The Ocean Sanctuaries Act (Holtec)

Shannon Bays [redacted]
Mon 8/28/2023 8:07 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

The Ocean Sanctuaries Act prohibits the 'dumping or discharge of commercial, municipal, domestic or industrial wastes' into ocean sanctuaries. The process water that Holtec proposes to discharge qualifies as industrial wastewater, and therefore, the proposed discharge is prohibited.

Please deny permit.

Cathy Coniaris

Massachusetts Department of Environmental Protection

100 Cambridge Street

Boston, MA 02114

massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station

Dear Ms. Coniaris:

I am writing to support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act. The proposed discharge is therefore illegal.

Holtec's proposed discharge is illegal. The Department's final determination should deny its application.

Thank you,

Brian T. Burba

[redacted]

Mailing address: [redacted]

Pilgrim Nuclear Power Station

Jeff Schwartz [redacted]
Mon 8/28/2023 9:38 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Good Morning:

Thank you for denying Holtec a permit to dump radioactive waste into Cape Cod Bay. Please hold firm against any attempts by Holtec to dump nuclear waste into our bay.

Thank you,

Jeff Schwartz
[redacted]

--

"So let us pick up the stones over which we stumble, friends, and build altars" - Padraig O Tuama

Pilgrim Nuclear Power Station

[redacted]

Mon 8/28/2023 9:54 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Massachusetts Department of Environmental Protection.
1 Winter St Boston, MA 02108

Anatol Zukerman
[redacted]

Memorandum

RE: Discharge of radioactive water from Pilgrim Nuclear Station

August 28, 2023

Dear Department of Environmental Protection,

Thank you for tentatively rejecting the application of Holtec Corporation to discharge radioactive water into Plymouth Bay. And thank you for listening the people of Massachusetts and beyond.

I will not repeat the long list of harmful chemicals that Holtec wants to dump in Plymouth Bay. Many engineers and scientists is studied and researched it many times during many years. Holtec is notorious for polluting this nation's water and soil for the sake of profit. It is time to stop it.

I am a member of South Shore Citizens Climate Lobby, a national and international organization that lobbies elected officials to save natural environment. We work hard to reduce carbon emissions in this country and the world. We promote clean sources of energy, fight deforestation, wasteful use of land and the growing flood and fire hazards.

But if our air, water and soil are poisoned, we toil in vain. No matter how many solar panels we put on our roofs, if our air, water and soil are poisoned, we toil in vain. Holtec Corporation makes millions by decommissioning nuclear stations around this country, but always looks for cheating coastal communities of their health, wealth and safety.

I was happy to learn of your tentative rejection of the Holtec application and hope that you will make it final.

Anatol Zukerman

Cathy Coniaris
Massachusetts Department of Environmental Protection 100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station

Dear Ms. Coniaris:

As a lifelong resident and boater of Duxbury and Plymouth Bays, I am writing to support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act. The proposed discharge is therefore illegal.

Holtec's proposed discharge is illegal. The Department's final determination should deny its application.

Thank you

Glen Cousins
[redacted]

Pilgrim Nuclear Power Station

Irene Paine [redacted]

Mon 8/28/2023 10:25 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Hello member of the DEP, and thank you for your service.
As we all know, it is we rate payers who have lived here for decades that paid into the decommissioning fund. There is plenty of money in that fund for Holtec to do the right thing, the hard thing, and remove those radioactive waters from the shores of Cape Cod Bay in a responsible manner.

They don't want to because it will eat into the profit they want to make. They want to spend as little money as possible doing the right thing, and keep the rest for themselves. This should not even be a profit undertaking, but it is. If they do not do it right, the taxpayers will be paying for a long time to address the damages.

Cape Cod Bay is already under extreme pressure with lack of oxygen, higher than normal temps, tons of fishing gear, and runoff from our roads. Please let's keep any further injections of tritium, etc, out of the bay. We have had enough, the whales have had enough, the shellfishermen have had enough, the fish have had enough. Please just continue to do the right thing.

Irene Paine, 13th generation Cape Codder
[redacted]

Pilgrim Nuclear Power Station

Linda Creed [redacted]
Mon 8/28/2023 10:59 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

To the Massachusetts Department of Environmental Protection:

Please ***DENY*** Holtec's request for a modified Surface Water Discharge Permit which would allow Holtec to illegally dump over a million gallons of Pilgrim's radiological and chemical industrial wastewater into Cape Cod Bay.

Cape Cod Bay is a precious natural resource that should be protected for current and future generations of aquatic life in the bay, as well as for current and future generations of humans who enjoy the beauty and environment of the bay.

I strongly oppose Holtec's request and applaud the MassDEP for their stand to uphold state laws that protect our Ocean Sanctuaries.

Best regards,
Linda Creed
Plymouth resident

Support for Holtec permit denial

Biz Turnell [redacted]
Mon 8/28/2023 11:33 AM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,

As a resident of Cape Cod, I strongly agree with the Massachusetts Department of Environmental Protection's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law.

I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you,
Biz Turnell
[redacted]

Please do not allow Holtec to ruin Plymouth Bay!

Pamela Russell [redacted]
Mon 8/28/2023 11:44 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

How dare this bill even be considered! How would it ever be okay to destroy our natural resources? Destroy the earth? This option is not an option!

Sent from my iPhone

Radioactive water

Harry Shamir -[redacted]

Mon 8/28/2023 11:53 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Regarding decomissioned atomic power plant in Plymouth, MA:

Water contaminated by Tritium should be stored for 24 years at least before release.

H Shamir

[redacted]

Pilgrim Nuclear Power Station

KRISTI HAINES [redacted]
Mon 8/28/2023 11:55 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114

massdep.npdes@mass.gov

Subject: Pilgrim Nuclear Power Station

Dear Ms. Coniaris:

I am writing to support DEP's tentative decision to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

DEP's tentative determination that requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries.

DEP should also deny Holtec's requested permit for at least two other reasons.

The first is that the Massachusetts Endangered Species Act prohibits altering the habitat of any endangered or threatened species, including the right whale, roseate tern, least tern, and loggerhead turtle that live in and along the shores of Cape Cod Bay. Massachusetts state regulations are explicit: the discharge of waste, wastewater, toxic or hazardous materials shall always be considered alterations of habitat.

The second is the antidegradation provisions of DEP's own regulations.

One prohibits Holtec's discharge unless the discharge would be insignificant and Holtec demonstrates "that the discharge is necessary to accommodate important economic or social development in the [Cape Cod Bay] area." The discharge of 1.1 million gallons of radioactive and chemically contaminated water that, harms the economy, ecology, recreational/ascetic interests is not "insignificant." Holtec's planned discharge is not necessary – for any reason. Holtec has other options. Increasing Holtec's profit is not an important economic or social development.

The other regulation requires DEP to determine that the discharge is "for the express purpose and intent of maintaining or enhancing" Cape Cod Bay; something Holtec's planned discharge plainly will not do.

PLEASE do not allow Holtec to poison our waters and endanger our wildlife.

DEP's final determination should deny Holtec's application for all of these reasons.

Sincerely,

Kristi Haines Young
[redacted]

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station

Dear Ms. Coniaris:

I am writing to support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act. The proposed discharge is therefore illegal.

Holtec's proposed discharge is illegal. The Department's final determination should deny its application.

Thank you,

GREG GOMER

[redacted]

Stop the dumping of industrial waste into Cape Cod Bay

AJ Mur [redacted]

Mon 8/28/2023 12:07 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

To whom it may concern,

Please uphold the DEP's draft determination that Holtec's proposed discharge is illegal.
The discharged water would contain radioactive material affecting marine life and beyond.

Please help preserve one of Massachusetts most beautiful assets, Cape Cod.

Thank you,

Amy Murrett
[redacted]

Pilgrim Nuclear Power Station

Lena Finch [redacted]
Mon 8/28/2023 12:12 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114

Dear Ms. Coniaris:

I am writing to **support the tentative determination** by the Massachusetts Department of Environmental Protection (MassDEP) to **deny Holtec's application** for a modified Surface Water Discharge Permit that would allow Holtec to discharge radioactive and chemically contaminated industrial wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act.

The MassDEP final determination must be to deny Holtec's application. Thank you for enforcing the law to protect our ocean sanctuaries.

Sincerely,

Lena Finch
[redacted]

Pilgrim Nuclear Power Station

Lori K [redacted]
Mon 8/28/2023 12:42 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Subject: Pilgrim Nuclear Power Station

Dear Ms. Coniaris:

I am writing to **support the tentative determination** by the Massachusetts Department of Environmental Protection (MassDEP) to **deny Holtec's application** for a modified Surface Water Discharge Permit that would allow Holtec to discharge radioactive and chemically contaminated industrial wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act.

The MassDEP final determination must be to deny Holtec's application. Thank you for enforcing the law to protect our ocean sanctuaries.

Sincerely,

Lori Keras
[redacted]

Pilgrim Nuclear Power Station - DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

[redacted]

Mon 8/28/2023 12:51 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Ms. Cathy Coniaris
Massachusetts Department of Environmental Protection 100 Cambridge Street Boston, MA 02114
massdep.npdes@mass.gov Re: Pilgrim Nuclear Power Station – DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit Dear Ms. Coniaris: I am writing to support the tentative decision by the Massachusetts Dept of Environmental Protection (MassDEP) to **DENY** Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay. MassDEP's tentative determination that requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries." The proposed discharge is therefore illegal ! Because the proposed discharge is illegal, the Department's final determination should deny Holtec's application.

Holtec's action is irresponsible and detrimental to human, animal, plant life and to fisheries for this and future generations.
Thank you,

Elaine Chang
[redacted]

From: David Bunker [redacted]
Sent: Sunday, August 27, 2023 6:35 PM
To: ESF Hotline (DEP) <esf.hotline@mass.gov>
Subject: Apparent release of contaminated water - Plymouth Nuclear Power Plant

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mailsystem. Do not click on links or open attachments unless you recognize the sender and know thecontent is safe.

August 27, 2023

Dear Ms. Bonnie Heiple, **Commissioner**

I am writing to support the tentative decision by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's (Plymouth Nuclear Power Plant) application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay. MassDEP's tentative determination that requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge of commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries." The proposed discharge is therefore illegal. Because the proposed discharge is illegal, the Department's final determination should deny Holtec's application.

I further request that MassDEP investigate Holtec's apparent 'forced evaporation' of radioactive and chemically contaminated wastewater into our environment.

Thank you,

David T. Bunker, Esquire
[redacted]

Sent from Mail for Windows

Pilgrim Nuclear Power Station

DEBORAH FIORENZA [redacted]

Mon 8/28/2023 1:30 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Re: Pilgrim Nuclear Power Station - DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit.

Dear Ms. Coniaris,

I am writing to support DEP's tentative decision to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

DEP's tentative determination that requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary.. Cape Cod, Plymouth, Kingston and Duxbury bays are all protected ocean sanctuaries.

DEP should also deny Holtec's requested permit for at least two other reasons.

The first is that the Massachusetts Endangered Species Act prohibits altering the habitat of any endangered or threatened species, including the right whale, roseate tern, least tern, and loggerhead turtle that live in and along the shores of Cape Cod Bay. Massachusetts state regulations are explicit : the discharge of waste, wastewater, toxic or hazardous materials shall be considered alterations of habitat.

The second is the antidegradation provision of DEP"s own regulation.

One prohibits Holtec's discharge unless the discharge would be insignificant and Holtec demonstrates "that the discharge is necessary to accommodate important economic or social development in the (Cape Cod Bay) area." The discharge of 1.1 million gallons of radioactive and chemically contaminated water that, harms the economy, ecology, recreational/ascetic interests is not "insignificant." Holtec's planned discharge is not necessary -- for any reason. Holtec has other options. Increasing Holtec's profit is not an important economic or social development.

The other regulation requires DEP to determine that the discharge is "for the express purpose and intent of maintaining or enhancing " Cape Cod Bay; something Holtec;s planned discharge plainly will not do.

DEP's final determination should deny Holtec;s application for all of these reasons.

Sincerly,

Mr. and Mrs. James Tyler

Pilgrim Nuclear Power Station-DEP's Tentative Determination to Deny Holtecs Application for a modified Permit

William Lannon [redacted]
Mon 8/28/2023 1:35 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Cathy Coniaris,
Being a former resident of Duxbury, and having friends in the oyster industry. I support the tentative decision to DENY, Holtec's application to modified Surface Water Discharge Permit that would allow the discharge of radioactive and chemically contaminated waste water into Cape Cod Bay.

This would be in violation of the Massachusetts Ocean Sanctuaries Act, that protects the Cape Cod, Plymouth, Duxbury, and Kingston bays. With all that is going on with major climate change, illegally discharging contaminated waste water makes no sense at all!

Thank you,

Bill Lannon
Former Duxbury resident

Sent from my iPad

Pilgrim Nuclear Power Station

Nils Shapiro [redacted]
Mon 8/28/2023 2:00 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Ms. Cathy Coniaris: My neighbors, family and I are outraged at the request by Holtec to discharge toxic nuclear waste into Cape Cod Bay and respectfully request that such request be vehemently denied, now and forever, both for the sake of the population of humans who reside in this area and for the innocent wildlife who would suffer from such an intolerable action!
Nils and Linda Shapiro
[redacted]

I endorse the DEP prohibition of the discharge of water from Pilgrim Nuclear Plant into Cape Cod Bay or other waters

HELENI THAYRE [redacted]

Mon 8/28/2023 2:05 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

Cc:HELENI THAYRE [redacted]

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cape Cod is precious to many Mass residents and a compelling tourist destination for visitors from many other states, as well as other countries. Please protect this incredibly special place. Do NOT allow the release of contaminated water into Cape Cod Bay!!

The economy of Cape Cod has thrived for well over a century thanks to this tourism (the rest of the year it is a quieter place.) I know because my mother bought a beach cottage on Cape Cod from her grandfather around the year that I was born and I went there for a part of almost every summer throughout my life. I've seen photos of me on the deck as a baby and I will be eighty in just a few months. I've seen photos of my mother and her brother there in their teens before she bought it, also. The cottage is tiny, having survived, diminished in size by the Hurricane of 1938, but the land and water around it are breathtakingly beautiful and the protected marshland behind it is full of crabs and clams and other edible wildlife. I never tired of walking down the beach to where it turned a corner to curve back into marshland. We must be very careful not to harm this irreplaceable, magical place and not to impair the use of it by families, homeowners, and tourists alike, and for commercial fishing. That would be a sad and highly unacceptable risk to to take with this unique and beautiful area of our state and our country.

Up until 2013, when we needed to sell it after our mother died to settle her estate, our family went to her beach cottage for a part of every summer. I loved it so. I miss it greatly. It is painful not to be able to go there any longer.

I am forever grateful for the many years I was able to enjoy it as a toddler, child, young adult and more briefly in the years thereafter. And for our great aunt who ran a bed and breakfast in town, for the whaling captain we were descended from who was my great aunt's father, for the cousins we visited in the summer who lived nearby, and for my great-grandfather who sold the cottage to my mother. Above all I am grateful to my mother for having the vision as a twenty-five year old to buy it from him for her brand new family and who maintained and cared for it until we were old enough to help her with it.

Now it is your turn. You must protect all the Cape Cod seashores and their continuous marshlands as your very title indicates you will.

We are counting on you. We depend upon you. Please do not waver.

Thank you for doing this.

Heleni Thayre
Brookline, MA. [redacted]

Re: Pilgrim Nuclear Power Station

[redacted]

Mon 8/28/2023 2:29 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Dear Ms. Coniaris:

I am writing to support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act. The proposed discharge is therefore illegal.

Holtec's proposed discharge is illegal. The Department's final determination should deny its application.

Thank you,

Jane Speranzini

[redacted]

Dumping from Pilgrim

RICHARD LEACH [redacted]

Mon 8/28/2023 2:47 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Please do not allow dumping of water from Pilgrim plant into the bay.

Thank you.

Richard Leach, Scituate, MA

Support to deny Holtec International's permit application

Stephen Mealy [redacted]
Mon 8/28/2023 3:41 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,

I strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay.

DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law.

I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.
Thank you,

Sincerely,

Stephen F. Mealy
Sagamor Beach, Bourne MA

Denial of permit to discharge water from Pilgrim Nuclear Power Plant into Cape Cod Bay

johnsullivan [redacted]
Mon 8/28/2023 4:27 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

I am writing in favor of denying any permit that would allow the Pilgrim Nuclear Power Plant to discharge any nuclear contaminated water, including tritiated water from the containment pools, into Cape Cod Bay.

I also ask that the State of Massachusetts thoroughly investigate recent whistleblower accusations that Holtec has imported evaporators to decrease the volume of contaminated water by evaporating it and releasing it through the usual evaporation system. This would effectively bypass direct release into the Bay, but increase the danger to those around the plant and would ultimately contaminate the Bay also.

This is a cynical move by a company that has knowingly associated with other corporations with a history of corruption and if allowed to happen will be used by the company in every other location that they are facing opposition to their plans to simply dump radiation into the community.

Respectfully,
John Sullivan
Indian Point Safe Energy Coalition
Peekskill, New York

Sent from Mail for Windows

discharge of waste into Cape Cod Bay

Virginia Hayssen [redacted]
Mon 8/28/2023 4:15 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

I fully support the state Department of Environmental Protection (DEP) draft decision to deny Holtec-Pilgrim's permit application to discharge radioactive and chemically contaminated water into Cape Cod Bay. This tentative denial is correctly based on the DEP legal determination that discharge by industrial sites such as Pilgrim is definitely prohibited by the state Ocean Sanctuaries Act. Holtec must comply with state laws. I urge you to fully deny the permit to uphold state regulations so our Ocean Sanctuaries in Plymouth, Duxbury, Kingston, and Cape Cod Bay remain protected.

Thank you,

Virginia Hayssen

--
****
Dr. Virginia Hayssen, PhD
Mary Maples Dunn Professor, Biological Sciences
[redacted]

Confidence is a habit, not a trait.
Pronouns: she/they series

Pilgrim Nuclear Power Station - DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

Patricia Arrington [redacted]
Mon 8/28/2023 4:45 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114

Dear Ms. Coniaris:

I fully support the state Department of Environmental Protection (DEP) draft decision to deny Holtec-Pilgrim's permit application to discharge radioactive and chemically contaminated water into Cape Cod Bay. This tentative denial is correctly based on the DEP legal determination that discharge by industrial sites such as Pilgrim is definitely prohibited by the state Ocean Sanctuaries Act. Holtec must comply with state laws. I urge you to fully deny the permit to uphold state regulations so our Ocean Sanctuaries in Plymouth, Duxbury, Kingston, and Cape Cod Bay remain protected.

Sincerely,
Patricia Arrington
[redacted]

Pilgrim

Mary Tousignant [redacted]
Mon 8/28/2023 7:17 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station

Dear Ms. Coniaris:

I am writing to support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act. The proposed discharge is therefore illegal.

With Holtec working on releasing discharge from Indian Point into the Hudson, they are creating environmental issue that can impact us in ways we have no way of knowing. With Japan releasing discharge, we should wait several years to realize impact.
Holtec's proposed discharge is illegal. The Department's final determination should be dismissed.

Have a great day.
Mary Tousignant
[redacted]

nuclear dumping in the ocean and evaporating the nuclear waste

Marion Kuras [redacted]

Mon 8/28/2023 7:33 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

please please stop this from happening with holtec in plymouth please don't let this happen to let the company dump radioactive waste in the ocean or evaporate the waste in the air A whistle blower says the evaporation is happening already!

Sent from my iPhone

Radioactive dumping

Jonathan Fallow [redacted]
Mon 8/28/2023 7:36 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Please do not allow the dumping of radioactive water from the Pilgrim nuclear power plant into Massachusetts Bay. The bay is much too important to our physical and mental well being to take any chances with. It's just an easy way for the company doing the decommissioning of the plant to get the water off of the site, while risking the health of an important ecosystem. It's incredible that this would even be considered.

Sincerely,
Jonathan Fallow
[redacted]

Sent from my iPhone

Vote to Deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station

Kelly Bennett [redacted]

Mon 8/28/2023 7:42 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,

As a citizen of Cape Cod, I have grave reservations regarding discharging radioactive water into our ocean. I strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law. I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you,

Kelly Bennett

[redacted]

HOLTEC ACTIVITIES AT THE PILGRIM POWER PLANT

Jim Mohan [redacted]

Mon 8/28/2023 8:08 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

Cc:Mary Mohan [redacted]

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

It was very disturbing to learn that HOLTEC might consider paying the related fines and nevertheless proceeding with the discharge of radioactive wastewater into Cape Cod Bay would be to their financial advantage. It should be clear to all that any such action would result in irreparable harm to our fragile environment.

HOLTEC must be prohibited from taking any further action without the unanimous consent of such stakeholders as the EPA, the NRC, the state of Massachusetts and the Massachusetts Attorney General's office. Concerned residents of Cape Cod are also stakeholders, and we clearly do NOT grant our consent.

KUDOS to APCC for their dedication and unwavering commitment to preserve our environment. APCC must continue their efforts to prevent HOLTEC from contaminating Cape Cod Bay with their harmful industrial pollutants.

Jim Mohan
Osterville, MA

Pilgrim Nuclear Power Station - DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

Keith Lewison [redacted]
Mon 8/28/2023 8:13 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station

Dear Ms. Coniaris:

I am writing to support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act. The proposed discharge is therefore illegal.

Holtec's proposed discharge is illegal. The Department's final determination should deny its application.

Furthermore, I am deeply concerned by recent news reports (e.g., "Whistleblower: Holtec Now Evaporating Nuclear Wastes," The Sandwich Enterprise, 8/25/2023) that Holtec is currently evaporating the nuclear waste water in order to circumvent the state's denial of a permit to discharge the waste into Cape Cod Bay. This action, too, must be stopped to protect the health and safety of Massachusetts residents and our local environment.

Thank you,
Keith Lewison
[redacted]

Holtec's plan to dump water into Plymouth Bay

Bonnie Peel [redacted]
Mon 8/28/2023 11:31 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear EPA,

Thank you for tentatively rejecting the application of Holtec Corporation to discharge radioactive water into Plymouth Bay. And thank you for listening to the people of Massachusetts and beyond.

I know you have done your job and understand how harmful such dumping could be, not only to Plymouth and Cape Cod Bays, but to the wider Atlantic as the currents carry the water out of the bay.

Holtec is looking for a solution that will benefit them by being cheap and easy, not one that will protect the environment.

I belong to Sustainable Plymouth, an organization that cares about the environment of our community and looks for ways to reduce pollution and mitigate climate change. Dumping radioactive waste into the water will only add pollution to an increasingly fragile ocean environment.

.

I am glad you have tentatively rejected the Holtec application and hope that you will make the rejection final.

Thank you for your attention.

Barbara Peel
[redacted]

Pilgrim Nuclear Power Station

Paul Titcomb [redacted]
Tue 8/29/2023 8:11 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

To: Public Comments
Massachusetts Department of Environmental Protection

I wish to voice my support for the discharge of filtered wastewater from the Pilgrim Nuclear Power Station in Plymouth into the waters of Cape Cod Bay.

I've never written about, or voiced support for, "the discharge of filtered wastewater" before, and I don't suppose it is a cause that garners much advocacy. But opposition to this plan seems reflexive and, judging from opinions that I've read in the press, unreasoned, uninformed, and ungrounded, so I'm moved to speak in favor of something that seems completely reasonable and sensible to me.

Compared to myriad sanctioned streams of effluent into the environment in Massachusetts, from highway stormwater runoff to diesel emissions to pesticide applications and fertilizer use, the dispersal of tritium from Pilgrim would be trivial. Naturally occurring background levels of tritium tell us that clearly. Why should we accept the principle of dilution in the release of all those other effluents, but not in the case of nature's most benign radioisotope, tritium?

Common sense, established science, and known facts make me extremely comfortable with the proposed discharges from Pilgrim. And the needless environmental costs of the alternatives to the wastewater discharge (particularly transportation and storage off-site), convince me it is the right step.

Thank you for hearing my opinion.

Paul Titcomb

[redacted]

DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit for Pilgrim Nuclear Power Station

Michelle Hatfield [redacted]
Tue 8/29/2023 9:51 AM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

August 29, 2023

Re: Pilgrim Nuclear Power Station and the Ocean Sanctuaries Act

Dear Ms. Coniaris:
I am writing to support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

Our beautiful and **productive** waters are protected under the Massachusetts Ocean Sanctuaries Act. MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. The act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act. The proposed discharge is therefore illegal.

Holtec's proposed discharge is illegal. The Department's final determination should deny its application in compliance with the laws of our Commonwealth.

Thank you,
Michelle MK Hatfield
[redacted]

Pilgrim Nuclear Power Station

[redacted]

Tue 8/29/2023 10:30 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

I VEHEMENTLY oppose Holtec discharging radioactive water into Cape Cod Bay.

Kathleen M. Folding

HOLTEC

Karen Whalley [redacted]

Tue 8/29/2023 11:07 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Hello Commisioner.

Please enforce the Ocean Sanctuaries Act and maintain their original denial of Holtec's plan to discharge wastewater into Cape Cod Bay. I have seen what has already become of this water compared to the Buzzards Bay where the Coalition is working to protect the waters from the point of no return. It is possible to stop a coorporation and stand up against what is wrong.

Thank you, Karen

Mary Lampert, Pilgrim Watch
[redacted]

August 29, 2023

Cathy Coniaris
Mass DEP
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station

Dear Ms. Coniaris:

I am the Executive Director of Pilgrim Watch and am submitting these comments on behalf of Pilgrim Watch.

Since I founded Pilgrim Watch thirty years ago, I have lived in Duxbury, six miles across the bay from Pilgrim Station, and have worked full-time on public interest issues regarding Pilgrim Station.

In addition to being the director of Pilgrim Watch, I am a member of the Massachusetts Nuclear Decommissioning Citizens Advisory Panel appointed by the Senate President; I have directed the town-appointed Duxbury Nuclear Advisory Committee since 1990, am a member of the executive committee of Save Our Bay MA a coalition focused on disposal of Pilgrim's wastewater and serve on state-wide environmental boards.

I represented Pilgrim Watch in Pilgrim's 2019 License Transfer Application proceeding, in the 2006-2012 adjudication process regarding Entergy's License Renewal Application for Pilgrim, in litigation regarding NRC's Post Fukushima Orders.

I also have served on a number of NRC panels and was a panelist on DOE's Consent Based Siting effort for the long-term management of our nations spent nuclear fuel and high-level radioactive waste and the President's Blue- Ribbon Commission on America's Nuclear Future focused on spent fuel storage.

Summary

DEP correctly found that Holtec's request to modify its permit violates the Ocean Sanctuary Law. The legislature recognized back in 1972 that Cape Cod Bay's economic, ecological, recreational/ascetic values needed high level protection.

For those same reasons (economic, ecological, recreational, and ascetic harm from discharging), Holtec's modification request must be denied. In addition to the Ocean Sanctuary Act, Holtec's desired discharge would violate (among others) the Massachusetts Endangered Species Act (MGL.ch 131A), the National Sanctuary Act that protects Stellwagen Bank, six miles off the coast of Provincetown), Massachusetts Crimes Against Public Health (MGL ch 270) that makes it a crime to deposit or discharge "waste or other material of any kind on a public highway or within 20 yards of a public highway, or on any other public land, or in or upon coastal or inland waters … or on property of another," the

Massachusetts Oil and Hazardous Material Release Prevention Act (ch 21E), and the states anti-degradation requirements (314 CMR 404). All laws that DEP should include in its final denial in order to be able to use them in court if Holtec files an appeal. Multiple arrows in the quiver are better than one.

Do not forget that, in its June 2020 in the Settlement Agreement (at III, 10, l), Holtec *agreed to comply with state laws and regulations*; and at paragraph 48 in the settlement it says, " *No Party to this Agreement (or any person or entity affiliated or related to a Party to this Agreement) shall assert that any provision of this Agreement (or the Agreement itself) is invalid under any federal law or any provision of the U.S. Constitution."* In other words, they agreed there would be no claim to preemption. These laws and regulations, and the reasons they prohibit Holtec's desired dumping, are discussed briefly below and in more detail in James Lampert's Comments in Support of DEP's Tentative Determination.

The reasons that Holtec's application should be denied include the following, many of which contradict what Holtec has said and what it likely will argue.

1. **Authority** (See page 3 below)

   Contrary to Holtec's repeated statements, NRC does not have authority over all things nuclear. Governor Healy has been clear: "The state has the authority to stop the discharge based on a settlement agreement with Holtec combined with state and federal law," and "I will do everything possible to hold Holtec responsible and ensure public health and safety throughout the decommissioning process."

   Holtec's agreement to comply with state laws is valid and enforceable. No federal law or NRC regulation requires dumping Pilgrim's waste into the bay. There is no "irreconcilable" conflict between what Holtec agreed to do when it signed the Settlement Agreement and any federal law or regulations.

2. **Holtec's Does Not Need to Dump into Cape Cod Bay** (See page 4 below)

   Holtec has at least three other NRC approved options to dispose of Pilgrim's radioactive and chemically contaminated wastewater - shipping to a licensed out-of-state facility, evaporation, or storage onsite. All are viable. If they were not, Holtec would not have repeatedly said that it might use them all. Preferring dumping, as it provides a small decrease in Holtec's profit, is no excuse.

3. **The Discharge will not be harmless, contrary to Holtec's statements.** (See page 5 below)

There is no completely safe level of radioactivity. Holtec's modification application admits that, even after filtration/treatment, Pilgrim's wastewater will contain both chemical and radioactive materials. They admit that Tritium cannot be filtered, period.

4. **Discharged wastewater will impact a large area.** (See page 6 below)

Any Pilgrim wastewater discharged into Cape Cod Bay will flow along the Bay's eastern, southern, and western shores, into at least three designed ORW's and four ACEC's. Contaminants will sink to the bottom and affect marine life. The discharged water will also flow north into the Stellwagen Bank National Marine Sanctuary.

Contrary to Holtec, wastewater discharged into Cape Cod Bay will not flush out quickly into the Atlantic Ocean. A large area will be impacted. Contaminated water will hug the shoreline, and the contaminants sink to the bottom and affect marine life, much of which will become human food.

5. **The Outstanding Values of Cape Cod Bay and the Blue Economy will be severely damaged.** (See 7 below)

Cape Cod Bay has outstanding socioeconomic value. The annual value of Cape Cod's Blue Economy, i.e., the economy that depends on Cape Cod Bay, is several billion dollars. This economy depends on the water in Cape Cod Bay being clean, and equally importantly on the public thinking it is.

6. **Holtec and finances, not the 2020 Permit's prohibitions, is the reason for any decommissioning delay.** (See page 23 below)

The reason the 2020 Permits did not analyze discharging spent fuel pool or decommissioning water is that *Pilgrim never asked they be included in the permit*.

After the 2020 Permits were issued, Holtec waited more than three years to request a modification.

Holtec decided to extend the estimated decommissioning completion date four years *at least two months before* DEP issued the Tentative Determination. Holtec discussed the delay at the state's Nuclear Decommissioning Citizens Advisory Panel (NDCAP) meeting, May 22, 2023. The reason for doing so was, again, money; the value of the decommissioning fund dropped $300 million dollars in 2022. This drop resulted in a four-year delay in reactor vessel segmentation and reactor building demolition.

It is also important that EPA cannot issue Holtec's requested permit unless DEP certifies that the modified EPA permit complies with state laws. For that reason, Pilgrim Watch asks that DEP not only deny Holtec's application but that it also informs EPA that the state will not certify any EPA permit allowing Holtec's proposed discharge.

I. Massachusetts has the Authority to Deny Holtec's Application

The Governor and the Office of the Attorney General have made their positions very clear. Over a year ago, Governor Healey said that the state has the authority to stop Holtec's desired discharge based on the settlement agreement, combined with state and federal law; "in whatever capacity I serve, that we're not going to have radioactive waste dumped down here."

The Office of the Attorney General said that it is "prepared to take action to halt any violations of state and federal water discharge permits." We expect that it still is.

Holtec wants people to forget that, in the Settlement Agreement (at III, 10, l), Holtec *agreed to comply with state laws and regulations*; and at paragraph 48 in the settlement it says, " *No Party to this Agreement (or any person or entity affiliated or related to a Party to this Agreement) shall assert that any provision of this Agreement (or the Agreement itself) is invalid under any federal law or any provision of the U.S. Constitution."* In other words, they agreed there would be no claim to preemption.

It also wants to forget that it has more than once told NDCAP, and likely others, that it "would not pursue discharge of water in violation of any state or federal requirement."

The question here is whether Holtec can avoid its agreement. It is *not* whether the NRC sets limits on radioactive discharges or whether Holtec could ignore state laws if it had not agreed to comply with them. The Settlement Agreement is a valid and enforceable contract.

The Supreme Court has decided four nuclear preemption cases. These decisions are clear: the NRC is not "the sole regulator of all matters nuclear" (*Virginia Uranium, Inc. v. Warren,* 587 U.S

A state law, and thus certainly an agreement to comply with state law, is enforceable unless "there is an irreconcilable conflict between the federal and state standards or whether the imposition of a state standard in a damages action would frustrate the objectives of the federal law" (*Silkwood v. Kerr-McGee Corp*., 464 U. S. 238, 256 (1984))

There is no irreconcilable conflict between any federal law or regulation and Holtec's agreement to comply with state law. No constitutional text , federal law, or NRC regulation requires Holtec to dump Pilgrim's waste in Cape Cod Bay." *Virginia Uranium, Inc. v. Warren,* 587 U.S ___ (2019: "A litigant must point specifically to 'a constitutional text or a federal statute' that … conflicts with state law.")

The Holtec executives who made the decision to sign the agreement obviously decided that it was in Holtec's best interests to agree to comply with Massachusetts laws and regulations so that the Commonwealth would drop its intervention opposing the sale from Entergy to Holtec, it could then buy Pilgrim, and hopefully make close to a billion dollars decommissioning profit.

Holtec must live with what it agreed.

II. Holtec Does Not Need to Dump Pilgrim's Waste into Cape Cod Bay.

Holtec has at least three other NRC approved options to dispose of Pilgrim's radioactive and chemically contaminated wastewater - shipping to a licensed out-of-state facility, evaporation, or storage onsite. All are viable. If they were not, Holtec would not have repeatedly said that it might use them all.

Shipping to a licensed out-of-state facility is the best, and most feasible. From 2029-2023, Holtec-Pilgrim has shipped for disposal 218,510 cubic feet of solid waste to WCS in Texas[1]; and the shipments will increase dramatically as decommissioning progresses. The 1.1 million gallons of contaminated wastewater Holtec wants to discharge into the bay amounts to 150,000 (CF). Vermont Yankee shipped 2 million gallons of wastewater to WCS in Texas so as not to contaminate the Connecticut River.

Environmental justice is not a viable excuse for Holtec opposing shipping wastewater to Texas. The US Census bureau shows Plymouth Country has more indigenous and citizens in poverty than Aberdeen County in Texas[2]; and the Massachusetts Environmental Justice Map show the numbers of poor and indigenous are larger around Pilgrim Station than the rest of the county.[3]

---

[1] https://www.mass.gov/doc/july-24-2023-holtec-presentation/download

[2] https://www.census.gov/quickfacts/andrewscountytexas pop estimate 2022 18, 334.

[3] https://mass-eoeea maps.arcgis.com/apps/webappviewer/index.html?id=1d6f63e7762a48e5930de84ed4849212
Updated Massachusetts 2020 Environmental Justice Populations Map: It shows specific pockets of environmental justice communities in the state such as in Plymouth and communities surrounding Cape Cod Bay. When identifying EJ Populations, the Act requires the consideration of the following demographic data for the residents of each U.S. Census block group in the Commonwealth: income level, English language

The supposed cost of shipment is not an excuse either. Dr. Singh's unsubstantiated $20 million dollar estimated cost of shipping is about 2% of Holtec's likely profit. Holtec had never told anyone what other disposal methods would cost, and neither Holtec nor any other Pilgrim owner ever contributed a cent to the Decommissioning Trust Fund that will pay the cost.

Storage onsite for some period of time may be another viable option. Holtec says if not allowed to discharge then it will store the water in the torus, located in the bottom of the reactor building close to Cape Cod Bay's shoreline. The question is for how long. Pilgrim cannot be decommissioned so long as the contaminated water remains on site. It might be possible to store the wastewater in casks or canisters in a new or expanded ISFSI, but that would require purchasing robust containers for the water, moving containers to high ground due to rising sea levels, and establishing a maintenance program for the storage containers going forward.

III. Discharged Radionuclides and Chemicals will not be Harmless.

Radionuclides: In its most recent Report on the Health Risks from Exposure to Low Levels of Ionizing Radiation,[4] the National Academy of Sciences concluded that:

> "Current scientific evidence is consistent with the hypothesis that there is a linear, no-threshold dose-response relationship between exposure to ionizing radiation and the development of cancer in humans."

In other words, there is no completely safe level of radioactivity. The risk that a person or marine organism will develop cancer or other radiation-linked disease increases linearly as the amount of radiation increases. The actual risk depends on age and sex. Also, contaminated water will evaporate into the atmosphere from the rapidly warming bay water and from beaches where the water came ashore, eventually returning to the groundwater and water supplies in the form of fog and rainfall.

Radiation works synergistically with other contaminants. Holtec admits that it will release both radiological and chemical contaminants. Recent research, discussed in the ecology Section VI below reviews some of that research showing radiation increases the impact of metals on marine organisms. A more substantial list of research is attached, Appendix. Therefore, although EPA does not consider radionuclides per se, in this context, EPA and DEP must look at the interaction of metals with radionuclides. In addition, radiological and chemical contaminants are already in Cape Cod Bay, although minimized by Pilgrim's licensees. Pilgrim's Annual Environmental Reports during operations are insufficient.

Also significant is that radionuclides have both short and very long half-lives-some millions of years. Therefore, once released they present a hazard in Cape Cod Bay for years to come.

