1 and subsequent chlorine decay effectively reduced or eliminated the residual chlorine concentration before the point of discharge into Cape Cod Bay. Therefore, no detrimental effects were expected due to this condition, and none were observed.

G. Follow up investigation of operation of the screenwash dechlorination system (discharge point #003), has concluded that the positive result for chlorine recorded on February 10, 2010 was an isolated incident. In addition to the routine sampling and analyses reported previously, testing conducted to examine initial component response showed that full and complete dechlorination of the screenwash water occurs immediately upon system start up.

ATTACHMENT 2

to Letter ENV1.10-005

COMPLETED

DISCHARGE MONITORING REPORT

FORMS

(6 pages of DMR Forms enclosed)

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME: ENGC - PILGRIM NUCLEAR POWER
ADDRESS: 600 ROCKY HILL ROAD
PLYMOUTH, MA 02360
FACILITY: PILGRIM NUCLEAR POWER STATION
LOCATION: 600 ROCKY HILL ROAD
PLYMOUTH, MA 02360
ATTN: David Noyes, Operations Mang.

MA0003557	001-1
PERMIT NUMBER	**DISCHARGE NUMBER**

	MONITORING PERIOD		
	MM/DD/YYYY		MM/DD/YYYY
FROM	03/01/2010	TO	03/31/2010

DMR Mailing ZIP CODE: 02360
MAJOR
(SUBR S)
CONDENSER COOLING WATER
External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Temperature, water deg. fahrenheit	SAMPLE MEASUREMENT	******	******	******	******	******	76.3	°F	0	99/99	RC
00011 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	******	102 DAILY MX	deg F		Continuous	RCORDR
Oxidants, total residual	SAMPLE MEASUREMENT	******	******	******	******	0.05	0.08	mg/L	0	Wh/Ds	GR
34044 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	.1 MO AVG	.1 DAILY MX	mg/L		When Discharging	GRAB
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	445.8	446.4	MGD	******	******	******	******	0	99/99	ES
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	447 MO AVG	510 DAILY MX	Mgal/d	******	******	******	******		Continuous	ESTIMA
Temp. diff. between intake and discharge	SAMPLE MEASUREMENT	******	******	******	******	******	28.3	°F	0	99/99	CA
61576 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	******	32 DAILY MX	deg F		Continuous	CALCTD

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE
David Noyes Operations Mgr.	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	DE Noyes	508	830 · 8117	04/19/2010
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA Code	NUMBER	MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

PH SHALL NOT VARY MORE THAN 0.5 PHSTANDARD UNITS FROM INTAKE WATER.SEE PERMIT PAGE 5 PARAGRAPHS M&N FOR BORON AND SODIUM NITRATE REPORTING REQUIREMENTS. ATTACH ALL RELATEDREPORTS TO THIS FORM. A BARRIERNET SHALL BE MAINTAINED AT THE THERMAL END OF DISCHARGE CANAL AT ALL TIMES.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME: ENGC - PILGRIM NUCLEAR POWER
ADDRESS: 600 ROCKY HILL ROAD
PLYMOUTH, MA 02360
FACILITY: PILGRIM NUCLEAR POWER STATION
LOCATION: 600 ROCKY HILL ROAD
PLYMOUTH, MA 02360
ATTN: David Noyes, Operations Mang.

MA0003557	002-1
PERMIT NUMBER	**DISCHARGE NUMBER**

	MONITORING PERIOD		
	MM/DD/YYYY		MM/DD/YYYY
FROM	03/01/2010	TO	03/31/2010

DMR Mailing ZIP CODE: 02360
MAJOR
(SUBR S)
THERMAL BACKWASH
External Outfall

No Discharge C

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Temperature, water deg. fahrenheit	SAMPLE MEASUREMENT	******	******	******	******	******		°F	0	99/99	RC
00011 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	******	120 DAILY MX	deg F		Continuous	RCORDR
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	******		MGD	******	******	******	******	0	Wh/Ds	ES
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	******	255 DAILY MX	Mgal/d	******	******	******	******		When Discharging	ESTIMA

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE
David Noyes Operations Mgr.	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	DE Noyes	508	830-8117	04/19/2010
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA Code	NUMBER	MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

THE PH SHALL NOT VARY MORE THAN 0.5 STANDARD UNITS FROM THAT OF THE INTAKE WATER. FLOW RATE IS TO BE ESTIMATED AS IF BACKFLUSHING TOOK PLACE FOR 24 CONTINOUS HOURS. SEE PERMIT PAGE 8 FOR CONDITIONS REGARDING THE FREQUENCY OF DISCHARGE.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

DISCHARGE MONITORING REPORT (DMR)

Form Approved
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME: ENGC - PILGRIM NUCLEAR POWER
ADDRESS: 600 ROCKY HILL ROAD
PLYMOUTH, MA 02360
FACILITY: PILGRIM NUCLEAR POWER STATION
LOCATION: 600 ROCKY HILL ROAD
PLYMOUTH, MA 02360
ATTN: David Noyes, Operations Mang.

MA0003557	003-A
PERMIT NUMBER	**DISCHARGE NUMBER**

	MONITORING PERIOD		
	MM/DD/YYYY		MM/DD/YYYY
FROM	03/01/2010	TO	03/31/2010

DMR Mailing ZIP CODE: 02360
MAJOR
(SUBR S)
INTAKE SCREEN WASH
External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	2.0	3.2	MGD	******	******	******	******	0	01/01	ES
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	4.1 MO AVG	4.1 DAILY MX	Mgal/d	******	******	******	******		Daily	ESTIMA

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE
David Noyes Operations Mgr.	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	D E Noyes	508	830-8117	04/19/2010
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA Code	NUMBER	MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

THE TEMPERATURE OF THIS DISCHARGE SHALL AT NO TIME EXCEED THE TEMPERATURE OF THE INTAKE WATER.ALL FISH SHELLFISH AND OTHER ORGANISMS COLLECTED OR TRAPPED ON INTAKESCREEN SHOULD BE RETURNED TO WATEROF AMBIENT TEMP. SUFFICIENTLY DISTAN FORM INTAKE STRUCTURES TO PREVENT REIMPINGEMENT.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME: ENGC - PILGRIM NUCLEAR POWER
ADDRESS: 600 ROCKY HILL ROAD
PLYMOUTH, MA 02360
FACILITY: PILGRIM NUCLEAR POWER STATION
LOCATION: 600 ROCKY HILL ROAD
PLYMOUTH, MA 02360
ATTN: David Noyes, Operations Mang.

MA0003557	008-A
PERMIT NUMBER	**DISCHARGE NUMBER**

	MONITORING PERIOD		
	MM/DD/YYYY		MM/DD/YYYY
FROM	03/01/2010	**TO**	03/31/2010

DMR Mailing ZIP CODE: 02360
MAJOR
(SUBR S)
SEA FOAM SUPRESSION DISCHARGE
External Outfall

No Discharge C

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Flow, in conduit or thru treatment plant	**SAMPLE MEASUREMENT**			MGD	******	******	******	******	0	01/01	ES
50050 1 0 Effluent Gross	**PERMIT REQUIREMENT**	.73 MO AVG	.73 DAILY MX	Mgal/d	******	******	******	******		Daily	ESTIMA

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE
David Noyes Operations Mgr.	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	D E Noyes	508	830-8117	04/19/2010
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA Code	NUMBER	MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME: ENGC - PILGRIM NUCLEAR POWER
ADDRESS: 600 ROCKY HILL ROAD
PLYMOUTH, MA 02360
FACILITY: PILGRIM NUCLEAR POWER STATION
LOCATION: 600 ROCKY HILL ROAD
PLYMOUTH, MA 02360
ATTN: David Noyes, Operations Mang.

MA0003557	010-A
PERMIT NUMBER	**DISCHARGE NUMBER**

	MONITORING PERIOD		
	MM/DD/YYYY		**MM/DD/YYYY**
FROM	03/01/2010	**TO**	03/31/2010

DMR Mailing ZIP CODE: 02360
MAJOR
(SUBR S)
PLANT SERVICE COOLING WATER
External Outfall

No Discharge ☐

PARAMETER		**QUANTITY OR LOADING**			**QUALITY OR CONCENTRATION**				**NO. EX**	**FREQUENCY OF ANALYSIS**	**SAMPLE TYPE**
		VALUE	**VALUE**	**UNITS**	**VALUE**	**VALUE**	**VALUE**	**UNITS**			
Oxidants, total residual	**SAMPLE MEASUREMENT**	******	******	******	******	0.27	1.03	mg/L	1	02/01	GR
34044 1 0 Effluent Gross	**PERMIT REQUIREMENT**	******	******	******	******	.5 MO AVG	1 DAILY MX	mg/L		Continuous	RCORDR
Flow, in conduit or thru treatment plant	**SAMPLE MEASUREMENT**	9.3	******	MGD	******	******	******	******	0	99/99	ES
50050 1 0 Effluent Gross	**PERMIT REQUIREMENT**	19.4 MO AVG	******	Mgal/d	******	******	******	******		Continuous	ESTIMA

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			**TELEPHONE**		**DATE**
David Noyes Operations Mgr.	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	D E Noyes	508	830-8117	04/19/2010
TYPED OR PRINTED		**SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT**	**AREA Code**	**NUMBER**	**MM/DD/YYYY**

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

CONTINOUS CHLORINATION OF SERVICE WATER SYSTEM MAY BE USED FOR MACROINVERTEBRATE CONTROL. FLOW RATE SHALL BE ESTIMATED FROM PUMP CAPACITY CURVES AND OPERATIONAL HOURS.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME: ENGC - PILGRIM NUCLEAR POWER
ADDRESS: 600 ROCKY HILL ROAD
PLYMOUTH, MA 02360
FACILITY: PILGRIM NUCLEAR POWER STATION
LOCATION: 600 ROCKY HILL ROAD
PLYMOUTH, MA 02360
ATTN: David Noyes, Operations Mang.

MA0003557	011-A
PERMIT NUMBER	**DISCHARGE NUMBER**

	MONITORING PERIOD		
	MM/DD/YYYY		**MM/DD/YYYY**
FROM	03/01/2010	**TO**	03/31/2010

DMR Mailing ZIP CODE: 02360
MAJOR
(SUBR S)
MAKE UP WATER AND DEMINERALIZE
External Outfall

No Discharge C

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Solids, total suspended	SAMPLE MEASUREMENT	******	******	******	******			mg/L	0	01/Ba	GR
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	30 MO AVG	100 DAILY MX	mg/L		Once Per Batch	GRAB
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT			MGD	******	******	******	******	0	Wh/Ds	ES
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	.015 MO AVG	.06 DAILY MX	Mgal/d	******	******	******	******		When Discharging	ESTIMA

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE
David Noyes Operations Mgr.	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	DE Noyes	508	830 · 8117	04/19/2010
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA Code	NUMBER	MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

SEE PAGE 5 OF PERMIT PARAGRAPH N FOR SODIUM NITRATE REPORTING REQUIERMENTS. ATTACH ALL RELATED REPORTSTO THIS FORM

EXHIBIT SIX

Pilgrim Nuclear Power Station:

Circulating Water System ("CWS") and (Salt) Service Water System ("SWS"), and Fish Sluice Water ("FSW") Chlorination Exceedances for 2002-2011[1]

Date	System	Maximum Concentration
05/25/2002	FSW	<0.1 mg/l*
11/11/2002	FSW	0.12 mg/l
2/3/2005	CWS	0.18 mg/l
1/5/2006	FSW	0.08 mg/l
2/2/2006	FSW	1.1 mg/l
7/19/2006	FSW	<0.5 mg/l*
8/16/2006	FSW	<0.5 mg/l*
8/16/2006	SWS	1.05 mg/l
9/20/2006	FSW	<0.4 mg/l*
10/15/2006	FSW	<0.5 mg/l*
2/19/2008	SWS	1.25 mg/l
1/27/2009	FSW	0.38 mg/l
2/10/2010	FSW	0.74 mg/l

[1] Exceedances are based on a review of Discharge Monitoring Reports ("DMRs") submitted monthly to the United States Environmental Protection Agency ("USEPA") and Massachusetts Department of Environmental Protection ("MADEP") between 2002-2011.

3/31/2010	SWS	1.03 mg/l
10/29/2010	FSW	0.22 mg/l
11/27/2010	SWS	2.4 mg/l
4/5/2011	SWS	1.3 mg/l
7/20/2011	SWS	1.15 mg/l
12/14/2011	CWS	0.14 mg/l

* Estimated concentrations.

EXHIBIT SEVEN

Boston Edison
Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360

E. T. Boulette, PhD
Senior Vice President -- Nuclear

October 25, 1995
5.95.088

Mr. Kevin McSweeney, Chief
Compliance Branch
U. S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Attn: Ms. Olga Vergara

Re: NPDES Permit Renewal Application
Pilgrim Station

Dear Mr. McSweeney:

In accordance with the Consolidated Permits Regulations under Title 40, Code of Federal Regulations, Parts 122, 123, 124 and 125 (Revised July 1, 1994), Boston Edison is applying for renewal of our National Pollutant Discharge Elimination System (NPDES) Permit under the Clean Water Act using Forms 1 and 2C of the consolidated permits application forms at Pilgrim Nuclear Power Station (NPDES #MA0003557). Comments are noted below:

1) Similar to Boston Edison Company's previous permit application in 1990 for our current Pilgrim Station NPDES Permit, the following requests and information are provided regarding this renewal application:

   A. Outfalls 001 (Condenser Cooling Water), 002 (Thermal Backwash), and 010 (Plant Service Cooling Water) are once-through discharge points whose sole source of water is the Cape Cod Bay. Therefore, we believe that they should be classified as identical outfalls. Outfalls 003 (Intake Screen Wash) and 008 (Sea Foam Suppression) utilize Cape Cod Bay water and/or Plymouth town water stored as Pilgrim Fire Water. For the pollutants listed in Parts B and C of Item V, we believe that, except for ambient levels, they are generally not present for these discharge points. Therefore, we would like the sampling requirements for these pollutants, at these outfalls, generally suspended. It is also requested that sampling/ analysis be waived for BOD, COD, TOC, TSS and ammonia at 001, 002, 003, 008 and 010 outfalls because they are non-process industrial discharge whose water source is classified as SA quality or potable water and are, therefore, not expected to influence these parameters.

B. For outfall numbers 001, 002, 003, 008 and 010, limited analyses were performed. For outfall number 001, the discharge is only treated with chlorine which is required to be monitored and not exceed 0.1 ppm TRC. Similarly, nothing is chemically added to 002 or 008, only sodium thiosulfate is added to 003 as a dechlorination agent, and only chlorine is added to 010 with chlorination monitoring required to maintain permit limits of 0.5 ppm daily average and 1.0 ppm daily maximum TRC, prior to mixing with condenser cooling waters. Analyses for cobalt, iron and titanium were performed for outfall numbers 001, 002 and 010 because there was a possibility of these constituents being present. An analysis for sulfate was performed for outfall number 003 because of the sodium thiosulfate addition. Protocol references and sampling strategies are noted in Attachment A.

C. For all outfalls in Item V Parts B and C, we have marked an "X" in the "believed present" or "believed absent" column for pollutant.

D. All temperature and pH data were taken from actual operating data rather than from grab samples.

2) The following changes have been adopted in the permit since the last application:

A. A modification of the Pilgrim Station NPDES permit was approved and issued effective August 30, 1994, containing various discharge changes.

B. A letter from EPA to Boston Edison dated June 30, 1995, approved the use of Tolytriazole, a corrosion inhibitor, in various Pilgrim Station systems.

C. Via telecon between the EPA and Boston Edison on December 16, 1994, (BECo Telecon #4.94.038), approval was granted to use Pilgrim Station storm drain #007 for the intermittent discharge of untreated seawater from the condenser scavenger tank.

3) Boston Edison requests that the five storm drains, Outfalls 004, 005, 006, 007, and a miscellaneous storm drain, be covered under the NPDES General Permit for Storm Water Discharges Associated with Industrial Activity (Permit No. MAR000000) upon expiration of the current NPDES permit. The Massachusetts Department of Environmental Protection has formally determined that the storm water discharges at the facility can be covered under the General Permit per the September 11, 1995, letter from Paul Hogan (Attachment B). Two days prior to expiration of the current NPDES permit, a Notice of Intent (NOI) will be submitted to EPA per Part II of the Preface of the General Permit.

A. The miscellaneous storm drain located at the boat launch between Outfalls 006 and 007 was noted during a recent site visit. It drains a small portion of the facility which is similar to the drainage areas for Outfalls 004, 005, 006 and 007. Stormwater runoff from the miscellaneous outfall is expected, therefore, to be similar to runoff from the other four outfalls.

4) The impacts associated with the Pilgrim Station 316(a) and 316(b) demonstration document (July 1975) and supplement (September 1977), submitted in conformance with Federal Water Pollution Control Act (The Clean Water Act), have not changed significantly.

5) Pilgrim Station discharges in the coastal zone comply with the policies of the Massachusetts approved coastal management program and will be conducted in a manner consistent with such policies.

I trust that these additional comments will meet your requirements and that our application is complete.

If you have any questions, please contact Mr. Robert D. Anderson of my staff at (508) 830-7935.

E T Boulette

E. T. Boulette, PhD
Senior Vice President - Nuclear

cc: Mr. Paul Hogan
Massachusetts Department of Environmental Protection
Regulatory Branch - 7th Floor
One Winter Street
Boston, MA 02108

Mr. Rick Zeroka
Massachusetts Coastal Zone Management
100 Cambridge Street, Floor 20
Boston, MA 02202

U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Senior Resident Inspector, Pilgrim Station

EXHIBIT EIGHT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

June 30, 1995

E.T. Boulette, PhD
Senior Vice President - Nuclear
Boston Edison
Pilgrim Nuclear Power Station
Rocky Point Road
Plymouth, Massachusetts 02360

Re: Pilgrim Nuclear Power Station (PNPS),
NPDES Permit No. MA0003557
Use of Tolytriazole as a Corrosion Inhibitor

Dear Dr. Boulette:

In your letter of May 22, 1995, you have requested approval to add Tolytriazole, a corrosion inhibitor, to the reactor building and turbine building closed cooling-water systems; station-heating and the emergency diesel generator cooling-water systems. This material has been recommended for use by the Institute of Nuclear Power Operations (INPO) for corrosion control of copper alloys.

Initial conditioning of the cooling systems would require a Tolytriazole maximum concentration 20 mg/l, after which concentrations would be maintained at 2 mg/l. The maximum concentration would be in the neutralizer sump.

At the facility, Tolytriazole would be discharged from PNPS' Outfall 011 only during scheduled plant outages, and during any unplanned system maintenance evolutions. In a "worst-case scenario", 200 GPM (maximum flow) of the Tolytriazole effluent would be diluted with 1500 GPM (minimum flow) of service water, prior to discharge to Cape Cod Bay. The Tolytriazole concentration of the effluent would be approximately 2.35 mg/l. If one of the circulating water pumps is operational during an outage, the Tolytriazole discharge would further be diluted with 155,000 GPM of Bay water, yielding an effective Tolytriazole discharge concentration of 0.03 mg/l.

Acute and chronic toxicity testing results in the vendor's Material Safety Data Sheets (MSDS) on Tolytriazole [or COBRATEC, TT-50-S], indicate that the Tolytriazole concentration in a "worst-case scenario" discharge is below both the acute and chronic toxicity levels.

Based on actual acute and chronic toxicity testing results, the "worst-case scenario" discharge concentrations, additional dilution from the circulating water pump, the use of Tolytriazole is approved at the requested dosage rate. Any change in the dosage rate or active ingredient concentration must be approved by EPA and the State prior to usage.

Should you have any questions, please contact Nick Prodany of my staff at 617-565-3587.

Sincerely,

Edward K. McSweeney

Edward K. McSweeney, Chief
Wastewater Management Branch

cc: R. Anderson, PNPS
Paul Hogan, MA DEP
S. Silva, EPA
Region I, NRC
Document Control Desk, NRC

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
Entergy Nuclear Generation Company and	)	Docket No. 50-293-LR
Entergy Nuclear Operations, Inc.	)	ASLBP No. 06-848-02-LR
	)	
(Pilgrim Nuclear Power Station)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of Entergy's Answer Opposing Jones River Watershed Association's and Pilgrim Watch's Motion to Reopen and Hearing Request on Contention Related to the Roseate Tern, dated May 16, 2012, was provided to the Electronic Information Exchange for service on the individuals below, this 16th day of May, 2012.

Secretary
Att'n: Rulemakings and Adjudications Staff
Mail Stop O-16 C1
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
hearingdocket@nrc.gov

Office of Commission Appellate Adjudication
Mail Stop O-16 C1
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
OCAAmail@nrc.gov

Administrative Judge
Ann Marshall Young, Esq., Chair
Atomic Safety and Licensing Board
Mail Stop T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
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Atomic Safety and Licensing Board
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June 25, 2012

VIA COURIER

Bruce K. Carlisle
Director
Massachusetts Office of Coastal Zone
Management
251 Causeway Street, Suite 800
Boston, MA 02114

Re: **Entergy's Response to Jones River Watershed Association's and Pilgrim Watch's June 15, 2012 Letter Concerning MOCZM's License Renewal Concurrence for Pilgrim Nuclear Power Station (Plymouth, MA)**

Dear Director Carlisle:

We write on behalf of Entergy Nuclear Generating Company and Entergy Nuclear Operations, Inc. (collectively, "Entergy") regarding Jones River Watershed Association's and Pilgrim Watch's (collectively, "JRWA") June 15, 2012 self-styled request for reconsideration (the "Request") to the Massachusetts Office of Coastal Zone Management ("MOCZM"), which is attached as Exhibit A.

In its Request, JRWA contends that MOCZM must reconsider its May 21, 2012 decision not to reopen its July 11, 2006 federal consistency concurrence (the "2006 License Renewal Concurrence") for Pilgrim Nuclear Power Station's ("Pilgrim") license renewal application to the Nuclear Regulatory Commission ("NRC"). JRWA claims that MOCZM "abus[ed] its discretion" in declining to credit the "*prima facie* evidence" of reopener contained in JRWA's April 4, 2012 correspondence ("April 4th Letter") – a four-page list of unsubstantiated, often facially erroneous allegations submitted to MOCZM more than six years after the conclusion of MOCZM's public notice and comment period.[1] JRWA's new Request – like the preceding April 4th Letter – is legally infirm, procedurally incorrect, and substantively without merit. Thus, as set forth below to ensure an accurate agency record, the Request should be denied.

[1] Entergy addressed – and roundly dispelled – each of JRWA's substantive claims in its correspondence of April 11, 2011 (the "April 11th Response"), which is attached as Exhibit B. To the extent JRWA's latest submission repeats or relies on those same claims, Entergy respectfully refers MOCZM to Entergy's April 11th Response.

I. Supplemental Coordination Is Unauthorized Here.

JRWA's request for "reopener" or supplemental coordination is without legal basis. Ex. A at 1-2. With the benefit of MOCZM's concurrence, the NRC issued to Pilgrim a *new* license (effective June 8, 2012) under which Pilgrim now operates. As a result, the standards for supplemental coordination referenced under 15 C.F.R. § 930.66, which apply only to federal license activities "which have *not yet begun*," no longer apply here (emphasis added).[2] For this reason alone, JRWA's Request must fail.

Moreover, even if the standards for supplemental coordination in § 930.66 were applicable, were satisfied, and MOCZM requested NRC to engage in supplemental coordination (none of which is the case), MOCZM would be required to support such a request with "information supporting a finding of substantially different coastal effects than originally described." 15 C.F.R. § 930.66(b). JRWA has utterly failed to demonstrate "substantially different coastal effects than originally described." To the contrary, JRWA's Request is comprised essentially of repurposed legal arguments—not new factual evidence showing substantially different coastal effects. For these reasons, JRWA's Request again must fail.

Finally, JRWA is simply wrong in contending that Entergy's April 11th Response addressed only the issue of whether supplemental coordination is required under 15 C.F.R. § 930.66(a)(1) ("changes in the proposed activity"), not whether such coordination may be required under 15 C.F.R. § 930.66(a)(2) ("significant new circumstances or information relevant to the proposed activity and the proposed activity's effect on any coastal use or resource."). Ex. A at 1-2. Neither standard is applicable here, as Entergy's April 11th Response establishes. Ex. B at 4.

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2 Instead, "remedial action" may be requested by MOCZM if the federally-licensed activity "is being conducted or is having an effect on any coastal use or resource substantially different than originally described and, as a result, is no longer consistent with the management program." 15 C.F.R. § 930.65(b)(1) and (d). Here, Entergy fully intends to operate in accordance with the approved activity as described in its NRC license, and Entergy also intends to comply with its approved CZMA certification. Accordingly, there are no grounds under § 930.65 to justify a request for remedial action. Moreover, the federal agency is entitled to rely on the "federal law effect" of the State agency consistency concurrence even if that State agency consistency concurrence is subsequently invalidated by a State court. *See, e.g., City of Tacoma v. FERC*, 460 F.3d 53, 69-70 (D.C. Cir. 2006) (federal license issued in reliance on state agency's issuance of CZMA concurrence was valid, even though concurrence was later set aside).

II. Entergy Possesses All Necessary State Permits For Operation.

JRWA also contends that Pilgrim lacks "all necessary state permits" required under MOCZM's regulations, claiming "[Pilgrim's] . . . joint state-federal [NPDES] permit and the state § 401 water quality certification for the permit are not valid, current permits." Ex. A at 2; *see also id.* at 3 n.3 (describing Pilgrim's NPDES permit as "now-expired"). Setting aside that JRWA offers no legal tenet that MOCZM consistency concurrences require current, valid permits,[3] JRWA is patently incorrect about Pilgrim's permit status.

To be clear, Pilgrim's NPDES permit, which expressly and necessarily authorizes Pilgrim's current cooling water intake structure ("CWIS"),[4] is in fact current and effective, i.e., has not expired. Because Pilgrim submitted timely and sufficient applications for renewal of its joint NPDES permit to both USEPA and MDEP,[5] its existing permit remains in full force and effect under both federal and state law until a new permit is issued. *See, e.g.*, 5 U.S.C. § 558(c) ("When the licensee has made timely and sufficient application for a renewal or a new license in accordance with agency rules, a license with reference to an activity of a continuing nature *does not expire* until the application has been finally determined by the agency." (emphasis added)); G. L. c. 30A, § 13 ("If a licensee has, in accordance with any law and with agency regulations, made timely and sufficient application for a renewal, his license *shall not expire* until his application has been finally determined by the agency." (emphasis added)). Thus, as Massachusetts's highest court has recognized, Pilgrim's joint NPDES permit "continues in force until a new permit is issued." *Entergy Nuclear Generation Co. v. Dep't of Envtl. Prot.*, 459 Mass. 319, 321 n.7 (2011).

JRWA's claim that Pilgrim somehow lacks a "valid, current" § 401 water quality certification ("WQC") is likewise disingenuous. In fact, Pilgrim possesses multiple WQCs, each by itself

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[3] NOAA regulations provide that "[n]ecessary data and information *may* include completed State or local government permit applications ..., *but shall not include the issued State or local permits*." 15 C.F.R. § 930.58(a)(2) (emphasis added). Beyond that, it is MOCZM, *not* JRWA, that gets to decide if the applicant's consistency certification is supported by the "necessary data and information," and MOCZM may elect to waive that requirement altogether. *See* 15 C.F.R. § 930.60(a)(2).

[4] *See* Joint Discharge Permit, ¶ A.1.i (Exhibit C) ("It has been determined that the circulating water intake structures presently employs [*sic*] the best technology available for minimizing adverse environmental impact."). Thus, there is no merit to JRWA's insinuation that Pilgrim's CWIS is not authorized. *See* Ex. A at 2.

[5] Both agencies acknowledged their receipt and acceptance of these renewal applications. *See* Letter from Jane Downing, USEPA, to E.T. Boulette, Boston Edison Co., dated March 1, 1996 ("[T]he NPDES permit for Pilgrim ... will remain in effect ..., since you have filed a timely and complete application.") (Exhibit D); Letter from William J. Dunn, Jr., MDEP., to Robert D. Anderson, Boston Edison Co., dated March 4, 1996 ("[MDEP] ... have determined that all the application requirements have been fulfilled."). (Exhibit E).

sufficient to satisfy § 401's requirements. *See* 33 U.S.C. § 1341(a)(1). First, as JRWA acknowledges, *see* Ex. A at 3 & n.3, the Commonwealth issued WQCs in 1970 and 1971, both of which reflect the Commonwealth's receipt of reasonable assurance that Pilgrim's operations will not violate applicable Massachusetts water quality standards ("MWQS"). Neither of these certifications has any expiration date under state or federal law, and JRWA fails to cite any authority suggesting otherwise. Indeed, the plain language of § 401(a)(3) makes clear that any "certification obtained pursuant to [§ 401(a)(1)] with respect to the construction of any facility shall fulfill the requirements of this subsection with respect to certification in connection with any other Federal license or permit required for the operation of such facility unless" *the state* notifies the federal agency within the required time period that its prior certification is no longer good. 33 U.S.C. § 1341(a)(3). Massachusetts has taken no such action.

Moreover, JRWA overlooks that Pilgrim's joint NPDES permit independently satisfies the certification requirement under § 401(a)(1), because it explicitly reflects Pilgrim's continued compliance with MWQS.[6] *See* Joint Discharge Permit, Part I, ¶¶ A.1.c and D.2; *id.*, Part II, ¶¶ A.1, A.4 and D.2 (Exhibit C). That NPDES permit also is supported by yet a third § 401 WQC, dated July 8, 1994, which certifies that the conditions specified in the permit "will achieve compliance with sections 208(e), 301, 302, 303, 306, and 307 of the [Clean Water Act], and with the provisions of the Massachusetts Clean Water[s] Act, [G. L. c. 21, §§ 26-53]." Letter from Andrew Gottlieb, MDEP, to Edward K. McSweeney, USEPA, dated July 8, 1994 (Exhibit F).

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6 JWRA's assertion that "[t]he last federal Clean Water Act ("CWA") §§316(a) and (b) demonstration reports accepted by the state and/or USEPA for PNPS were done in the 1970s" is simply false. Ex. A at 3. On April 1, 2000, Entergy submitted a § 316 Demonstration that evaluated potential impacts associated with its CWIS and thermal discharges. In addition, on October 6, 2006, Entergy submitted a Proposal for Information Collection ("PIC") to USEPA and MDEP further addressing CWIS considerations at Pilgrim. In 2008, Entergy submitted to USEPA and MDEP extensive technical documentation in response to USEPA's request for information under CWA, § 308 relating specifically to CWIS considerations at Pilgrim, including four separate reports: (1) Adverse Environmental Impact Assessment for Pilgrim Nuclear Power Station; (2) Engineering Response to United States Environmental Protection Agency CWA § 308 Letter—Pilgrim Nuclear Power Station, Plymouth, Massachusetts; (3) Economic Assessment of Fish Protection Alternatives at Pilgrim Nuclear Power Station; and (4) Entrainment and Impingement Studies Performed at Pilgrim Nuclear Power Station, Plymouth, Massachusetts from 2002 to 2007. Collectively, the analyses in these reports document the absence of material aquatic impacts associated with thermal discharges from the Station, and conclude that the operation of Pilgrim's CWIS had not resulted, and is not expected to result, in an adverse environmental impact to the aquatic ecosystem in the vicinity of the Station as a result of impingement or entrainment. Indeed, these conclusions mirror those in USEPA's 2004 facility-specific assessment of Pilgrim which concluded that no additional CWIS technology is required to bring Pilgrim into compliance with § 316(b). *See* 69 Fed. Reg. 41576, 41646, 41677 (July 9, 2004) (Pilgrim is among facilities that "already meet otherwise applicable performance standards based on existing technologies and measures"). Copies of all of these documents will be provided upon request. Thus, not only is there ample technical information from 2000, 2006 and 2008, but all of that information supports the continued operation of Pilgrim in its current configuration.

Thus, just as there is no merit to JRWA's arguments that Pilgrim's NPDES permit is invalid, its claim that Pilgrim lacks a valid WQC is likewise baseless, providing no credible basis for "reopener."

III. Federal Law Precludes MOCZM's Regulation of Radionuclides at Pilgrim.

JRWA also contends that MOCZM can and must regulate purported "radiological considerations" associated with Pilgrim operations. *See* Ex. A at 3-4. Yet, JRWA does not seriously contest the general proposition that federal law (specifically, the Atomic Energy Act of 1954 ("AEA")) preempts state regulation of radionuclides associated with the construction or operation of nuclear power plants, a principle supported by four decades of federal case law and discussed at length in Entergy's April 11th Response. *See* Ex. B at A-7 to -8; *see, e.g.*, *Pac. Gas & Elec. Co. v. State Energy Res. Conservation & Dev. Comm'n*, 461 U.S. 190, 212-13 (1983); *Illinois v. Kerr-McGee Chem. Corp.*, 677 F.2d 571, 581 (7th Cir. 1982); *N. States Power Co. v. Minnesota*, 447 F.2d 1143, 1149-50 (8th Cir. 1971), *aff'd*, 405 U.S. 1035 (1972).

JRWA is thus left with little else but its position that "under Massachusetts'[s] agreement with the NRC, the NRC has explicitly relinquished to the Commonwealth the authority to ensure that Entergy's discharges of radioactive byproduct materials are not inconsistent coastal zone and coastal uses under the CZMA." Ex. A at 4; *see also id.* at 4 n.4 (claiming that "NRC relinquished to the Commonwealth regulatory authority over 'byproduct materials as defined by Section 11e.(a) of the [Atomic Energy] Act.'"). That position is clearly wrong, resting on either a misreading or a misrepresentation of the very Memorandum of Understanding ("MOU") that JRWA cites, which it tellingly chose not to attach to its Request. Specifically, in quoting from the MOU, *see id.* at 4 n.4, JRWA neglects to address the limiting language that precedes the quotation, which makes clear that the quoted provision is "subject to exceptions provided in Article II, III and IV." MOU, art. I, at 2 (Exhibit G). Among those "exceptions" is that the MOU "does not provide for the discontinuance of any authority and [that] the [NRC] shall retain authority and responsibility with respect to the regulation of . . . [t]he construction and operation of any production or utilization facility," a category that clearly includes Pilgrim; "[t]he disposal into the ocean or sea of byproduct, source, or special nuclear waste materials" as defined in NRC regulations and orders; and "[t]he disposal of such other byproduct, source, or special nuclear material as [NRC] from time to time determines by regulation or order should . . . not be so disposed of without a license from [NRC]." *Id.*, art. II(A), (C), and (D), at 3. The MOU thus flatly belies JRWA's claim that alleged radioactive discharges from Pilgrim are "something that the NRC is not, in fact, regulating in Massachusetts." Ex. A at 4, and shows all the more strongly that MOCZM appropriately declined JRWA's invitation to regulate activities clearly beyond its purview as a matter of federal law.[7]

IV. JRWA Misrepresents NMFS's Findings.

In its Request, JRWA similarly misreads or mischaracterizes the May 17, 2012 response of the National Marine Fisheries Service ("NMFS") to the NRC's request for informal consultation under § 7 of the Endangered Species Act ("ESA"), 16 U.S.C. § 1536, which JRWA also chose not to attach for MOCZM's independent consideration. Specifically, JRWA lifts two brief snippets from NMFS's 32-page response, and suggests based on those sound bites that NMFS "implicitly concluded that Entergy's radioactive effluent releases may affect endangered species such as Atlantic sturgeon, whales and sea turtles." [8] Ex. A at 5.

Curiously, JRWA omits the remainder of NMFS's findings, which were that Pilgrim's continued operation would have only "insignificant or discountable" effects to listed species, and thus "is not likely to adversely affect" them. NMFS Letter at 2, 30 (Exhibit H). Further, NMFS made clear that, in its review of the "most recent" REMP samples, none "indicated any detectable radioactivity attributable to Pilgrim Station operations," suggesting "that despite the discharge of radioactive effluent from Pilgrim during these years, this low level of radioactivity is not detectable in the environment above background levels." *Id.* at 27. Moreover, "[n]o radioactivity attributable to Pilgrim was detected in any of the [fish] samples collected during 2008-2010, and results of any detectable naturally occurring radioactivity were similar to those observed in the preoperational monitoring program." *Id.* While NMFS noted that "no whales,

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7 JRWA appears to argue that Pilgrim has waived the preemptive effect of the AEA by failing to raise preemption challenges to the Massachusetts Department of Public Health's monitoring requirements under the Commonwealth's Radioactive Materials Program. *See* Ex. A at 4. Pilgrim has not suggested that the Commonwealth is immune from the preemptive effect of NRC's jurisdiction. In any event, JRWA operates under the mistaken premise that AEA preemption may be waived by voluntary compliance with state regulatory programs, a proposition that is (correctly) rejected by one of its own cited cases. *See Me. Yankee Atomic Power Co. v. Bonsey*, 107 F. Supp. 2d 47, 50 (D. Me. 2000) ("even if [nuclear facility owners] purported to 'waive' federal authority, the state would not thereby obtain any ability to regulate in those areas since Congress has reserved that power to itself").

8 JRWA's reading of NMFS's response demonstrates its unfamiliarity with the law in this area. Under § 7 of the ESA, there is no latitude for NMFS to "implicitly conclud[e]" that radionuclide releases (or any other activity) may affect listed species. Under the ESA regulations, NRC can determine that the proposed activity has "no effect" on listed species, in which case no further review necessary, or that the activity "may effect" listed species, in which case an informal consultation may be undertaken to determine whether the action: 1) "may effect, but is not likely to adversely affect" listed species, in which case, upon concurrence of NMFS, no further action is required; or 2) "may affect and is likely to adversely affect" listed species, in which case a formal consultation is undertaken with NMFS to determine whether the proposed action is likely to jeopardize the continued existence of the species. *See* 50 C.F.R. §§ 402.12-14. There are no other options.

sea turtles or Atlantic sturgeon have been tested to determine levels of radionuclides," it observed that "no samples of *any species* have detected radionuclides attributed to Pilgrim," and reasonably concluded, based on those results, that "similar results would be seen if these listed species were sampled," and that "radiological impacts as to these species are extremely unlikely." *Id.* (emphasis added). JRWA's characterization of NMFS's findings is thus misleading, and provides no support for its Request.

V. JRWA Raises No Serious Issues Under the Massachusetts Endangered Species Act.

Lastly, JWRA accuses Entergy's April 11th Response of "conveniently ignor[ing]" the fact that the Massachusetts Endangered Species Act ("MESA"), which prohibits unauthorized "takes" of listed species, defines "take" broadly to include "provisions to guard against impacts that are less than an actual killing of the species, and includes impacts on food supplies and the ambient environment of endangered species." Ex. A at 8. This characterization of Entergy's April 11th Response is disingenuous at best. Entergy's Response simply states that "JWRA provides no evidence that Pilgrim's operations take ESA or MESA-listed species" and "[t]o the contrary, Entergy's and NRC's reviews of ESA [and] MESA . . . listed species indicate that no 'takes' are reasonably considered to have occurred, a conclusion with which the federal agencies that implement the ESA appear to agree." Ex. B at A-4. The letter makes no representation regarding the breadth of the term "take," nor does it indicate that Entergy understands a "take" to mean only the killing of species. To the contrary, Entergy has submitted two lengthy affidavits in response to JWRA's allegations before the Atomic Safety and Licensing Board,[9] which have been in JWRA's possession for weeks if not months, and which clearly demonstrate that the continued operation of Pilgrim is expected to result in no effects on listed species that would qualify as a take, including "harass, harm, pursue, hunt, shoot, hound, kill, trap, capture, collect, process [or] disrupt the nesting, breeding, feeding or migratory activity. . . ." G. L. c. 131A, § 1. If anything, it is JWRA that "conveniently ignores" the wealth of information Entergy has generated demonstrating that Pilgrim's continued operation will not cause the "take" of listed species.

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9 *See* 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 (March 19, 2012) (Exhibit I); Affidavit of Michael D. Scherer, Ph.D. and Sarah A. Barnum, Ph.D., in Support of Entergy's Answer Opposing Jones River Watershed Association's and Pilgrim Watch's Motion to Reopen, Request for Hearing and Permission to File New Contention (May 16, 2012) (Exhibit J).

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For all of the above-stated reasons, as well as those provided in Entergy's April 11th Response, MOCZM should deny JRWA's request to reconsider its decision not to suspend or otherwise to reopen its 2006 License Renewal Concurrence as reconfirmed in 2012 for Pilgrim Station.

As always, should you require additional information, please do not hesitate to contact us. Thank you for your time and consideration.

Very truly yours,

Elise N. Zoli

Elise N. Zoli

ENZ
Enclosures

cc: Fred Mogolesko
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EXHIBIT A

Jones River Watershed's Request for Reconsideration, June 15, 2011

Jones River Watershed Association*Pilgrim Watch

June 15, 2012

Bruce K. Carlisle, Director
Massachusetts Office of Coastal Zone Management
251 Causeway Street
Suite 800
Boston MA 02114

Re: MCZM Consistency Certification: Entergy's Pilgrim Nuclear Power Station, Plymouth MA

We ask the Massachusetts Coastal Zone Management (MCZM) to reconsider its' May 21, 2012 decision not to reopen its six-year old 2006 consistency certification for the Nuclear Regulatory Commission (NRC) 20-year relicensing of the Pilgrim Nuclear Power Station (PNPS). (May 21 Letter) See, JRWA and Pilgrim Watch letter of April 4, 2012. On May 25, 2012, the NRC approved Entergy-Louisiana's application to relicense PNPS through 2032, with the renewal period beginning June 8, 2012. Prior to the renewed license effective date of June 8, we presented MCZM with *prima facie* evidence that a supplemental consistency review was required and that MCZM had a duty to so notify Entergy. See, 15 CFR § 930.66(a) and (b).

A marked reluctance to make any thoughtful or independent statement about the environmental impacts of PNPS relicensing permeates MCZM and MassDEP's historic and present dealings with PNPS owners and operators. This is despite the fact that two federal statutes explicitly express the duty, as well as the right, of states to impose their own standards on all projects, including nuclear facilities, in the coastal zone.See, 16 USCS § 1452(1), (2), and § 1456(f). These duties exist independent of, and are unaffected by, the fact that PNPS is a nuclear facility that is also subject to federal laws. MCZM's failure to require supplemental coordination is but another abdication of the state's independent and essential environmental review duties, intended to protect its citizens and resources, which we continue to document. MCZM's actions are arbitrary, capricious and an abuse of discretion, or otherwise not in accordance with law.

Reopening Standard Is Met

Supplemental coordination is mandated here by 15 CFR § 930.66(a)(2), which provides that where "there are significant new circumstances or information relevant to the proposed activity and the proposed activity's effect on any coastal use or resource" then "substantially different coastal effects are reasonably foreseeable" and reopening is required. We have provided ample evidence that relicensing will have "substantially different coastal effects" compared to those Entergy described in its scanty 2006 consistency certification report contained in its "Environmental Report." [1]certification.

These "substantially different coastal effects" are described in the documents identified in the attached list.

Entergy's April 11, 2012 Letter (Entergy Letter) claims the only applicable grounds for reopening are whether Entergy "proposed material changes to its federally permitted activity" per §930.66(a)(1). Entergy Letter, Part I, page 4. Entergy ignores the two additional grounds or reopening: § 930.66(a)(2), which requires reopening when there are "significant new circumstances or information" and § 960.66(a)(3) which requires reopening when "substantial changes were made to the activity." By accepting Entergy's analysis, MCZM misapplies the law and fails to consider and apply the breadth of its independent state authority.

We respond briefly to the Entergy Letter below.

State authority under the CZMA and state Clean Waters Act

In the CZMA, Congress identified the relicensing of a nuclear reactor as subject to federal consistency review.[2] It preserves the states' independent rights to regulate water quality. 16 U.S.C.S. §1456(f). MCZM regulations require an applicant seeking a federal consistency certification to possess all necessary state permits. 301 CMR §§ 20.00 to 26.00. As we have shown elsewhere, Entergy's 1994 joint state-federal surface water discharge permit and the state § 401 water quality certification for the permit are not valid, current permits. Entergy has not demonstrated compliance with the Commonwealth's cooling water intake structure (CWIS) and other water quality standards at 314 CMR § 4.00. Therefore, it does not "possess all necessary state permits."

An applicant seeking a consistency review "shall furnish to the state...all necessary information and data," 16 U.S.C.S. 1456(c)(3)(A), including "**all**

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[1] Entergy's "Coastal Zone Management Consistency Certification" is Attachment D to Appendix E to "Applicant's Environmental Report Operating License Renewal Stage," filed with the NRC January 27, 2006. Since MCZM issued the July 11, 2006 consistency certification ***before the NRC's draft Supplemental Environmental Impact Statement (SEIS) for PNPS was published in December 2006***, MCZM cannot even claim that it reviewed the NRC's EIS for Pilgrim prior to issuing the July 2006 consistency

[2] The CZMA establishes a national policy to "preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations" and to "*encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone...*" 16 U.S.C.S. § 1452(1) and (2). (emphasis added) Coastal effects are defined broadly, and include "not only environmental effects ... but also to effects on human uses, such as fishing and boating, public access and recreation, scenic and aesthetic enjoyment, and resource creation or restoration. Furthermore, effects include both direct effects that occur from the federally licensed activity at the same time and place, and indirect effects resulting from the incremental impact when added to other past, present, and anticipated actions, regardless of who undertakes such actions."15 C.F.R. § 930.11(g).

material relevant to a State's management program…." 15 CFR § 930.58; 301 CMR 21.07(3). See, e.g. Conservation Law Foundation v. Lujan, 560 F. Supp. 561 (D.Mass. 1983). Entergy has failed to furnish all necessary information and data, including a valid state permit and § 401 certification, and other information identified in the attached list.

One of the state's core CZM policies is the impact of CWIS. MCZM has largely ignored its obligation to ensure that this policy is met.[3] The last federal Clean Water Act (CWA) §§ 316(a) and (b) demonstration reports accepted by the state and/or US EPA for PNPS were done in the 1970s. We have filed a claim with the NRC asserting that any attempt by the NRC to rely upon 40 year old § 401 certificates, expired surface water discharge permits, and the 2006 MCZM certificate based on this outdated data, is unreasonable and an egregious derogation of duty. By providing a CZM certificate based on this outdated data, MCZM has enabled the NRC and Entergy to subvert the purposes of state and federal water pollution laws and the CZMA. The MCZM certificate is thus inconsistent with the Congressional findings outlined in the CZMA, § 1451(a)-(m) and the Congressional declarations of national policy in § 1452.

MCZM's own policy guidance documents expose the falsity of Entergy's argument that JRWA's challenge to the 2006 certificate "conflates separate NRC and EPA proceedings." A CZM certificate is required for NRC licensing. In turn, a CZM certificate requires that MCZM make certain rational findings under its state program. As explicitly laid out at length in the MCZM policy, those findings include whether there is compliance with the Clean Water Act, and whether Entergy has all "necessary state permits."

Radioactive Releases to Cape Cod Bay

Entergy's argument that CZM cannot address radiological considerations is wrong. Entergy Letter, p. A-7. In passing the CZMA, Congress acted with full knowledge of the pre-existing 1954 Atomic Energy Act (AEA) and the NRC's authority over certain, but not all, areas of the operation of a nuclear power station.