Filtration: Contrary to Holtec, Holtec's filtration will not solve the danger or result in the discharge meeting state laws - zero pollutants. Pilgrim's reports to the NRC say that filters[5] only will remove 90-95% of the particles; 5-10% will

---

proficiency, self-identified race (i.e. "minority"), or race + municipal income level. 1 The EJ Maps illustrate these data as the U.S. Census reports it, at differing levels of granularity for each of these criteria. Generally, with a few anomalies, the maps display the following data for each block group in Massachusetts: median household income level, percentage of households with limited English proficiency, and percentage of individuals who self-identify as non-white (i.e., "minority")

[4] Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR **VII** Phase 2 (2006), Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation, Board on Radiation Effects Research, Division on Earth and life Studies, National Research Council of the National Academies, The National Academies Press, Washington DC, https://www.nap.edu/read/11340/chapter/1#xv

[5] David Noyes, Holtec, response by email to Mary Lampert's questions regarding filtration, June 6,2023. A copy is available upon request.

remain. Holtec's application for a modified permit admits that even after treatment Pilgrim's wastewater will contain both chemical and radioactive materials. Tritium, contrary to Holtec, that cannot be filtered is not harmless to marine and human life; neither are the other radionuclides that will be released despite filtering. The National Academies of Sciences conclusively concluded (BEIR VII) no amount of radiation is safe. Radiation interacts with chemicals and metals, each enhancing one another's mischief. See Appendix A.

According to Holtec, "The only radionuclide expected to remain in consistent concentrations above detection limits post-treatment would be tritium.[6] Mn-54, Co-60, Zn-65, Cs-137, and potentially other isotopes that have been reported in past Annual Radiological Environmental Operating Reports may exist at levels slightly above detection limits." Ken Buesseler, Senior Scientist WHOI, commented to Christine Legere, reporter for the Provincetown Independent, that, "This is not about "filtration," it is about removal of dissolved radioactive elements that pass through filters." You need to know, "what amount of 'dissolved' radioactive cesium, strontium, plutonium, etc. are removed. FYI for all of those 3 (and there are others), >90% is not removed by a 0.75 um filter. You would need some reactive material (clays, resin, charcoal) that takes the dissolved radionuclides out of water." David Noyes, Holtec, did not respond to a question asking what particles are expected to be in the water smaller than 0.75 microns.

Dilution: Holtec incorrectly implies that dilution with seawater is a solution to pollution. Dilution will decrease the concentration of the radionuclides and other pollutants that will enter the bay, making them harder to detect by monitors. But dilution does not remove any and will not reduce how much pollution the Bay receives.

Tritium: Tritium is worth a short discussion. Tritium (a beta particle) is a radioactive form of water that cannot be filtered. Contrary to Holtec, it is dangerous . It is incorporated into all parts of the body that contain water - most of our body's tissues. It has been shown in animal experiments that tritium causes genetic damage of all kinds, both chromosomal and non-chromosomal. Tritium ingested by a pregnant female passes through the umbilical cord to the embryo and the developing fetus in fact gets a larger radiation dose than the mother. Tritium has been shown to cause physical deformities and more subtle developmental abnormalities in embryos of experimental animals. It can be absorbed directly through the skin. Once inside the body it goes everywhere (all organs) and is known to be at least 2-3 times more biologically damaging (per unit of absorbed energy) than gamma radiation. Although this "discrepancy" has been known for decades, and is not disputed, NONE of the regulatory bodies take it into account. After careful study, the UK Committee Examining Radiation Risks of Internal Emitters (CERRIE) has concluded that the biological damage of tritium (per unit of absorbed energy) may be as much as 15 times greater than the damage from gamma radiation. [7]

IV. Discharged Wastewater Will Impact a Large Area

Cape Cod Bay is a Protected Ocean Sanctuary and must be protected by law, as the Legislature and DEP have recognized.

Cape Cod Bay and the areas surrounding it have outstanding socioeconomic, recreational, ecological, and aesthetic values. Any discharge of Pilgrim's contaminated wastewater into the bay will inevitably damage them.

---

[6] Holtec downplays the risk of tritium, likely because it cannot be filtered. Exposure occurs through ingestion, skin absorption, and inhalation. As radioactive water, tritium can cross the placenta, posing risk of birth defects and early pregnancy failures. Ingestion of tritiated water also increases cancer risk. It has a half-life of 12.3 years. Ten half-lives typically render it safe-123 years. Resources: **Exploring Tritium Dangers (https://ieer.org/wp/wp-content/uploads/2023/02/Exploring-Tritum-Dangers.pdf); The Hazards of Tritium (https://www.ianfairlie.org/news/the-hazards-of-tritium/)**

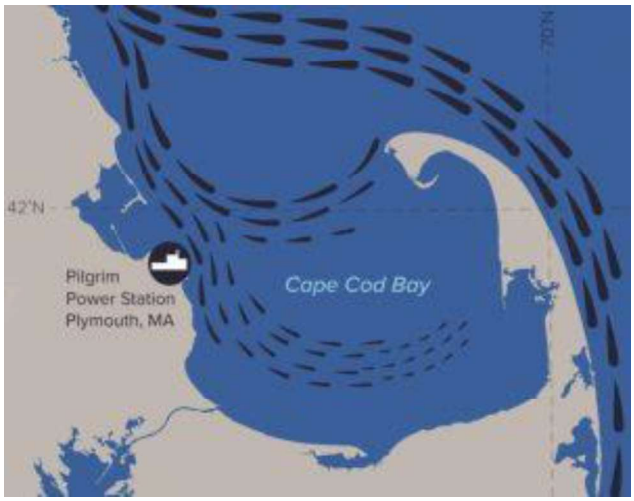
[7] www.ccnr.org/tritium_paper_CERRIE.pdf

As shown by studies on circulation within Cape Cod Bay and its embayments, the wastewater will flow into three already-designated ORWs – The western shore of the Cape Cod National Seashore, Wellfleet Harbor and Barnstable Habor. It will also flow into at least four already designated Areas of Critical Environmental Concern - the Wellfleet Harbor ACEC, the Sandy Neck Barrier Beach System ACEC, the Inner Cape Cod Bay ACEC , and the Ellisville Harbor ACEC.

It will also flow into the Stellwagen Bank National Marine Sanctuary.

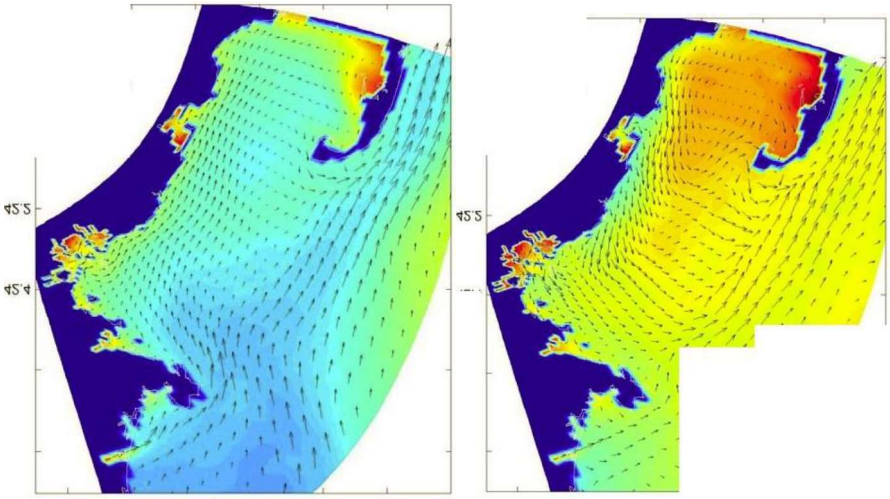
Circulation in Cape Cod Bay: Cape Cod Bay, a protected ocean sanctuary, is a large semi-enclosed embayment surrounded by approximately three hundred miles of shoreline that is open to the north and enclosed by the mainland to the west and Cape Cod to the south and east. This means that pollutants discharged into the bay are not quickly flushed out, it can take about a month for a full exchange of water to occur, allowing contaminants to sink to the bottom to the sediment, affecting the marine web of life. Irina Rypina, a physical oceanographer at the Woods Hole Oceanographic Institution (WHOI), is an expert in ocean currents. She has studied currents in Cape Cod Bay in depth.[8]

Irina Rypina's research also shows that water will flow past Provincetown to Stellwagen Bank designated by Congress in November 1992, as a National Marine Sanctuary. Regulations prohibit discharging or depositing, from beyond the boundary of the Sanctuary, material[9] or other matter that subsequently enters the Sanctuary and injures a Sanctuary resource or quality (15 CFR § 922.42(a)(1)(ii)).



[8] https://www.sciencedirect.com/science/article/pii/S0265931X22002302https:// ; https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4178379; provincetownindependent.org/top-stories/2022/11/02/new-study-concludes-pilgrim-plumes-would-hit-outer-cape/; Physical and Biological Oceanography of Massachusetts, Wendy Leo, Rocky Geyer, Mike Mickelson http://www mwra.state.ma.us/harbor/enquad/pdf/ms-085_04.pdf;

Seasonal variability, tides, and winds are all important players and can cause a reversal of the flow.



Spring 1999 Summer 1999 [9]

Twice daily tides and winds bring contaminants into Duxbury, Kingston, and Plymouth Bays, all semi-enclosed spaces and also protected ocean sanctuaries. Duxbury Bay, for example, has the largest aquaculture industry in the state. The economic harm spreads far in the state. Seafood processors, shippers, restaurants in other parts of the state will be negatively impacted if consumers will not buy this area's seafood.

Also, Cape Cod Bay has many Areas of Critical Environmental Concern, designated by the state due to their cultural and natural resources, into which Pilgrim's discharged wastewater will flow.

Listed ACEC locations, courtesy of Mass.gov

In addition, the state designated other areas on Cape Cod Bay as Outstanding Resource Waters that Pilgrim's wastewater

[9] [9] Physical and Biological Oceanography of Massachusetts, Wendy Leo, Rocky Geyer, Mike Mickelson http://www mwra.state.ma.us/harbor/enquad/pdf/ms-085_04.pdf

water discharge inevitably will flow. They include: the portion of Cape Cod Bay adjacent the western shore of the National Seashore;, Barnstable Harbor and Wellfleet Harbor.

V. Holtec's Discharge Will Severely Damage the Bay and Economy

Cape Cod Bay is a Protected Ocean Sanctuary and must be protected by law, as the Legislature and DEP recognized. In addition, other state and federal laws also would be violated by Holtec's modification request to discharge. Also, if DEP had subjected Holtec's modification request to an anti-degradation review, the request would be denied due to the bay's outstanding economic value.

Holtec's request to discharge 1.1 million gallons of radioactive and chemically contaminated wastewater will severely harm economic and social development in the area in which the waters are located due to the actual damage from contaminants and, as important, consumer perception that the water and marine life are toxic. The Cape Cod Bay coastline is three hundred miles.

The Blue Economy:

Former Governor Baker appreciated the economic importance of Massachusetts' marine economy and appointed his Lt. Governor, Karen Polito, to direct the Blue Economy Task Force. The task force defined what the "Blue Economy" entails - all factors that need to be considered that need to be factored into assessing Cape Cod Bay's classification. It consists of five major sectors: Commercial Seafood, Marine Transportation, Coastal Tourism and Recreation, Marine Science and Technology, Marine-related Construction, and Infrastructure. Lt. Gov. Polito added that economic impacts must include direct impacts, indirect impacts, induced impacts (induced impacts adds the multiplier effects of the direct and indirect impacts created by successive rounds of spending by employees and proprietors) and total impacts (sum of direct, indirect, and induced impacts). Also considered are dollars that are not spent locally, but on goods and services produced elsewhere - dollars "leaked" out of the local economy. These dollars do not have an opportunity to be locally re-spent and to create a "ripple" effect in the local economy.[10]

The Cape Cod Blue Economy Project, launched by the Cape Cod Chamber of Commerce, call to action says [11]

"A Healthy Environment = A Healthy Economy."

The report has detailed data in its appendices. The report's Executive Summary says:

> While the Commonwealth derives 2.6% of direct employment and 1.3% of direct gross state product from the maritime economy[i], the Cape region is more connected, more dependent, and more focused on the "blue" or water economy. In fact, the "dark blue" economy, that which is directly dependent on water, in the Cape region is worth 6% of the region's revenues and employs 4% of the workforce. The top five industries by number of jobs are shellfish fishing, marinas, environmental conservation organizations, finfish fishing and

[10] (https://www.bluecapecod.org/themes/ Also see an earlier study done in 2006 for Massachusetts Coastal Zone Management by the University of Massachusetts Donahue Institute, An assessment of the Coastal and Marine Economies of Massachusetts. It provides a detailed analysis of the marine economy in Massachusetts – employment and economic output; and an analysis of the economic value of the coastal and marine economies as well as an overview of employment, wages, and business activities within important sectors of the Massachusetts marine economy that would be impacted. Available online at http://www.massbenchmarks.org/publications/studies/pdf/czmreport1.pdf

[11] https://www.bluecapecod.org/project-overview/

> recreational businesses like yacht clubs and charter boats. More broadly, the Cape region's overall blue economy is a significant economic driver for the region, representing 12% of jobs and 11% of gross revenues.

The Cape Cod Chamber of Commerce agrees.

> The entire economic well-being of our communities relies on healthy water resources. Strategic investments that support clean water, working waterfronts, and access to water are vital to sustaining our Blue Economy. Recognition of the role that the environment plays in our regional economy is at the core of our growth plan.

Amount of Damage:

Holtec's discharge of 1.1 million gallons of chemical and radioactive waste into Cape Cod Bay would cause severe economic damage to Massachusetts "Blue Economy" - aquaculture, fishing, real estate, marine based businesses, tourism - collectively estimated to be over several billion dollars a year.[12]

The Economic Value of Aquaculture:

The Cape Cod Bay area is the largest aquaculture area in the state- oysters, scallops, clams, quahogs, lobsters. Dumping will contaminate the water, and millions of oysters, lobsters, mussels, clams, scallops, and fish. Public perception of radioactive and chemical contamination could destroy a hundreds-of-millions-of-dollars aquaculture. Consumers will not purchase these products once word gets out that 1.1 million gallons of radioactive and chemical waste was dumped into the bay. And the word is out already that this may happen. The economic value of aquaculture means the bay must be considered an ORW and moved up to a Tier 2.5 review to protect our economy, if DEP decides to perform an anti-degradation review.

Who will be hurt? WBUR reported May 25th that:

> "…business owners and fishing industry advocates continue to oppose any plans to dump the water in the bay. Gregg Morris, owner of 2 Rock Oyster farm in Duxbury, called the proposal "mind-boggling" and said that even the perception of tainted water would harm the state's nearly $30 million dollar oyster industry."
>
> Would you want to eat something that's tainted? The perception is going to kill the market that we've developed," he said. "It's just sad, you know? This is my livelihood. This is how I support my family, how many of us support our families. And so, it's just a real kick in the shins."[13]

Another example was provided by Chris Sherman, President of Island Creek Oysters in Duxbury that sells over eleven million oysters annually through their e-commerce site, Duxbury retail store, and to 600 of the country's best restaurants including five of their own properties here in New England.[14] Last summer, Duxbury Bay was seeded 77 million oyster

---

[12] https://www mass.gov/doc/port-by-port-profiles-and-analysis-of-the-massachusetts-commercial-fishery/download.Previous Studies: Economic effects of decommissioning on Plymouth by U, Mass Amherst., attached. The Pilgrim Nuclear Power Station Study: A Socio-Economic Analysis and Closure Transition Guidebook, Jonathan Cooper April 2015, file:///C:/Users/maryl/Downloads/fulltext_stamped.pdf; second study is the Massachusetts Ocean Management Plan, Volume 2, Chapter 7- Economic Valuation. It relies on the Donahue study. Figures given are for the entire marine economy and breakdowns per sector. http://www.env.state ma.us/eea/mop/final-v2/v2-text.pdf. For key Cape Cod statistics, visit StatsCapeCod.org or DataCapeCod.com. Access a Small Business Profile of Massachusetts small businesses.

[13] Ibid

[14] http://www nantucketwinefestival.com/participants/sherman/

seedlings. This is big business, requiring a very large investment in equipment and workers. Island Creek Oysters in Duxbury alone sold 18 million oysters in 2021, oysters served in top restaurants around the country.[15]

Duxbury, Kingston, and Plymouth alone are home to 50 oyster farms, worth $5.1M last year[16]. Wellfleet on the other side of Cape Cod Bay too has an important oyster farming industry. Wellfleet's oyster industry, a business that has been worth as much as $6.2 million annually to a town with about 3,000 annual residents.[17] Wellfleet's Bay scallops are highly prized.

Aquaculture is not only of high economic value for the region and state but also of high ecological value. If the aquaculture business falls due to consumer perception that the bay is toxic from Holtec's discharge, it will end the large and growing number of filter feeders that are helping to clean our bay. The Cape Cod Commission estimates that aquaculture beds/floating racks can remove 8-15% of the nitrogen they encounter[18]. Oysters, for example, are important filter feeders.

The Economic Value of Travel and Tourism:

The summer tourism season serves as a reminder of the fragility of an economy based on clean, healthy waters. Tourists and summer short and long term rentals/residents provide nearly 50 percent of the Cape's annual economy.[19] (https://www.clf.org/blog/feature/saving-cape-cods-waters/)[20]

Cape Cod is a unique region in Massachusetts with a significant percentage of its economic base concentrated in the resort industry. When the effect of indirect and induced impacts is calculated, the resort industry generates as much as 40 percent of the region's total employment. Visitors are drawn to Cape Cod because of its isolated character and still unspoiled natural features. Because of this relationship between the economy and the environment, land use and economic development planning on Cape Cod is highly focused on the preservation of its historical and natural attractiveness. [21] The perception that the bay contains radioactive and chemical toxins would not be a "selling point."

It is estimated that 5.23 million tourists visit Cape Cod each year and that nearly two thirds (65%) of all visitors to the Cape arrive in the summer and early fall months. Four of Barnstable County's five largest industries are in the resort cluster. The resort industry directly employs an annual average of 19,064 persons in 2,436 business units and accounts for 22.3 percent of the region's total direct employment. When the effect of indirect and induced impacts is calculated, the resort industry generates approximately 40 percent of the region's total employment.

In calendar year 2021, direct domestic tourism spending in Barnstable County was $1.37 billion, supporting 9.6k travel-related jobs and $350.1 million in wages, while generating $160 million in state and local taxes (exceeding 2019 levels). On average, day trip guests to Cape Cod spend $200 per travel party per day, and overnight guests spend about

---

[15] https://www.obsidianwineco.com/blog/ISLAND-CREEK-OYSTER-HATCHERY.

[16] https://www.facebook.com/maseafoodcollab/

[17] https://www.marketwatch.com/story/wellfleet-oysters-have-been-beloved-by-everyone-from-queen-victoria-to-anthony-bourdain-can-they-face-off-new-competition-11628184955

[18] https://barnstablewaterresources.com/aquaculture/

[19] https://www.clf.org/blog/feature/saving-cape-cods-waters/

[20] Travel figures provided include travel to all of Cape Cod, so it is hard to exactly parcel out how many directly visit Cape Cod Bay area towns. However, tourists typically visit many areas during their vacation and likely visitors decide to come to the Cape by their perception of the health of the environment.

[21] https://archives.lib.state ma.us/bitstream/handle/2452/202400/ocn182755979.pdf?sequence=1&isAllowed=y, pg.,20.

$800 per travel party per trip.
https://www.capecod.com/newscenter/over-4-million-visited-cape-cod-national-seashore-last-year/

The Cape Cod National Seashore welcomed 4.1 million visitors in 2020, according to the U.S. National Park Service. The area was the ninth most visited national park area in the nation last year, as just over 237 million people visited national parks across the country, according to the NPS.[22] Circulation studies by WHOI in Cape Cod Bay show that once the discharge reaches Provincetown, it hooks around the point to travel down the National Seashore.

Beaches Along Massachusetts Southshore Towns facing Cape Cod Bay: All summer visitors do not head to Cape Cod. Communities on the Southshore facing Cape Cod Bay are increasingly popular bringing money to those towns. For example: Scusset Beach is located at the southwest corner of Cape Cod Bay. It has 1.5 miles of beachfront. The Reservation also offers 98 R.V. sites with hook-ups, and 5 tent-only campsites. Plymouth Beach. Plymouth Beach is a barrier beach approximately three miles in length. Recreational activities include swimming, walking, picnicking, and fishing. Duxbury Beach is a sand barrier six miles in length, extending from Marshfield to Gurnet Point and Saquish, part of Plymouth. The Gray's Beach area in Kingston was likely a summer encampment for the Wampanoag and now a popular beach. During the early spring and summer season, portions of these beaches are home to a wide variety of shorebirds, several species of which are protected as Endangered Species under state and federal law. Certain recreational activities are affected during the nesting season, drawing naturalists.

Recreation value also includes other big business: marine charters, ferry services, marine sales, rentals, and service of sail and power boats, and restaurants.

Recreational and Aesthetic Value

EPA looked at the economic value of recreation and water quality on Cape Cod.[23] The study demonstrates that socio-economic, ecological, recreational, and ascetic values are all inter-twined.
It showed that,

> Water quality is important to recreation and can affect its availability and experience. Th(e) presentation explains a number of projects that are ongoing to quantify recreation and value its importance to people on Cape Cod, Barnstable County, MA.
> A team of social scientists at the US EPA's Atlantic Ecology Division have been working to quantify the economic value of recreation and how it may be affected by water quality. As part of this effort, we have conducted a number of studies on Cape Cod related to recreation including a study of visitation to the Three Bays estuary, an economic valuation of the town of Barnstable's major beaches, as well as a few studies more broadly applicable to the Cape and New England. Clean beaches worth twice as much to the public

[22] https://www.capecod.com/newscenter/over-4-million-visited-cape-cod-national-seashore-last-year/
[23] Merrill, N., M. Mazzotta, K. Mulvaney, AND S. Lyon. The Economic Value of Recreation and Water Quality on Cape Cod. Presented at OneCape Summit, Harwich, MA, August 16 - 17, 2018.

https://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=537084&Lab=NHEERL ,https://www.nps.gov/caco/learn/management/upload/CACO_FD_508-2.pdf

The study is dated but the number of people going to beaches increased due to the increase in population and hotter summers resulting from climate change. It is predicted to continue to increase unless Holtec discharges 1.1 M gallons of radioactive and chemical water into the bay, negatively impacting public perception.

We know that recreational opportunities in clean outdoor settings like Cape Cod Bay are important to improve mental health through stress relief and appreciation of nature. For the individual Cape Cod Bay, its beaches and vistas provide individuals with multiple benefits- Physical Health, Self Esteem and Self Reliance, Creativity and Sense of Accomplishment, Fun, Pleasure, Reduces Stress, and Increases Life Satisfaction.

Ascetic Value: Cape Cod's environmental beauty, sense of solitude, and other aesthetic values have created a place for people to come for inspiration and renewal for more than 100 years and contributed to vibrant artistic communities. Provincetown, America's oldest artist community, is a prime example. "The light and natural, coastal beauty of Provincetown, on the tip of Cape Cod in Massachusetts, has inspired artists for over a century[24]."

In addition, the anti-degradation regulation definitions, Appendix B (5) (a) Additional Minimum Criteria Applicable to All Surface Waters.[25] Define aesthetics as

> (a) Aesthetics. All surface waters shall be free from pollutants in concentrations or combinations that settle to form objectionable deposits; float as debris, scum, or other matter to form nuisances; produce objectionable odor, color, taste, or turbidity; or produce undesirable or nuisance species of aquatic life.

As described in the foregoing, Cape Cod Bay is under serious stress now. Contaminants bioaccumulate and work synergistically. Therefore, the release of 1.1 million gallons of radioactive and chemically contaminated wastewater, Holtec's application shows the water is by no means "pure "will increase the probability of aesthetic damage. The "frosting on the cake."

[24] https://www.artsy.net/article/artsy-editorial-cape-cod-town-inclusive-haven-artists
[25] **https://www.mass.gov/doc/314-cmr-400/download**

The Economic Value of Housing:

Housing values have already been impacted by the threat of Holtec dumping 1.1 M gallons into Cape Cod Bay. The Realtors Association of Southeast Massachusetts and Massachusetts Association of Realtors (MAR) are active partners with the Save Our Bay MA coalition opposing dumping. Christine Silva, Plymouth resident and realtor[26], delivered the following statement to the Massachusetts Nuclear Decommissioning Citizens Advisory Panel on July 25, 2022.

> Christine Silva, Resident & Realtor here in Plymouth. It continues to baffle me as to why we must fight so hard for clean waters, I am very grateful to everyone here tonight. Without your diligent and persistent efforts, we would not have come this far. My duty as a REALTOR is to protect homeowners' rights, to use their properties as they wish. The freedom to buy, sell, and utilize property, as protected in the 5th amendment, underlies all real estate transactions and markets.
>
> Any restrictions such as the proposed dumping will surely prevent a property owner from realizing the highest and best use of their property as well as hindering economic growth and development on the South Shore and beyond.
>
> Currently we are now experiencing the impact of the proposed plan within our markets. Clients are losing interest in our area due to the concerns about pollution, negative health impacts, and long term value loss. The numbers correlate with our observations with fewer sales, lower prices, as compared to our statewide averages. The average Single Family home sale from Jan-April 2022, home to the Pilgrim Nuclear Power Plant was 12% lower than statewide averages. Meanwhile the number of homes sold dropped across the South Shore, a decrease of 50% more than statewide averages. This data comes from the Massachusetts Association of Realtors.
>
> Just last week I overheard a woman telling her daughter not to order oysters in a local restaurant, exclaiming that the plant is probably dumping now.
>
> There are alternatives to dumping even if those alternatives are expensive. Considerable financial resources have already been provided to Holtec by the taxpayers.

Research

Literature measuring the economic impact of sites harboring waste materials on real estate values, *Waste Sites and Property Values: A Meta-Analysis, 2011*,[27] concluded that research "suggest that all classes of waste sites affect real

---

[26] **Christine Silva, Broker Associate, ABR, BPOR, CBR, CHP, CNE, C2EX, WCR, RENE, SRS, REALTOR®**,;*Certified Residential Specialist, Top 3% of Agents in the USA;* 2021-2022 Commitment to Excellence | Ambassador, National Association of REALTORS®; 2021-2023 Member, Housing Opportunity Committee, National Association of REALTORS®;2019 Past President, South Shore REALTORS®; 2022 Board of Directors, Massachusetts Association of REALTORS®;2021 Board of Directors, National Association of REALTORS®; Website: http://www.christinesilva.raveis.com-License #906462

[27] https://link.springer.com/article/10.1007/s10640-011-9467-9; https://www.researchgate.net/publication/46448194_Water_Quality_and_Residential_Property_Values_A_Natural_Experiment_Approach Water Quality and Residential Property Values: A Natural Experiment Approach, JO - Department of Economics, Appalachian State University; https://d38c6ppuviqmfp.cloudfront.net/documents/Walsh_et_al_2017_EcolEcon_HedonicWQChesapeakeBay.pdf Modeling the Property Price Impact of Water Quality in 14 Chesapeake Bay Counties Patrick Walsh a, ∗, Charles Griffiths b , Dennis Guignet b , Heather Klemick b

estate prices, but sites classified as hazardous, *especially aquatic hazardous sites*, are associated with the greatest discounts." (Emphasis added)

There is considerable literature and research on the negative impact in general of perception on consumer behavior, especially from releases of radiation. Radioactive wastewater along with chemicals will be released by Pilgrim's discharge if it is permitted.

Summer is a reminder of the fragility of an economy based on clean, healthy waters.

[28]

VI. Ecological Damage:

Cape Cod Bay is a Protected Ocean Sanctuary and must be protected by law, as the Legislature and DEP recognized. In addition, other state and federal laws also would be violated by Holtec's modification request to discharge. Also, if DEP had subjected Holtec's modification request to an anti-degradation review, the request also would be denied due to the bay's outstanding ecological value.

Ecological condition refers to the state of ecological systems, which includes their physical, chemical, and biological characteristics and the processes and interactions that connect them. We depend on Cape Cod Bay being a healthy ecological system not only for our economy but also our health and other intangible benefits. EPA and state agencies bear a collective responsibility to ensure our ecological system is conserved.

When considering the current health of the bay, it is important to remember that assaults are cumulative. Toxins interact accentuating one another's damage and are persistent poisons - some radionuclides have exceedingly long half-lives, some mere seconds, but others have half-lives of millions of years.

Cape Cod Bay, and associated embayments, are under stress now. This is no time to add additional stressors- chemicals and radionuclides.

[28] https://www.weneedavacation.com/blog/2022-short-term-rental-market-on-cape-cod/

'Things are worse': Cape Cod water quality is declining, says environmental group's report[29] - Cape Cod Times

"Is 'the Blob' coming back to Cape Cod Bay? Low oxygen ..."[30]

This Coastal Studies paper is directed to unprecedented bottom hypoxia in southern Cape Cod Bay (CCB).

Cape Cod Bay and Nantucket Sound are ecologically rich complexes of coastal and marine habitats. Beaches, wetlands, and offshore waters are home to plant and animal communities that include commercially valuable species of finfish and shellfish, marine mammals, sea turtles and birds.

Cape Cod Bay is part of the much larger Gulf of Maine system that contains some of the world's most productive waters. While strong tides move water around in the Bay, it can take about a month for a full exchange of water to occur. Nantucket Sound is located at a confluence of the cold Gulf of Maine and the warm Gulf Stream. It is protected from the Atlantic Ocean by Martha's Vineyard and Nantucket Islands and is shallower than the Bay.

Cape Cod Bay and Nantucket Sound were designated as state ocean sanctuaries more than 40 years ago to "prohibit activities that may significantly alter or endanger the ecology or appearance of the ocean, seabed or subsoil." This designation recognized the vitality and importance of the Bays and the Sound's resources to the state.

Threats to Cape Cod Bay and Nantucket Sound waters:

Pollution

From a distance both Cape Cod Bay and Nantucket Sound appear healthy. However, according to the Cape Cod Commission, Cape Cod has a water problem. The saltwater border that has defined our peninsula is being poisoned by nitrogen. About 80% of the nitrogen that enters Cape Cod's watersheds is from septic systems. The conditions it creates destroy animal habitat and result in frequent violations of water quality standards indicated in part by fish kills and diminished shellfisheries.• The impacts of this pollution need to be closely monitored.

Polluted runoff is another major problem impacting our coastal waters. This type of pollution is a result of contaminants picked up in rainwater and melting snow which are eventually emptied into the bay. Examples of possible pollutants picked up in runoff include fertilizers and other lawn/garden chemicals, wastes from pets, salt from roadways, and oil and gasoline leaked from automobiles. In many towns on the Cape this problem is compounded by the large parking lots located near or directly adjacent to harbors. Not only are the oil and gasoline associated with parked automobiles a problem, but these large parking lots are often the site of the disposal of snow (and the associated salt used to treat the roads) cleared from roads during the winter.

[29] https://www.capecodtimes.com/story/news/2022/01/11/cape-cod-water-quality-continues-decline-says-watchdog-group-apcc/9093785002/; see also: https://www.capeandislands.org/local-news/2023-01-24/health-of-cape-cod-waters-continues-to-decline-new-report; https://www.wbur.org/news/2022/01/03/cape-cod-water-pollution-report

[30] https://www.bostonherald.com › 2022/09/19

Habitat Destruction

One of the most important, yet least studied habitats in our coastal waters are the eelgrass ecosystems. Eelgrass (*Zostera marina*) in Nantucket Sound is found predominately in the nearshore waters from Monomoy west to Hyannis Port and the shore of Falmouth. It is found more extensively in shallow areas of Cape Cod Bay, along most of the shoreline and out on Billingsgate Shoal. In both the Bay and the Sound, eelgrass is fundamental in structuring the resident flora and fauna. Eelgrass systems are highly productive and extremely important biologically. They act as a refuge and nursery for juvenile fish and shellfish, many of which are commercially important species in this region and typically support a higher diversity and abundance of marine life compared to surrounding unvegetated areas (Heck et al. 1989). Seagrasses are equally important from a purely physical perspective in that they help to prevent erosion by stabilizing sediments with their extensive root systems as well as aid in filtering contaminants from the water column.

Despite the obvious value of seagrass ecosystems, eelgrass beds in the Bay and the Sound are threatened by a number of anthropogenic perturbations. Declines in eelgrass habitat have been linked to physical disturbances (i.e., dredging, construction, shell fishing, propeller damage from boating), turbidity (i.e., topsoil runoff, activities that re-suspend sediments), and pollution (including eutrophication). There is evidence of the destruction of eelgrass habitats in the Bay and the Sound by all of these mechanisms making the health of this already fragile ecosystem even more tenuous.

Eutrophication

The consequences of pollution have already manifested in our coastal waters. In addition to the direct, toxic effects of pollution, excessive nutrient input from both point and nonpoint sources leads to high levels of plant growth. This process, known as eutrophication, is occurring to some degree in Cape Cod Bay and Nantucket Sound and more noticeably in the coastal ponds and embayments that discharge into them. Eutrophication has been linked to a number of different harmful processes in coastal waters. Two symptoms of eutrophication that have been extensively documented are harmful algal blooms (HABs) and hypoxia.

Harmful Algal Blooms (HABs)

Algal blooms occur primarily during the spring and summer in our coastal waters. During the spring, *Phaeocystis* blooms occur frequently in Cape Cod Bay. The negative impacts of a bloom of this phytoplankton are far reaching, affecting the entire food chain by out-competing other beneficial species of phytoplankton (Roberts 2003, Tang 2003), affecting zooplankton growth and production (Tang 2001, Turner et al. 2002), and being a nuisance to feeding right whales (Kelly et al. 1998). A more well-known species of phytoplankton resulting in HABs is *Alexandrium* sp., one of the species behind the phenomenon of red tides. Red tides have been linked to the deaths of fish, whales, and humans (Anderson 1994, Bushaw-Neston & Sellner 1999). Blooms of this species vary greatly from year to year. Â Due to its lifecycle of dormant cysts, *Alexandrium* blooms are likely to become a repetitive occurrence if conditions remain conducive, i.e., high nutrient input, stratification (Mcgillicuddy et al. 2003). Although there have been no documented deaths as a result of the recent blooms that have occurred in the Bay or the Sound, the effects are still felt by the loss of income of commercial fishermen from shellfish bed closures and impacts on conch fisheries.

Hypoxia

Closer inshore, the negative impacts of pollution are evident in the sediments. Sediments in and around harbors such as Rock Harbor and Wellfleet Harbor, which were once sandy, are now composed primarily of silty, dark mud. If disturbed, these sediments release a distinct sulfurous odor indicative of areas of low oxygen. This odor comes from the production of hydrogen sulfide by bacteria which reside in low oxygen (hypoxic) sediments. Since most organisms are stressed by low oxygen levels, hypoxic waters are usually devoid of most life. While motile organisms such as fish can leave these areas, benthic organisms will be killed. Portions of the estuaries discharging into Nantucket Sound, for example the Three Bays complex in Barnstable, also have oxygen-depleted sediments. This had occurred in areas of Chesapeake Bay and the Gulf of Mexico, giving these areas the name 'dead zones'. Although areas of low oxygen in the coastal waters of Cape Cod are not nearly as extensive as observed in these locations, these areas need to be monitored and remedied before the problem progresses.[31]

Overexploitation

This region of Massachusetts was given the name of Cape Cod because of its abundance of codfish. Today these fish have virtually disappeared from the waters of the Bay. Other species found in the Bay and Sound, such as flounder, tautaug, sea bass, and striped bass have likewise suffered from overexploitation.

With reference to some commercial shellfish species, overexploitation is tied directly to habitat destruction. The development of different methods of fishing to increase the catch of a declining stock has been disruptive. Hydraulic pumping for sea clams was once outlawed in the Bay. Over the past several decades, however, it has been re-implemented in an attempt to increase the harvesting of these clams.

In summary: The health of Cape Cod Bay is increasingly threatened by: nitrogen from development and consequent runoff from septic systems; polluted run-offs sending contaminants picked up in rainwater and melting snow which are eventually emptied into the bay; habitat destruction especially eelgrass and sea grasses; Eutrophication, high levels of plant growth from excessive nutrient input that leads to algae blooms (HABs) and hypoxia, low oxygen levels killing marine life; overexploitation of marine life in the bay; and invasive species.

Climate change adds to the bay's deterioration, and climate change will get worse. For example, the Association to Preserve Cape Cod in its annual report pointed out, "pollution feeds cyanobacteria blooms, also known as toxic algae, which can kill wildlife and harm humans and pets. Scientists predict warming temperatures attributable to climate change will contribute to more frequent and intense toxic algae blooms …"[32] For example, Lobster deaths.[33]

Because the overall health of the bay has not improved, it stands to reason that neither EPA nor the state can grant a modification to the discharge permits and relax its discharge standards set in 2020.

---

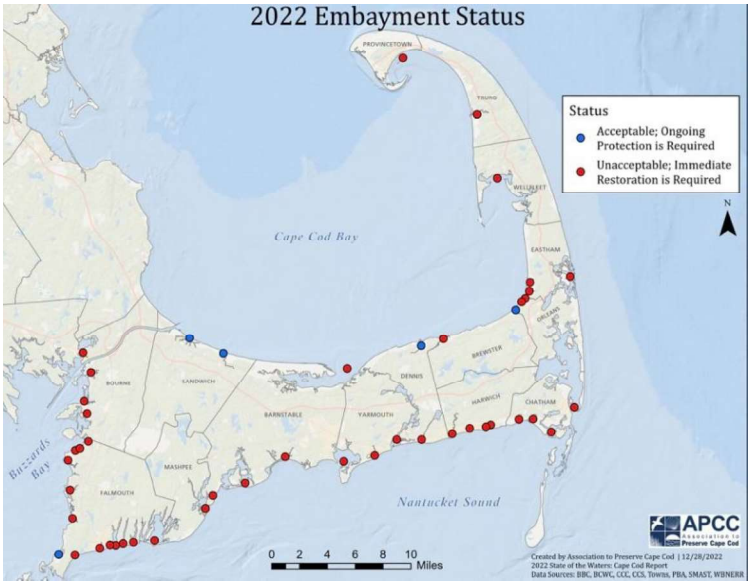
[31] See also Unprecedented summer hypoxia in southern **Cape Cod Bay**: an ecological response to regional climate change?[31] (ME Scully, WR Geyer, D Borkman, TL Pugh… - …, 2022 - bg.copernicus.org

[32] https://www.wbur.org/news/2022/01/03/cape-cod-water-pollution-report

[33] https://www.wbur.org/news/2021/11/09/hypoxia-cape-cod-bay-algae-bloom-karenia-mikimotoi

APPC Monitoring Report - Cod Bay[34]

The Association to Protect Cape Cod (APCC) report saw continued degradation of both marine and freshwater water quality. It noted for the first time none of the 21 marine bays and estuaries the APCC monitors along the Cape's south-facing shoreline had acceptable water quality. For the Cape as a whole, only six of 4 bays and estuaries were rated as having acceptable water quality, while 41, or 87%,received a grading of unacceptable. Last year's report had 38% receiving a failing grade, or 79%, and in 2019 report, 68% failed.[35]



It is time this vital resource will be provided with the increased oversight that it needs.