The impacts of Entergy's radioactive releases to Cape Cod Bay via atmospheric deposition and surface and groundwater effluent discharges must be considered by MCZM in making a consistency determination. Massachusetts never ceded this

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[3] Under NRC rules, the Applicant must provide "a copy of a current Clean Water Act 316(b) determinations [sic] and, if necessary, a 316(a) variance in accordance with 40 CFR part 125, or equivalent State permits and supporting documentation. If the applicant cannot provide these documents, it shall assess the impact of the proposed action on fish and shellfish resources resulting from heat shock and impingement and entrainment." 10 C.F.R. 51,53(c)(3)(ii)(B). In an attempt to meet this requirement, Entergy filed with its license application two letters from the state, dated April 15, 1971 and July 31, 1970, which it claims are § 401 certifications, and an excerpt from the now-expired 1994 NPDES permit purporting to state that the current CWIS is the "best technology available for minimizing adverse environmental impact." See, "Applicant's Environmental Report, Operating License Renewal Stage", Attachment A, which is part of Entergy's NRC relicensing Application. See Sections 4.2.5, Page 4-8, and 4.3 of Entergy's (ER) In its response to our claim, Entergy produced the water quality certifications for the 1991 permit, but the NRC did not have these when they issued the new license on May 25, 2102.

sovereign authority to the NRC. Moreover, under Massachusetts' agreement with the NRC, the NRC has explicitly relinquished to the Commonwealth the authority to ensure that Entergy's discharges of radioactive byproduct materials are not inconsistent with coastal zone and coastal uses under the CZMA.[4]

While Entergy attempts to argue that the NRC preempts all state authority over radiological safety, courts have been careful to interpret the AEA in a manner that does not preempt state sovereign powers and rights of action under state laws. See, e.g. Kerr-McGee v. City of West Chicago, 914 F.2d 820 (N.D. Ill. 1990), Maine Yankee v. Bonsey, 107 F. Supp. 47 (D. Me. 2000). Ensuring that Entergy's constant, ambient discharges of radioactive materials (an nonradiological materials) to air and water is consistent with the state MCZM policy is directly related to Entergy's CWIS operations -- a subject Entergy expressly emphasizes as outside the NRC's jurisdiction. Entergy Letter, p. 4. Brown v. Kerr-McGee Chem. Corp, 767 F. 2d 1234 (1985) cert. denied, 475 U.S. 1066, is a seminal and soundly reasoned case, reminding us that, consistent with other federal-state law preemption analyses, preemption of state law should be explicit. Where it is not, only those elements of state law which directly interfere with federal occupation of a field are suspect. As noted earlier, the express authority retained by, or given to states under CWA and CZMA, are unaffected by the fact that a nuclear power facility is at issue. The Commonwealth's responsibilities cannot be ceded even on this ponderous issue of water quality standards.

Entergy's argument that MCZM should ignore PNPS tritium discharges to groundwater flowing to Cape Cod Bay falls especially short. The Massachusetts Department of Public Health has been actively exercising its state authority under the Agreement to require that Entergy maintain monitoring wells and report its results pursuant to the state's Radioactive Materials Program and no preemption argument with regard to MDPH's requirements has ever been raised. [5] It is illogical to argue that the NRC should have sole authority over something that the NRC is not, in fact, regulating in Massachusetts or that the data Entergy is providing to a sister state agency of MCZM cannot be referenced or analyzed by MCZM.

Massachusetts Surface Water Quality Standards Govern Entergy's Radioactive Releases

Massachusetts, as a non-delegated state under the federal Clean Water Act NPDES program, possesses entirely independent and antecedent authority to regulate discharges of pollutants, including radioactivity, to surface waters of the Commonwealth [6] M.G.L. c.

[4] The NRC relinquished to the Commonwealth regulatory authority over "byproduct materials as defined by Section 11e.(a) of the [Atomic Energy] Act," See, Article I, p. 2, "Agreement Between the United States Nuclear Regulatory Commission and the Commonwealth of Massachusetts for Discontinuance of Certain Commission Regulatory Authority and Responsibility within the State Pursuant to Section 274 of the Atomic Entergy Act of 1954, As Amended", dated Marcy 19, 1997.

[5] See, e.g., http://www.mass.gov/eohhs/consumer/community-health/environmental-health/exposure-topics/radiation/radioactive-materials/radioactive-materials-program.html

[6] Massachusetts CWA permit No. 359, was first issued to PNPS in the 1970s. 314 CMR 4.05(5)(d) requires

21, §§ 26 – 53. Massachusetts' water quality standards, including the standard for radioactivity in 314 CMR § 4.05(5)(d), do not interfere with the NRC's regulation of radiation hazards. The NRC does not set water quality standards to prevent harmful impacts on human, animal or aquatic life of the most sensitive designated uses of Cape Cod Bay, as do the Massachusetts water quality standards. See, 314 CMR 4.05(4)(a). There is no conflict between MCZM's authority to conduct a consistency review of Entergy's radiologic effluent releases on coastal zone resources and uses because this is an area that the NRC does not regulate.

Entergy argues ferociously that the "NRC has no jurisdiction over NPDES considerations." The NRC also cannot interfere with the state's sovereign authority under its own state water quality standards, which are protective of state designated uses of state waters. Although U.S. EPA does not regulate radioactivity as a pollutant under the federal act, Massachusetts may and has established its own standards.

On May 21, 2012, the U.S. National Marine Fisheries Service (NMFS) issued a recommendation to the NRC under the federal Endangered Species Act on possible impacts to endangered species of radiological releases from PNPS. NMFS recommended to the NRC that the license include several conditions.[7] NMFS states, "We have indentified several areas where additional and/or more recent information would be helpful to better characterize effects of the Pilgrim facility." NMFS recommends "revising the species sampled in the REMP to include species that serve as forage for listed species and species that occupy similar ecological niches as Atlantic sturgeon, whales and sea turtles and could be considered surrogate species for radionuclide testing." NMFS Letter, p. 31. NMFS implicitly concluded that Entergy's radioactive effluent releases may affect endangered species such as Atlantic sturgeon, whales and sea turtles. This fact must be considered by MCZM in determining whether supplemental coordination is warranted.

MCZM's Decision is Contrary to the SJC's Recent Decision in Entergy v. MassDEP

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that all surface waters shall be free from radioactive substances in concentrations or combinations that would be harmful to human, animal or aquatic life or the most sensitive designated use; result in radionuclides in aquatic life exceeding the recommended limits for consumption by humans; or exceed Massachusetts Drinking Water Regulations as set forth in 310 CMR 22.09. Under 314 CMR 4.05(4)(a), Cape Cod Bay is a Class SA: "These waters are designated as an 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. In certain waters, excellent habitat for fish, other aquatic life and wildlife may include, but is not limited to, seagrass. Where designated in the tables to 314 CMR 4.00 for shellfishing, these waters shall be suitable for shellfish harvesting without depuration (Approved and Conditionally Approved Shellfish Areas). These waters shall have excellent aesthetic value.").

[7] NMFS says it reviewed Entergy's Radiological Evaluation Monitoring Reports (REMPs) for 2009, 2010, and 2011 (which we contend are problematic in numerous respects). We note that Entergy's REMPs summarize radiological impact on humans. No where do they assess impacts on the uses designated for Cape Cod Bay under 314 CMR 4.05(4) or on other coastal zone resources and uses, such as noncontact recreation

Entergy falsely states that the Massachusetts CWIS regulations in 314 CMR 4.05 contain no new substantive requirements. Entergy Letter at A-2. In Entergy vs. Department of Environmental Protection, 459 Mass. 319 (2011), the Court reiterated that under the federal CWA, the states "retain the right to impose pollution control limits that are more stringent than the "floor" set by Federal law" and that states have independent authority under the CWA, § 1341, to certify that the permittee's activities will not violate the State's water quality standards.

The SJC stated,

> ...the ecological harms associated with CWISs are well understood. The intake of water a CWIS at a single power plant can kill or injure billions of aquatic organisms in a single year. The environmental impact of these [cooling water intake] systems is staggering...destabilizing wildlife populations in the surrounding ecosystem. *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.* (citations omitted; emphasis supplied)

Entergy claims the SJC decision means the state has no authority declare its CWIS are inconsistent with MCZM policy, a reading belied by the plain language of the holding.[8] Neither the federal CWA nor the Atomic Energy Act strips Massachusetts of its sovereign powers to regulate Entergy's CWIS, as Entergy implies in its rambling citations to MOU's and NRC administrative law judge decisions. See, Entergy Letter, p. 5-6. Entergy's analysis of the evolution of the NRC's authority in relation to the Atomic Energy Commission is wholly irrelevant to the independent authority of the Commonwealth of Massachusetts to exercise its sovereign authority over its territorial waters. See, Entergy Letter, p. 4-5. This state authority and responsibility includes the timely renewal of state clean water act permits, and exercise of the authority Congress has explicitly given to the state in the CZMA to make unilateral decisions to protect its resources, regardless of NRC's rules, conduct, or attempts to short circuit and avoid mandated environmental reviews.

MCZM's Decision Contradicts the Massachusetts Attorney General's Position on PNPS Relicensing

MCZM's decision not to reopen the 2006 certification contradicts the position of the Massachusetts Attorney General in her April 5, 2012 appeal to the First Circuit. In appealing the NRC's denial of the Commonwealth's request for a hearing on a contention challenging the severe accident mitigation alternatives analysis in the wake of the

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[8] Entergy's timing in bringing the case is indeed curious: within months of submitting its request for MCZM certification, Entergy had sued MassDEP to prevent implementation of the state's CWIS regulations at Pilgrim. Since Entergy owns no other power plant in Massachusetts that has a CWIS, except Pilgrim, Entergy's lawsuit to prevent implementation of the CWIS regulations was nothing but a blatant attempt to avoid having to comply with state CWA standards at Pilgrim. By suing the state, Entergy, indeed, won a 5-year reprieve, during which time, your office issued its CZM certification. Entergy initiated the CWIS challenge in January, 2006, and it was finally resolved by the SJC in 2011.

Fukushima-Dai-ichi disaster, the Attorney General asserts that "new and significant" information must be considered before the NRC decides on Entergy's relicensing. The AG's contentions are based, in part, on two reports from Gordon R. Thompson asserting that the environmental impact statement for PNPS relicensing required revision. See, e.g., Aug. 8, 2011 Report, p. IV-2. The AG asserts in federal court that a new environmental impact analysis is required under the National Environmental Policy Act (NEPA) "because the environmental risks posed by the Pilgrim spent fuel pools are inextricably linked to the environmental risks of a core-melt accident and thereby to the NRC's SAMA analysis for Pilgrim.[9]

Although the stated concern regarding post accident aqueous discharges is valid and urgent, the logical extension of this argument has not, and must be, considered by the state regulatory agencies in order to comply with their explicit statutory mandate, to protect coastal zone resources and uses, including water quality and wildlife habitat. State agencies must also consider the constant daily radioactive discharges in effluent over forty years of PNPS operation, which will continue for another twenty years – making a total of sixty years. That this has not been considered by MCZM, Mass Marine Fisheries or MassDEP is baffling, given that in 1976 and again in 1988 data showed significant bioaccumulation of nuclear material from PNPS in blue mussels, a filter feeder and bottom of the food chain accumulator of radioactive material. This information warrants reopening the 2006 MCZM certification.

MESA

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[9] Commonwealth's "Conditional Motion to Suspend Pilgrim Nuclear Power Plant License Renewal Proceeding Pending Resolution of Petition for Rulemaking to Rescind Spent Fuel Rod Exclusion Regulations," Docket No 50-293-LR, filed with the NRC June 2, 2011, and Pilgrim Watch's Request For Hearing On A New Contention Regarding Inadequacy Of Environmental Report, Post Fukushima - Cost/Benefit, filed November 18, 2011 with the NRC. Pilgrim Watch claims certain aqueous offsite discharges had not been modeled properly:

> The computer code to model the cost-benefit analysis (MACCS2), that Entergy chose to use for its SAMA, does not currently model and analyze aqueous transport and dispersion of radioactive materials; and there is no provision within the Severe Accident Mitigation Guidelines (SAMGs) for processing the water post accident, just as there was no discussion in NUREG/CR-5634. Lessons learned from Fukushima show that we are now placed at significant risk. **As in Japan, if there should be a severe accident at Pilgrim, enormous quantities of contaminated water are likely to enter Cape Cod Bay and other waters (adding to the radioactive atmospheric fallout on the water and runoff) posing significant offsite consequences and costs, threatening the health of citizens and the ecosystem and damaging the economy.** NEPA requires that these technical gaps be addressed prior to any licensing decision. Absent addressing these gaps, Entergy fails to satisfy the purpose of its required SAMA review to ensure that any plant changes that have a potential for significantly improving severe accident safety performance are identified and addressed.

Entergy's April 11, 2012 letter, see, e.g., P A-4, conveniently ignores the fact that MESA MGL c. 131A, § 1, defines "take", in reference to animals to include " to harass, harm, pursue, hunt, shoot, hound, kill, trap, capture, collect, process, disrupt the nesting, breeding, feeding or migratory activity or attempt to engage in any such conduct, or to assist such conduct...." This broad definition includes provisions to guard against impacts that are less than an actual killing of the species, and includes impacts on food supplies and the ambient environment of endangered species.

The JRWA/PW request forcefully demonstrates that supplemental coordination by MCZM is required

Entergy claims JRWA's request is tardy and insufficient. It is never too late to identify and address impacts which the state agency has heretofore ignored or failed to consider when clear facts in the record mandate such a review; that is the purpose of the statutes. We believe the story of wholesale failure of the regulatory system is unfolding: from the NRC's flawed and unlawful decision to relicense Pilgrim in the absence of a valid and enforced effluent discharge permits from the MassDEP and EPA to MCZM's failure to investigate and consider data in the state's own files.

Entergy's claim that the CZM Office "has played a continuing, active role in the review of federally authorized action associated with Pilgrim" is patently untrue. Entergy Letter, p. 2. No "active role" by any state or federal agency with regard to the impacts associated with Entergy's use of Cape Cod Bay has occurred for decades: the state and federal permits expired 16 years ago and the matter has sat dormant, other than a boilerplate request by U.S. EPA for CWA § 308 information. As a result, the NRC has relicensed Pilgrim based on a faulty1970s CWA § 316 demonstration report, outdated § 401 water quality certificate, and invalid CZM certificate --- and no agency of the Commonwealth has said a word in response. In light of the record before the agencies, augmented by our recent findings, MCZM's failure to reopen the consistency review is arbitrary, capricious, an abuse of discretion and otherwise not in accordance with law.

In addition to an action challenging the agency's decision, we may pursue a petition under 16 U.S.C.S. § 1458(a) to (c) and the Administrative Procedures Act before the Secretary to review the performance of MCZM with respect to coastal management. This process includes public participation, evaluation of the state's performance, as provided under §1458(b), and may include a request for suspension of federal financial assistance pursuant to § 1458(c)for noncompliance with the state CZM program.

Very truly yours,

Jones River Watershed Association

Pilgrim Watch

By: Margaret E. Sheehan, Esq.

Anne Bingham, Esq.

Cc:
Governor Duval Patrick
Secretary Rick Sullivan, EOEEA
Senator Therese Murray
Senator Marc Pacheco
Sen. William Brownsberger
Sen. Dan Wolf
Rep. Ann Gobi
Rep. Sarah Peake
Rep. Tom Calter
Rep. Vinny DeMacedo
U.S. EPA
MassDEP

EXHBIT B

Entergy's Response to Jones River Watershed Association's and Pilgrim Watch's Request,

April 11, 2012

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April 11, 2012

VIA FACSIMILE (617) 626-1240
VIA FEDEX

Bruce K. Carlisle
Director
Massachusetts Office of Coastal Zone
Management
251 Causeway Street, Suite 800
Boston, MA 02114

Re: Entergy's Response to Jones River Watershed Association's and Pilgrim Watch's Request Concerning CZM Office's License Renewal Concurrence for Pilgrim Nuclear Power Station (Plymouth, MA)

Dear Director Carlisle:

We write on behalf of Entergy Nuclear Generating Company and Entergy Nuclear Operations, Inc. (collectively, "Entergy") regarding the April 4, 2012 request by the Jones River Watershed Association and Pilgrim Watch (collectively, "JRWA") to the Massachusetts Office of Coastal Zone Management (the "CZM Office"), attached hereto as Exhibit A. Briefly, JRWA contends that the CZM Office must suspend or alter its federal consistency concurrence related to the Pilgrim Nuclear Power Station's ("Pilgrim" or "Pilgrim Station") license renewal application (the "Application") to the Nuclear Regulatory Commission ("NRC"), which the CZM Office issued on July 11, 2006 (the "2006 License Renewal Concurrence") and confirmed on February 29, 2012 (the "2012 CZM Confirmation"). JRWA's claim rests almost exclusively on purported concerns about continued operation of Pilgrim's cooling water intake structure and associated thermal discharges (the "cooling water system"). *See* Exhibit A at 1-3.

As detailed below, JRWA's challenge to the CZM Office's action with respect to Pilgrim misapprehends applicable law and procedure regarding CZM Office federal consistency concurrences, which do not authorize reopening prior consistency determinations absent a material change in Pilgrim's Application – circumstances that do not exist here. *See*, *infra*, Section I. Further, JRWA's request impermissibly conflates two separate and distinct federal actions, *i.e.*, the NRC's license renewal determination and the United States Environmental Protection Agency's ("EPA") National Pollutant Discharge Elimination System ("NPDES") permit renewal, in a manner inconsistent with the CZMA, not to mention the federal agencies' respective jurisdictions. *See*, *infra*, Section II. Finally, none of the purported factual issues raised by JRWA, which could have been raised years ago when the CZM Office undertook its twin federal consistency reviews for the NPDES permit renewal and License Renewal and provided an opportunity for public comment, is new or has merit. For this reason, JRWA's purported factual issues are not appropriately addressed here, but instead are separately addressed in Appendix A, and solely to provide the CZM Office with an accurate presentation of the facts. In the final analysis, JRWA's request to the CZM Office offers neither a credible basis for reopener, nor promises any discernible environmental benefit from a reconsideration of a federal consistency concurrence that Entergy and the CZM Office handled in a manner consistent with applicable law. As such, and for the reasons detailed below, JRWA's challenge to the CZM Office's federal consistency determinations for Pilgrim should be rejected.

Background

The CZM Office has played a continuing, active role in the review of federally authorized action associated with Pilgrim Station, fulfilling that role in a legally supported and appropriate manner.

First, in 1991, when EPA last renewed Pilgrim's NPDES permit, including by authorizing Pilgrim's existing cooling water system, the CZM Office issued an official consistency concurrence (the "1991 NPDES Concurrence") in satisfaction of the federal Coastal Zone Management Act (16 U.S.C. § 1451 *et seq.* (the "CZMA")) requirement that federal licensing activities be consistent with state coastal management programs approved by the National Oceanic and Atmospheric Administration ("NOAA") under the CZMA. *See, e.g.*, 16 U.S.C. § 1456(c)(1)(A). The 1991 NPDES Concurrence determined that Pilgrim's operations under the NPDES permit complied with the NOAA-approved Massachusetts coastal zone management program (the "MCZM Policies"). *See* Correspondence from Jeffery R. Benoit, Director, CZM Office, to John P. Seferiadis, Boston Edison (Apr. 17, 1991). EPA has since proposed no renewal of or substantial modification to Pilgrim's NPDES permit, but continuously has sought from Entergy information about Pilgrim's cooling water system and its potential aquatic impacts; Entergy has complied promptly with such requests. *See, e.g.*, Correspondence from Elise N. Zoli, Goodwin Procter to Damien Houlihan, EPA (Jul. 8, 2008) (providing response to EPA's most recent [July 31, 2007] request under §308 of the Clean Water Act for information on Pilgrim's cooling water system). That EPA has not yet acted on Entergy's timely application to renew or modify Pilgrim's NPDES permit is unsurprising, as EPA is *currently* undergoing a highly publicized, nationwide rulemaking to address cooling water intake structures at certain large-scale power plants, such as Pilgrim Station. *See* EPA, National Pollutant Discharge Elimination System – Cooling Water Intake Structures at Existing Facilities and Phase I Facilities, Proposed Rule, 76 Fed. Reg. 22174 (Apr. 20, 2011) (hereinafter "Proposed Rule"). If and when EPA proposes to renew or substantially modify Pilgrim's NPDES permit pursuant to its Proposed Rule or otherwise, the CZM Office will again conduct a federal consistency review. JRWA may participate in any such CZMA federal consistency process at that time.

Second, on July 11, 2006, the CZM Office officially concurred (the "2006 License Renewal Concurrence") with Entergy's consistency certification relating to Entergy's January 2006 Application seeking a twenty-year renewal of Pilgrim's existing NRC-issued license to operate ("License Renewal"). *See* Correspondence from Susan Snow-Cotter, CZM Office to Stephan Bethay, Entergy (July 11, 2006). As with the 1991 NPDES Concurrence, the 2006 License Renewal Concurrence was issued by the CZM Office in satisfaction of its CZMA obligations, based on an assessment of MCZM Policies. *See, e.g.*, 16 U.S.C. § 1456(c)(1)(A). The CZM Office's 1991 NPDES Concurrence was known to the CZM Office and necessarily was taken into account when it issued the 2006 License Renewal Concurrence. While NRC's License Renewal assessment also addresses the National Environmental Policy Act ("NEPA"), that statute as discussed below does not give NRC any NRC jurisdiction over NPDES considerations. Additionally, although NRC possesses no jurisdiction over NPDES considerations, Entergy's consistency certification ("Consistency Certification") described operations of Pilgrim, including Pilgrim's existing cooling water system operated in accordance with its NPDES permit. *See* Correspondence from Stephan Bethay, Pilgrim Nuclear Power Station to Truman Henson, Massachusetts CZM Office 5 (Jan. 27, 2006) (hereinafter, "Consistency Certification") ("The [Pilgrim] NPDES permit, issued August 30, 1994, by EPA Region I, constitutes the current CWA Section 316(b) determination for [Pilgrim]."). As importantly, Entergy's Consistency Certification also included a comprehensive Environmental Report, submitted to NRC pursuant to NEPA. *See* Consistency Certification (attaching the following document: Entergy, License Renewal Application, Pilgrim Nuclear Power Station, Environmental Report Appendix E (Jan. 27, 2006) (hereinafter, "ER")). Consistent with NEPA, that ER described the potential environmental impacts of continued operation of Pilgrim, including under its NPDES-permitted cooling water system. *See* ER § 4.0. There has been no modification of Pilgrim's License Renewal Application that affect the cooling water system since the 2006 License Renewal Concurrence, and JRWA tellingly identifies none.

On February 29, 2012, the CZM Office confirmed (the "2012 CZM Confirmation") that its 2006 License Renewal Concurrence remains valid. *See* Correspondence from Robert L. Boeri, CZM Office to Al Dodds, Entergy (Feb. 29, 2012).

I. JRWA's Request Is Procedurally Improper and Substantively Groundless.

JRWA's challenge to the 2006 License Renewal Concurrence rests on the notion that reopener is required. *See* Exhibit A at 1. JRWA's position is without merit.

Under NOAA regulations implementing CZMA federal consistency review, as set forth in 15 C.F.R. Part 930, a consistency concurrence made by a state's coastal management agency in connection with federal licensing activities ("Federal Consistency Review") may be reconsidered only under limited circumstances. *See* 15 C.F.R. §§ 930.51 and 930.66. Under the circumstances at issue here, reconsideration would be proper only if Entergy proposed material changes to its federally permitted activity, *i.e.*, the NRC License Renewal Application, that would cause coastal effects "substantially different" than those originally described. *Id.*

The legal standard for reopener under the CZMA is not met here. As discussed in the background section above, the 2006 License Renewal Concurrence addressed all relevant aspects of the NRC License Renewal process, including Pilgrim's existing NPDES-authorized cooling water system. No material change to Pilgrim's cooling water system or the manner in which it is operated, or to any other activity that would adversely affect the coastal zone during the License Renewal period has been proposed by Entergy. As such, there is no basis for concluding that a change to Pilgrim's NRC-licensed activities exists that could create coastal effects "substantially different" from those reviewed by the CZM Office when it issued its 2006 License Renewal Concurrence. Accordingly, JRWA's challenge to the 2006 License Renewal Concurrence has failed to meet the CZMA standard for reopener, and must be rejected.

II. JRWA's Challenge Impermissibly Conflates Separate NRC and EPA Proceedings.

JRWA's challenge to the 2006 License Renewal Concurrence effectively asks the CZM Office to introduce future NPDES considerations into the current and nearly complete NRC License Renewal. *See* Exhibit A at 1-3. JRWA's position lacks legal, procedural and practical merit.

First, NRC has no jurisdiction to resolve the application of the federal Clean Water Act, 33 U.S.C. §§ 1251 *et seq.* (the "CWA"), to Pilgrim's cooling water system, but rather expressly has deferred to EPA on the matter, including in the context of Pilgrim's License Renewal. *See* NRC, Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 29 Regarding Pilgrim Nuclear Power Station Final Report, 4-10, 4-39 note (b) (Jul. 2007) (hereinafter, "FSEIS"), *available at*: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff /sr1437/supplement29/v1/sr1437s29v1.pdf ("Section 316(b) of the Clean Water Act of 1977 (CWA) ... requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impacts (33 U.S.C. 1326). Entrainment of fish and shellfish into the cooling water system is a potential adverse environmental impact that can be minimized by the use of best technology available. Licensees may be required as part of the NPDES permit renewal to alter the intake structure, redesign the cooling system, modify facility operation, or take other mitigative measures.") (emphasis added). In its 1991 NPDES and 2006 License Renewal Concurrences, the CZM Office has recognized these jurisdictional limitations of NRC and EPA, and there is no sound reason for that approach to change. Specifically, prior to the 1972 CWA, NRC's predecessor agency, the Atomic Energy Commission ("AEC"), exercised authority over water permitting for nuclear power plants. In 1972, Congress amended the CWA to assign statutory authority over water quality matters to the EPA, eliminating duplicative authority among other federal agencies, including NRC. *See* CWA § 511(c)(2) (prohibiting federal agencies from reviewing coling water systems pursuant to NEPA); *see also, e.g., In re Consolidated Edison Co. of New York, Inc.*, 13 N.R.C. 448, 449 (1981) ("It is well established, by the terms of the Clean Water Act and Commission precedent, that the NRC must defer to final decisions of the EPA with respect to the type of cooling water system to be employed by nuclear power plants."). After the 1972 CWA amendments, the AEC entered into a memorandum of understanding with EPA establishing EPA's exclusive authority over NPDES issues, particularly cooling water systems. *See* Second Memorandum of Understanding Regarding Implementation of Certain NRC and EPA Responsibilities ("MOU"), Appendix A-Policy Statement on Implementation of Section 511 of the Federal Water Pollution Control Act, 40 Fed. Reg. 60115, 60120 (Dec. 31, 1975) (eff. Jan. 30, 1976) ("cooling water intake structure location, design, construction, and capacity ... will [not] be considered by NRC" if a particular alternative is required by Sections 401 or 402 of the CWA); 10 C.F.R. § 51.53(c)(3)(ii)(B) (requiring applicants to provide documentation of compliance with EPA's regulations governing CWA § 316(a) and (b)). That MOU remains in effect. Consequently, during the License Renewal process at Pilgrim, NRC properly deferred to EPA regarding NPDES-related decisions about cooling water systems.

Indeed, where NRC staff has attempted to impose more stringent or merely different water quality requirements on applicants than those imposed by EPA in its NPDES permits, those attempts have been struck down on an intra-agency appeal. *See, e.g., In re Tennessee Valley Auth.* (Yellow Creek Nuclear Plant, Units 1 and 2), ALAB-515, 8 NRC 702, 713-715 (1978). NRC staff is required to defer to EPA's determinations about open-cycle cooling. *In re Carolina Power and Light Co.* (H. B. Robinson, Unit No. 2), ALAB-569, 10 NRC 557, 561-562 (1979). Even when EPA's NPDES permit is under administrative extension at the time of NRC's review, the Atomic Safety and Licensing Board ("ASLB") has ruled that NRC is obligated to defer to EPA's then-current water quality determinations and NPDES permit. *See In re Entergy Nuclear Operations Inc.* (Indian Point Nuclear Generating Units 2 and 3), ASLBP-08-13, 68 NRC 43, 155-158 (2008). In doing so, the ASLB reasoned:

> It would be futile for the Board to review any of the CWA determinations, given that it is not possible for the Commission to implement any changes that might be deemed appropriate.

Id. at 156-157 (internal footnotes omitted).

JRWA's request erroneously seeks to import NPDES-related cooling water system considerations that are the province of EPA into the License Renewal process, and should be rejected as inconsistent with settled federal law.

Second, JRWA's request is too little, too late, inasmuch as it does not rest on a credible and timely allegation of relevant new information. To support its challenge to the 2006 License Renewal Concurrence, JRWA relies heavily on a June 27, 2000 CZM Office correspondence to EPA expressing concerns about the then-existing CWA § 316 demonstration report for Pilgrim. Setting aside the fact that the June 27, 2000 letter relates to the 1991 NPDES Concurrence and, therefore, is outside the scope of NRC's License Renewal as a matter of law, JRWA's characterization of the June 27, 2000 letter is improper. In that letter, issued six years prior to the 2006 License Renewal Concurrence, the CZM Office simply requested that additional information be provided before it could conclude, "unequivocally," that the scientific evidence proved that there were no long-term adverse environmental impacts at Pilgrim as the result of entrainment. *See* Correspondence from Thomas W. Skinner, CZM Office to Dave Webster, EPA (June 27, 2000). The CZM Office's request for additional scientific evidence in 2000 in no way invalidates or contradicts its 2006 License Renewal Concurrence. As such, it in no way supports JRWA's challenge to the 2006 License Renewal Concurrence and request for reopener.

Finally, JRWA's request lacks a common sense foundation that advances legitimate environmental goals. It is undisputed that EPA will address Pilgrim's cooling water system when it renews Pilgrim's NPDES permit, at which time the CZM Office will undertake its role in issuance of a federal consistency concurrence. JRWA will be able to participate in that process if it so chooses. There is nothing to be gained by importing EPA's future actions – actions unknown today – into a nearly complete NRC proceeding as a form of reopener. As such, the CZM Office should not accept JRWA's challenge to its 2006 License Renewal Concurrence.

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For all of the above-stated reasons, and as supported by the information provided in Appendix A, the CZM Office should decline JRWA's request to suspend or otherwise reopen the 2006 License Renewal Concurrence as reconfirmed in 2012 for Pilgrim Nuclear Power Station.

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As always, should you require additional information to conclude this matter, please do not hesitate to contact us.

Thank you for your time and consideration.

Sincerely,

Elise N. Zoli (CB)

Elise N. Zoli

ENZ
Attachments:

Exhibit A
Appendix A

cc:
Fred Mogolesko, Entergy Corporation
Jacob J. Scheffer, Entergy Nuclear, Inc.
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William B. Glew, Jr., Entergy Services, Inc.
Joseph R. Lynch, Entergy Nuclear Operations
Al Dodds, Entergy Nuclear Operations

Exhibit A

*Jones River Watershed Association*Pilgrim Watch*

April 4, 2012

By Express Mail

Bruce K. Carlisle
Director
Massachusetts Office of Coastal
Zone Management
251 Causeway Street
Suite 800
Boston MA 02114

Re: MCZM July 11, 2006 Consistency Certification for Entergy's Nuclear Pilgrim Nuclear Power Station, Plymouth MA

Dear Mr. Carlisle,

We are writing to request that your office immediately suspend its July 11, 2006 Coastal Zone Management Act (CZMA) Consistency Certification for the Nuclear Regulatory Commission (NRC) relicensing of the Entergy Nuclear Generation Company and Entergy Nuclear Operations Inc. (Entergy) Pilgrim Nuclear Power Station (PNPS). Entergy has inaccurately certified to the NRC that relicensing will be consistent with the MCZM program. The facts show that continued operation of PNPS as proposed by Entergy will be inconsistent with enforceable state coastal zone management policies, as codified at 301 CMR §§ 20.00 to 26.00 (MCZM program), and therefore the 2006 consistency determination is invalid. Time is of the essence as Entergy's current NRC operating permit expires June 8, 2012 and relicensing based on MCZM's 2006 consistency determination is likely to occur before May 29, 2012.

We further request that your office notify Entergy that a supplemental coordination is required for the relicensing application. See, 10 C.F.R. § 930.66 and CZMA, 16 U.S.C.S. §§ 1451 *et seq.*

Entergy's NRC application states that during the relicensing period (2012 to 2032) it plans to continue its 40-year use of its once-through cooling water system. It is documented that this system has had destructive impacts on Cape Cod Bay coastal zone resources and uses due to impingement, entrainment, thermal discharges, and discharges of other pollutants including chlorine and biocide residuals. Entergy's 2006 Coastal Zone Management Consistency Certification (CZM Report) certified that operations during relicensing will be consistent with MCZM policies. Some of these statements were not true at the time they were made, and others are no longer true.

Entergy's continued operation of the Pilgrim station for the relicensing period will violate at least MCZM Water Quality Policy #1, 301 CMR 21.98(3), and Habitat Policies, #1-2, 301 CMR 21.98(4), in the following ways:[1]

1. Noncompliance with its Clean Water Act NPDES permit: Since 1999, Entergy has failed to obtain state and federal approval of its Biological Monitoring plans, in violation of its NPDES permit, Part A.8, and has failed to conduct the Biological Monitoring it did do, under the oversight of the Pilgrim Advisory Technical Committee, in violation of Part 8.d.

2. Entergy's NPDES permit expired in 1996, but has been administratively extended since that time. EPA and MassDEP do not have the capacity to issue a new NPDES permit before June 8, 2012, the NRC relicensing deadline

3. Entergy's last § 316 demonstration project was provided to U.S EPA in 1977, Additional information for a new review was submitted to EPA by ENSR in 2000 but the review was never completed. MCZM staff comments on the 2000 ENSR report forcefully stated that this submittal failed to demonstrate § 316 and MCZM standards were met.

4. Since 2006, Entergy has annually violated the state's moratorium on the taking of river herring, 322 CMR 6.17(3), and river herring is now a candidate species under the federal Endangered Species Act. 76 Fed. Reg. 67652 (11/2/2011) River herring are the third most impinged species at PNPS.

5. Entergy's CZM Report stated there would be "no effects" on endangered and threatened species. On March 26, 2012, the U.S. Fish and Wildlife Service informed the NRC Staff it does not agree that there will be "no effects" on Cape Cod Bay endangered and threatened species from PNPS operations.

6. MCZM's 2006 certification fails to address or acknowledge impacts to marine mammals such as whales, porpoise, and dolphin, which are known to be present in the PNPS area and in Cape Cod Bay, and which are protected by the federal Marine Mammal Protection Act, 16 U.S.C.S. §§ 1362 (13), 1372 (a).

7. Impacts to species listed under the Massachusetts Endangered Species Act were ignored or inadequately assessed, including impacts to hawksbill turtle, humpback whale, roseate tern, and arctic tern.

8. New discharges of radioactive tritium to groundwater at the Pilgrim station are being documented, and this groundwater is reported to flow toward Cape Cod Bay. It is unknown for how long this discharge has been occurring. MCZM has not determined whether discharges of this radioactive material, combined with PNPS point source discharges of radioactive wastewater to Cape Cod Bay, is consistent with MCZM policies.

[1] This is not a comprehensive list of all the ways in which continued operations will violate MCZM policies, but only examples. More information is available upon request.

9. An Essential Fish Habitat consultation with NMFS as required by Magnuson-Stevens Fishery Conservation and Management Act has not been completed and will not be done prior to June 8, 2012, the relicensing deadline. Instead, the NRC has postponed the EFH consultation indefinitely to the NPDES permit renewal process. Therefore the MCZM's consistency review was done without the benefit of the results of this consultation.

10. Entergy has not demonstrated compliance with MassDEP's 2006 cooling water intake structure water quality standards, upheld by the Massachusetts Supreme Judicial Court in April 2011, following a legal challenge by Entergy. Entergy Nuclear Generation Company v. Department of Environmental Protection, 459 Mass. 319 (2011). These regulations are designed, *inter alia*, to minimize impacts on aquatic life through entrainment, impingement and thermal discharge. See, 314 CMR § 4.05(b)(2)(d), 4.05(3)(c)(2)(d), 4.05(4)(a)(2)(d), 4.05(4)(b)(2)(d), 4.05(4)(c)(2)(d).

Entergy should have provided all of the information listed above to MCZM, pursuant to 16 U.S.C.S. 1456(c)(3)(A), which requires an applicant to submit "**all** material relevant to a State's management program...." 15 CFR 930.58; 301 CMR 21.07(3). See, e.g. Conservation Law Foundation v. Lujan 560 F.Supp. 561 (D.Mass. 1983).

Under 15 C.F.R. § 930.66(a), applicants for federal consistency review "shall further coordinate with the State agency and prepare a supplemental consistency certification if the proposed activity will affect any coast use or resource substantially different than originally described." Significant new circumstances or information and substantial changes both warrant such supplemental review. *Id.* § 930.66(a)(1)-(3). The information we have indicated above shows a supplemental coordination is required. Facts, documents, and data establishing this information were obtained from agency files.

About two weeks ago we requested a meeting with your staff to discuss this, and we remain willing to do so, in order to reach a mutually agreeable resolution of the concerns raised here. We are ready and able to provide you with full documentation of these facts and others that show that NRC relicensing of PNPS will violate MCZM policies.
In the meantime, we reiterate our request that you immediately suspend the 2006 Consistency Certification and so notify the NRC, and inform Entergy that supplemental coordination is needed under 15 C.F.R. § 930.66.

Thank you for consideration of our information. Please contact Pine duBois, Executive Director, Jones River Watershed Association, 781-585-2322 or pine@jonesriver.org should you have any questions or concerns.

Very truly yours,

Jones River Watershed Association, Inc.

By:

Pine duBois, Executive Director

Margaret E. Sheehan, Esq., Volunteer

Anne Bingham, Esq.

Cc: Representative Edward Markey
The Hon. Duval Patrick, Governor
Senator Therese Murray
Provincetown Center for Coastal Studies
James McCaffrey, Director, Sierra Club, Massachusetts
Susan M. Reid, Conservation Law Foundation
Curt Spaulding, Regional Administrator, USEPA Region 1
David Webster, US EPA
Kenneth Kimmel, Commissioner, MassDEP
Beth Card, MassDEP
State Senators and Representatives
Whale and Dolphin Conservation Society
Pilgrim Coalition
Herring Alliance
Cape Cod Hook Fisherman's Association
Trout Unlimited, Massachusetts Chapter
Massachusetts Rivers Alliance
Cape Cod Commission

Appendix A:

A Detailed Review of JRWA's Factual Allegations of "Non-Compliance" with State and Federal Permitting Requirements

In their April 4, 2012 letter to the Massachusetts Office of Coastal Zone Management (the "CZM Office"), attached as Exhibit A, the Jones River Watershed Association and Pilgrim Watch (collectively, "JRWA") challenge Entergy Nuclear Generating Company's and Entergy Nuclear Operations, Inc.'s (collectively, "Entergy") federal consistency concurrence related to the Pilgrim Nuclear Power Station's ("Pilgrim" or "Pilgrim Station") license renewal application (the "Application") to the Nuclear Regulatory Commission ("NRC"), which the CZM Office concurred with on July 11, 2006 (the "2006 License Renewal Concurrence"), and affirmed their confirmation with on February 29, 2012 (the "2012 CZM Confirmation"). JWRA provides ten (10) separate factual bases for their challenge. *See* Exhibit A at 2-3. An analysis of each basis is provided below, which demonstrates that none of JRWA's factual claims has merit.

Allegations regarding Pilgrim's NPDES permit status and compliance (Issues #1, 2, and 10).

JRWA acknowledges that Pilgrim's National Pollution Discharge Elimination System Permit ("NPDES") permit is current, having been administratively continued, but alleges – without support – instances by Pilgrim of supposed noncompliance with its NPDES permit terms, as well as federal and Commonwealth requirements relating to cooling water systems. *See* Exhibit A at 2.

JRWA is in error. First, Pilgrim's current NPDES permit expressly memorializes Pilgrim's compliance with the cooling water system requirements of the CWA and Commonwealth law. *See* National Pollutant Discharge Elimination System (NPDES) Permit modification for Pilgrim Nuclear Power Station (NPDES #MA0003557) (Aug. 30, 1994), Section A(1)(i), p. 3 of 15 ("It has been determined, based on engineering judgment, that the circulating water intake structures presently employs the best available technology for minimizing adverse environmental impacts. ... The present design shall be reviewed for conformity to regulations pursuant to Section 316(b) of the Act when such are promulgated."). Unless and until either the U.S. Environmental Protection Agency ("EPA") or the Commonwealth successfully issue a renewed or modified final NPDES permit with different terms, Pilgrim's existing system remains, as it has to date, officially and finally authorized.

JRWA's claims about Pilgrim's alleged noncompliance likewise are incorrect. EPA is mid-process in a federal rulemaking to address cooling water systems, *see* EPA, National Pollutant Discharge Elimination System – Cooling Water Intake Structures at Existing Facilities and Phase I Facilities, Proposed Rule, 76 Fed. Reg. 22174 (Apr. 20, 2011) (hereinafter "Proposed Rule"), which means that EPA's current direction for power plants, such as Pilgrim Station, remains unknown. What is known is that EPA's official position with respect to Pilgrim in its prior (now suspended on other grounds) rulemaking was that Pilgrim Station needed to take no additional action. *See* EPA, National Pollutant Discharge Elimination System – Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities, Final Rule, 69 Fed. Reg. 41576, 41677 (July 9, 2004) (allocating no EPA Technology upgrade costs to Pilgrim); EPA, National Pollutant Discharge Elimination System – Suspension of Regulations Establishing Requirements for Cooling Water Intake Structures at Phase II Existing Facilities, Suspension of Final Rule, 72 Fed. Reg. 37107 (July 9, 2007) (suspending the rule).

JRWA's claims about "new" Commonwealth law cannot be reconciled with the findings of the Massachusetts Supreme Judicial Court (the "SJC"), which reviewed the Massachusetts Department of Environmental Protection's ("MDEP") cooling water intake structure regulations, and concluded that the regulations contained no new substantive requirements. *See Entergy Nuclear Generation Co. v. Dep't of Envtl. Prot.*, 459 Mass 319, 327 (2011) ("The literal terms of the regulations go no further than declaring that the department has the authority to regulate CWISs.") (emphasis in original). Consequently, it is not possible for Pilgrim to be in non-compliance with the new regulations, as JRWA contends.

Finally, JWRA's claims regarding Entergy's non-compliance with its NPDES permit biological monitoring requirements are vague and unclear. Entergy has provided, on a yearly basis and via certified mail, plans for its yearly Biological Monitoring program to MDEP, and to EPA, as required by Section A.8 of its NPDES permit. *See, e.g.*, Correspondence from Stephen Bethay, Entergy to EPA and MDEP (Dec. 16, 2010) (providing its 2011 Biological Monitoring program for the agencies' consideration). Since 1999, both EPA and MDEP have failed to reply to Entergy's Biological Monitoring program submission. Further, Entergy understands that the Pilgrim Advisory Technical Committee ("PATC") stopped formally meeting in approximately 2001. Yet, Entergy still provides, on a yearly basis, copies of its annual Marine Ecology Reports to the individuals that sat on the PATC when it stopped meeting. *See, e.g.*, Correspondence from Jacob Scheffer, Entergy, to Dr. Todd Callaghan, MA Coastal Zone Management Office (May 11, 2009) (enclosing "a copy of Pilgrim Nuclear Power Station's Annual Marine Ecology Studies Report for 2008"). Occasionally, Entergy receives questions on the Biological Monitoring program from PATC agency members, but no substantive comments have been received from the PATC since it stopped formally meeting.

Allegations relating to River Herring (#4)

JWRA claims that "[s]ince 2006, Entergy has annually violated the state's moratorium on the taking of river herring 322 CMR 6.17(3), and river herring is now a candidate species under the [ESA]." *See* Exhibit A at 2.

To the contrary, Massachusetts's moratorium on the "taking" of river herring is a restriction placed only on commercial and recreational fishing, such that Pilgrim cannot be in violation of it. The moratorium referenced by JRWA, entitled "Taking and Possession of River Herring in Waters under the Jurisdiction of the Commonwealth," is enforced by the Massachusetts Department of Marine Fisheries ("MDMF"). *See* MDMF, Marine Fisheries Regulation Summaries (July 2011), *available at*: http://www.mass.gov/dfwele/dmf/commercialfishing/reg_summary_062411.pdf (summarizes fishing regulations administered by MDMF). Importantly, and as JRWA fails to mention, the specific statute that authorizes MDMF, M.G.L. c. 130 § 17A, allows MDMF to promulgate regulations governing fishing activities, not power plants. *See* M.G.L. c. 130 § 17A; *see, e.g.*, 322 CMR 3.02 ("Taking of White Perch from the Agawam River, Wareham"); 3.05 ("Taking of Anadromous Fish, Except Alewives and River Herring, in the Territorial Waters of Massachusetts"); and 3.06 ("Taking of Coho Salmon (Oncorhychus kisutch)); 322 CMR 6.01 ("Lobster Maximum and Minimum Sizes"); and 6.07 ("Striped Bass Fishery"). As such, it is incorrect as a matter of law to state that Pilgrim Station is "in violation" of the moratorium, and, moreover, would be wholly inappropriate to import a regulation that manages marine fisheries into the NRC relicensing context.[1]

Allegations regarding ESA, MESA and Related Species (# 5, 6 and 7)

JRWA asserts that the 2006 License Renewal Concurrence should be suspended because Entergy (and by extension the CZM Office) have somehow failed to adequately address or acknowledge the potential impact of Pilgrim's continued operation on certain aquatic and terrestrial species listed as endangered, threatened, or otherwise protected under the federal Endangered Species Act ("ESA"), 16 U.S.C. §§ 1531 *et seq.*, the Massachusetts Endangered Species Act ("MESA") M.G.L. c. 131A, and/or the federal Marine Mammal Protection Act ("MMPA"), 16 U.S.C. §§ 1362 *et seq. See* Exhibit A at 2.

To the contrary and as JRWA is aware based upon both the NRC Staff's and Entergy's response to its proposed new contention in the NRC License Renewal proceeding: (1) appropriate consideration was given to all relevant listed species having a reasonable potential to occur at or in the vicinity of Pilgrim; (2) continued operation of Pilgrim is not expected to have a discernible effect on any such species; [2] and, as such (3) the CZM Office's 2006 License Renewal Concurrence (and its 2012 CZM Confirmation) was in all respects legally and factually sound.

First, the CZM Office's federal consistency review is limited to a review of the proposed License Renewal for compliance with the enforceable Massachusetts coastal zone management program policies (the "MCZM Policies"). *See* 301 CMR 21.07(3)(f) and 21.98(1) (outlining MCZM Policies and scope of federal consistency review by the CZM Office); *see also* 15 C.F.R. § 930.63(a), (b) and (c) (state agency objections must either "describe how the proposed activity is inconsistent with specific enforceable policies of the management program," or "be based upon a determination that the applicant failed ... to supply the information required"). As such,

1 The fact that National Marine Fisheries Service ("NMFS") recently declared river herring to be a "candidate species" for ESA listing does not change this calculus. *See* NMFS, Listing Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition To List Alewife and Blueback Herring as Threatened Under the Endangered Species Act, 76 Fed. Reg. 67652 (Nov. 2, 2011). The ESA's procedural and substantive requirements, as embodied in the Section 7 consultation between NMFS and NRC, apply only to species that have been listed as "endangered" or "threatened" or, at a minimum, formally proposed for listing. *See* 16 U.S.C. § 1536(a), (c). Indeed, NMFS has explicitly stated that "designation [as a candidate species] does not confer any procedural or substantive protections of the ESA on the candidate species." *See* NMFS, Endangered and Threatened Species; Establishment of Species of Concern List, Addition of Species to Species of Concern List, Description of Factors for Identifying Species of Concern, and Revision of Candidate Species List Under the Endangered Species Act, 69 Fed. Reg. 19975, 19976 (Apr. 15, 2004). Furthermore, river herring are not a protected species under the Massachusetts Endangered Species Act ("MESA"), M.G.L. c. 131A. *See* 321 CMR 8.01, 10.90 (official list of MESA-protected species). Thus, JWRA's assertion that river herring are an ESA "candidate species" is legally irrelevant to the CZM Office's 2006 License Renewal Concurrence or its 2012 CZM Confirmation.

2 NRC Staff's Answer to Jones River Watershed Association and Pilgrim Watch's Petitions for Leave to Intervene and Motions to Reopen the Record (March 19, 2012); Entergy's Answer Opposing Jones River Watershed Association's and Pilgrim Watch's Motion to Reopen and Hearing Request (March 19, 2012); NRC Staff's Answer to Correction and Supplement to Jones River Watershed Association and Pilgrim Watch's Petitions to Intervene and Motions to Supplement (March 26, 2012).

evaluation of ESA, MESA and MMPA considerations during consistency review is appropriate solely to the extent it is part of the enforceable MCZM Policies.

As an initial matter, evaluation of MMPA-specific species is neither required, nor authorized, during federal consistency review, because the MMPA is incorporated into none of the enforceable MCZM Policies.[3] *See* 301 CMR 21.98 (setting forth the enforceable MCZM Policies); Massachusetts Office of Coastal Zone Management, Policy Guide (Oct. 2011) (hereinafter, "Policy Guide") (failing to identify the MMPA as a source of law for the enforceable MCZM Policies). Further, while MESA provides authority for select MCZM Policies, *i.e.*, Energy #1; Habitat #1, #2; Ocean Resources #1, #2, the operative prohibition is on the unauthorized "take" of relevant MESA-listed species, including species listed under the federal ESA, or the alteration of significant habitat of ESA- or MESA-listed species. *See* Policy Guide at 147 (identifying MESA as a source of law for certain MCZM Policies); 321 CMR 10.03(4) (species "listed as endangered or threatened under the provisions of the Federal Endangered Species Act shall be listed in an equivalent category on the state list"); 321 CMR 10.00 (rules and prohibitions regarding activities which "take" MESA-listed species or alter designated significant habitats). Thus, to implicate the ESA or MESA, a credible "take" must be established.

In fact, however, JRWA provides no evidence that Pilgrim's operations take ESA or MESA-listed species or alter significant habitats for such species. To the contrary, Entergy's and NRC's reviews of ESA, MESA and, to the extent overlapping, MMPA-listed species indicate that no "takes" are reasonably considered to have occurred, a conclusion with which the federal agencies that implement the ESA appear to agree. *See* Correspondence from Michael J. Amaral, USFWS to Rani Franovich, NRC (May 23, 2006) (referencing correspondence that concurs with Entergy's determination that License Renewal is not likely to adversely affect federally-listed species under USFWS jurisdiction); Correspondence from Daniel S. Morris, NMFS to Andrew S. Imboden, NRC (Mar. 26, 2012) (hereinafter, "NMFS' March 2012 Correspondence") (responding to NRC's request for a concurrence in the ESA Section 7 consultation).

Nor can JRWA credibly claim that Entergy's consistency certification was legally or substantively insufficient to support the CZM Office's issuance of the 2006 License Renewal Concurrence. In preparing the NRC-mandated Environmental Report ("ER") for Pilgrim's License Renewal Application, Entergy consulted with the Massachusetts Division of Fisheries and Wildlife ("MADFW") to consider species listed as endangered or threatened under MESA, *see* Entergy, License Renewal Application, Pilgrim Nuclear Power Station, Environmental Report Appendix E § 2.5 & Table 2.1 (Jan. 27, 2006) (hereinafter, "ER"), and to identify

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[3] To the extent that enforceable MCZM Policies require an evaluation of impacts to certain marine mammals that may also fall under purview of the MMPA, Pilgrim's Environmental Report ("ER") addressed those species in the manner necessary. Specifically, and as discussed below, the ER describes the environmental impacts of continued operation of Pilgrim and its once-through cooling water system. *See* Entergy, License Renewal Application, Pilgrim Nuclear Power Station, Environmental Report Appendix E § 4.0 (Jan. 27, 2006) (hereinafter, "ER"). In addition, the ER specifically evaluates potential impacts to threatened and endangered whale species that may occur in Cape Cod Bay. *Id.* at § 4.10.5. As such, the information provided in the ER is more than adequate to demonstrate that impacts to relevant marine mammals are not reasonably expected to occur in connection with Pilgrim's License Renewal, such that any evaluation of impacts to marine mammals required by the MCZM Policies is satisfied.

important habitat, *see* ER at § 2.4, as required by NRC regulations on the preparation of License Renewal applications *See* 10 C.F.R. 51.53(c)(3)(ii)(E) ("All license renewal applicants shall assess the impact of refurbishment and other license-renewal-related construction activities on important plant and animal habitats. Additionally, the applicant shall assess the impact of the proposed action on threatened or endangered species in accordance with the [federal] Endangered Species Act."). Indeed, Entergy's ER catalogued more than 80 state-listed endangered and threatened plants and animals believed at that time to potentially occur in the general vicinity of Pilgrim or in Plymouth County. *See* ER at Table 2-1.

The ER went on to specifically address no less than fifteen endangered and threatened species by name, including three of the four species (hawksbill sea turtle, humpback whale, and roseate tern) inexplicably identified in JRWA's letter as having been "ignored or inadequately assessed."[4] *Compare* Exhibit A at 2 *to* ER at § 2.5. Importantly, and as both the ER and the NRC's *Biological Assessment of the Potential Effects on Endangered or Threatened Species from the Proposed License Renewal for the Pilgrim Nuclear Power Station* (the "Biological Assessment") make clear, the hawksbill turtle, humpback whale, and roseate tern have not been observed at Pilgrim; indeed, as a function of their individual habitat, feeding, and/or nesting preferences, none of those species can be reasonably expected to encounter Pilgrim's cooling water system or otherwise be impacted by the Pilgrim's continued operation. *See* ER at § 2.5; NRC, *Biological Assessment of the Potential Effects on Endangered or Threatened Species from the Proposed License Renewal for the Pilgrim Nuclear Power Station* at § 5.0 (Dec. 2006) (prepared as part of the federal ESA Section 7 consultation between NRC and NMFS for License Renewal).

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4 Further, there is no credible evidence that the fourth MESA-species identified by JRWA – the arctic tern – has been or plausibly could be affected by Pilgrim's operations. By way of clarification, the arctic tern is not listed as endangered or threatened under federal or state law, but has been designated a species of special concern under MESA. 321 CMR 10.90. This bird occurs as far north as British Columbia, northern Manitoba and Quebec, and as far south as South Africa and the Antarctic ice pack. MADFW, Natural Heritage Endangered Species Program, Arctic Tern Fact Sheet at 1 (Aug. 2008), *available at*: http://www.mass.gov/dfwele/dfw/nhesp/species_info/nhfacts/sterna_paradisaea.pdf. Arctic terns are known to occur in Massachusetts during their breeding season (roughly May to August). *Id.* However, because Massachusetts is at the southern-most edge of the arctic tern's breeding range, it is possible that this species will always occur in limited numbers in the state, irrespective of any peaks or declines in population. *Id.* at 2. Furthermore, the arctic tern's preferred nesting habitat is comprised of sandy, gravelly areas on islands and barrier spits. *Id.* at 1. While arctic terns occasionally occur on mainland shores, *id.*, these birds are not known to nest or breed in the immediate vicinity of Pilgrim. Nor does JRWA contend this species has actually been observed at or in the immediate vicinity of Pilgrim. Finally, MADFW identifies predation and human disturbance, not power plant operations, as causes of the arctic tern's decline. *Id.* at 2. Pilgrim's site even provides undisturbed beach habitat and limits human disturbance for security purposes. *See* NRC, Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 29 Regarding Pilgrim Nuclear Power Station Final Report, 2-87 (Jul. 2007) (hereinafter, "FSEIS"), available at: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1437/supplement29/v1/sr1437s29v1.pdf. Further, impacts to the arctic tern's prey (*e.g.*, sand lance and herring, *see* Arctic Tern Fact Sheet at 1, from impingement at Pilgrim were evaluated in the ER and found to be small. ER at § 4.3. Under these circumstances, consideration of this species is not reasonably warranted in connection with Pilgrim's License Renewal.

As required by the CZMA and the CZM Office's regulations, *see* 15 C.F.R. § 930.58(a)(1)(i); 301 CMR 21.07(3)(a); Policy Guide at 11-12, Pilgrim's ER was provided to the CZM Office with its consistency certification. Pilgrim's consistency certification appropriately concluded "that [Pilgrim's] impacts to these [MESA-listed] species are small during current operations and [Pilgrim] has no plans that would change this conclusion for the [L]icense [R]enewal term." Consistency Certification at 7. The information Pilgrim provided to the CZM Office was more than adequate for the CZM Office to concur with Pilgrim's conclusions on the impacts to threatened and endangered species that are expected to occur during License Renewal and fully supports issuance of the 2006 License Renewal Concurrence.

JRWA's attempts to rely on a March 26, 2012 National Marine Fisheries Service ("NMFS") correspondence to make its case on potential impacts. *See* Exhibit A at 2. JRWA neglects to mention NMFS's conclusion in that correspondence that it "may be able to conclude that [License Renewal] may affect, <u>but is not likely to adversely affect</u>, any NMFS listed species [which] is the appropriate conclusion of a Section 7 consultation <u>when listed species or critical habitat are present in the action area, but effects of an action are wholly beneficial, insignificant, or discountable</u>." NMFS' March 2012 Correspondence at 1-2 (emphasis supplied). In short, while the March 26, 2012 letter may reflect NMFS's semantic disagreement with NRC's chosen terminology, it confirms NRC's substantive findings, and therefore underscores the infirmity of JRWA's request.

Allegations regarding Tritium (#8)

JRWA identifies, among its ten (10) enumerated concerns, the presence in groundwater of tritium, a naturally occurring, ubiquitous and low-energy or weak beta particle. *See* Exhibit A at 2; NRC, Fact Sheet Tritium, Radiation Protection Limits, and Drinking Water Standards 2 (Feb. 2011) (hereinafter, "Tritium Fact Sheet"), *available at*: http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/tritium-radiation-fs.html (describing tritium).

Contrary to JRWA's implied assertion, this issue is not reasonably construed as a new concern. Rather, the issue of the potential presence of tritium in groundwater at nuclear power plants is one NRC began to address on a nationwide basis in 2006. *See* Tritium Fact Sheet at 1. At that time, the identification of tritium in groundwater at certain nuclear power plants precipitated parallel industry-led and NRC-initiated investigations and reviews of conditions at the majority of nuclear power plants throughout the nation, including at Pilgrim Station. *See, e.g.,* NRC, Liquid Radioactive Release, Lessons Learned Task Force, Final Report i-iv (Sept. 1, 2006), *available at*: http://pbadupws.nrc.gov/docs/ML0626/ML062650312.pdf. At Pilgrim, a comprehensive hydrological assessment has been performed, with an array of multiple monitoring wells that continue to monitor tritium conditions even today. *See, e.g.,* Environmental Resources Management, Groundwater Investigation Report for Pilgrim Nuclear Power Station, 5 (prepared on behalf of Entergy Nuclear Operations, Inc.) (Nov. 1 2010) (hereinafter, "ERM Report") (describing Pilgrim's groundwater monitoring activities); Entergy, Pilgrim Nuclear Power Station, Annual Radioactive Effluent Release Report, January 1 through December 31, 2010, 69 (2010) (hereinafter, "Annual Radioactive Effluent Release Report"). This assessment focused on the levels of tritium in groundwater in and around the site and hydrological conditions, among other factors. *See* Annual Radioactive Effluent Release Report at 69-70; ERM Report at 1. No drinking water wells are present at Pilgrim, or in the near vicinity. *See* ER at § 2.3. Moreover, Pilgrim's groundwater assessment showed no tritium in the majority of on-site monitoring wells, with tritium present at extremely low levels in select monitoring wells, thus underscoring the insignificance of the tritium conditions at Pilgrim Station. *See* ERM Report at 26; Annual Radioactive Effluent Release Report at 71-73.

At all times during which monitoring has occurred, *i.e.*, from 2007 to date, conditions at Pilgrim have been within NRC limits for radionuclides, *see* Annual Radioactive Effluent Release Report at 74, limits that ensure that radionuclides are maintained at levels considered "as low as reasonably achievable," and without credible potential human health or environmental consequences. *See, e.g.*, 10 C.F.R. §§ 20.1003 (defining "as low as reasonably achievable"), 20.1101 (proscribing "as low as reasonably achievable" standard). Notably, NRC performed an independent assessment of Pilgrim's analysis. As the NRC's ongoing assessment reflects, Pilgrim's highest concentration of tritium was comparable to the levels that EPA has authorized for drinking water providers at the tap. *Compare* NRC, List of Historical Leaks and Spills At U.S. Commercial Nuclear Power Plants (Rev. Dec. 2, 2011), *available at*: http://pbadupws.nrc.gov/docs/ML1012/ML101270439.pdf (reflecting a highest concentration of approximately 25,000 picocuries per liter), *to* Tritium Fact Sheet at 6 ("EPA set a maximum contaminant level of 20,000 picocuries per liter (pCi/L) for tritium" based on the assumption that this level yields a dose of 4 mrem per year," though later science has shown that 20,000 pCi/L yields a dose less than 4 mrem). Likewise, NRC's assessment confirms that Pilgrim's current tritium levels are a fraction of the EPA-authorized drinking water levels (again, measured at the tap). *Id.* Further, levels of tritium in Pilgrim's monitoring wells are decreasing. *See* Correspondence from Joesph Lynch, Entergy to Tom Hinchliffe, Massachusetts Department of Public Health (enclosing groundwater monitoring samples from the week of March 20, 2012 which demonstration "a decreasing trend"). For these reasons, JRWA's claim of a new tritium condition of concern is both factually inaccurate, as these conditions have been known for some time, but also strains credulity, since the condition in question is one that is improving over time.

Second, JRWA's position, insomuch that it suggests the CZM Office can address radiological considerations, controverts the clear law of federal preemption. Controlling federal precedent holds that NRC retains exclusive jurisdiction over all radiological hazards posed by NRC-licensed nuclear power plants. *See, e.g., Northern States Power Co. v. Minnesota*, 447 F.2d 1143, 1149-50 (8th Cir. 1971) ("states possess no authority to regulate radiation hazards unless pursuant to the execution of an agreement surrendering federal control over the three categories authorized under § 2021(b)," not at issue here); *Pacific Gas & Elec. Co. v. State Energy Resources Conservation and Development Comm'n*, 461 U.S. 190, 210 (1983) (quoting § 2021(k) and finding that Congress, "by permitting [State] regulation 'for purposes other than protection against radiation hazards' underscored the distinction drawn in 1954 between the spheres of activity left respectively to the Federal Government and the states."); *Illnois. v. Kerr-McGee Chemical Corp.*, 677 F.2d 571, 581 (7th Cir. 1982) ("In line with [other federal cases], we hold that the Atomic Energy Act has expressly and impliedly preempted regulation by the states of the radiation hazards associated with nuclear materials."); *Entergy Nuclear Vermont Yankee, LLC v. Shumlin*, No. 1:11-cv-99, 2012 WL 162400,*36 (D. Vt., Jan. 19, 2012) (striking Vermont's attempt to regulate the relicensing of the Vermont Yankee nuclear power plant based on the conclusion that the state's attempted regulation was both motivated by radiological safety concerns and had the effect of regulating radiological safety aspects of the operation of an NRC-regulated nuclear facility). In short, the case law is clear that the federal government reserves all authority to regulate radiation hazards associated with NRC-licensed power plants. JRWA's efforts to have the CZM Office reopen its review on the basis of tritium conditions at Pilgrim cannot be reconciled with this precedent.

Allegations relating to EFH (#9)

JRWA contends that NRC failed to complete an Essential Fish Habitat ("EFH") consultation with NMFS as required by the Magnuson-Stevens Fishery Conservation and Management Act ("MSA"), 16 U.S.C. § 1855(b), or that such consultation has been postponed indefinitely during the NPDES permit renewal process. *See* Exhibit A at 3. This contention is incorrect as a matter of law and fact.

First, it is simply incorrect that NRC has failed to complete an EFH consultation with NMFS in relation to the Pilgrim license renewal. In 2006, NRC contacted NMFS requesting information regarding potential EFH in the vicinity of PNPS. *See* Appendix E to the FSEIS, *available at*: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1437/supplement29/v2/sr1437s29v2.pdf. On June 8, 2006, NMFS responded with the requested information and NRC prepared an EFH Assessment that it submitted to NMFS (along with the Biological Assessment) on December 8, 2006. *See* FSEIS at E-38, E-80. On January 23, 2007, NMFS sent a letter to NRC that concurred with NRC's findings and "conclude[ed] the EFH consultation under the MSA." FSEIS at E-45. The NRC subsequently published the EFH Assessment for Pilgrim in the FSEIS. *See* FSEIS at E-38, E-79. Therefore, NRC in fact completed the EFH consultation, as JRWA elsewhere has acknowledged. *See* Correction and Supplement at 2.[5]

Moreover, JWRA's claim that NRC has postponed its EFH consultation indefinitely misreads applicable law. Section 305 of the MSA requires, among other things, that if NMFS receives information that a proposed action would adversely affect any essential fish habitat, NMFS "shall recommend to such agency measures <u>that can be taken</u> by such agency to conserve such habitat." 16 U.S.C. § 1855(b)(4). However, and necessarily, NMFS's implementing regulations specifically acknowledge the jurisdictional limitations of federal agencies, providing that "<u>NMFS will not recommend that state or Federal agencies take actions beyond their statutory authority</u>." 50 C.F.R. § 600.925(a). Thus, as detailed above, the EFH process cannot extend NRC's authority to address Pilgrim's cooling water system; rather, that remains EPA's exclusive role, as NMFS has recognized. Indeed, in its January 23, 2007 letter, NMFS expressly acknowledged NRC's jurisdictional limitations, conceding that "EFH would be most

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[5] Correction and Supplement to: 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), Originally Filed on March 8, 2012 in the above Captioned License Renewal Proceeding (March 15, 2012) (ADAMS No. ML12075A029) ("Correction and Supplement").

appropriately addressed through the EPA's NPDES permit renewal process." FSEIS at E-44.[6] JRWA offers no legal basis to circumvent NMFS, NRC and EPA's jurisdictional limitations, and Entergy is aware of none.

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6 By letter dated May 25, 2001, NMFS issued a finding under 50 C.F.R. § 600.920(e) accepting EPA's environmental review process under the NPDES permit system to satisfy the EFH consultation requirements for those projects under EPA's direct authority. *See* Correspondence from Rolland A. Schmitten, NMFS to Michael B. Cook, EPA (May 25, 2011), *available at* http://sero.nmfs.noaa.gov/hcd/pdfs/efhdocs/20010525_NMFS_EPA_Findings.pdf.

EXHIBIT C

Pilgrim Nuclear Power Station's National Pollutant Discharge Elimination System permit, August 30, 1994

MODIFICATION OF AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Clean Water Act, as amended, (33 U.S.C. §§1251 et seq.; the "CWA"), and the Massachusetts Clean Waters Act, as amended, (M.G.L. Chap. 21, §§26-53),

Boston Edison Company
Pilgrim Nuclear Power Station
800 Boylston Street
Boston, Massachusetts 02199

is authorized to discharge in accordance with effluent limitations, monitoring requirements and other conditions set in the previous permit, except as set forth herein and listed as follows:

1. Page 9, Par. I.A.4 has been changed for the new flow rate for Discharge 003.
2. Page 9a, Par. I.A.4a has been added for the new Discharge 008.
3. Page 2, Par. I.A.1.a.(2) change word from "daily" to "monthly" (typographical error).
4. Page 5, Par. I.A.m. delete "shall" and "circulating" (typographical errors) and add " 'no more than' 20,000 gallon batches " (clarification).
5. Page 7, Par I.A.2.e add "from April 1 to November 30 each year" (clarification).
6. Page 12, Par. I.A.7.i clarify Discharge #005 contents.

This modifies the permit issued on April 29, 1991.

This permit modification shall become effective on the date of issuance.

This permit modification and the authorization to discharge shall expire at midnight, April 29th, 1996.

Signed this 30th day of August 1994

Edward K. McSweeney
Director
Water Management Division
Environmental Protection Agency
Region I
Boston, MA

Director of the Office of Watershed Management
Department of Environmental Protection
Commonwealth of Massachusetts
Boston, MA

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. Except as specified in Paragraphs 1 through 8 herein, the permittee shall not discharge to Cape Cod Bay, a final effluent to which it has added any pollutants.

a. Chlorine may be used as a biocide. No other biocide shall be used without explicit approval from the Regional Administrator and the Director.

(1) The chlorination cycle for the circulating cooling water systems shall not exceed two hours in any one day for one cooling water point source unless the discharger demonstrates to the EPA and the State that discharge for more than two hours is required for macroinvertebrate control. The Total Residual Oxidant concentration shall not exceed 0.10 mg/l in the plant discharge prior to release into Cape Cod Bay.

(2) Continuous chlorination of each service water system may be used for macroinvertebrate control. The Total Residual Oxidant concentration shall not exceed a maximum daily concentration of 1.00 mg/l nor exceed an average monthly concentration of 0.50 mg/l in the service water discharge prior to mixing with any other stream.

(3) The use of any molluscicide for controlling macroinvertebrate growths must be approved by the Regional Administrator and the State before implementation.

b. The discharges shall not jeopardize any Class SA use of Cape Cod Bay and shall not violate applicable water quality standards.

c. This permit shall be modified, revoked or reissued to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 207(a)(2) of the Act, if the effluent standard or limitation so issued or approved:

(1) contains different conditions or is otherwise more stringent than any effluent limitation in this permit; or

(2) controls any pollutant not limited by this permit.

If the permit is modified or reissued, it shall be revised to reflect all currently applicable requirements of the Act.

d. The term "EPA" means the Regional Administrator of Region I of the U. S. Environmental Protection Agency or his designee and the term "State" means the Director of the Divison of Water Pollution Control of the Massachusetts Department of Environmental Protection or his designee.

e. There shall be no discharge of polychlorinated biphenyl compounds commonly used for transformer fluid.

f. 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.

g. The rate of change of Discharge 001 Delta-T shall not exceed: (1) a 3 °F rise or fall in temperature for any 60-minute period during normal steady state plant operation and (2) a 10 °F rise or fall in temperature for any 60-minute period during normal load cycling. Variation in inlet temperature shall not be considered as an operational rise or fall of temperature. Normal startup temperature rise shall not exceed the maximum allowed in Subparagraph I.A.2.a below. In the event of a reactor emergency shutdown, the allowable decrease of 10° F/hour may be exceeded. In such an event, the permittee shall report the occurrence in the next monthly DMR to EPA and the State.

h. The thermal plumes from the station:

(1) shall not deleteriously interfere with the natural movements, reproductive cycles, or migratory pathways of the indigenous populations within the water body segment;

(2) shall have minimal contact with the surrounding shorelines.

i. It has been determined, ~~based on engineering judgment,~~ that the circulating water intake structures presently employs the best technology available for minimizing adverse environmental impact. Any change in the location, design or capacity of the present structure shall be approved by the Regional Administrator and the Director. The present design shall be reviewed for conformity to regulations pursuant to Section 316(b) of the Act when such are promulgated.

j. The effluent shall not contain materials in concentrations or combinations which are hazardous or toxic to aquatic life or which would impair the uses designated by the classification of the receiving waters.

k. All existing manufacturing, commerical, mining, and silvacultural dischargers must notify the Director as soon as they know or have reason to believe (40 CFR §122.42):

(1) That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant (as defined in 40 CFR §122.2) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"

(a) One hundred micrograms per liter (100 ug/l);

(b) Two hundred micrograms per liter (200 ug/l)

for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4 , 6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony;

(c) Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 C.F.R. §122.21(g)(7); or

(d) Any other notification level established by the Director in accordance with 40 C.F.R. §122.44(f).

(2) That any activity has occurred or will occur which would result in the discharge, on a non-routine or infrequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"

(a) Five hundred micrograms per liter (500 ug/l);

(b) One milligram per liter (1 mg/l) for antimony;

(c) Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 C.F.R. §122.21(g)(7); or

(d) Any other notification level established by the Director in accordance with 40 C.F.R. §122.44(f).

(3) That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the permit application.

l. The discharge of radioactive materials shall be in accordance with the Nuclear Regulatory Commission operational requirements (10 CFR 20 and NRC Technical Specifications set forth in facility operating license, DPR-35).

m. Sodium pentaborate shall be discharged in no more than 20,000 gallon batches at a maximum concentration of 16,500 mg/l calculated as boron. The boron concentration shall not exceed 1.0 mg/l (by calculation) above background in Discharge 001 at the point of release into Cape Cod Bay. The maximum concentration of boron in the storage tanks and/or dilution provided by the cooling water pumps' flow shall be controlled, if necessary to satisfy the 1.0 mg/l boron discharge criteria. (Nominally the maximum flow rate from the storage tanks into Discharge 001 will not exceed 200 gpm to satisfy the 1.0 mg/l boron criteria.) A cooling-water pump must be in operation during a sodium pentaborate release to ensure proper sodium pentaborate dilution. Each release of boron will be reported in the appropriate DMR providing the date (s) of discharge, gallons discharged, the concentration of the boron in the tank before release, and the calculated boron concentration in Discharge 001 before mixing with Cape Cod Bay water.

n. Sodium nitrite shall be discharge from the station closed loop cooling water systems and heating system into Discharge 011 and from fire water storage tanks, condensate storage tanks, and demineralized water storage tanks into Discharge 001. The discharge of sodium nitrite shall not exceed 2.0 mg/l (by calculation) in Discharge 001 before release into Cape Cod Bay water. Each release shall be reported in the appropriate DMR providing the gallons discharged, the concentration of the sodium nitrite in the water discharged, and the calculated sodium nitrite in Discharge 001 before mixing with Cape Cod Bay Water.

o. Sand may be removed from the concrete surfaces of the intake structure when the sand buildup interferes with the normal operation of the rotating screen equipment posing a threat to the mechanical components. The sand may be disposed of on the land. Each such sand removal shall be reported in the appropriate DMR.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

2. During the period beginning Effective Date and lasting through Expiration Date, the permittee is authorized to discharge from outfall(s) serial number(s) 001, Condenser Cooling Water.

a. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Avg. Monthly	Max. Daily	Measurement Frequency	Sample Type
Flow, MGD	447.0	510.0	Continuously*	Daily Avg. & Max.
Total Residual Oxidants (mg/l)	0.1	0.1	When in use	Grab
Temperature (Maximum), T_{Max}, °F	-	102	Continuously	Daily Max.
Temperature Rise (Maximum), Delta-T, °F**	-	32	Continuously	Daily

* The flow rate shall be estimated from pump capacity curves and operational hours.
** Temperature Rise is defined as the difference between the cooling water discharge temperature and the intake temperature.

b. The pH shall not vary by more than 0.5 standard units from that of the intake water.

c. There shall be no discharge of visible oil sheen, foam, or floating solids in other than trace amounts except in cases of condenser leak seeking and sealing. In such cases, the use of a reasonable quantity of biodegradable and non-toxic material may be used to the extent necessary to find and/or seal the leak. Each month the permittee shall report the time and estimated amounts of such material used.

d. Samples taken in compliance with the monitoring requirements specified above shall be at any representative point in the discharge canal prior to release into Cape Cod Bay.

e. The permittee shall maintain a barrier net as near to the terminal end of the discharge canal as good engineering practice wi.ll allow. Except for changing nets or other barrier maintenance, it shall prevent fish entry into the canal from April 1 to November 30 each year when the plant is operating.

f. If EPA or the State determine that the physical barrier net required by Subparagraph "e" above does not effectively prevent the mortality of menhaden or other finfish, the permittee shall, from the date of said determination, maintain an average dissolved nitrogen saturation level of less than 115%. The dissolved nitrogen saturation level is defined as the dissolved nitrogen saturation at the surface layer of the canal at the point of discharge into the bay during periods of time when a school of menhaden or other finfish susceptible to mortality from gas bubble disease is detected in or near (within 0.5 mile of the canal) the discharge canal by the program developed under Paragraph 8(b) below. After it has been determined by representatives of the permittee, EPA and the State that fish as mentioned above are within the prescribed area, the permittee shall as soon as possible take the necessary steps to reduce the dissolved nitrogen saturation level to the permitted level.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

3. During the period beginning Effective Date and lasting through Permit Expiration Date the permittee is authorized to discharge from outfall(s) serial number(s) 002. Thermal Backwash for Bio-fouling Control.

a. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Avg. Monthly	Max. Daily	Measurement Frequency	Sample Type
Flow, MGD	-	255.0	When in use	Estimate*
Temperature (Maximum), °F	-	120	Continuous	Report Avg. and Max.

* Flow rate is to be estimated as if backflushing took place for 24 continuous hours.

b. The discharge shall not be more frequent than three hours a day twice a week for those periods when required the plant to operate most efficiently. Infrequent, abnormal environmental conditions may require this frequency to be doubled. These conditions will be described in the subsequent monthly DMR submittal.

c. The pH shall not vary more than 0.5 standard units from that of the intake water.

d. There shall be no discharge of floating solids, oil sheen, or visible foam in other than trace amounts.

e. Samples taken in compliance with the monitoring requirements specified above shall be taken at some representative point prior to discharge into the intake canal.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

4. During the period beginning Effective Date and lasting through Permit Expiration Date the permittee is authorized to discharge from outfall serial number(s) 003, Intake Screen Wash (Fish Sluice Water) effluent subject to the following conditions:

a. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristics	Discharge Limitations		Monitoring Requirements	
	Avg. Monthly	Max. Daily	Measurement Frequency	Sample Type
Flow - MGD	4.1	4.1	Daily	Estimate

b. The temperature of the discharge shall at no time exceed the temperature of the intake water used for this discharge.

c. The screen wash water shall consist of: (1) 3.2 MGD of Cape Cod Bay marine water and (2) 0.90 MGD of potable fresh water used as Station Fire Water. The marine water will be dechlorinated before injection. The Station Fire Water (0.90 MGD) shall be used only during emergency conditions when the screen operation is impeded by an accumulation of algae or other biological material. The Nuclear Regulatory Commission (NRC) must approve this use of the Station Fire Water as consistent with the overall station safety requirements. (Salt Service water bays)

d. All live fish, shellfish and other organisms collected or trapped on the intake screens should be returned to their habitat, sufficiently distant from the intake structure to prevent reimpingement.

e. The pH shall not vary more than 0.5 standard units from the intake pH.

f. There shall be no discharge of floating solids, oil sheen, or visible foam in other than trace amounts.

g. The flow rate and quantity of fire water used for this shall meet the Nuclear Regulatory Commission safety criteria.

h. Samples taken in compliance with the monitoring requirements specified above shall be taken at some representative point prior to discharge into receiving waters.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

4a. During the period beginning Effective Date and lasting through Permit Expiration Date the permittee is authorized to discharge from outfall serial number(s) 008, Sea Foam Suppression Discharge effluent subject to the following conditions:

a. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristics	Discharge Limitations		Monitoring Requirements	
	Avg. Monthly	Max. Daily	Measurement Frequency	Sample Type
Flow - MGD	0.73	0.73	Daily	Estimate

b. The temperature of the discharge shall at no time exceed the temperature of the intake water used for this discharge.

c. The Sea Form Suppression discharge shall consist of Station Fire Water (potable fresh water). The Fire Water (0.73 MGD) shall be used only during emergency conditions when the sea foam blanket near the intake structure could be blown by the wind into the transformer yard jeopardizing the electrical systems therein. The Nuclear Regulator Commission (NRC) must approve this use of the Station Fire Water as consistent with the overall station safety requirements.

d. The pH shall not vary more than 0.5 standard units from the Fire Water System pH.,

e. There shall be no discharge of floating solids, oil sheen, visible foam in other than trace amounts.

f. The flow rate and quantity of fire water used for this shall meet the Nuclear Regulatory Commission safety criteria.

g. Samples taken in compliance with the monitoring requirements specified above shall be taken at some representative point prior to discharge into the receiving waters.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

5. During the period beginning Effective Date and lasting through Permit Expiration Date the permittee is authorized to discharge from outfall(s) serial number(s) 010, Plant Service Cooling Water.

a. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Avg. Monthly	Max. Daily	Measurement Frequency	Sample Type
Flow, MGD	19.4	-	Continuous*	Daily Avg. and Max.
Total Residual Oxidants, mg/l	0.50	1.00	Continuous	Daily Avg. and Max.

* The flow rate shall be estimated from pump capacity curves and operational hours.

b. Continuous chlorination of the Plant Service Water System may be used for macroinvertebrate control.

c. Should the continuous TRO monitoring equipment become inoperative, manual grab samples taken once per day may be submitted in lieu of the continuous monitoring data.

d. Samples taken in compliance with the monitoring requirements specified above shall be taken at the heat exchanger before this stream mixes with any other stream going to the discharge.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

6. During the period beginning Effective Date and lasting through Permit Expiration Date the permittee is authorized to discharge from outfall(s) serial number(s) 011, Makeup Water and Demineralizer Waste Discharge.

a. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Avg. Monthly	Max. Daily	Measurement Frequency	Sample Type
Flow, MGD	0.015	0.06	When in use	Daily Avg. and Max., Estimate
Total Suspended Solids, mg/l	30	100.	Batch	Grab

b. The pH shall not be less than 6.1 standard units nor greater than 8.4 standard units.

c. Samples taken in compliance with the monitoring requirements specified above shall be taken at representative point prior to mixing any other stream.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

7. During the period Effective Date and lasting through Permit Expiration Date the permittee is authorized to discharge from outfall(s) serial numbers 004, 005, 006, and 007 yard drains, an effluent subject to the following conditions:

a. Such discharges shall be limited and monitored by the permittee as specified below:

	Effluent Characteristic		Discharge Limitations	
	Avg. Monthly	Max. Daily	Measurement Frequency	Sample Type
Flow - MGD	—	—	—	—
Total Suspended Solids, mg/l	30	100	2/year	Grab
Oil and Grease, mg/l	—	15.0	2/year	Grab

b. The discharge shall consist only of stormwater runoff.

c. The discharge shall not cause visible discoloration of or sheen upon the receiving waters.

d. There shall be no discharge of floating solids or visible foam in other than trace amounts.

e. The discharge shall not cause violation of the water quality standards of the receiving waters.

f. The pH shall not be less than 6.0 standard units nor greater than 8.5 standard units or not more than 0.2 standard units outside the naturally occurring range.

g. The discharge shall be monitored twice per year (once during the month of April and once during the month September). A grab sample shall be taken within the first hour of the start of a significant storm event. The data shall be reported by the 21st day of the month following the completed report period.

h. Samples taken in compliance with the monitoring requirements specified above shall be taken at some representative point prior to discharge to the receiving waters.

i. Yard Drain #005 may also accommodate demineralizer system and hydrogen injection system effluents within the permit limits except for a higher pH from the hydrogen system. The higher pH of the hydrogen system scrubber discharge of less than 10 gpm will be rapidly reduced to ambient marine water pH by the circulating cooling water discharge.

(add neutralizing sump waste + heating system effluent)

8. Biological Monitoring

a. Any incidence of fish mortality associated with the thermal plume or of unusual number of fish impinged on the intake traveling screens shall be reported to EPA and State immediately by telephone report as required in Part II of this permit. A written confirmation report is to be provided within five (5) days. These reports should include the following:

(1) The kinds, sizes, and approximate number of fish involved in the incident.

(2) The time and date of the occurence.

(3) The operating mode of the plant.

(4) The opinion of the company as to the reason the incident occured.

(5) The remedial action the company will take to prevent a reoccurrence of the incident.

b. The permittee shall 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.

c. The 1990 Environmental Monitoring Programs and plans, previously approved, becomes an integral element of this permit (Attachment A).

d. No later than December 31st of each year, the permittee shall submit to EPA and the State for approval any revisions of the existing biological monitoring program (Par. c above) which may be warrented by the availability of new information. Upon approval by the Regional Administrator and the Director, the revised program submitted in accordance with this paragraph shall be incorporated as a part of this permit. The permittee shall carry out the monitoring program under the guidance of the Pilgrim Technical Advisory Committee.

e. The permittee shall submit biological reports on semi-annual basis including an annual summary report.

f. All live fish, shellfish, and other aquatic organisms collected or trapped on the intake screens shall be returned to water of ambient temperature sufficiently distant from the intake structures to prevent reimpingement.

All solid materials except leaves and twigs removed from the screens shall be disposed of on land. All sluice waters employed in backwashing the intake screens shall be dechlorinated before use.

C. MONITORING AND REPORTING

1. Reporting

Monitoring results obtained during the previous month shall be summarized and reported on Discharge Monitoring Report Form(s) postmarked no later than the 21th day of the month following the completed reporting period. The first report is due on the 21st day of the month following the effective date of this permit.

Duplicate signed copies of these, and all other reports required herein, shall be submitted to the Regional Administrator and the State at the following addresses:

Environmental Protection Agency
Permit Processing Section
Post Office Box 8127
Boston, Massachusetts 02114

The State agency is:

Massachusetts Department of Environmental Protection
Massachusetts Division of Water Pollution Control
Southeastern Regional Office
Lakevile Hospital
Lakeville, Massachusetts 02358

Signed copies of all other notifications and reports required by this permit shall be submitted to the State at:

Massachusetts Department of Environmental Protection
Massachusetts Division of Water Pollution Control
Regulatory Branch - 7th Floor
One Winter Street
Boston, Massachusetts 02108

D. STATE PERMIT CONDITIONS

1. This Discharge Permit is issued jointly by the U.S. Environmental Protection Agency and the Division of Water Pollution Control under Federal and State law, respectively. As such, all the terms and conditions of this Permit are hereby incorporated into and constitute a discharge permit issued by the Director of the Massachusetts Division of Water Pollution Control pursuant to M.G.L. Chap. 21, §43.

2. Each Agency shall have the independent right to enforce the terms and conditions of this Permit. Any modification, suspension or revocation of this Permit shall be effective only with respect to the Agency taking such action, and shall not affect the validity or status of this Permit as issued by the other Agency, unless and until each Agency has concurred in writing with such modification, suspension or revocation. In the event any portion of this Permit is declared invalid, illegal or otherwise issued in violation of State law such permit shall remain in full force and effect under Federal law as an NPDES Permit issued by the U.S. Environmental Protection Agency. In the event this Permit is declared invalid, illegal or otherwise issued in violation of Federal law, this Permit shall remain in full force and effect under State law as a Permit issued by the Commonwealth of Massachusetts.

Attachment A
Permit: MA0003557

Attachment to BECo Letter No. 90- 068
Dated: December 21, 1990

MARINE ECOLOGY MONITORING RELATED TO OPERATION OF PILGRIM STATION UNIT 1 NPDES PERMIT PROGRAMS

In accordance with NPDES Permit requirements for Pilgrim Station Permit No. MA0003557 (Federal) and No. 359 (State), the following modified programs are presented for 1991. The 1978 through 1990 programs were submitted to the Regional Administrator, U.S. Environmental Protection Agency (EPA) and Director, Mass. Division of Water Pollution Control (MDWPC), in December 1977 through December 1989, respectively.

I. ENVIRONMENTAL MONITORING

The Environmental Monitoring Program represents a continuation of previous monitoring. Pre-operational studies for Pilgrim Unit I commenced in 1969, almost four years before initial operation in December 1972. In accordance with environmental monitoring and reporting requirements of the Unit 1 Operating License, DPR-35, issued by the U.S. Atomic Energy Commission (now the Nuclear Regulatory Commission) Boston Edison carried out a post-operational Marine Ecology Program. This program was designed to investigate the Cape Cod Bay ecosystem, with emphasis on the Rocky Point area, in order to determine whether the operation of Pilgrim Station resulted in measurable effects on the marine ecology and evaluate the significance of any such effects. The Marine Ecology Program for Unit 1 continued for five years from initial full power operation (that is, through December 1997) and was replaced by this NPDES Permit Program (with NRC concurrence). Amendment #67 (1983) to the PNPS Technical Specifications deleted Appendix B non-radiological water quality requirements since the NRC believed they were incorporated in the NPDES Permit. The post-operational monitoring for Pilgrim Unit 1 and the collected data are incorporated and analyzed in the Marine Ecology Semi-Annual Reports (#1-36), Marine Ecology Final Report (1978), and the Section 316 Demonstration Document (1975) and Supplement (1977) pursuant to the Federal Water Pollution Control Act Amendments of 1972.

The NPDES Program includes the following elements:

A. Pilgrim Administrative - Technical Committee

The Pilgrim Administrative - Technical Committee (PATC) is an advisory committee that was established to ensure the Pilgrim marine studies have the benefit of qualified, outside scientific and technical advice, and are responsive to regulatory agency concerns. The PATC recommends improvement to ongoing monitoring based on the latest results with the approval of the U.S. EPA and Mass. Div. of Water Pollution Control. It has held 74 meetings

The present membership is as follows:

<u>Agency</u>

National Marine Fisheries Services - (2 members)

Mass. Division of Water Pollution Control - (3 members)

U. S. Environmental Protection Agency - (2 members)

Mass. Division of Marine Fisheries - (2 members)

Mass. Office of Coastal Zone Management - (1 member)

University of Massachusetts (2 members)

Boston Edison Company (1 member)

Each meeting was chaired by a representative of the Mass. Div. of Water Pollution Control in 1989. Minutes of PATC meetings appear in the semi-annual Pilgrim Station marine ecology reports.

B. <u>Marine Fisheries Monitoring</u> (Mass. Division of Marine Fisheries)

The Division of Marine Fisheries (DMF), an agency of the Commonwealth of Massachusetts, conducts field monitoring (modified in 1981) pertinent to Pilgrim Station. The monitoring efforts listed below will be continued in 1990.

<u>Fish</u>

The DMF monitors the occurrence and distribution of fish around Rocky Point and at sites in the area of discharge temperature increase. Groundfish will be collected using a 32-foot Shrimp trawl (1/2 inch mesh liner) bi-weekly from April-December and monthly from January-March. Four stations will be sampled (including replicates), at 2 reference and 2 surveillance locations which include the PNPS intake embayment and discharge thermal effluent. Figure 1 shows sampling station locations.

A finfish observational dive survey (Figure 1) will continue in 1990 for the Pilgrim Station thermal plume area. This monitoring will involve bi-weekly diving from May through November to document fish behavior and condition at six stations. During mid-August to mid-September, weekly diving will be done to document potential thermal plume-related mortalities.

In June-November 1990, a 150-foot and 20-foot beach seine (3/16 inch mesh bag) survey (Figure 2) will be performed bi-weekly at four stations, including one in the Pilgrim Station intake embayment. This monitoring will record fishes which are most susceptible to large impingement mortalities that have occurred in previous years. An initial cunner tagging effort will be commenced to determine the feasibility of documenting this resident species relation to the thermal plume.

Lobster

An experimental lobster pot study, initiated in 1986, will be continued during June-September in reference and surveillance areas to better define Pilgrim Station's thermal influence on lobster catch rate (Figure 3).

The DMF has collected lobster catch statistics bi-weekly through each fishing season (May-November) by sampling commercial lobstermen's pot hauls. This effort will continue with one lobsterman as a measure of the Pilgrim Station effect on the local lobster population (Figure 4 shows the sampling grid).

Gas Saturation

In 1990, saturated gas analyses will be conducted only during periods of potential discharge-related mortalities (as occurred in August 1985). A Weiss saturometer will be used in situ to measure total partial pressure of dissolved gases, and percent saturation of total gas, nitrogen, and oxygen.

C. Impingement Monitoring (Marine Research, Inc./BECo)

The main objective of the impingement study is to calculate impingement rates of marine organisms by gathering and analyzing data on numbers and species carried onto the four travelling water screens at Pilgrim Station. In 1990 the weekly collection time will be twenty-four hours (three 8-hour periods). Supplemental fish survival data will also be recorded. BECo will analyze the data and prepare the reports.

D. Benthic monitoring

The benthic flora and fauna will be monitored at three sampling stations at depths of approximately 10 feet (MLW) (Figure 1). The dominant flora and fauna in each plot are recorded, and quantitative samples are collected from rock surfaces. Sampling will continue two times a year (March and September) to determine power plant-related effects.

In addition, transect monitoring to map the extent of stunted and denuded areas immediately off the discharge canal will be continued 4 times a year (March, June, September and December) in 1990.

E. Entrainment Monitoring (Marine Research, Inc.)

Entrainment monitoring in 1989 emphasized consideration of ichthyoplankton, as it will in 1990.

The 1990 entrainment studies will consist of routine monitoring of the Pilgrim discharge. This monitoring will be on a weekly basis during the period March-September and bi-weekly during the periods January-February and October-December. Samples will be collected in triplicate. If exceptionally high egg or larvae concentrations are found in the discharge when compared with previous years, steps will be taken to implement contingency ichthyoplankton sampling plans to assess the reason for the high concentrations. The first plan will consist of additional tows and sample analysis from the discharge canal. If ichthyoplankton numbers remain exceptionally high, the second plan consisting of single tows at each of 13 Bay stations off the plant will be initiated, and the samples analyzed immediately to determine the cause for the high densities (Figure 5). MRI will analyze the data and prepare the reports.

F. Reporting of Environmental Monitoring

Semi-annual and annual reports with results of the above (Items A-E) will be submitted to the EPA and MDWPC on October 31, 1990 and April 30, 1991 covering the periods January-June and January-December 1990, respectively.

II. THERMAL DISCHARGE FISH SURVEILLANCE

The Thermal Discharge Fish Surveillance Program for Pilgrim Station has the following primary parts:

A. Overflights

Periodic aerial overflights of western Cape Cod Bay and the Pilgrim vicinity will be conducted to alert Boston Edison to the presence of large schools of fish in the area. These overflights will be conducted weekly from March-November 1990 and results summarized by BECo in each annual monitoring report.

B. Observation of the Discharge Canal

Boston Edison personnel will make frequent visual observations of the Pilgrim discharge canal during periods of fish migration.

C. Dive Surveys

Dive inspections of the discharge canal and fish barrier net will determine fish presense and condition, and barrier net performance. BECo will report dive survey findings in each annual monitoring report. Also, fish sampling and diver observation in the plume area will be conducted bi-weekly from May through November by Massachusetts Division of Marine Fisheries personnel as part of the Environmental Monitoring Program.

The dive and observation elements of the Surveillance Program monitor compliance with the NPDES Permit barrier net condition, by providing a check on the adequacy of the net in preventing fish passage into the discharge canal. If these elements indicate that the barrier net is not functioning adequately and the Permit's 115% surface nitrogen limitation is triggered by the EPA, the overflights, as well as the canal observations and dive surveys, will indicate when fish susceptible to gas bubble disease mortality are sufficiently near Pilgrim Station to warrant action to reduce surface nitrogen saturation level to less than 115%. Boston Edison will notify the EPA Regional Administrator and Massachusetts DWPC Director of the presence of large schools of fish within 1/2 mile of the discharge canal concurrent with water quality conditions potentially harmful to the fish.