Ecological Analysis Must Include Interactive Effects Chemicals, Metals and Radionuclides:

Although the EPA permit focuses solely on chemical contaminants, the discharge will also include radionuclides, chemicals and metals that also will be in the receiving water and sediment from Pilgrim's, and other parties, previous releases. DEP is not restricted to the type of contaminant, and it also must consider the interaction between them.

Research has shown that radionuclides, chemicals, and metals interact, enhancing one another's mischief, and can pose enhanced threats to marine life. Contaminants cannot be evaluated one at a time in isolation. Unfortunately, that has been the case.

Holtec's modification application, sections G and H, admits, for example, that copper, lead, nickel, and zinc will be released, but it says in "very low concentrations;" and will be further reduced by comingling the wastewater inside the building prior to discharge, filtering, and dilution with seawater during discharge. Filtering, at best, is approximately 90-95%. Tritium cannot be filtered because it is radioactive water. Dilution is not the solution, either. The same contaminants will be released, simply harder to detect by monitors.

[3434] APCC.org

[35] https://www.capecodtimes.com/story/news/2022/01/11/cape-cod-water-quality-continues-decline-says-watchdog-group-apcc/9093785002/

Below are a handful of studies, emphasis provided by Mary Lampert. For a long list and summary of studies, please see the Attachment.

a. *Nuclear power: how might radioactive wastewater affect the environment?*[36]

April 30, 2021 "…experiments with both marine and freshwater mussels found that when radionuclides are present in seawater alongside commonly-occurring metals like **copper,** the DNA damage caused by radionuclides to the mussels was increased. Much, much more research is needed to understand the effects of exposure to different types of radionuclides on different species. The study is the first to explore the interactive effects of ionizing radiation (IR) and Cu on two bivalve species representing two ecological habitats. The complexity of IR-metal interactions demonstrates that extrapolation of findings obtained from single stressor studies into field conditions could be misrepresentative of real-world environments. In turn, environmental protective strategies deemed suitable in protecting biota from a single, isolated stressor may not be wholly adequate."
https://www.tandfonline.com/doi/full/10.1080/09553002.2020.1823032

b. *Evaluation of interactive effects of phosphorus-32 and **copper** on marine and freshwater bivalve mollusks showed that contaminants seldom occur in isolation in the aquatic environment*.[37]

"Results concluded a clear antagonistic effect of Zn on ^{3}H-induced DNA damage at all Zn concentrations used, likely explained by the importance of **Zn** in DNA repair enzymes. The interaction of DOC with ^{3}H was variable, with strong ^{3}H-DOC associations observed in the first 3 d of the experiment. The secretion of ^{3}H-binding ligands by the mussels is suggested as a possible mechanism for early biological control of ^{3}H toxicity. The results suggest risk assessments for radionuclides in the environment require consideration of potential mixture effects."

https://www.sciencedirect.com/science/article/abs/pii/S0265931X17306124,, Journal of Environmental Radioactivity, Vol. 187, July 2018, Pages 133-143

c. *Radionuclides On Marine Mussels: Proteomics and Ecotoxicological Approaches,* 2020
https://pearl.plymouth.ac.uk/handle/10026.1/16786 Assessing the Impacts of Metals and Radionuclides on Marine Mussels: Proteomics and Ecotoxicological Approaches, 2020

"It is well established that anthropogenic contaminants occur in all probable combinations and therefore are not isolated in their threat to the aquatic environment. Recently there has been an increasing interest in measuring pollutants in environmentally realistic conditions to predict the potential detrimental outcomes on the ecosystem. This includes realistic levels of contamination concentrations, chronic exposures duration and mixtures of contaminants. With this perspective, in the present work, marine mussels, Mytilus galloprovincialis were exposed to concentrations of copper (5, 32 µg L-1), lead (5, 25 µg L-1) and tritiated water (HTO, 1.5, 5 MBq L-1) both individually and as a binary mixture. Binary combinations of Cu, Pb and HTO demonstrated different impacts to genotoxic (i.e., DNA damage and chromosomal aberrations) enzymatic (acetylcholinesterase and glutathione activity, protein carbonyl content) and behavioural (clearance rate) compared to M. galloprovincialis exposed to the same contaminants singularly. In particular, the comet assay results, which suggests an antagonistic increase with the highest binary treatment in **Cu-Pb, Cu-HTO** and Pb-HTO (Cu-32 µg L-1, Pb- 25 µg L-1 and HTO- 5 MBq L-1. As determined in

[36] https://theconversation.com/nuclear-power-how-might-radioactive-waste-water-affect-the-environment-159483
[37] https://www.tandfonline.com/doi/full/10.1080/09553002.2020.1823032; https://theconversation.com/nuclear-power-how-might-radioactive-waste-water-affect-the-environment-159483

this work, environmental contaminants interact with each other, which affect an ecologically and economically important marine invertebrate differently compared to single exposures."

It is important to note that Tritium cannot be filtered from Pilgrim's proposed wastewater release. Tritium is in the bay now from previous water and stack releases and more will be there if Pilgrim is allowed to release its 1.1 million gallons of contaminated wastewater.

d. *Mixtures of* ***tritiated water, zinc and dissolved organic carbon****: Assessing interactive bioaccumulation and genotoxic effects in marine mussels, Mytilus galloprovincialis,* Holly B.C. Pearson [a 1], Lorna J. Dallas [b 1], Sean D.W. Comber [a], Charlotte B. Braungardt [a], Paul J. Worsfold [a], Awadhesh N. Jha
https://www.sciencedirect.com/science/article/abs/pii/S0265931X17306124
Journal of Environmental Radioactivity -Volume 187, July 2018, Pages 133-143

Abstract: Release of tritium (^3H) in the marine environment is of concern with respect to its potential bioaccumulation and detrimental impact on the biota. Previous studies have investigated the uptake and toxicity of this radionuclide in marine mussels, and the interaction of ^3H with dissolved organic ligands and elevated temperature. However, despite the well-established view that toxicity is partly governed by chemical speciation, and that toxic effects of mixture of contaminants are not always additive, there have been no studies linking the prevailing chemistry of exposure waters with observed biological effects and tissue specific accumulation of ^3H in combination with other constituents commonly found in natural waters.
This study exposed the marine mussel *Mytilus galloprovincialis* for 14 days to mixtures of ^3H (as tritiated water, HTO) and zinc (Zn) at 5 Mbq L^{-1}, and 383, 1913 and 3825 nM Zn, respectively, to investigate (a) ^3H and Zn partitioning in soft tissues of mussels, and (b) DNA damage in haemocytes, determined using the single cell gel electrophoresis or the comet assay. Additionally, the extent of association of ^3H with dissolved organic carbon (DOC, added as humic acid) over the exposure period was investigated in order to aid the interpretation of biological uptake and effects.

Results concluded a clear antagonistic effect of **Zn on ^3H-induced DNA damage at all Zn concentrations used, explained by the importance of Zn in DNA repair enzymes**. Suggest risk assessments for radionuclides in the environment require consideration of potential mixture effects. Previous studies have demonstrated that ^3H induces DNA damage to the haemocytes of marine bivalve molluscs (e.g., oysters and mussels) at considerably below the recommended (dose) guidelines of IAEA and EURATOM. In addition, ^3H bioaccumulates in specific tissue in these biota of ecological and economic importance (Hagger et al., 2005, Jha et al., 2005, Jaeschke et al., 2011, Devos et al., 2015, Dallas et al., 2016a, Dallas et al., 2016b). DNA is the important target for the action of ionising radiation (UNSCEAR, 1996). In addition, there is growing concern over the presence of those contaminants, which have the potential to induce carcinogenic, mutagenic and reproductive toxicity (Dallas et al., 2016) this study aimed to investigate the induction of genetic damage and tissue specific bioaccumulation of ^3H in marine mussel, *Mytilus galloprovincialis*, either alone or as binary mixtures of HTO and Zn, and HTO and dissolved organic carbon (DOC)

Conclusions
Our study provides both chemical and biological data over an exposure duration of 14 days of marine mussels to unary and binary mixtures of zinc, tritium, and dissolved organic carbon. As there is growing concern over the presence of those contaminants which could be carcinogenic, mutagenic and reproductive toxicants (Dallas et al., 2013), genotoxicological assessment in haemocytes of exposed mussels reveals, for the first time, evidence of antagonism when Zn is added at concentrations.

e. *Assessing The Impacts of Metals and Radionuclides on Marine Mussels: Proteomics And Ecotoxicological Approaches*, Crowther, 2020, https://pearl.plymouth.ac.uk/handle/10026.1/16786

It is well established that anthropogenic contaminants occur in all probable combinations and therefore are not isolated in their threat to the aquatic environment. Recently there has been an increasing interest in measuring pollutants in environmentally realistic conditions to predict the potential detrimental outcomes on the ecosystem. This includes realistic levels of contamination concentrations, chronic exposures duration and mixtures of contaminants. With this perspective, in the present work, marine mussels, Mytilus galloprovincialis were exposed to concentrations of **copper (5, 32 µg L-1), lead (5, 25 µg L-1) and tritiated water (HTO, 1.5, 5 MBq L-1)** both individually and as a binary mixture.

Binary combinations of Cu, Pb and HTO demonstrated different impacts to genotoxic (i.e. DNA damage and chromosomal aberrations) enzymatic (acetylcholinesterase and glutathione activity, protein carbonyl content) and behavioural (clearance rate) compared to M. galloprovincialis exposed to the same contaminants singularly.

As determined in this work, environmental contaminants interact with each other, which affect an ecologically and economically important marine invertebrate differently compared to single exposures.

This indicates the requirement for more environmentally realistic exposure conditions to facilitate the implementation of regulations for hazard and risk assessments for the protection of both environmental and human health.

Chemical contaminants alone, like radioactive isotopes, can cause damage to marine life, as shown, for example, in the following study.

f. *Effects of heavy metals on sex inversion of the mussel Mytilus galloprovincialis Lam., 1819 in coastal zone of the Black Sea* https://pubmed.ncbi.nlm.nih.gov/36347192/

N S Chelyadina [1], M A Popov [1], N V Pospelova [2], L L Smyrnova [3]

"The present study is the first to directly show that heavy metals can cause females of the mussel M. galloprovincialis to change into males during post-spawning development of gonads. The degree of impact of heavy metals on the sex change in mussel females was different and decreased in the following sequence: $Cu^{2+} \rightarrow Cd^{2+} \rightarrow Hg^{2+} \rightarrow Pb^{2+} \rightarrow Zn^{2+}$. Copper ions had the greatest effect, which caused a sex inversion in 54 % of females. The heavy metals Hg^{2+} and Pb^{2+} were also quite toxic causing mortality in 13 % and 10 % of individuals, respectively. It is possible to use M. galloprovincialis as a model organism in the study of mechanism of environmental sex reversal in bivalves."

Pilgrim Station's Annual Environmental Reports are unreliable.[38]

Holtec points to Pilgrim's environmental reports to show that there has been no negative impact of Pilgrim's releases into Cape Cod Bay. We are meant to conclude that there would be no negative impact to dumping 1.1 M gallons of contaminated wastewater into the bay. Those reports are not convincing. They do not provide reliable information to judge the ecology of the bay and the impact of discharge. For example: The samples are too small; some of the control samples are in fact indicator samples and should be treated as such; the samples are tested only for gamma, where beta and alpha will be missed; and the media are collected by the licenses and analyses and reports were performed by Pilgrim's own laboratory.

[38] All reports available here https://www.nrc.gov/reactors/operating/ops-experience/tritium/plant-specific-reports/pilg.html

Sediment: Only 12 samples are required and only from the surface layer-not specialized depth sampling. The samples are taken from the discharge canal outfall, Manomet Point, Plymouth Harbor, Plymouth Beach and controls from Duxbury and Marshfield. Analysis is gamma only.

Shellfish, Mussels, Clams and Quahogs This is an important omission because research points to the crucial importance to consider the life stage, sex and size of aquatic invertebrates used in experiments, as these factors have important implications for absorbed dose.[39] (10) samples and just the meat-not shells sampled semi-annually. Only 8 samples taken in 2019. Samples are from discharge canal outfall and one other location in Plymouth-Plymouth harbor and from controls in Duxbury and Marshfield. Analysis is gamma only.

Lobsters: (5) samples taken, monthly from discharge area June-September, one time from controls. Location of samples is the outfall area of discharge canal and control locations in Cape Cod Bay and Vineyard Sound. Analysis is gamma only.

Fish : only (9) fish samples are taken. Bottom oriented fish are sampled on a semiannual basis from the outfall area of the discharge canal, and on an annual basis from a control location. Other fish are sampled annually from the discharge canal outflow and control locations in Cape Cod Bay and Buzzards Bay. Obviously, there is no indication whether these 9 fish lived anywhere near Pilgrim Station. Analysis is gamma only.

There is insufficient information from these samples. Ken Buesseler (WHOI) explained "radioactive contaminants have vastly different fates in the ocean depending on their chemical nature. Some dilute and mix and are transported the same as water, like tritium. Others are more likely to be associated with marine sediments, like cobalt-60, and others accumulate in marine biota. Usually cesium isotopes and strontium-90 are of concern."

For example, in the article Assessing the Impact of Ionizing Radiation on Aquatic Invertebrates: A Critical Review by Dallas, Lorna, Keith-Roach, Lyons, Zha, Radiation Research 177 (5): 693-716, Published by the Radiation Research Society[40] The research showed that age, sex, and size of the invertebrate determined radiosensitivity. Therefore, absent Holtec indicating the age, sex and size of the samples, there is not enough information from the samples collected to be useful.

VII. Holtec, not DEP or EPA, is Responsible for any Delays.

Holtec's spokesperson, Patrick O'Brien took the position in the Provincetown Independent July 26, 2023[41] that, "… the permitting process has slowed economic development at the site. His statement continued: "This process has already delayed the completion of the project for an additional four years, impacted the workforce on site and further changes

[39] Assessing the Impact of Ionizing Radiation on Aquatic Invertebrates: A Critical Review, Lorna J. Dallas, Miranda Keith-Roach, Brett P. Lyons, Awadhesh N. Jha, School of Biomedical & Biological Sciences, University of Plymouth, UK, RADIATION RESEARCH 177, 693–716 (2012), Radiation Research Society, 2012, pg. 699 https://scholar.google.com/scholar?q=assessing+the+impact+of+ionizing+radiation+on+aquatic+invertebrates:+a+critical&hl=en&as_sdt=0&as_vis=1&oi=scholart

[40] https://doi.org/10.1667/RR2687.1

[41] State Agency Denies Holtec's Permit Change, *DEP's draft decision blocks path to nuclear wastewater release for now, Christine Leger, July* 23,2023 HTTPS://PROVINCETOWNINDEPENDENT.ORG/FEATURED/2023/07/26/STATE-AGENCY-DENIES-HOLTECS-PERMIT-CHANGE/

when the site can be returned to be an economic driver for the Plymouth Community." What is wrong with O'Brien's statement?

It is Holtec, not the permitting process, which has slowed the process. Holtec did not ask to discharge this waste when asking for the 2020 permits. It was delayed over three years to ask for modification. Holtec refused to take the other three options [42] to deal with the wastewater such as shipping the wastewater to an available licensed facility in Texas WCS, an option taken by NorthStar decommissioning Vermont Yankee. It shipped two (2) million gallons, nearly twice Pilgrim's. The delay was Holtec's choice. Holtec made its decision to delay months before the DEP issued the Tentative Decision.

The real reason Holtec decided to delay completion of the project is lack of money. Holtec's latest financial report to the NRC (03.31.23) showed that the value of the Decommissioning Trust Fund, that finances decommissioning Pilgrim, fell $307M largely due to the stock market.[43] The DTF was $825M (3/31/22) and fell to a balance of $515M (3/31/23). Also, costs to decommission, like all costs, increased. The result of the financial drop and inflation is a four-year delay in completing decommissioning to partial site release to 2031.

Mr. Noyes May 22 power point presentation, slide 3 explains further. Note that the number one driver for the delay is "preserving Decommissioning Trust Fund Growth by flattening cost curves," not "Uncertainty Associated With The NPDES And Surface Water Discharge Permits Modifications."

Schedule Impacts

HOLTEC INTERNATIONAL

4-year delay in Partial Site Release (PSR) caused by 4-year delay in reactor vessel segmentation and reactor building demolition

Drivers:

- Preserving Decommissioning Trust Fund Growth by flattening cost curves
- Reactor Pressure Vessel segmentation option evaluation based on industry lessons learned and likely innovations
- Uncertainty associated with the NPDES and Surface Water Discharge Permits modifications

Pine DuBois, at the DEP Hearing August 24, 2023, testified that in essence the 1.1 M gallons of radioactive and chemically contaminated wastewater should be discharged into Cape Cod Bay. She said this would hasten dewatering the reactor and speed up dismantlement and cleanup, needed to beat sea level rise impacting the property and carrying contaminants still in the soil out to sea. She should have listened to Holtec that explained at the May 22, 2023, NDCAP meeting, otherwise.[44] What is wrong with DuBois' statements?

---

[42] https://www.nrc.gov/info-finder/reactors/pilg/faq-discharge.html **Who is responsible for determining how the liquid effluents at Pilgrim are removed from the site?**

[43] https://www.mass.gov/doc/holtecs-annual-decommissioning-fund-report-to-the-nrc/download

[44] See approved May NDCAP minutes ,July 24, 2023, and referenced video Minute markers 1:36:40-1:40:31 https://www.youtube.com/watch?v=IkQ4T9jcTZI

At the May 22 NDCAP meeting, two other NDCAP panelists (Andrew Gottlieb and Seth Pickering, DEP) asked how the delay would impact Holtec's schedule to dewater. We learned from Holtec's responses to Andrew and Seth that the delay would not change the dewatering schedule for the spent fuel pool or cavity. The water will be needed for shielding during dismantling over the delayed 4 years. Holtec may be the ability to drain the reactor vessel of its 5,000-6,000 gallons of water earlier if Holtec decides to go to dry dismantlement of the "interior of the can" by using a fixative, meaning water shielding would no longer be needed to protect workers. If Holtec decides to use a fixative, it may explain if Holtec decides to evaporate that 5,000-6,000 gallons using water heaters that were installed the beginning of this year.

decide the 5,000-6,000 gallons using the water heaters installed the beginning of this year[45].

CONCLUSION

We conclude where we started. DEP correctly found that Holtec's request to modify its permit violates the Ocean Sanctuary Law. The legislature recognized back in 1972 that Cape Cod Bay's economic, ecological, recreational/ascetic values needed a high level of protection, that we described in some detail.

For those same reasons (economic, ecological, recreational, and ascetic harm from discharging), Holtec's modification request must be denied because its discharge would violate. in addition to the Ocean Sanctuary Act, the Massachusetts Endangered Species Act (MGL.ch 131A), the National Sanctuary Act that protects Stellwagen Bank, six miles off the coast of Provincetown), Massachusetts Crimes Against Public Health (MGL ch 270) that makes it a crime to deposit or discharge "waste or other material of any kind on a public highway or within 20 yards of a public highway, or on any other public land, or in or upon coastal or inland waters … or on property of another," the Massachusetts Oil and Hazardous Material Release Prevention Act, and the states anti-degradation requirements (314 CMR 404). All laws, that DEP should include in its final denial so as to be able to use them in court if Holtec files an appeal. Multiple arrows in the quiver are better than one.

Do not forget that, in its June 2020 in the Settlement Agreement (at III, 10, l), Holtec *agreed to comply with state laws and regulations*; and at paragraph 48 in the settlement it says, " *No Party to this Agreement (or any person or entity affiliated or related to a Party to this Agreement) shall assert that any provision of this Agreement (or the Agreement itself) is invalid under any federal law or any provision of the U.S. Constitution."* In other words, they agreed there would be no claim to preemption. These laws and regulations, and the reasons they prohibit Holtec's desired dumping, are discussed briefly below and in more detail in James Lampert's Comments in Support of DEP's Tentative Determination.

It is also important EPA cannot issue Holtec's requested permit unless DEP certifies that the modified EPA permit complies with state laws. For that reason, Pilgrim Watch asks that DEP not only deny Holtec's application but that it also informs EPA that the state will not certify any EPA permit allowing Holtec's proposed discharge.

The Commonwealth's Administration, elected federal, state, and town officials, organizations representing trade groups, public interest groups, and last and most important thousands of citizens have consistently and correctly repeated, "**NOT ONE DROP**."

[45] Holtec Releases Some Pilgrim Wastewater as Gas- *Officials say amount is small, but watchdogs worry more is planned* Provincetown Independent, Christine Legere, Aug 23, 2023. https://provincetownindependent.org/featured/2023/08/23/holtec-releases-some-pilgrim-waste-as-gas/

Respectfully submitted, August 29, 2023, on behalf of Pilgrim Watch,

Mary Lampert, director
[redacted]

APPENDIX

INTERACTIVE EFFECTS METALS AND RADIONUCLIDES

Ecological Analysis Must Include Interactive Effects Chemicals , Metals, and Radionuclides

Although the EPA permit focuses solely on chemical contaminants, the discharge will also include radionuclides, and radionuclides and chemicals/metals will be in the receiving water and sediment from Pilgrim's, and other parties, previous releases. DEP is not restricted to chemicals, and it also must consider the interaction between contaminants. Research has shown that radionuclides, chemicals, and metals interact, enhancing one another's mischief, and can pose enhanced threats to marine life. Contaminants cannot be evaluated one at a time in isolation. Unfortunately, that has been the case. Holtec's modification application (The Pilgrim Nuclear Power Station – National Pollutant Discharge Elimination System Permit #MA0003557 Modification Application (March 31, 2023) , sections G and H, admits, for example, that copper, lead, nickel, and zinc- perhaps others- will be released, along with radionuclides. These metals also are already in the bay from previous discharges. The following collection are abstract collections of studies looking at the interactions. Highlights in studies provided by Mary Lampert.

INTERACTIVE EFFECTS METALS AND RADIONUCLIDES

copper & phosphorus-32 -mussels (2020)
https://pearl.plymouth.ac.uk/bitstream/handle/10026.1/18266/Vernon%20et%20al%20MS%20Revised%20FINAL~deposition~16.9.20.pdf?sequence=1
LINK HAS WHOLE STUDY & CONTACT INFO

University of Plymouth PEARL https://pearl.plymouth.ac.uk Faculty of Science and Engineering School of Biological and Marine Sciences 2020-10-06 Evaluation of interactive effects of phosphorus-32 and copper on marine and freshwater bivalve molluscs Jha, Awadhesh http://hdl.handle.net/10026.1/18266 10.1080/09553002.2020.1823032 International Journal of Radiation Biology Taylor and Francis All content in PEARL is protected by copyright law. Author manuscripts are made available in accordance with publisher policies. Please cite only the published version using the details provided on the item record or document. In the absence of an open licence (e.g. Creative Commons), permissions for further reuse of content should be sought from the publisher or author.

International Journal of Radiation Biology Evaluation of interactive effects of phosphorus-32 and copper on marine and freshwater bivalve molluscs Emily L. Vernona, Michael N. Mooreabc, Tim P. Beande and Awadhesh N. Jhaa* aSchool of Biological and Marine Sciences, University of Plymouth, Plymouth,
*Correspondence: a.jha@plymouth.ac.uk Running Title: Effects of radionuclide and metal on mussels

Abstract Purpose: Contaminants seldom occur in isolation in the aquatic environment. While pollution of coastal and inland water bodies has received considerable attention to date, **there is limited information on potential interactive effects between radionuclides and metals**. Whether by accidental or controlled release, **such contaminants co-exist in aquatic ecosystems** and can pose an **enhanced threat** to biota. Using a range of biological responses, the study aimed to evaluate relative interactive effects on representative **freshwater and marine bivalve species**.
Methods: An integrated, multi-biomarker approach was adopted to investigate response to **copper (**Cu, 18 µg L-1), a known environmentally relevant genotoxic metal and differing concentrations of **phosphorus-32** (32P; 0.1 and 1 mGy d-1), alone and in combination in marine (Mytilus galloprovincialis) and freshwater (Dreissena polymorpha) mussels. Genetic and molecular biomarkers were determined post-exposure and included DNA damage (as measured by the comet assay), micronuclei (MN) formation, γ-H2AX foci induction and the expression of key stress-related genes (i.e. hsp70/90, sod, cat, gst).
Results: Overall, using a tissue-specific (i.e. gill and digestive gland) approach, genotoxic response was reflective of exposures where **Cu had a slight additive effect on 32P-induced damage across the species (but not all), cell types and dose rates.** Multivariate analysis found significant correlations between comet and γ-H2AX assays, across both the tissues. Transcriptional expression of selected genes were generally unaltered in response to contaminant exposures, independent of species or tissues. 3
Conclusions: Our study is the first to explore the interactive effects of ionizing radiation (IR) and Cu on two bivalve species representing two ecological habitats. **The complexity of IR-metal interactions demonstrate that extrapolation of findings obtained from single stressor studies into field conditions could be misrepresentative of real-world environments. In turn, environmental protective strategies deemed suitable in protecting biota from a single, isolated stressor may not be wholly adequate**

Highlights • Adoption of an integrated, multi-biomarker approach in two bivalve species • Toxicity of combined mixtures of 32P and Cu compared • **Cu induced additive effects with 32P in the tissues** • DNA damage and DDR showed strong correlations • Multiple stressors should be considered in assessing the impact of ionizing radiations

---

Mixtures of tritiated water, zinc and dissolved organic carbon: Assessing interactive bioaccumulation and genotoxic effects in marine mussels, *Mytilus galloprovincialis*
Holly B.C. Pearson [a 1], Lorna J. Dallas [b 1], Sean D.W. Comber [a], Charlotte B. Braungardt [a], Paul J. Worsfold [a], Awadhesh N. Jha

https://www.sciencedirect.com/science/article/abs/pii/S0265931X17306124
Journal of Environmental Radioactivity -Volume 187, July 2018, Pages 133-143

Abstract

Release of tritium (^3H) in the marine environment is of concern with respect to its potential bioaccumulation and detrimental impact on the biota. Previous studies have investigated the uptake and toxicity of this radionuclide in marine mussels, and the interaction of ^3H with dissolved organic ligands and elevated temperature. However, despite the well-established view that toxicity is partly governed by chemical speciation, and that toxic effects of mixture of contaminants are not always additive, there have been no studies linking the prevailing **chemistry of exposure waters with observed biological effects and tissue specific accumulation of ^3H in combination with other constituents commonly found in natural waters**. This study exposed the marine mussel *Mytilus galloprovincialis* for 14 days to mixtures of **^3H (as tritiated water, HTO) and zinc (Zn) at** 5 Mbq L^{-1}, and 383, 1913 and 3825 nM Zn, respectively, to investigate (a) ^3H and Zn partitioning in soft tissues of mussels, and (b) DNA damage in haemocytes, determined using the single cell gel electrophoresis or the comet assay. Additionally, the **extent of association of ^3H with dissolved organic carbon (**DOC, added as humic acid) over the exposure period was investigated in order to aid the interpretation of biological uptake and effects. **Results concluded a clear antagonistic effect of Zn on ^3H-induced DNA damage at all Zn concentrations used, likely explained by the importance of Zn in DNA repair enzymes**. The interaction of DOC with ^3H was variable, with strong ^3H-DOC associations observed in the first 3 d of the experiment. The secretion of ^3H-binding ligands by the mussels is suggested as a possible mechanism for early biological control of ^3H toxicity. The results suggest **risk assessments for radionuclides in the environment require consideration of potential mixture effects**.

Introduction

The release of radionuclides into the environment is of particular concern to scientists, regulators and the general public (Dallas et al., 2012, Dallas et al., 2016a, Dallas et al., 2016b, Jha, 2008), especially in light of recent events such as the Fukishima Daiichi nuclear disaster (FDND) of 2011. Tritium (^3H), a radioactive isotope of hydrogen is produced and discharged in large quantities by nuclear power plants and nuclear fuel reprocessing facilities (NFRF), mostly as tritiated water. The FDND is estimated to have released between 10 and 50 thousand TBq of tritium into the NW Pacific ocean (Povinec et al., 2013). From 2005 to 2008, the two NFRFs discharging into the English Channel/Irish Sea (i.e. at Sellafield in the UK and La Hague in France) discharged *ca.* 1000–10000 TBq y^{-1} (i.e. 1–10 K TBq y^{-1}) of tritiated water (HTO) (Dallas et al., 2016b).
Previous studies have demonstrated that ^3H induces DNA damage to the haemocytes of marine bivalve molluscs (e.g. oysters and mussels) at considerably below the recommended (dose) guidelines of IAEA and EURATOM. In addition ^3H bioaccumulates in specific tissue in these biota of ecological and economic importance (Hagger et al., 2005, Jha et al., 2005, Jaeschke et al., 2011, Devos et al., 2015, Dallas et al., 2016a, Dallas et al., 2016b). Despite this, potential modulation of these effects in a situation where organisms are co-exposed to ^3H and other contaminants has not been explored.
As a ubiquitous aquatic contaminant, which has recently been identified by the UK Environment Agency as a "Specific Pollutant" under the EU Water Framework Directive, zinc **(Zn) is a metal likely to be found co-localised with ^3H. It is biologically active, playing an important role in enzyme-catalysed reactions within organisms, but potentially toxic when present in excess**. In addition, **Zn has been shown to exhibit both antagonistic and synergistic outcomes in combination with other metals**. For example, a synergistic effect is observed when larvae of *Mytilus galloprovincialis* are exposed to Zn and Cd in combination. Markedly higher levels of metallothionein production, an indicator of metal-induced stress, has been predicted for the sum of the two metals' individual effects (Pavičić et al., 1994). In contrast, a study on lysosomes of organisms exposed to various metals showed that Zn^{2+} exhibited a protective effect against damage caused by Cd^{2+} and Cu^{2+}(Viarengo et al., 2000). Another study showed the accumulation of Cd in *Mytilus edulis* decreased, and Cu increased, in the presence of higher concentrations of Zn (Elliott et al., 1986). Zinc is therefore considered a good candidate for investigating potential interactive (i.e. antagonistic, synergistic or additive) effects in combination with ^3H.
It is known that dissolved organic ligands can ameliorate the potential toxic effects of metals in environmental waters by complexation of the biologically available free metal. Information on the interaction of ^3H with dissolved ligands is, however, limited to a few studies (e.g. Turner et al., 2009) that report chemical behaviour, without investigation of concomitant biological effects.

DNA is the important target for the action of ionising radiations (UNSCEAR, 1996). In addition, there is **growing concern over the presence of those contaminants, which have the potential to induce carcinogenic, mutagenic and reproductive toxicity** (Dallas et al., 2013). There has however been only limited study to evaluate potential impact of ionising radiations on the aquatic invertebrates which play important role in ecosystem functioning and which could also pose risk to human health via the food chain (Dallas et al., 2012, Jha, 2008). Furthermore, it is also appreciated that contaminants in the environment occur in all probable combinations and their bioaccumulation and toxic effects could be influenced by many confounding factors (Jha, 2008).

Within the above context**, this study aimed to investigate the induction of genetic damage and tissue specific bioaccumulation of ^{3}H in marine mussel**, *Mytilus galloprovincialis*, **either alone or as binary mixtures of HTO and Zn, and HTO and dissolved organic carbon (DOC).** Following exposure of mussels to binary mixtures of differing concentrations of Zn and a fixed concentration of HTO, the objectives of the study were to (a) determine Zn speciation and the association of HTO with DOC present in the exposure waters, (b) investigate the partitioning of HTO and Zn inside the mussels, and (c) quantify the extent of DNA damage in haemocytes following various treatments. In order to achieve these objectives, the chemistry of the exposure water, resultant biological effects and their potential links were investigated. Anodic stripping voltammetry (ASV) and solid phase extraction (SPE) were used to investigate Zn speciation and HTO association with DOC in exposure waters throughout the experimental time. Post-exposure organism dissection, individual tissue analysis and evaluation of genetic damage in the haemocytes (using the single cell gel electrophoresis or the comet assay) were carried out following various treatments in the marine mussels.

Section snippets

Radiation protection- This study was carried out within University of Plymouth's Consolidated Radioisotope Facility (CORiF, an ISO 9001 accredited laboratory) or in controlled spaces, under the guidance of the Radiation Protection Supervisor and Radiation Protection Assistant. All necessary precautions were taken to ensure minimal exposure of experimenters and colleagues to ^{3}H.

Sample apparatus and reagents-Standard clean laboratory operating procedures were adhered to throughout the experiment. Ultra high purity water (UHP:

Quality control-Percent recoveries of total dissolved Zn in aquatic CRMs as determined by ASV were all within 92.1–100.1% (certified concentration 172.3 ± 11 nM Zn). The ASV LOD was determined to be 2 nM Zn. In mussel tissue CRM percent recovery for determining Zn by ICP-MS was lower than the tolerance range (80.5%), for reasons that are unclear. Results were corrected (measured concentration/80.5 × 100) to account for this. The precision of ICP-MS was determined as ≤ 5% RSD ($n = 3$) and the LOD was 112 nM Zn.

Conclusions-Our study provides both chemical and biological data over an exposure duration of 14 days of marine mussels to unary and binary mixtures of zinc, tritium, and dissolved organic carbon. As there is growing concern over the presence of those contaminants which could be carcinogenic, mutagenic and reproductive toxicants (Dallas et al., 2013), genotoxicological assessment in haemocytes of exposed mussels reveals, for the first time, evidence of antagonism when Zn is added at concentrations of

---

Tritium-copper-lead

https://pearl.plymouth.ac.uk/handle/10026.1/16786

Assessing The Impacts Of Metals And Radionuclides On Marine Mussels: Proteomics And Ecotoxicological Approaches

View/Open

Thesis - full version (6.549Mb)
license.txt (3.016Kb)

Date 2020-Author
Crowther, Charlotte

Show full item record

It is well established that anthropogenic contaminants occur in all probable combinations and therefore are not isolated in their threat to the aquatic environment. Recently there has been an increasing interest in measuring pollutants in environmentally realistic conditions to predict the potential detrimental outcomes on the ecosystem. This includes realistic levels of contamination concentrations, chronic exposures duration and mixtures of contaminants. With this perspective, in the present work, marine mussels, **Mytilus galloprovincialis** were exposed to concentrations of **copper (5, 32 µg L-1), lead (5, 25 µg L-1) and tritiated water (HTO**, 1.5, 5 MBq L-1) both individually and as a binary mixture. After a 14-days exposure period, ranges of endpoints at different levels of biological organisation were investigated, including an in-depth investigation into the mussel's proteome. In addition, the results obtained for different endpoints (viz., DNA and chromosomal damage; acetylcholine and glutathione activities, protein carbonyl content, 'clearance rate') were **analysed using network modelling to establish role of sub-lethal biological responses or biomarkers on overall health of the mussels following exposure to contaminants. Binary combinations of Cu, Pb and HTO demonstrated different impacts to genotoxic (i.e. DNA damage and chromosomal aberrations) enzymatic (acetylcholinesterase and glutathione activity, protein carbonyl content) and behavioural (clearance rate) compared to M. galloprovincialis exposed to the same contaminants singularly. In particular, the comet assay results, which suggests an antagonistic increase with the highest binary treatment in Cu-Pb, Cu-HTO and Pb-HTO (Cu-32 µg L-1, Pb- 25 µg L-1 and HTO- 5 MBq L-1).** Whereas the induction of micronucleus were significantly lower in treatments combined with Pb-HTO compared to the single treatments. A number of influential biomarkers were found with the endpoints used in these studies, especially comet assay and glutathione activity when M. galloprovincialis are exposed to the combination of Cu and Pb. As determined in this work, **environmental contaminants interact with each other, which affect an ecologically and economically important marine invertebrate differently compared to single exposures.** This was investigated further by proteomic analyses, which revealed firstly, a number of proteins of interest that were altered when the mussels were exposed to binary combinations of Cu, Pb and HTO. These altered proteins also indicate that a number of biological processes, cellular components and molecular functions are potentially affected by these combinations of contaminants. The variation in biomarker responses found and alterations in the proteome of M. galloprovincialis exposed to mixtures of Cu, Pb and HTO demonstrate the biological complexity of these combination effects. **This indicates the requirement for more environmentally realistic exposure conditions to facilitate the implementations of regulations for hazard and risk assessments for the protection of both environmental and human health**.

Copper

Nuclear power: how might radioactive wastewater affect the environment?
Published: April 30, 2021 9.25am EDT https://theconversation.com/nuclear-power-how-might-radioactive-waste-water-affect-the-environment-159483

That being said, our experiments with both marine and freshwater mussels found that **when radionuclides are present in seawater alongside commonly-occurring metals like copper, the DNA damage caused by radionuclides to the mussels was increased. Much, much more research is needed** to understand the effects of exposure to different types of radionuclides on different species.