III. DISSOLVED NITROGEN SATURATION REDUCTION

The plan for reducing dissolved nitrogen surface saturation levels to less than 115% in the discharge canal will involve a power reduction or outage should a school of fish susceptible to gas bubble disease mortality be in the immediate vicinity of Pilgrim Station. The procedure for determining the need, feasibility and request for a power reduction or outage is as follows:

1. Responsible regulatory/agency personnel familiar with fishery statistics (e.g. Mass. Division of Marine Fisheries) will estimate the magnitude of the fish school and, based on measured water quality and other pertinent environmental data, make a determination as to the likelihood and effect of a gas bubble disease mortality. They will also determine the potential necessity for a nitrogen saturation reduction, and notify Boston Edison of this initial judgment.

2. Boston Edison will notify the Rhode Island, Eastern Massachusetts, and Vermont Energy Control (REMVEC) of the possibility of a power reduction and obtain projections through at least the upcoming weekend. Boston Edison will transmit load information to the agencies/persons taking the actions identified in No. 1 above.

3. On the basis of this information, agency personnel will formulate specific recommendations to the EPA Regional Administrator and/or the MDWPC Director on the timing and duration of a power reduction that is, in their judgment, appropriate and in the overall public interest.

4. Responsible regulatory personnel will request a power reduction through a telephone call to the Boston Edison, Pilgrim Nuclear Power Station Director.

5. Boston Edison personnel will record results of periodic surveillance of the condition and location of the fish prior to and subsequent to any plant changes.

RDA/1503

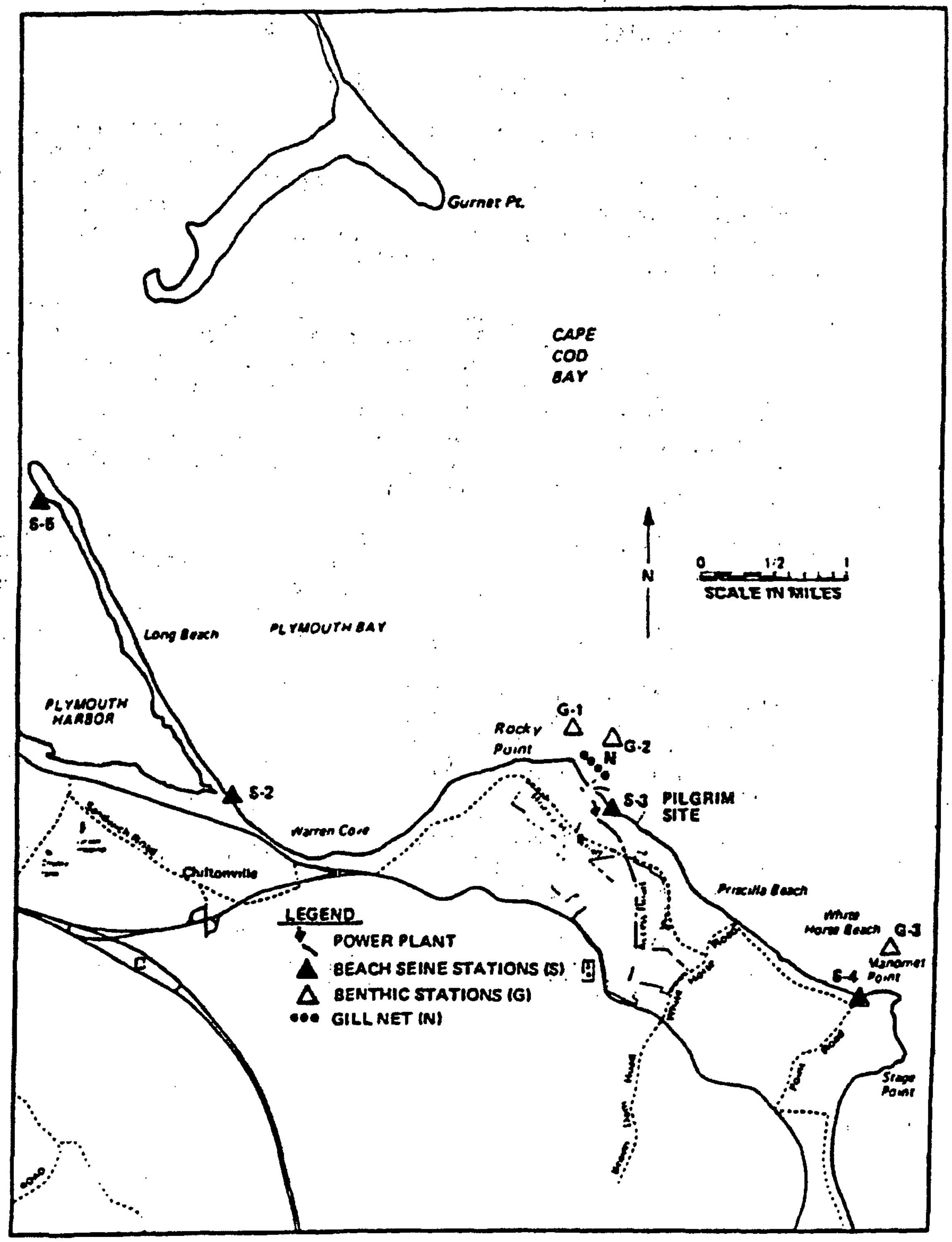

Figure 1. Location of Beach Seine and Gill Net Sampling Stations for Marine Fisheries Studies, and Benthic Studies Sampling Stations

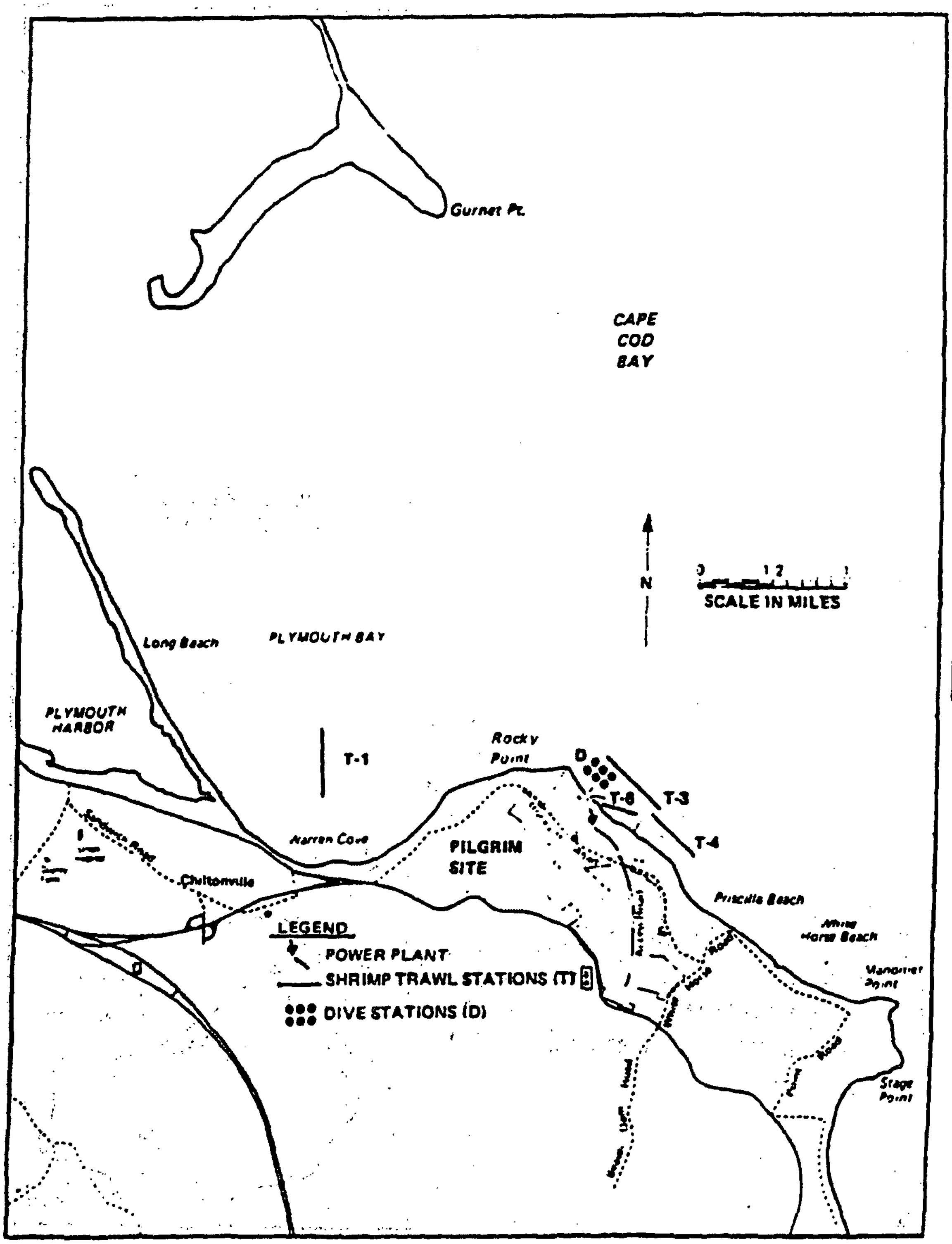

Figure 2. Location of Shrimp Trawl and Dive Sampling Stations for Marine Fisheries Studies

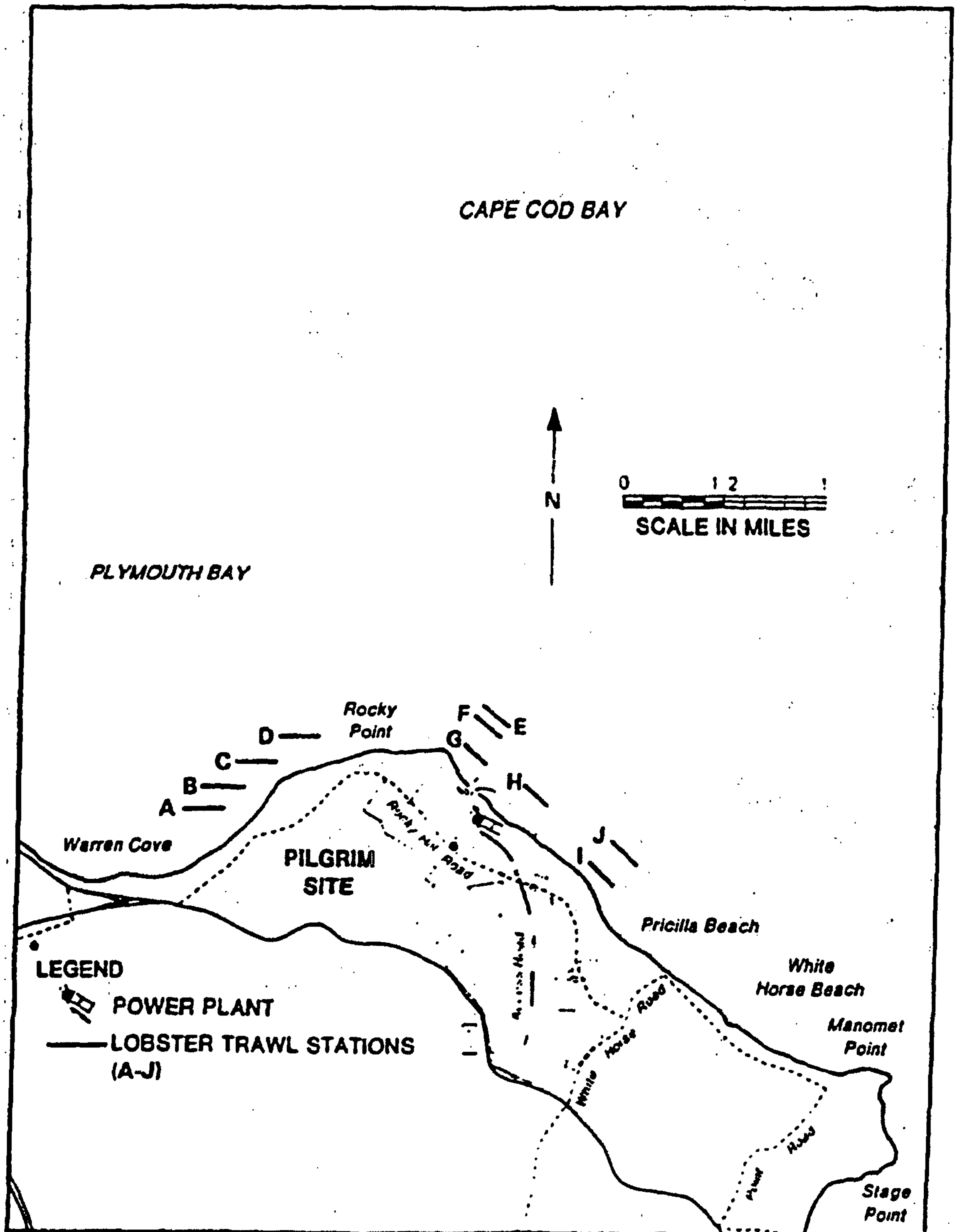

Figure 3. Location of experimental lobster gear (5-pot trawls) for Marine Fisheries Studies.

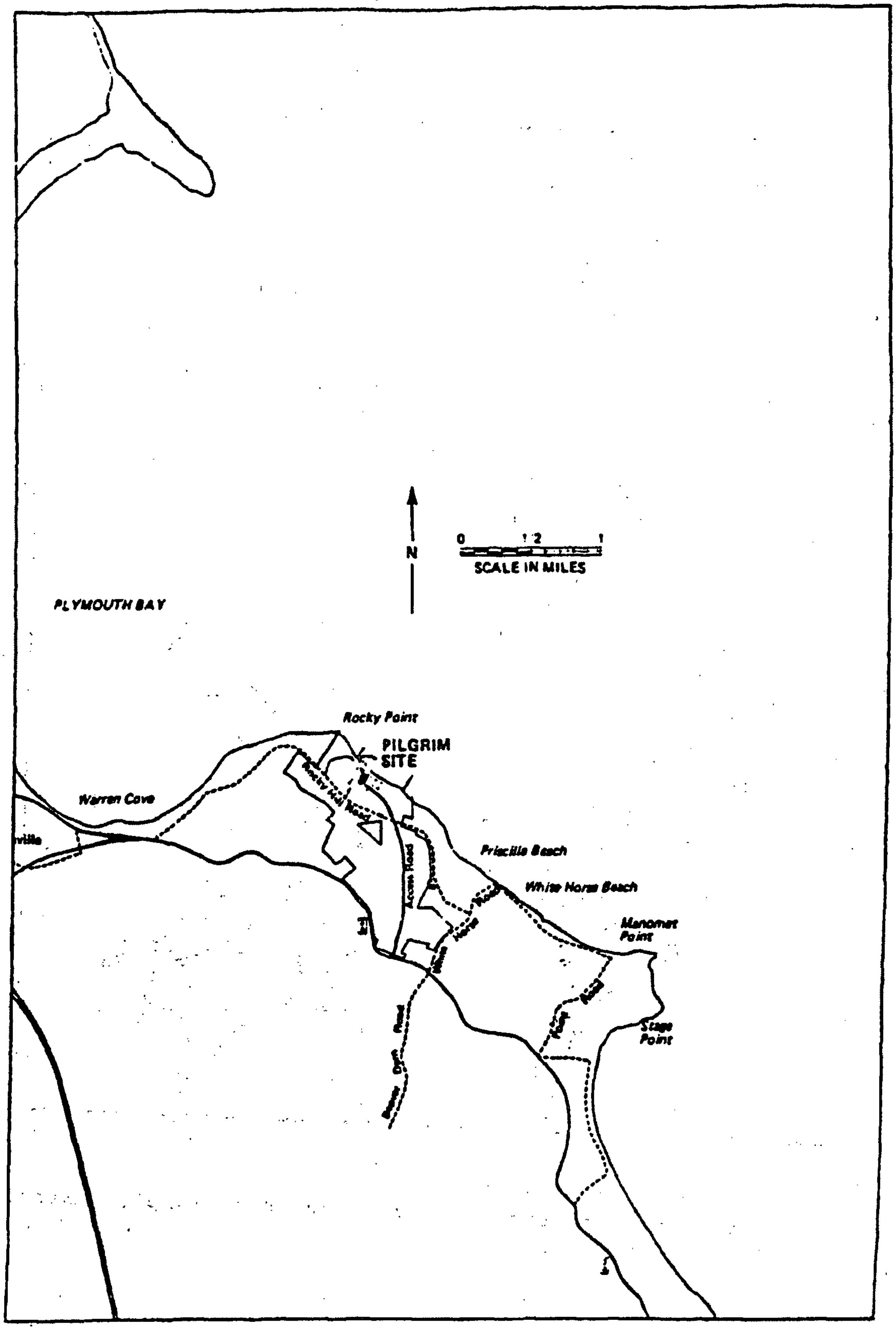

Figure 4. Lobster Pot Sampling Grid for Marine Fisheries Studies

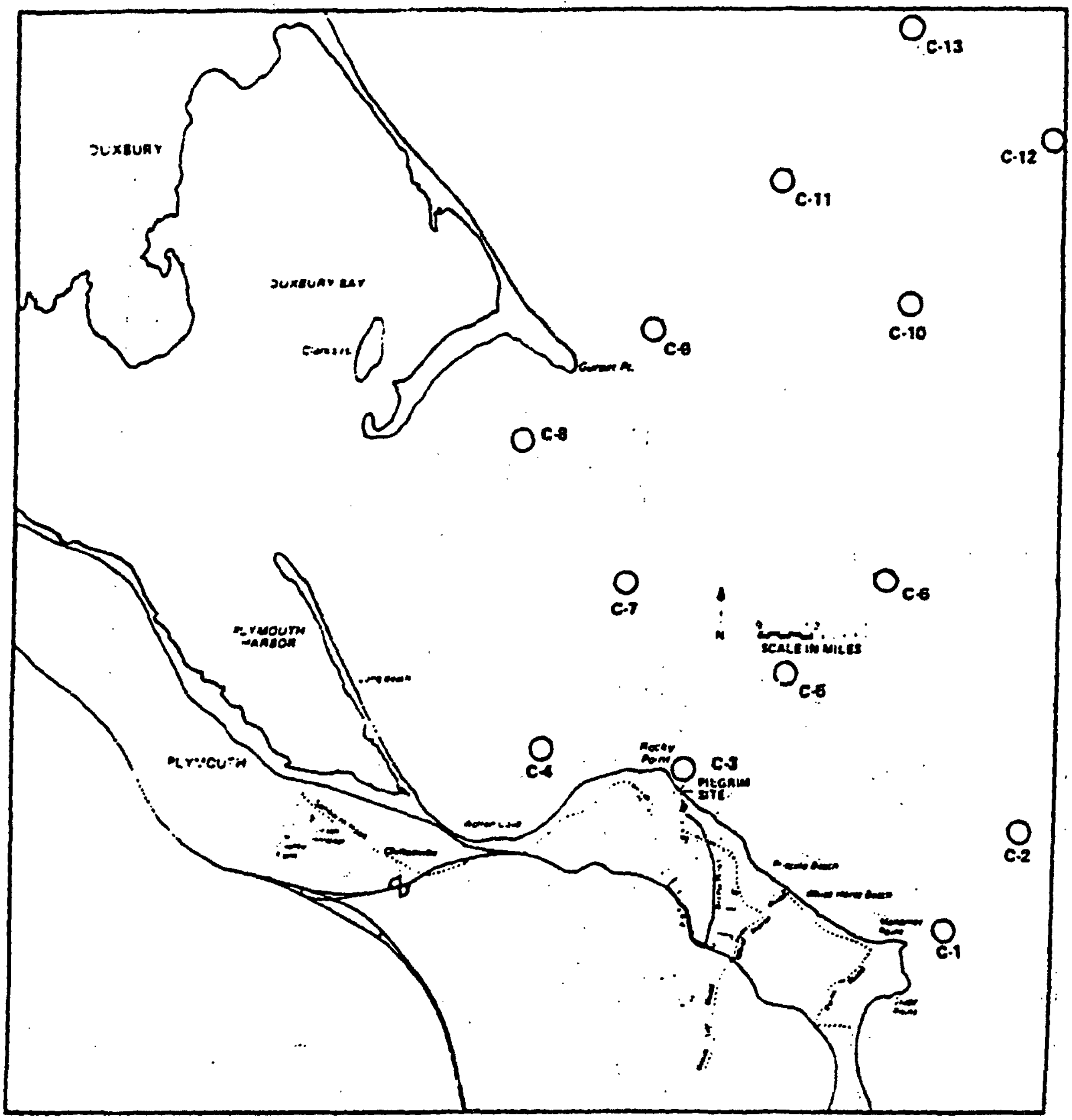

Figure 5. Location of Entrainment Contingency Plan Sampling Stations, C.

CONTENTS - PART II
(April 6, 1990)

SECTION A. GENERAL REQUIREMENTS

1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

a. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405 (d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

b. The CWA provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the CWA is subject to a civil penalty not to exceed $25,000 per day of such violation. Any person who willfully or negligently violates permit conditions implementing Sections 301, 302, 306, 307, or 308 of the Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both.

c. Except as provided in permits conditions on "Bypassing" (Part II.B.4) and "Upsets" (Part II.B.5) below, nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

2. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause, including but not limited to: (1) Violation of any terms or conditions of this permit; (2) Obtaining this permit by misrepresentation or failure to disclose all relevant facts; or (3) A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

3. Duty to Provide Information

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

4. <u>Reopener Clause</u>

The Regional Administrator reserves the right to make appropriate revisions to this permit in order to establish any appropriate effluent limitations, schedules of compliance, or other provisions which may be authorized under the CWA in order to bring all discharges into compliance with the CWA.

5. <u>Oil and Hazardous Substance Liability</u>

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the CWA.

6. <u>Property Rights</u>

This permit does not convey any property rights of any sort, or any exclusive privilege.

7. <u>Severability</u>

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

8. <u>Confidentiality of Information</u>

a. In accordance with 40 CFR Part 2, any information submitted to EPA pursuant to these regulations may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission in the manner prescribed on the application form or instructions or, in the case of other submissions, by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, <u>EPA may make the information available to the public without further notice.</u> If a claim is asserted, the information will be treated in accordance with the procedures in 40 CFR Part 2 (Public Information).

b. Claims of confidentiality for the following information <u>will</u> be denied:

(i) The name and address of any permit applicant or permittee;

(ii) Permit applications and permits; and

(iii) NPDES effluent data.

c. Information required by NPDES application forms provided by the Director under 40 CFR §122.21 may not be claimed confidential. This includes information submitted on the forms themselves and any attachments used to supply information required by the forms.

9. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee must apply for and obtain a new permit. The permittee shall submit a new application at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Director. (The Director shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)

10. Right of Appeal

Within thirty (30) days of receipt of notice of a final permit decision, the permittee may submit a request to the Regional Administrator for an evidentiary hearing under Subpart E, or a formal hearing under Subpart F, of 40 CFR Part 124, to reconsider or contest that decision. The request for a hearing must conform to the requirements of 40 CFR §124.74.

11. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the CWA.

12. Other Laws

The issuance of a permit does not authorize any injury to persons or property or invasion of other private rights, nor does it relieve the permittee of its obligation to comply with any other applicable Federal, State, and local laws and regulations.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when the operation is necessary to achieve compliance with the conditions of the permit.

[redacted]

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. <u>Duty to Mitigate</u>

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

4. <u>Bypass</u>

a. <u>Definitions</u>.

(i) "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

(ii) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. <u>Prohibition of bypass</u>.

(i) Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless all the following conditions occur:

(A) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(B) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

(C) The permittee submitted notices as required under Paragraph B.4.c of this section.

(ii) The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in Paragraph B.4.b.(i) of this section.

(iii) Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Paragraph B.4.c of this section.

c. Notice.

(i) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(ii) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Paragraphs D.1.a and D.1.e (24-hour notice).

5. Upset

a. Definition. "Upset" means an exceptional incident in which there is unintentional and temporary non-compliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Paragraph B.5.c of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(i) An upset occurred and that the permittee can identify the cause(s) of the upset;

(ii) The permitted facility was at the time being properly operated;

(iii) The permittee submitted notice of the upset as required in Paragraphs D.1.a and D.1.e of this section (24-hour notice); and

(iv) The permittee complied with any remedial measures required under (d) above.

d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

6. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner consistent with applicable Federal and State laws and regulations including, but not limited to the CWA and the Federal Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq., and regulations promulgated thereunder.

7. Power Failures

In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall either:

"In accordance with the Schedule of Compliance contained in Part I of this permit, provide an alternative power source sufficient to operate the wastewater control facilities";

or, if such alternative power source is not in existence, and no date for its implementation appears in Part I of this permit:

"Halt, reduce or otherwise control production and/or all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater control facilities".

SECTION C. MONITORING AND RECORDS

1. Monitoring and Records

a. Samples and measurements taken for the purpose of monitoring shall be representative of the volume and nature of the discharge over the sampling and reporting period.

b. The permittee shall retain for a period of at least 5 years (or longer as required by 40 CFR Part 503) all records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities.

The permittee shall retain wastewater related records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings from continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

c. Records of monitoring information shall include:

(i) The date, exact place, and time of sampling or measurements;

(ii) The individual(s) who performed the sampling or measurements;

(iii) The date(s) analyses were performed;

(iv) The individual(s) who performed the analyses;

(v) The analytical techniques or methods used; and

(vi) The results of such analyses.

d. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, unless other test procedures are specified in this permit.

e. The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall upon conviction, be punished by a fine of not more than $25,000 per violation or by imprisonment for not more than 6 months per violation or by both.

f. Monitoring results must be reported on a Discharge Monitoring Report (DMR).

g. If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under CFR Part 136 and specified in 40 CFR Part 503 or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

2. Inspection and Entry

The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

SECTION D. REPORTING REQUIREMENTS

1. Reporting Requirements

a. Planned changes. The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

(i) the alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR §122.29(b); or

(ii) the alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to the effluent limitations in the permit, not to the notification requirements under 40 CFR §122.42(a)(1).

(iii) the alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition or change may justify the application of permit conditions different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

b. Anticipated noncompliance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

c. Transfers. This permit is not transferable to any person except after written notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the CWA.

d. Monitoring reports. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(i) Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided as specified by the Director for reporting results of monitoring of sludge use or disposal practices.

(ii) If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting forms specified by the Director.

e. Twenty-four hour reporting. The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances or the next working day.

A written submission shall also be provided within five (5) days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

The following information must be reported within 24 hours (24-hour reporting) or the next working day:

(i) Any unanticipated "bypass" which causes a violation of any effluent limitation in the permit; or

(ii) Any "upset" which causes a violation of any effluent limitation in the permit; or

(iii) Any violation of a maximum daily discharge limitation for any of the pollutants specifically listed by the Director in the permit.

The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours or the next working day.

f. <u>Other noncompliance</u>. The permittee shall report all instances of noncompliance not reported under Subparagraphs (a), (b), and (e), of this section, or not reported in a compliance schedule report in the permit conditions, at the time monitoring reports are submitted. The reports shall contain the information required in Subparagraph (a) and (e) of this section.

g. <u>Other information</u>. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

2. <u>Change in Discharge</u>

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, production increases, or process modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new NPDES application at least 180 days prior to commencement of such discharges, or if such changes will not violate the effluent limitations specified in this permit, by notice, in writing, to the Director of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

Until such modification is effective, any new or increased discharge in excess of permit limits or not specifically authorized by the permit constitutes a violation.

3. Signatory Requirement

All applications, reports, or information submitted to the Director shall be signed and certified in accordance with 40 CFR §122.22. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $25,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

4. Availability of Reports

Except for data determined to be confidential under Paragraph A.8 above, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State water pollution control agency and the Regional Administrator. As required by the CWA, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the CWA.

SECTION E. OTHER CONDITIONS.

1. DEFINITIONS.

a. For purposes of this permit, the following definitions shall apply.

Administrator means the Administrator of the United States Environmental Protection Agency, or an authorized representative.

Applicable standards and limitations means all State, interstate, and Federal standards and limitations to which a "discharge" or a related activity is subject to, including water quality standards, standards of performance, toxic effluent standards or prohibitions, "best management practices," and pretreatment standards under Sections 301, 302, 303, 304, 306, 307, 308, 403, and 405 of CWA.

Application means the EPA standard national forms for applying for a permit, including any additions, revisions or modifications to the forms; or forms approved by EPA for use in "approved States," including any approved modifications or revisions.

Average - The arithmetic mean of values taken at the frequency required for each parameter over the specified period. For total and/or fecal coliforms, the average shall be the geometric mean.

Average monthly discharge limitation means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average weekly discharge limitation means the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of "waters of the United States." BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Best Professional Judgement (BPJ) means a case-by-case determination of Best Practicable Treatment (BPT), Best Available Treatment (BAT) or other appropriate standard based on an evaluation of the available technology to achieve a particular pollutant reduction.

Class I Sludge Management Facility means any POTW identified under 40 CFR §403.8(a) as being required to have an approved pretreatment program [including such POTWs located in a state that has elected to assume local program responsibilities pursuant to 40 CFR §403.10(e)] and any other treatment works treating domestic sewage classified as a "Class I Sludge Management Facility" by the Regional Administrator, or, in the case of approved State programs, the Regional Administrator in conjunction with the State Director, because of the potential for its sludge use or disposal practices to adversely affect public health and the environment.

Composite Sample - A sample consisting of a minimum of eight grab samples collected at equal intervals during a 24-hour period (or lesser period as specified in the section on Monitoring and Reporting) and combined proportional to flow, or a sample continuously collected proportionally to flow over that same time period.

CWA means the Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub. L. 92-500, as amended by Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483 and Pub. L. 97-117; 33 U.S.C. §§1251 et seq.

Daily Discharge means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, he daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the daily discharge is calculated as the average measurement of the pollutant over the day.

Director means the person authorized to sign NPDES permits by EPA and/or the State.

Discharge Monitoring Report Form (DMR) means the EPA standard national form, including any subsequent additions, revisions, or modifications, for the reporting of self-monitoring results by permittees. DMRs must be used by "approved States" as well as by EPA. EPA will supply DMRs to any approved State upon request. The EPA national forms may be modified to substitute the State Agency name, address, logo, and other similar information, as appropriate, in place of EPA's.

Discharge of a pollutant means:

(a) Any addition of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source," or

(b) Any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation.

This definition includes additions of pollutants into waters of the United States from: surface runoff which is collected or channelled by man; discharges through pipes, sewers, or other conveyances owned by a State, municipality, or other person which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances leading into privately owned treatment works.

This term does not include an addition of pollutants by any "indirect discharger."

Effluent limitation means 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.

Effluent limitations guidelines means a regulation published by the Administrator under Section 304(b) of CWA to adopt or revise "effluent limitations."

EPA means the United States "Environmental Protection Agency."

Grab Sample - An individual sample collected in a period of less than 15 minutes.

Hazardous Substance means any substance designated under 40 CFR Part 116 pursuant to Section 311 of CWA.

Indirect Discharger means a non-domestic discharger introducing pollutants to a publicly owned treatment works.

Industrial User means a non-domestic discharger introducing pollutants to a publicly owned treatment works.

Interference means an addition or disruption of the POTW, its treatment processes or operations, or its sludge processes, use or disposal which is cause of or significantly contributes to either a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or to the prevention of sewage sludge use or disposal by the POTW in accordance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including Title II more commonly referred to as the Resource Conservation and Recovery Act (RCRA) and including State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the SWDA), the Clean Air Act, and the Toxic Substance Control Act. An Industrial User significantly contributes to such a permit violation or prevention of sludge use or disposal in accordance with above-cited authorities whenever such User:

(a) Discharges a daily pollutant loading in excess of that allowed by contract with the POTW or by Federal, State, or local law;

(b) Discharges wastewater which substantially differs in nature or constituents from the User's average discharge; or

(c) Knows or has reason to know that its discharge alone or in conjunction with discharges from other sources, would result in a POTW permit violation or prevent sewage sludge use or disposal in accordance with the above-cited authorities as they apply to the POTW's selected method of sludge management.

Maximum daily discharge limitation means the highest allowable "daily discharge."

Municipality means a city, town, borough, county, parish, district, association, or other public body created by of under State law and having jurisdiction over disposal or sewage, industrial wastes, or other wastes, or an Indian tribe or an authorized Indian tribe organization, or a designated and approved management agency under Section 208 of CWA.

National Pollutant Discharge Elimination System means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 402, 318, and 405 of CWA. The term includes an "approved program."

New discharger means any building, structure, facility, or installation:

(a) From which there is or may be a "discharge of pollutants";

(b) That did not commence the "discharge of pollutants" at a particular "site" prior to August 13, 1979;

(c) Which is not a "new source"; and

(d) Which has never received a finally effective NPDES permit for discharges at that "site".

This definition includes an "indirect discharger" which commences discharging into "waters of the United States" after August 13, 1979. It also includes any existing mobile point source (other than an offshore or coastal oil and gas exploratory drilling rig or a coastal oil and gas developmental drilling rig) such as a seafood processing rig, seafood processing vessel, or aggregate plant, that begins discharging at a "site" for which it does not have a permit; and any offshore or coastal mobile oil and gas exploratory drilling rig or coastal mobile oil and gas developmental drilling rig that commences the discharge of pollutants after August 13, 1979, at a "site" under EPA's permitting jurisdiction for which it is not covered by an individual or general permit and which is located in an area determined by the Regional Administrator in the issuance of a final permit to be an area of biological concern. In determining whether an area is an area of biological concern, the Regional Administrator shall consider the factors specified in 40 CFR §§ 125.122.(a)(1) through (10).

An offshore or coastal mobile exploratory drilling rig or coastal mobile developmental drilling rig will be considered a "new discharger" only for the duration of its discharge in an area of biological concern.

New source means any building, structure, facility, or installation from which there is or may be a "discharge of pollutants," the construction of which commenced:

(a) After promulgation of standards of performance under Section 306 of CWA which are applicable to such

(b) After proposal of standards of performance in accordance with Section 306 of CWA which are applicable to such source, but only if the standards are promulgated in accordance with Section 306 within 120 days of their proposal.

NPDES means "National Pollutant Discharge Elimination System."

Owner or operator means the owner or operator of any "facility or activity" subject to regulation under the NPDES programs.

Pass through means "the discharge of pollutants through the POTW" into navigable waters in quantities or concentrations which are a cause of or significantly contribute to a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation). An industrial user significantly contributes to such permit violation where it:

(a) Discharges a daily pollutant loading in excess of that allowed by contract with the POTW or by Federal, State, or local law;

(b) Discharges wastewater which substantially differs in nature and constituents from the user's average discharge;

(c) Knows or has reason to know that its discharge alone or in conjunction with discharges from other sources would result in a permit violation; or

(d) Knows or has reason to know that the POTW is, for any reason, violating its final effluent limitations in its permit and that such Industrial User's Discharge either alone or in conjunction with Discharges from other sources, increases the magnitude or duration of the POTW's violations.

Permit means an authorization, license, or equivalent control document issued by EPA or an "approved State."

Person means an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof.

Point source means any discernible, 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, vessel, or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture.

Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. §§2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. It does not mean:

(a) Sewage from vessels; or

(b) Water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well used either to facilitate production or for disposal purposes is approved by authority of the State in which the well is located, and if the State determines that the injection or disposal will not result in the degradation of ground or surface water resources.

Primary industry category means any industry category listed in the NRDC settlement agreement (Natural Resources Defense Council et al. v. Train, 8 E.R.C. 2120 (D.D.C. 1976), modified 12 E.R.C. 1833 (D.D.C. 1979)); also listed in Appendix A of 40 CFR Part 122.

Process wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

Publicly Owned Treatment Works (POTW) means any facility or system used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature which is owned by a "State" or "municipality."

This definition includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment.

Regional Administrator means the Regional Administrator, EPA, Region I, Boston, Massachusetts.

State means any of the 50 States, the District of Columbia, Guam, the Commonwealth of Puerto Rico, the Virgin Islands, American Samoa, the Trust Territory of the Pacific Islands.

Secondary Industry Category means any industry category which is not a "primary industry category."

Septage means the liquid and solid material pumped from a septic tank, cesspool, or similar domestic sewage treatment system, or a holding tank when the system is cleaned or maintained.

Sewage Sludge means any solid, semisolid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. Sewage sludge includes, but is not limited to solids removed during primary, secondary, or advanced wastewater treatment, scum, septage, portable toilet pumpings, Type III Marine Sanitation Device pumpings (33 CFR Part 159), and sewage sludge products. Sewage sludge does not include grit or screenings, or ash generated during the incineration of sewage sludge.

Sewage sludge use or disposal practice means the collection, storage, treatment, transportation, processing, monitoring, use, or disposal of sewage sludge.

Sludge Management Facility, Class I, see the definition under "Class I Sludge Management Facility" above.

Sludge-only facility means any "treatment works treating domestic sewage" whose methods of sewage sludge use or disposal are subject to regulations promulgated pursuant to Section 405(d) of the CWA, and is required to obtain a permit under 40 CFR §122.1(b)(3).

Sludge Technical Standards (40 CFR Part 503). All references to 40 CFR Part 503 (the technical regulations required by Section 405(d) of the CWA in Parts 122, 123, and 124) refer to the final regulation. Promulgation of the final regulation is expected in 1991. Until the promulgation of this regulation, sludge requirements in the NPDES Permits are based on EPA's "Sewage Sludge Interim Permitting Strategy" dated September 1989 and EPA's "Guidance for Writing Case-by-Case Permit Requirements for Municipal Sewage Sludge" dated December 1989.

Toxic pollutants means 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.

Treatment works treating domestic sewage means a POTW or any other sewage sludge or wastewater treatment devices or systems, regardless of ownership (including federal facilities), used in the storage, treatment recycling, and reclamation of municipal municipal or domestic sewage, including land dedicated for the disposal of sewage sludge. This definition does not include septic tanks or similar devices.

For purposes of this definition, "domestic sewage" includes waste and wastewater from humans or household operations that are discharged to or otherwise enter a treatment works. In States where there is no approved State sludge management program under Section 405(f) of the CWA, the Regional Administrator may designate any person subject to the standards for sewage sludge use and disposal in 40 CFR Part 503 as a "treatment works treating domestic sewage", where he or she finds that there is a potential for adverse effects on public health and the environment from poor sludge quality or poor sludge handling, use or disposal practices, or where he or she finds that such designation is necessary to ensure that such person is in compliance with 40 CFR Part 503.

Waters of the United States means:

(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(b) All interstate waters, including interstate "wetlands."

(c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands," sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

(1) Which are or could be used by interstate or foreign travelers for recreational or other purposes;

(2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(3) Which are used or could be used for industrial purposes by industries in interstate commerce;

(d) All impoundments of waters otherwise defined as waters of the United States under this definition;

(e) Tributaries of waters identified in Paragraphs (a) through (d) of this definition;

(f) The territorial sea; and

(g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in Paragraphs (a) through (f) of this definition.

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

2. The following abbreviations, when used, are defined below.

cu. M/day or M^3/day	cubic meters per day
mg/l	milligrams per liter
ug/l	micrograms per liter
lbs/day	pounds per day
kg/day	kilograms per day
Temp. °C	temperature in degrees Centigrade
Temp. °F	temperature in degrees Fahrenheit
Turb.	turbidity measured by the Nephelometric Method (NTU)
NFR or TSS	total nonfilterable residue or total suspended solids
DO	dissolved oxygen
BOD	five-day biochemical oxygen demand unless otherwise specified

CBOD	carbonaceous BOD
TKN	total Kjeldahl nitrogen as nitrogen
Total N	total nitrogen
NH_3-N	ammonia nitrogen as nitrogen
Total P	total phosphorus
COD	chemical oxygen demand
TOC	total organic carbon
Surfactant	surface-active agent
pH	a measure of the hydrogen ion concentration
PCB	polychlorinated biphenyl
CFS	cubic feet per second
MGD	million gallons per day
Oil & Grease	Freon extractable material
Total Coliform	total coliform bacteria
Fecal Coliform	total fecal coliform bacteria
ml/l	milliliter(s) per liter
NO_3-N	nitrate nitrogen as nitrogen
NO_2-N	nitrite nitrogen as nitrogen
NO_3-NO_2	combined nitrate and nitrite nitrogen as nitrogen
Cl_2	total residual chlorine
ZID	zone of initial dilution
Cont. (Continuous)	Continuous recording of the the parameter being monitored, i.e.: flow, temperature, pH etc.

EXHIBIT D

Letter from EPA to E.T. Boulette, Boston Edison, March 1, 1996

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

MAR - 1 1996

E. T. Boulette, PhD
Senior Vice President - Nuclear
Boston Edison
Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360

Re: Pilgrim Nuclear Power Station,
NPDES Permit No. MA0003557 - Reissuance

Dear Dr. Boulette:

This letter confirms a telephone conversation between Robert Anderson of your staff and Nick Prodany of EPA-New England on February 12, 1996.

As explained to Bob Anderson, the NPDES permit for Pilgrim Nuclear Power Station, which expires April 29, 1996, will remain in effect (see 40 CFR §122.6, concerning the continuation of expiring permits), since you have filed a timely and complete application. Furthermore, Boston Edison is hereby notified that the application is considered to be administratively and technically complete.

Permit conditions and effluent limitations of the soon-to-expire permit will remain unchanged. This also includes the process of submitting monthly Discharge Monitoring Reports (DMRs).

The reissuance of the NPDES permit, however, will be delayed due to no fault of Boston Edison. Under the direction of the Secretary of Environmental Affairs, Massachusetts has adopted a watershed approach to managing water resources. The State and EPA-New England have made a joint decision to adhere to the watershed initiative. Under this initiative, the strategy is "resource-based" using the watershed as the management unit rather than singling out a specific portion of the receiving waterbody (or a facility discharging into it). The program schedule of the Office of Watershed Management, specifies the reissuance of South Coastal-Basin NPDES permits, which includes Pilgrim Nuclear Power Station, for the year 1998.

At the present time, EPA-New England will reissue NPDES permits which are out-of-phase with the watershed cycle, only if it can be demonstrated that the issued permit significantly benefits the environment. Should Boston Edison have overriding reasons for permit reissuance, such as significant changes to their operations, EPA and the State should be apprised, such that an environmental impact evaluation can be constituted.

Should you have any questions, please contact N. W. Prodany of my staff at 617-565-3513.

Sincerely,

Jane Downing

Jane Downing, Director
Massachusetts State Program Unit
Office of Ecosystem Protection

cc: BECO, Attn: R. Anderson
MA DWPC, Attn: Paul Hogan
EPA, Attn: C. Chow

LMA3557.L02

EXHIBIT E

Letter from Massachusetts Department of Environmental Protection to Robert D. Anderson, Boston Edison, March 4, 1996

D.96.CDO

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF WATERSHED MANAGEMENT

WILLIAM F. WELD
Governor

ARGEO PAUL CELLUCCI
Lt. Governor

TRUDY COXE
Secretary

DAVID B. STRUHS
Commissioner

March 4, 1996

Robert D. Anderson
Boston Edison Company
800 Boylston Street
Boston, MA 02199

Transmittal #115265
Permit Category BWPIW36

Dear Mr. Anderson:

The Department of Environmental Protection (DEP), Office of Watershed Management has received a copy of your completed National Pollutant Discharge Elimination System (NPDES) state permit application for the Pilgrim Nuclear Power Station in Plymouth. This includes a completed copy of forms 1 and 2C. We have examined the application for administrative completeness, including proper fee payment, and have determined that all the application requirements have been fulfilled.

An NPDES/Surface Water Discharge Permit is issued jointly by DEP and the U.S. Environmental Protection Agency (U.S. EPA). First, a draft NPDES permit is prepared at the U.S. EPA, and then it is sent to the permittee and the Division. The Division's technical review does not commence until it receives the draft permit from U.S. EPA. Although an application and fee submitted to the DEP is expeditiously reviewed for administrative completeness, final permit issuance is dependent on the preparation of the draft permit by the U.S. EPA.

Future correspondence with the Division should reference the NPDES and state permit application numbers. If there are any questions relative to your application at this stage, please contact me or Paul Hogan at (508) 792-7470.

Thank you for your cooperation in this matter.

Sincerely yours,

William J. Dunn, Jr.
Environmental Analyst

WJD/ro
adminappr

cc: P. Hogan, OWM
J. Gould, SERO

EXHIBIT F

Massachusetts Department of Environmental Protection Water Quality Certification for Pilgrim NPDES Permit, July 8, 1994

Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Protection

William F. Weld
Governor
Trudy Coxe
Secretary, EOEA
Thomas B. Powers
Acting Commissioner

July 8, 1994

Edward K. McSweeney, Chief
Wastewater Management Branch-WMB 368
U.S. Environmental Protection Agency
John F. Kennedy Federal Building
Boston, MA 02203

**Re: Water Quality Certification
NPDES Permit # MA0003557
Boston Edison Company: Pilgrim Nuclear Power Station
Permit Modification**

Dear Mr. McSweeney:

Your office has requested the Department of Environmental Protection to issue a water quality certification pursuant to Section 401(a) of the Federal Clean Water Act ("the Federal Act") and 40 CFR 124.53 for the above referenced draft NPDES permit modification. The Department has reviewed the draft permit modification and has determined that the permit conditions will achieve compliance with sections 208(e), 301, 302, 303, 306, and 307 of the Federal Act, and with the provisions of the Massachusetts Clean Water Act, M.G.L. c.21, ss 26-53 and regulations promulgated thereunder. The Department hereby certifies the referenced permit modification.