Copper etc

Effects of heavy metals on sex inversion of the mussel Mytilus galloprovincialis Lam., 1819 in coastal zone of the Black Sea https://pubmed.ncbi.nlm.nih.gov/36347192/
N S Chelyadina [1], M A Popov [1], N V Pospelova [2], L L Smyrnova [3]

Abstract: Sex inversion in the mussel Mytilus galloprovincialis under the influence of heavy metals as one of the reasons for the shift in the sex ratio in the mussel population on the Black Sea coastal zone of Crimea were considered in the work. The present study is the first to directly show that **heavy metals can cause females of the mussel M. galloprovincialis to change into males**

during post-spawning development of gonads. The degree of impact of heavy metals on the sex change in mussel females was different and decreased in the following sequence: $Cu^{2+} \rightarrow Cd^{2+} \rightarrow Hg^{2+} \rightarrow Pb^{2+} \rightarrow Zn^{2+}$**. Copper ions had the greatest effect, which caused a sex inversion in 54 % of females.** The heavy metals Hg^{2+} and Pb^{2+} were also quite toxic causing mortality in 13 % and 10 % of individuals, respectively. It is possible to use M. galloprovincialis as a model organism in the study of mechanism of **environmental sex reversal in bivalves.**

Copyright © 2022 Elsevier Ltd. All rights reserved.
https://www.sciencedirect.com/science/article/abs/pii/S0025326X22010050

Copper-phospherus-32
https://www.tandfonline.com/doi/full/10.1080/09553002.2020.1823032

Evaluation of interactive effects of phosphorus-32 and copper on marine and freshwater bivalve mollusks
Emily L. Vernon,Michael N. Moore,Tim P. Bean,**Awadhesh N. Jha 2020**

Purpose

Contaminants seldom occur in isolation in the aquatic environment. While pollution of coastal and inland water bodies has received considerable attention to date, **there is limited information on potential interactive effects between radionuclides and metals**. Whether by accidental or controlled release, such contaminants co-exist in aquatic ecosystems and can pose an enhanced threat to biota. Using a range of biological responses, the study aimed to evaluate relative interactive effects on representative freshwater and marine bivalve species.

Methods-

An integrated, multi-biomarker approach was adopted to investigate response **to copper (Cu,** 18 $\mu g\ L^{-1}$), a known environmentally relevant genotoxic metal and differing concentrations of **phosphorus-32 (^{32}P; 0.1** and 1 mGy d^{-1}), alone and in combination in **marine (*Mytilus galloprovincialis*) and freshwater (*Dreissena polymorpha*) mussels. Genetic** and molecular biomarkers were determined post-exposure and **included DNA damage** (as measured by the comet assay), micronuclei (MN) formation, γ-H2AX foci induction and the expression of key stress-related genes (i.e. *hsp70/90, sod, cat, gst*).

Results

Overall, using a tissue-specific (i.e. gill and digestive gland) approach, genotoxic response was reflective of exposures where **Cu had a slight additive effect on ^{32}P-induced damage across the species (but not all), cell types and dose rates.** Multivariate analysis found significant correlations between comet and γ-H2AX assays, across both the tissues. Transcriptional expression of selected genes were generally unaltered in response to contaminant exposures, independent of species or tissues.

Conclusions

Our study is the first to explore the interactive effects of ionizing radiation (IR) and Cu on two bivalve species representing two ecological habitats. The complexity of IR-metal interactions demonstrate that extrapolation of findings obtained from single stressor studies into field conditions could be misrepresentative

of real-world environments. **In turn, environmental protective strategies deemed suitable in protecting biota from a single, isolated stressor may not be wholly adequate.**

- **Adoption of an integrated, multi-biomarker approach in two bivalve species.**
- **Toxicity of combined mixtures of ^{32}P and Cu compared.**
- **Cu induced additive effects with ^{32}P in the tissues.**
- **DNA damage and DDR showed strong correlations.**
- **Multiple stressors should be considered in assessing the impact of ionizing radiations.**

Tritium-zinc-organic carbon

Mixtures of tritiated water, zinc and dissolved organic carbon: Assessing **interactive** bioaccumulation and genotoxic **effects** in **marine** mussels, Mytilus galloprovincialis, Holly B.C. Pearson [a 1], Lorna J. Dallas [b 1], Sean D.W. Comber [a], Charlotte B. Braungardt [a], Paul J. Worsfold [a], Awadhesh N. Jha [b]https://www.sciencedirect.com/science/article/abs/pii/S0265931X17306124
Journal of Environmental Radioactivity,Volume 187, July 2018, Pages 133-143

Abstract

Release of tritium (^3H) in the marine environment is of concern with respect to its potential bioaccumulation and detrimental impact on the biota. Previous studies have investigated the uptake and toxicity of this radionuclide in marine mussels, and the interaction of ^3H with dissolved organic ligands and elevated temperature. However, despite the well-established view that toxicity is partly governed by chemical speciation, and that toxic effects of mixture of contaminants are not always additive, there have been no studies linking the prevailing chemistry of exposure waters with observed biological effects and tissue specific accumulation of ^3H in combination with other constituents commonly found in natural waters. **This study exposed the marine mussel *Mytilus galloprovincialis* for 14 days to mixtures of ^3H (as tritiated water, HTO) and zinc (Zn) at 5 Mbq L^{-1}, and 383, 1913 and 3825 nM Zn, respectively, to investigate (a) ^3H and Zn partitioning in soft tissues of mussels, and (b) DNA damage in haemocytes, (Note: Circulating haemocytes participate in five classes of physiological function in bivalves: wound repair, shell repair, nutrient digestion and transport, excretion, and internal defence) determined using the single cell gel electrophoresis or the comet assay.** Additionally, the extent of association of ^3H with dissolved organic carbon (DOC, added as humic acid) over the exposure period was investigated in order to aid the interpretation of biological uptake and effects. Results concluded a clear antagonistic effect of Zn on ^3H-induced DNA damage at all Zn concentrations used, likely explained by the importance of Zn in DNA repair enzymes. The interaction of DOC with ^3H was variable, with strong ^3H-DOC associations observed in the first 3 d of the experiment. The secretion of ^3H-binding ligands by the mussels is suggested as a possible mechanism for early biological control of ^3H toxicity. **The results suggest risk assessments for radionuclides in the environment require consideration of potential mixture effects.**

---

https://pearl.plymouth.ac.uk/handle/10026.1/16786

Copper, Lead, Tritiated Water

Assessing The Impacts Of Metals And Radionuclides On Marine Mussels: Proteomics And Ecotoxicological Approaches, Crowther, Charlotte

Thesis - full version (6.549Mb), 2020
license.txt (3.016Kb)

It is well established that anthropogenic contaminants occur in all probable combinations and therefore are not isolated in their threat to the aquatic environment. Recently there has been an increasing interest in measuring pollutants in

environmentally realistic conditions to predict the potential detrimental outcomes on the ecosystem. This includes realistic levels of contamination concentrations, chronic exposures duration and mixtures of contaminants. With this perspective, in the present work, marine mussels, Mytilus galloprovincialis (Note: Mediteranian or blue mussel) **were exposed to concentrations of copper (5, 32 µg L-1), lead (5, 25 µg L-1) and tritiated water (HTO, 1.5, 5 MBq L-1) both individually and as a binary mixture**. After a 14-days exposure period, ranges of endpoints at different levels of biological organisation were investigated, including an in-depth investigation into the mussel's proteome. In addition, the results obtained for different endpoints (viz., DNA and chromosomal damage; acetylcholine and glutathione activities, protein carbonyl content, 'clearance rate') were **analysed using network modelling to establish role of sub-lethal biological responses or biomarkers on overall health of the mussels following exposure to contaminants. Binary combinations of Cu, Pb and HTO demonstrated different impacts to genotoxic (i.e. DNA damage and chromosomal aberrations) enzymatic (acetylcholinesterase and glutathione activity, protein carbonyl content) and behavioural (clearance rate) compared to M. galloprovincialis exposed to the same contaminants singularly. In particular, the comet assay results, which suggests an antagonistic increase with the highest binary treatment in Cu-Pb, Cu-HTO and Pb-HTO (Cu-32 µg L-1, Pb- 25 µg L-1 and HTO- 5 MBq L-1).** Whereas the induction of micronucleus were significantly lower in treatments combined with Pb-HTO compared to the single treatments. A number of influential biomarkers were found with the endpoints used in these studies, especially comet assay and glutathione activity when M. galloprovincialis are exposed to the combination of Cu and Pb. As determined in this work, **environmental contaminants interact with each other, which affect an ecologically and economically important marine invertebrate differently compared to single exposures.** This was investigated further by proteomic analyses, which revealed firstly, a number of proteins of interest that were altered when the mussels were exposed to binary combinations of Cu, Pb and HTO. These altered proteins also indicate that a number of biological processes, cellular components and molecular functions are potentially affected by these combinations of contaminants. The variation in biomarker responses found and alterations in the proteome of M. galloprovincialis exposed to mixtures of Cu, Pb and HTO demonstrate the biological complexity of these combination effects. **This indicates the requirement for more environmentally realistic exposure conditions to facilitate the implementations of regulations for hazard and risk assessments for the protection of both environmental and human health**.

Phosphorus 32

Assessing relative biomarker responses in marine and freshwater bivalve molluscs following exposure to phosphorus 32 (³²P): Application of genotoxicological and molecular biomarkers 2020, Journal of Environmental Radioactivity

Despite the lower dose rate to MG gill compared to DP gill cells (0.1 and 1 mGy d−1), DNA damage was noted (~7−15% tail DNA). Disparity may be down to numerous factors, including differential sensitivity between cell types or species, radionuclide properties (e.g. linear energy transfer: LET values), absorbed dose, exposure length and physiological factors (i.e. reproductive stage, metabolism, health status) (Nalepa et al., 1991; Jha, 2008; Pearson et al., 2018). As previously noted, 32P incorporates directly onto the ribose-phosphate backbone of replicating DNA and isotopic decay (32P to 32S) breaks the initial strand (SSB), and by close proximity emitted elections can cause DSBs

---

Ammonia Nitrate

Toxicity of ammonia, nitrite and nitrate to Litopenaeus vannamei juveniles in low-salinity water in single and ternary exposure experiments and their environmental implications 2019, Environmental Toxicology and Pharmacology

:

The limited number of studies of the toxicity combined with nitrogen compounds found synergic and antagonistic effects at different exposure times and only evaluate binary combinations of nitrogen compounds (ammonia and nitrite, Alcaraz et al., 1999; nitrite and nitrate, Cheng and Chen, 2002a; ammonia and nitrite, Schuler et al., 2010). In contrast, **numerous studies evaluating on single and mixtures the toxicity mixtures of heavy metals and/or other chemicals (organic compounds) have been documented in different taxonomic groups such as fish (Feng et al., 2015; Yan et al., 2016), mollusks (Pearson et al., 2018; Zheng et al., 2018) and crustaceans (Sung et al., 2014; De Liguoro et al., 2018), studies documenting that the behavior of the interactions is highly variable.** From these findings, **it is of particular importance the development of toxicity tests considering the co-exposure of the three nitrogen compounds mixture to evaluate the**

antagonistic and/or synergic responses under low-salinity conditions in shrimp, since the available (binary) studies have been developed in higher salinities.

Copper

Effects of heavy metals on sex inversion of the mussel Mytilus galloprovincialis Lam., 1819 in coastal zone of the Black Sea

Author links open overlay panelN.S. Chelyadina [a], M.A. Popov [a], N.V. Pospelova [a], L.L. Smyrnova [b]

https://doi.org/10.1016/j.marpolbul.2022.114323Get rights and content

Highlights

- Females of *Mytilus galloprovincialis* inverse of sex influence of heavy metals (Zn^{2+}, Cd^{2+}, Pb^{2+}, Hg^{2+} Cu^{2+}).
- The degree of exposure of HM on sex inversion of mussel females decreased in the following sequence: $Cu^{2+} \rightarrow Cd^{2+} \rightarrow Hg^{2+} \rightarrow Pb^{2+} \rightarrow Zn^{2+}$.
- Cu ions had the greatest effect on the death and sex inversion of mussel females.

Abstract

Sex inversion in the mussel *Mytilus galloprovincialis* under the influence of heavy metals as one of the reasons for the shift in the sex ratio in the mussel population on the Black Sea coastal zone of Crimea were considered in the work. The present study is the first to directly show that **heavy metals can cause females of the mussel *M. galloprovincialis* to change into males during post-spawning development of gonads**. The degree of impact of heavy metals on the sex change in mussel females was different and decreased in the following sequence: $Cu^{2+} \rightarrow Cd^{2+} \rightarrow Hg^{2+} \rightarrow Pb^{2+} \rightarrow Zn^{2+}$. **Copper ions had the greatest effect, which caused a sex inversion in 54 % of females. The heavy metals Hg^{2+} and Pb^{2+} were also quite toxic causing mortality in 13 % and 10 % of individuals, respectively. It is possible to use *M. galloprovincialis* as a model organism in the study of mechanism of environmental sex reversal in bivalves.**

Data will be made available on request.

P-32 NOTE COMMENTS IN TEXT APPLCIABLE TO TRITIUM

https://www.sciencedirect.com/science/article/abs/pii/S0265931X19305831

Assessing relative biomarker responses in marine and freshwater bivalve molluscs following exposure to phosphorus 32 (^{32}P): Application of genotoxicological and molecular biomarkers

Author links open overlay panelEmily L. Vernon [a], Tim P. Bean [b], Awadhesh N. Jha [a]

https://doi.org/10.1016/j.jenvrad.2019.106120Get rights and content Abstract

Anthropogenic radionuclides can enter water bodies through accidental or controlled discharges. In order to assess their potential impact, understanding the link between exposure, tissue specific bioaccumulation and radiation dose rate, to biological or biomarker responses in aquatic biota is required. Adopting an integrated, multi-biomarker, multi-species approach, we have investigated potential biological responses induced by short-lived radionuclide, phosphorus-32 (^{32}P, radiophosphorus) in two ecologically important mussel species, the freshwater *Dreissena polymorpha* (DP) and marine *Mytilus galloprovincialis* (MG). Adult individuals were exposed to ^{32}P for 10 days, to acquire nominal whole-body average dose rates of 0.10, 1 and 10 mGy d^{-1}, which encompass a screening value of 10 μGy h^{-1} (0.24 mGy d^{-1}), in accordance with the ERICA tool. Following exposure, a suite of genotoxic biomarkers (DNA damage, γ-H2AX induction and micronucleus [MN] formation) were measured in gill and digestive gland tissues, along with transcriptional expression of selected stress-related genes in both the species (i.e. *hsp70/90, sod,* cat *and* gst). **Our results demonstrate the relationship between tissue specific dosimetry, where ^{32}P induced a dose-dependent increase, and biological responses independent of species**. Gene expression analysis revealed little significant variation across species or tissues. Overall, MG appeared to be more sensitive to short-term damage (i.e. high DNA damage and γ-H2AX induction), particularly in digestive gland. This study contributes to limited knowledge on the **transfer and biological impact of radionuclides within differing**

aquatic systems on a tissue specific level, aiding the development of adequate management and protective strategies.

Introduction

Radionuclides discharged in the environment can pose short and long-term detrimental effects to both human and natural biota (UNSCEAR, 1982; Dallas et al., 2012). With rapid population growth driving the need for nuclear energy, along with accidental (e.g. Chernobyl 1986; Fukushima 2011) and controlled release (i.e. from educational, medical and other establishments), radionuclides are of concern to both scientific and regulatory bodies (Hu et al., 2010; Khamis and Kavvadias, 2012). While there is not enough experimental information available in the literature to develop a screening dose rate for each species (Dallas et al., 2012), a dose rate of 10 μGy h^{-1} (0.24 mGy d^{-1}) has been adopted as a generic screening value (all species), where no significant negative effects are expected at the population level (Andersson et al., 2008, 2009). Where this value will over protect some biota and under protect others, it can be used as a benchmark to screen out situations of no regulatory concern. As explained in previous literature (Vernon et al., 2018), **a whole-body dose monitoring approach may be insufficient in wholly protecting organisms from radiation exposure, as radionuclides are known to display specificity in tissue uptake. As such, a specific tissue (e.g. digestive gland) accumulating a significant proportion of a radionuclide, compared to another tissue would receive a far higher dose and therefore, a higher degree of biological damage. Whole-body monitoring may therefore mask tissue specific damage. To ensure an adequate degree of protection, impacts at sub-organismal and individual levels need to be extrapolated and related to those at the population, community, or ecosystem level. Linking radiation exposure to tissue specific bioaccumulation and dose rate, and to subsequent biological responses in a range of aquatic organisms to establish relative radiation sensitivities will aid this extrapolation** (Scoppa, 1983; Dallas et al., 2012; Kumar et al., 2017; Carvalho, 2018; Salbu et al., 2018; Skipperud and Salbu, 2018; Vernon et al., 2018).

To date, the majority of radiation studies have focused primarily on external exposures to long-lived radionuclides, where whole-body dose rates are related to biological response. However, **short-lived radionuclides such as ^{32}P (half-life = 14.29 d), whilst occurring in small quantities within the environment have the capacity to accumulate in aquatic biota, particularly when they are chronically exposed (Smith et al., 2011). When accumulated, internal exposure within cells/tissue can induce significant biological damage dependant on the radionuclide and typical range in tissue (**e.g. alpha particles have short range in tissue, ~0.3 mm) (Cherry et al., 2012).

Environmental ^{32}P originates from various sources (e.g. cosmogenic and anthropogenic) but there is paucity of information about its presence in the environment. While the half-life of this radionuclide is short, it is discharged and detected in the aquatic environment. In terms of recorded environmental concentrations, ^{32}P values (2005–2013) average 0.27 ± 0.21 Bq L^{-1} in the River Clyde (Erskine Habour, King George V Dock), Scotland (SEPA, 2013). Reference conditions for ^{32}P (i.e. concentrations that result in a total ingested dose for humans of 0.10 mSv y^{-1} if consumed at 2 L day^{-1}), are set at 57 Bq L^{-1} (DWQR, 2014). **While not as environmentally prominent as other radionuclides such as caesium-137 (^{137}Cs), cobalt-60 (^{60}Co), and tritium (^{3}H), ^{32}P can be utilised as a relatively cheap, easy to use (in terms of experimental design) surrogate for beta and gamma emitting radionuclides** (Vernon et al., 2018), **capable of producing an internal and external exposure to study biological responses in appropriate models**. Furthermore, whilst **appearing in small concentrations within the environment as mentioned above, ^{32}P is able to rapidly accumulate to high concentrations in tissues and could induce detrimental effects in a tissue specific manner** (Vernon et al., 2018). Our recent study has reported highly tissue specific accumulation in marine and freshwater bivalves, where the greatest ^{32}P concentrations were present in the digestive gland (Vernon et al., 2018). **Once concentrated in tissues, the radioisotope has the potential to cause significant molecular and genetic level effects.** ^{32}P is chemically and radiologically unique as the mode of actions (MoA) is mediated by DNA double-strand break (DSB) induction (Cheng et al., 2015). Aqueous ^{32}P gets incorporated into the ribose-phosphate backbone of replicating DNA, isotopic decay (^{32}P to sulfur-32, ^{32}S) results in chemical breakage of DNA (SSBs), and the release of high energy beta particles causes **further DNA damage** through double strand breaks (DSBs) (Cheng et al., 2015). It should be noted that the term 'DNA damage' will refer to strand breakage as measured by the comet assay whereas DNA damage/repair response will be referred as Gamma-H2AX assay in this study.

Ionising radiations (IR) primarily influence sub-cellular levels of biological organisation by interacting with atoms of biomolecules (Bayliss and Langley, 2003). Therefore, molecular and genetic alterations are perceived as an early warning signal of organism's stress (Bayliss and Langley, 2003; Czapla-Masztafiak et al., 2016). Due to (a) the radiological nature of ^{32}P, (b) its accumulative potential in aquatic biota and (c) the limited amount of information available with respect to possible impacts of short-lived radionuclides on the biota, we aimed to investigate potential

genetic and molecular alterations in two bivalve species, inhabiting different environments. Measured biological responses included DNA damage and repair, micronuclei (MN) formation, and changes in the transcription of key genes involved in stress responses, given that the earliest observable signs of biological stress can be transcriptional alteration of the genes (Bahrami and Drabløs, 2016). To date, there is limited information available on IR induced mRNA alterations in aquatic invertebrates (Gomes et al., 2018; Han et al., 2014a, b; Farcy et al., 2007, 2011; AlAmri et al., 2012; Devos et al., 2015; Dallas et al., 2016). More studies are required, particularly as most of the information available in the literature have evaluated expression of genes and other biological responses following exposure of organisms to acute, external radiation sources (i.e. ^{137}Cs), which could not be considered as environmentally relevant as chronic, low-dose exposures (Dallas et al., 2012).
In the present study, we investigated ^{32}P-induced potential biological damage in two ecologically important bivalve species, the marine mussel *Mytilus galloprovincialis* (MG), and freshwater species *Dreissena polymorpha* (DP). Bivalve molluscs utilised in the study represent both coastal and inland water bodies (McDonald et al., 1991; Binelli et al., 2015). Where marine species might not be used to determine risk in freshwater environments or vice-versa, it is important to determine biological damage associated with radionuclide exposure in the biota belonging to the same biological group. This would assist in identifying the most sensitive species for environmental protection (Vernon and Jha, 2019), and will add to the paucity of radioecological/radiotoxicity data, particular for freshwater bivalves (Falfushynska et al., 2016; Vernon et al., 2018). As sessile, filter feeders, bivalves play an important role as bioindicators of environmental health (Hawkins, 1992; Viarengo et al., 2007; NOAA, 2012; Souza et al., 2012). Their prominent use in ecotoxicological studies has resulted in a well-understood physiology, anatomy and ecology (Bayne, 1976; Dallas et al., 2012; Binelli et al., 2015; Beyer et al., 2017; Vernon et al., 2018). Digestive gland and gill tissues were utilised as in previous studies from our laboratory. This allowed for comparison between biological responses in tissues exhibiting varying accumulation patterns. **As noted in Vernon et al. (2018), ^{32}P accumulation, and therefore dose rate is far greater in digestive gland compared to other soft tissues** (i.e. gill, mantle). **Mussel digestive glands accumulate and process nutrients, which are distributed to reproductive tissues during gonad development**. As such, apart from impact on overall homeostatic control, the **key concern with digestive gland damage is the possible influence on reproductive success** (Sastry and Blake, 1971; Dimitriadis et al., 2004). Mussel gills play a major role in respiratory processes, nutrient uptake and digestion (David and Fontanetti, 2005; Gómez-Mendikute et al., 2005). They filter suspended particulates directly from the surrounding media to specific organs (Jørgensen, 1982). The large surface area and close proximity to aquatic contaminants makes them a prime tissue for biomonitoring and ecotoxicological studies and their sensitivity to numerous pollutants is well documented (Mersch et al., 1996; Parolini et al., 2011; Al-Subiai et al., 2012; Canesi et al., 2014; Dallas et al., 2013, 2016, 2018).
The aims and objectives of this study were (a) to relate radionuclide (i.e. ^{32}P) bioaccumulation and delivered dose rate to subsequent biological responses, **in gill and digestive gland tissues of the selected bivalves, (**b) to determine genotoxic and molecular responses in two bivalves following ^{32}P exposure adopting a multi-biomarker approach and (c) to determine relative sensitivity between marine and freshwater adult bivalves. We hypothesised that as ^{32}P uptake, and therefore dose rate increases, as will the level of biological damage. In terms of variation between bivalve species subsequent to ^{32}P exposure, we hypothesised that little disparity in genotoxic or molecular response would be evident, increased DNA damage would be paralleled by DDR, and lastly, genes related to oxidative stress would be upregulated following ^{32}P exposure.

Results

During the exposure periods, no spawning or mortality of mussels occurred for either of the species. Metal (Cu) and ^{32}P concentrations, along with water quality measurements are presented in Table 1. Results of the ICP-MS and LSC analysis confirmed that achieved values were in line with expected concentrations across all treatments.

Tritium

(*also see previous section interactions metals/chemicals)*

https://ieer.org/wp/wp-content/uploads/2023/02/Exploring-Tritum-Dangers.pdf

Exploring Tritium Dangers

Exploring Tritium Dangers discusses much neglected aspects of radiation risks when radionuclides are inside the body and inside cells. It considers risks to the embryo and fetus of radionuclides that cross the placenta by using tritium, radioactive hydrogen, which becomes radioactive water, as the illustrative pollutant. It focuses on non-cancer risks in early pregnancy, ecosystem impacts, and suggests the ways in oxidative stress caused by internal radiation could combine with similar stress by non-radioactive pollutants like heavy metals, notably to damage mitochondria, which power the energy systems of plants, fungi, and animals, including people.

PSR Greater Boston-Dr. Greta Lundberg speech to Plymouth presentation Plymouth Board of Health

https://us02web.zoom.us/rec/share/FrAiiwmafRjDpKONyMQ_TyUWggDm3U8RANnFmLLf0TJ2ad5Eel8gcWpMX3uRzKAy.TFyyj9hgU97jGkZJ
Passcode: 4r4GaO.i

Ian Fairlie

https://www.ianfairlie.org/news/the-hazards-of-tritium/

https://www.ianfairlie.org/news/should-tepco-japanese-government-dump-tritium-contaminated-water-from-fukushima-into-the-sea/

PODCAST Ian Fairlie-Arnie/Maggie Gundersen
tritium? https://static1.squarespace.com/static/54aac5e4e4b0b6dc3e1f6866/t/57153cce8a65e2a38d5ce833/1461009668060/tritiumpodcast_final.mp3/original/tritiumpodcast_final.mp3

TEPCO misleads on tritium dangers, threatens to dump contaminated water
https://www.asahi.com/ajw/articles/13243911
Water contaminated with radionuclides, including tritium, and stored at the Fukushima nuclear site, could soon be dumped into the Pacific ocean. The water becomes contaminated with radionuclides while being used to constantly cool the three ruined nuclear reactors there. It is then stored in tanks -- 777,000 tons as of July 6 this year -- but storage space on the site is running out, a problem that had been foreseen. Recent news reports about TEPCO's plan touched off a firestorm of criticism from all corners of Japan's society.

Despite misleading news reports that tritium is relatively harmless, a number of scientific studies have shown that this is simply not true. A radioactive form of hydrogen, tritium is virtually impossible to filter. It will travel anywhere in the body if inhaled or ingested; is extremely mobile in the environment; can become organically bound and bioconcentrate, especially in aquatic life; and can collect to twice the concentration in fetal compared to maternal tissue. Clearly there is no guarantee, as TEPCO argues, that tritium will *stay* "dispersed" once released into Japan's coastal waters. TEPCO also claims that other radionuclides have been filtered out of the tank water, but there is no independent, transparent confirmation of this. Contaminated water from Fukushima continues to flow into the Pacific, also without proper accounting.

---

http://www.huffingtonpost.com/roger-witherspoon/indian-point-contaminates_b_9224302.html

Indian Point Contaminates the Hudson River With Uncontrollable Radioactive Flow

Tritium," explained David Lochbaum, nuclear safety expert at the Union of Concerned Scientists, "is just the first item reported. It tends to be the leading edge of any spill since it is the lightest and most mobile of the radioactive contaminants. The other isotopes slow down as they go through the soil. That other stuff is on its way, however. Tritium just wins the race."

Note: Importance cleanup

https://www.sciencedirect.com/science/article/abs/pii/S0265931X12001890

Bioaccumulation of tritiated water in phytoplankton and trophic transfer of organically bound tritium to the blue mussel, *Mytilus edulis* Benedict C. Jaeschke, Clare Bradshaw

Journal of Environmental Radioactivity, Volume 115, January 2013, Pages 28-33
https://doi.org/10.1016/j.jenvrad.2012.07.008Get rights and content

Abstract

Large releases of tritium are currently permitted in coastal areas due to assumptions that it rapidly disperses in the water and has a low toxicity due to its low energy emissions. This paper presents a laboratory experiment developed to identify previously untested scenarios where tritium may concentrate or transfer in biota relevant to Baltic coastal communities. Phytoplankton populations of *Dunaliella tertiolecta* and *Nodularia spumigena* were exposed at different growth-stages, to tritiated water (HTO; 10 MBq l^{-1}). Tritiated *D. tertiolecta* was then fed to mussels, *Mytilus edulis*, regularly over a period of three weeks. Activity concentrations of phytoplankton and various tissues from the mussel were determined. **Both phytoplankton species transformed HTO into organically-bound tritium (OBT) in their tissues.** *D. tertiolecta* accumulated significantly more tritium when allowed to grow exponentially in HTO than if it had already reached the stationary growth phase; both treatments accumulated significantly more than the corresponding treatments of *N. spumigena*. No effect of growth phase on bioaccumulation of tritium was detectable in *N. spumigena* following exposure. After mussels were given 3 feeds of tritiated *D. tertiolecta*, significant levels of tritium were detected in the tissues. **Incorporation into most mussel tissues appeared to follow a linear relationship with number of tritiated phytoplankton feeds with no equilibrium, highlighting the potential for biomagnification.** Different rates of incorporation in species from a similar functional group highlight the difficulties in using a 'representative' species for modelling the transfer and impact of tritium. **Accumulations of organic tritium into the mussel tissues from tritiated-phytoplankton demonstrate an environmentally relevant transfer pathway of tritium even when water-concentrations are reduced, adding weight to the assertion that organically bound tritium acts as a persistent organic pollutant. The persistence, potential for biomagnification and the increased toxicity of organic tritium increases the potential impact on the environment following a release of HTO; current legislation does not adequately take into account the nature of organic forms of tritium and therefore may be underestimating accumulation and toxic effect of tritium in the environment**. Such information is necessary to accurately assess the distribution of tritium following routine releases, and to adequately protect the environment and humans.

Highlights

► Tritium was bioaccumulated into organic tritium in phytoplankton cells. ► Green algae incorporated more tritium than the cyanobacteria. ► Organic tritium was transferred from phytoplankton to blue mussels when ingested. ► Linear uptake of tritium into mussels indicates a potential for biomagnification. ► Current legislation may underestimate accumulation of tritium in the environment.

---

https://pubmed.ncbi.nlm.nih.gov/22863967/

Bioaccumulation of tritiated water in phytoplankton and trophic transfer of organically bound tritium to the blue mussel, Mytilus edulis

Benedict C Jaeschke [1], Clare Bradshaw

Affiliations expand

Abstract

Large releases of tritium are currently permitted in coastal areas due to assumptions that it rapidly disperses in the water and has a low toxicity due to its low energy emissions. This paper presents a laboratory experiment developed to identify previously untested scenarios where tritium may concentrate or transfer in biota relevant to Baltic coastal communities. Phytoplankton populations of Dunaliella tertiolecta and Nodularia spumigena were exposed at different growth-stages, to tritiated water (HTO; 10 MBq l(-1)). Tritiated D. tertiolecta was then fed to mussels, Mytilus edulis, regularly over a period of three weeks. Activity concentrations of phytoplankton and various tissues from the mussel were determined. **Both phytoplankton species transformed HTO into organically-bound tritium (OBT) in their tissues.** D. tertiolecta accumulated significantly more tritium when allowed to grow exponentially in HTO than if it had already reached the stationary growth phase; both treatments accumulated significantly more than the corresponding treatments of N. spumigena. No effect of growth phase on bioaccumulation of tritium was detectable in N. spumigena following exposure**. After mussels were given 3 feeds of tritiated D. tertiolecta, significant levels of tritium were detected in the tissues. Incorporation into most mussel tissues appeared to follow a linear relationship with number of tritiated phytoplankton feeds** with no equilibrium, highlighting the potential for biomagnification. Different rates of incorporation in species from a similar functional group highlight the difficulties in using a 'representative' species for modelling the transfer and impact of tritium. Accumulations of organic tritium into the mussel tissues from tritiated-phytoplankton demonstrate an environmentally relevant transfer pathway of tritium even when water-concentrations are reduced, adding weight to the assertion that organically bound tritium acts as a persistent organic pollutant. **The persistence, potential for biomagnification and the increased toxicity of organic tritium increases the potential impact on the environment** following a release of HTO; current legislation **does not adequately take into account the nature of organic forms of tritium and therefore may be underestimating accumulation and toxic effect of tritium in the environment.** Such information is necessary to accurately assess the distribution of tritium following routine releases, and to adequately protect the environment and humans.

Copyright © 2012 Elsevier Ltd. All rights reserved.

Similar articles

- Organically bound tritium (OBT) formation in rainbow trout (Oncorhynchus mykiss): HTO and OBT-spiked food exposure experiments.

  Kim SB, Shultz C, Stuart M, McNamara E, Festarini A, Bureau DP.Appl Radiat Isot. 2013 Feb;72:114-22. doi: 10.1016/j.apradiso.2012.10.001. Epub 2012 Oct 17.PMID: 23208241

- Tissue-specific incorporation and genotoxicity of different forms of tritium in the marine mussel, Mytilus edulis.

  Jaeschke BC, Millward GE, Moody AJ, Jha AN.Environ Pollut. 2011 Jan;159(1):274-280. doi: 10.1016/j.envpol.2010.08.033. Epub 2010 Sep 29.PMID: 20880622

- Impact of low doses of tritium on the marine mussel, Mytilus edulis: genotoxic effects and tissue-specific bioconcentration.

  Jha AN, Dogra Y, Turner A, Millward GE.Mutat Res. 2005 Sep 5;586(1):47-57. doi: 10.1016/j.mrgentox.2005.05.008.PMID: 16039156

- Metabolism of organically bound tritium in man.

  Etnier EL, Travis CC, Hetrick DM.Radiat Res. 1984 Dec;100(3):487-502.PMID: 6390489 Review.

- Uncertainties in dose coefficients for intakes of tritiated water and organically bound forms of tritium by members of the public.
  Harrison JD, Khursheed A, Lambert BE.Radiat Prot Dosimetry. 2002;98(3):299-311. doi: 10.1093/oxfordjournals.rpd.a006722.PMID: 12018747 Review.

See all similar articles

---

https://www.japantimes.co.jp/opinion/2022/08/26/commentary/japan-commentary/radioactive-water-release/

More data needed before ocean release of Fukushima water

The full extent of the nuclear isotopes in the damaged plant's tanks requires more study

Even for tritium, its high levels are not adequately addressed, as it is assumed to be present only in inorganic form as tritiated water. However, there are also organically bound forms of tritium (OBT) that undergo a higher degree of binding to organic material. OBT has been found in the environment at other nuclear sites and is known to be more **likely stored in marine sediments or bioaccumulated in marine biota**

J Environ Radioact

. 2013 Jan;115:28-33.
doi: 10.1016/j.jenvrad.2012.07.008. Epub 2012 Aug 3.

---

https://pubmed.ncbi.nlm.nih.gov/22863967/

Bioaccumulation of tritiated water in phytoplankton and trophic transfer of

organically bound tritium to the blue mussel, Mytilus edulis

Benedict C Jaeschke[1], Clare Bradshaw
Affiliations expand

- PMID: 22863967

- DOI: 10.1016/j.jenvrad.2012.07.008

Abstract

Large releases of tritium are currently permitted in coastal areas due to assumptions that it rapidly disperses in the water and has a low toxicity due to its low energy emissions. This paper presents a laboratory experiment developed to identify previously untested scenarios where tritium may concentrate or transfer in biota relevant to Baltic coastal communities. Phytoplankton populations of Dunaliella tertiolecta and Nodularia spumigena were exposed at different growth-stages, to tritiated water (HTO; 10 MBq l(-1)). Tritiated D. tertiolecta was then fed to mussels, Mytilus edulis, regularly over a period of three weeks. Activity concentrations of phytoplankton and various tissues from the mussel were determined. Both phytoplankton species transformed HTO into organically-bound tritium (OBT) in their tissues. D. tertiolecta accumulated significantly more tritium when allowed to grow exponentially in HTO than if it had already reached the stationary growth phase; both treatments accumulated significantly more than the corresponding treatments of N. spumigena. No effect of growth phase on bioaccumulation of tritium was detectable in N. spumigena following exposure. After mussels were given 3 feeds of tritiated D. tertiolecta, significant levels of tritium were detected in the tissues. Incorporation into most mussel tissues appeared to follow a linear relationship with number of tritiated phytoplankton feeds with no equilibrium, highlighting the potential for biomagnification. Different rates of incorporation in species from a similar functional group highlight the difficulties in using a 'representative' species for modelling the transfer and impact of tritium. Accumulations of organic tritium into the mussel tissues from tritiated-phytoplankton demonstrate an environmentally relevant transfer pathway of tritium even when water-concentrations are reduced, adding weight to the assertion that organically bound tritium acts as a persistent organic pollutant. The persistence, potential for biomagnification and the increased toxicity of organic tritium increases the potential impact on the environment following a release of HTO; current legislation does not adequately take into account the nature of organic forms of tritium and therefore may be underestimating accumulation and toxic effect of tritium in the environment. Such information is necessary to accurately assess the distribution of tritium following routine releases, and to adequately protect the environment and humans.

Copyright © 2012 Elsevier Ltd. All rights reserved.

Similar articles

- Organically bound tritium (OBT) formation in rainbow trout (Oncorhynchus mykiss): HTO and OBT-spiked food exposure experiments.

  Kim SB, Shultz C, Stuart M, McNamara E, Festarini A, Bureau DP.Appl Radiat Isot. 2013 Feb;72:114-22. doi: 10.1016/j.apradiso.2012.10.001. Epub 2012 Oct 17.PMID: 23208241

- Tissue-specific incorporation and genotoxicity of different forms of tritium in the marine mussel, Mytilus edulis.

  Jaeschke BC, Millward GE, Moody AJ, Jha AN.Environ Pollut. 2011 Jan;159(1):274-280. doi: 10.1016/j.envpol.2010.08.033. Epub 2010 Sep 29.PMID: 20880622

- Impact of low doses of tritium on the marine mussel, Mytilus edulis: genotoxic effects and tissue-specific bioconcentration.

  Jha AN, Dogra Y, Turner A, Millward GE.Mutat Res. 2005 Sep 5;586(1):47-57. doi: 10.1016/j.mrgentox.2005.05.008.PMID: 16039156

- Metabolism of organically bound tritium in man.

  Etnier EL, Travis CC, Hetrick DM.Radiat Res. 1984 Dec;100(3):487-502.PMID: 6390489 Review.

- Uncertainties in dose coefficients for intakes of tritiated water and organically bound forms of tritium by members of the public.
  Harrison JD, Khursheed A, Lambert BE.Radiat Prot Dosimetry. 2002;98(3):299-311. doi: 10.1093/oxfordjournals.rpd.a006722.PMID: 12018747 Review.

See all similar articles

Cited by

- Transcriptome Analysis of the Immortal Human Keratinocyte HaCaT Cell Line Damaged by Tritiated Water.

  Zhang Y, Zhou Y, Wu H, Yan Z, Chen J, Song W.Biology (Basel). 2023 Mar 3;12(3):405. doi: 10.3390/biology12030405.PMID: 36979097 **Free PMC article.**

- Investigation of the tritium content in surface water, bottom sediments (zoobenthos), macrophytes, and fish in the mid-stream region of the Yenisei River (Siberia, Russia).
  Bondareva L, Schultz MK.Environ Sci Pollut Res Int. 2015 Nov;22(22):18127-36. doi: 10.1007/s11356-015-5042-1. Epub 2015 Jul 16.PMID: 26178837

Publication ty

CESIUM ON MUSSELS

A simulated **toxic assessment of cesium on the blue mussel** Mytilus edulis provides evidence for the potential impacts of nuclear wastewater discharge on marine ecosystems
https://pubmed.ncbi.nlm.nih.gov/36270569/

A simulated toxic assessment of cesium on the blue mussel Mytilus edulis provides evidence for the potential impacts of nuclear wastewater discharge on marine ecosystems

Mengxue Xu [1], Yaya Zhang [2], Sai Cao [3], Yuanyuan Li [4], Jiayi Wang [5], Huihui Dong [6], You Wang [7]
Affiliations expand

- DOI: 10.1016/j.envpol.2022.120458

Abstract

The toxic effects of cesium (Cs) on the blue mussel Mytilus edulis were experimentally investigated to assess the potential environmental consequences of the discharge of nuclear wastewater containing radionuclides. A simulated experimental system of stable cesium (^{133}Cs) was set up to mimic the impacts of radiocesium, and its heavy metal property was emphasized. The mussels were exposed to a concentration gradient of ^{133}Cs for 21 days, followed by another 21-day elimination period. ^{133}Cs exposure resulted in effective bioaccumulation with distinct features of concentration dependence and tissue specificity, and hemolymph, gills and digestive glands were recognized as the most target tissues for accumulation. Although the elimination period was helpful in reducing the accumulated ^{133}Cs, the remaining concentrations of tissues were still significant. **^{133}Cs exposure presented little effect on growth status at the individual level but had distinct interference on feeding and metabolism indicated by the oxygen consumption rate, ammonia-N excretion rate and O:N ratio, simultaneously with the impairment of digestive glands**. Regarding hemocytes in the hemolymph, the cell mortality increment, micronucleus promotion, lysosomal membrane stability disruption and phagocytic ability inhibition suggested that the **immune function was injured.** The cooccurrence of reactive oxygen species overproduction had a close relationship with the observed damages and was thought to be the possible explanation for the immune toxicity. The assay based integrated biomarker response (IBR) presented a **good linear relation with the exposure concentrations, s**uggesting that it was a promising method for assessing the risk of ^{133}Cs. The results indicated that ^{133}Cs exposure damaged M. edulis at the tissue and cell before at the macroscopic individual, **evidencing the potentially detrimental impacts of nuclear wastewater discharge on marine ecosystems.**

https://www.sciencedirect.com/science/article/pii/S0269749122016724 ***more detail-whole article***

Abstract

The toxic effects of cesium (Cs) on the blue mussel *Mytilus edulis* were experimentally investigated to assess the potential environmental consequences of the discharge of nuclear wastewater containing radionuclides. A simulated experimental system of stable cesium (^{133}Cs) was set up to mimic the impacts of radiocesium, and its heavy metal property was emphasized. The mussels were exposed to a concentration gradient of ^{133}Cs for 21 days, followed by another 21-day elimination period. ^{133}Cs exposure resulted in effective bioaccumulation with distinct features of concentration dependence and

tissue specificity, and hemolymph, gills and digestive glands were recognized as the most target tissues for accumulation. Although the elimination period was helpful in reducing the accumulated ^{133}Cs, the remaining concentrations of tissues were still significant. ^{133}Cs exposure presented little effect on growth status at the individual level but had **distinct interference on feeding and metabolism indicated by the oxygen consumption rate, ammonia-N excretion rate and O:N ratio, simultaneously with the impairment of digestive glands**. Regarding hemocytes in the hemolymph, the cell mortality increment, micronucleus promotion, lysosomal membrane stability disruption and phagocytic ability inhibition suggested that the immune function was injured. The cooccurrence of reactive oxygen species overproduction had a close relationship with the observed damages and was thought to be the possible explanation for **the immune toxicity. The assay based integrated biomarker response (IBR) presented a good linear** relation with the exposure concentrations, suggesting that it was a promising method for assessing the risk of ^{133}Cs. The results indicated that ^{133}Cs exposure damaged *M. edulis* at the tissue and cell before at the macroscopic individual, evidencing the potentially detrimental impacts of nuclear wastewater discharge on marine ecosystems.

1. Introduction

The announcement of the Japanese government for starting an initiative within 2 years to release 1.25 million tons of radioactive wastewater from the crippled Fukushima Daiichi Nuclear Power Plant (FDNPP) into the ocean over approximately 30 years has garnered worldwide attention. Although the Japanese government promised the security of radioactive wastewater because of its low concentration after treatments, the people and related countries **still concerned that radionuclides remained in wastewater would threaten marine safety and human health**.

Generally, **radionuclides pose two aspects of radiation toxicity and ionic toxicity to biota (Burger and Lichtscheidl, 2018): the former mainly refers to the genotoxicity caused by DNA lesions (Adam-Guillermin et al., 2012; Pearson et al., 2018), and the latter induces physiological damage that depends on the level of accumulation and internal exposure in organisms (Lai and Luo, 2019).** Cesium (Cs) radioactive isotopes (^{134}Cs and ^{137}Cs) are recognized as the characteristic radionuclides of nuclear accidents because of their sheer abundance, relatively high persistence (half-lives of 2.4 and 30.2 years respectively), **mobility in the water column and direct interaction with aquatic organisms** (Bam et al., 2021; Delaval et al., 2020; Thomas and Fisher, 2019). Simulative experiments using ^{137}Cs irradiation in marine organisms indicated that ionizing radiation could induce **DNA damage (**Alamri et al., 2012) and fecundity decline (Gilbin et al., 2008). Moreover, **Cs has chemical properties similar to those of potassium (K), and it can be easily absorbed and accumulated in the body of organisms, causing ionic toxicity to internal organs** (Lai and Luo, 2019). **In marine ecosystems, the uptake of dissolved Cs is thought to be an important route of bioconcentration among invertebrates (such as zooplankton, shrimp, some mollusks and fish larvae**) (Thomas and Fisher, 2019), after which bioaccumulation occurs in higher trophic level organisms through the food chain (Thomas et al., 2018). Notably, **Cs accumulated in organisms can provide high doses to tissues in proximity and result in more severe localized effects and even organ failure, while external irradiation usually exerts uniform exposure across tissues.**

Despite the long-recognized importance of Cs waste products, our understanding of the toxic effects of Cs on marine organisms is still somewhat limited. **Mussels are widely recognized as sentinel organism**s indicating environmental changes and assessing ecological risk through macrolevel physiological processes when facing radioactive pollutant stress (Baltas et al., 2016; Kılıç et al., 2014; Murakami-Sugihara et al., 2021). They are provided with a complex innate immune system composed of humoral and cell-mediated responses against pathogenic and xenobiotic insults (Wootton et al., 2003). Hemocytes represent the main immune defense cells of mussels and studies on immune responses are helpful to predict the environmental impact (Burgos-Aceves et al., 2021). We thus performed the present study to simulate the possible impacts of Cs on the blue mussel *Mytilus edulis*, and the alteration of key physiological processes was determined and the possible hidden explanation was discussed. The results may lead to a better knowledge of the risks

that radiocesium poses to marine organisms, especially in the context of the nuclear wastewater from the crippled FDNPP about to be discharged into the ocean.

2. Methods and materials

2.1. Mussel cultivation

Adult individuals of *M. edulis* (over a year old, mature gonad, shell length 4.5 ± 0.5 cm) were collected from an aquaculture farm of Rizhao, Shandong Province, China (119°33′E, 35°22′N) in May 2021. After being transferred to the laboratory, 300 healthy mussels without shell damage were selected and maintained in glass tank containing 75 L of natural seawater. The mussels were fed microalgae *Platymonas helgolandica* (1.5×10^5 cells/mL) once a day and allowed to acclimate for 7 days under the following conditions: seawater renewed daily, constant aeration, salinity 31 ± 1.0, pH 8.1 ± 0.1, temperature 18 ± 2 °C, and 12/12 h of light/dark cycle.

2.2. Experimental design

2.2.1. The simulative system of Cs exposure

Stable nuclides and radioactive nuclides have identical chemical properties and biological characteristics that exert ionic toxic impacts on organisms, and many studies thus choose stable nuclides as substitutes for radioactive nuclides considering the safety of field testing (Ding et al., 2016; Lai and Luo, 2019). A simulated experimental system of stable Cs (^{133}Cs) was set up to mimic the impacts of radiocesium (e.g., ^{134}Cs, ^{137}Cs). CsCl (analytical purity) was applied as the source of ^{133}Cs (Lai and Luo, 2019), and the median lethal dose (96 h-LD_{50}) was determined to be 4.5 mM according to the preliminary acute toxicity experiment (Supplementary Material). Three sublethal exposure concentrations were set based on 96 h-LD_{50}, which were 4.5 μM, 45 μM and 450 μM. During the experiment, the acclimated mussels were randomly selected and equally divided into four experimental groups: the control group (without ^{133}Cs), the low concentration group (4.5 μM), the middle concentration group (45 μM) and the high concentration group (450 μM). Each group contained one tank with 63 individuals, and the approximate density was 250 mL/mussel. The exposure lasted for 21 days, and water with an equal supplement of ^{133}Cs was renewed each day. After the exposure period, the treated mussels (n = 9) in each group were randomly collected and transferred into clean seawater without ^{133}Cs addition for the 21-day elimination period.

2.2.2. Bioaccumulation and elimination of ^{133}Cs in *M. edulis*

Nine mussels in each group were randomly selected at the end of the exposure and elimination periods, respectively. The different tissues, including hemolymph, digestive gland, gills, gonad, foot and mantle, were separately sampled according to the method of Jiang et al. (2017), and the tissues of three mussels were collected as a test sample. The concentrations of ^{133}Cs in the tissues mentioned above were measured by inductively coupled plasma atomic emission spectrometry (ICP-AES, SPECTRO ARCOS EOP, SPECTRO Analytical Instruments GmbH) (Supplementary Material) and were expressed as μg/g wet weight (Ww). The elimination rate was calculated according to the following equation:Eliminationrate=Cexposure−CeliminationCexposure×100%

$C_{exposure}$ and $C_{elimination}$ were denoted as the concentrations at the end of the exposure and elimination periods, respectively.

2.2.3. Changes in the growth status of *M. edulis* induced by ^{133}Cs

Nine mussels in each group were randomly selected and equally divided into three on the 21st day. The growth status of individuals after ^{133}Cs exposure was elucidated by condition index (CI) and water content (WC), which were determined according to the methods of Sun et al. (2016) and Smolders et al. (2004), respectively.

2.2.4. Changes in the feeding and metabolism of *M. edulis* induced by ^{133}Cs

Nine mussels were randomly collected and equally divided into three from each group on the 21st day for the analysis of feeding and metabolism at the individual level after ^{133}Cs exposure. The filtering rate (FR) was

determined according to the method of Wilding and Maltby (2006). The metabolic mode was indicated by oxygen consumption rate (R_O), ammonia-N excretion rate (R_N) and O:N ratio. R_O was analyzed based on the method of Sun et al. (2016). R_N was determined by AA3 continuous flow analysis. The O:N ratio was calculated as described by Widdows (1978). Moreover, paraffin sections with H. E. staining were applied to observe the impairment of the digestive gland that indicated the alteration of digestion.

2.2.5. Changes in hemocytes of *M. edulis* induced by ^{133}Cs

Nine mussels were randomly chosen from each group on the 7th, 14th and 21st day during exposure to determine the immune responses of hemocytes in *M. edulis* exposed to ^{133}Cs. After the extraction, the hemolymph of three mussels was pooled as a test sample which was kept on ice until analysis. The sample pre-processing for testing different indicators was preformed according to Jiang et al. (2017) with minor modifications (Supplementary Material). The flow cytometer (FCM) analysis and micronucleus (MN) assays were only performed on the 21st day.

- (1) Changes in the component and function

The total hemocyte count (THC) refers to the total number of circulating hemocytes per milliliter of hemolymph. Hemocyte mortality was measured with the FCM analysis according to the method of Hégaret et al. (2003). For the component proportion, hemocytes were distinguished into hyalinocytes and granulocytes, and the proportion changes of these two subpopulations were verified using FCM analysis. The MN frequency was microscopically examined (400 ×) after Giemsa staining, and was defined as the percentage of MN per 1000 cells. The specific measurement methods of the above four indicators were described in the study of Jiang et al. (2017).

Lysosomal perturbation was reflected by the lysosomal membrane stability (LMS) and important hydrolases. The LMS analysis was determined by neutral red retention time (NRRT) according to the method of Regoli et al. (2004). Acid phosphatases (ACP) and alkaline phosphatases (ALP) were measured using disodium phenylphosphate colorimetric determination (Hervio et al., 1991).

Phagocytosis, the main immune defense mechanism initiated by hemocytes, was determined by the ingestion of fluorescent beads with the FCM analysis (Gagnaire et al., 2006; Jiang et al., 2017). The phagocytic ability was indicated by the percentage of phagocytic cells that internalized fluorescent beads.

- (2) Changes in reactive oxygen species (ROS) production and malondialdehyde (MDA) levels

The intracellular ROS content was measured based on the DCFH-DA method (Lambert et al., 2003) and expressed as a fluorescence value per 2×10^6 cells. MDA, the typical bioindicator of oxidative stress, was measured by the Nanjing Jiancheng chemical box.

2.3. Statistical analysis

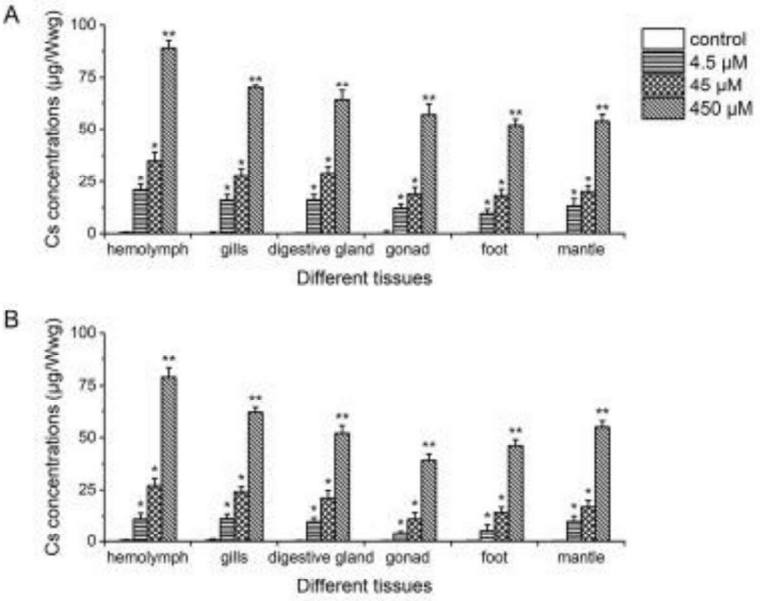
The results of each treatment were calculated from different replicates and presented as the mean ± SE. A one-way ANOVA was performed to identify the differences between the treatments and the control. The nonparametric, Kruskal-Wallis test, was used to determine the effects of the exposure time and concentration. A bivariate Pearson's correlation analysis was performed to analyze the relationship between different indicators of hemocytes. Data statistics were performed using Excel 2019 and SPSS 23.0, and figures were generated using Origin 8.5.

3. Results

3.1. Bioaccumulation and elimination of ^{133}Cs in *M. edulis*

The 21-day ^{133}Cs exposure resulted in effective bioaccumulation in different tissues of *M. edulis* with distinct features of concentration dependence and tissue specificity: the accumulated concentrations in tissues increased significantly and steadily with increasing exposure concentrations, and the peaks were generally found in hemocytes followed by gills, digestive gland, gonad, mantle and foot (Fig. 1A; one-way ANOVA, $p < 0.05$). The subsequent elimination period could reduce the accumulated concentrations in different tissues of all treated groups; however, the extent of elimination still depends on the tissue specificity. There was significant residual ^{133}Cs remaining in tissues of all treatments (Fig. 1B; one-way

ANOVA, $p < 0.05$), and the hemolymph had the highest concentration, followed by gills, mantle, digestive gland, foot and gonad. In addition, the elimination rates decreased with increasing exposure concentrations, and that in the high concentration group (450 μM) was only approximately 15% (Table 1). The big gap between accumulation and elimination would result in ^{133}Cs bioavailability in tissues of *M. edulis*.



1. Download : Download high-res image (376KB)
2. Download : Download full-size image

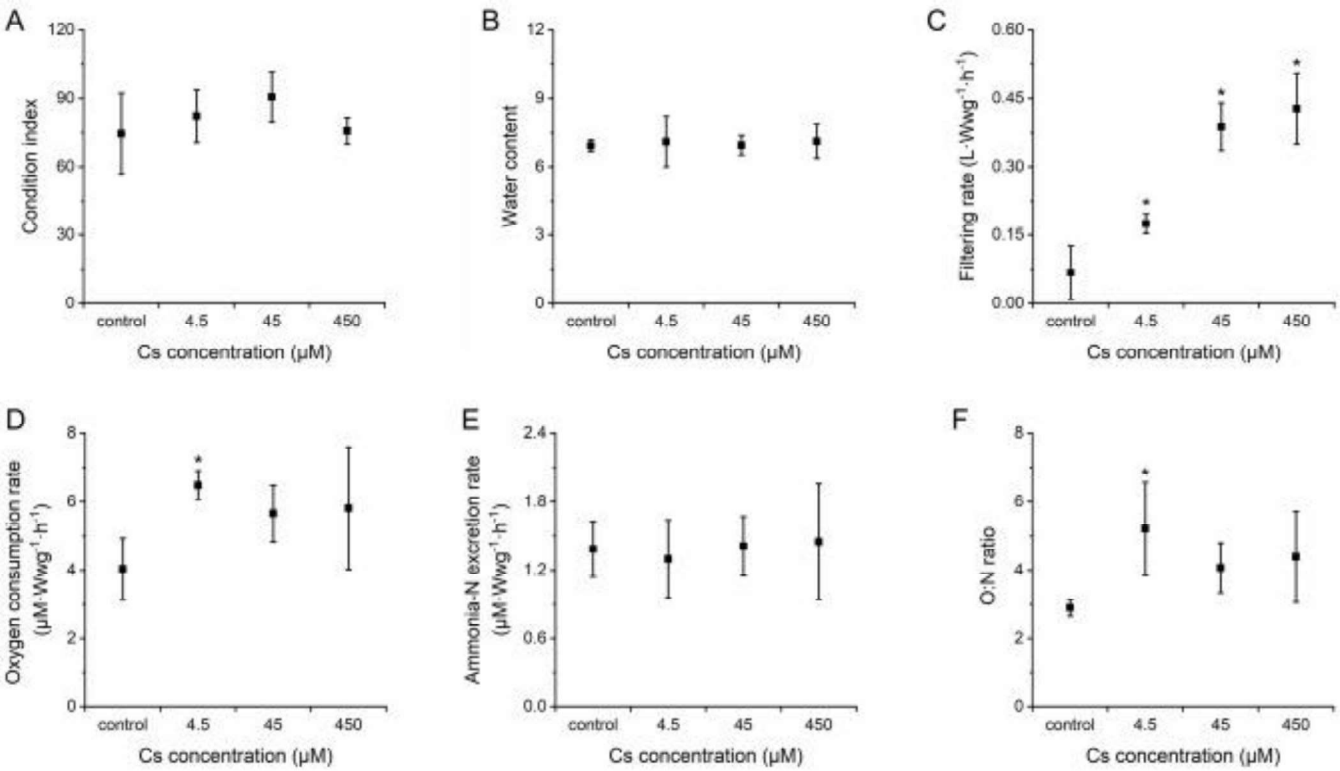
Fig. 1. ^{133}Cs concentrations in different tissues of *M. edulis* after two periods (n = 9). A: The accumulation period; B: The elimination period. *Significant differences at $p < 0.05$ level; **Significant differences at $p < 0.01$ level.

Table 1. Elimination rates of ^{133}Cs in different tissues of *M. edulis*.

Tissue	Elimination rates (%)		
	4.5 μM	45 μM	450 μM
Hemolymph	47.6	22.9	18.8
Gills	30.0	17.2	11.4
digestive gland	40.0	27.6	11.7
Gonad	66.3	42.1	31.6
Foot	27.4	21.9	11.5
Mantle	25.0	16.1	11.3

3.2. Changes in the growth status of *M. edulis* induced by ^{133}Cs

The growth status alterations indicated by CI (Fig. 2A) and WC (Fig. 2B) showed little difference in all treatments compared to the control, and no visible change was found at the individual level after the 21-day exposure.



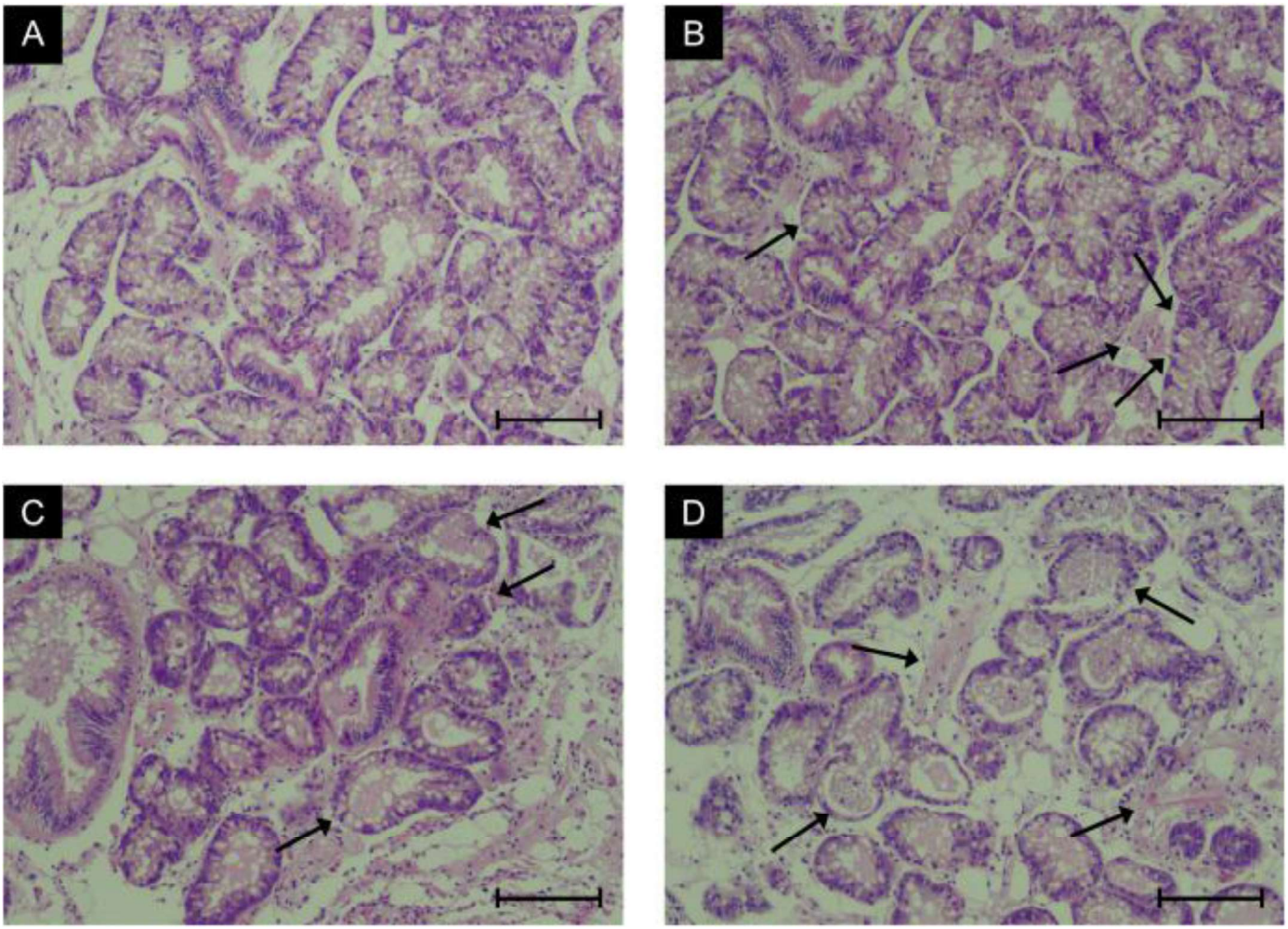
1. Download : Download high-res image (406KB)
2. Download : Download full-size image

Fig. 2. Changes in the growth status, feeding and metabolism of *M. edulis* induced by ^{133}Cs (n = 9). A: Condition index (CI); B: Water content (WC); C: Filtering rate (FR); D: Oxygen consumption rate (R_O); E: Ammonia-N excretion rate (R_N); F: O:N ratio. *Significant differences at $p < 0.05$ level.

3.3. Changes in the feeding and metabolism of *M. edulis* induced by ^{133}Cs

The feeding behavior indicated by FR increased significantly and steadily with increasing ^{133}Cs concentrations (Fig. 2C; one-way ANOVA, $p < 0.05$). Regarding metabolism, R_O was apparently enhanced and the low concentration group (4.5 μM) had statistical significance (Fig. 2D; one-way ANOVA, $p < 0.05$), while R_N fluctuated with little difference in all treatments (Fig. 2E). The O:N ratio was calculated and was found to present a tendency quite similar to that in R_O (Fig. 2F; one-way ANOVA, $p < 0.05$). The results inferred that both feeding and metabolism were influenced by ^{133}Cs exposure.

The digestive gland was not only the target for ^{133}Cs accumulation but also the link loop of feeding and metabolism. We observed obvious histopathological impairment in each treatment, and the injury to an extent depended on the ^{133}Cs exposure concentrations. The normal structure of the digestive gland was composed of tightly arranged digestive tubes with luminal stenosis, as shown in the control (Fig. 3A). Minor damage was observed in the low concentration group (4.5 μM), mainly manifested as hemocyte infiltration and epithelial atrophy (Fig. 3B). The damage became more serious in the middle concentration group (45 μM), which was reflected by the loose arrangement of epithelial cells and the abnormal enlarge of lumens (Fig. 3C). The partial lesions deteriorated to large area in the high concentration group (450 μM), and diffuse digestive tubules and cellular fibrosis appeared (Fig. 3D). A consistency was found between digestive gland damage and physiological dysfunction, providing a possible explanation for the physiological alterations at feeding and metabolism.



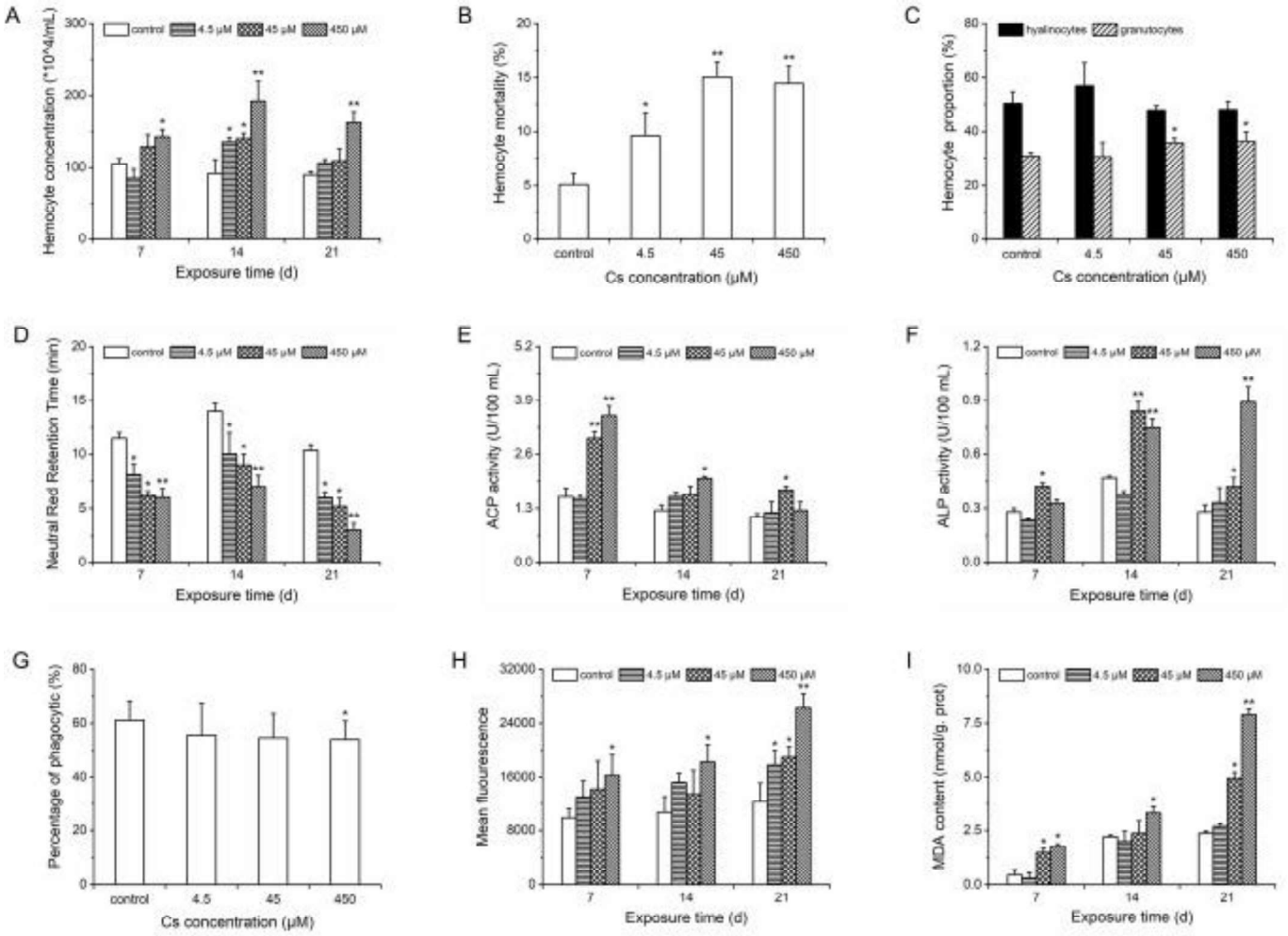
1. Download : Download high-res image (2MB)
2. Download : Download full-size image

Fig. 3. Histopathological alterations in the digestive gland of *M. edulis* induced by ^{133}Cs. A: Control; B: Low concentration group (4.5 μM); C: Middle concentration group (45 μM); D: High concentration group (450 μM). Scale bars = 100 μm.

3.4. Changes in hemocytes of *M. edulis* induced by ^{133}Cs

3.4.1. Changes in components and functions

THC increased significantly (Fig. 4A; one-way ANOVA, $p < 0.05$) with a clear concentration-effect relationship (Table 2; Kruskal-Wallis test, $p < 0.05$), and peaks were found in the high concentration group (450 μM). A similar trend was found in the mortality rate, and the peak values appeared in the middle (45 μM) and high (450 μM) groups (Fig. 4B; one-way ANOVA, $p < 0.05$). The proportion of two main components in hemocytes, granulocytes and hyalinocytes, presented various responses during the exposure: granulocytes presented a positive response to the increasing ^{133}Cs concentrations with significance, while hyalinocytes showed little change (Fig. 4C; one-way ANOVA, $p < 0.05$).



1. Download : Download high-res image (877KB)
2. Download : Download full-size image

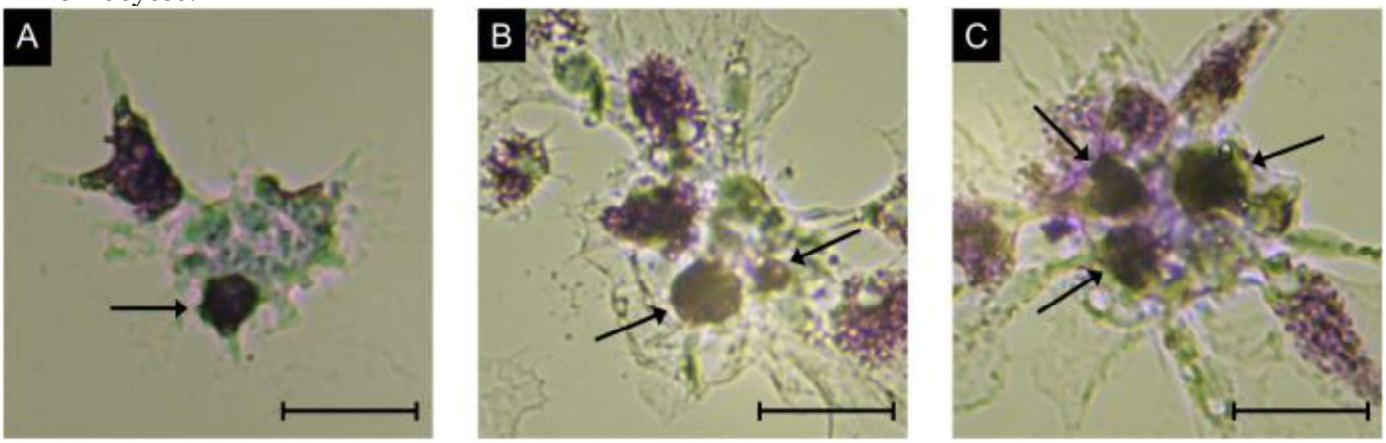
Fig. 4. Changes in the hemocyte of *M. edulis* induced by ^{133}Cs (n = 9). A: Total hemocyte concentration (THC); B: Hemocyte mortality; C: Hemocyte proportion; D: Neutral red retention time (NRRT); E: Acid phosphatases (ACP) activity; F: Alkaline phosphatases (ALP) activity; G: Phagocytosis; H: Reactive oxygen species (ROS) level; I: Malondialdehyde (MDA) content. *Significant differences at $p < 0.05$ level; **Significant differences at $p < 0.01$ level.

Table 2. Results of nonparametric tests, Kruskal-Wallis tests on THC, NRRT, ACP, ALP, ROS and MDA of hemocytes against concentration and time.

Empty Cell	**Time**		**Concentration**	
	K^2	***p***	**K^2**	***p***
THC	1.08	0.584	8.44	0.038
NRRT assay	3.50	0.174	7.05	0.040
ACP activity	3.61	0.164	5.51	0.133
ALP activity	4.06	0.131	4.40	0.221
ROS level	2.58	0.276	7.67	0.048
MDA content	8.58	0.014	2.12	0.547

In addition, the MN assay distinguished the hemocytes into three different types according to the number of nuclei. Most of the cells were normal (Fig. 5A) with few MN cells in the low (4.5 μM) and medium (45 μM) groups. Binucleated (Fig. 5B) and multinucleated (Fig. 5C) cells were observed in the high concentration

group (450 μM) with MN frequency up to 7‰, indicating ^{133}Cs-induced interference with nucleus formation in hemocytes.



1. Download : Download high-res image (654KB)
2. Download : Download full-size image

Fig. 5. Representative image of hemocyte micronucleus assays. A: Normal cell; B: Binucleate cell; C: Multinucleate cell. Scale bars = 50 μm.

NRRT decreased significantly in all treatments (Fig. 4D; one-way ANOVA, $p < 0.05$) with a clear concentration-effect relationship (Table 2; Kruskal-Wallis test, $p < 0.05$), suggesting that LMS was adversely disrupted by ^{133}Cs. The opposite tendency was found in the activities of two phosphatases, ACP and ALP, which increased positively with ^{133}Cs increments (Fig. 4E and F; one-way ANOVA, $p < 0.05$) and peaked in the high concentration (450 μM) group on the 7th day (Fig. 4E) and the 21st day (Fig. 4F), respectively. Moreover, the overall trend of decrease was found in phagocytic ability with ^{133}Cs exposure, but statistical significance was only found in the high group (450 μM) (Fig. 4G; one-way ANOVA, $p < 0.05$). The combined evaluation evidenced the ^{133}Cs-induced lysosomal perturbation and immune dysfunction.

3.4.2. Changes in ROS production and MDA levels

Exogenous stress-induced ROS overproduction and oxidative stress are usually thought to be responsible for the injury. In the present study, we observed the cooccurrence of ROS overproduction (Fig. 4H) and MDA elevation (Fig. 4I) with statistical significance, and peaked in the high group (450 μM) on the 21st day after exposure (Fig. 4H and I; one-way ANOVA, $p < 0.05$). A clear concentration-effect relationship and a clear time-effect relationship were obtained for ROS and MDA, respectively (Table 2; Kruskal-Wallis test, $p < 0.05$).

4. Discussion

Contaminants in water environments can be accumulated by bivalves through filtering activity and stored in functional tissues, and then pose toxic risks to individual survival. In the present study, ^{133}Cs was bioaccumulated effectively by *M. edulis* after the 21-day exposure in a concentration-dependent and tissue-specific manner, and **hemolymph had the highest accumulation levels, followed by gills, digestive gland, gonad, mantle and foot**. We thus recognized **that hemolymph, gills and digestive gland, as well as the immune and metabolism function they performed, were the main attacking targets**. We also found that the subsequent 21-day elimination period could reduce the accumulated concentration, and the big gap between the accumulation and elimination resulted in ^{133}Cs bioavailability that influenced the mussels' activities. The results also inferred that either low environmental concentrations or short-term exposure to ^{133}Cs exert impacts on the coexisting organisms to a certain extent.