Very truly yours,

Andrew Gottlieb
Director
MADEP-BRP
Office of Watershed Management

\pilgrmod

T. E. LANDRY
JUL 22 1994

One Winter Street • Boston, Massachusetts 02108 • FAX (617) 556-1049 • Telephone (617) 292-5500

EXHIBIT G

Agreement Between the United States Nuclear Regulatory Commission and the Commonwealth of Massachusetts for Discontinuance of Certain Commission Regulatory Authority and Responsibility Within The State Pursuant to Section274 of the Atomic Energy Act of 1954, As Amended, March 19, 1997

AGREEMENT
BETWEEN THE
UNITED STATES NUCLEAR REGULATORY COMMISSION
AND THE
THE COMMONWEALTH OF MASSACHUSETTS
FOR
DISCONTINUANCE OF CERTAIN COMMISSION REGULATORY AUTHORITY AND RESPONSIBILITY WITHIN THE STATE PURSUANT TO SECTION 274 OF THE ATOMIC ENERGY ACT OF 1954, AS AMENDED

WHEREAS, The United States Atomic Energy Commission (hereinafter referred to as the Commission) is authorized under Section 274 of the Atomic Energy Act of 1954, as amended, (hereinafter referred to as the Act) to enter into agreements with the Governor of any State providing for discontinuance of the regulatory authority of the Commission within the State under Chapters 6, 7, and 8, and Section 161 of the Act with respect to byproduct materials, source materials, and special nuclear materials in quantities not sufficient to form a critical mass; and

WHEREAS, The Governor of the Commonwealth of Massachusetts is authorized under Massachusetts General Laws, Chapter 111H, to enter into this Agreement with the Commission; and

WHEREAS, The Governor of the Commonwealth of Massachusetts certified on March 28, 1996, that the Commonwealth of Massachusetts (hereinafter referred to as the Commonwealth) has a program for the control of radiation hazards adequate to protect the public health and safety with respect to the materials within the Commonwealth covered by this Agreement, and that the Commonwealth desires to assume regulatory responsibility for such materials; and

WHEREAS, The Commission found on March 3, 1997, that the program of the Commonwealth for the regulation of the materials covered by this Agreement is compatible with the Commission's program for the regulation of such materials and is adequate to protect the public health and safety; and

WHEREAS, The Commonwealth and the Commission recognize the desirability and importance of cooperation between the Commission and the Commonwealth in the formulation of standards for protection against hazards of radiation and in assuring that Commonwealth and Commission programs for protection against hazards of radiation will be coordinated and compatible; and

WHEREAS, The Commission and the Commonwealth recognize the desirability of reciprocal recognition of licenses and exemption from licensing of those materials subject to this Agreement; and

WHEREAS, This Agreement is entered into pursuant to the provisions of the Atomic Energy Act of 1954, as amended;

NOW, THEREFORE, It is hereby agreed between the Commission and Governor of the Commonwealth, acting in behalf of the Commonwealth, as follows:

ARTICLE I

Subject to the exceptions provided in Articles II, III, and IV, the Commission shall discontinue, as of the effective date of this Agreement, the regulatory authority of the Commission in the Commonwealth under Chapters 6, 7, and 8, and Section 161 of the Act with respect to the following materials:

A. Byproduct materials as defined in Section 11e.(1) of the Act;

B. Source materials; and

C. Special nuclear materials in quantities not sufficient to form a critical mass; and

D. Licensing of Low-Level Radioactive Waste Facilities.

ARTICLE II

This Agreement does not provide for discontinuance of any authority and the Commission shall retain authority and responsibility with respect to regulation of:

A. The construction and operation of any production or utilization facility;

B. The export from or import into the United States of byproduct, source, or special nuclear material, of any production or utilization facility;

C. The disposal into the ocean or sea of byproduct, source, or special nuclear waste materials as defined in regulations or orders of the Commission;

D. The disposal of such other byproduct, source, or special nuclear material as the Commission from time to time determines by regulation or order should, because of the hazards or potential hazards thereof, not be so disposed of without a license from the Commission.

E. The extraction or concentration of source material from source material ore and the management and disposal of the resulting by-product material.

ARTICLE III

This Agreement may be amended, up application by the Commonwealth and approval by the Commission, to include the additional area(s) specified in Article II, paragraph E, whereby the Commonwealth can exert regulatory control over the materials stated therein.

ARTICLE IV

Notwithstanding this Agreement, the Commission may from time to time by rule, regulation, or order, require that the manufacturer processor, or producer of any equipment, device, commodity, or other product containing source, byproduct, or special nuclear material shall not transfer possession or control of such product except pursuant to a license or an exemption from licensing issued by the Commission.

ARTICLE V

This Agreement shall not affect the authority of the Commission under subsection 161 b. or i. of the Act to issue rules, regulations, or orders to protect the common defense and security, to protect restricted data or to guard against the loss or diversion of special nuclear material.

ARTICLE VI

The Commission will use its best efforts to cooperate with the Commonwealth and other Agreement States in the formulation of standards and regulatory programs of the Commonwealth and the Commission for protection against hazards of radiation and to assure that Commonwealth and Commission programs for protection against hazards of radiation will be coordinated and compatible. The Commonwealth will use its best efforts to cooperate with the Commission and other Agreement States in the formulation of standards and regulatory program of the Commonwealth and the Commission for protection against hazards of radiation and to assure that the Commonwealth's program will continue to be compatible with the program of the Commission for the regulation of like materials. The Commonwealth and the Commission will use their best efforts to keep each other informed of proposed changes in their respective rules and regulations and licensing, inspection and enforcement policies and criteria, and to obtain the comments and assistance of the other party thereon.

ARTICLE VII

The Commission and the Commonwealth agree that it is desirable to provide for reciprocal recognition of licenses for the materials listed in Article I licensed by the other party or by any Agreement State. Accordingly, the Commission and the State agree to use their best effort to develop appropriate rules, regulations, and procedures by which such reciprocity will be accorded.

ARTICLE VIII

The Commission, upon its own initiative after reasonable notice and opportunity for hearing to the Commonwealth, or upon request of the Governor of the Commonwealth, may terminate or suspend all or part of this Agreement and reassert the licensing and regulatory authority vested in it under the Act if the Commission finds that (1) such termination or suspension is required to protect the public health and safety, or (2) the Commonwealth has not complied with one or more of the requirements of Section 274 of the Act. The Commission may also, pursuant to Section 274j of the Act, temporarily suspend all or part of this Agreement if, in the judgement of the Commission, an emergency situation exists requiring immediate action to protect public health and safety and the Commonwealth has failed to take necessary steps. The Commission shall periodically review this Agreement and actions taken by the Commonwealth under this Agreement to ensure compliance with Section 274 of the Act.

ARTICLE IX

This Agreement shall become effective on March 21, 1997, and shall remain in effect unless, and until such time as it is terminated pursuant to Article VIII.

Done at Rockville, Maryland, in triplicate, this 10th day of March 1997.

FOR THE UNITED STATES
NUCLEAR REGULATORY COMMISSION

Shirley Ann Jackson

Shirley Ann Jackson, Chairman

Done at Boston, Massachusetts, in triplicate, this 19 day of March, 1997.

FOR THE COMMONWEALTH
OF MASSACHUSETTS

William F. Weld

William F. Weld, Governor

EXHIBIT H

Letter from National Marine Fisheries Service to Nuclear Regulatory Commission re Pilgrim Nuclear Power Station, May 17, 2012

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

OFFICE OF THE
GENERAL COUNSEL

May 22, 2012

Administrative Judge
Ann Marshall Young, Chair
Atomic Safety and Licensing Board Panel
Mail Stop T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Paul B. Abramson
Atomic Safety and Licensing Board Panel
Mail Stop T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Richard F. Cole
Atomic Safety and Licensing Board Panel
Mail Stop: T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

In the Matter of
Entergy Nuclear Generation Company and
Entergy Nuclear Operations, Inc.
(Pilgrim Nuclear Power Station)
Docket No. 50-293-LR; ASLBP No. 06-848-02-LR

Dear Administrative Judges:

This letter is an update to the NRC staff's April 19, 2012 response to the Board's Inquiry (Regarding Information on Expected NMFS ESA Determination), dated April 18, 2012, requesting that the NRC staff (Staff) provide a copy of the Endangered Species Act (ESA) informal consultation from the National Marine Fisheries Service (NMFS), if received, or, in the alternative, an estimate of the anticipated date of receipt.

Please find attached hereto a copy of the ESA informal consultation letter dated May 17, 2012 from the NMFS. The NMFS acknowledged that the continued operation of Pilgrim under the terms of a renewed operating license is not likely to adversely affect any listed species under NMFS jurisdiction. The NMFS letter further provided justification concluding consultation.

By copy of this letter, I am serving a copy of the NMFS letter dated May 17, 2012 on the service list.

Sincerely,

Susan L. Uttal
Counsel for NRC Staff

ENCLOSURE:
As stated

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
55 Great Republic Drive
Gloucester, MA 01930-2276

MAY 17 2012

Andrew S. Imboden, Chief
Environmental Review and Guidance Update Branch
Division of License Renewal
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
MS T-11 F1
Washington, DC 20555-0001

Re: Pilgrim Nuclear Power Station

Dear Mr. Imboden,

The Nuclear Regulatory Commission (NRC) is proposing to issue a renewed Operating License to Entergy Corp. for their Pilgrim Nuclear Power Station (Pilgrim). Pilgrim is located on the western shore of Cape Cod Bay in the Town of Plymouth, Plymouth County, Massachusetts. The NRC prepared a Biological Assessment (BA) in 2006 which evaluates the effects of the proposed license renewal on whales and sea turtles listed as threatened or endangered by NOAA's National Marine Fisheries Service (NMFS). In 2012, in response to the listing of five Distinct Population Segments (DPS) of Atlantic sturgeon, you prepared a supplemental BA to consider effects of operations on Atlantic sturgeon. You have also considered effects to these species in your 2006 Draft Supplemental Environmental Impact Statement (SEIS) and your 2007 final SEIS. A conference call was held on March 22, 2012, to discuss the status of the consultation because we had significant confusion regarding NRC's determination of effects.

In the species by species discussion in the 2006 BA, NRC concludes that the continued operation of Pilgrim would have no effect on each of the ten species considered; the conclusion of the BA states, "staff has identified ten[1] Federally listed endangered or threatened species that are under full or partial NMFS jurisdiction, that have a reasonable potential to occur in the vicinity of PNPS, and, therefore, may be affected by continuing operations of PNPS... the staff has determined that continued operation of PNPS for an additional 20 years would not have any adverse impact on any threatened or endangered marine aquatic species" (NRC 2006 and NRC 2007 at E-73). The FSEIS states, "staff concludes that continued operation of PNPS during the license renewal term is not likely to adversely affect any Federally listed marine aquatic species" (NRC 2007 at p. 4-64). Your February 29, 2012, letter transmitting the supplemental BA and the supplemental BA itself state that you have determined the continued operation of Pilgrim will have no effect on Atlantic sturgeon.

[1] In the FEIS and 2006 BA, NRC considered loggerhead, green, leatherback and Kemp's ridley sea turtles and sei, fin, North Atlantic right, humpback and sperm whales and shortnose sturgeon.

On the March 22, 2012 conference call, your staff confirmed that NRC believes the continued operation of Pilgrim will have "no effect" on any NMFS listed species. As discussed with your staff on a March 22, 2012 conference call, we do not agree with your "no effect" determination. As we also discussed, informal consultation would be appropriate in this situation. Consultation is required when an action "may affect" listed species and/or critical habitat. Consultation may be concluded informally if the action "may affect, but is not likely to adversely affect" listed species and/or critical habitat. A "not likely to adversely affect" conclusion is appropriate when effects are wholly beneficial, insignificant or discountable. As explained in the joint U.S. Fish and Wildlife and NMFS Section 7 Handbook, "beneficial effects are contemporaneous positive effects without any adverse effects. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur."

We have reviewed the available information and do agree that the continued operation of Pilgrim may affect, but is not likely to adversely affect any species listed as threatened or endangered by NMFS. We have also considered whether the continued operation of Pilgrim may affect critical habitat designated for the Northern right whale in 1994 (herein after, right whale critical habitat). In this letter, we provide our justification for concluding consultation informally.

Description of the Facility and Proposed Action

You are proposing to issue a renewed Operating License for the Pilgrim facility. The plant was constructed and licensed in 1972, and the current license expires on June 8, 2012. The facility is currently owned and operated by the Entergy Corporation. The renewed license would authorize the continued operation of the facility until June 8, 2032. There would be no major construction, refurbishment or replacement activities associated with the license renewal. If the NRC approves the license renewal application, the reactor and support facilities would be expected to continue to operate and be maintained until the renewed license expires in 2032.

The Pilgrim facility operates a single reactor unit with a boiling water reactor and turbine generator. The cooling and service water systems operate as a once-through cooling system, with Cape Cod Bay being the water source. Seawater is withdrawn from the Bay through an intake embayment formed by two breakwaters. Two pumps provide a continuous supply of condenser cooling water.

In 1972, Congress assigned authority to administer the Clean Water Act (CWA) to the U.S. Environmental Protection Agency (EPA). EPA issues National Pollutant Discharge Elimination System (NPDES) permits for facilities in Massachusetts. Section 316(b) of the CWA requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available (BTA) for minimizing adverse environmental impacts (33 USC 1326). EPA regulates impingement and entrainment under Section 316(b) of the CWA through the NPDES permit process. The EPA administers Section 316(b) in Massachusetts through the NPDES program.

Pilgrim cannot operate without the intake and discharge of cooling water. NRC is responsible for authorizing the operation of nuclear facilities, as well as approving any extension of an initial operating license through the license renewal process. Intake and discharge of water through the cooling water system would not occur but for the operation of the facility pursuant to a renewed license; therefore, the effects of the cooling water system on listed species and any designated critical habitat are effects of the proposed action.

Pursuant to NRC's regulations, operating licenses are conditioned upon compliance with all applicable law, including but not limited to CWA Section 401 Certifications and NPDES permits. Therefore, the effects of the proposed Federal action-- the continued operation of Pilgrim as proposed to be approved by NRC, which necessarily involves the removal and discharge of water from the Atlantic Ocean-- are shaped not only by the terms of the renewed operating license but also by the NPDES permit issued. In this consultation we consider the effects of the operation of Pilgrim pursuant to the extended Operating License to be issued by the NRC and the NPDES permit issued by EPA that is already in effect; this is the scenario contemplated in the FSEIS. The NPDES permit for this facility was last issued in 1991 and modified in 1994. This permit expired in 1996 and has been administratively extended each year. We requested information from EPA Region 1 regarding the expected publication date for a revised draft permit and were told that no schedule is currently available. Based on this, we do not anticipate that a revised NPDES permit will be available prior to the expiration of the existing operating license. As such, we have considered the effects of continued operation of Pilgrim under the terms of a new operating license and the existing modified 1991 NPDES permit (EPA 1991 and EPA 1994).

NMFS Listed Species in the Action Area

The action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50CFR§402.02). The Pilgrim facility is located on land and includes two land based transmission lines. The effects analysis presented below will be limited to effects experienced in the aquatic environment. Effects of this action on listed species include impingement and entrainment of potential prey and effects to habitat, including the discharge of heated effluent. Therefore, the action area for this consultation includes the intake area and the region within Cape Cod Bay where effects of the thermal plume are experienced. Based on the available information, the largest area measured with increased water temperatures was a surface area of 216 acres with a temperature of 3°C above ambient; however, models predict that the maximum surface area (extending no deeper than five feet from the surface) with a temperature of 1°C above ambient can encompass an area as large as 3,000 acres (this 3,000 acre area extends approximately 7,000 feet (approximately 1.3 miles) from the discharge canal). At the bottom, the largest area that is likely to experience increased temperatures is 8.4 acres. As we explain below, all direct and indirect effects to listed species are limited to the area where increased water temperatures are experienced; thus, the action area is also limited to this area.

Individual North Atlantic right whales (*Eubalaena glacialis*) occur in Cape Cod Bay nearly year round; however, the vast majority of sightings occur from January – April (Pace and Merrick 2008). The species population size was estimated to be at least 361 individuals in 2005 based on a census of individual whales identified using photo-identification techniques (Waring *et al.*. 2010). The population trend for right whales is increasing; the mean growth rate for the population from 1990-2005 was 2.1% (Waring *et al.*. 2010). Of the 17,257 right whale sightings in New England during 1970 through 2005, 7,498 were in Cape Cod Bay (Pace and Merrick 2008). Right whales are most common in eastern Cape Cod Bay, although individuals have been sighted throughout the Bay. Sightings from May 1997 to the present have been mapped (see http://www.nefsc.noaa.gov/psb/surveys/SASInteractive2.html. Since 1997, there have been three sightings in Cape Cod Bay in June; two sightings of three whales in July, none in August, one in September, one in October, three in November (likely the same individual sighted on three consecutive days in 2011), and four in December. Of the thousands of recorded sightings of hundreds of individual right whales in Cape Cod Bay since 1997, we have identified six sightings records (five definite, one probable) of 12 right whales within approximately two miles of the Pilgrim facility. Four of the six sightings were in April (2008, 2010 and 2012), one was in May and one was in December. The seasonal presence of right whales in Cape Cod Bay is thought to be closely associated to the seasonal presence of dense patches of their preferred copepod prey (primarily *Calanus finmarchus* but also *Pseudocalanus* spp. and *Centropages* spp.; Pace and Merrick 2008)

Humpback whales (*Megaptera novaeangliae*) feed during the spring, summer, and fall over a range that encompasses the eastern coast of the United States. Humpback whales in this area belong to the Gulf of Maine stock. The humpback whale population is thought to be steadily increasing and numbers over 11,000 individuals (Waring *et al.*. 2010). While small numbers of humpback whales may be present in Massachusetts waters year round, sightings are most frequent from mid-March through November between 41°N and 43°N, from the Great South Channel north along the outside of Cape Cod to Stellwagen Bank and Jeffreys Ledge (CETAP 1982) and peak in May and August (Waring *et al.*. 2010). Humpback whales are known to occur in Cape Cod Bay and could be present in the action area. We have reviewed sightings data plotted in the OBIS-SEAMAP[2] database. The majority of humpback whale sightings are in eastern Cape Cod Bay. Of 21,472 records of 36,268 individual sightings of humpback whales recorded in this database, only two are within five miles of Pilgrim.

Fin whales (*Balaenoptera physalus*) are also known to be present in Cape Cod Bay and could occur in the action area. The best abundance estimate available for the western North Atlantic fin whale stock is 3,985 (CV=0.24) (Waring *et al.*. 2010). We have reviewed sightings data plotted in the OBIS-SEAMAP database. Of 51,942 records of 61,874 individual sightings, there are only six records of 16 individual fin whales within five miles of Pilgrim. There are no sightings recorded in the database closer than 3 miles from the facility.

NRC's BA and EIS also discuss sei and sperm whales. Sei (*Balaenoptera borealis*) whales occur in deep water throughout their range, typically over the continental slope or in basins situated between banks (NMFS 2011). Sperm whales (*Physter macrocephalus*) occur on the

[2] Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations is a spatially referenced online database aggregating marine mammal, seabird and sea turtle observation data from across the globe. The maps illustrate sightings from 432 databases. Available at: www.seamap.env.duke.edu (last accessed May 10, 2012).

continental shelf edge, over the continental slope, and into mid-ocean regions. Sightings of sei whales in Cape Cod Bay are extremely rare. Of 9,172 sightings of sei whales recorded in OBIS-SEAMAP database, only three are records of sei whales in Cape Cod Bay; all three sightings were on the extreme eastern edge of the Bay near Provincetown. These sightings were in 1967 and 1976. Based on the extremely rare occurrence of sei whales and their known habitats (the continental shelf and other offshore waters), we do not expect sei whales to occur in the action area. Of the 23,929 sightings of sperm whales in the OBIS-SEAMAP database, none were in Cape Cod Bay. Based on the lack of known occurrences of sperm whales in Cape Cod Bay and their known habitats (continental shelf edge, over the continental slope, and into mid-ocean regions), we do not expect sperm whales to occur in the action area.

Certain New England waters were designated as critical habitat for Northern right whales[3] in 1994 (59 FR 28793). The Great South Channel critical habitat is the area bounded by 41°40′ N/69°45′ W; 41°00′ N/69°05′ W; 41°38′ W; and 42°10′ N/68°31′ W. The Cape Cod Bay critical habitat is the area bounded by 42°02.8′ N/70°10′ W; 42°12′ N/70°15′ W; 42°12′ N/70°30′ W; 41°46.8′ N/70°30′ W and on the south and east by the interior shore line of Cape Cod, Massachusetts. The maximum distance that the thermal plume extends from the discharge canal is approximately 1.5 miles from the area in Cape Cod Bay designated as critical habitat.

Sea turtles are seasonally present in Cape Cod Bay. The species that occur in Cape Cod Bay and are likely to occur in the action area include the threatened Northwest Atlantic Distinct Population Segment (DPS) of loggerhead (*Caretta caretta*) sea turtles as well as endangered Kemp's ridley (*Lepidochelys kempi*) sea turtles, endangered leatherback sea turtles (*Dermochelys coriacea*) and endangered green sea turtles *(Chelonia mydas)*. There are no estimates of the numbers of sea turtles that are present seasonally in Cape Cod Bay generally or the action area specifically. Few researchers have reported on the density of sea turtles in Northeastern waters; however, this information is available from one source (Shoop and Kenney 1992). Shoop and Kenney (1992) used information from the University of Rhode Island's Cetacean and Turtle Assessment Program (CETAP[4]) as well as other available sightings information to estimate seasonal abundances of loggerhead and leatherback sea turtles in northeastern waters. As illustrated in Figure 3 of the Shoop and Kenney paper, the aerial and shipboard surveys covered Cape Cod Bay, including the portion of the Bay we have defined as the action area. The authors calculated overall ranges of abundance estimates for the summer of 7,000-10,000 loggerheads and 300-600 leatherbacks present in the study area from Nova Scotia to Cape Hatteras. Using the available sightings data (2841 loggerheads, 128 leatherbacks and 491 unidentified sea

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[3] In 2008, NMFS listed the endangered northern right whale (*Eubalaena spp.*) as two separate, endangered species: the North Pacific right whale (*E. japonica*) and North Atlantic right whale (*E. glacialis*) (*73 FR 12024*). We received a petition to revise the 1994 critical habitat designation in October 2009. In an October 2010 Federal Register notice, we announced that we intend to revise existing critical habitat by continuing our ongoing rulemaking process to designate critical habitat for North Atlantic right whales with the expectation that a proposed critical habitat rule for the North Atlantic right whale will be published in 2011. To date, we have not published a proposed rule so the 1994 critical habitat designation for northern right whales is the only critical habitat for right whales in the Atlantic.

[4] The CETAP survey consisted of three years of aerial and shipboard surveys conducted between 1978 and 1982 and provided the first comprehensive assessment of the sea turtle population between Nova Scotia, Canada and Cape Hatteras, North Carolina.

turtles), the authors calculated density estimates for loggerhead and leatherback sea turtles (reported as number of turtles per square kilometer). These calculations resulted in density estimates of 0.00164 – 0.510 loggerheads per square kilometer and 0.00209 – 0.0216 leatherbacks per square kilometer. It is important to note, however, that this estimate assumes that sea turtles are evenly distributed throughout the waters off the northeast, even though Shoop and Kenney report several concentration areas where loggerhead or leatherback abundance is much higher than in other areas. Further, despite high observation effort in Cape Cod Bay in the spring, summer and fall, no sea turtles were observed in Cape Cod Bay. Additionally, the report only considered the presence of leatherback and loggerhead sea turtles. The Shoop and Kenney abundance estimates, despite considering only the presence of loggerhead and leatherback sea turtles, likely overestimates the number of sea turtles present in the action area. This is due to the assumption that sea turtle abundance will be even throughout the Nova Scotia to Cape Hatteras study area. However, sea turtles occur in high concentrations in several areas outside of the action area, and the inclusion of these concentration areas in the density estimate likely overestimates the number of sea turtles in the action area. Therefore, we expect even lower abundance and density of sea turtles in the action area than the coast wide estimates provided in Shoop and Kenney (1992).

The maximum size of the area warmed by the thermal plume is 3,000 acres (approximately 12 square kilometers), using the density estimates of Shoop and Kenney (1992), we would expect no more than 6 leatherback sea turtles and no more than 1 loggerhead sea turtle to be present in the action area at a given time during the summer. Because Kemp's ridleys and greens are less common than leatherbacks and loggerheads in Massachusetts, we would expect fewer individuals of these species to be present in the action area. For reference, there are approximately 60,000 adult loggerheads in the NWA DPS, with an additional unknown number of juveniles and subadults; the most recent population size estimate for the North Atlantic alone is 34,000-94,000 adult leatherbacks (TEWG 2007); current population estimates for Kemp's ridleys are approximately 7-8,000 adult females with additional unknown numbers of males and younger age classes (NMFS and USFWS 2007); for green sea turtles there are an estimated 17,402-37,290 nesting females per year (NMFS and USFWS 2007b) with additional males and younger age classes. Sightings data indicate that leatherback sea turtles are the most common species of sea turtle in Massachusetts waters, including Cape Cod Bay, followed by loggerheads, with fewer Kemp's ridley and green sea turtles. Sea turtles are typically present in Massachusetts waters from June through October; however, cold stunned turtles may continue to strand on Massachusetts beaches through January. Sea turtles in the action area are likely to be foraging or migrating.

On February 6, 2012, we published two rules listing five DPSs of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) under the ESA. The effective date of these listing rules was April 6, 2012. The marine range of all five DPSs extends along the Atlantic coast from Canada to Cape Canaveral, Florida. Atlantic sturgeon originating from any of five DPSs could occur in Cape Cod Bay and may be present in the action area. Atlantic sturgeon originating from the New York Bight, Chesapeake Bay, South Atlantic and Carolina DPSs are listed as endangered. Atlantic sturgeon originating from the Gulf of Maine DPS are listed as threatened. Atlantic sturgeon spawn in their natal river and remain in the river until approximately age two and at lengths of approximately 76-92 cm (30-36 inches; ASSRT 2007). After emigration from the natal estuary, subadult and adult Atlantic sturgeon forage within the marine environment, typically in waters less than 50 m in depth, using coastal bays, sounds, and ocean waters (see ASSRT 2007). The nearest rivers to Pilgrim where Atlantic sturgeon are known to spawn are the Kennebec River (Maine) and the Hudson River (New York). Because of the distance from the nearest known spawning grounds and the intolerance of early life stages and juveniles to saline waters, no eggs, larvae or juvenile Atlantic sturgeon are likely to occur in the action area. Only sub-adult or adult Atlantic sturgeon would be present in the action area. Atlantic sturgeon in the action area are likely to be migrating and could also be foraging opportunistically. We do not have any estimates of the number of Atlantic sturgeon present in Cape Cod Bay generally or the action area specifically. Entergy has reported the capture of two Atlantic sturgeon (1982 and 2009[5]) in surveys associated with assessing impacts of Pilgrim on the environment. The capture of Atlantic sturgeon in trawl surveys carried out by the Massachusetts Division of Marine Fisheries in Cape Cod Bay is rare, with only one capture recorded to date. Similarly, few Atlantic sturgeon have been reported as bycatch in commercial fisheries operating in Cape Cod Bay (Stein *et al.*. 2004).

NRC also considers shortnose sturgeon (*Acipenser brevirostrum*) in their BA and FSEIS. However, shortnose sturgeon are not known to occur in the action area. Shortnose sturgeon are present in certain large rivers along the U.S. Atlantic coast. The nearest rivers to Pilgrim that are known to contain shortnose sturgeon is the Merrimack River (MA) and Connecticut River (CT/MA). While in the Gulf of Maine, shortnose sturgeon have been documented to make nearshore coastal migrations between neighboring rivers (i.e., the Kennebec and Penobscot Rivers, both in Maine), this behavior is not known to occur outside of this region. No shortnose sturgeon have been documented in Cape Cod Bay and we do not expect this species to be present in the action area. Therefore, this species will not be considered further in this consultation.

EFFECTS OF THE ACTION

Below, we consider the effects of the continued operation of Pilgrim under the terms of a new operating license on listed species and critical habitat. We consider the effects of water withdrawal (impingement or entrainment of listed species and their prey) and effects of the discharge of effluent (exposure to pollutants, including heat, and effects on prey). In addition to considering information presented in the 2006 DSEIS and the 2007 FSEIS, we have considered information presented in NRC's Generic EIS for relicensing, the most recent impingement and entrainment reports (Normandeau 2011a and 2011b) for Pilgrim, and other sources of information on listed species and their prey as cited below.

Entrainment of Listed Species

Entrainment occurs when small aquatic life forms are carried into and through the cooling system during water withdrawals. Entrainment primarily affects organisms with limited swimming ability that can pass through the screen mesh, used on the intake systems.

[5] One fish measuring 82.8 cm (2.7 feet) was caught in a gill net operated by the Mass. Division of Marine Fisheries in November 1982. A second fish measuring 180 cm (5.9 feet) was caught in a bottom trawl survey conducted by Normandeau Associates in May 2009 (Scherer 2012).

Entrainment sampling was initiated in 1974 and was initially conducted twice per month from January to February and from October to December and conducted weekly from March through September. During these events, sampling was conducted in triplicate. Beginning in 1994, during the January to February and October to December time periods, samples have been collected every other week on three separate days for a total of approximately six samples per month. During the March through September time frame, three separate samples have been collected every week for a total of approximately 12 samples per month (NRC 2007).

A rack system is in place in front of the intakes to screen out large debris; this consists of vertical bars spaced 3-inches apart. There is also a ¼-inch by ½-inch mesh traveling screen system (NRC 2007). To be entrained in the facility, an organism must be able to pass through this mesh. All whales, sea turtles, and Atlantic sturgeon are considerably larger than this minimum size, making entrainment impossible. Because of this, no entrainment of listed species will occur during the period of continued operations.

Impingement of Listed Species

Impingement occurs when organisms are trapped against cooling water intake screens or racks by the force of moving water. Impingement happens when aquatic species cannot escape from the screen or rack and become stuck. Impingement sampling has been ongoing since 1980 and consists of monitoring three scheduled screen-wash periods each week throughout the year. Monitoring occurs for 30 to 60 minutes at a time (NRC 2007).

Atlantic sturgeon

Fish that are narrower than 3-inches may pass through the trash bars and become impinged on the traveling screens. Fish with body widths larger than 3-inches could become impinged on the trash racks. Information on length-width relationships for sturgeon indicates that sturgeon longer than 85cm would be excluded from a 4-inch opening (UMaine, unpublished data). While we do not have information on the body lengths that would have widths sufficiently large to prevent passage through a 3-inch opening, because fish get wider as they get longer, we expect that the length of fish that could possibly pass through a 3-inch opening would be smaller than 85 cm. Atlantic sturgeon do not leave their natal rivers until they are approximately 76 cm (ASSRT 2007); thus, the only fish susceptible to impingement on the traveling screens would be those that are 76 – 85 cm long, which would be a subadult given that they mature at approximately 150cm (ASSRT 2007). Atlantic sturgeon attain lengths of approximately 200cm (Colette and Klein-MacPhee 2002).

Regardless of fish size, impingement only occurs when a fish cannot swim fast enough to escape the intake (e.g., the fish's swimming ability is overtaken by the velocity of water being sucked into the intake). Intake velocities at Pilgrim's racks are approximately 1.0 feet per second (fps) or less, depending on tide and operations; through-screen velocities on the traveling screen are no higher than 2.0 feet per second (NRC 2007). In order for impingement to happen, a fish must be overcome by the intake or through-screen velocity. Juvenile and adult shortnose sturgeon (body lengths greater than 58.1cm) have been demonstrated to avoid impingement and entrainment at intakes with velocities as high as 3.0 feet per second (Kynard *et al.*. 2005). Assuming that Atlantic sturgeon have swimming capabilities at least equal to shortnose sturgeon, Atlantic sturgeon should also be able to avoid becoming impinged on the trash bars and intake screens. This is a reasonable assumption given that the Atlantic sturgeon that would be present in the action area are at least of a similar size to the shortnose sturgeon tested by Kynard and because these species have similar body forms, we expect swimming ability to be comparable between individuals of similar sizes. No Atlantic sturgeon have been documented as impinged at Pilgrim.

As a condition of their existing license, Entergy must report to NRC any observations of listed species. No whales or sea turtles have been observed impinged at the Pilgrim intakes (NRC 2007). We have considered whether there is the potential for future impingement at Pilgrim. All whales and sea turtles that may be present in the action area are too large to pass through the trash bars (i.e., they have body widths much larger than 3-inches). Whales in the action area are expected to be at least 13 feet long (the minimum size of newborn calves, which is the smallest size of these whale species anywhere; NMFS OPR 2012), with body widths of several feet. Whales are too large to pass through the trash racks and become impinged on the traveling screens. Whales are capable of swimming speeds of several miles per hour; the low intake velocity at the trash rack (1.0-foot per second; NRC 2007) makes it extremely unlikely that any whales would be impinged at the intakes. We are not aware of any incidences of whales becoming impinged on cooling water intakes anywhere in the U.S.

The impingement of sea turtles has been documented at some (e.g., Oyster Creek, NJ; St. Lucie, FL), but not all, nuclear power plants on the U.S. East Coast. As noted above, no sea turtles have been recorded at the Pilgrim intakes. No sea turtle impingements have been recorded at any other power plant with a cooling water intake in New England, including the Seabrook (NH) and Millstone (CT) nuclear power plants. Factors related to the potential for impingement likely include intake velocity (animals may have more difficulty escaping areas with higher intake velocity), plant location, and the physical features of the intake structure (for example, sea turtle impingement at the Salem, NJ nuclear facility was nearly eliminated after ice barriers were seasonally removed from the intakes (NRC 2010)). Sea turtles are strong swimmers and are likely to be able to avoid impingement at the Pilgrim intakes; the lack of any impingement in the past supports this conclusion.

Based on this analysis, the impingement or entrainment of any whales, sea turtles, or Atlantic sturgeon is extremely unlikely to occur during the extended operating period. This conclusion is supported by past monitoring data as reported in the BA, DEIS and FEIS; no Atlantic sturgeon, whales or sea turtles have been observed as impinged or entrained at the intakes.

Impingement and Entrainment - Effects on Prey

NRC reports in the FEIS that 73 species of fish and 18 taxa of invertebrates have been recorded during impingement sampling since 1980 (NRC 2007). NRC also reports that losses due to impingement from Pilgrim were less than one percent of the population for each of the recorded impinged species, with the exception of cunner and rainbow smelt. Below, we consider the effects of the loss of potential prey species due to impingement or entrainment at Pilgrim for whales, sea turtles and Atlantic sturgeon that may be foraging in the action area and in Cape Cod Bay.

Right whales

Right whales feed almost exclusively on copepods, a type of zooplankton. Of the different kinds of copepods, North Atlantic right whales feed especially on late stage *Calanus finmarchicus*, a large calanoid copepod (Baumgartner *et al.*. 2007), as well as Pseudocalanus spp. and Centropages spp. (Pace and Merrick 2008). Because a right whale's mass is ten or eleven orders of magnitude larger than that of its prey (late stage *C. finmarchicus* is approximately the size of a small grain of rice), right whales are very specialized and restricted in their habitat requirements – they must locate and exploit feeding areas where copepods are concentrated into high-density patches (Pace and Merrick 2008). Right whales forage in Cape Cod Bay from January – April; this area is known to have high densities of copepods during this time of year (Pace and Merrick 2008).

Because of their small size, copepods would be entrained at Pilgrim rather than impinged against the intake screens. Some entrained copepods are likely to die as they travel through the plant due to thermal stress and exposure to chlorine. Entergy reports that studies conducted in 1984 indicate that mortality of entrained zooplankton is approximately 5% during most operating conditions, with an additional loss of 8.3% of entrained zooplankton that are exposed to chlorine. Thus, more than 85% of entrained zooplankton are likely to survive entrainment (Bridges and Anderson 1984).

A study on the effect of Pilgrim's operations on zooplankton was undertaken in the 1970s, after Pilgrim began operating. In a study conducted from August 1973 through December 1975, duplicate samples were taken monthly at mid-depth near the Pilgrim intake and discharge and at various depths at offshore stations. Copepods, especially *Acartia clausi* and *Acartia tonsa*, dominated the samples. *Pseudocalanus minutus* occurred in moderate abundances (approximately 1,000 individuals/m3) every month. Reports indicate that statistical evaluation of the mean densities of the copepod species observed did not reveal any differences between sampling stations (ENSR 2000).

NRC has indicated that, other than the studies cited above, no information on the entrainment of zooplankton generally or copepods specifically is available for Pilgrim. No estimates of the number of copepods entrained are available. NRC indicates that the issue of zooplankton entrainment has been considered generically. As stated in the GEIS (see section 4.2.2.1.1 in NRC 1996), because of large numbers and short regeneration times of phytoplankton and zooplankton (most copepods live from one week to several months), impacts of entrainment on these organisms have rarely been documented outside the immediate vicinity of any plant and are considered to be of little consequence (referencing Schubel and Marcy 1978; Hesse *et al.*. 1982; Kennish *et al.*. 1984; MDNR 1988; MRC 1989; EPRI EA-1038). NRC states that the effects of entrainment at nuclear plants are not expected to cause or contribute to cumulative impacts to populations of zooplankton or phytoplankton. NRC also states that the effects of phytoplankton and zooplankton entrainment are localized (i.e., the affected areas are smaller than the distances between power plants) and are not expected to contribute to cumulative impacts because generation times of plankton are rapid. NRC further states that review of the literature and operational monitoring reports did not reveal evidence of cumulative impacts from entrainment of phytoplankton and zooplankton. Based on this analysis, NRC has concluded that any effects to zooplankton, including copepods, would be small and localized. "Small" effects are defined by NRC as, "environmental effects [that are] not detectable or are so minor that they will neither destabilize or noticeably alter any important attribute of the resource" (see NRC 2007 at p. iii).

Because we do not have information on the number of copepods entrained at Pilgrim that we can compare to the volume of copepods in Cape Cod Bay, which would give us information on the relative loss of copepods, we have considered other information on zooplankton and copepods in Cape Cod Bay. We expect that if the continued operation of Pilgrim was having an effect on the zooplankton community in Cape Cod Bay, that there would be a negative trend in zooplankton and copepod abundance in the Bay since Pilgrim became operational. However, as explained below, long term studies of zooplankton and copepods in Cape Cod Bay have not found any negative trend in copepod abundance.

The zooplankton community in Cape Cod Bay has been monitored by the Massachusetts Water Resources Authority (MWRA) since 1992, both near the MWRA outfall and at farfield stations, including stations in Cape Cod Bay. As most recently reported in 2010, there have been no changes in the zooplankton community at any of the stations beyond normal ecological fluctuations (Werme *et al.*. 2011).

The abundance of the three primary copepod that right whales feed on is variable in Cape Cod Bay, both monthly and annually (Stamieszkin *et al.*. 2010); a review of data on copepods collected in Cape Cod Bay from 2003-2010 compiled by Stamieskin *et al.*. (2010) reveals no trends of enrichment or decline for any of the three taxa studied (*Calanus*, *Pseudocalanus* and *Centropages*). Together, these studies support NRC's determination that continued operations of Pilgrim have not destabilized or negatively impacted the zooplankton community in Cape Cod Bay.

We have conducted a literature search to determine if there is any information on the effects of other nuclear power plants with once through cooling systems on zooplankton, including copepods. A peer reviewed paper was found which documented an 8-year study of zooplankton entrainment at a nuclear facility on Lake Michigan (Evans *et al.*. 1986). The authors concluded that the studies showed a small percentage of entrained zooplankton were actually killed as a result of passage through the condenser cooling system and that these small losses were not able to be detected at the lake. However, this study occurred in a fresh water system with different species of zooplankton (and different species of copepods) and operations of the Lake Michigan power plant and Pilgrim may be different. The Bridges and Anderson (1984) study at Pilgrim on zooplankton mortality does reach similar conclusions regarding zooplankton mortality resulting from entrainment.

Studies presented by Huggett and Cook (1991) consider effects of entrainment of zooplankton at a nuclear power facility on the coast of South Africa. While there are right whales off the coast of South Africa, this study did not consider effects to right whales or other species that feed on copepods. Mortality rates for entrained copepods were approximately 22%; however, the copepods discussed were not the species that right whales in Cape Cod Bay forage on. The authors concluded that plankton entrainment at the Koeberg facility was not considered to be "particularly detrimental to the marine environment" mainly because of the localized area affected (no more than 1 km from the mouth of the outfall canal), the rapid dispersion of heat and chlorine, the rapid regeneration times of phytoplankton and some zooplankton, and the potential for recruitment from the surrounding area.

Extensive pre- and post-operation monitoring has occurred at the Seabrook Nuclear Power Station in New Hampshire. Seabrook withdraws approximately 600 million gallons of water per day (MGD; NRC 2011) (Pilgrim withdraws a maximum of 510 MGD). As reported in the DEIS prepared by NRC for relicensing of Seabrook, NextEra compared the density of holoplankton, meroplankton, and hyperbenthos taxa prior to and during operation at nearfield and farfield sites (3-8 miles away from the intakes and discharge and considered to be outside the influence of the facility). No significant difference in the density of holoplankton (copepods are considered holoplankton) or meroplankton taxa prior to and during operations or between the nearfield and farfield sampling sites were reported. These results suggest that Seabrook operations have not noticeably altered holoplankton or meroplankton density near Seabrook in the more than 20 years that Seabrook has been operating.

The available information indicates that most (greater than 85%) entrained zooplankton will survive entrainment at Pilgrim. We expect that some of the zooplankton that are killed will be copepods and that some of those copepods may be of the three types that are preferred by right whales. However, studies conducted at Pilgrim, and at other nuclear power plants, indicate that any losses of copepods are not detectable outside of natural variability. Further, information gathered from several longterm monitoring programs designed to document changes in the zooplankton community in Cape Cod Bay, does not indicate that there have been any reductions in copepod abundance in the Bay. If Pilgrim was having more than an insignificant effect on copepod populations within the Bay, we expect that these studies would have detected a negative trend over time.

While there may be significant annual variability in copepod abudance and associated right whale foraging in the Bay, which is thought to be due at least party to weather and oceanic conditions (e.g., differences in 2010 as compared to other years are thought to be due to the changes in the Western Maine Coastal Current (Stamieszkin *et al.*. 2010), the available information does not suggest that there has been a long-term negative trend in copepod abundance or distribution or right whale abundance or distribution since the Pilgrim facility became operational that may be attributable to operations of the facility. While some copepods are likely lost to entrainment at Pilgrim each year and these losses, if they were the right species and occurred at a time of year when right whales were present, would reduce the amount of prey available to right whales, however these reductions will be insignificant and undetectable from natural variability. As such, we expect any effects to foraging right whales to be insignificant.

Humpback and fin whales
Humpback and fin whales feed on krill and small schooling fish, primarily Atlantic herring[6], mackerel and sand lance. Other species that humpbacks are reported to forage on while in the North Atlantic include capelin, pollock, and haddock. Capelin (*Mallotus villosus*) are not recorded as being impinged or entrained at Pilgrim (NRC 2007 and Normandeau 2011a and 2011b).

Atlantic mackerel (*Scomber scombrus*) have been occasionally impinged at Pilgrim. From 1980-2010, mackerel have been impinged in seven years with a mean annual impingement of seven individuals. As described in the 2010 entrainment report (Normandeau 2011a), Atlantic mackerel "equivalent adults" attributable to entrainment in 2010 amounted to 316 age-one fish or 114 age-three fish based on two sets of survival values. The northwest Atlantic mackerel spawning stock biomass was 96,968 metric tons in 2008 with average recruitment of 566 million age-one fish from 1985-2009 (TRAC 2010). While the annual loss of Atlantic mackerel at Pilgrim over the 20-year operating period will result in fewer fish that are available for large whales to eat, this loss represents an extremely small percentage of the Atlantic herring available to these species. Because of this, any effects to foraging whales will be insignificant.

Atlantic herring (*Clupea harengus*) have been impinged and entrained at Pilgrim. The mean number of Atlantic herring impinged at Pilgrim (1990-2004) is 2,069 individuals per year. The most recent (Normandeau 2011a) report for entrainment at Pilgrim indicates that the equivalent adult value of Atlantic herring entrained or impinged at Pilgrim would account for about 0.01 percent of the spawning stock by biomass. Atlantic herring are a prolific, widely distributed species; the most recent stock assessment report (TRAC 2009) indicates that this species has fully recovered from past overfishing. At the beginning of 2008, the biomass was approximately 652,000 metric tons; the 2005 year class was approximately 3.3 billion individuals. While the loss of Atlantic herring at Pilgrim results in fewer fish that are available for large whales to eat, this loss represents an extremely small percentage of the Atlantic herring available to these species. Because of this, any effects to foraging whales will be insignificant.

Sand lance are a common, widely distributed species. American sand lance (*Ammodytes americanus*) is impinged in only some years and at very low numbers (Normandeau 2011b). Larval sand lance are entrained seasonally at Pilgrim (Normandeau 2011a); the long term annual mean number entrained is 3,854 (Normandeau 2011a). Collette and Klein-MacPhee (2002) report that the abundance of sand lance in the western North Atlantic in 1987 was approximately 500,000 metric tons. While the loss of sand lance at Pilgrim results in fewer fish that are available for large whales to eat, this loss represents an extremely small percentage of the sand lance available to these species. Because of this, any effects to foraging whales will be insignificant.

[6] It is important to distinguish between Atlantic herring and the species commonly referred to as "river herring" because there are often references made to "herring" without further specificity about which species is being referred to. Atlantic herring are a marine species that occurs exclusively in saline waters; these small schooling fish are preyed upon by large whales. The term river herring refers to alewife and blueback herring which are small anadromous fish that spawn in rivers and then make oceanic migrations.

Humpback whales may feed occasionally on pollock and haddock. Entergy reports the impingement of a total of 15 haddock (all in 2007) from 1980-2010 (Normandeau 2011b). Haddock eggs and larvae are also occasionally entrained at Pilgrim. The annual entrainment estimate for haddock eggs and larvae at Pilgrim ranges between 0 and 89,926 eggs and 0 and 178,892 larvae (ENSR 2000). Entergy reports that haddock eggs were only observed once between 1989 and 1998 and haddock larvae were only observed in four of these 10 years. Considering that an average female haddock lays 850,000 eggs (Brodziak and Traver 2006), and the Georges Bank stock of haddock has a spawning stock biomass of 120,000 metric tons (NMFS 2003), the loss of eggs and larvae at Pilgrim represents an extremely small percentage of the haddock available to whales.

Entergy reports the impingement of an average of 65 pollock annually from 1980-2010. The average number of estimated pollock eggs and larvae entrained annually at Pilgrim between 1989 and 1998 is 26,044 and 47,364 respectively (ENSR 2000). Pollock eggs were only observed twice between 1989 and 1998 and pollock larvae were only observed four of the 10 years (ENSR 2000). Estimates of pollock abundance were 196,000 metric tons in 2009. The loss of pollock at Pilgrim represents an extremely small percentage of the sand lance available to these species. Because of this, any effects to foraging whales will be insignificant.

Other small schooling fish that are impinged or entrained at Pilgrim include alewives and river herring. Fin and humpback whales are not known to prey on either of these species (see NMFS 1991 and NMFS 2010 for descriptions of the diet of humpback and fin whales).

Green sea turtles

Green sea turtles feed primarily on sea grasses and may also feed on algae. Sea grasses are immobile and rooted in the substrate; they can only be impinged at the intakes if they have become uprooted due to some other cause, such as a storm. The continued operation of Pilgrim does not cause the loss of any seagrasses due to impingement or entrainment. Green sea turtles are not known to feed on Irish moss (K. Sampson[7], personal communication), the red seaweed that has been identified as being impinged and entrained (spores) at Pilgrim. As the species that green sea turtles forage on are not affected by impingement or entrainment, we do not anticipate any loss of green sea turtle forage items due to impingement or entrainment.

Loggerhead and Kemp's ridley sea turtles

Loggerhead turtles feed on benthic invertebrates such as gastropods, mollusks and crustaceans. Kemp's ridleys primarily feed on crabs, with a preference for portunid crabs including blue crabs. Pilgrim impinged a mean of 273 cancer crabs (*Cancer* spp.) per year from 1980 through 2010 based on extrapolated annual totals (Normandeau 2011b). However, annual impingement rates have varied widely. Pilgrim impinged cancer crabs in only two years from 1980 to 1999, but from 2000 to 2010, Pilgrim impinged cancer crabs nine out of the 10 years (Normandeau 2011b). There is similar variability in the number of other invertebrates, including other crab species, impinged at Pilgrim each year, with no individuals impinged in many years but some years having multiple individuals impinged. In some years, several thousand individual invertebrates, including crabs, are impinged (Normandeau 2011b). However, all of these species

[7] Personal communication, April 2012 with Kate Sampson, NMFS NERO Sea Turtle Stranding Coordinator.

are widely distributed with populations of at least millions of individuals and any loss due to impingement at Pilgrim represents an extremely small percentage of the individuals in the action area and in Cape Cod Bay or throughout their range. While the loss of benthic invertebrates, including crabs, at Pilgrim results in fewer individuals that are available for sea turtles to eat, this loss is expected to be an extremely small percentage of the forage available to these species. Because of this, any effects to foraging sea turtles will be insignificant.