When facing external stress, macrolevel physiological processes of organisms including the growth, development and even reproduction are obviously influenced. CI and WC are usually used as biological indicators at the community level, but we found in the present study that the CI and WC of *M.*

edulis presented little alteration after ^{133}Cs exposure. However, this does not mean that ^{133}Cs are safe to the coculture organisms; this is because the biological reactions are hierarchical. The subsequent observed increase in FR and R_O of *M. edulis* after ^{133}Cs exposure confirms this inference. It seemed a common coping strategy that mussels increased FR and R_O, namely, food intake and metabolic activity, to offset the high energic cost of cellular maintenance, damage repair and detoxification processes caused by contamination (Martinez et al., 2019). In addition, we found few differences in R_N between the control and treatments, indicating that ^{133}Cs stress had no distinct adverse effects on the protein metabolism level. Further computation showed that the O:N ratio increased significantly after ^{133}Cs exposure, which suggested an alteration of the utilization of energy resources, i.e., the propensity to use lipids as an energy source (Chandurvelan et al., 2012). Simultaneously, marked damage observed in the digestive gland provided direct evidence of ^{133}Cs-induced noxious impacts in *M. ediulis*, which may explain the physiological dysfunctions of feeding and metabolism. The present results suggested that *M. edulis* increased food intake and regulated energy utilization to cope with the survival stress induced by ^{133}Cs exposure.

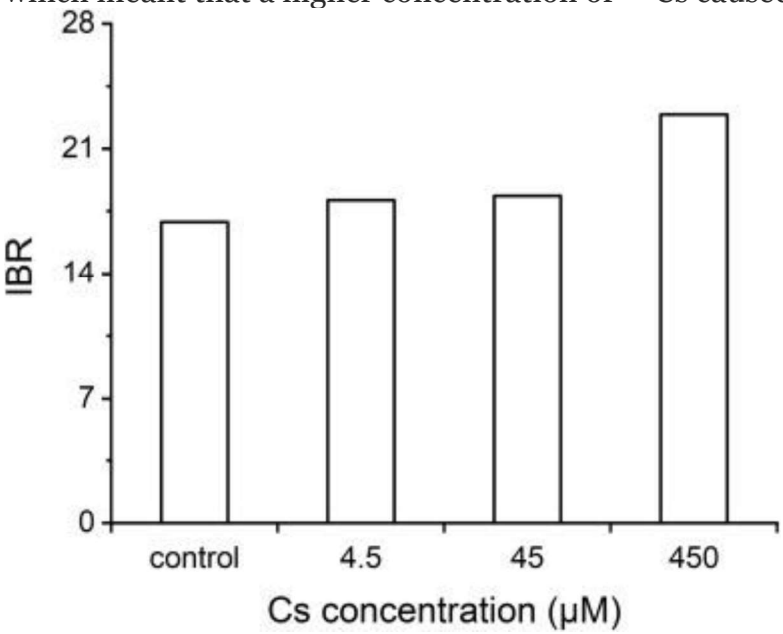
Immune function is the key process of mussels that are coping with exogeneous stress, and its impairment influences the survival, growth and dynamics of the population. We also speculated that immune function was the most sensitive target for ^{133}Cs attack because of the highest bioaccumulation in the hemolymph of *M. edulis*. Hemolymph cells are the hemocytes responsible for mastering the immune response and serve as the first line of defense against foreign invaders (Bouallegui, 2019). In this study, we observed that THC and hemocyte mortality in *M. edulis* increased significantly with increasing ^{133}Cs concentrations, suggesting a high susceptibility of hemocytes to ^{133}Cs exposure. As phagocytic cells of hemocytes, granulocytes containing abundant hydrolytic enzymes can phagocytize microbial pathogens and contribute to intracellular killing (Jiang et al., 2017; Parrino et al., 2019), and its proportion increased slightly after ^{133}Cs exposure in the present study. Simultaneously, we observed the nuclear deformity via MN assay, which indicated a typical sign of chromosome damage. In fact, MN frequency is known to be related to the genotoxic effects and the level of ecological risk on mussels (Shi et al., 2018), and we thus assumed the occurrence of ^{133}Cs-induced genotoxicity on hemocytes in *M. edulis*. Notably, the alteration in the community structure of hemocytes affects the immune response, nutrient transport and energy distribution (Jiang et al., 2017). As the main mechanism of the cell-mediated immune defense in bivalves, phagocytosis is usually impaired when individuals are exposed to heavy metal pollution (Renault, 2015), which is consistent with our results that the phagocytic activity of hemocytes in *M. edulis* was inhibited significantly after ^{133}Cs exposure. We also found obvious lysosomal perturbation, characterized by the adverse disruption of LMS and the abnormal elevation of ACP and ALP activity, which would affect the endocytosis and degradation of invasive materials during the phagocytosis process. Furthermore, ROS production originated from endogenous processes provides the main medium of killing phagocytosed pathogens (Lambert et al., 2007). However, the excessive production of ROS induces oxidative stress and causes oxidative damage, which can destroy the structure of biological macromolecules and result in injured organisms. Therefore, the ROS-mediated pathway is always considered as the mechanism to explain the toxicity induced by xenobiotics. In this study, the obvious overproduction of ROS and MDA indicated that ^{133}Cs exposure induced oxidative stress and lipid peroxidation in hemocytes. Moreover, a good correlation between ROS and the other indices, including THC, NRRT, ALP and MDA, was obtained through Pearson's correlation coefficients (Table 3). Taken together, we confirmed that ^{133}Cs induced immune toxicity and impaired immune function of hemocytes in *M. edulis*, and the ROS-mediated pathway might be a possible explanation for the observation.

Table 3. Pearson's correlation coefficients for THC, morality, NRRT, ACP, ALP, phagocytosis, ROS and MDA of hemocytes. *Significant differences at $p < 0.05$ level; **Significant differences at $p < 0.01$ level.

Empty Cell	**THC**	**Morality**	**NRRT**	**ACP**	**ALP**	**Phagocytosis**	**MDA**	**ROS**
THC	1							
Morality	0.678	1						
NRRT	−0.844	−0.914	1					

Empty Cell	THC	Morality	NRRT	ACP	ALP	Phagocytosis	MDA	ROS
ACP	0.039	0.744	−0.429	1				
ALP	0.991**	0.656	−0.791	0.047	1			
Phagocytosis	−0.683	−0.928	0.968*	−0.566	−0.615	1		
MDA	0.945*	0.803	−0.837	0.304	0.964*	−0.698	1	
ROS	0.965*	0.825	−0.955*	0.239	0.935*	−0.851	0.934*	1

To comprehensively evaluate the effects of ^{133}Cs on *M. edulis*, we further integrated the biomarker data into the integrated biomarker responses (IBR) according to the method of Beliaeff and Burgeot (2002). The IBR provides an overall assessment and comparison of the health status of mussels from different living conditions, with a higher IBR value indicating increased environmental stress and poorer health status. In this study, a clear positive correlation between the IBR and the ^{133}Cs concentrations was observed (Fig. 6), which meant that a higher concentration of ^{133}Cs caused greater survival stress on *M. edulis*.



1. Download : Download high-res image (195KB)
2. Download : Download full-size image

Fig. 6. IBR of *M. edulis* after 21 days of ^{133}Cs exposure.

5. Conclusion

The heavy metal property of radiocesium, the other property except radiation, presented obviously detrimental effects on marine mussels even with a short exposure time and low exposure concentration. Damage occurred first from the microbiospectrum of tissue and cells, although no macroscopic alterations in individuals were found, and **metabolic activities and immune function were the main targets of attack.** It should be mentioned that the marine organisms are typically hierarchy, and the subtle change at the microbiospectrum would enlarge and ultimately be present at the macro level. **The consolidated results indicated that the discharge of nuclear wastewater containing radionuclides would harm the marine organisms and threatens the safety and sustainability of marine ecosystems.**

References

1. Adam-Guillermin et al., 2012

C. Adam-Guillermin, S. Pereira, C. Della-Vedova, T. Hinton, J. Garnier-Laplace

Genotoxic and reprotoxic effects of tritium and external gamma irradiation on aquatic animals

D. Whitacre (Ed.), Reviews of Environmental Contamination and Toxicology, Springer, New York (2012), pp. 67-103, 10.1007/978-1-4614-3414-6_3
View article
View in ScopusGoogle Scholar

2. Alamri et al., 2012

O.D. Alamri, A.B. Cundy, Y. Di, A.N. Jha, J.M. Rotchell

Ionizing radiation-induced DNA damage response identified in marine mussels, *Mytilus* sp
Environ. Pollut., 168 (2012), pp. 107-112, 10.1016/j.envpol.2012.04.015
View PDFView articleView in ScopusGoogle Scholar

3. Baltas et al., 2016

H. Baltas, E. Kiris, G. Dalgic, U. Cevik

Distribution of ^{137}Cs in the mediterranean mussel (*Mytilus galloprovincialis*) in eastern black sea coast of Turkey
Mar. Pollut. Bull., 107 (2016), pp. 402-407, 10.1016/j.marpolbul.2016.03.032
View PDFView articleView in ScopusGoogle Scholar

4. Bam et al., 2021

W. Bam, J.L. Teyssié, M. Metian, F. Oberhaensli, K. Maiti, P.W. Swarzenski

An experimental approach to assess the post-depositional mobility of ^{134}Cs
J. Environ. Radioact., 240 (2021), Article 106753, 10.1016/j.jenvrad.2021.106753
View PDFView articleView in ScopusGoogle Scholar

5. Beliaeff and Burgeot, 2002

B. Beliaeff, T. Burgeot

Integrated biomarker response: a useful tool for ecological risk assessment

Environ. Toxicol. Chem., 21 (6) (2002), pp. 1316-1322

View in ScopusGoogle Scholar

6. Bouallegui, 2019

Y. Bouallegui

Immunity in mussels: an overview of molecular components and mechanisms with a focus on the functional defenses

Fish Shellfish Immunol., 89 (2019), pp. 158-169, 10.1016/j.fsi.2019.03.057
View PDFView articleView in ScopusGoogle Scholar

7. Burger and Lichtscheidl, 2018

A. Burger, I. Lichtscheidl

Stable and radioactive cesium: a review about distribution in the environment, uptake and translocation in plants, plant reactions and plants' potential for bioremediation

Sci. Total Environ., 618 (2018), pp. 1459-1485, 10.1016/j.scitotenv.2017.09.298
View PDFView articleView in ScopusGoogle Scholar
8. Burgos-Aceves et al., 2021

M.A. Burgos-Aceves, H.G. Abo-Al-Ela, C. Faggio

Impact of phthalates and bisphenols plasticizers on haemocyte immune function of aquatic invertebrates: a review on physiological, biochemical, and genomic aspects

J. Hazard Mater., 419 (2021), Article 126426, 10.1016/j.jhazmat.2021.126426
View PDFView articleView in ScopusGoogle Scholar
9. Chandurvelan et al., 2012

R. Chandurvelan, I.D. Marsden, S. Gaw, C.N. Glover

Impairment of green-lipped mussel (*Perna canaliculus*) physiology by waterborne cadmium: relationship to tissue bioaccumulation and effect of exposure duration
Aquat. Toxicol., 124–125 (2012), pp. 114-124, 10.1016/j.aquatox.2012.07.013
View PDFView articleView in ScopusGoogle Scholar
10. Delaval et al., 2020

A. Delaval, C. Duffa, O. Radakovitch

A review on cesium desorption at the freshwater-seawater interface

J. Environ. Radioact., 218 (2020), Article 106255, 10.1016/j.jenvrad.2020.106255
View PDFView articleView in ScopusGoogle Scholar
11. Ding et al., 2016

K. Ding, S. Liu, Y. He, Y. Dong, F. Zhang, S. Wang, J. Guo, W. Zhang, X. Wang, X. Jiang

Simulating the transfer of strontium-90 from soil to leafy vegetables by using strontium-88

Water Air Soil Pollut., 227 (2016), p. 414, 10.1007/s11270-016-3098-2
View article
View in ScopusGoogle Scholar
12. Gagnaire et al., 2006

B. Gagnaire, H. Thomas-Guyon, T. Burgeot, T. Renault

Pollutant effects on Pacific oyster, *Crassostrea gigas* (Thunberg), hemocytes: screening of 23 molecules using flow cytometry
Cell Biol. Toxicol., 22 (2006), pp. 1-14, 10.1007/s10565-006-0011-6
View article
View in ScopusGoogle Scholar
13. Gilbin et al., 2008

R. Gilbin, F. Alonzo, J. Garnier-Laplace

Effects of chronic external gamma irradiation on growth and reproductive success of *Daphnia magna*
J. Environ. Radioact., 99 (2008), pp. 134-145, 10.1016/j.jenvrad.2007.07.004
View PDFView articleView in ScopusGoogle Scholar
14. Hégaret et al., 2003

H. Hégaret, G.H. Wikfors, P. Soudant

Flow cytometric analysis of haemocytes from eastern oysters, *Crassostrea virginica*, subjected to a sudden temperature elevation: II. Haemocyte functions: aggregation, viability, phagocytosis, and respiratory burst
J. Exp. Mar. Biol. Ecol., 293 (2) (2003), pp. 249-265, 10.1016/S0022-0981(03)00235-1
View PDFView articleView in ScopusGoogle Scholar

15. Hervio et al., 1991

D. Hervio, D. Chagot, H. Godin, H. Grizel, E. Mialhe

Localisation and characterization of acid phosphate activity in *Bonamia ostreae* (Ascetospora), an intrahemocytic protozoan parasite of the flat oyster *Ostrea edulis* (Bivalvia)
Dis. Aquat. Org., 12 (1991), pp. 67-70
View in ScopusGoogle Scholar

16. Jiang et al., 2017

Y. Jiang, X. Tang, T. Sun, Y. Wang

BDE-47 exposure changed the immune function of haemocytes in *Mytilus edulis*: an explanation based on ROS-mediated pathway
Aquat. Toxicol., 182 (2017), pp. 58-66, 10.1016/j.aquatox.2016.11.010
View PDFView articleGoogle Scholar

17. Kılıç et al., 2014

Ö. Kılıç, M. Belivermiş, F. Gözel, F.P. Carvalho

Radioactivity levels in mussels and sediments of the golden horn by the bosphorus strait, marmara sea

Mar. Pollut. Bull., 86 (1–2) (2014), pp. 555-561, 10.1016/j.marpolbul.2014.06.033
View PDFView articleView in ScopusGoogle Scholar

18. Lai and Luo, 2019

J. Lai, X. Luo

High-efficiency antioxidant system, chelating system and stress-responsive genes enhance tolerance to cesium ionotoxicity in Indian mustard (*Brassica juncea* L.)
Ecotoxicol. Environ. Saf., 181 (2019), pp. 491-498, 10.1016/j.ecoenv.2019.06.048
View PDFView articleView in ScopusGoogle Scholar

19. Lambert et al., 2003

C. Lambert, P. Soudant, G. Choquet, C. Paillard

Measurement of *Crassostrea gigas* hemocyte oxidative metabolism by flow cytometry and the inhibiting capacity of pathogenic vibrios
Fish Shellfish Immunol., 15 (3) (2003), pp. 225-240, 10.1016/S1050-4648(02)00160-2
View PDFView articleView in ScopusGoogle Scholar

20. Lambert et al., 2007

C. Lambert, P. Soudant, M. Jegaden, M. Delaporte, Y. Labreuche, J. Moal, J. Samain

In vitro modulation of reactive oxygen and nitrogen intermediate (ROI/RNI) production in *Crassostrea gigas* hemocytes
Aquaculture, 270 (1–4) (2007), pp. 413-421, 10.1016/j.aquaculture.2007.04.074

View PDFView articleView in ScopusGoogle Scholar
21. Martinez et al., 2019

A.S. Martinez, M. Mayer-Pinto, R.A. Christofoletti

Functional responses of filter feeders increase with elevated metal contamination: are these good or bad signs of environmental health?

Mar. Pollut. Bull., 149 (2019), Article 110571, 10.1016/j.marpolbul.2019.110571
View PDFView articleView in ScopusGoogle Scholar
22. Murakami-Sugihara et al., 2021

N. Murakami-Sugihara, K. Shirai, H. Tazoe, K. Mizukawa, H. Takada, T. Yamagata, S. Otosaka, H. Ogawa

Spatiotemporal change of cesium-137 in the Pacific coast of Tohoku, Japan: the mussel watch approach

Mar. Pollut. Bull., 168 (2021), Article 112413, 10.1016/j.marpolbul.2021.112413
View PDFView articleView in ScopusGoogle Scholar
23. Parrino et al., 2019

V. Parrino, G. Costa, C. Cannavà, E. Fazio, M. Bonsignore, S. Concetta, G. Piccione, F. Fazio

Flow cytometry and micro-Raman spectroscopy: identification of hemocyte populations in the mussel *Mytilus galloprovincialis* (Bivalvia: mytilidae) from faro lake and tyrrhenian sea (sicily, Italy)
Fish Shellfish Immunol., 87 (2019), pp. 1-8, 10.1016/j.fsi.2018.12.067
View PDFView articleView in ScopusGoogle Scholar
24. Pearson et al., 2018

H.B.C. Pearson, L.J. Dallas, S.D.W. Comber, C.B. Braungardt, P.J. Worsfold, A.N. Jha

Mixtures of tritiated water, zinc and dissolved organic carbon: assessing interactive bioaccumulation and genotoxic effects in marine mussels

Mytilus galloprovincialis. J. Environ. Radioact., 187 (2018), pp. 133-143, 10.1016/j.jenvrad.2017.12.018
View PDFView articleView in ScopusGoogle Scholar
25. Regoli et al., 2004

F. Regoli, G. Frenzilli, R. Bocchetti, F. Annarumma, V. Scarcelli, D. Fattorini, M. Nigro

Time-course variations of oxyradical metabolism, DNA integrity and lysosomal stability in mussels, *Mytilus galloprovincialis*, during a field translocation experiment
Aquat. Toxicol., 68 (2) (2004), pp. 167-178, 10.1016/j.aquatox.2004.03.011
View PDFView articleView in ScopusGoogle Scholar
26. Renault, 2015

T. Renault

Immunotoxicological effects of environmental contaminants on marine bivalves

Fish Shellfish Immunol., 46 (1) (2015), pp. 88-93, 10.1016/j.fsi.2015.04.011
View PDFView articleView in ScopusGoogle Scholar
27. Shi et al., 2018

J. Shi, X. Li, T. He, J. Wang, Z. Wang, P. Li, Y. Lai, E. Sanganyado, W. Liu

Integrated assessment of heavy metal pollution using transplanted mussels in eastern Guangdong, China

Environ. Pollut., 243 (2018), pp. 601-609, 10.1016/j.envpol.2018.09.006
View PDFView articleView in ScopusGoogle Scholar

28. Smolders et al., 2004

R. Smolders, L. Bervoets, W. De Coen, R. Blust

Cellular energy allocation in zebra mussels exposed along a pollution gradient: linking cellular effects to higher levels of biological organization

Environ. Pollut., 129 (1) (2004), pp. 99-112, 10.1016/j.envpol.2003.09.027
View PDFView articleView in ScopusGoogle Scholar

29. Sun et al., 2016

T. Sun, X. Tang, B. Zhou, Y. Wang

Comparative studies on the effects of seawater acidification caused by CO_2 and HCl enrichment on physiological changes in *Mytilus edulis*
Chemosphere, 144 (2016), pp. 2368-2376, 10.1016/j.chemosphere.2015.10.117
View PDFView articleView in ScopusGoogle Scholar

30. Thomas and Fisher, 2019

D.M. Thomas, N.S. Fisher

Evaluation of body size and temperature on ^{137}Cs uptake in marine animals
J. Environ. Radioact., 202 (2019), pp. 25-31, 10.1016/j.jenvrad.2019.02.005
View PDFView articleView in ScopusGoogle Scholar

31. Thomas et al., 2018

D.M. Thomas, C. Lee, N.S. Fisher

Bioaccumulation and trophic transfer of ^{137}Cs in marine and freshwater plankton
Chemosphere, 209 (2018), pp. 599-607, 10.1016/j.chemosphere.2018.06.124
View PDFView articleView in ScopusGoogle Scholar

32. Widdows, 1978

J. Widdows

Physiological indices of stress in *Mytilus edulis*
J. Mar. Biol. Assoc. U. K., 58 (1978), pp. 125-142, 10.1017/S0025315400024450
View article
View in ScopusGoogle Scholar

33. Wilding and Maltby, 2006

J. Wilding, L. Maltby

Relative toxicological importance of aqueous and dietary metal exposure to a freshwater crustacean: implications for risk assessment

Environ. Toxicol. Chem., 25 (7) (2006), pp. 1795-1801, 10.1897/05-316R1.1
View article

View in ScopusGoogle Scholar
34. Wootton et al., 2003

E.C. Wootton, E.A. Dyrynda, N.A. Ratcliffe

Bivalve immunity: comparisons between the marine mussel (*Mytilus edulis*), the edible cockle (*Cerastoderma edule*) and the razor-shell (*Ensis siliqua*)
Fish Shellfish Immunol., 15 (3) (2003), pp. 195-210, 10.1016/S1050-4648(02)00161-4
View PDFView articleView in ScopusGoogle Scholar

OVERALL DISCUSSION DISCHARGE CONTAMINANTS MARINE ORGANISMS

https://wiki.ubc.ca/Course:EOSC270/2021/Unregulated_and_Unknown:_Effects_of_Nuclear_Waste_on_Marine_Ecosystems

Nuclear waste in the ocean: What it is and why it's there

Highlights:

Figure 1. Effects of radiation on humans have been extensively studied, but not as much is known about the effects of radiation on marine life. Since marine life also uses DNA molecules, we can expect it may have a similar effect. The challenge is determining how exposed the marine life will be, because some radioactive molecules are soluble, and will travel farther and become very dilute, while others are insoluble. Additionally, some radioactive isotopes have a very long half life, and so will persist in radioactive form for much longer than others

The effects of nuclear waste on marine life

The effects of radioactive isotopes on humans are well studied, but their impacts on marine life are difficult to predict, since they are dependent on the exact isotopes leaked and the degree of exposure–the concentration and the length of exposure. In many cases, radioactive isotopes are absorbed in much the same way in fish as they are in humans. Kelp, plankton, and invertebrates directly absorb radioactive isotopes, while fish intake radioactive matter through their gills as well as by ingesting other organisms that are contaminated.[3] In this way, radioactive matter is concentrated in organisms higher on the food chain. Due to this, it is difficult to say just how dilute the nuclear waste must be to be considered "safe". Since many of these isotopes have long half lives, they will persist in the ocean for a long time

How does this problem impact marine ecosystems?

Dangers of nuclear waste

Current marine nuclear waste is mainly low level and mostly consists of discharge from nuclear power plants.[6] **Coastal marine ecosystems are more directly affected by this low level radiation as they tend to be shallower**

Radionuclides: Generally, after 10 half lives the ecosystem will no longer be affected.[10] Cesium-137, a main radioactive pollutant in marine ecosystems,[6] has a half life of 30 years, which means its effects could last as long as 300 years.[10]

Marine organisms

A serious concern is that some radionuclides have the ability to bioaccumulate in benthic invertebrates.[10] *Oceanic pelagic fish, such as the tuna pictured above, have agile bodies made for long distance migration. Many oceanic pelagic fish travel in schools while some are solitary that drift with ocean currents. Some examples of pelagic invertebrates include krill, copepods, jellyfish, decapod larvae, hyperiid amphipods, rotifers and cladocerans.*) **This is due to radioactive waste being absorbed and accumulated in the sediment more than it is in the open seawater above.[7]**

Meiobenthic organisms,(*Meiofauna (or meiobenthos): those animals retained by a 0.1–1.0-mm-mesh sieve. These are small animals commonly found in sand or mud. The group includes very small molluscs, tiny worms, several small crustacean groups (including benthic copepods), as well as less familiar invertebrates (see Section 8.4.*) **such as harpacticoid and ostracod crustaceans, have a high sensitivity to pollutants, including radionuclides.**

---

https://www.sciencedaily.com/releases/2016/10/161018141309.htm

Impact of the Fukushima accident on marine life, five years later

The variability in fish has numerous confounding factors -- the fishes' position in the food chain, where they live in the water column and their migratory patterns, to name a few. Additionally, there is a hypothesis that sediments have delayed the dispersal of the radioactive substances. Benthic fish, those at the bottom of the ocean, are more exposed to contaminated sediments and receive higher dose rates than pelagic fish living in the higher levels of the water column.

BioOne COMPLETE---recommend reading-highlighted some key points

Assessing the Impact of Ionizing Radiation on Aquatic Invertebrates: A Critical Review Dallas, Lorna, Keith-Roach, Lyons, Zha Radiation Research 177(5):693-716, Published Radiation Research Society
https://doi.org/10.1667/RR2687.1

RADIATION RESEARCH 177, 693–716 (2012)
0033-7587/12 $15.00
©2012 by Radiation Research Society.
All rights of reproduction in any form reserved.
DOI: 10.1667/RR2687 1

Note: Invertebrates that you may be familiar with include spiders, worms, snails, lobsters, crabs and insects like butterflies.

The kinds of aquatic invertebrates in freshwater systems include protozoans (single cell animals), freshwater sponges, various types of worms, mollusks (snails, clams, freshwater mussels), and arthropods (animals with jointed legs such as spiders, mites, crustaceans, and insects).

In marine systems: They represent the vast majority of marine biodiversity and include, for example, sponges, corals, bluebottles, worms, shells, sea urchins, starfish, crustaceans, sea cucumbers and nudibranchs.

Respectfully submitted, August 29, 2023, on behalf of Pilgrim Watch, Mary Lampert, director-148 Washington Street Duxbury, MA 02332 - Mary.lampert@comcast.net

Comments of James B. Lampert

James B. Lampert
[redacted]

August 29, 2023

Cathy Coniaris
Mass DEP
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station

Dear Ms. Coniaris:

I am writing to provide our comments with respect to DEP's tentative determination to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactively and chemically contaminated water into the Bay. [1]

I graduated from MIT and Harvard Law School, and have been involved in nuclear safety issues – including the transfer of Pilgrim's licenses from Entergy to Holtec –since I retired from Wilmer Cutler Pickering Hale and Dorr more than 10 years ago.

I am now a member of the Town of Duxbury Nuclear Advisory Committee, the Commonwealth's Nuclear Decommissioning Citizens Advisory Panel (NDCAP) and Pilgrim Watch.

As discussed below, I submit that the tentative determination reached by DEP – that Holtec's application for permit modification must be denied, is entirely correct. It is correct not only because Holtec's proposed discharge is prohibited by the Ocean Sanctuaries Act but also because it is prohibited by Endangered Species Act (and others) and by DEP's Antidegradation Regulations.

Section I below is directed to relevant facts. Section II is directed to the tentative determination and to other state laws that require the same result. Section III shows that denial is also mandated by DEP's antidegradation regulations. Section IV addresses the EPA regulations that require state certification to grant an EPA permit, and Section V discusses arguments that Holtec may will make in its expected attempt to convince DEP to change its position.

[1] A Table of Contents is attached.

I request that DEP issue a final determination denying Holtec's application. In doing so, I ask that the final determination (i) include facts and reasons set forth in Section I further evidencing that denial of the application is mandated by the Ocean Sanctuaries Act, (ii) deny the application on the basis of the Endangered Species Act, Massachusetts Crimes Against Public Health, and the Massachusetts Oil and Hazardous Material Release Prevention Act, and (iii) deny the application under 314 CMR 4.

I also request that, when the Final Determination is issued, DEP inform EPA that Massachusetts will *not* certify that any proposed EPA permit that would allow Holtec's requested dumping would comply with Massachusetts law.

Holtec may appeal any Final Determination denying its application. Litigation is inherently uncertain, and it almost goes without saying that the likelihood that a court will uphold DEP's decision is increased if the Final Determination includes multiple ground for denial.

I. Relevant Facts

A. Background

1. Holtec purchased Pilgrim from Entergy as part of as part of Holtec's plan to get into a new business, decommissioning of nuclear power plants.

2. Holtec and Entergy requested the U.S. Nuclear Regulatory Commission ("NRC") to transfer Pilgrim's NRC licenses to Holtec. The Commonwealth filed a petition with the NRC to prevent the sale.

3. To settle the litigation, and get on with its acquisition of Pilgrim and the opportunity to make a profit of as much as a billion dollars ($1,000,000,000), Holtec decided that it was in its best interest to settle the litigation.

4. On June 16, 2019, Holtec signed a settlement agreement with the Commonwealth.

5. In the Settlement Agreement between it and the Commonwealth, Holtec agreed that it would "comply with all applicable environmental and human-health based standards and regulations of the Commonwealth, i.e., that it would:

a. Not dump or discharge any of Pilgrim's industrial waste in an ocean sanctuary such as Cape Cod Bay (Massachusetts Ocean Sanctuary Act);

b. Not discharge any of Pilgrim's wastewater into Cape Cod Bay (Massachusetts Endangered Species Act);

c. Not discharge any waste in any Massachusetts' coastal or inland waters (Crimes Against Public Health); and

d. Comply with DEP's Antidegradation Regulations.

6. In the Settlement Agreement also it would not try to avoid what it agreed on the basis of preemption (Settlement Agreement, par 48):

   Validity. No Party to this Agreement (or any person or entity affiliated or related to a Party to this Agreement) shall assert that any provision of this Agreement (or the Agreement itself) is invalid under any federal law or any provision of the U.S. Constitution.

7. Nonetheless, on March 31, 2023 Holtec asked DEP to issue a modified Surface Water Discharge Permit that would not comply with any of these laws and regulations with which Holtec had agreed to comply.

8. DEP issued a Tentative Determination denying Holtec's Request on July 24, 2023.

B. Pilgrim Nuclear Power Station

8. Pilgrim Nuclear Power Station ("Pilgrim") was built by Boston Edison between 1967 and 1972. Its first NRC operating license was granted in June, 1972. Pilgrim began commercial operations in December of 1972. (Holtec App, 1)[2]

[2] Holtec application for a modified permit that Holtec dated March 31, 2023.

9. In 1999, Boston Edison sold Pilgrim to Entergy. Entergy sold Pilgrim to Holtec International in 2019. Pilgrim is now owned by Holtec-Pilgrim, LLC and operated by Holtec Decommissioning International (HDI). Bot are wholly owned subsidiaries of Holtec International.[3] Holtec-Pilgrim is the NRC-licensed owner; HDI is the NRC-licensed operator.

10. Pilgrim stopped generating electric power on May 31, 2019. For the last four years Holtec has been decommissioning Pilgrim. ("Holtec is in the process of decommissioning the facility under a Post Shutdown Decommissioning Activities Report (PSDAR) as revised." (Holtec App, 1)

11. In 2019, HDI published a paper, "*Pilgrim Nuclear Power Station Decommissioning,*[4] outlining decommissioning steps.

12. Two decommissioning steps that Holtec had already accomplished were:

    a. Shutting down Pilgrim's reactor for the final time.
    b. Removing Pilgrim's nuclear fuel from the reactor vessel core and placing it in the spent fuel pool.

13. Holtec reports the status of decommissioning to meetings of the Commonwealth's Nuclear Decommissioning Citizens Advisory Panel (NDCAP). Holtec's presentations and the minutes of the meetings are available on the NDCAP website. The presentations and the meeting minutes make clear that everything Holtec has done at Pilgrim since 2019 involves *only* decommissioning, not operating or maintaining Pilgrim, and not generating electricity .

14. Before Holtec bought Entergy, Holtec's predecessor, Entergy Nuclear Operations, Inc. (ENOI) provided formal notification to the NRC that it planned to permanently

---

[3] In the hope of avoiding confusion, these comments use "Holtec" to collectively refer to Holtec International and the two Holtec subsidiaries, Holtec-Pilgrim LLC and Holtec Decommissioning International LLC (HDI) that own and operate Pilgrim.

[4] Pilgrim Nuclear Power Station Decommissioning, https://hdi-decom.com/our-fleet/pilgrim-decommissioning/.

cease power operations at Pilgrim Nuclear Power Station (Pilgrim) no later than June 1, 2019. (NRC document ML19276C420)

15. ENOI certified that all fuel was permanently removed from the Pilgrim reactor and placed in the spent fuel pool (SFP) on June 9, 2019. (NRC document ML19276C420).

16. On January 2, 2020, the NRC amended Pilgrim's operating license to state that the license "no longer authorizes operation of the reactor." (NRC document ML19276C420).

17. Holtec's proposed discharge is not associated with the generation of electric power. See pp 19-23 below. Neither is it an "industrial discharge" of the same volume any discharge before December 8, 1971.

C. Pilgrim's Contaminated Wastewater

18. Holtec's application *admits that the wastewater that Holtec intends to discharge includes both chemical and radioactive materials.*

19. As part of decommissioning, HDI must dispose of 1.1 million gallons of radioactive and chemically contaminated waste. Holtec's application for a modified permit says: "There remains approximately 1.1 million gallons of water stored at the facility, comprised of water from the spent fuel pool that contains varying levels of radioactivity." (Holtec App, 3)

20. Holtec's application repeatedly refers to the water it wants to discharge as "industrial wastewater." The application admits that the "industrial wastewater proposed for discharge is a 'New Source.'" The proposed discharge has nothing to do with Pilgrim's operation or maintenance, and it is not a discharge that existed before December 8, 1971, See pp 23-24 below.

21. According to a set of slides Holtec presented to the EPA on October 17, 2022 approximately 280,000 gallons of this water was in the spent fuel pool, 400,000 gallons was in the dryer separator, and 285,000 was in the torus. The remainder, some 130,000 gallons, was apparently in the reactor vessel.

22. Holtec ignores, and obviously would like DEP to ignore, that the Massachusetts state laws and regulations (discussed below) that prohibit discharging waste or hazardous materials into Cape Cod Bay do not exclude radioactive materials. The definitions of those terms in those laws and regulations make this clear.

23. Pilgrim's approximately 1.1 million gallons of wastewater will be filtered/processed before it is discharged, but processing will not remove all chemical or radioactive contaminants.

24. Holtec's application for a modified permit admits that Pilgrim's treated wastewater will contain chemical pollutants: "The industrial wastewater proposed for discharge will contain low concentrations of a small number of pollutants:" (Holtec App, Tables 1, 2 and 3)

25. As said in a July 21, 2023 letter from DEP to CZM, decommissioning activities "have introduced new pollutants or increased pollutant concentrations in these waters."

26. The wastewater includes Spent Fuel Pool water that has been comingled and mixed with radioactive water from Pilgrim's reactor cavity and dryer separator pit. (Holtec App, 3)

27. Except for saying that that the water "contains varying levels of radioactivity" (Holtec App, 2), Holtec's application ignores the radioactive materials in Pilgrim's wastewater.

28. The wastewater will include radioactive tritium. Holtec's filtering/treatment system will not remove tritium.[5]

29. In addition to radioactive tritium that cannot be filtered, the wastewater Holtec intends to discharge will also contain other radioactive materials.

---

[5] Tritium is water, with a third hydrogen atom. Unlike normal water, tritium is radioactive. Tritium (not to be confused with heavy water) is so much like normal water than the tritium cannot be filtered out of the water. NRC Backgrounder On Tritium, Radiation Protection Limits, And Drinking Water Standards | NRC.gov

30. Holtec tested samples of Pilgrim's untreated wastewater in April. Ken Buesseler, a marine radiochemist at the Woods Hole Oceanographic Institution, reviewed the results. According to Dr. Buesseler, the radionuclide levels were high, even factoring in that the wastewater was untreated: "The numbers for cesium-137 in the untreated water are 200 million times higher than what's in the ocean right now." "Even if you remove 99 percent of it, you might still be a million times higher than what's in the ocean." Dr. Buesseler also said that cobalt ends up in seafloor sediments and can be ingested by marine life and end up in humans who eat the seafood.

31. Since Pilgrim stopped generating electricity over four years ago, the 1.1 gallons of Pilgrim's wastewater has been used only for purposes of decommissioning – underwater waste generation, consolidation, and packaging (See July 21 letter to the Director of the Office of Coastal Zone Management, attached to the tentative determination), and to shield decommissioning workers from some of Pilgrim's radioactive systems and components.

D. Pilgrim's 2020 Discharge Permits

32. Pilgrim's current discharge permits were issued January 30, 2020.

33. The 2020 EPA and state permits are clear:

- Discharge of pollutants in spent fuel pool water (including, but not limited to, boron) is not authorized by this permit.

- Discharge of pollutants associated with the dismantlement and decontamination of plant systems and structures and/or the demolition of buildings are not authorized by this permit.

34. A principal reason the 2020 permits did not authorize these discharges is that Holtec never asked that they be included. See 2022 Permit, Response to 5.1 comment, pg. 346.

35. The 2020 permits explicitly told Holtec that, if it wanted to modify the 2020 permit to include them, it could request a permit modification. The EPA repeatedly told Holtec that the 2020 permits do not authorize Pilgrim's planned 1.1 million gallon discharge.

36. Holtec spent almost three years after the 2020 permits were issued trying, unsuccessfully, to convince EPA and DEP that "not authorized by this permit" did not mean what it clearly says.

37. Not until November of 2022, did Holtec finally say it would seek aa modified permit.

38. Not until March 31, 2023, more than 3 years after the 2020 permits were issued, did Holtec do what the 2020 permits explicitly said Holtec could do – request a modified permit.

E. Holtec's Application for a Modified Permit

39. Holtec's application for a modified permit consists of a two-page form, and a 362 page attachment. The attachment is the March 31, 2023 application for a modified permit that Holtec filed with the EPA. (Holtec App.)

40. The attachment's only reference to a state permit is "A separate Water Discharge Permit will be obtained as required by the Massachusetts Clean Water Act, as amended (M.G.L Chapter 21, §§ 26-53." (Holtec App, 3)

41. Holtec filed its request to modify the 2020 permits for one reason: to allow Pilgrim to discharge what the 2020 permits prohibit.

> "This application for modification of NPDE Permit No.MA0003557 [asks] to authorize discharge of a *new source* of industrial wastewater" from the spent fuel pool, torus, reactor cavity, and dryer separator pit, via an outfall numbered #015, into the existing, permitted discharge canal which discharges into Cape Cod Bay. Holtec App at 3-4

42. Holtec's application for a modified permit repeatedly says that the water it seeks to discharge is "industrial wastewater" or "treated wastewater." (Holtec App, 3, 4, 5,6).

43. Holtec's application admits that the wastewater "contains varying levels of radioactivity. (Holtec App, 3).

44. Holtec's application says that "the term 'pollutant" in the [U.S.] CWA excludes 'radioactive materials.'" Holtec App, 3. That is not so. The definition of "pollutant" in Section 50(6) of the Clean Water Act explicitly includes "radioactive materials." The EPA excludes Atomic Energy Act radionuclides from NPDES permits, but the exclusion does not extend to antidegradation.

45. Much of Holtec's application is an attempt to show that, after treatment, the level of chemical contaminants in Pilgrim's wastewater will meet EPA discharge limits.

46. Even if true, this is irrelevant to DEP's decision whether to deny the application. As discussed in detail below, relevant Massachusetts laws and regulations prohibit discharge of <u>any</u> waste into Cape Cod Bay.

47. Pilgrim's contaminated wastewater will be released into Cape Cod Bay from PNPS's discharge canal. (Holtec App, 3) The discharge point is at the shoreline a short distance east of where Cape Cod Bay joins Plymouth Bay.

48. Holtec's application says the Pilgrim wastewater will be from a new source: "authorize discharge of a new source of industrial wastewater," that "the industrial waste proposed for discharge is a New Source." (Holtec App, 3.)

49. If released, Pilgrim's industrial wastewater from this "new source" will flow not only into Cape Cod Bay but also into contiguous Plymouth, Duxbury and Kingston Bays, particularly on an incoming tide. When I asked whether Holtec intends to discharge on the incoming or outgoing tide, Pilgrim's Site Vice President replied "both."

50. Holtec's application says, "The last discharge of any water having resided for any period of time in the SFP, occurred in 2015." Holtec App, 3

51. Holtec's annual radioactive effluent release reports to the NRC say that there have been no post-2015 releases of liquid radioactive effluents.

52. Holtec's application says that the approximately 1.1 million gallons of "industrial wastewater" will be "discharged in batches of approximately 19,000 gallons." (Holtec App,

3)

53. In other words, there will be about 58 separate discharges. 1,000,000 ÷ 19,000 = 57.89

F. Holtec's Options for Pilgrim's Industrial Wastewater

54. Holtec's decommissioning of Pilgrim cannot be completed until it has disposed of about Pilgrim's approximately 1.1 million gallons of radioactively and chemically contaminated water. So long as that industrial wastewater remains on-site (other than perhaps in a new or expanded ISFSI) the NRC cannot release the Pilgrim site.

55. repeatedly has made clear that it wants to discharge Pilgrim's contaminated wastewater into Cape Cod Bay.

56. It is not necessary for Pilgrim to discharge its contaminated wastewater into Cape Cod Bay. Less damaging alternatives are available. See pp 44-46 below.

57. In addition to discharging the wastewater into Cape Cod Bay, Holtec has at least three other options to dispose of Pilgrim's 1.1 million gallons of contaminated wastewater: evaporate the water, ship the water to an off-site low level waste storage facility, and store the water on-site at Pilgrim for some indefinite period of time and eventually do something else with it.

58. NRC allows all four option, but *it does not require Holtec to use any of them.* No regulation requires Holtec to discharge Pilgrim's wastewater into Cape Cod Bay.

> Holtec Decommissioning International (HDI) is responsible for determining how it will manage radioactive material in its liquid effluent. HDI may elect to use any of the methods allowed under the NRC's regulations, which allow discharge, shipment for disposal, or evaporation of the liquid and disposal of the resulting solid waste." **https://www.nrc.gov/info-finder/reactors/pilg/faq-discharge.html#what**

59. All of Holtec's NRC approved options are feasible.

60. Holtec has evaporated contaminated water since about March 1, 2023. According to a recent NRC inspection report and an email from the NRC:

[T]the evaporation occurs in the reactor cavity. The reactor cavity is in communication with the (former) spent fuel pool and the dryer-separator pit (all which are being used to cut and package the reactor internals).

61. In the course of decommissioning Pilgrim, Holtec has safely shipped over 218,000 cubic feet of solid low level radioactive waste to Waste Control Specialists, an existing licensed radioactive waste storage facility located in Andrews, Texas.

62. The volume of the 1.1 million gallons of liquid low level radioactive waste that Pilgrim wants to dump into Cape Cod Bay is a little less than 150,000 cubic feet.

63. In connection with its plans to build spent nuclear fuel storage site in Southeastern New Mexico, Holtec assured the NRC that it will be perfectly safe to transport thousands of tons of spent nuclear fuel from all over the U.S. to that site. https://holtecinternational.com/ products-and-services/hi-store-cis/

64. Holtec's CEO, Kris Singh, repeated this assurance in a letter to Senator Markey: There will be an "absence … of the risk of hazardous accident."

65. Although some has objected to shipping Pilgrim's wastewater to Waste Control Specialists, Dr. Singh told Senator Markey that Holtec's plan to ship tons of spent nuclear fuel to Holtec's proposed New Mexico site is "the very epitome of social justice."

66. We doubt that Dr. Singh would have told Senator Markey that Holec would "leave the facility standing and leave the water there: if that option was not feasible.

.

G. Cape Cod Bay[6]

67. Cape Cod Bay has outstanding socio-economic, recreational, ecological and aesthetic values. See Pilgrim Watch comments.

[6] Important facts about Cape Cod Bay are discussed in detail in Pilgrim Watch's comments.

68. Cod Bay, Plymouth Bay, Kingston Bay and Duxbury Bay are all part of the protected Cape Cod Bay Ocean Sanctuary. (Ch 132A, Sec. 13(b)).

69. Pilgrim's industrial wastewater will flow into Plymouth, Duxbury and Kingston Bays, particularly on an incoming tide.

70. The portion of Cape Cod Bay adjacent the western shore of the National Seashore is designated an Outstanding Resource Water (ORW).

71. Barnstable Harbor and Wellfleet Harbor, on the south and eastsides of Cape Cod Bay, also are designated ORWs.

72. Any of Pilgrim's wastewater that has been discharged into Cape Cod Bay will inevitably flow along the western shore of the National Seashore and into Barnstable and Wellfleet Harbors.

73. At least four Areas of Critical Environmental Concern (ACECs) border Cape Cod Bay. These include:

    a. The Wellfleet Harbor ACEC includes Wellfleet Harbor, Loagy Bay, Drummer Cove, The Cove, Duck Harbor, and part of Cape Cod Bay.

    b. The Sandy Neck Barrier Beach System ACEC that includes Barnstable and Scorton Harbors.

    c. The Inner Cape Cod Bay ACEC includes Cape Cod Bay above the low water mark.

    d. The Ellisville Harbor ACEC.

74. Ellisville Harbor ACEC is located situated along the western shore of Cape Cod Bay, just north of the Cape Cod Canal. It has outstanding scenic qualities. It is important to the public health as a water supply, and for fishing and shell fishing, swimming and recreation.

75. Wellfleet Harbor ACEC includes Wellfleet harbor that is an ORW.

76. Sandy Neck Barrier Beach System ACEC has extraordinary natural sources. Its boundary follows low water in Cape Cod Bay on the seaward side. Barnstable Harbor and Broad Sound are partially or entirely within it. Barnstable Harbor is an ORW.

77. Inner Cape Cod Bay ACEC – Its boundary follows mean low water on the seaward side. The portion of Cape Cod Bay above low water is within the ACEC.

78. Herring River Watershed ACEC – The area lies within the Plymouth Carver Sole Source Aquifer and is critical to public water supply. Carters River (Plymouth) and Herring River (Bourne) are partially within the ACEC.

79. Pilgrim wastewater discharged into Cape Cod Bay will inevitably flow into these four ACECs.

80. The southern edge of the Stellwagen Bank National Marine Sanctuary connects to the northern edge of Cape Cod Bay. Water from Cape Cod Bay will flow into the Sanctuary.

81. Water circulation patterns in Cape Cod Bay will hold any Pilgrim wastewater that Holtec might discharge into the Bay for a considerable period of time. According to an ocean currents expert at Woods Hole Oceanographic Institution (WHOI), Irina Rypina, the water would be trapped in the bay and will not quickly flush out of the Bay.

82. Numerous scientific studies show the circulation of wastewater in Cape Cod Bay.

83. The studies show that a Pilgrim wastewater discharge will flow along the east, south and west shores of Cape Cod Bay, and also north into the Stellwagen Bank National Marine Sanctuary. See Woods Hole Oceanographic Institute's study on currents in Cape Cod Bay (https://www.sciencedirect.com/science/article/pii/ S0265931X22002302), and also Physical and Biological Oceanography of Massachusetts, Wendy Leo, Rocky Geyer, Mike Mickelson (http://www.mwra.state.ma.us/ harbor/enquad/pdf/ms-085_04.pdf), and Lermusiaux et al. 2001, both available from the Massachusetts Water Resources Authority.

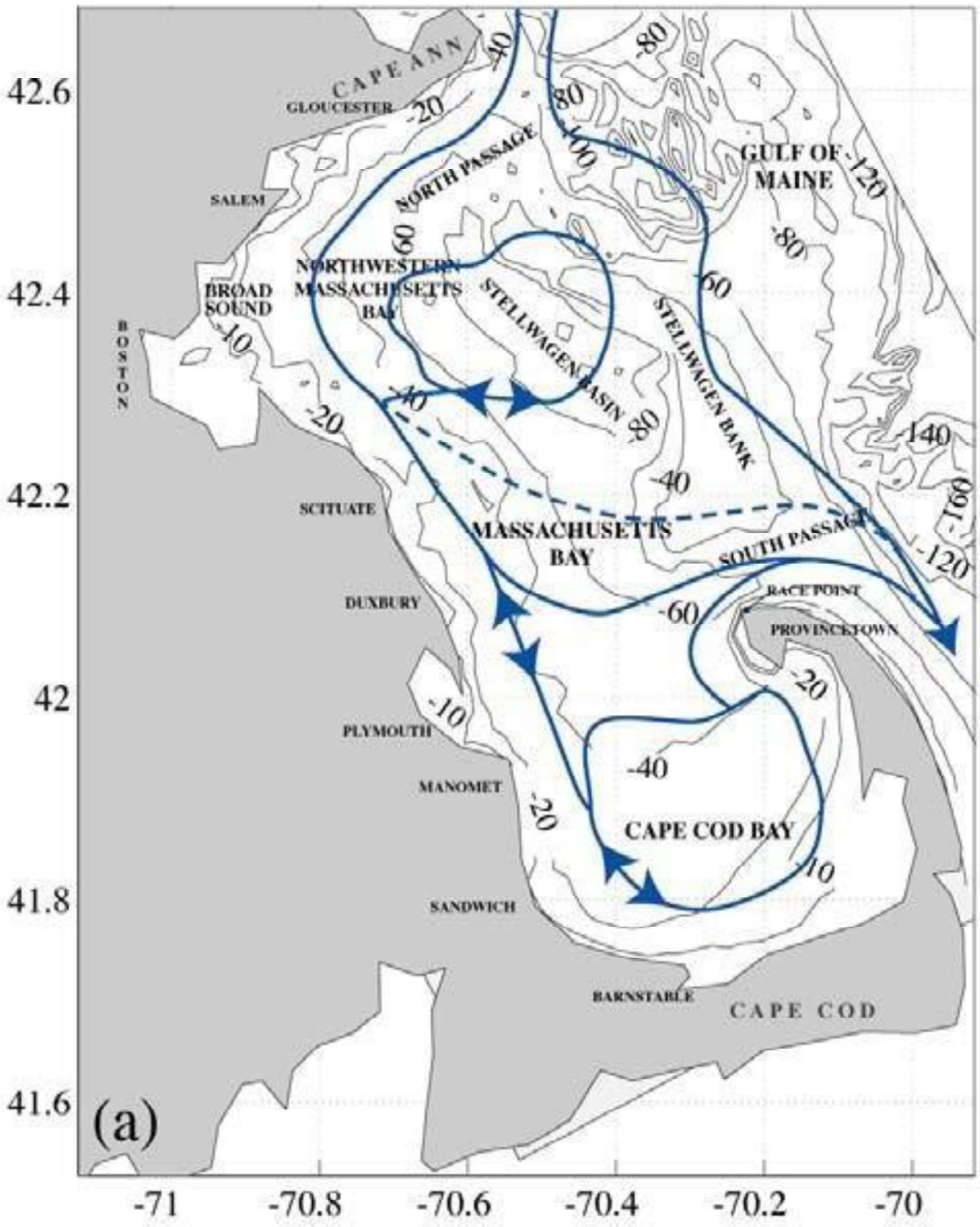
84. Wastewater flowing along the eastern shore of Cape Cod Bay will be in the Cape Cod National Seashore ORW and will flow into the Wellfleet Harbor ORW. Flow along the

southern shore will flow into the Barnstable Harbor ORW.

85. Along the western shore of Cape Cod Bau, the water from Pilgrim's discharge canal will flow into Duxbury, Kingston, and Plymouth Bays, and along miles of beaches north and south of Pilgrim.

86. The discharged water will also flow in the four Areas of Critical Environmental Concern located along the Bay's eastern, southern, and western shores.

87. The current flow pattern is shown in the figure below from Lermusiaux.


CAPE ANN
GLOUCESTER
SALEM
BROAD SOUND
BOSTON
NORTH PASSAGE
NORTHWESTERN MASSACHUSETTS BAY
STELLWAGEN BASIN
STELLWAGEN BANK
GULF OF MAINE
SCITUATE
MASSACHUSETTS BAY
SOUTH PASSAGE
RACE POINT
PROVINCETOWN
DUXBURY
PLYMOUTH
MANOMET
CAPE COD BAY
SANDWICH
BARNSTABLE
CAPE COD
(a)
42.6
42.4
42.2
42
41.8
41.6
-71
-70.8
-70.6
-70.4
-70.2
-70

88. Cape Cod Bay is a significant habit of threatened and endangered species, including the Right Whale, Rosette Tern, Least Tern, and Piping Plover. There are at least eleven threatened or endangered species in the bay. NUREG-1437, Supplement 29 July 2007, Page 2-84. Also see https://coastalstudies.org/ cape-cod-bay and these examples:

- Cape Cod Bay | Center for Coastal Studies

Cape Cod Bay is ecologically rich with a complex and diverse array of coastal and marine habitats.

Beaches, wetlands and offshore water provide important habitats for plant and animal communities that include commercially valuable species of finfish and shellfish as well as endangered marine mammals and birds. Endangered bird species such as the Roseate Tern and the Piping Plover utilize the bay's natural resources.

Cape Cod Bay is also a feeding ground for the critically endangered North Atlantic right whale. Humpback whales migrate to Cape Cod Bay and surrounding waters annually, to feed on schooling fish April through December.

- Cape Cod Bay - Wikipedia

The sea life of Cape Cod Bay is quite varied and healthy. Fish that call the bay home include Bluefin Tuna, Striped Bass, Bluefish, Flounder, and Atlantic Mackerel. Sea mammals also live in Cape Cod Bay (seals, dolphins, and whales). Cape Cod Bay has a diverse range of coastal and marine ecosystems, making it ecologically rich. Beaches, marshes, and offshore water provide critical habitats for plant and animal ecosystems, including commercially valuable fin-fish and shellfish, as well as endangered marine animals and birds. The bay's natural resources are used by endangered bird species like the Roseate Tern and the Piping Plover. The North Atlantic right whale, which is severely endangered, feeds in Cape Cod Bay. From April to December, humpback whales travel to Cape Cod Bay and nearby seas to feast on schooling fish.

- North Atlantic Right Whale | NOAA Fisheries-

The North Atlantic right whale is one of the world's most endangered large whale species; the latest preliminary estimate suggests there are fewer than 350 remaining. North Atlantic right whales have been listed as endangered under the Endangered Species Act since 1970. The latest preliminary estimate suggests there are fewer than 350 remaining, with fewer than 70 breeding females. The number of new calves born in recent years has been below average.

NOAA Fisheries has designated two areas as critical habitat for North Atlantic right whales. These areas provide important feeding, nursery, and calving habitat.[7]

89. Cape Cod Bay has outstanding socio-economic, recreational, ecological, and aesthetic values. See Pilgrim Watch Comments.

H. Pilgrim's Contaminated Water is Prohibited Waste

90. Holtec's application for a modified permit says at least six times that the water it seeks to discharge is "industrial wastewater" or "treated wastewater." Holtec App, 3-6.

91. The definitions of "industrial waste" and "pollutant" in DEP's Surface Water Protection Program regulations are (314 CMR 3.02):

> Industrial Waste - *any liquid,* gaseous, or solid waste substance or a combination thereof *resulting from any process of industry,* manufacturing, trade, or business or from the development or recovery of any natural resources.
>
> Pollutant - any element or property of sewage, agricultural, industrial, or *commercial waste*, runoff, leachate, heated effluent, or other matter, in whatever form and whether originating at a point or major non-point source, which is or may be discharged, drained, or otherwise introduced into any sewerage system,

[7] North Atlantic Right Whale Critical Habitat Map and GIS Data | NOAA Fisheries shows that NOAA's Right Whale Critical Habitat includes Cape Cod Bay.

treatment works or waters of the Commonwealth.

92. Pilgrim's contaminated water is a pollutant that resulted from a process of industry. In a January 27, 2022 Information Sheet, the president of HDI said that the wastewater was "leftover from plant operations."

93. 301 CMR 27 "defines, interprets, and explains provisions of M.G.L. c. 132A, §§ 12A through 16K and § 18." (301 CMR 27.01(2)). Its definition of wastes is: "any unwanted, discarded, or environmentally harmful solid, liquid, or gaseous materials resulting from commercial, municipal, domestic, or industrial Activities…." (301 CMR 27.02)

94. Pilgrim's wastewater is unwanted liquid material resulting from industrial Activities that Holtec wants to discard.

95. Sec. 26A of the Massachusetts Clean Water Act defines "pollutant" as

> any element or property of sewage, agricultural, *industrial or commercial waste,* runoff, leachate, heated effluent, or other matter, in whatever form and whether originating at a point or major nonpoint source, *which is or may be discharg*ed, drained or otherwise introduced into any sewerage system, treatment works or *waters of the commonwealth*.

96. Pilgrim's wastewater is "industrial waste" that Holtec wants to "discharge" into the "waters of the commonwealth."

97. None of the definitions in the relevant Massachusetts laws and regulations exclude radioactive waste.

98. At an NDCAP meeting, DEP's representative was asked "Does any state law or regulation require that a nuclear power station discharge permit not cover radioactive materials."

99. His answer affirmed that state law prohibitions include radioactive waste: "We are not aware of any state law or regulation that requires exclusion of radioactive one.

II. The Tentative Determination

As said at the outset, in the June 2020 Settlement Agreement between it and the Commonwealth, Holtec agreed that it would "comply with all applicable environmental and human-health based standards and regulations of the Commonwealth." (Par. 10(l)). It also agreed to "comply with Chapter 21E and the MCP as applicable." (Par. 10(e))

The state standards and regulations with which Holtec has agreed to comply include the Ocean Sanctuaries Act (Ch 132A), the Endangered Species Act (Ch 131A), Crimes against Public Health (Ch 270), the Massachusetts Oil and Hazardous Material Prevention Act (Ch 21E, and their associated regulations.

DEP's Tentative Determination to deny Holtec's application was based on the Ocean Sanctuaries Act:

> "[T]he proposed discharge is prohibited by Section 15 of the Act and does not qualify for any exception to the Act under Section 16." Tentative Determination, par.11.

As discussed below, the proposed discharge is also prohibited by the Endangered Species Act, the Massachusetts Crimes Against Public Health, the Massachusetts Oil and Hazardous Material Release Prevention Act, and 314 CMR 4. The Final Determination should deny Holtec's application on the basis of all of these.

A. The Ocean Sanctuaries Act

Section 15 of the act says, "Except as otherwise provided in this section, the following activities shall be prohibited in an ocean sanctuary, … (4) the dumping or discharge of commercial, municipal, domestic or industrial wastes; provided, however, that the department may approve a new or modified discharge of municipal wastewater from a POTW in accordance with section 16G."[8]

The tentative determination itself correctly concluded that Section 15 prohibits what Holtec wants to do – discharge industrial waste into the Cape Cod Bay Ocean Sanctuary.

[8] Pilgrim Nuclear Power Station is not a POTW. As discussed below, none of the Act's exemptions apply.

DEP's July 21, 2023 letter to CZM and CZM's July 24, 2023 reply correctly explain the reasons for DEP's determination in more detail:

> Holtec's 2023 Application itself characterizes the proposed discharges as "industrial wastewater." 2023 Application at 4. Likewise, the proposed discharge qualifies as "waste" resulting from an "industrial Activity[y]" under the definition in CZM's Regulations, as the discarded water is unwanted, intended to be discarded, and may contain "environmentally harmful" pollutants resulting from PNPS's decommissioning activities, even after treatment. We therefore conclude that the proposed discharges would be a discharge of industrial wastewater and, consequently, that section 15 prohibits the discharge of water from the spent fuel pool, torus, reactor cavity, and dryer separator pit (DEP letter of July 21)
>
> Based on the description in the Letter, it appears to be undisputed that the receiving water for the proposed discharge is within the Cape Cod Bay Ocean Sanctuary, and that the proposed discharge is "waste" from an industrial activity. As the Letter notes, according to Holtec's own application to EPA, the discharged water, though treated, will potentially contain suspended solids, oil and grease, copper, zinc, lead, nickel, boron, and phenol. Based on that description, the proposed discharge is plainly unwanted, discarded, and potentially environmentally harmful. Further, Holtec refers to the proposed discharge in the Application as a "new source of industrial wastewater." Application at 4. The proposed discharge therefore is prohibited by Section 15. (CZM reply of July 24)

1. <u>Pilgrim's wastewater is industrial waste.</u>

I would not be surprised if Holtec contended that its proposed discharge is <u>not</u> the prohibited dumping or discharge of commercial, municipal, domestic or industrial waste. I see no reasonable basis for such a contention.

However, at the July 14, 2023 meeting of the Nuclear Decommissioning Citizens Advisory Panel (NDCAP) a former long-time Pilgrim employee asked DEP's representative how "waste" was defined. In a July 29th email to me, the former employee further outlined her position that the definitions of waste were too undefined.

> The issue I have are that the terms -unwanted, discarded and environmentally harmful solids are NOT defined anywhere. what constitutes an "Unwanted" waste? what constitutes an "environmentally harmful" waste. What is a "discarded waste"? There should be specific definitions for these terms otherwise it is open to interpretation.

In my view, the important terms are well defined in the laws and regulations, and also have well-understood meanings. When the Holtec application repeatedly said Pilgrim's water was "industrial wastewater" (Holtec App, 3-6), Holtec presumably knew what those words meant.

The Massachusetts Clean Water Act defines a "pollutant" to include :

> "[A]ny element or property of … industrial … waste …, in whatever form and whether originating at a point or major nonpoint source, which is or may be discharged, drained or otherwise introduced into … waters of the commonwealth."

314 CMR 3.02 is clear that "industrial waste":

> means any unwanted, discarded, or environmentally harmful solid, liquid, or gaseous materials resulting from commercial, municipal, domestic, or industrial Activities…"

I question that even Holtec would argue that the Pilgrim wastewater for which it seeks a modified discharge permit is wanted, that Pilgrim's "industrial wastewater" will not be "discarded," or that it did not "result[] from … industrial Activities."

At the August 24, 2023 hearing, the former employee "environmentally harmful" meant. Pilgrim's wastewater is environmentally harmful. Some may dispute whether it is, but even if it is not that fact is irrelevant to whether it is prohibited "waste." 301 CMR 27.02 says waste is "unwanted, discarded, *or* environmentally harmful." The important word is "or," Whether or not "environmentally harmful" the water is "unwanted" and will be "discarded." No law or regulation requires that it also be "environmentally harmful.

In short, Section 15 of the Ocean Sanctuaries Act unequivocally prohibits Holtec's proposed discharge of Pilgrim's wastewater into Cape Cod Bay.

2. The discharge does not qualify for any exception.

When it enacted the Ocean Sanctuaries Act, the Great and General Court followed a well-known and well-understood practice. First, it broadly prohibited discharging *any* industrial waste into an Ocean Sanctuary (Sec.15: Prohibited Activities in Ocean Sanctuaries). Then, recognizing that a few specific exceptions to this flat prohibition were required, it added Section 16: Permitted Activities in Ocean Sanctuaries.

Section 16 of the Ocean Sanctuary Act provides a number of exceptions to Section 15's otherwise flat prohibition. Only two – "planning, construction, reconstruction, operation and maintenance … activities associated with the generation, transmission, and distribution of electrical power," and "the operation and maintenance of existing commercial or industrial facilities and discharges" - are even potentially relevant to Holtec's application.

There is nothing to indicate that the legislature to include discharges associated with decommissioning, or new discharges, in the Section. 16 exceptions.

It is well-established that such exemptions must be narrowly construed. See *Boston Globe Media Partners, LLC v. Department of Public Health*, 482 Mass. 427, 432 (2019) ("statutory exemptions" from the statute "must be strictly and narrowly construed"); *Hull Mun. Lighting Plant v. Massachusetts Mun. Wholesale Elec. Co*., 414 Mass. 609, 614 (1993) ("[s]tatutory exemptions are strictly construed"); *Metro. Prop. & Casualty Ins. v. Emerson Hosp.*, 99 Mass. App. Ct. 513, 522 (2021) ("It is a 'maxim of statutory construction . . . that a statutory expression of one thing is an implied exclusion of other things omitted from the statute.'"

That maxim squarely applies here. Nothing in Section 16 exempts Holtec's planned discharge.

a. The generation of electrical power.

The only discharges allowed by this Section 16 are licensed discharges that (i) comply with applicable laws and regulations and (ii) that also are part of the "planning, construction, reconstruction, operation and maintenance" of Pilgrim "activities, uses and facilities associated with the generation, transmission, and distribution of electrical power."

Since Pilgrim shut down over four years ago, all activities at Pilgrim have involved

decommissioning, i.e., tearing down a power plant that has permanently been taken out of service. None have involved any "planning, construction, reconstruction, operation and maintenance" of Pilgrim, much less with generating, transmitting or discharging electrical power.

In a November 10, 2015 letter, Holtec's predecessor, Entergy Nuclear Operations, Inc. (ENOI), formally notified the NRC that it planned to permanently cease power operations at Pilgrim Nuclear Power Station no later than June 1, 2019. Pilgrim permanently ceased power operations on May 31, 2019, more than four years ago.

In a June 10, 2019 letter to the NRC (ADAMS Accession No. ML 19161A033), ENOI certified that all fuel had been permanently removed from the Pilgrim reactor and placed in the spent fuel pool (SFP) on June 9, 2019.

On January 20, 2020 the NRC amended Pilgrim's license and said that the ***"license for Pilgrim no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel."*** (Bold and italics added)

Without fuel in the reactor Pilgrim can no longer generate electricity, and has no ability to discharge or transmit power.

Post-shut-down decommissioning activities have nothing to do with constructing, reconstructing, operating or maintaining Pilgrim so it can generate, transmit or distribute electricity, or with planning how to do so.

Since June 1, 2019, Holtecmay gave planned how to use Pilgrim's industrial wastewater for decommissioning purposes unrelated to generation of electric power, such as underwater waste generation, consolidation, and packaging, and to shield decommissioning workers from some of Pilgrim's radioactive systems and components. Some of those plans may have involved building, operating or maintaining some structures that would make decommissioning – *but not the generation of electrical power* - possible.

A 2019 paper published by Holtec Decommissioning International "*Pilgrim Nuclear Power*

Station Decommissioning, outlined decommissioning steps that had been and would be taken,[9] and made clear that no activities at Pilgrim involved , or would involve, any planning, construction, operation or maintenance for any purpose other than decommissioning.

1. Pilgrim shut down its reactor for the final time on Friday, May 31, at 5:28 p.m. This removed 670 megawatts of electricity from the regional grid.

2. Pilgrim's nuclear fuel has been removed from the reactor vessel core and placed in the spent fuel pool to cool.

3. Once cooled, the fuel will be placed in stainless steel canisters and transported to the Independent Spent Fuel Storage Facility (ISFSI) on station property.

4. Radioactive equipment and components are dismantled per decommissioning plan that is reviewed, but not approved by the NRC.

5. Contaminated components are dismantled, packaged, and transported to a licensed off- site facility.

6. The site is inspected by state and federal agencies to ensure the property has been returned to conditions outlined in the decommissioning plans. Both the State and Federal agencies will continue to monitor the site.

Holtec's regular reports on the status of decommissioning to meetings of the Commonwealth's Nuclear Decommissioning Citizens Advisory Panel also make clear that what Holtec as done at Pilgrim since 2019 has absolutely nothing generating electricity.

One would search in vain for any suggestion that Holtec is planning to generate electrical power, or constructing, operating or maintaining anything at Pilgrim to do so. Everything

[9] Pilgrim Nuclear Power Station Decommissioning, https://hdi-decom.com/our-fleet/pilgrim-decommissioning/.

Holtec has done make power generation impossible.

As said in the Tentative Determination, "It is undisputed that Facility has ceased electrical power generation, is no longer transmitting or distribution power, and is in the process of decommissioning.

Based on these facts alone (none of which are open to dispute), DEP's tentative determinations that the proposed discharge is "associated with the decommissioning of the Facility, not the generation, transmission, or distribution of electrical power" and that "this exemption does not apply" are plainly correct. Tentative Determination, par. 8.

The tentative determination is also correct because Section 16 also says there is no exception, not only if the planning, etc. is not for the purpose of generating electricity, but also unless "*all* certificates, licenses, permits and *approvals required by law are obtained therefor*, and further, that such activities, uses and facilities shall *not be so undertaken* or located *except in compliance with any applicable general or special statutes, rules, regulations* or orders lawfully promulgated….

Holtec might argue that the exemption applies to *any* discharge, at *any* time, of *any* water that is left over from *any* operation of Pilgrim Nuclear Power Station. - even if (i) the water includes decommissioning pollutants, (ii) that all required permits and approvals have not been obtained, and (iii) the discharge would not be "in compliance with any applicable general or special statutes, rules, regulations or orders lawfully promulgated."

I disagree. By its plain terms, this exemption does *not* apply to wastewater used only for decommissioning purposes or activities associated with decommissioning during the more than four years since Pilgrim stopped generating electric power, particularly given that the wastewater includes pollutants that are the result of decommissioning.

Holtec would also like DEP to overlook that ""all certificates, licenses, permits and approvals required by law" have not been obtained are obtained and likely will not be therefor" *and* that the activity – dumping the wastewater into Cape Cod Bay would <u>not</u> be "in compliance with" among others, the Endangered Species Act, Section 16 of Ch. 270, Ch 21E, 314 CMR 3.00 and 4.00, 301 CMR 12.11, and the National Marine Sanctuaries Act (16 U.S.C. Secs. 1431-1445; 15 CFR Part 922).

The state statutes and regulations (not only the Ocean Sanctuaries Act) with which Holtec's proposed dumping would not comply are discussed below.

As for federal laws, Holtec's proposed dumping would not be in compliance with the US Endangered Species Act (16 USC § 1531 et seq.), or the National Marine Sanctuaries Act (16 USC § 1431 et seq).

Section 1436 of the National Marine Sanctuaries Act prohibits injuring any "sanctuary resource," i.e., "any living or non-living resource of a national marine sanctuary …including, but not limited to, … marine mammals" such as the right whale, in the Stellwagen Bank National Marine Sanctuary.

15 CFR 922.72(a)(3)(ii) says that the prohibition includes " Discharging or depositing from beyond the boundary of the Sanctuary any material or other matter that subsequently enters the Sanctuary and injures a Sanctuary resource or quality." The southern edge of the Sanctuary connects to the northern edge of Cape Cod Bay. If discharged into Cape Cob Bay, Pilgrim's wastewater will flow into the Stellwagen Bank Sanctuary. See Section II.A below.

For all of these reasons, including those specifically discussed in Par. 8 of the tentative determination, DEP correctly determined that that "the proposed discharge is associated with the decommissioning of the Facility, not the generation, transmission, or distribution of electric power, [and that] this exception does not apply."

b. Existing facilities and discharges

The other potentially relevant exception of Section 16 permits "t*he operation and maintenance of existing* municipal, commercial or industrial facilities and *discharges* w*here such discharges or facilities have been approved and licensed by appropriate federal and state agencies* . . . ."

This exception also does not apply, for at least two reasons.

First, as discussed above, Holtec's proposed discharge has nothing to do with Pilgrim's "operation and maintenance." Holtec's problem is that it cannot tear down the buildings in which that water is now, and therefore cannot finish decommissioning Pilgrim until it has

disposed of Pilgrim's contaminated wastewater.

I would not be surprised if Holtec tried to use its NRC Operating License as evidence that Pilgrim is still being operated and maintained. If it does so, I also would not be surprised if Holtec forgets to tell DEP that, as discussed above, its current NCC license *"no longer authorizes operation of the reactor.*" (NRC document ML19276C420, bold italics added):

Second, to qualify for this Section 16 exemption, Holtec must show that the proposed discharge is the "continuation of an existing discharge" (Tentative Determination, par. 9).

Holtec's problem here is that to be an "existing…discharge" under Section 16, the discharge must be an "industrial discharge at the volume and locations authorized by the appropriate federal and state agencies on . . . December eighth, nineteen hundred and seventy-one, in the case of the Cape Cod Bay . . . Ocean Sanctuary." (Ch 31A, Sec.12B.)

Holtec's proposed discharge quite clearly is not.

Pilgrim's first NRC operating license was granted in June of 1972, and commercial operations did not begin until December 1972.

Indeed, Holtec's application admits that "[t]he industrial discharge proposed for discharge is a New Source, " and that Holtec wants authorization for "discharge of a new source of industrial wastewater." (Holtec app., 3)

We strongly doubt that Holtec (it bears the burden of proof) can show that Pilgrim's 1.1 million gallon "discharge of a new source of industrial wastewater" would be at the same volume and locations authorized by the appropriate federal state agencies" as anything that discharged by Pilgrim before December 8, 1971.

Not only does the proposed discharge include pollutants resulting from decommissioning that did not even begin until 2019, but there is also no reason to think that any discharge more than 6 months before Pilgrim began operation included contaminated wastewater from Pilgrim's spent fuel pool, dryer/separator, torus and reactor cavity.

As said in DEP's July 24, letter to CZM,

> Holtec did not provide any authorization for any discharge of pollutants related to plant operations prior to 1975 – well after the December 8, 1971 cutoff for such discharge into Cape Cod Bay Ocean Sanctuary. Even if there were authorized discharges of pollutants prior to the cutoff, those discharges would not be the same as those proposed: the proposed discharges contain pollutants resulting from decommissioning which *per se* could not have been "existing" prior to December 8, 1971….

c. The August 24, 2023 Public Hearing

At the August 24, 2023 Public Hearing , Shawn Noyes of ECO Nuclear Solutions said that Pilgrim's "*request for discharge"* predated passage of the Ocean Sanctuaries Act in 1971, and that Holtec planned discharge is "grandfathered."

A request is not a discharge. Not surprisingly, Mr. Noes did *not* say that that were any discharges (whether or not authorized) before that date, or (and most important) that before that date there were approved discharges of water from the same place - the spent fuel pool, dryer/separator, torus and reactor vessel - *at the same volume* as Holtec's now-proposed discharge.

Holtec's application says its proposed discharge is a "new source." The Tentative Determination said that "the proposed discharge is not a continuation of an existing discharge. As quoted above, DEP's July 21, 2023 letter to CZM said that "Holtec did not provide any authorization for any discharge of pollutants related to plant operation prior to 1975," and that "Even if there were authorized discharges of pollutants occurring prior to the cutoff, … the proposed discharges contain pollutants resulting from decommissioning, which *per se* could not have been 'existing' as of December 8, 1971, [or] while the plant was operational.

Mr. Noyes also said that dismantling and decommissioning were integral phases in the life cycle of any power plant, and that the existence of the DTF showed highlighted that planning for the end of a plant's life was a fundamental consideration; and that Pilgrim had been discharging spent fuel pool, reactor cavity, torus and separator water for 45 years of its operation. He also referred to the "effectiveness" of Pilgrim's treatment process.

Taking the latter first, the effectiveness of a treatment process such as Pilgrim's is a policy decision to be made by the legislature, but DEP must apply laws and as they now exist . The legislature has made its policy decision – it enacted laws that prohibit any discharge.

As for 45 years of operation, Pilgrim stopped generating electricity in 2019. Forty-five years of operation before 2019 starts in 1974 - consistent with Holtec not providing any authorization for pollutants relating to operations before 1975 (see DEP to CZM letter above), and at least two years after the December, 1971 cut-off date.

Finally, even if "planning for the end of a plant's life [should be] was a fundamental consideration," there is no evidence that whatever planning Boston Edison or Entergy may have done including Holtec's now-desired discharge. The fact that those seeking Pilgrim's existing 2020 permit "forgot" to include this now-desired discharge in its request for a NPDES permit is a clear indication that the discharge was *not* included in any planning for the end of Pilgrim's life.

The crux of Mr. Noyes statement was that the statutory language" includes Holtec's proposed discharge of Pilgrim's contaminated wastewater.

Much of this has been addressed at pages 22-26 above, but a few additional comments may be helpful to DEP in making its Final Determination.

First, and perhaps most important, the Ocean Sanctuaries Act is not the only bar to granting Holtec's request for a modified permit.

Second, it is important to remember that the ODA's Section 16 exemptions are limited to Section 15's prohibition of discharge of industrial waste into a protected ocean sanctuary. It does not exempt discharges prohibited by any other law.

Third, it seems clear that, when it enacted Section 16, the Massachusetts legislature was concerned with operating power plants. It recognized that some discharges were needed while a plant was operating. But it did not allow any discharges from a plant that was no longer generating electricity for the public. In other words, the legislature was willing to allow discharges that were potentially harmful to the public health so long as the economy and public were receiving the generated electric power. Once the public benefit ended, there was no longer any justification for the concomitant public risk.

Finally, the "existing" facilities and discharges exemption is, as Mr. Noyes seemed to recognize,

a grandfather clause. In substance, it is limited to plants as they existed before December 8, 1971, and limits future discharges to then-existing plants and at the same volume as licensed discharges predating the cut-off date. In other words, an existing, operating-in- December 1971 facility can continue doing exactly what it was doing before that date, but nothing more.