Leatherback sea turtles
Leatherback sea turtles feed exclusively on jellyfish. The most recent impingement report for Pilgrim (Normandeau 2011b) indicates that Pilgrim impinged 744 jellyfish (Phylum Cnidaria) in 1981 and 940 jellyfish in 1983 based on extrapolated totals. However, no jellyfish have appeared in impingement samples since 1983. Because the impingement of jellyfish is rare, and the numbers of jellyfish impinged in the past is low in relation to overall population levels, we expect that in the 20 years of continued operations, there will be the occasional impingement of low numbers of jellyfish. Any jellyfish lost at Pilgrim represent a reduction in available prey for leatherbacks foraging in Cape Cod Bay; however, because the loss will be limited to occasional instances and only a small number of individuals, which equates to a miniscule percentage of the overall number of jellyfish available to leatherbacks, the effect on foraging leatherbacks will be insignificant.

Atlantic sturgeon
Atlantic sturgeon feed on benthic invertebrates and occasionally on sand lance. Effects to sand lance are considered above; because the loss of sand lance at Pilgrim is an extremely small percentage of the biomass of sand lance, effects to foraging Atlantic sturgeon from this loss are will be insignificant. NRC states that monitoring of the benthic environment near Pilgrim indicates that effects related to Pilgrim can only be detected in a very small area (less than 1 acre; NRC 2007). Any benthic invertebrates lost at Pilgrim results in fewer individuals that are available for Atlantic sturgeon to eat; however, given the small area where the benthic community is affected (less than 1 acre), any effects to foraging Atlantic sturgeon would be insignificant.

Discharge of heated effluent

Description of the thermal plume
Heated effluent is discharged from the Pilgrim outfalls. Under normal operation, seawater is heated in the condensers to approximately 15 to 17°C above the intake temperature (which ranges annually from 2 to 22°C). The temperature of the discharged water is a function of the temperature of the incoming seawater. From the condensers, water flows through a buried concrete conveyance to the discharge canal. Upon exiting the concrete pipe, discharged water enters a 900-foot-long trapezoidal discharge canal. The NRC has indicated that this thermal plume is rapidly dissipated and is only present in the nearshore area around the facility. The NPDES permit limits the temperature of cooling water discharged from the facility to be no more than 32°F (17.8°C) above ambient, with a maximum limit of 102°F (56.7°C). Studies of the thermal plume occurred in the 1970s and again in the 1990s. Two of the most detailed thermal investigations at PNPS were a 1974 study by the Massachusetts Institute of Technology (MIT

1974), which focused on characterizing the plume based on surface water temperature measurements, and a 1994 study by EG&G (1995), which focused on bottom water temperature measurements to characterize the benthic thermal plume and validate mathematical models to predict bottom plume characteristics (ENSR 2000). At low tide, the turbulent discharge plume is well mixed vertically as it leaves the canal, due in part to the significant downward momentum of the discharge as it spills from the mouth of the discharge canal. The plume remains in contact with the bottom at low tide for up to several hundred meters offshore. At the surface, the plume spreads by mixing with the ambient water. At the bottom the core temperature of the plume drops and its width narrows with distance offshore. As a result, elevated temperatures are present at low tide over a limited area of the bottom near the discharge canal (see detailed discussion below; EG&G 1995). At high tide, the discharge has a much lower velocity and no downward momentum. As a result, the thermal discharge plume rises away from the bottom almost immediately upon leaving the discharge canal (EG&G 1995).

The 1974 study found that the thermal plume is largest during high tide, and that during high tide the plume is essentially confined to the surface layer. The depth of the plume was found to be relatively shallow, with depths ranging from 3 to 8 feet at high tide. The temperature difference (delta T) between ambient water and the thermal plume was found to cover a larger area when ambient temperatures were higher. For example, water with a delta T of 3°C (5.4°F) covered approximately 216 acres in August when the ambient temperature was 17.0°C (62.6°F), but only 14 acres in November when the ambient temperature was 8.5°C (47.3°F). The maximum recorded size of the plume was a 216 acre area that had temperatures 3°C (5.4°F) above ambient from the surface to 4 feet below the surface. The study demonstrated that the size of the plume was influenced by ambient temperatures. In November, when ambient water temperatures were 8.5°C (47.3°F), the largest measured extent of the plume (delta T of 1°C (1.8°F)) was only 56 acres. In July, when the ambient temperature was 11.5°C (52.7°F), the largest measured extent of the plume (delta T of 1°C (1.8°F)) was 138 acres. In all instances, the plume was limited to the area between the surface and 3-8 feet below the surface. The area of the plume was found to decrease rapidly with increasing depth, due to the buoyancy of the plume. Throughout the tidal cycle, the smallest surface areas with elevated temperatures occurred between low water slack tide and peak flood tide, and the largest areas occurred between high water slack tide and peak ebb tide (ENSR 2000 in NRC 2007). Model results suggest that, during worst case conditions, the area where water temperatures will be at least 1°C above ambient could be as large as 3,000 acres. Visual depictions of the area encompassed by this area are not available. However, the delta T 3°C area was illustrated (see MIT 1974). Using this figure and the maximum distance between the 4°C and 3°C isopleths, the 3,000 acre area occupied by the delta T 1°C is predicted to extend approximately 7,000 feet (approximately 1.4 miles) from the discharge canal. For reference, measured from the shoreline at Pilgrim, it is approximately 18.5 miles to the tip of Cape Cod and approximately 18 miles to the southern extent of Cape Cod Bay.

The 1994 study (EG&G 1995) measured the bottom temperature patterns based on time series measurements at 59 locations in the immediate vicinity of the discharge. The maximum offshore extent of the benthic thermal plume at low tide, based on the area of 1°C temperature elevation, did not exceed 170 meters (558 feet) from the mouth of the discharge canal, and its width did not exceed 40 meters (131 feet) at a distance of 80 m (262 ft) offshore. The maximum bottom area covered by the 1°C temperature elevation at low tide was about 1.2 acres; the maximum temperature elevation recorded (increase of 9°C (16.2°F)) was limited to an area of less than 0.13 acres at the bottom. During high tide, there was no discernible temperature increase at any location, even within 50 m of the mouth of the discharge canal. Because the benthic thermal plume study involved measurements taken over a short period of time and the temperatures and extent of the plume were strongly affected by ambient temperatures, the report (EG&G 1995 references in NRC 2007) also considered the potential for more extreme thermal plume characteristics under worst case conditions. It concluded that extreme bottom temperatures and plume areas could result from a prolonged period of unusually warm weather, spring tide conditions in which the lowest water level can be nearly 1 m (3 feet) below mean water level (MLW), and conditions favorable for downwelling could be produced by warm winds from the north or northeast in summer. The combination of these conditions potentially could result in peak discharge temperatures in excess of 38°C (100.4°F). Given the uncertainty in the area it was estimated that these conditions potentially could result in the thermal plume contacting the bottom over an area about four to seven times the area measured in the study. Using this information, during extreme conditions, the maximum offshore extent of the benthic thermal plume at low tide, based on the area of 1°C temperature elevation, would not exceed 680-1,190 meters from the mouth of the discharge canal, and its width would not exceed 160-280 meters at a distance of 80 meters offshore. The maximum bottom area covered by the 1°C temperature elevation at low tide, would be 4.8-8.4 acres; the maximum bottom area covered by the 9°C temperature elevation would be 0.52-0.91acres at the bottom.

An additional source of heated water discharge at PNPS is backwashing operations; this is used to control biofouling in the condenser tubes. Condenser tubes at Pilgrim are cleaned by backwashing on a one to two week interval, depending on the degree of biofouling; the flow of heated water is reversed so that organisms fouling the condenser tubes and intake structure are killed by the elevated temperatures. The process results in the flow of heated water out of the intake structure and into the intake embayment. The thermal backwashing process generally occurs for approximately 45 to 60 minutes and produces elevated water temperatures averaging approximately 37.8°C (100°F) (NRC 2007). A thermal survey to determine the effects of backwashing operations at Pilgrim found that backwashing results in a relatively thin thermal plume, averaging 3 to 5 feet in depth (water depths in the area are at least 18-24 feet at mean low water), that spreads rapidly from the intake structure across the western end of the intake embayment and along the outer breakwater. The plume completely dissipates within 2-4 hours (Normandeau 1977).

Effects of the Thermal Plume

Whales

Right whales have been recorded at sea surface temperatures (SST) of 0.0-21.8°C (Kenney in Kraus and Rolland 2007); humpback whales at SST up to 32°C (NMFS 1991) and fin whales at SST up to 28°C (NMFS 2010). All three whale species show tolerance for changing temperatures as reflected by movements through varied water temperatures over periods of minutes to weeks (Kenney in Kraus and Rolland 2007). Heated areas are discussed below in terms of acres. For reference, the surface area of Cape Cod Bay is approximately 321,237 acres (1,300 square kilometers; Emberton 1981).

While small numbers of right whales (e.g., less than 3 at a time) can be present in Cape Cod Bay year round, right whales are typically present in the Bay from January – April (Pace and Merrick 2008). During this time of year, mean sea surface temperatures in Cape Cod Bay range from approximately 0-10°C (see Delorenzo Costa *et al.*. 2006). Assuming that right whales may be negatively affected at water temperatures above 21.8°C (the maximum temperature where they have been recorded), to consider direct effects to right whales from the thermal plume (i.e., stress that may cause injury or mortality or avoidance behavior), we would consider the area where water could be heated to above 21.8°C. During the January – May time period, water would need to be heated at least 11.8°C above ambient to reach this level. The discharge temperature of the effluent is 15-17°C above ambient so even in the winter, water would be discharged at levels potentially above the thermal tolerance of right whales. However, outside of extreme summer conditions, the bottom area where temperatures are greater than 9°C above ambient are less than 0.13 acre (EG&G 1995). Thus, the bottom area that we would expect right whales to avoid would be less than 0.13 acres.

We have information on the size of the thermal plume at the surface when ambient temperatures were 8.5°C and 11.5°C. These conditions are similar to those when whales are present in Cape Cod Bay and are most likely to be present in the action area. As noted above, avoidance by right whales could occur at temperatures of 21.8°C. With ambient temperatures of less than 10°C, right whales are only likely to avoid surface areas with water temperatures warmed at least 11.8°C above ambient. When ambient temperatures were 8.5°C and 11.5°C, the surface area where water temperatures were greater than 7°C and 6°C respectively were 0.1 and 0.5 acres; the areas where water temperature would be 21.8°C or higher would be even smaller. Based on this, the area where water temperatures are potentially high enough for right whales to avoid during the January – May time period are less than 0.13 acres at the bottom and less than 0.5 acres at the surface. As stated previously, most right whale sightings in Cape Cod Bay occurred in the eastern portion of the Bay. With regard to the relatively small subset of right whales in Cape Cod Bay that travel to the western part of the Bay, we expect that right whales would avoid waters heated to above 21.8°C by swimming under or around them. Because the area of the plume that would be avoided is extremely small (less than 0.5 acre, or less than 0.0002% of the surface area of Cape Cod Bay), any avoidance will not result in any disruption or delay in any essential behaviors that these species may be carrying out in the action area, including foraging, migrating or resting. Additionally, there is not expected to be any increase in energy expenditure that has any detectable effect on the physiology of any individuals or any future effect on growth, reproduction, or general health.

Fin and humpback whales could be present in the action area year round but are more likely to be in the action area during the summer months. During the warmest months, ambient temperatures can be as high as 22°C. Given the known distribution of fin and humpback whales in waters of 28 and 32°C respectively, water would need to be heated to at least 6 and 10°C above ambient to be potentially stressful to these species. As evidenced in the discussion for right whales above, during the winter months, this area is extremely small (less than 0.13 acre at the bottom and less than 0.5 acre at the surface).

At conditions of ambient temperature 17°C, the area where temperatures are more than 6°C above ambient (23°C and higher) was measured at 2.6 acres (ENSR 2000). No measurements were made at ambient temperatures over 17°C. However, we also know the size of the area where delta T was 6°C at 11.5°C; in this case, a 50% increase in ambient temperature (11.5°C to 17°C) results in approximately a five-fold increase in the size of the area with a delta T 6°C (0.5 acres to 2.6 acres). Assuming that this relationship is linear, we calculate that the size of the delta T 6°C would be 4.33 times bigger when ambient temperatures are 22°C (i.e., a 1.3 times increase in ambient temperature would result in an approximately 4.33-fold increase in the size of the delta T 6°C area). Thus, we expect the area where surface temperatures would be higher than 28°C to be approximately 11.25 acres (2.6x4.33); the area with surface temperatures of 32°C would be even smaller. Based on this analysis, the surface area where water temperatures would be potentially stressful to humpback and fin whales (i.e., greater than 32°C and 28°C respectively), would be smaller than 11.25 acres (approximately 0.004% of the surface area of Cape Cod Bay).

As discussed in EG&G (1995), during most of the year, the benthic area where water temperatures are more than 9°C above ambient is less than 0.1 acres and the area where water temperatures are more than 1°C above ambient is less than 1 acre. Throughout most of the year, the benthic area that fin and humpback whales would avoid is no more than 1 acre. During certain extreme conditions, the area where water temperature is heated above ambient by 9°C can be as large as 0.91 acres and the area where water temperature is heated above ambient by 1°C can be 8.4 acres. The size of the thermal plume as measured at the delta T 1°C, 5°C, and 9°C isopleths, changes by at least one-third (see Table 5.1-3 in ENSR 2000; e.g., the area at the bottom that is 5°C is approximately 1/3 the size of the area that is 1°C). Thus, we expect that even in the worst case summer conditions, the benthic area that would be avoided by humpback and fin whales would be approximately 3 acres (1/3 the size of the delta T 1°C).

Given that the size of the surface and bottom areas that fin and humpback whales are likely to avoid (no more than 11.25 acres at the surface and 3 acres at the bottom) is small, and avoidance behavior is expected to be limited to swimming around or under the plume, any avoidance will not result in any disruption or delay in any essential behaviors that these species may be carrying out in the action area, including foraging, migrating or resting. Additionally, there is not expected to be any increase in energy expenditure that has any detectable effect on the physiology of any individuals or any future effect on growth, reproduction, or general health.

Sea turtles

Excessive heat exposure (hyperthermia) is a stress to sea turtles but is a rare phenomenon when sea turtles are in the ocean (Milton and Lutz 2003). As such, limited information is available on the impacts of hyperthermia on sea turtles. All sea turtle species are known to regularly occur in waters of at least 28°C; Caribbean waters can be even warmer in the low to mid 30s. Environmental temperatures above 40°C can result in stress for green sea turtles (Spotila *et al.*. 1997). Even assuming that a water temperature greater than 28°C could be stressful for sea turtles, as explained above, even when ambient temperatures are there warmest, the surface area heated to 28°C or higher is approximately 11.25 acres; the benthic area is even smaller (less than 3 acres (see above for calculations)). Sea turtles could avoid the heated area of the bottom by swimming around it and could avoid the surface area by swimming underneath it. Given the small size of this area, any avoidance will not result in any disruption or delay in any essential behaviors that these species may be carrying out in the action area, including foraging, migrating or resting. Additionally, there is not expected to be any increase in energy expenditure that has any detectable effect on the physiology of any individuals or any future effect on growth, reproduction, or general health.

We have considered whether the thermal effluent discharged from the plant may represent an attraction for turtles. If turtles are attracted by this thermal plume, they could remain there late enough in the fall to become cold-stunned. Cold stunning occurs when water temperatures drop quickly and turtles become incapacitated. The turtles lose their ability to swim and dive, lose control of buoyancy, and float to the surface (Spotila *et al.*. 1997). If sea turtles are attracted to the heated discharge or remain in surrounding waters heated by the discharge and move outside of this plume into cooler waters (approximately less than 8-10°C), they could become cold stunned. While no one has studied the distribution of sea turtles in Cape Cod Bay to determine whether the thermal effluent associated with Pilgrim affects sea turtle distribution; existing data from other nuclear power plants in the NMFS Northeast Region do not support the concern that warm water discharge may keep sea turtles in the area until surrounding waters are too cold for their safe departure. For example, extensive data is available on sea turtles at the Oyster Creek facility in New Jersey (OCNGS; NMFS NERO 2011). We expect cold-stunning to occur around mid-November in New Jersey waters. No incidental captures of sea turtles have been reported at the OCNGS later than October 30, with the minimum recorded temperature at time of capture of 11.7°C (this turtle was alive and healthy, not cold stunned), suggesting that the thermal effluent is not increasing the risk of cold stunning.

There are several factors that may make it unlikely that the thermal effluent from Pilgrim increases the risk of cold-stunning of sea turtles. During the winter, when water temperatures are low enough for cold stunning to occur, the area where the water temperatures would be suitable for sea turtles is transient, small and localized. In order to stay in the action area once ambient waters cool in the Fall, sea turtles would need to find areas where temperatures higher than at least 11°C would consistently be found. While there is warm water discharged from Pilgrim year round and there are nearly always areas where water is heated to above 11°C, the amount of water that is at this temperature is highly variable and because of tidal influences on the distribution of the thermal plume in the water column (i.e., at low tide, the plume is only at the bottom), there would never be a period longer than 6 hours where warm enough water would be present throughout the water column. When ambient water temperatures are 8.5°C, the area warmed to over 11°C is less than 14 acres (approximately 0.004% of the surface area of Cape Cod Bay) and extends only 4 feet from the surface (see Table 5.1-1 in ENSR 2000); because sea turtles are benthic feeders and must dive down away from the surface to eat, being restricted to surface waters would preclude long term use of this area. Given 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. Because of this, it is extremely unlikely that sea turtles would remain unseasonably long in the action area because of the presence of heated water from Pilgrim. Based on the best available information, it is extremely unlikely that the discharge of heated effluent increases the vulnerability of sea turtles in the action area to cold stunning.

Atlantic sturgeon
Limited information on the thermal tolerances of Atlantic sturgeon is available. Atlantic sturgeon have been observed in water temperatures above 30°C in the south (see Damon-Randall *et al.*. 2010). In the laboratory, juvenile Atlantic sturgeon showed negative behavioral and bioenergetics responses (related to food consumption and metabolism) after prolonged exposure to temperatures greater than 28°C (82.4°F) (Niklitschek 2001). Tolerance to temperatures is thought to increase with age and body size (Ziegweid *et al.*. 2008 and Jenkins *et al.*. 1993), however, no information on the lethal thermal maximum or stressful temperatures for subadult or adult Atlantic sturgeon is available. Shortnose sturgeon, which are likely to be a reasonable surrogate for Atlantic sturgeon given similar geographic distribution and known biological similarities, have been documented in the lab to experience mortality at temperatures of 33.7°C (92.66°F) or greater.

We first consider the potential for Atlantic sturgeon to be exposed to temperatures which are expected to result in behavioral avoidance (28°C). Atlantic sturgeon could be in the action area year round. The maximum ambient temperature is expected to be 22°C. As explained above, even when ambient temperatures are there warmest, the surface area that Atlantic sturgeon are likely to avoid (28°C) is less than 11.25 acres. The benthic area is even smaller (less than 3 acres). Atlantic sturgeon exposure to the surface area where water temperature may be elevated above 28°C is limited by their normal behavior as benthic-oriented fish, which results in limited occurrence near the water surface. Any surfacing Atlantic sturgeon are likely to avoid near surface waters with temperatures greater than 28°C. Reactions to this elevated temperature are expected to consist of swimming away from the plume by traveling deeper in the water column or swimming around the plume. As the area that would be avoided is at or near the surface, away from bottom waters where shortnose sturgeon spend the majority of time and complete all essential life functions that are carried out in the action area (foraging, migrating, resting), and given the small area that may have temperatures elevated above 28°C it is extremely unlikely that these minor changes in behavior will preclude shortnose sturgeon from completing any essential behaviors such as resting, foraging or migrating or that the fitness of any individuals will be affected. Additionally, there is not expected to be any increase in energy expenditure that has any detectable effect on the physiology of any individuals or any future effect on growth, reproduction, or general health.

Given that Atlantic sturgeon are known to actively seek out cooler waters when temperatures rise to 28°C (82.4°F), any Atlantic sturgeon encountering bottom waters with temperatures above 28°C (82.4°F) area are likely to avoid it. Reactions to this elevated temperature are expected to be limited to swimming away from the plume by swimming around it. Given the extremely small percentage of the action area and of the Bay that may have temperatures elevated above 28°C and the limited spatial and temporal extent of any elevations of bottom water temperatures above 28°C, it is extremely unlikely that these minor changes in behavior will preclude Atlantic sturgeon from completing any essential behaviors such as resting, foraging or migrating or that the fitness of any individuals will be affected. Additionally, there is not expected to be any increase in energy expenditure that has any detectable effect on the physiology of any individuals or any future effect on growth, reproduction, or general health.

We have considered the potential for Atlantic sturgeon to be exposed to temperatures that could result in mortality (33.7°C or greater). Because we expect Atlantic sturgeon to avoid waters with temperatures greater than 28°C, it is extremely unlikely that they would swim through those waters to reach areas where the water is warm enough to result in mortality. Given that fish are known to avoid areas with unsuitable conditions and that Atlantic sturgeon are likely to actively avoid heated areas, as evidenced by Atlantic sturgeon moving to deep cool water areas during the summer months (see ASSRT 2007 and Damon-Randall *et al.*. 2010), it is likely that Atlantic sturgeon will avoid the area where temperatures are greater than tolerable. As such, it is extremely unlikely that any Atlantic sturgeon would remain within the area where surface temperatures are elevated to 33.7°C (92.7°F) and be exposed to potentially lethal temperatures. This risk is further reduced by the limited amount of time Atlantic sturgeon spend near the surface, the small area where such high temperatures will be experienced and the gradient of warm temperatures extending from the outfall; if any Atlantic sturgeon are present, they are likely to begin avoiding areas with temperatures greater than 28°C (82.4°F) and are unlikely to remain within the heated surface waters or swim towards the outfall and be exposed to temperatures which could result in mortality.

We have considered whether the avoidance behavior expected for whales, sea turtles and Atlantic sturgeon discussed above, constitutes "take" as defined by the ESA. NMFS has not defined "harassment," a type of take under the ESA. The term "harass" has not been defined by NMFS; however, it is commonly understood to mean to annoy or bother. In addition, legislative history helps elucidate Congress' intent: "[take] includes harassment, whether intentional or not. This would allow, for example, the Secretary to regulate or prohibit the activities of birdwatchers where the effect of those activities might disturb the birds and make it difficult for them to hatch or raise their young" (HR Rep. 93-412, 1973). The U.S. Fish and Wildlife Service has defined harassment to mean, "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly impair normal behavioral patterns including breeding, feeding or sheltering" (50 CFR 17.3). For purposes of this consultation, we interpret harassment to be a significant disruption or delay in carrying out essential behaviors that is likely to cause injury. As explained above, we do not anticipate any significant impairment of any normal behaviors that is likely to cause injury as a result of avoidance of heated waters. Therefore, we do not anticipate any avoidance-related effects to listed species from the thermal plume to rise to the level of take.

Effects to Prey

NRC has concluded that thermal impacts from Pilgrim operations have not noticeably altered aquatic communities near Pilgrim, except in very small areas (i.e., less than 1 acre; NRC 2007). We have considered the potential for heated effluent to affect the abundance or distribution of prey in the action area.

Kemp's ridley and loggerhead sea turtles, as well as Atlantic sturgeon, feed on benthic invertebrates. Mobile invertebrates are likely to avoid the area where temperatures are above their thermal tolerance. Considering that the maximum benthic area where water temperatures would be 1°C above ambient is limited to 8.4 acres, all effects to the benthic community due to the thermal plume are expected to be limited to this area. Given the small area that these benthic prey species would be displaced and the likelihood that these species would avoid intolerant temperatures and not be injured or killed due to exposure to intolerable temperatures, any effects to foraging Kemp's ridley and loggerhead sea turtles and Atlantic sturgeon will be insignificant and limited only to the distribution of their prey away from the thermal plume.

Leatherbacks foraging off Massachusetts primarily consume the scyphozoan jellyfishes, *Cyanea capillata* and *Chrysaora quinquecirrha* (Dodge *et al.*. 2011). The thermal tolerance of *Chrysaora quinquecirrha* is approximately 30°C (Gatz *et al.*. 1973); *Cyanea capillata* experience mortality at temperatures of 34-36°C (Cargo and Schultz 1967). The area where these temperatures could be experienced is small and limited at the bottom to an area no larger than 0.91 acres (see above) and at the surface to an area smaller than 11.25 acres (see above). Given the small area that these benthic prey species would be displaced and the likelihood that these species would avoid intolerant temperatures and not be injured or killed due to exposure to intolerable temperatures, any effects to foraging leatherback sea turtles will be insignificant and limited only to the distribution of their prey away from the thermal plume.

The distribution of fish species that humpback and fin whales prey upon could be affected by the thermal plume. Field studies on the distribution of Atlantic herring indicate that this species prefers temperatures below 16°C (Collette and Klein-MacPhee 2002); thus, this species is unlikely to be in the action area when ambient temperatures are above 16°C. When ambient temperatures are 16°C, the area at the bottom with water temperatures 1°C or more above ambient was measured at 1.08 acres (see Table 5.1-3 in ENSR 2000); the surface area above their preferred temperature would be less than 216 acres (ENSR 2000). Sand lance tolerate temperatures up to 11°C, but are most common at temperatures up to 6°C. This species is benthic and not present at the surface. The area of the bottom that could be warm enough to affect this species is less than 1 acre. Pollock can tolerate temperatures up to 14°C, but adults do not occur at the surface when temperatures are greater than 11.1°C (Collette and Klein-MacPhee 2002); similar to Atlantic herring, the area that would be avoided by this species is limited to less than 216 acres at the surface and less than 1 acre at the bottom. Mackerel tolerate temperatures up to about 20°C. During these conditions, the surface area that this species may avoid could be as large as 3,000 acres; however, because the plume is limited to depths of 4 feet from the surface, mackerel would only be displaced from surface waters, not from the entirety of this area. Given the small area that prey species for humpback and fin whales would be displaced and the likelihood that these species would avoid intolerant temperatures and not be injured or killed due to exposure to intolerable temperatures, any effects to foraging humpback and right whales will be insignificant and limited only to the distribution of their prey away from the thermal plume.

As discussed above, right whales feed on copepods, primarily on C. finmarchicus, but also Pseudocalanus spp. and Centropages spp. Different populations of *C. finmarchicus* are thought to have variable thermal tolerances; this species has been documented in the wild where temperature measurements or estimates ranged from 3.1 to 28.1°C; this species was most abundance where water temperatures ranged from 7 – 13°C and very scare where it was above 21°C (Kane 2005). Halcrow (1963) reported this species being found in waters of -2 to 22°C. A lab study indicated *C. finmarchicus* sampled from the Gulf of Maine, did not experience mortality upon exposure of temperatures of 18°C for 24 hours, but did have mortality when exposed to this temperature for up to 48 hours (Voznesensky *et al.*. 2004). A lab study indicated survival of *C. finmarchicus* was unaffected by temperatures up to 13.5°C (Willis 2007). Centropages spp. are found at temperatures from 1-24°C (Bonnet *et al.*. 2007); Pseudocalanus spp. are found at temperatures up to at least 20°C (Ji *et al.*. 2009). Copepods are mobile and can move through the water column. During the time of year when right whales are foraging in Cape Cod Bay (January – May), ambient water temperatures are typically 0-10°C. Copepod distribution is not likely to be affected at temperatures below 21°C (see citations referenced above). At ambient water temperatures of 11.5°C and below, the area which would experience an increase in water temperature more than 11°C above ambient is limited to less than 0.5 acres (see table 5.1-1 in ENSR 2000); the area at the bottom which would experience temperatures this high is less than 0.13 acres. Given the small size of the area where the distribution of copepods would be affected (0.5 acres; less than 0.0002% of the surface area of Cape Cod Bay) and that copepods are likely to avoid the area rather than be injured or killed, any effect to foraging right whales is extremely unlikely.

Effect on Oceanographic Features

We have considered the potential for the thermal plume to affect oceanographic features that serve to aggregate copepods. As discussed by Pace and Merrick (2008), the prominent source of copepods that become aggregated in Cape Cod Bay is Wilkinson and Jordan Basin; circulation patterns within Cape Cod Bay entrain these copepods produced elsewhere and serve to aggregate the copepods in densities sufficient for right whale foraging. These source areas are at least 100 miles away and "upstream" from the waters where the thermal plume is detectable so it is extremely unlikely that these sources of copepods are affected at all by operations of Pilgrim.

Several factors are thought to concentrate copepods in Cape Cod Bay. These include currents and circulation patterns, bathymetric features (basins, banks, and channels), oceanic fronts, density gradients, and temperature regimes (Wishner *et al.*. 1988, Mayo and Marx 1990, Murison and Gaskin 1989, Baumgartner *et al.*. 2003a, Jiang, et al 2007, Pace and Merrick 2008). The major oceanographic features include the Maine Coastal Current (MCC), Georges Bank anti-cyclonic frontal circulation system, the basin-scale cyclonic gyres (Jordan, Georges and Wilkinson), the deep inflow through the NEC, the shallow outflow via the Great South Channel and the shelf-slope front (SSF) (Gangopadhyay *et al.*. 2003, Pace and Merrick 2008). It is also thought that some variability in the availability of copepods is linked to water temperature changes associated with the North Atlantic Oscillation (Greene at al. 2004). It is thought that these features combine to result in conditions that affect the distribution of copepods throughout the Gulf of Maine, including Cape Cod Bay. We have considered whether the thermal plume from Pilgrim could affect any of these conditions in a way that would affect copepods and therefore, foraging right whales. However, because these conditions and patterns are regional to global scale, and temperature increases from Pilgrim are not detectable at distances more than 1.4 miles from the outfall, it is extremely unlikely that any of these conditions would be affected by the thermal plume. Therefore, it is extremely unlikely that the factors that serve to aggregate copepods in Cape Cod Bay would be affected by continuing operations of Pilgrim.

Other Pollutants Discharged from the Facility

Pollutants discharged from Pilgrim are regulated under the facility's NPDES permit (MA0003557; EPA 1991 and EPA 1994). Limits on the concentration of pollutants in effluent are included when required for a specific type of facility or when a reasonable potential analysis indicates that there is a reasonable potential for an excursion from a water quality standard (then, a water quality based limit is required). The NPDES permit also regulates thermal discharges (see above), total residual oxidants (chlorine is used to control biofouling), pH, Oil and Grease, Total Suspended Solids (TSS), Copper, and Iron. The permit also requires WET testing. All pollutant limits authorized by the NPDES permit to be discharged by Pilgrim are at levels at or below EPA's aquatic life criteria.

During spring, summer, and fall, the circulating water system is chlorinated for up to two hours per day, one hour each pump, to control nuisance biological growth. Total residual chlorine cannot exceed 0.10 parts per million (ppm) in the cooling water discharge (outfall 001). Continuous chlorination of the service water system can be used to control nuisance biological organisms with a maximum daily concentration of 1.0 ppm and an average monthly concentration of 0.5 ppm in the service water discharge (outfall 010). During chlorination, the screens are operated, and sodium thiosulfate is added to the wash water to neutralize the chlorine. Sodium thiosulfate is considered nontoxic. Entergy has confirmed that no other biocides are used at Pilgrim.

Water quality criteria are developed by EPA for protection of aquatic life (see http://water.epa.gov/scitech/swguidance/standards/current/index.cfm for current criteria table; last accessed May 1, 2012). Both acute (short term exposure) and chronic (long term exposure) water quality criteria are developed by EPA based on toxicity data for plants and animals. Often, both saltwater and freshwater criteria are developed, based on the suite of species likely to occur in the freshwater or saltwater environment. For aquatic life, the national recommended toxics criteria are derived using a methodology published in *Guidelines for Deriving Numeric National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (EPA 1985). Under these guidelines, criteria are developed from data quantifying the sensitivity of species to toxic compounds in controlled chronic and acute toxicity studies. The final recommended criteria are based on multiple species and toxicity tests. The groups of organisms are selected so that the diversity and sensitivities of a broad range of aquatic life are represented in the criteria values. To develop a valid criterion, toxicity data must be available for at least one species in each of eight families of aquatic organisms. The eight taxa required are as follows: (1) salmonid (e.g., trout, salmon); (2) a fish other than a salmonid (e.g., bass, fathead minnow); (3) chordata (e.g., salamander, frog); (4) planktonic crustacean (e.g., daphnia); (5) benthic crustacean (e.g., crayfish); (6) insect (e.g., stonefly, mayfly); (7) rotifer, annelid (worm), or mollusk (e.g., mussel, snail); and, (8) a second insect or mollusk not already represented. Where toxicity data are available for multiple life stages of the same species (e.g., eggs, juveniles, and adults), the procedure requires that the data from the most sensitive life stage be used for that species.

The result is the calculation of acute (criteria maximum concentration (CMC)) and chronic (criterion continuous concentration (CCC)) criteria. CMC is an estimate of the highest concentration of a material in surface water to which an aquatic community can be exposed briefly (i.e., for no more than one hour) without resulting in an unacceptable effect. The CCC is an estimate of the highest concentration of a material in surface water to which an aquatic community can be exposed indefinitely without resulting in an unacceptable effect. EPA defines "unacceptable acute effects" as effects that are lethal or immobilize an organism during short term exposure to a pollutant and defines "unacceptable chronic effects" as effects that will impair growth, survival, and reproduction of an organism following long term exposure to a pollutant. The CCC and CMC levels are designed to ensure that aquatic species exposed to pollutants in compliance with these levels will not experience any impairment of growth, survival or reproduction.

Data on toxicity as it relates to whales, sea turtles, and Atlantic sturgeon is extremely limited. In the absence of species specific chronic and acute toxicity data, the EPA aquatic life criteria represent the best available scientific information. Absent species specific data, NMFS believes it is reasonable to consider that the CMC and CCC criteria are applicable to NMFS listed species as these criteria are derived from data using the most sensitive species and life stages for which information is available. As explained above, a suite of species is utilized to develop criteria and these species are intended to be representative of the entire ecosystem, including marine mammals and sea turtles and their prey. These criteria are designed to not only prevent mortality but to prevent all "unacceptable effects," which, as noted above, is defined by EPA to include not only lethal effects but also effects that impair growth, survival and reproduction.

For the Pilgrim facility, the relevant water quality criteria are the Massachusetts water quality criteria, which must be certified by EPA every three years. This certification process is designed to ensure that the MA water quality standards are consistent with, or more protective than, the EPA national recommended aquatic life criteria. Based on this reasoning outlined above, for the purposes of this consultation, NMFS considers that pollutants that are discharged with no reasonable potential to cause excursions in water quality standards, will not cause effects that impair growth, survival and reproduction of listed species. Therefore, the effect of the discharge of these pollutants at levels that are less that the relevant water quality standards, which by design are consistent with, or more stringent than, EPA's aquatic life criteria, will be insignificant on NMFS listed species.

Radiological Impacts

We have reviewed the information presented in the FEIS and the most recent reports of the Radiological Evaluation Monitoring Report ((REMP) Entergy 2009, 2010 and 2011) as well as the Radiological Effluent Release Reports for those same years to assess any radiological impacts to listed species or their prey.

As described in the REMP, radioactivity released from the liquid effluent system to the environment is limited, controlled, and monitored by a variety of systems and procedures which include: reactor water cleanup system; liquid radwaste treatment system; sampling and analysis of the liquid radwaste tanks; and, liquid waste effluent discharge header radioactivity monitor. Effluent is tested for radioactivity before being released and is only released if the radioactivity levels are below the federal release limits. Thus, releases would only occur to Cape Cod Bay after it is determined that the amount of radioactivity in the wastewater is diminished to acceptable levels that meet NRC criteria. The NPDES permit issued by EPA requires that all discharges of radioactive materials be in compliance with NRC criteria.

We reviewed the Radiological Effluent Release Reports for 2008, 2009 and 2010 (Entergy 2009b, 2010b and 2011b). There were no releases of liquid effluents containing radioactivity in 2008, four in 2009 and six in 2010. For the six 2010 discharges, the mean concentration of fission/activation products was 0.0000000000600 gCi/mL; the mean concentration of tritium in these discharges was 0.00000000404 pCi/mL (Entergy 2011b).

As reported in the most recent REMPs, during 2008, 2009 and 2010, samples (except charcoal cartridges) collected as part of the REMP at Pilgrim continued to contain detectable amounts of naturally-occurring and man-made radioactive materials. No samples indicated any detectable radioactivity attributable to Pilgrim Station operations. This suggests that despite the discharge of radioactive effluent from Pilgrim during these years, this low level of radioactivity is not detectable in the environment above background levels. These results were consistent in surface water samples, sediments (including collections in the discharge canal), Irish moss, blue mussels, soft shell clams, quahogs, lobsters and four groups of fish (bottom oriented, near bottom, anadromous and coastal migratory). Naturally-occurring potassium-40, radium-226, and actinium/thorium-228 were detected in several of the surface water samples, especially those composed primarily of seawater. Eleven samples of fish were collected during 2010. The only radionuclides detected in any of the samples were naturally-occurring potassium-40 and radium-226. No radioactivity attributable to Pilgrim was detected in any of the samples collected during 2008-2010, and results of any detectable naturally occurring radioactivity were similar to those observed in the preoperational monitoring program.

It is important to note that no whales, sea turtles or Atlantic sturgeon have been tested to determine levels of radionuclides; however, because in the most recent years that sampling occurred, no samples of any species have detected radionuclides that would be attributed to Pilgrim, it is reasonable to anticipate that similar results would be seen if these listed species were sampled. Based on this information, we do not expect that any whales, sea turtles or Atlantic sturgeon contain any detectable levels of radionuclides attributable to Pilgrim. As such, radiological impacts to these species are extremely unlikely. Thus, NMFS considers the effects to listed species and their prey from radionuclides to be insignificant and discountable.

Climate Change

In the future, global climate change is expected to continue and may impact listed species and their habitat in the action area. The period considered for extended operations of Pilgrim is limited to 20 years (i.e., through June 8, 2032). We considered climate change impacts in the action area over the next 20 years to provide context within which the effects of the action will occur from present to June 8, 2032. Much about the rate of potential climate change and associated changes in weather patterns and ambient water temperatures is unknown; however, as explained below, given the likely rate of change associated with climate impacts in Cape Cod

Bay generally and the action area specifically, it is unlikely that climate-related impacts will have a significant effect on the status of listed species over the temporal scale of the proposed action or that in this time period, the abundance, distribution, or behavior of these species in the action area will change as a result of climate change related impacts. The greatest potential for climate change to impact our assessment would be if (1) ambient water temperatures increased enough such that a larger portion of the thermal plume had temperatures that were stressful for listed species or their prey or if (2) the status, distribution and abundance of listed species or their prey changed significantly in the action area. Sea surface temperatures have fluctuated around a mean for much of the past century, as measured by continuous 100+ year records at Woods Hole (Mass.), and Boothbay Harbor (Maine) and shorter records from Boston Harbor and other bays. Periods of higher than average temperatures (in the 1950s) and cooler periods (1960s) have been associated with changes in the North Atlantic Oscillation (NAO), which affects current patterns. Over the past 30 years however, records indicate that ocean temperatures in the Northeast have been increasing. For example, Boothbay Harbor's temperature has increased by about 1°C since 1970. The model projections are for an increase of somewhere between 3-4°C by 2100 and a pH drop of 0.3-0.4 units by 2100 (Frumhoff *et al.*. 2007). Assuming that there is a linear trend in increasing water temperatures and decreasing pH, one could anticipate a 0.03-.04°C increase each year, with an increase in temperature of 0.6-0.8°C between now and 2032 and a 0.003-0.004 unit drop in pH per year, with a drop of 0.06-0.08 units between now and 2032. Given this small increase, it is not likely that over the proposed 20-year operating period that any water temperature changes would be significant enough to affect the conclusions reached by us in this consultation. If new information on the effects of climate change becomes available then reinitiation of this consultation may be necessary.

Non-routine and Accidental Events

By their nature, non-routine and accidental events that may affect the marine environment are unpredictable and typically unexpected. In the FSEIS, NRC considers design-basis accidents (DBAs); these are those accidents that both the licensee and the NRC staff evaluate to ensure that the plant can withstand normal and abnormal transients, and a broad spectrum of postulated accidents, without undue hazard to the health and safety of the public. NRC states that "a number of these postulated accidents are not expected to occur during the life of the plant, but are evaluated to establish the design basis for the preventive and mitigative safety systems of the facility" (NRC 2007). NRC states that the environmental impacts of these DBAs will be "small" (i.e., insignificant), because the plant is designed to withstand these types of accidents including during the extended operating period. NRC also states that the risk of severe accidents initiated by internal events, natural disasters or terrorist events is small. As noted by Thompson (2006) in a report regarding the risks of spent-fuel pool storage, the available information does not allow a statistically valid estimate of the probability of an attack-induced spent-fuel-pool fire. However, Thompson states that "prudent judgment" indicates that a probability of at least one per century within the U.S. is a reasonable assumption. There have been very few instances of accidents or natural disasters that have affected nuclear facilities and none at Pilgrim that have led to any impacts to the marine environment. While the experience at Fukishima in Japan provides evidence that natural disaster induced problems at nuclear facilities can be severe and may have significant consequences to the environment, the risk of non-routine and accidental events at Pilgrim that would affect the marine environment, and subsequently affect listed species and critical habitat, is extremely low. Because of this, effects to listed species are discountable. We expect that in the unlikely event of any accident or disaster that affects the marine environment, reinitiation of consultation, or an emergency consultation, would be necessary.

Dredging at Pilgrim

Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur. They include the effects on listed species or critical habitat of future activities that are induced by the action subject to consultation. Interrelated actions are those that are part of a larger action and depend upon the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration (50 CFR 402.02; see also 1998 FWS-NMFS Joint Consultation Handbook, pp. 4-26 to 4-28). Entergy occasionally carries out dredging in the discharge canal and in the intake embayment (J. Schiffer, Entergy, pers. Communication[8]). Dredging is not required as a condition of Pilgrim's existing operating license and is not considered as part of the proposed license. Entergy indicated that dredging occurs approximately every 12 years. Dredging last occurred in 2011 and in 1999. Because dredging occurs approximately every 12 years, it is likely that dredging would occur once during the 20 year extended operating period.

We have considered whether the effects of this dredging fit the definitions of indirect effects and the definitions of interrelated or interdependent actions. For the reasons explained below, we have determined that while the future dredging can be considered an interrelated or interdependent action, the effects of the future dredging are so uncertain that they do not meet the definition of indirect effects and cannot be meaningfully considered in this consultation. The dredging meets the definition of an interdependent action because it has no independent utility apart from the continued operation of Pilgrim (i.e., but for the continued operation of Pilgrim there would be no need to remove sediment from these areas). It also meets the definition of an interrelated action because while the dredging is not part of the action proposed by NRC (i.e., continued operation of Pilgrim), it does rely solely on NRC's proposed action for its justification. Again, the dredging would not occur "but for" the issuance of a license by NRC. The effects of dredging, however, do not meet the definition of indirect effects. While the effects of dredging will be "caused" by the continued operation of Pilgrim and the need to maintain the intake and discharge areas to support such operation, and some type and amount of dredging will occur later in time according to Entergy, we lack a reasonable certainty regarding the effects that will occur in the future for several reasons. First, no specific plans for future dredging are available; also, no permits or approvals, which are required from the U.S. Army Corps of Engineers, have been obtained. This sheds uncertainty on both the future dredging project itself and its potential effects. Second, while we have a general idea of the location where dredging will occur and know, generally, the types of dredges that could be used to complete the dredging, we have no information on the volume of material to be removed, the timing of the dredging (i.e., the season), the duration of dredging or the actual type of dredge to be used. Different types of dredges can pose different risks to listed species and habitat. Information on all of these factors is necessary to consider effects of the dredging on listed species. Therefore, while a dredging project itself meets the definitions of an interrelated and interdependent activity, the effects of

[8] *Phone conservation between J. Schiffer, Entergy, and Mark Murray-Brown, NMFS on May 7, 2012.*

the dredging are not reasonably certain at this time for us to consider them in this consultation. However, any proposals for future dredging will need a permit from the U.S. Army Corps of Engineers, which would trigger the need for a subsequent ESA Section 7 consultation.

Effects to Right Whale Critical Habitat

We have considered whether the continued operation of Pilgrim would have any direct or indirect effects to right whale critical habitat. Right whales use the waters of Cape Cod Bay for foraging. Within critical habitat, the thermal plume is no longer detectable and any pollutants discharged from Pilgrim, including chlorine, are fully mixed and would no longer be detectable from background levels. As such, there would be no direct effects to critical habitat. We do expect that the continued operation of Pilgrim would result in a reduction in copepods compared to the levels that would be present if no copepods were entrained at Pilgrim. However, as explained above, because we expect the loss to be extremely small and undetectable from natural variability, the effect of this loss on foraging right whales will be insignificant. We do not expect mortality of copepods from exposure to the thermal plume as we expect copepods to avoid areas above their thermal tolerance (see Lenz *et al.*. 2005 for a discussion of the escape response of copepods); we expect these effects to distribution to be minor and be limited to an area outside of critical habitat. Copepods in Cape Cod Bay originate from Jordan, Wilkinson and George's Basin. The influence of Pilgrim does not extend to these areas and we do not expect any effects to the generation of copepods in these areas that could be attributable to the continued operation of Pilgrim. The operation of Pilgrim will also not affect any of the physical or oceanographic conditions that serve to aggregate copepods in Cape Cod Bay. For these reasons, there will be no indirect effects to critical habitat. Therefore, we have determined that the continued operation of Pilgrim will have no effect on right whale critical habitat.

CONCLUSION

As discussed on our March 22, 2012 call, we do not agree with your determination that the proposed renewal will have no effect on listed species. The agencies agreed, however, to engage in informal consultation to determine whether formal consultation was necessary or if consultation could be concluded with a "not likely to adversely affect" finding. As explained above, based on information from NRC, Entergy, and other sources, all effects to listed species will be insignificant or discountable. Therefore, the continued operation of Pilgrim under the terms of a renewed operating license is not likely to adversely affect any listed species under NMFS jurisdiction. We have determined that the continued operation of Pilgrim will have no effect on right whale critical habitat.

Reinitiation of consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (a) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in the consultation; (b) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the consultation; or (c) If a new species is listed or critical habitat designated that may be affected by the identified action. No take is anticipated or exempted; take is defined in the ESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." If there is any incidental take of a listed species, reinitiation would be required. If any whales, sea turtles or Atlantic sturgeon are observed at or near Pilgrim, including in the discharge canal, at the trash racks or on the intake screens, this should be immediately reported to us.

We have identified several areas where additional and/or more recent information would be helpful to better characterize effects of the Pilgrim facility. While this information was not necessary to complete this consultation, we request that you consider adding conditions to any new license for Pilgrim to require: (1) monitoring and reporting zooplankton entrainment, including copepods (particularly, *Calanus finmarchus, Pseudocalanus* spp. and *Centropages* spp); (2) monitoring zooplankton at nearfield and farfield locations to serve as a check on your determination that effects of Pilgrim on zooplankton are small and localized; (3) establishing a monitoring program for ambient water temperatures and the thermal effluent to better understand how any changes in ambient water temperatures during the relicensing period, which may partly be related to global and/or regional climatological changes, may change the characteristics and distribution of the thermal plume; and (4) revising the species sampled in the REMP to include species that serve as forage for listed species and species that occupy similar ecological niches as Atlantic sturgeon, whales and sea turtles and could be considered surrogate species for radionuclide testing.

Please note that as announced on October 6, 2010 (see 75 FR 61690), we are continuing our ongoing rulemaking process to designate critical habitat for North Atlantic right whales. Should a final rule be promulgated, reinitiation of this consultation may be necessary.

Technical Assistance for Candidate Species

In 2011, we designated blueback herring and alewife as "Candidate Species;" a status review for these species is currently ongoing. NMFS candidate species are those petitioned species that are actively being considered for listing as endangered or threatened under the ESA, as well as those species for which NMFS has initiated an ESA status review that it has announced in the *Federal Register*. For detailed definitions and explanations, please refer to the April 15, 2004 and October 17, 2006, *Federal Register* notices (69 FR 19975), (71 FR 61022), which revised the Candidate Species definition.

Blueback herring and alewife are impinged annually and occasionally entrained at Pilgrim (NRC 2007, Normandeau 2011b and ENSR 2000). As they are candidate species that could be listed under the ESA in the future, we encourage you to work with Entergy to minimize effects to these species to the maximum extent possible. Monitoring requirements for these species should be incorporated into the new license. We request that any monitoring reports produced that contain information on these species be provided to us. We also request that you work with Entergy to investigate why early life stages (larvae) of alewife are present near the intakes (as evidenced by entrainment (NRC 2007)). Alewife normally spawn in freshwater and presence of early life stages in marine waters, such as the Pilgrim intake, is unexpected and warrants further investigation to determine if the operations of Pilgrim contribute to this unusual behavior or if it is due to unrelated factors. Should either species be listed under the ESA in the future, reinitiation of consultation would be necessary. Questions specific to candidate species and the status review process should be directed to Kimberly Damon-Randall (978) 281-9328.

Coordination with EPA
We are providing EPA with a copy of this letter for their records. If in the future EPA issues a revised NPDES permit for this facility, reinitiation of this consultation, involving both EPA and NRC, is likely to be necessary. Additionally, it is our understanding that revised CWA 316(b) regulations may be issued by EPA in 2012. If there are any modifications to the Pilgrim facility resulting from the implementation of these regulations, reinitiation of this consultation is likely to be necessary.

Should you have any questions about this correspondence please contact Kimberly Damon-Randall, Acting Assistant Regional Administrator for Protected Resources at the number provided above.

Sincerely,

George W. Darey

for Daniel S. Morris
Acting Regional Administrator

Cc: Chiarella, F/NER4
Webster, EPA Boston
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File code: Sec. 7 NRC Pilgrim Power Station
PCTS: I/NER/2006/07083

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
ENTERGY NUCLEAR OPERATIONS, INC.	)	Docket No. 50-293-LR
	)	
(Pilgrim Nuclear Power Station)	)	ASLBP No. 12-917-05-LR
	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing Letter to the Atomic Safety and Licensing Board regarding the Attached ESA Informal Consultation from the NMFS, dated May 22, 2012, in the above-captioned proceeding have been served on the following by the Electronic Information Exchange, this 22nd day of May, 2012.

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EXHIBIT I

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, March 19, 2012

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Commission

In the Matter of **Entergy Nuclear Generation Company** **Entergy Nuclear Operations, Inc.** **(Pilgrim Nuclear Power Station)**	**Docket No. 50-293-LR** **ASLBP No. 06-848-02-LR**

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

I, Michael D. Scherer, Ph.D., do hereby depose and say on the basis of personal knowledge and my professional opinion, and under penalties of perjury, that:

BACKGROUND AND QUALIFICATIONS

1. I am a Vice President and Senior Marine Scientist with Normandeau Associates, Inc. ("Normandeau"), a professional consulting firm that specializes in ecological, environmental and natural resources management services. I hold a Ph.D. degree with a Fisheries Biology major and Biometrics minor from the University of Massachusetts, a Master of Science degree in Fisheries Biology from the University of Massachusetts, and a Bachelor of Science degree in Fisheries Biology from Cornell University. My most recent curriculum vitae, including a list of my peer-reviewed scientific publications and professional society presentations, is attached hereto as **Exhibit 1**.

2. Prior to joining Normandeau Associates, I was President (1993-2006) and a principal (1979-2006) of Marine Research, Inc. ("MRI"). Normandeau acquired MRI in 2006.

3. My expertise is in marine fisheries biology and the application of field sampling design and analytical methods to evaluate anthropogenic influences on population and community dynamics of aquatic ecosystems. During my career, I have supervised at least twelve (12) site-specific assessments of potential impacts from power plant thermal discharges or cooling water intakes on aquatic ecosystems, and actively have participated in at least thirty-five (35) such assessments performed by Marine Research, Inc. (now Normandeau) over the past thirty four (34) years, mostly in the northeastern United States. These assessments have included several studies in Cape Cod Bay and Massachusetts Bay within the Gulf of Maine.

4. MRI, and as of 2006 Normandeau, have been managing certain aspects of the biological monitoring program at the Pilgrim Nuclear Power Station located in Plymouth, Massachusetts ("PNPS") since 1973, and Normandeau continues to do so. As a result, I have supervised and participated in the aquatic studies that MRI and Normandeau have performed at PNPS since 1974. I have studied river herring (a term which reflects both alewife [*Alosa pseudoharengus*] and blueback herring [*Alosa aestivalis*] species) populations throughout my graduate and professional career, most recently in the Charles River basin in Boston where I have directed studies from 1999 to present.

PURPOSE AND METHODOLOGY

5. This declaration is made in response to (1) the Jones River Watershed Association's 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's 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) filed March 8, 2012, (2) the Correction and Supplement to the Petition filed on March 15, 2012 (the "Supplement"), and (3) the technical affidavits submitted therewith (collectively, "the Petition"). The Petition alleges certain deficiencies in the NRC's

evaluation of the potential impacts of continued operation of PNPS on marine species listed as threatened or endangered under the federal Endangered Species Act ("ESA"). In this declaration, I will offer my expert opinion that potential impacts of the continued operation of PNPS will have no discernible effects on ESA-listed species. It is my further opinion that, although not ESA-listed species, PNPS is expected to have no discernible effect on river herring or winter flounder populations.

6. The opinions expressed in this declaration are in part based on a review of the sources identified in **Exhibit 2**. To the best of my knowledge, the factual statements in this declaration are true and accurate, and the opinions expressed therein are based on my best professional judgment.

DISCUSSION

Description of PNPS and its Environment

7. PNPS is located in Plymouth, Massachusetts on the northwestern coast of Cape Cod Bay (alternatively, the "Bay"). The Bay is enclosed by Cape Cod (Barnstable County) to the south and east, and Plymouth County to the west. (NRC 2006a [hereinafter BA] at E-54). The northern portion of the Bay opens to the larger Massachusetts Bay and the Gulf of Maine in the Atlantic Ocean. (BA at E-54). The Bay exchanges water with Massachusetts Bay in a well-documented fashion. In general, near shore currents carry water from Massachusetts Bay and the Gulf of Maine southward along the coast, requiring about 15 days for water from Boston, and 30 days for water from the Gulf of Maine, to reach Cape Cod Bay.

8. Extensive oceanographic research shows that the movement of water within the Bay is largely controlled by ocean circulation patterns, tidal fluctuations, and wind-induced motion (Davis 1984, ENSR 2000). These effects control the hydrodynamics of the Bay to varying degrees and together control the exchange of water between the Bay and the much larger

Massachusetts Bay. Residual ocean currents in the vicinity of PNPS are generally toward the south and represent a part of the large-scale counterclockwise circulation pattern within Massachusetts Bay.

9. Several studies of currents have been conducted in the Bay, using fixed velocity profilers as well as drogues (free floating buoys). These studies demonstrate that as water moves southward in the Bay, it gradually turns eastward and ultimately passes the tip of Cape Cod toward Georges Bank, creating a counterclockwise circulation pattern within the Bay. (Davis 1984). Early drift bottle studies by Bigelow (1924) showed an average speed to the south of 1.9 nautical miles per day (2.8 ft per sec; Ayers, 1956). A 1983 seabed drifter study (Marine Research Inc., 1984, 1986) undertaken to determine the transit time between Plymouth Bay and PNPS near the bottom of the water column confirmed the counterclockwise flow reported by Bigelow (1924) and Fish (1928). In 1994, the U.S. Geological Survey used a three-dimensional model to conduct current investigations of the Massachusetts and Cape Cod Bay system. This model predicted net or residual currents in the vicinity of PNPS during the spring that were towards the south in the range of 2 to 8 cm per sec (0.07 to 0.26 ft per sec). Although significant wind-driven current fluctuations can occasionally affect the general circulation pattern in the Bay (ENSR 2000), such disruptions are typically short lived and the circulation pattern described here prevails.

10. PNPS utilizes once-through cooling, in which water is withdrawn from the Bay through a cooling water intake structure ("CWIS"), and returned to the Bay through a nearby discharge canal. PNPS's CWIS is located at the northwest end of a small embayment created by two manufactured stone breakwaters. The larger of the two breakwaters extends approximately 1400 feet from the northwest in a southeast direction in front of PNPS; the smaller breakwater extends approximately 700 feet from the southeast in a northeast direction. (BA at Figure 3-1).

The breakwaters create an opening to the Bay approximately 800 feet wide that faces east, with the result that the water flowing past PNPS in a southerly direction does not directly funnel into the intake embayment. As a result, the breakwaters not only isolate PNPS's CWIS from the Bay, but also create a hydraulic dynamic that limits the entrance of organisms into the intake embayment.

11. The average velocity of flow at the intake embayment opening is approximately 0.05 ft per sec at mid-tide. (BA at E-59). This is approximately equal to, or slower than, the velocity of the south-flowing surface water currents outside the embayment. Thus, the water flow at the intake embayment opening is not stronger than the ambient currents in the Bay, and aquatic organisms in the ambient Bay currents are not differentially drawn into the intake embayment. The intake current's lack of influence on the currents in the Bay is corroborated by a study conducted in the 1970s of PNPS's "hydraulic zone of influence," which delineates the portion of the Bay that is potentially affected by the intake flow at PNPS. (Chau and Pierce 1977). This study showed that PNPS's intake had "negligible modification on tidal flow" near PNPS.

12. PNPS's CWIS is located at the northwestern end of the embayment, and is comprised of a screen well that takes in seawater at its northern wall through four bays topped by a skimmer wall. (BA at E-56) The average flow velocity in the embayment just in front of the CWIS is approximately 1 ft per sec at all tides. (BA at E-59). The openings to the bays are fully submerged at mean low water level, and are protected by the skimmer wall, the bottom of which is located at 12 ft below mean sea level. (BA at E-56). The skimmer wall is designed to restrict floating materials at or just below the surface from entering the CWIS, and also restricts aquatic organism entry. Fish are able to escape the system through a series of six to twelve 10-inch

circular openings located in the skimmer walls and at each end of the intake structure. (BA at E-56).

13. PNPS's CWIS has two independent screening systems that protect the circulating water pumps from material floating in the water. The primary barrier is a set of trash racks (also known as bar racks) installed in a vertical orientation just inside the skimmer wall. (BA at E-56). The trash racks are constructed of 3-inch by 3/8-inch rectangular bars, with a 3-inch opening between bars. (BA at E-56). The trash racks thus prevent objects larger than 3 inches in smallest dimension from passing through.

14. PNPS employs a team of surface-air divers to inspect and clean the trash racks on an as needed basis, e.g., whenever a drop in water level in the CWIS indicates they require cleaning. In addition to cleaning the trash racks, divers also periodically remove accumulated sand from the concrete apron at the base of the CWIS using a large suction hose and ancillary equipment. During these cleanings, any material that accumulates on the trash racks, at the base of the trash racks, and on the concrete intake apron is visible to the divers. Consequently, both the trash rack cleanings and the sand vacuuming efforts provide subsurface, confirmatory information on potential impingement of organisms larger than 3 inches in smallest dimension on the trash racks. From 1997 through 2011, the years for which records are available, divers worked on the trash racks from 15 to 55 times per year, averaging approximately 36 dives per year. Despite their consistent presence in the vicinity of the trash racks, no CWIS diver has ever observed or reported any ESA-listed species in the vicinity of the trash racks, or within the intake embayment.

15. Divers also periodically enter the intake embayment to collect fish and shellfish along the northern and southern breakwaters as part of PNPS's required radiological environmental monitoring program ("REMP"). REMP monitoring requires periodic sampling of

various potential environmental pathways to establish that radionuclide levels in the surrounding environment meet NRC regulatory standards. The REMP dives provide an opportunity to directly observe whether free swimming organisms are present in the vicinity of PNPS. From 2001 through 2011, the years for which records are available, REMP dives ranged from 4 to 13 per year on the northern breakwater, averaging approximately 7 dives per year. On the southern breakwater, REMP dives occurred in 2009 (one), 2010 (two), and 2011 (one). No REMP diver has ever observed or reported any ESA-listed species within the intake embayment or in the immediate vicinity of PNPS, offering added support to the information provided by the CWIS divers.

16. Downstream of the trash racks are four traveling water screens, two for each circulating water pump bay. (BA at Figure 3-2). The traveling water screens consist of a continuous series of rotating wire mesh panels. Each screen is approximately 10 ft wide, oriented perpendicular to the water flow, and typically screens out any material in the water larger than ½ by ¼ inch. (BA at E-59). The traveling screens are always in place, and are operated (i.e., rotated) routinely whenever a certain pressure (or water level) differential exists between the upstream and downstream sides of the screen assembly, indicating that the screens are becoming clogged with material. (BA at E-60). In addition, when seawater temperatures drop below 30°F, the screens are operated continuously to prevent freezing. Through-screen velocity at mean low water is calculated to be 1.57 ft per sec. (Enercon 2008). PNPS employs three scheduled, dual (high and low)-pressure nozzle screen washes per week to monitor fish impingement at the travelling screens during three different times of day: morning, afternoon, and evening. (Entergy 2011). As elaborated below, operators and the biologists who monitor the screens have never in the history of PNPS's operation observed an ESA-listed species in the impingement monitoring.

Potential Impacts of PNPS on Endangered and Threatened Species

17. As noted in the 2006 Biological Assessment ("BA") and 2007 Final Supplemental Environmental Impact Statement ("FSEIS") prepared by NRC in connection with PNPS's license renewal, ten (10) ESA-listed species were known to occur in Cape Cod Bay at that time: the shortnose sturgeon; four species of sea turtles; and five species of whales. (NRC 2007, [hereinafter FSEIS] at § 4.6, BA at E-65). Since the 2006 BA, one additional species, the Atlantic sturgeon, has been designated for listing as threatened in the Gulf of Maine, effective April 6, 2012. In February 2012, the NRC prepared a Supplemental Biological Assessment for the Atlantic sturgeon ("Supplemental BA"). (NRC 2012). Each of these listed species is discussed below. As the information discussed below demonstrates, NRC's conclusion in the 2006 BA and the Supplemental BA that the continued operation of PNPS will have no effect on listed species is well-founded.

Shortnose Sturgeon

18. The potential effects of PNPS on shortnose sturgeon (*Acipenser brevirostrum*) were evaluated by NRC in the 2006 BA, which found that PNPS's relicensing would have "no effect" on this listed species. Based on its biology, life history, and more than 30 years of monitoring showing no impingement or entrainment of shortnose sturgeon, the NRC's conclusion with respect to PNPS is technically supported and sound.

19. The shortnose sturgeon is federally listed as endangered throughout its range, and was placed on the endangered species list in 1967. (BA at E-72). Shortnose sturgeon are the smallest North American sturgeon species, reaching adult size at 45 to 50 cm (15.7 to 19.7 inches) and a maximum total length of 143 cm (56.3 inches). (Dadswell 1979, Dadswell et. al. 1984). They are "amphidromous," living in freshwater and estuarine reaches of large river systems that drain into the Atlantic. Shortnose sturgeon spawn upstream, typically in freshwater

above the zone of tidal influence. (BA at E-73). Eggs, larvae and young-of-the-year (fish one year old and younger) are benthic, remaining in deeper channels of freshwater reaches of the rivers in a manner that would not allow their entrainment at PNPS. (Dadswell et. al. 1984). Although some older juvenile and adult shortnose sturgeon may move short distances into marine waters, they do not perform extensive migrations in coastal marine waters. (Dadswell et. al. 1984, Dovel et al. 1992). The river nearest PNPS supporting a breeding population of shortnose sturgeon is the Merrimack River some 62 miles to the north. (Kynard 1997). As a result, shortnose sturgeon are not believed to be present in the Bay in significant numbers. Moreover, their swimming ability as late juveniles and adults is such that none are expected to be subject to impingement. It is, thus, not surprising that no shortnose sturgeon has ever been observed in the trash rack or travelling screen monitoring performed at PNPS, nor have any been observed in the intake embayment or the immediate vicinity of PNPS by REMP divers.

20. Because: 1) shortnose sturgeon generally do not migrate beyond the estuary associated with their natal river; 2) the nearest river supporting a breeding population is 62 miles away; and 3) the life history, habitat preference and swimming ability, in conjunction with the absence of impingement information at PNPS, militate against encounter with PNPS's CWIS, there is no credible technical evidence of any potential impact of PNPS on shortnose sturgeon. Therefore, the NRC's conclusion in the 2006 BA that PNPS will have no effect on shortnose sturgeon is well-founded.

Atlantic Sturgeon

21. As noted above, when NMFS prepared its BA for PNPS in 2006, Atlantic sturgeon were not a federally listed species. However, Atlantic sturgeon are identified in the FSEIS as a marine aquatic species with "the potential to occur in the vicinity of PNPS site...." and as one that "could occur in Cape Cod Bay in the vicinity of PNPS...." (FSEIS at 2-83). On

February 6, 2012, NMFS issued a regulation designating a distinct population segment of the Atlantic sturgeon (*Acipenser oxyrhynchus*) in the Gulf of Maine, which includes Cape Cod Bay, as threatened under the ESA. (NMFS 2012). Unless successfully challenged, this designation will become effective on April 6, 2012.

22. In a letter dated February 29, 2012, NRC requested NMFS's concurrence, pursuant to 40 CFR 40.12(j), with the conclusions in its February 2012 Supplemental BA addressing potential effects of PNPS's license renewal on Atlantic sturgeon. (NRC 2012a [hereinafter Supplemental BA]). The Supplemental BA reviewed the life history, distribution and population status of Atlantic sturgeon and stated "based on the available information on the distribution and the absence of any record of incidental takes of the species at Pilgrim since it began operating, the NRC concludes that the proposed license renewal of Pilgrim will have no effect on the Atlantic sturgeon." (Supplemental BA at 3). Available information supports this conclusion.

23. The Atlantic sturgeon is anadromous, with adults living primarily in marine waters and spawning in freshwater reaches of large river systems. (Murawski and Pacheco 1977, Bain 1997, Bain et al. 2000, Collette and Klein-MacPhee 2002). In contrast to the shortnose sturgeon, adult Atlantic sturgeon are known to migrate significant distances along the Atlantic coast. (Smith 1985, Savory and Pacileo 2003).

24. Atlantic sturgeon eggs and larvae are intolerant of brackish water and remain at or near the bottom in upstream freshwater reaches of rivers. (Van Eenennaam et al. 1996, Greene et al. 2009). The river systems nearest to PNPS that are large enough to support Atlantic sturgeon are the Merrimack River in northern Massachusetts, located approximately 62 miles north of PNPS, and the Piscataqua River in New Hampshire, located approximately 77 miles north of PNPS, though neither of these rivers currently support a spawning population. Thus,

spawning populations nearest to PNPS that currently exist include the Hudson River in New York, located approximately 200 miles south of PNPS, and likely the Kennebec River in Maine, located approximately 130 miles northeast of PNPS. (ASSRT 2007, Greene et al. 2009). Consequently, eggs and larvae of Atlantic sturgeon do not occur, and due to their salinity intolerance cannot survive, in the vicinity of PNPS.

25. After hatching, Atlantic sturgeon spend approximately a year living at the river bottom near their upstream hatching location. (Secor et al. 2000). At between 2 and 6 years of age, juvenile Atlantic sturgeon gradually begin to move downriver to marine waters. (Bain 1997). When juvenile Atlantic sturgeon leave their natal river and move into coastal waters, they are generally between 70 and 150 cm in length with commensurate swimming abilities. (Bain 1997, ASSRT 2007).

26. While it cannot be ruled out that Atlantic sturgeon are present in the Bay, in more than thirty years of continuous monitoring through various mechanisms, a total of only two Atlantic sturgeon have been caught and recorded in the vicinity of PNPS. One fish measuring 82.8 cm (2.7 feet) in length was caught in a gill net by the PNPS biological monitoring conducted by the Massachusetts Division of Marine Fisheries in November 1982 (Lawton et al. 1983), and a second sturgeon measuring 180 cm (5.9 feet) was caught in a bottom trawl tow conducted by Normandeau Associates in May 2009.

27. Any Atlantic sturgeon that found its way into the Bay would not be expected to be affected by PNPS. Coastal migrant Atlantic sturgeon are large, powerful fish, exceeding 70 cm in length and growing up to 4.3 m (approximately 14 feet) in length as adults. (Smith and Clugston 1997). Consequently, Atlantic sturgeon that travel into or through Cape Cod Bay and encounter PNPS have substantial swimming abilities, and would be able to overcome the CWIS intake flow and avoid impingement. Even a moribund or dead fish that drifted into the intake

embayment would be visible to the CWIS divers. As with the shortnose sturgeon, no Atlantic sturgeon has ever been observed in impingement monitoring or CWIS dives conducted at PNPS, nor has one been observed by the REMP divers in the intake embayment or immediate vicinity of PNPS.

28. Because: 1) Atlantic sturgeon eggs and larvae cannot survive in the waters near PNPS; 2) migrating Atlantic sturgeon are large, powerful swimmers that should not be susceptible to impingement at PNPS's CWIS; and 3) no Atlantic sturgeon has ever been observed impinged at PNPS' CWIS, there is no credible technical evidence of any potential impact of PNPS on Atlantic sturgeon. Therefore, NRC's conclusions in the 2012 Supplemental BA that PNPS will have no effect on Atlantic sturgeon is well-founded.

Sea Turtles

29. As described in the 2006 BA and the 2007 FSEIS, four (4) species of sea turtles are known to forage in Cape Cod Bay during the summer months. (BA at E-65, FSEIS at § 2.2.5.3.7). Three species – the green turtle (*Chelonia mydas*), the loggerhead turtle (*Caretta caretta*), and the Kemp's ridley turtle (*Lepidochelys kempi*) – forage from May to October. The fourth species, the leatherback turtle (*Dermochelys coriacea*), may be present in August and September. (Mass Audubon 2012). The 2006 BA found that continued operation of PNPS would have no effect on any of the four species. Briefly, early life stages of sea turtles are not present in the vicinity of PNPS. Healthy juvenile sea turtles are present in the Bay, but are not reasonably expected in the immediate vicinity of PNPS, as a function of habitat preferences and swimming abilities. Impaired sea turtles, as a function of cold stunning, move with prevailing currents away from PNPS, and therefore also are not credibly expected to encounter PNPS's CWIS. Monitoring of PNPS's CWIS, including through CWIS dives, establishes no such

encounters with sea turtles. The following sections provide the detailed information supporting each of these conclusions.

30. Sea turtles' nesting locations vary with species, but are generally in warmer, tropical regions far south of Cape Cod Bay (i.e., beaches of the southern United States Atlantic shore, the Gulf of Mexico, or the Caribbean). After hatching, neonatal turtles crawl to the ocean and swim offshore until they encounter offshore current systems which eventually carry them to larger gyres, in particular the Gulf Stream, which is located far off the U.S. Atlantic coast. Once in the Gulf Stream, they live and forage among floating rafts of *Sargassum* sea weed for a period of two (2) to 35 years, depending on species, while they develop into juveniles. As such, early life stages of sea turtles are not reasonably expected in the vicinity of PNPS and therefore could not reasonably be expected to encounter PNPS's CWIS.

31. When sea turtles reach the juvenile stage, they are ready to change their foraging habits, and begin returning to coastal areas along the U.S. eastern seaboard as far north as New England. (NMFS, USFWS, and SEMARNAT 2011). As noted above, the four species of juvenile turtles at issue may spend the summer months foraging in and around the Bay. As their extended migratory behavior reflects, juvenile sea turtles have substantial swimming abilities. Also, given their habitat preferences, juvenile sea turtles are not expected to be present in the immediate vicinity of PNPS. Finally, given their swimming abilities, it is not expected that their swimming abilities would result in their encountering the PNPS CWIS. For all of these reasons, encounters with PNPS' CWIS is not reasonably expected for unimpaired juvenile sea turtles.

32. Even for impaired sea turtles, which may occur as a result of cold stunning, encounters with PNPS's CWIS is not reasonably expected. In the fall, when water temperatures begin to decline, the sea turtles leave New England and the Bay, and travel south to warmer waters to overwinter. If during the fall, the water temperature declines too quickly, sea turtles

may become "cold stunned." (Morreale et al. 1992). Beginning in November, when the water temperature in the Bay nears 50°F, some sea turtles can become cold stunned, at which point they may travel with prevailing winds and currents, often washing up on shore, an event known as "stranding." Stranded turtles may be rescued, rehabilitated and subsequently released to sea.

33. From year to year, the largest percentage of strandings in the Bay is attributable to Kemp's ridleys (approximately 77%), followed by loggerheads (20%) and green turtles (3%). (Dodge et al. 2003). The same pattern holds true for most individual years, with Kemp's ridleys comprising the largest percentage of strandings each fall (as high as 90%), followed by loggerhead and green sea turtles. (Mass Audubon 2012a). Leatherbacks are able to thermoregulate to some extent and, although they are known to strand, it is generally not due to cold stunning. (New England Aquarium 2012). It is not known whether stranded turtles are stunned inside the Bay or are swept into the Bay already in cold stunned condition. However, well-known studies of currents in Massachusetts Bay and Cape Cod Bay readily explain observed stranding patterns, and offer a clear and cohesive understanding of how cold-stunned turtles are carried in Cape Cod Bay, including in the vicinity of PNPS.

34. As discussed above, the Cape Cod Bay's prevailing circulation pattern creates a net south flowing current in front of PNPS, which should carry cold stunned turtles south past PNPS and to the southeastern shore, where they would wash ashore.

35. Specifically, sea turtle stranding data for Massachusetts for the more than twenty-year period from 1986 through 2007 indicate that, during this period, sea turtles have only rarely stranded in Plymouth County, where PNPS is located, as compared to Barnstable County, which comprises the Cape Cod portion of the Bay. (NMFS SEFSC 2012.). Of the turtles that have stranded in the Bay, only 3 of 1,149 (0.3%) Kemp's ridley, 2 of 258 (0.8%) loggerhead, 3 of 97 (3.0%) leatherback; and 1 of 40 (2.5%) green turtle strandings have occurred in Plymouth

County. (NMFS SEFSC 2012). Consistent with this twenty-year dataset, stranding locations for the years 2003 and 2010 indicate that the vast majority of sea turtles stranded in Cape Cod occur on the south east shore of Cape Cod Bay. (Dodge et al. 2003, Mass Audubon 2012b).

36. As described below, the conclusions above are borne out by the more than thirty years of operation during which no sea turtle has ever been observed impinged or swimming in the PNPS intake embayment.

37. The following sections of this affidavit provide additional information on the four species of sea turtle found in the Bay. In each case, this information supports the NRC's conclusion in the 2006 BA that continued operation of PNPS will have no effect on the sea turtles.

Kemps Ridley Turtle

38. The range for the Kemp's ridley turtle includes the Gulf of Mexico and the western Atlantic coast from the Gulf of Mexico to Newfoundland. (BA at E-67). Kemp's ridley turtles nest primarily on beaches in the Gulf of Mexico, in Mexico, though a few nesting sites exist in the United States from Texas to North Carolina.

39. Once the hatchlings reach a carapace (shell) length of about 20 cm (7.9 inches), they are considered juveniles, and they begin their movement toward shore to forage. (NMFS 2012a). Juvenile Kemp's ridleys can range in size from approximately 20 to 60 cm (7.9 to 23.6 inches) in carapace length. (Renaud 1995). During the summer and early fall, adult Kemp's ridleys can be found inshore along the Atlantic seaboard from Florida to New England, but, for the most part, only juveniles have been reported in New England. (Mass Audubon 2012a). Adult Kemp's ridley turtles are very rare in New England. (TEWG 2000).

40. Most of the Kemp's ridleys stranded in Cape Cod Bay are comparably sized to two-year old turtles, with the great majority ranging in size from 20 to 34 cm (7.9 to 13.4 inches)

in length, with a mean carapace length of 28 cm (11 inches). (Dodge et al. 2003). Consequently, if a Kemp's ridley turtle were to become impinged on the trash racks at PNPS's CWIS, it would be observed by CWIS divers, given the periodicity of their dives. Even if the turtle were to remain impinged long enough that its flesh fully decomposed, it is expected that the shell of a turtle of this size would remain on the trash racks or fall to the apron at the base of the trash racks, where it would be clearly visible to the CWIS divers. Thus, the CWIS diver information provides confirmatory data regarding potential impingement of sea turtles, including Kemp's ridley turtles, at PNPS. No Kemp's ridley turtle or remains ever have been observed in the vicinity of PNPS's CWIS or embayment. Therefore, NRC's conclusion in the 2006 BA that PNPS will have no effect on the Kemp's ridley turtle is technically supported.

Loggerhead Turtle

41. The loggerhead turtle is the most abundant species of sea turtle found in U.S. coastal waters. (BA at E-66). The species is federally listed as threatened throughout its range, which includes temperate and tropical regions in the Atlantic, Pacific, and Indian Oceans. (BA at E-66). Loggerhead sea turtles are separated into nine distinct population segments (DPS), and as of October 25, 2011, the northwestern Atlantic DPS, which includes Cape Cod Bay, is listed as threatened. (NMFS 2011a). Adults and juveniles of this species can be found foraging in coastal areas around Cape Cod from June to mid-September and into the fall. However, most loggerheads in southern New England waters, including the Bay, are juveniles ranging from 15 to 36 inches in carapace length and 25 to 100 pounds in weight, with substantial swimming abilities. Thus, it is not reasonably expected that loggerhead turtles would encounter PNPS's CWIS.

42. Loggerhead turtles make up a minor proportion of strandings in Cape Cod Bay. (Mass Audubon 2012b). The low stranding rate suggests that loggerhead turtles are not cold

stunned at a high rate. As discussed above, given the prevailing currents in the Bay, it is not reasonably expected that a loggerhead turtle would encounter PNPS's CWIS. In addition, no loggerhead turtle or remains ever have been observed in the vicinity of PNPS's CWIS or embayment. Therefore, NRC's conclusion in the 2006 BA that PNPS will have no effect on the loggerhead turtle is technically supported.

Green Turtles

43. The green turtle is listed as endangered in breeding populations in Florida, and as threatened in other areas of the U.S. (BA at E-68). The green turtle has a worldwide distribution, including coastal areas in tropical and subtropical climates. (BA at E-68). In the U.S., they are found in inshore and nearshore waters from Texas to Massachusetts. (BA at E-68).

44. Only juvenile green turtles have been recorded in New England, ranging in size from 12 to 20 inches and weighing approximately 10 pounds, with substantial swimming abilities. Thus, it is not reasonably expected that green turtles would encounter PNPS's CWIS.

45. On average, only one green turtle strands per year in the Bay, indicating that this species is likewise not particularly susceptible to cold stunning. (NMFS SEFSC 2012). As discussed above, given the prevailing currents in the Bay, it is not reasonably expected that a cold stunned green turtle, an infrequent occurrence, would encounter PNPS's CWIS. In addition, no green turtle or remains ever have been observed in the vicinity of PNPS's CWIS or embayment. Therefore, NRC's conclusion in the 2006 BA that PNPS will have no effect on the green turtle is technically supported.

Leatherback Turtles

46. The leatherback sea turtle is the largest of the sea turtles, with adults reaching a weight of up to 2,000 pounds. (BA at E-68). Leatherback turtles are listed as endangered

throughout their range, which is global. (BA at E-68). In the U.S., leatherback turtles nest in the tropics (Puerto Rico, the U.S. Virgin Islands and southeast Florida), and they have been found along the Atlantic coast as far north as the Gulf of Maine. (BA at E-68). Leatherback turtles remain in warmer southern waters as juveniles and once they become sub-adults or adults, they travel north to feeding grounds near the Arctic Sea where they feed primarily on jellyfish. In late summer to fall, adult begin to head south and can be seen in Cape Cod Bay in August and September. Adult leatherback turtles possess substantial swimming abilities. Thus, it is not reasonably expected that leatherback turtles would encounter PNPS's CWIS.

47. Leatherback turtles can regulate their body temperature to some degree, and generally do not strand as a result of cold stunning. Even if they were susceptible to cold stunning, as discussed above, given the prevailing currents in the Bay, it is not reasonably expected that a cold stunned leatherback turtle would encounter PNPS's CWIS. In addition, no leatherback turtle or remains ever have been observed in the vicinity of PNPS's CWIS or embayment. Therefore, NRC's conclusion in the 2006 BA that PNPS will have no effect on the leatherback turtle is technically supported.

Whales

48. The NRC's 2006 BA identifies five federally listed species of whale that are known to occur in the Bay: the Northern Atlantic right whale (*Eubalaena glacialis*); the humpback whale (*Megaptera novaengliae*); the fin whale (*Balaenoptera physalis*); the sei whale (*Balaenoptera borealis*); and the sperm whale (*Physeter catadon*). As correctly stated by NRC, whales are generally endangered due to historic overharvesting, and currently are threatened by mortality from ship collisions and entanglement in fishing gear. (BA at E-69 to E-72). On the basis of this information, the NRC concluded that continued operation of PNPS would have no direct effect on any of the five whale species. (BA at E-69 to E-72). Because all life stages of

whales are powerful swimmers, the sole credible potential for PNPS's continued operations – on a theoretical basis – to affect whales rests solely on the question of potential impacts to food sources. Implicit in NRC's no effect finding is a conclusion that PNPS will have no discernible impacts on the availability of prey to relevant whale species. The following sections of this declaration provide information on the relevant biology of whales and their food sources that confirms the NRC's conclusion that the listed whales found in the Bay also will not indirectly be affected by the continued operation of PNPS.

North Atlantic Right Whales

49. The North Atlantic right whale is the most critically endangered of the large whale species, and is federally listed as endangered throughout its range. (Waring et al. 2011). The International Whaling Commission has identified four categories of right whale habitats, including feeding, calving, nursery, and breeding areas. (BA at E-69). In 1994, NMFS designated three areas as critical habitat for the western population of the North Atlantic right whale, one of which includes portions of Cape Cod Bay. (BA at E-69). During winter, calving occurs in southern latitudes, including the southeastern U.S. (BA at E-69). In spring and summer, the whales migrate to northern latitudes, including the New England coast, for feeding. (BA at E-69). New England waters are considered to be an important feeding ground for the North Atlantic right whale, with the main food source being copepods of the species *Calanus finmarchicus* and of the genera *Pseudocalanus* and *Centropages*. (Leeney et al. 2009). As noted in the 2006 BA, critical feeding habitat for the North Atlantic right whale in the Bay begins approximately 3 miles east of PNPS, and extends south and east to the coastline and north beyond the tip of Cape Cod. (BA at E-69).

50. Recently, Nichols et al. standardized NOAA's sighting data for right whales, based on Sightings Per Unit Effort ("SPUE"), the measure by which sightings are placed in

context and therefore validated. (Nichols et al. 2008). These data demonstrate that North Atlantic right whales are not typically present in the vicinity of PNPS. Rather, the whales concentrate in the eastern portion of the Bay. Indeed, the SPUE data show that between 1998 and 2002, each of the quadrants in the immediate vicinity of PNPS (covering an area extending approximately 6 to 10 km, or 3.72 to 6.2 miles) has a mean SPUE of zero, representing no presence of right whales. (Nichols et al. 2008). The Nichols et al. data are consistent with current scientific understanding of North Atlantic right whale foraging and the designation of right whale critical habitat approximately 3 miles east of PNPS, as discussed in the NRC's BA. (BA at E-69). In other words, given that right whales would not typically be expected to feed in the vicinity of PNPS, it is not reasonable to expect a potential impact to their food sources.

51. Additional information about right whale feeding habitat underscores the absence of an effect as a result of PNPS's continued operation. North Atlantic right whales feed on dense patches of copepods (small, shrimp-like crustaceans). Recent studies show that North Atlantic right whales feed on three specific copepods in the Bay (*Calanus finmarchicus*, *Centropages* spp., and *Pseudocalanus* spp.) with a threshold (i.e., minimum) feeding density of at least 4000 organisms per cubic meter. (Baumgartner et al. 2011, Nichols et al. 2008). The threshold feeding density represents the density of prey organisms, which are very small (on the order of a few mm in length), at which the concentration is sufficient to make foraging worthwhile energetically for these large animals, and therefore amounts to a biological limitation in their feeding behavior.

52. The copepod prey of the North Atlantic right whale are planktonic (i.e., drifters), meaning they can move about the water column to some degree, but their location within the Bay is determined primarily by currents and prevailing winds. (DeLorenzo Costa et al. 2006). The prevailing counterclockwise circulation pattern and dominant wind direction in the Bay,

discussed above, result in generally more abundant and dense copepod populations in the northeast and southern portion of the Bay (analogous to where turtle strandings are highest) (Jiang et al. 2007; Leeney et al. 2009). As one might expect, the northeast and southern portion of the Bay is also where North Atlantic right whale SPUE is highest. (NCCOS 2006).

53. These more recent studies corroborate the NRC's statement in the BA that North Atlantic right whales have not been observed in the Bay near PNPS during the duration of Entergy's aquatic monitoring studies. (BA at E-66).

54. In addition, in order to impact North Atlantic right whale foraging, entrainment at PNPS would need to cause significant mortality of its zooplankton prey. A study performed in 1984 looked at the potential mortality to zooplankton that pass through PNPS's CWIS, and found that under most operating conditions, greater than 95% of individuals survive entrainment unless the system is being actively chlorinated to eliminate biofouling organisms. (Bridges and Anderson 1984). Chlorination activities are well-defined, carefully regulated activities during the period when the whales might be present in the Bay, December through April. Each chlorination event, whether from once a day to once a week, lasts approximately two hours only. Therefore, chlorination would cause additional mortality to a maximum of 8.3% (2/24ths) of zooplankton entrained during any given day or week during the relevant period. This extremely low level of zooplankton mortality on the fraction entrained at PNPS is not reasonably expected to affect right whales. Thus, continued operation of PNPS is not reasonably expected to have a discernible indirect effect on right whales. Consequently, the NRC's conclusion in the 2006 BA that the continued operation of PNPS will have no effect on the North American right whale is sound.

55. Finally, I have reviewed the North Atlantic right whale sighting data reported in NOAA's Sighting Survey and Sighting Advisory System database (http://www.nefsc.noaa.gov

/psb/surveys/) that are cited by Alex Mansfield at ¶¶ 12-15 of his affidavit. These data are potentially misleading because they do not account for sighting effort, and therefore, do not provide an accurate understanding of the North Atlantic right whale's presence within the Bay throughout the year. Specifically, sighting data uncorrected for sighting effort may overstate or understate the actual abundance of whales in an area because the number of sightings in an area is necessarily correlated with the amount of time people spend looking for whales in that area. For example, if whales are evenly distributed throughout the Bay, one would expect more sightings in an area where sighting effort is greater, and fewer sightings in an area where sighting effort is lower. Thus, unless accounted for, sighting effort has the potential to skew whale observation data such that it no longer represents the true distribution of whales in a given area. To avoid this potential source of error, scientists generally correct for sighting effort by reporting the number as SPUE. SPUE is calculated as the number of whales sighted divided by the total effort spent looking for whales, represented in units of time or distance surveyed by boat or plane. Thus, SPUE data are more appropriate for drawing conclusions about whale distributions than the uncorrected sighting data referred to by Mr. Mansfield in his affidavit.

Humpback Whales

56. The humpback whale is federally listed as endangered throughout its range, though no critical habitat has been designated for the species. (BA at E-70). The Gulf of Maine stock is one of four distinct stocks in U.S. waters. (BA at E-70). Humpback whales inhabit shallow water on continental shelves, with summer ranges close to shore, including major coastal embayments. (BA at E-70). Humpback whales may be found off of the coast of Massachusetts during the period from March 15 to November 30, with peak abundance in May and June. (BA at E-70).

57. SPUE data demonstrate that humpback whales are present in the Bay in relatively low numbers, and instead heavily congregate to the north in proximity to Georges Bank and Stellwagen Bank, a National Marine Sanctuary, and to the south in the Great South Channel. (NCCOS 2006). These SPUE data are consistent with NMFS's 2005 humpback whale stock assessment relied on by the NRC in drafting the BA and with the NRC's statement that humpback whales have not been observed in Cape Cod Bay in the vicinity of PNPS during the duration of Entergy's aquatic monitoring studies. (BA at E-66, NMFS 2005).

58. Similar to the North Atlantic right whale, humpback whales are typically found associated with their food source. The Gulf of Maine stock of humpback whales is known to feed primarily on schooling fish, including Atlantic herring, capelin, sand lance, mackerel, and euphausiids. (NMFS 2005). While PNPS impinges Atlantic herring and sand lance, these species are impinged in relatively low numbers, with mean *annual* impingements estimated to be 1,014 sand lance, 978 Atlantic herring. (Entergy 2012). Even assuming 100% impingement mortality, these annual impingement numbers are insignificant, compared to the *daily* consumption of an individual humpback, which is estimated to be 471 kg/day. (Roman and McCarthy 2010). By way of comparison, 471 kg/day equals approximately 34,600 age 1 herring or 7,864 sand lance per day. In other words, a single humpback whale consumes far more herring and/or sand lance in a day than would be expected to be impinged at PNPS on an annual basis.

59. The SPUE data indicate that humpback whales frequent the Bay in relatively low numbers. Further, impingement of a fraction of their prey species is *de minimis*. Thus, continued operation of PNPS is not reasonably expected to have a discernible indirect effect on humpback whales. Consequently, the NRC's conclusion in the 2006 BA that the continued operation of PNPS will have no effect on the humpback whale is sound.

Fin Whales

60. The fin whale is federally listed as endangered throughout its range and is commonly found from Cape Hatteras to Nova Scotia. (BA at E-71). Information on the calving, mating, and feeding grounds for fin whales is limited, but New England waters are known to be an important feeding ground for the species. (BA at E-71). Fin whales are the most frequently sighted endangered whale species found in Massachusetts and the Bay, and are present in the Bay throughout the year. (BA at E-71).

61. Although sightings in the Bay are common, SPUE data establish that fin whales are present in the Bay in relatively low numbers, and instead congregate primarily outside the Bay near Provincetown, and on Georges Bank, Stellwagen Bank and the Great South Channel. (NCCOS 2006). These SPUE data are consistent with NMFS's 2005 fin whale stock assessment relied on by the NRC in drafting the BA and with the NRC's statement that fin whales have not been observed in Cape Cod Bay near PNPS, or in the facility intake and discharge areas, during the duration of Entergy's aquatic monitoring studies. (BA at E-66, NMFS 2005).

62. The fin whale diet consists overwhelmingly of small, schooling fish, including Atlantic herring, capelin, sand lance, and squid, and incidentally of krill (shrimp-like crustaceans on the order of 1 to 2 cm in length). (Kenney et al. 1997). While PNPS impinges Atlantic herring and sand lance, these *annual* impingement numbers are insignificant, compared to the *daily* consumption of an individual fin whale, which is estimated to be at approximately 751 kg/day. (Roman and McCarthy 2010).

63. The SPUE data indicate that fin whales frequent the Bay in relatively low numbers. Further, impingement of a fraction of their prey species is *de minimis*. Thus, continued operation of PNPS is not reasonably expected to have a discernible indirect effect on

fin whales. Consequently, the NRC's conclusion in the 2006 BA that the continued operation of PNPS will have no effect on the fin whale is sound.

Sei Whales

64. The sei whale is federally listed as endangered throughout its range, but no critical habitat has been designated for this species. (BA at E-71). The sei whale ranges from Cape Hatteras to Nova Scotia, with a concentration of spring, summer, and fall feeding in the Georges Bank area. (BA at E-71). Sei whales typically inhabit deep waters of the outer continental shelf, in areas of water depth of about 2,000 m (6,560 ft), and are only rarely sighted in Massachusetts and the Bay. (BA at E-72).

65. SPUE data confirm that sei whales are present in the Bay in relatively low numbers, and instead congregate offshore over the continental shelf waters. (NCCOS 2006). These data are consistent with the NRC's BA and statement that sei whales have not been observed in Cape Cod Bay near PNPS, or in the facility intake and discharge areas, during the duration of Entergy's aquatic monitoring studies. (BA at E-66, E-71).

66. Like the North Atlantic right whale, sei whales primarily feed on zooplankton such as calanoid copepods and euphausiids (NMFS 2011), which as discussed above are not reasonably considered affected by PNPS.

67. The SPUE data indicate that sei whales only rarely frequent the Bay. Further, impacts to prey species are not expected. Thus, continued operation of PNPS is not reasonably expected to have a discernible indirect effect on sei whales. Consequently, the NRC's conclusion in the 2006 BA that the continued operation of PNPS will have no effect on the sei whale is sound.

Sperm Whales

68. The sperm whale is federally listed as endangered throughout its range, but no critical habitat has been designated for this species. (BA at E-72). Five different stocks of sperm whales are recognized in U.S. waters, including a North Atlantic stock estimated at approximately 4,700 individuals that is concentrated east and northeast of Cape Hatteras in the winter, shifts northward to east of Delaware and Virginia in the spring, and is located offshore of New England in the summer and fall. (BA at E-72). The sperm whale is primarily found in water greater than 600 m (1970 ft) deep, and is rarely found in water less than 300 m (984 ft) deep. (BA at E-72). The Bay has a maximum depth of less than 200 feet. (BA at E-64) As such, while the sperm whale seasonally may be present in New England waters, it is typically found in deeper offshore waters. (BA at E-72).

69. Unlike the other species of whales discussed above, which feed by straining organisms out of the water with baleen, sperm whales are a toothed whale that eat primarily deepwater denizens, such as medium-sized squid and fish, and occasionally giant squid. (Waring 2011). Such prey species either possess sufficient swimming abilities, or have habitat preferences, that make it unreasonable to conclude that they are likely to encounter the PNPS CWIS in any meaningful manner.

70. The SPUE data indicates that sperm whales rarely frequent the Bay. Further, impacts to prey species are not expected. Thus, continued operation of PNPS is not reasonably expected to have a discernible indirect effect on sperm whales. Consequently, the NRC's conclusion in the 2006 BA that the continued operation of PNPS will have no effect on the sperm whale is sound.

Potential Impacts of PNPS on Non-ESA-Listed Species

River Herring

71. It is my understanding that river herring, the collective term used to describe the closely related and difficult to distinguish blueback herring (*Alosa aestivalis*) and alewife (*Alosa pseudoharengus*), are not a listed or proposed-listed species under the ESA. Nonetheless, insomuch as Petitioners address this candidate species, this declaration provides the requisite technical information to support the NRC's FSEIS.

72. River herring are infrequently entrained at PNPS. Monitoring records from PNPS indicate that, dating back to 1980, larvae have been identified in PNPS entrainment samples in only five years out of thirty years, those years being 1985, 1990, 1996, 2005, and 2009. In each of those five years, larval entrainment was minimal. For example, a total of two larvae was found in 1996, and just a single larva in 2005. This minimal entrainment cannot reasonably be said as having any discernible effect on river herring populations.

73. River herring impingement is likewise minimal. From 1980 to 2010, annual impingement at PNPS of alewives and blueback herring averaged 2,150 and 735 respectively, most, if not all, of which were young-of-the-year fish. Due to the high natural mortality rates of these species, the number of adult fish (i.e., maturing at age 3) that would be expected to survive from that number of juveniles is 38 and 2, respectively. Therefore, PNPS's effect on river herring populations through impingement is also negligible at best.

Winter Flounder

74. Winter flounder is not an ESA-listed species. Nonetheless, in their Supplement, Petitioners cite to a June 27, 2000 letter to the U.S. Environmental Protection Agency from the Massachusetts Office of Coastal Zone Management ("MCZM"), which alludes to data from 1997 and 1998 indicating that PNPS caused the mortality of almost "40% of the annual total

recreational and commercial catch" of winter flounder. (Supplement at 5). It is my understanding that Petitioners mean to use this letter and its contents as evidence of the "extensive destruction of marine life in Cape Cod Bay," and in particular to winter flounder, that Petitioners say is caused by operation of PNPS. (Supplement at 5). For each of the reasons set forth below, the Supplement is incorrect.

75. PNPS extensively monitors winter flounder, and therefore has a thorough understanding of this species and PNPS's potential effects.

76. Most recently, in June 2008, Normandeau Associates, in collaboration with LWB Environmental Services, Inc., prepared a document entitled *Adverse Environmental Impact Assessment for Pilgrim Nuclear Power Station* (the "AEI Assessment"). (Normandeau 2008). The AEI Assessment, as summarized below, presents three lines of evidence indicating that impingement and entrainment of winter flounder at PNPS has negligible impact on the population of winter flounder in the Bay.

77. First, available evidence shows that the potential for entrainment of winter flounder larvae in the vicinity of PNPS is very low. Entergy Nuclear Generating Company ("ENGC") conducted a three-year study of the flux of winter flounder larvae passing by the PNPS CWIS in the nearfield water currents. (ENGC 2000, 2002, and 2004). The study design consisted of three components: field sampling of the four stages of winter flounder larvae at five or more transects in the western part of the Bay; water velocity measurements at these transects; and coincident sampling of winter flounder larvae entrained at the PNPS CWIS. The objective of these studies was to estimate the percent of winter flounder larvae passing PNPS that may be entrained. The results of these studies indicate that, converting all larvae to stage 4 larvae to account for high natural mortality of earlier stages, the percent of larvae that are in the vicinity of

PNPS that are actually entrained is very low, ranging from 0.45% to 2.03%, with an average of 1.23%.

78. Second, the total annual mortality of winter flounder from entrainment and impingement at PNPS, when expressed as adult (age 3) equivalents to account for high natural mortality of early life stages, is a minor fraction of winter flounder abundance in the Gulf of Maine (including Cape Cod Bay). NMFS's estimates of the population of age 3 winter flounder in the Gulf of Maine are available for the years 1982 through 2005. (Normandeau 2008). Winter flounder entrained or impinged at PNPS in 1980 would have been three years old in 1983. Winter flounder entrained or impinged at PNPS is 2002 would have been three years old in 2005. Therefore, the relevant comparison to make is between average adult mortality for the years 1980 to 2002 and average age 3 abundance in the Gulf of Maine for the years 1983 to 2005. From 1983 to 2005, the NMFS's stock assessment indicates that an average of more than 3.4 million age 3 winter flounder were present in the Gulf of Maine. (Normandeau 2008). From 1980 to 2002, an average of 8,452 equivalent age 3 winter flounder per year were entrained or impinged at PNPS. Based on these estimates, entrainment and impingement at PNPS represents on average only 0.25% of the age 3 winter flounder population present in the Gulf of Maine.

79. As the third line of evidence, a standard model used in fisheries management, known as a "Spawning Stock Biomass Per Recruit" or "SSBPR" model, indicates that impingement and entrainment mortality at PNPS does not rise to a level that threatens the ability of the Bay's winter flounder population to sustain itself. The SSBPR model uses information on age-specific mortality (i.e., the proportion of the population that dies, or conversely, lives, to a given age) and fecundity (i.e., the number of eggs produced by a female fish of a given age) to calculate the expected lifetime reproductive output of a one-year old fish. (Normandeau 2008). This information can be used to determine the importance of the loss of reproductive capacity in

the winter flounder population caused by entrainment and impingement mortality at PNPS relative to the loss of reproductive capacity caused by fishing. Application of the SSBPR method indicates that the influence of PNPS is only a fraction (less than one [1] percent) of the influence of fishing on the winter flounder population in the Gulf of Maine (including Cape Cod Bay).

80. Thus, as the AEI Assessment concludes, "the impact of the PNPS CWIS, either alone or in combination with all other existing power plants affecting the [Gulf of Maine] winter flounder stock, is only a minor contributor to overall human influences on this stock and does not threaten the sustainability of the susceptible winter flounder populations."

81. In summary, the extensive research presented in the AEI Assessment demonstrates that: 1) only a small fraction of the winter flounder larvae drifting past the intake are actually entrained; 2) equivalent adult losses from entrainment and impingement at PNPS are very small compared to the size of the winter flounder population in the Gulf of Maine (including Cape Cod Bay); and 3) fisheries management models indicate that the impacts of entrainment and impingement at PNPS are very small compared to impacts of fishing and have a negligible impact on the sustainability of winter flounder populations. Therefore, the continued operation of PNPS will have no discernible effect on winter flounder populations.

CONCLUSION

82. The information detailed above demonstrates that the NRC's conclusion in the 2006 BA and Supplemental BA that continued operation of PNPS will have no effect on the relevant ESA-listed species is well founded. The information also demonstrates that continued operation of PNPS would have no discernible effect on river herring or winter flounder populations.

I declare under penalty of perjury that the foregoing is true and correct.

Executed in Accord with 10 C.F.R. § 2.304(d)
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Dated: March 19, 2012

EXHIBIT ONE

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

MICHAEL D. SCHERER, Ph.D

Vice President/Senior Marine Scientist

Dr. Scherer is a Vice President and senior marine scientist at Normandeau Associates, Inc. He is an expert in marine fisheries science. He manages entrainment and impingement studies at several power plant facilities and oversees diverse fisheries studies related to dredging, desalination, LNG and other projects associated with shore line and offshore developments.

EDUCATION

Ph.D.	1974, Fisheries Biology major, Biometrics minor, University of Massachusetts
M.S.	1972, Fisheries Biology, University of Massachusetts
B.S.	1969, Fisheries Biology, Cornell University

PROFESSIONAL EXPERIENCE

2006-Present	Normandeau Associates
1993-2006.	President, Marine Research, Inc.
1974-1993	Marine Research, Inc.
1970-1975	Massachusetts Cooperative Fishery Research Unit

PROFESSIONAL AFFILIATIONS

American Fisheries Society

SELECTED PROJECT EXPERIENCE

Wheelabrator Saugus (2010-2011) – Impingement and entrainment studies for an open-cycle refuse to energy electric power facility on the Saugus River. Project Manager.

Entergy Nuclear Generation Company (2001-2010) - Winter flounder hatchery release and survival feasibility study designed to determine whether stock enhancement can be used as a mitigation tool for 316a and b compliance. Project Manager.

Entergy Nuclear Generation Company (2001–2011) - Sediment, shellfish, and irish moss collections for the radiological environmental monitoring program at Pilgrim Nuclear Power Station.

Entergy Nuclear Generation Company (2000-2011) - Bottom trawl-based population estimate of adult winter flounder in Western Cape Cod Bay designed to improve the impact assessment of entrainment and impingement for Pilgrim Nuclear Power Station.

New England Power Company, U.S. Generating, Dominion Energy (1974-2011) - Studies of the Mount Hope Bay portion of Narragansett Bay in the vicinity of Brayton Point Station to evaluate the effects of the open cycle cooling system for New England's largest fossil fuel power plant. Project Manager.

Boston Edison Company, Entergy Nuclear Generation Company (1974-2011) - Studies designed to determine the potential impacts of Pilgrim Nuclear Power Station on the abundance and distribution of ichthyoplankton and key finfish in Cape Cod Bay. Project Manager.

New England Power Company, U.S. Generating, Dominion Energy (1992-2011) - Entrainment and impingement studies at Manchester Street Generating Station in Providence Rhode Island. River-wide ecological studies associated with inplant work included phytoplankton, periphyton, epibenthos, zooplankton, water quality, and fisheries monitoring programs. Project Manager.

Southern Company, Mirant and TRC Environmental Corp (1999–2010) - Fisheries and eutrophication studies in the Charles River for Kendall Square Station repowering project. Work included ichthyoplankton sampling in the lower basin as well as the lakes region and fish sampling with gill nets and push nets. Hydroacoustics and multiyear sonic tracking programs were employed to learn about adult river herring movements near a thermal discharge. Project Manager.

Aquaria Desalination Facility, Dighton, MA (2007-2009) – Impact assessment resulting from entrainment and impingement on a Filtrex Filtration System intake, alternative to an Aquatic Filter Barrier.

Sconset Beach Nourishment Project (2005-2007) - Impact assessment related to the use of a dredge site off the east coast of Nantucket for nourishment of Sconset Beach. Studies included ichthyoplankton, nearshore and offshore fisheries sampling, habitat assessment dive surveys, and mitigation studies. Project Manager.

Town of Swansea, MA. with Epsilon Associates (2004-2007) - Benthos, ichthyoplankton, and fisheries studies related to a proposed desalination facility on the Palmer River. Project Manager.

Northeast Gateway LNG Terminal with Woods Hole Group (2005-2006) - Equivalent adult, equivalent yield modeling and fisheries support for a proposed LNG terminal off the coast of Gloucester in Massachusetts Bay. Project Manager.

Wheelabrator Saugus, G. E. Lynn Aircraft Division (1984-1997, 2005-2006) - Fisheries studies of the Saugus and Pines River estuaries, Saugus and Lynn, Massachusetts related to the impact of the open-cycle cooling systems of two industrial facilities. Project Manager.

Weaver's Cove Energy and Epsilon Associates (2003-2006) - Benthic sampling, analysis, and fisheries support related to dredging plans for a liquid natural gas terminal in Fall River, Massachusetts.

Massachusetts DCR/Parsons Brinckerhoff Quade & Douglas/Applied Coastal Research and Engineering (2001-2006) - Impact assessment related to the use of a Massachusetts Bay dredge site for beach nourishment in Winthrop. The project included an expanded essential fish habitat (EFH) assessment. Project Manager.

Commonwealth Engineers/ Rhode Island Dept. of Transportation (2000-2001, 2006) - Sakonnet River Bridge replacement project, environmental impact statement designed to assess impacts to local fish populations.

Keyspan LNG and Natural Resource Group, Inc. (2003-2004) - Fisheries support related to an LNG facility upgrade project in Providence, R.I.

Taunton Municipal Power and Light and EarthTech (2002-2003) - Fisheries and benthic invertebrate analyses and preparation of 316a and 316b document for a utility on the Taunton River. Project Manager.

ConEdison and TRC Environmental (2000-2003) - Preoperational and post operation studies for the Newington Power Facility on the Piscataqua River, New Hampshire and Maine that included ichthyoplankton, larval lobster and impingement sampling programs. Benthic sampling programs were conducted to assess construction and habitat related impacts of the facilities submerged diffuser. Project Manager.

Sverdrup-Jacobs, Inc./MBTA/ Town of Weymouth (2001) - Rainbow smelt migration and spawning study in Smelt Brook for the Weymouth Landing, Greenbush commuter railroad line. Project Manager.

Southern Company, Mirant and TRC Environmental Corp. (1999-2001) - Aquatic ecology studies for the Cape Cod Canal power plant located in Sandwich, MA. Work included entrainment and impingement sampling as well as ichthyoplankton sampling in the Cape Cod Canal, Cape Cod Bay, and Buzzards Bay. Sampling for larval lobster was also completed. Project Manager.

Raytheon Environmental Services/ Washington Group International/Sunset Energy (1999-2001) - Ichthyoplankton study in Gowanis Bay, New York for a proposed barge-mounted power station with once-through cooling system. Project Manager.

Sithe Edgar Development LLC. In conjunction Epsilon Associates, Inc. (1998-1999) - Fisheries studies in the Weymouth Fore, Smelt Brook, and Town River required for the proposed repowering of a fossil fuel power station. Project Manager.

Boston Edison Company, Sithe Energy (1989-1993, 1998-1999) - Studies of the Weymouth Fore River, Mass. including ichthyoplankton, fish, benthos, and water quality as part of a monitoring program for a proposed power station. Preparation of 316a and 316b documents was included. Project Manager

Bluestone Energy Services, Inc. and Epsilon Associates, Inc. (1997) - Assessment of fish population issues related to a proposed desalination plant on the Taunton River in Deighton, MA. Project Manager.

General Electric Company (1994-1997) - Impingement and entrainment monitoring studies at G.E's Lynn, Massachusetts aircraft engine plant including ichthyoplankton studies in the Saugus River source water. Project Manager.

Camp, Dresser and McKee (1996) - Assessment of potential fisheries impacts associated with a proposed water diversion facility on the Taunton River for the City of Brockton, MA. Project Manager.

Boston Edison Company (1993) - Fish impingement study at Mystic Station in Everett, MA. Project Manager.

HMM Associates (1990-1992) - Entrainment and impingement studies at B. F. Cleary Station and multiphased in-river sampling of fish and benthos in connection with Taunton Cogeneration Facility Project. Project Manager.

Continental Shelf Associates (1990) - Analysis of ichthyoplankton samples from Mobil drilling site on Continental Shelf off Cape Hatteras. Project Manager.

National Park Service (1984-1986) - Ecological study of the upper Pamet River, Truro, Mass. including nutrient cycling, eutrophication, groundwater analyses, and river hydrology. Principal Investigator.

Lynn Massachusetts Sewer Commission (1982) - Study of the impact of sewage outflow after a rainstorm on the benthic invertebrate and water column plankton populations of Lynn Harbor. Principal Investigator.

Yankee Atomic Electric Company, New England Power Co (1974-1979) - Studies of Block Island Sound, Charlestown Pond, Quonochontog Pond, and Point Judith Pond, R.I. to assess possible environmental effects of a proposed power plant. Principal Investigator.

SELECTED PRESENTATIONS

Scherer, M.D. and D. Lawrence. 2002. Macroalgal impacts on the nursery habitat of young-of-the-year winter flounder (*Pleuronectes americanus*), Mount Hope Bay. Poster presented at the NEER/SNECAFS joint meeting, May 8-10, 2003.

Scherer, M.D. and B. Morgan. 2001. Winter flounder stock enhancement. Poster presented at the Flatfish Biology Conference, December 2002. Mystic CT.

Scherer, M.D., with G. Klein-MacPhee, R. Satchwill, A. Keller, and C. Vasconcelas. 2000. Increase in numbers of smallmouth flounder, Etropus microstomus, in the ichthyoplankton of Narragansett Bay and Mount Hope Bay, Rhode Island. Poster presented at the Flatfish Biology Conference, December 5-6, 2000. Mystic Ct.

Scherer, M.D., with D. Galya., J. Herberich, S. Kelly, J. Scheffer. Assessment of Power Plant Entrainment in Comparison to Long-Shore Ichthyoplankton Transport. Presented at the 134th Annual Meeting of the American Fisheries Society, Madison, WI. August 22-26, 2004.

Scherer, M.D., with D. Rutecki, D. 2006. Assessment of hatchery reared winter flounder, *Pseudopleuronectes americanus*, as a mitigation tool in Cape Cod Bay, MA. Presented at the New England Estuarine Research Society, Spring 2006 Meeting.

Scherer, M.D., with D. A. Rutecki, J. F. Battaglia. 2009. A preliminary assessment of finfish and invertebrates on the east side of Nantucket, MA. Presented at the 3rd Nantucket Biodiversity Initiative Conference.

SELECTED PEER-REVIEWED ARTICLES AND PUBLICATIONS

Author or co-author of seven scientific papers related to fish and larval lobsters.

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EXHIBIT J

Affidavit of Michael D. Scherer, Ph.D. and Sarah A. Barnum, Ph.D. in Support of Entergy's Answer Opposing Jones River Watershed Association's and Pilgrim Watch's Motion to Reopen, Request for Hearing, and Permission to File New Contention

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of **Entergy Nuclear Generation Company** **Entergy Nuclear Operations, Inc.** **(Pilgrim Nuclear Power Station)**	**Docket No. 50-293-LR**

AFFIDAVIT OF MICHAEL D. SCHERER, Ph.D. AND SARAH A. BARNUM, PH.D. IN SUPPORT OF ENTERGY'S ANSWER OPPOSING JONES RIVER WATERSHED ASSOCIATION'S AND PILGRIM WATCH'S MOTION TO REOPEN, REQUEST FOR HEARING AND PERMISSION TO FILE NEW CONTENTION

We, Michael D. Scherer, Ph.D. and Sarah A. Barnum, Ph.D., do hereby depose and say on the basis of personal knowledge and our professional opinion, and under penalties of perjury, that:

BACKGROUND AND QUALIFICATIONS

1. My name is Dr. Michael D. Scherer. I am a Vice President and Senior Marine Scientist with Normandeau Associates, Inc. ("Normandeau"), a professional consulting firm that specializes in ecological, environmental and natural resources management services. I hold a Ph.D. degree with a Fisheries Biology major and Biometrics minor from the University of Massachusetts, a Master of Science degree in Fisheries Biology from the University of Massachusetts, and a Bachelor of Science degree in Fisheries Biology from Cornell University. My most recent curriculum vitae, and additional detail regarding my qualifications, are described in and attached to my March 19, 2012 Declaration, also submitted in this proceeding and hereby incorporated by reference as if set forth fully herein. *See* 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.

2. My name is Dr. Sarah A. Barnum. I am a Senior Wildlife Ecologist with Normandeau. I hold a Ph.D. degree from the School of Architecture and Planning with a concentration in Conservation Planning from the University of Colorado, a Master of Science degree in Wildlife Ecology from Utah State University, and a Bachelor of Science degree in Wildlife Biology from the University of Vermont. My most recent curriculum vitae is attached hereto as **Exhibit 1**. I have over 15 years experience as a wildlife ecologist, with a focus on avian ecology, and I have significant experience in assessing the potential impacts of energy facilities and technologies on birds, including the roseate tern and other seabirds that may occur in portions of Cape Cod Bay and, more generally, the Gulf of Maine. In particular, I have worked as an avian biologist and project manager assessing potential impacts of proposed wind turbine projects in Massachusetts (e.g., the Madaket Wind Turbine Project and the Saugus Community Wind Project) on avian resources, including terns and other shorebirds. In addition, from 2005-2007, I was a Conservation Program Manager for New Hampshire Audubon, where I oversaw multiple on-going research and conservation programs, including the Tern Restoration Project.

PURPOSE AND METHODOLOGY

3. This Declaration is made in response to the Jones River Watershed Association's and Pilgrim Watch's Motion to Reopen, Request for Hearing and Permission to File New Contention (collectively, "the Petition"), dated May 2, 2012. The Petition alleges certain deficiencies in the NRC's evaluation of the potential impacts of continued operation of Pilgrim Nuclear Power Station ("PNPS") on the roseate tern (*Sterna dougallii*) which is listed as

endangered under the federal Endangered Species Act ("ESA"). 16 U.S.C. § 1531 *et seq*. In this Declaration, we will offer our expert opinion that the continued operation of PNPS will have no discernible effects on the northeast population of roseate tern, its habitat or recovery goals.

4. The opinions expressed in this Declaration are in part based on our review of the sources identified in **Exhibit 2**. To the best of our knowledge, the factual statements in this Declaration are true and accurate, and the opinions expressed therein are based on our best professional judgment.

DISCUSSION

Description of PNPS and its Environment

5. A description of PNPS and its location and environment is provided in paragraphs 7 through 16 of Dr. Scherer's previous Declaration submitted in this proceeding. Additional information on the operation of PNPS is provided in the Declaration of Mr. Jacob J. Scheffer, which we have reviewed and understand is being submitted contemporaneously with this Declaration.

Relevant Biology and Ecology of the Roseate Tern

6. The roseate tern, a medium sized, fish eating, shore bird, is a migratory species that spends at least half the year in tropical latitudes with a scattered distribution primarily in the tropical and sub-tropical Atlantic, Indian, and Pacific Oceans. Gochfeld et al., 1998. During the summer, a subpopulation of roseate terns breeds in the northeast region of North America, from New York to Nova Scotia. *Id.*

7. Roseate terns arrive in Massachusetts from late-April to mid-May to nest at several coastal locations, typically on islands (as discussed below). Mostello 2007. These birds then abandon their breeding locations in late-July and August, although they temporarily may

congregate in "staging areas" around Cape Cod and the Islands of Nantucket and Martha's Vineyard, before departing by mid- to late-September for wintering grounds in the West Indies and off the northern and eastern coasts of South America, where they will remain for upwards of six months out of the year. *See* US FWS. 1998 (Hereinafter, "Recovery Plan"). Roseate terns appear to disperse throughout the breeding range in July and August, re-aggregating at staging areas primarily on outer Cape Cod in late August and early September prior to southward migration. US FWS 2010 (Hereinafter, "5-Year Review"); Trull et al., 1999; Blake 2010. Staging areas are transitory relative to breeding colonies, and individuals may remain in one place foraging for as little as a few hours or overnight (i.e., roosting) before moving on to the next spot. *See* e.g., Trull et al. 1999. In short, because staging roseate terns are not "anchored" to a single area by the presence of a nest, they are free to move to alternative staging areas if the fishing or other ambient conditions are not advantageous in a particular area.

8. Roseate terns typically nest in colonies on sandy, gravelly, or rocky islands (which are less likely than the mainland to have mammalian and certain avian predators) and, less commonly, in small numbers at the ends of long barrier beaches. Recovery Plan; Mostello 2007. In Massachusetts, the roseate tern invariably nests in association with common terns, forming clusters or sub-colonies within larger common tern colonies. Mostello 2007. Compared to the common tern, the roseate tern selects nest sites with denser vegetation, such as seaside goldenrod and beach pea, which provide cover for eggs and chicks. *Id.* In Massachusetts, significant nesting colonies of roseate terns are found at Bird Island and Ram Island, in Buzzards Bay, with 735 and 584 breeding pairs in 2010, respectively, which accounts for 95% of the Massachusetts breeding population. MADEP 2011. Birds in these two colonies are not expected to be influenced by PNPS, as they belong to a subgroup of the northeast population that is

separate from birds near PNPS. Specifically, a long-term banding study of roseate terns indicates that the northeast population is split into two separate subgroups: a "cold water" subgroup nesting north and east of Cape Cod, which would include any birds nesting near Plymouth, Massachusetts; and a "warm water" subgroup nesting south and west of Cape Cod, which includes the major colonies in Buzzards Bay. 5-Year review. The interchange of individual birds between these two groups is thought to be limited. *Id.*

9. Long Beach, in Plymouth, Massachusetts has historically been a minor nesting site. Recovery Plan Appendix B; 5-Year Review). From 1999 through 2009, only a single nesting pair was recorded, in 2008. 5-Year Review. Dr. Nisbet states in his Affidavit that three pairs of roseate tern nested at Long Beach in 2011, though the source of this information is not stated and does not appear to have been published. Nisbet Aff. ¶ 8.

10. Roseate terns are highly mobile foragers, flying much faster than common terns (Recovery Plan), which allows them to forage over large areas. In Massachusetts, roseate terns may forage 25-30 km (about 15 to 18 miles) away from the breeding colony. Mostello 2007; Recovery Plan. Published data on the roseate tern's foraging range from staging areas are not available, due to the difficulty in monitoring the movements of individuals that are not anchored to a single location for a significant period of time, as is the case for nesting birds. However, there is nothing that would indicate that roseate tern's foraging range from staging areas is smaller than from breeding colonies. In fact, because they are not anchored to a nest, they may be able to forage over a larger range.

11. Roseate terns also exhibit a flexible foraging strategy, adapting to foraging conditions within their range by concentrating their feeding efforts in areas where prey are more abundant. *See* Heinemann 1992. For example, Heinemann (1992) observed over the course of a

summer the foraging behaviors of individuals nesting in the breeding colony located at Bird Island, Massachusetts. He reported significant variation in foraging intensity over the course of the summer at different locations around Buzzards Bay, separated by distances of more than 20 km (12.5 miles). *See id.* The flexible foraging strategy exhibited by this colony demonstrates the ability of roseate terns to adapt to local conditions and to concentrate their feeding efforts in areas within their relatively large foraging range where prey are more plentiful.

12. The roseate tern is a fairly specialized forager, usually feeding over shallow sandbars, shoals, inlets, tide rips, which bring prey fish close to the surface, making them easier to catch. Recovery Plan; 5-yr Review. They feed almost exclusively on small, schooling marine fish, though occasionally they include crustaceans in their diet. *See* Gochfeld et al., 1998. Although the composition of their diet varies from year to year and with location, the bulk of the roseate tern diet in Massachusetts is comprised of sand lance (*Ammodytes spp.*), hake (*Urophycis* spp.), and Atlantic herring (*Clupea harengus*). 5-Year Review. The roseate tern captures prey fish mainly by plunge-diving from heights of up to 20 m and often submerging 50 cm or more, but also by surface-dipping and contact-dipping. Mostello 2007; Recovery Plan.

13. The northeastern population of the roseate tern was listed as endangered under the federal ESA in 1987, principally due to contraction of the population into a small number of breeding sites and secondarily because of its declining numbers. Recovery Plan; *see also* DOI 1987. From the 1920s through the 1970s, roseate terns were displaced from at least 30 nesting colonies, due primarily to occupation of those sites by herring gulls and great black-backed gulls, and secondarily to animal predation (which may have intensified as terns were displaced by gulls to sites closer to the mainland), and erosion of the shoreline. Recovery Plan. By 1979, the northeast population (i.e., from New York to Nova Scotia) was estimated to be approximately

2,500 pairs. Mostello 2007. Following two decades of fairly steady increase, the northeast population peaked at 4,310 pairs in 2000 (*id.*) and is currently estimated at approximately 3,000 nesting pairs. 5-Year Review. The cause of this more recent population decline has not been identified, but data suggest that this decline is likely related to mortality at the wintering grounds in South America. Mostello 2007.

14. The primary range-wide threats to the northeastern roseate tern population include habitat displacement by gulls, predation of eggs and chicks by a number of birds and mammals, including owls, black crowned night herons, great black-backed gulls, peregrine falcons, mink, raccoon, rats and other rodents and fox, as well as physical human disturbance of, and activities in, staging areas (i.e., habitat loss). 5-Year Review. There is no indication that a lack of prey fish availability in Massachusetts during the summer months (even assuming any such lack of availability exists) has caused or contributed to the decrease in nesting sites or the decline in the northeastern roseate tern population.

Absence of Potential Impacts of PNPS on the Roseate Tern

No Credible Evidence of Direct Impacts

15. Based on available information, PNPS is not expected to have any direct impact on the roseate tern. There clearly is no risk to the roseate tern of impingement or entrainment in PNPS's cooling water intake system ("CWIS"). Furthermore, although JRWA does allege and infer that discharges of chlorine, corrosion inhibitors, and "heavy metals" from PNPS to Cape Cod Bay could directly affect the roseate tern, as explained in the Declaration of Mr. Scheffer: (i) heavy metals (such as chromium, zinc, and copper) are believed to be absent from the Station's regularly discharged effluent (Scheffer Aff. at ¶ 18); (ii) periodic discharges of corrosion inhibitors are subject to and well below EPA-authorized effluent limitations (Scheffer Aff. at ¶

19); and (iii) chlorination of PNPS's CWS and SWS is conducted subject to and with the benefit of a NPDES permit (Scheffer Aff. at ¶ 9), the federal chlorine effluent limitations for which are considered protective of marine organisms in Cape Cod Bay. While PNPS has, on rare occasion, experienced exceedances of its chlorine discharge limits at certain outfall locations, it is well-established that chlorine decays rapidly in sea water following a predictable relationship (*see* e.g., Wang et al., 2008; Høstgaard-Jensen, et al., 1977) such that, irrespective of dilution, it is highly unlikely that chlorine discharges from even occasional exceedances would affect the environment. In short, the chlorine discharges from PNPS are small, infrequent, and decay quickly and there is no expectation they will have any impact on the biota in Cape Cod Bay. Consequently, there is no credible scientific evidence that discharges from PNPS have any adverse effect on roseate terns. Indeed, because PNPS is not expected to directly (or, as discussed below, indirectly) impact the roseate tern, the PNPS property in fact may provide especially suitable nesting or staging habitat, as human entry is restricted and the birds would likely be protected from human disturbance.

No Credible Evidence of Indirect Impacts

16. Based on available information, PNPS is not expected to have any indirect impact on the roseate tern. Although JRWA also alleges that PNPS's operation has potential indirect impacts on the roseate tern through: 1) impacts on the availability of fish prey due to impingement and entrainment ("I&E") mortality; and 2) impacts of "pollution" on their fish prey, there is no technical evidence to suggest that either alleged impact is scientifically credible (or even plausible).

No Impacts on Roseate Tern Prey Species

17. In its Petition, JRWA refers to statements in the PNPS Final Supplemental Environmental Impact Statement ("FSEIS") regarding historical I&E of the roseate tern's main fish prey species by PNPS's CWIS (*see* Petition at 20-21) and, based on these statements, suggests that PNPS may adversely impact the roseate tern's food supply. Petition at 34. While PNPS does result in some I&E of the roseate tern's main fish prey species, as explained below, the evidence indicates that PNPS I&E will have no discernable impact on the availability of these fish species as prey for the roseate tern.

Sand Lance

18. As discussed above, roseate terns eat almost exclusively small marine fish that they capture by plunge diving, feeding primarily on sand lance, which at times represents 95% of the bird's diet. *See* Uttley et al., 1989, Safina 1990, Heinemann 1992, Shealer and Kress 1994, Goyert 2010. Sand lance typically occur in dense schools, with individual fish reportedly numbering from 500 to tens of thousands. Meyer et al., 1979. Because they do not support a commercial or recreational fishery, estimates of sand lance populations in the Gulf of Maine, such as the spawning stock assessments conducted by the National Marine Fisheries Service ("NMFS") for many other species, are not available. However, a thorough review of the available literature reveals no indication that the abundance of sand lance in the Gulf of Maine is low or declining, and they remain a significant proportion of the diet of a number of marine predators, including piscivorous fish, various shorebirds, and several species of seals and whales. Robards, et al., 1999. Moreover, PNPS monitoring indicates that the number of sand lance has been relatively stable over the past decade. Entergy 2012.

19. Sand lance are known to be impinged at PNPS, though in low numbers, and primarily during November and December, well after roseate terns have migrated to their southern winter habitat. Setting aside a single year reflecting an aberrational event, the annual average number of sand lance impinged is only 147 individuals. Even including the aberrational year (2003, in which a three-day impingement of 13,758 sand lance resulted an anomalous annual estimate of 30,765 fish that year), the annual average over the last decade is only 3,209 sand lance per year impinged at PNPS. Although the age of impinged sand lance is not known, the size range of those impinged corresponds to age 1 and age 2 fish. If impinged sand lance are assumed to be age 1 fish, which weigh on average 0.00384 pounds (EPA 2004), the annual average of 147 fish would weigh a total of 0.56 pounds. Indeed, even if one includes the anomalous year (2003) in these calculations, the annual average weight of 3,209 fish is only 12.3 pounds.

20. Sand lance eggs are demersal and adhere to the ocean bottom, and are therefore rarely subject to entrainment at PNPS, as evidenced by eggs being found in entrainment samples in only one year – 1979 – over the last three decades. Entergy 2012. Sand lance larvae do appear in PNPS entrainment samples during their winter spawning season. Over the last decade, the number of sand lance larvae entrained, expressed in terms of age 1 fish, averaged approximately 426,000 individuals each year, which, applying the same per fish weight of 0.00384 pounds, converts to an estimated total weight of 1,636 pounds of fish annually. Thus, absent a declining population, entrainment of sand lance at PNPS cannot reasonably be considered to have a potential impact, even indirectly, on roseate tern.

21. Moreover, the I&E losses reported above (and below) are conservative because they assume 100% mortality. In a review of entrainment mortality studies conducted at 21

power plants, the Electric Power Research Institute ("EPRI") concluded "it is clear that for most species survival can be quite high. The available data do not support the assumption that all entrained organisms are killed." EPRI (2000). Considering an array of species, EPRI found that entrainment survival rates ranged from approximately 25% for sensitive species to greater than 50% for hardier ones. *Id.* Likewise, impingement studies conducted at PNPS indicate that latent survival rates (56 hours after being impinged) ranged from 0 to 25% depending on species (MRI 1983). Accordingly, the I&E losses reported in this Declaration likely overstate actual losses.

22. As a reference point, humpback whales, which are known to feed on sand lance in New England waters (Weinrich et al., 1992; Overholtz and Nicolas 1979; Payne et al., 1990; Weinrich et al., 1997; Friedlaender et al., 2009), are estimated to consume food at the rate of approximately 471 kg/day (1,036 lbs/day). Roman and McCarthy 2010. In addition, humpback whales in Cape Cod Bay are known to employ specialized feeding behaviors, known as "bubble net" feeding or the similar "lobtail" feeding, that allow the whales to increase their foraging efficiency by concentrating schooling fish near the surface. Weinrich et al., 1992; Hain et al., 1982; Hazen et al., 2009. When employing these behaviors, humpbacks may target schools of sand lance. *Id.* Indeed, in some areas of the Gulf of Maine, humpback whales are known to specialize in feeding on sand lance, and their spatial distribution is highly correlated with sand lance density. Payne et al., 1986. Based on their daily consumption, when humpback whales are concentrating on sand lance, two whales would eat more sand lance in one day than would be impinged and entrained at PNPS in an average year. It is, therefore, simply not scientifically credible to suggest that the annual magnitude of I&E mortality at PNPS could potentially affect the availability of sand lance as prey for the roseate tern.

23. Another reference point for appreciating the miniscule scale of I&E losses at PNPS, as well as the general abundance of sand lance in the North Atlantic is provided by Hammill and Stenson (2000), who estimated the number of fish of various species that are consumed by the seal population in Atlantic waters of Canada. Over a seven-year period (1990-1996), an average of 5.4 million seals consumed 831 million pounds of sand lance annually, which would be equivalent to 216.5 billion age 1 sand lance. Thus, the consumption of sand lance by seals in the North Atlantic dwarfs I&E losses at PNPS. Further, where seals presumably consume only a fraction of the sand lance present in their foraging area, these data illustrate the overall abundance of sand lance.

Atlantic Herring and Hake

24. In addition to sand lance, Atlantic herring (*Clupea harengus*) as well as three species of hake in the genus *Urophycis* may make up a portion of the roseate tern's diet. Heinemann 1992.

Atlantic Herring

25. Young-of-the-year Atlantic herring are impinged in minimal numbers at PNPS, with an annual average (again, expressed in terms of age 1 fish) of 140 individuals per year over the last decade. Atlantic herring eggs are not entrained at PNPS because they are spawned on offshore banks and, like the sand lance, are demersal and adhesive. Larval Atlantic herring are subject to entrainment at PNPS, with annual losses (expressed in terms of age 1 fish) of 9,294 individuals per year over the last decade. Entergy 2012. Conservatively assuming 100% I&E mortality, annual mortality of Atlantic herring at PNPS averages 9,434 fish. Where an age 1 Atlantic herring weighs on average 0.0314 pounds, this represents an annual loss of 296 pounds of fish. EPA 2004.

26. By comparison, the Atlantic herring spawning stock biomass of the Gulf of Maine-Georges Bank herring complex was estimated to be 400,000 metric tons, or 900 million pounds, of adult fish in 2008. TRAC 2009. Spawning stock biomass consists of fish age 3 and older. Based on these estimates and accounting for the additional mortality experienced between age 1 and age 3 (to adult), the number of Atlantic herring entrained and impinged at PNPS is a minute fraction of the northeast population available for predation by roseate terns, and cannot reasonably be expected to impact the availability of these fish or the feeding success of the roseate tern.

Hake

27. Three species of hake – red hake (*Urophycis chuss*), white hake (*U. tenuis*), and spotted hake (*U. regia*) – are impinged and entrained at PNPS. Early life stage hake are impinged at PNPS in minimal numbers, with an annual average over the last decade for all three species combined of 150 fish (Entergy 2012), which is the equivalent of 35 pounds, per year. Eggs and larvae of the three species cannot readily be distinguished from one another, and so their entrainment numbers are combined. The average annual entrainment rate for hake over the last decade, expressed as age 1 fish, is 60,759 per year, which represents an annual total of 14,035 pounds. Thus, the annual combined estimate of hake entrainment and impingement losses at PNPS, again conservatively assuming 100% I&E mortality, is approximately 14,070 pounds.

28. Stock assessments are completed periodically by NMFS for both red and white hake. The latest stock assessment in 2010 for red hake alone provided a stock estimate of 4,706 metric tons or 10,374,000 pounds (spring and fall estimates averaged) for the northern stock defined as the Gulf of Maine to Northern Georges Bank region. NEFSC 2011. The most recent

spawning stock biomass assessment for white hake was completed in 2007, at which time the Gulf of Maine to Northern Georges Bank population was estimated to be 19,800 metric tons or 43,651,100 pounds. NEFSC 2008. Based on these data, which do not include the spotted hake, losses due to I&E at PNPS are a minute fraction of the hake population in the Cape Cod area, and the continued operation of PNPS cannot reasonably be expected to affect the availability of hake prey to roseate terns.

Miscellaneous Responses

29. The Petition also asserts that "turbulent water around [PNPS's] two breakwaters," and "turbulence created by regular and periodic cooling water discharges" are "expected to be prime locations for foraging roseate terns" and goes so far as to state that "PNPS is thus an attractive nuisance" for the roseate tern. Petition at 20. These assertions are erroneous. First, the currents flowing past PNPS's two intake embayment breakwaters are relatively slow, even during thermal backwashing, and do not result in any additional turbulence that is not already associated with the shoreline generally (i.e., during storms). Second, as discussed above, while roseate terns often forage over turbulent waters, such turbulence is associated with shoreline hydrodynamic features, such as tide rips, that act to bring fish in these areas to the surface, making them more easily preyed upon by diving birds. Although roseate tern prey such as sand lance do occur in the vicinity of PNPS, as evidenced by their appearing in I&E samples, the sea floor in the vicinity of Rocky Point, where PNPS is located, is rocky, and therefore is not suitable habitat for sand lance, which prefer substrates into which they can burrow such as clean sand, sand and shell, and fine gravel. Meyer 1979. Thus, the asserted turbulence associated with PNPS's cooling water discharge is not expected to bring an abundance of sand lance to the

surface where they can be captured, and should therefore not provide desirable foraging conditions for the roseate tern.

30. Moreover, to the extent any roseate terns might be attracted to the turbulence created by PNPS's cooling water discharge, if prey fish are absent from the water, any such attractiveness would likely be short lived, as the roseate tern's flexible foraging strategy, as described above, would allow it to either move or concentrate its feeding efforts where prey are abundant. *See* Heinemann 1992. Consequently, even if PNPS did adversely affect local prey fish abundance (which there is no evidence that it does) there is no credible evidence that, were significant numbers of roseate terns to nest or stage in areas near PNPS in the future, their ability to forage adequately would be impaired by continued operation of PNPS.

31. JRWA also alleges that discharges of pollution from PNPS potentially affect the roseate tern through their fish prey. For the reasons discussed above in ¶ 15, and as explained in Mr. Scheffer's Declaration, there is no credible scientific evidence such discharges have any adverse effect on roseate tern fish prey.

32. Finally, JRWA alleges that "thermal releases" from PNPS, including "backwash operations," may adversely affect the roseate tern's prey fish. *See* Petition at 21. First, there is no evidence that the thermal plume created by PNPS's CWIS, as authorized by its NPDES permit, adversely affects roseate tern prey fish in Cape Cod Bay. Moreover, as explained in Mr. Scheffer's Declaration, backwash operations are performed infrequently – 3 to 5 times per year – and, due to the low volume of water discharged, the temporal and spatial extent of the thermal plume associated with backwashing is very limited – occurring for only a few hours in 3 to 5 feet of water at the surface of the intake embayment. Scheffer Aff. ¶ 16. Consequently, there is no

credible scientific evidence that thermal discharges from PNPS have any adverse effect on roseate tern prey fish.

I declare under penalty of perjury that the foregoing is true and correct.
Executed in Accord with 10 C.F.R. § 2.304(d)

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I declare under penalty of perjury that the foregoing is true and correct.
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EXHIBIT ONE

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

SARAH A. BARNUM, Ph.D.
Senior Wildlife Ecologist

Dr. Barnum is a Senior Wildlife Ecologist at Normandeau with over 15 years of professional experience. Her background includes providing expertise to the transportation and energy sectors, as well as a variety of general development projects. She has hands-on experience with a with a wide range of species including forest birds, waterfowl, raptors, small mammals, large mammals, amphibians, and reptiles. Dr. Barnum's projects have emphasized examining habitat relationships, impact assessment for threatened and endangered species, mitigation planning, and Federal ESA compliance. Dr. Barnum also has extensive experience in project planning, project management, experimental design, and data analysis.

EDUCATION

Ph.D	2003, Conservation Planning, University of Colorado
M.S	1993, Wildlife Biology, Utah State University
B.S	1988, (cum laude) Wildlife Biology, University of Vermont

PROFESSIONAL EXPERIENCE

2007-Present	Normandeau Associates
2005-2007	New Hampshire Audubon, Concord, NH
2004-2005	Baystate Environmental Consultants, East Longmeadow, MA
2001-2003	Environmental Planning and Policy Unit, Colorado DOT, Denver, CO
1998-2000	Office of Environmental Services, Colorado DOT, Denver, CO
1996-1998	Dames & Moore, Denver, CO
1993-1994	Bio-Resources, Inc., Logan, UT

SELECTED PROJECT EXPERIENCE

Confidential (2011- present) – Wind Development, Northern MA. Avian and acoustic bat surveys to support environmental permitting for a proposed six turbine project. Avian surveys include raptor surveys and breeding bird surveys. Project Manager and Avian Biologist.

Confidential (2011- present) – Wind Development, Down East ME. Avian and acoustic bat surveys to support environmental permitting for a proposed 20 plus turbine project. Avian surveys include raptor surveys and eagle surveys. Wildlife Task Manager and Avian Biologist.

Confidential (2011) – Wind Development, Northern ME. Avian and acoustic bat surveys to support environmental permitting for a proposed six turbine project. Avian surveys include raptor surveys, eagle surveys, and breeding bird surveys. Wildlife Task Manager and Avian Biologist.

First Wind (2010-2011) - Post-Construction Mortality Monitoring, Stetson Wind Power Facility, Washington County, Maine. Managed personnel to search all turbines on-site for bird and bat fatalities from April-October, 2010, and conduct searcher efficiency trials and scavenger trials to estimate true number of fatalities; report writing. Project Manager.

Northern Pass (2010- Present) - HVDC Power Line Upgrade. Conduct wildlife assessments in support of state and federal permitting for installation of a new, 200-mile long HVDC line in New Hampshire. Tasks include consultation with state and federal agencies (ESA, NEPA), desktop analysis, and design and coordination of field surveys. Species of interest include forest carnivores, bats, raptors, song birds, turtles, snakes, and lepidopterons. Task Manager.

Town of Nantucket (2010-2011) – Madaket Wind. Assessment of avian and T&E resources in the project area to determine potential impacts and permitting requirements. Specie of interest included long-tailed duck, northern harrier, and night migrants. Work includes both desktop and field assessment. Project Manager

MA Clean Energy Center (2009-2010) – Avian Impact Assessment for Madaket Wind. Desktop analysis of biological and permitting issues associated with a proposed wind development in Nantucket, MA. Project Manager and Avian Biologist.

First Wind (2009-2010) – Brimfield Wind. Avian and acoustic bat surveys to support environmental permitting for a proposed 20 MW project in southwestern MA. Avian surveys include raptor surveys and breeding bird surveys. Project Manager and Avian Biologist.

Federal Highway Administration (2009-2011) – Analysis of Methods to Identify Deer-Vehicle Collision Hotspots. Qualitative and quantitative methods to identify DVC hotspots will be compared based on data needs, ease of implementation, expertise required, and relevancy to solving safety and ecological issues. Project responsibilities include review of methods through literature review and interviews with DOT staff, creating and implementing comparison protocols, staff management and report writing. Project Manager.

Confidential (2007-Present) - Maine Wind Energy Developer. Wildlife surveys to support environmental permitting for a proposed 50 MW project in western Maine. Permit currently in preparation include a Site Location of Development Act permit, a Natural Resources Protection Act permit, and likely a Corps Section 404 individual permit. Task Manager.

Federal Highway Administration (2008-2010) – Mitigation Wetland Functional Assessment. Wetlands constructed to mitigate for highway project-related impacts were surveyed and compared, and levels of invasive cover and wildlife functions were compared to natural wetlands. Project responsibilities included identifying and selecting study sites, conducting surveys, semi-quantitative analysis, report writing, and managing staff. Project Manager.

Florida Power and Light (2008-2010) - Seabrook Nuclear Facility Relicensing. Review and summarize all terrestrial ecology issues associates with facility construction and operations with a focus on threatened and endangered species, and impact assessment; results presented in an Environmental Report to support relicensing. Task Manager.

The Mount Washington Resort (2007-2008) – Dartmouth Brook Habitat Assessment. Provided expert opinion regarding the suitability of the resort's property for Canada lynx and American marten. Tasks included field assessment of the property, review of current literature, producing a written report detailing analysis approach and findings, and ongoing consultation with regulating agencies. Senior Wildlife Ecologist.

U.S. Navy (2008) - Casco Bay Fuel Line Removal. Wildlife studies to support Corps 404 and Maine NRPA permitting in Brunswick and Harpswell, ME. Conducted habitat survey of project area, wildlife habitat mapping, field review and impact assessment, with a focus of identifying suitable habitat for and presence of species listed by the State of Maine and /or USFWS. Compiled results in a report to support all local and federal permitting efforts. Senior Wildlife Ecologist.

Mount Snow Resort (2008) – Review all threatened and endangered species issues associated with a snow making upgrade; analyze impacts and summarize results in a Forest Service Biological Assessment and a NEPA Environmental Assessment. Senior Wildlife Ecologist.

Waste Management (2008) – Crossroads Landfill Deer Wintering Habitat Assessment. Survey of deer wintering areas associated with the Crossroads landfill to determine value of habitat. Compile results in letter report suitable for reference in future expansion planning and permitting. Senior Wildlife Ecologist.

Noble (2007) – Granite Reliable Wind Breeding Bird Surveys. Oversaw design and implementation of breeding bird surveys at project area. Managed staff and conducted quality assurance tasks for field activities and report writing. Managing Principal.

New Hampshire Audubon (2005-2007) – NH Route 2 Wildlife Crossing Investigation. Designed, implement and managed a tracking study to indentify the locations where wildlife crossed the highway, and to determine the characteristics of preferred crossing locations. Tasks included extensive quantitative and qualitative analysis of GIS based data sets. Principle Investigator and Project Manager.

EXHIBIT TWO

Sources Reviewed

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