There is no evidence that what Holtec wants to do in 2023 or 2024 is exactly what Pilgrim was doing in December of 1971.

B. The Endangered Species Act

DEP should also deny Holtec's application because what Holtec wants to do is prohibited by the Endangered Species Act (M.G.L. ch 131A, Sec. 1 et seq.) and its associated regulations (321 CMR 10).

The purpose of the Massachusetts Endangered Species Act is to protect rare species and their habitat. https://www.mass.gov/service-details/ma-endangered-species-act-mesa-overview#:~:text=The%20Massachusetts%20Endangered%20Species%20Act%20protects%20rare%20species%20and%20their%20habitats.

Unlike the Ocean Sanctuaries Act, so far as I know there are *no exemptions to the Endangered Species Act's prohibitions*

Section 2 of the Endangered Species Act and 321 CMR 10.63 expressly prohibit Holtec's planned discharge.

The second paragraph of Section 2 says that "Except as otherwise provided in this chapter, *no person may alter significant habitat.*" 321 CMR 10.63 says that the *discharge of waste water and toxic or hazardous substances "shall always be considered alternations:*"

> Alterations of Significant Habitat. The following categories of activities shall always be considered alterations: … (e) discharge, storage, or disposal of solid waste, rubbish, stormwater, waste water, toxic or hazardous substances, petroleum based products, dredged materials, or fill.

According to the NRC's NUREG 1437, Supplement 29 there are 9 endangered species, and two threatened species in Cape Cod Bay.[10]

Holtec's proposed discharge is also prohibited by the first paragraph of Section 2:

> Except as otherwise provided in this chapter, no *person may take …. any plant or animal species listed as endangered, threatened* or of special concern or listed under the Federal

Section 1 of Ch. 131A defines "Take" to include, "in reference to animals, to harass, *harm,* … [or] disrupt the nesting, breeding, feeding or migratory activity…."

The U.S. Supreme Court in *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon,* 515 U.S. 687 (1995), the U.S, Supreme Court held that, as used in the U.S. Endangered Species Act, the word "take" meant "harm" and that "harm" included habitat modification.
DEP should find that prohibited "harm" in the Massachusetts act has the same meaning. .

Holtec's proposed dumping will "harm" endangered species, not the least by altering the habitat in which they live – whether or not that habitat qualifies as "significant" under the second paragraph of Section 2.

C. Crimes Against Public Health

The applicable section of this Act is (Ch 270, Section 16) isvery simple. It is a criminal offense to discharge any waste in coastal waste.

> *Whoever places, throws, deposits or discharges* or whoever causes to be placed, thrown, deposited or discharged, trash, bottles or cans, refuse, rubbish, garbage, debris, scrap, waste or other material of any kind on a public highway or within 20 yards of a public highway, or on any other public land, or *in or upon coastal or inland waters,* as defined in section 1 of chapter 131, or within 20 yards of such

[10] Ch 131A, Sec. 1 defines "endangered species" to mean " any species of plant or animal in danger of extinction throughout all or a significant portion of its range including, but not limited to, species listed from time to time as "endangered" under the provisions of the Federal Endangered Species Act of 1973. as amended, and species of plants or animals in danger of extirpation, as documented by biological research and inventory.

> waters, or on property of another, or on lands dedicated for open space purposes, including lands subject to conservation restrictions and agricultural preservation restrictions as defined in chapter 184, shall be punished by a fine of not more than $5,500 for the first offense and a fine not to exceed $15,000 for each subsequent offense; provided, however, that 50 per cent of the fine imposed shall be deposited in the conservation trust established in section 1 of chapter 132A and the court may also require that the violator remove, at his own expense, the trash, refuse, rubbish, debris or materials.

Cape Cod Bay is a coastal water as defined by section 1 of chapter 131:

> "Coastal waters", all waters of the commonwealth within the rise and fall of the tide and the marine limits of the jurisdiction of the commonwealth….

The prohibition of Ch. 270, sec. 16 clearly encompasses the proposed discharge of what Holtec calls Pilgrim's "industrial wastewater" into Cape Cod Bay

We respectfully suggest that DEP should not grant a permit purporting to authorize criminal activity.

D. Oil and Hazardous Material Release Prevention Act[11]

This Act (Ch. 21E) says that anyone who discharges, or threatens to release, any "hazardous material into any of the "waters of the commonwealth" is liable to both the Commonwealth and any person damaged by the release or threat. It also says that any violation is "presumed to constitute irreparable harm to the public health, safety, welfare or the environment; " and that the " superior court department of the trial court shall have jurisdiction to enjoin violations."

This Act says that "Hazardous material" includes.

> "any material, in whatever form, which, because of its … chemical … or radioactive characteristics … constitutes a present or potential threat to human health, safety,

[11] In par. 10(e) of the Settlement, Holtec agreed to comply with the applicable provisions of not only this Act, but also of the Massachusetts Contingency Plan.

welfare, or to the environment, when improperly stored, treated, transported, disposed of, used, or otherwise managed. .

"Waters of the commonwealth" includes "all waters within the jurisdiction of the commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, coastal waters and groundwaters."

If discharged into Cape Cod Bay, the chemical and radioactive materials in Pilgrim's industrial wastewater would constitute "a present or potential threat to human health, safety, welfare" and "to the environment." See Pilgrim Watch Comments.

DEP should not grant any permit authorizing such a discharge.

In sum, DEP should deny Holtec's application, not only on the ground that "the proposed discharge is prohibited by Section 15 of the Act and does not qualify for any exception to the Act under Section 1," but also on the grounds that it is prohibited by the Endangered Species Act, Massachusetts Crimes Against Public Health, and the Massachusetts Oil and Hazardous Material Release Prevention Act.

III. DEP's Antidegradation Regulations

DEP should also deny Holtec's application because 314 CMR 4.04 precludes DEP from issuing a permit that would allow Holtec to discharge Pilgrim's industrial wastewater into:

1. A water, i.e., Cape Cod Bay, "whose quality exceeds, i.e., is better than, minimal levels necessary to support the national goal uses of propagation of fish, shellfish and wildlife and recreation in and on the water" unless the discharge would be "insignificant" or Holtec demonstrates that the discharge is necessary and that no better alternative is available, and that the discharge will not impair existing uses or decrease water quality. (314 CMR 4.04(2) and (3)); or

2. A water, i.e., Cape Cod Bay, having "outstanding socioeconomic, recreational, ecological or esthetic value" unless DEP determines that the discharge is "for the express purpose

and intent of maintaining or enhancing [Cape Cod Bay]"

A. 314 CMR 4.04(2)

Before Holtec filed its application, DEP's representative to NDCAP said that DEP had identified Cape Cod Bay as SA and that Tier 2 review would be required.

DEP apparently made this identification based on 314 CMR 4.05(4)(a) and a presumption allowed by 314 CMR 406.5.

DEP's decision that Tier 2 review would be required was apparently based on Section IV of the (Implementation Procedures for the Antidegradation Provisions of the Massachusetts Surface Water Quality Standards ("Implementation Procedures") that says, "Absent information that a particular water is not high quality, … the water is presumed high quality and Tier 2 review would apply."

For the purposes of 314 CMR 4.04(2), I will assume that Tier 2 review is appropriate. As discussed below, however, Tier 2 ½ review is required.

Under 314 CMR 404(2), DEP can issue a permit only if (a) DEP determines that Holtec's proposed discharge is insignificant, or (b) that Holtec demonstrates (i) that the "discharge is necessary to accommodate important economic or social development," and (ii) that the "discharge is necessary," and (iii) that "no less damaging alternative … method of elimination of the discharge is reasonably available." Implementing Procedures, V(2).

Taking the latter first, Holtec cannot demonstrate that the discharge is necessary at all; of that no alternative method of disposing of Pilgrim's wastewater "is reasonably available or feasible." Holtec has at least three other NRC-approved ways to dispose of Pilgrim's contaminated wastewater. See pp 36-39 below/

Neither can Holtec demonstrate that its proposed discharge is necessary to "accommodate [and] important economic or social development." To be an important social or economic development the development must serve a serves a valid public purpose." Implementation Procedures, V(2).

A discharge may be considered necessary to accommodate economic or social

> development [only] it is needed for: (i) new production for a new discharger; (ii) production that cannot be accommodated by the current treatment facility; (iii) increased loading to a POTW, as a result of community growth, that cannot be accommodated by the current treatment facility; or (iv) other circumstances the department considers analogous to i) through iii).” Implementation Procedures, V(2)(a).

In sum, Holtec cannot (and the burden of proof is Holtec’s) make these required demonstrations.

That being so, Holtec will likely contend that DEP must determine that Holtec’s proposed discharge is “insignificant.” It is not, and DEP could not properly determine that it is.

Holtec might rely on the statement in the Implementation Procedures that the DEP “has determined” that some discharges are “insignificant.” Implementation Procedures, V.1.

There are several reasons why that “has determined” statement cannot and does not apply here. s.

Most fundamentally, Holtec’s proposed discharge would, as discussed above, violate both the Ocean Sanctuary Act and the Endangered Species Act, and also Chs. 21E and 270. As a matter of both law and common sense, an illegal discharge cannot be “insignificant.” [12]

The “determination” is simply part of the Implementation Procedures, but it is not a law or regulation. We suggest that DEP may give it effect only when doing so would not be consistent with state laws.

A statement of procedures for implementing the state’s surface water quality standards does not and legally cannot override state laws (such as the Ocean Sanctuary Act and the Endangered Species Act) that specifically prohibit discharging any waste into Cape Cod Bay.

---

[12] Neither is dumping 58 separate batches of radioactively and chemically contaminated wastewater into Cape Cod Bay.

314 CMR 4.04(2) says that DEP "may allow" limited degradation "where it determines that a new use or increase discharge is insignificant;" Contrary to Holtec's apparent hope, it does not add "even if the discharge is prohibited by state law."

The "has determined" sentence in the Implementation Procedures should not, and properly cannot, be used to give Holtec a "green light" to ignore state law.

Beyond that, Holtec's proposed dumping does not meet a specific limitation of the "has determined" - that the quality of water in Cape Cod Bay after the discharge "*will be at least equal to* that which existed prior to the commencement of the discharge." (Implementation Procedures for the Antidegradation Provisions of the Massachusetts Surface Water Quality Standards ("Implementation Procedures"), V(1)(a)). It will inevitably be lower. See Pilgrim Watch Comments.

Holtec' application says that its discharges will be highly diluted , but dilution *does not decrease how much chemical and radioactive contamination will be discharged into Cape Cod Bay.*

Holtec has not shown, and cannot ensure, that its planned 58 discharges totaling 1.1 million gallons of contaminated wastewater will not impair any existing or designated use of the Bay (including as a source of human food and a habitat for endangered Right Whales and other species), or significantly lower the Bay's water quality.[13] Implementation Procedures, V(1)

As discussed in more detail in Pilgrim Watch's comments, discharging Pilgrim's wastewater into Cape Cod will result in significant damage to the Blue Water Economy that depends on Cape Cod Bay being, and being viewed by the public as being, clean and free from chemical and radioactive materials.

Holtec's proposed discharge is not insignificant, and Holtec cannot demonstrates (i) that the "discharge is necessary to accommodate important economic or social development," and (ii) that the "discharge is necessary," and (iii) that "no less damaging alternative … method of elimination of the discharge is reasonably available." Implementing Procedures, V(2)

---

[13] The statements in Holtec's application about the quantity and effects of pollutants in a discharge apparently are "based on a 19,000-gallon volume," i.e., on only one of the 58 discharges. (Holtec App., p. 5, footnote 2)

B. 314 CMR 4.04(3).

This section of the CMR provides stronger protection for waters that have socioeconomic, recreational, ecological, or aesthetic values that are greater than those prerequisite for High Quality Waters, but that may not have the "exceptional ecological significance" of a special resource water.

As said by the EPA (EPA Water Quality Standards Handbook, p. 2).

> "The supporting rationale that led to the development of the Tier 2½ concept was a concern by the States that the Tier 3 ONRW provision was so stringent that its application would likely prevent States from taking actions in the future that were consistent with important social and economic development on, or upstream of, ONRWs. This concern is a major reason that relatively few water bodies are designated as ONRWs. The Tier 2½ approach allows States to provide a very high level of water quality protection without precluding unforeseen future economic and social development considerations."

Massachusetts included 314 CMR 4.04(3) in its Antidegradation Regulations to provide this high level of water quality protection. This CMR prohibits "a new or increased discharge to an Outstanding Resource Water," unless DEP determines that the discharge is "for the express purpose and intent of maintaining or enhancing" Cape Cod Bay.

Dumping Pilgrim's contaminated wastewater into Cape Cod Bay is a "new or increased discharge," and Holtec's "express purpose and intent" it plainly is not "maintaining or enhancing" the Bay.

Why does Holtec want to dump the water? Its many public statements make the reason clear: to get rid of the contaminated water as cheaply and quickly as possible. The quality of the Bay quite clearly will be neither maintained nor enhanced.

As for whether the proposed discharge is a new or increased discharge, Holtec's application admits that it is "discharge of a new source of industrial wastewater," and that "[t]he industrial wastewater proposed for discharge a New Source." (Holtec App, 3) . It is a "new or increased discharge" as defined by 314 CMR 4.02.

The proposed discharge will flow into Outstanding Resource Waters.

At least three portions of Cape Cod Bay – the eastern shore along the Cape Cod National Seashore, Wellfleet Harbor at the southeast corner of the arm of the Cape, and Barnstable Harbor at the southern edge of the Cape - are designated Outstanding Resource Waters.

As discussed above, the circulation patterns in Cape Cod Bay ensure that wastewater discharged from Pilgrim will inevitably flow into these ORWs.

Pilgrim wastewater discharged into Cape Cod Bay from Pilgrim will flow into the enclosed arm of the Bay, along the Bay's eastern, southern, and western shores. It will also flow north into the Stellwagen Bank National Marine Sanctuary.

Water flowing along the eastern shore of Cape Cod Bay will be in the Cape Cod National Seashore ORW and will flow into the Wellfleet Harbor ORW. Water along the southern shore will flow into the Barnstable Harbor ORW. See pp 11-15[14]

These facts alone - a new discharge to enhance Holtec's profits that will flow into already-designated ORWs - require DEP to apply the 314 CMR 4.04(3) standard when reviewing, and to deny, Holtec's application.[15]

The application should also be denied because Pilgrim's wastewater would flow along the western shore of Cape Cod Bay and into contiguous Duxbury, Plymouth, and Kingston Bays (all of which, along with Cape Cod Bay, are part of the Cod Bay Ocean Sanctuary); and into at least ACECs.

To be entitled to the protections of a Tier 2 ½ review, body of water does not have to be formally designated an ORW.

---

[14] Wastewater discharged from Pilgrim's discharge canal will also flow (I) along the western shore of Cape Cod Bay and into Duxbury, Plymouth and Kingston Bays – all of which have "outstanding socio-economic, recreational, ecological and/or aesthetic values," and (ii) north into the Stellwagen Bank National Sanctuary. See pp. 11-15.

[15] The "new" discharge will also flow in at least four Areas of Critical Environmental Concern located along the Bay's eastern, southern and western shores.

CMR 314's definition of an ORW entitled to Tire 2½ protection includes "other waters as determined by the Department based on their outstanding socio-economic, recreational, ecological and/or aesthetic values."

We recognize that, before Holtec even filed its application, DEP *presumed* that Cape Cod Bay is a High Quality Water, and thus said that Tier 2 review would be required. DEP apparently did so rely on 314 CMR 406.5 that allows such presumption *in the absence of actual information.*

A presumption cannot be a substitute for facts. When actually reviewing Holtec's application, DEP must actually determine, based on facts, the quality, e.g., the "socio-economic, recreational, ecological and aesthetic" values, of <u>all</u> waters into which Pilgrim's wastewater discharge would flow.

The Implementation Procedures seem clear that a water's value should be determined on a case-by-case basis, and the determination depends on, other things whether it is "within certain Areas of Critical Concern." Implementation Procedures, III(2)

If the western shore of the bay and Duxbury, Plymouth and Kingston Bays have any of these outstanding values, that is another reason that Tier 2 ½ review is required.[16] They do not need to have all four. Discharged Pilgrim wastewater will flow into them.

DEP likely already has, or has ready access to, facts showing that Tier 2 ½ review of Holtec's application is required.

For example, DEP has, or has access to, the facts on the basis of which it or some other agency of the Commonwealth determined that (i) the eastern shore of Cape Cod Bay along the Cape Cod National Seashore, Wellfleet Harbor, and Barnstable Harbor were designated Outstanding Resource Waters, and (ii) that areas including Wellfleet Harbor, the Sandy Neck Barrier Beach, Inner Cape Cod Bay, and Ellisville Harbor were areas of critical environmental concern.

[16] Assuming, of course, that DEP does not deny Holtec's application simply on the grounds that the proposed discharge is illegal under at least four state laws.

In addition to facts that DEP may already know, there are innumerable readily available facts demonstrating the values of Cape Cod and its contiguous bays.[17] For example:

a. The annual "blue economy[18] of the towns surrounding the Bay is *billions of dollars.* Every year, more than 77 million oyster seedlings are planted to grow in Duxbury Bay.

b. The number of beaches along the Cape Cod shores, the number of people swimming in the Bay's water, and the number of recreational and commercial boats on the Bay are too large to count. There are miles of beaches along the western shore alone, and hundreds of boats in Duxbury, Plymouth and Kingston Harbors.

In the course of its review of Holtec's application, DEP can deny Holtec's application under 314 CMR 4.04(3) without formally determining that all of Cape Cod Bay is an ORW

DEP can and should apply the Tier 2 ½ standard to Holtec's proposed discharge and deny Holtec's application because Pilgrim's discharge will flow into the at least three existing ORWs .and four existing ACECs.

DEP also could, and we submit should, apply that Tier 2 ½ standard and deny Holtec's application because Pilgrim's discharge will flow even more directly into the waters along the western shore of Cape Cod Bay and into Plymouth, Kingston, and Duxbury Bays. Their "values" are no lower than those of the areas on the eastern and southern shores that have already been designated ORWs.

That Tier 2 ½ standard says that a permit "may be allowed only where both the discharge is 'determined by the Department to be for the express purpose and intend of maintaining or

---

[17] For a more detailed explication of facts showing these values, see the important facts about Cape Cod Bay that are discussed in detail in Pilgrim Watch's comments.

[18] The blue economy important here is the marine-related economy that is dependent on Cape Cod Bay. It includes aquaculture, fishing, charter boats, tourism, real estate and jobs performed at a distance such as food processing and shipment.

enhancing the resource for its designate use' and that an authorization is granted pursuant to 314 CMR 4.04(5)." Based on the facts as I understand them, DEP could neither make any such determination nor grant any such authorization.

Finally, both DEP and ACEC regulations require that any doubts about what standard to use in reviewing Holtec's application must be resolved in favor of using the Tier 2 ½ standard.

DEP's regulations require DEP "provide a margin of safety to account for any lack of knowledge concerning the relationship between the pollutants being discharged and their impact on the quality of the receiving waters." 314 CMR 3.11(3).

The ACEC regulations, 301 CMR 12.11, require DEP to "take action, administer programs, and revise regulations in order to: … (b) preserve, restore, or enhance the resources of the ACEC, and (c) ensure that activities in or impacting on the area are carried out so as to minimize[19] adverse effects on: 1. marine and aquatic productivity" and "habitat values and biodiversity."

IV. DEP Cannot Certify that a Modified EPA NPDES Permit Would Comply With Massachusetts Law.

EPA can issue Holtec's requested permit only if Massachusetts either waives certification or certifies in writing that the permit complies with the requirements of Massachusetts state law.

> **40 CFR 124.53 State certification.**
>
> (a) Under CWA section 401(a)(1), EPA may not issue a permit until a certification is granted or waived in accordance with that section by the State in which the discharge originates or will originate.
>
> (e) State certification shall be in writing and shall include: (1) Conditions which are necessary to assure compliance … with appropriate requirements of State law.

[19] An obvious way for DEP to "minimize adverse effects" is to deny Holtec's application and require it to use one of its other NRC-approved options.

40 CFR § 124.55 Effect of State certification.

> (a) When certification is required under CWA section 401(a)(1) no final permit shall be issued: (1) If certification is denied, or (2) Unless the final permit incorporates the requirements specified in the certification under § 124.53(e).

The Commonwealth clearly should not waive certification.

We respectfully request that DEP tell EPA, in writing, that the Commonwealth does not waive its right to certify, and that it will not certify that any proposed EPA permit allowing Holtec's desired discharge complies with the requirements of state law.

As a courtesy to EPA and to avoid EPA having to do unnecessary work, we suggest that DEP should do so as soon as it issued a final determination denying Holtec's application.

It also must do so again if EPA follows the 40 CFR 124.53 procedures.

V. Other Possible Holtec Arguments

We expect that Holtec will make a number of arguments in an attempt to persuade DEP that its application for a modified Surface Water Discharge Permit should be granted.

We have already addressed several possible contentions that Holtec might make:

- Pilgrim's wastewater is not prohibited waste or industrial waste. It is (pp 5-6, 17-18, 20-21).
- Holtec's desired discharge (i) is part of the "planning, construction, reconstruction, operation and maintenance" of Pilgrim "activities, uses and facilities associated with the generation, transmission, and distribution of electrical power" and complies with applicable laws and regulations, or (ii) is an existing discharge. It is neither (pp 22-30).
- Holtec's desired discharge is "insignificant." It is not. (pp 35-36)

Given what Holtec personnel and supporters have said, there are other potential Holtec arguments that Holec may make, e.g.:

1. The EPA permit will override any state prohibition.

2. None of Holtec's other options to dispose of Pilgrim's wastewater is reasonable or feasible.

3. Not granting Holtec a permit to dump has unacceptably delayed decommissioning,

4. The level of pollutants in the discharged water will be below EPA limits and have no potential to cause adverse environmental impacts.

5. The permit governs only non-radiological contaminants.

6. DEP cannot deny the requested permit because only the Nuclear Regulatory Commission has any power over radioactive releases.

These would be equally untenable.

A. <u>EPA cannot override a DEP Final Determination</u>

Whether EPA might override a DEP final determination is not relevant to DEP's Final Determination, but in any event EPA cannot do so.

The Clean Water Act and EPA regulations are clear that states can have water quality regulations that are *more* stringent than those required by the Federal Clean Water Act or EPA regulations.

- 33 U.S.C. §1370 - Except as expressly provided in this chapter, nothing in this chapter shall (1) preclude or deny the right of any State … to adopt or enforce (A) any standard or limitation respecting discharges of pollutants, or (B) any requirement respecting control or abatement of pollution; except that …such State … may not adopt or enforce any effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard, or standard of performance which is less stringent than the effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard, or standard of performance under this chapter.
- 40 CFR § 131.4 State authority. - States (as defined in § 131.3) are responsible for reviewing, establishing, and revising water quality standards. As recognized by section

510 of the Clean Water Act, States may develop water quality standards more stringent than required by this regulation.

Also, and as discussed above (pp 41-42), EPA Cannot Issue a NPDES Permit unless the Commonwealth certifies that the permit complies with Massachusetts law.

B. Holtec's Other Options are Feasible.

As already discussed (pp 10-11), Holtec does not need to dump Pilgrim's chemically and radioactively contaminated water into Cape Cod Bay. It has three other options, evaporation, shipment to an off-site low level waste storage facility, and storage on-site at Pilgrim for some indefinite period of time. All are allowed by the NRC. All are reasonable and feasible.

Indeed, Holtec has often said it may use all four; it is already using evaporation.
In a January 27, 2022 letter and accompanying Information Sheet to "Stakeholders, Elected Officials, Advocacy Groups and Community Member," Kelley Trice, then the President of HDI, said: "Pilgrim has three available options, all of which will most likely be necessary:[20]

We doubt that Trice would have made this statement if Holtec thought that any of the "three available options" was not feasible. Neither would Holtec's CEO, Dr. Singh, have said that the wastewater could be stored on site for an indefinite period of time if he believed that was not a feasible option.

Of Holtec's four NRC-allowed options, shipping offsite is the most feasible. In the course of decommissioning Pilgrim, Holtec has already shipped over 218,000 cubic feet of solid low level radioactive waste to Waste Control Specialists, an existing licensed radioactive waste storage facility located in Andrews, Texas. Many of Holtec's Pilgrim's buildings and other facilities, including the most radioactive, remain to be demolished.
.
The 1.1 million gallons of liquid low level radioactive waste that Pilgrim wants to dump into Cape Cod Bay, what Holtec refers to as Pilgrim's "wastewater, amounts to a little less than

[20] Holtec's CEO, Kris Singh, added the fourth option, storage on site, to the list in the course of his discussions and correspondence with Senator Markey.

150,000 cubic feet. Vermont Yankee will ship twice as much water to off-site storage facilities rather than dump it in the Connecticut River. There is no reason that Holtec could not do the same and send Pilgrim's wastewater to WCS.

> As part of its "one-stop shop" approach, WCS provides dedicated cask transport services to its customers through an exclusive agreement with Visionary Solutions, LLC. The service offered to our clients will include team drivers (Type B casks) and all necessary permitting, escorts, etc. to transport waste to our facilities. The majority of waste arrives via rail and WCS has its own locomotive with the only rail line in Andrews County, which reduces traffic on public highway." https://www.wcstexas.com/transportation-cask-services/

Holtec's reluctance to shipping the wastewater comes down to cost. Holtec told Senator Markey that the estimated cost to ship would be $20 million to ship, but this would be a small fraction of its likely profit from decommissioning Pilgrim.[21] Even if we were to take this estimated shipping cost at face value, Holtec has never said what the costs of discharging into the Bay, or of any of its other possible options would be.

Holtec also disparaged shipping on two other grounds – environmental justice and the potential for accidents.

Holtec's statement that it would be unfair to burden another community by sending more waste to an off-site storage facility, even though that facility is already there, is more than a little inconsistent. According to Holtec, its plan to develop a new interim spent fuel storage site in New Mexico for all the nation's commercial spent fuel assemblies is the "epitome of social justice." Apparently whether something is "social justice" depends on

---

[21] It is important to remember that it is rate-payer money, not Holtec's, that is paying for decommissioning. No Pilgrim licensee even contributed a cent to Pilgrim's Decommissioning Trust Fund.

As for "how much profit," Holtec included profit (likely not less than 30%) in its more than one billion dollar estimated decommissioning costs – at least $300 million in profit. In addition, the Department of Entergy will pay Holtec what is spends out of the ratepayer funded trust (not its own money) for spent fuel storage expenses – another $500 million in profit. Finally, Holtec will pocket any left-over money in the DTF/

whether it makes or costs Holtec money.

As for safety, Kelley Trice's fear of "potential accidents" is also pure hypocrisy. For years, Holtec has consistently said that transporting radioactive waste and debris is perfectly safe.

Holtec has already safely shipped more than 200,000 tons of low level radioactive waste to WCS in Andrews County, Texas. In connection with its plans to build spent nuclear fuel storage site in Southeastern New Mexico, Holtec assured the NRC that it will be perfectly safe to transport thousands of tons of spent nuclear fuel to New Mexico from all over the U.S.

> "Statistically, 2.9 fatalities from traffic accidents would be expected over the 20-year transportation period. Because the risks are for the entire population of individuals along the transportation routes, the risk to any single individual would be small. About 99.99 percent of transportation accidents would not be severe enough to result in a release of radiological material from the transportation cask or degradation in the cask's shielding." (Nov 2020 Environmental Report, p 220)

After Senator Markey's May 2022 hearing in Plymouth, Dr. Singh wrote Senator Markey, saying again that there will be an "absence … of the risk of hazardous accident" in transporting more than ten thousand canisters of spent nuclear fuel from nuclear power plants all over the US to New Mexico.

As for evaporation, Holtec's again raised the issue of cost. According to Trice, the "residual heat" and "air handling systems" that Pilgrim previously used for evaporation were decommissioned and are no longer there. "With residual heat not available, evaporation would require an alternate heat source, and the use of carbon creating fossil fuels" (Fact Sheet, p. 3). Pilgrim "would need to use electricity in great quantities to "might also need to use the diesel fuel/diesel generator to help create the power." (Letter, p. 2)

According to an August 15, 2023 email from the NRC, Holtec has apparently overcome these supposed obstacles. Since February of 2023, Holtec has been using submersion heaters to increase the evaporation of water which will be released through the reactor building ventilation system.

Storage onsite would likely delay shipping or evaporation for some period of time. But Dr. Singh would not have told Senator Markey that storage is an option if Holtec believed it was not feasible.

Dumping the wastewater into Cape Cod Bay is Holtec's favorite - for the simple reason that it will be cheap.

C. . Lack of a Permit Has Not Delayed Decommissioning

In a statement shortly after DEP's tentative determination, Patrick O'Brien, Holtec International's Director of Government Affairs and Communication, said:

> We are disappointed by the state's denial of our permit modification for discharge of treated water from Pilgrim Station well within safe limits. We will continue with the EPA modification process and will look to evaluate all options related to ultimate disposition of the water used in plant operations for the last 50 years. This process has already delayed the completion of the project for an additional four years, impacted the workforce on site and further changes when the site can be returned to be an economic driver for the Plymouth Community."

The last sentence in this statement is more than a little incomplete and misleading.

As a starting point, if ensuring that decommissioning would be complete by September of 2027 was really that important to Holtec, one might ask why it did not simply ship the water off-site, rather than waiting until 2023, more than 3 years after the 2000 permits were issued, ,to request an amended permit.

Perhaps more important, Holtec's decision to change the estimated date for completing Pilgrim's decommissioning from 2027 to 2031 had nothing to do with DEP's Tentative Determination.

On March 31, 2023, four months before the tentative determination was issued, Holtec "notify[ied] the NRC that HDI is planning to delay the start of activities associated with the Reactor Pressure Vessel (RPV) segmentation and partial site release milestone dates." RPV segmentation was delayed from 2024 to 2028.

The decommissioning timeline in Holtec's May 22, 2023 report to NDCAP, two months before the Tentative Determination, showed that the estimated site release date had been changed to four years later than the date in Holtec's earlier reports.

It is Holtec, not EPA or DEP, that decided to delay when the Pilgrim site would be released. Holtec's decision to delay once again comes back to money.

The real reason Holtec delayed the estimated partial release date is that the value of Pilgrim's Decommissioning Trust Fund dropped by more than 300 million dollars in 2022. Holtec decided to delay decommissioning in the hope that the stock market would recover so that it would not have to spend its own money (rather than rate-payer money in the DTF) to complete decommissioning faster.

Two months before DEP issued the Tentative Determination, Holtec told the NRC that the value of the decommissioning fund had dropped by over $300 million in 2022, that the amount Holtec estimated would remain after license termination had decreased from $252 million to $44 million, and that Holtec would delay completion of decommissioning for four (4) years.

Holtec may not be responsible for the drop in the stock market. But Holtec, and not the EPA's modification process, is responsible for any delay.

The EPA also is not responsible for the fact that the discharge permits that DEP and the EPA issued on January 30, 2020 did not allow discharge of either spent fuel pool water or of any pollutants associated with decommissioning. The principal reason the 2020 permits did not authorize these discharges is that *neither Holtec nor its predecessor asked that they be included* in the permit. See 2022 Permit, Response to 5.1 comment, pg. 346.

The 2020 permits explicitly told Holtec that, if Holtec wanted to modify the 2020 permit to include them, it could request a permit modification. For reasons that Holtec might be able to explain, it was not until March 31, 2023, more than three year later, that Holtec finally applied for permit modification.

It is in everyone's interest that Pilgrim be properly decommissioned in a reasonable length of time. But neither the EPA nor DEP bears any responsibility for Holtec's delays.

The August 24, 2023 Public Hearing

At the August 24, 2023 Public Hearing, Pine duBois, a member of NDCAP, said a delay in dealing with Pilgrim's wastewater would "most certainly delay decommissioning of the entire Pilgrim site." [22]

At the May 22, 2023 NDCAP meeting, two other NDCAP panelists, Andrew Gottlieb and Seth Pickering, DEP, asked how the delay would impact Holtec's schedule to dewater. David Noyes, Holtec's representative, said that the delay would not change the dewatering schedule for the spent fuel pool or cavity, that the water will be needed for shielding during dismantling over the delayed 4 years. He also said Holtec might be able to drain the reactor vessel of its 5,000-6,000 gallons of water earlier if Holtec decides to dry dismantle of the "interior of the can" by using a fixative.

In either case, no decommissioning delay will be caused by what Mr. Patrick called the "EPA modification process. And in any event Holtec remains free to ship the water offsite anytime it might choose to do so.

D. Pollutants in Pilgrim's Treated Wastewater

The majority of the less than six pages of text of Holtec's application, and essentially all of its over 300 page attachment, are directed to what pollutants in what concentrations will be in the "treated wastewater to be discharged through Outfall 015." Holtec App, 5. This is not surprising. Holtec wrote this application in the hope of obtaining a new EPA NPDES permit.

What pollutants will be in Pilgrims treated water may be important to EPA; it is irrelevant to Massachusetts law. The Massachusetts laws discussed above all prohibit the discharge of any waste, regardless of how much.

[22] Ms. duBois also seemed to suggest that Holtec should be allowed to discharge the wastewater into Cape Cod Bay because the discharge would not be harmful. During the hearing, a number of speakers repeated this theme. What all apparently fail to accept is that there will be both chemicals and radionuclides in Pilgrims water even after treatment, and that Massachusetts laws forbid the discharge of any amount of waste into Cape Cod Bay.

It is apparent from Holtec's application that those who wrote it were focused on the EPA, and gave little or no thought to the fact that Holtec also needed a modified Massachusetts Surface Water Discharge Permit .

The application that Holtec submitted to DEP consists only of the application that Holtec had sent EPA a few days earlier, plus a two page form.

In filing its application with DEP, Holtec either forgot (or simply didn't care) about Massachusetts state laws and regulations – even though Holtec had agreed to comply with them.

Massachusetts law does not care how many pollutants there will be in Pilgrim's treated water or their concentrations; these are essentially relevant to whether DEP should issue a modified permit. Massachusetts laws prohibit the discharge of *any* waste, industrial waste, or hazardous materials into Cape Cod Bay; there is no *de minimus* exception.

E. Massachusetts Laws Cover Radionuclides.

Holtec's application says:

> "The term 'pollutant' in the CWA excludes 'radioactive materials' regulated by the Nuclear Regulatory Commission ('NRC') under the Atomic Energy Act. Consequently the Final NPDES Permit does not include any numeric limits on such radioactive materials."

The first sentence of this is simply wrong. The CWA definition of "pollutants" explicitly *includes* radioactive materials (see CWA, sec. 502).

As for the second, Pilgrim's current NPDES permit does not "include any numeric limits on such radioactive materials only because EPA's practice has been to use a narrower , one that excludes many radioactive contaminants, in its NPDES permits.

However, the definitions of waste and hazardous materials in the Massachusetts Ocean Sanctuaries Act, Endangered Species Act, Massachusetts Oil and Hazardous Material Release Prevention Act *do* encompass both radiological and non-radiological materials. See pp 20, 27, 29. So does the definition of "pollutant" in 314 CMR 4.02.

Three years ago, DEP followed EPA's lead and issued a 2020 permit identical to EPA's. But DEP chose not to do so when it issued the Tentative Determination.

As DEP's representative told NDCAP, no relevant Massachusetts law or regulation excludes radioactive materials.

It is important to remember that the state has the right to set more stringent standards than EPA's.

In enacting its laws and writing its regulations, the Commonwealth made the decision that it is important to protect the environment and the public and *not* to grant any permit that would allow any unnecessary discharge of waste, particularly into waters such as Cape Cod Bay.

To limit those laws and regulations to non-radiological waste, and to allow *any* discharge that contains radiological materials, would emasculate what the Commonwealth decided.

Pilgrim's wastewater includes both radiological and non-radiological components; the two cannot and will not be separated. We doubt that even a company like Holtec can plausibly argue that Massachusetts laws and regulations do not allow dumping chemical pollutants into Cape Cod Bay.

It cannot be the case that Holtec (or any other company) can avoid a law against dumping non-radiological pollutants simply by adding tritium or some other radioactive material to the discharge. In slightly more simple terms – would a company be allowed to dump cyanide into Cape Cod Bay simply because it was mixed with a few ounces of Pilgrim's radioactively contaminants?

Not to construe Massachusetts laws and regulations to cover both radiological and non-radiological materials would be untenable.

F. DEP Can Deny the Permit

It would be impossible to count the number of times that Holtec and its supporters have told legislators, the press and the public that, because of preemption, only the NRC can tell Holtec what radioactive discharges it can or cannot make.

That is simply not so. It is simply another example of Holtec trying to avoid its agreed responsibilities and obligations.

The question here is whether Holtec can avoid its agreement. It is *not* whether the NRC sets limits on radioactive discharges or whether Holtec could ignore state laws if it had not agreed to comply with them. The Settlement Agreement is a valid and enforceable contract, and Holtec has agreed not to contest that.

Holtecwants people to forget that, in the Settlement Agreement between it and the Commonwealth, Holtec agreed not only that it would comply with Massachusetts laws and regulations, but also that it would not assert that any provision of the agreement was invalid under any federal law. In other words, Holtec agreed that it would not assert that its agreement to comply with Massachusetts laws was preempted.

- "Holtec shall comply with all applicable environmental and human-health based standards and regulations of the Commonwealth." (Settlement Agreement, Par. 10(l)).

- "Holtec shall comply with Chapter 21E and the MCP as applicable." (Settlement Agreement, Par. 10(e)).

- "No Party to this Agreement (or any person or entity affiliated or related to a Party to this Agreement) shall assert that any provision of this Agreement (or the Agreement itself) is invalid under any federal law or any provision of the U.S. Constitution." (Settlement Agreement, par. 48).

Holtec also wants to forget that it has more than once told NDCAP, and likely others, that it "would not pursue discharge of water in violation of any state or federal requirement."

Over a year ago, Governor Healey said that the state has the authority to stop Holtec's desired discharge based on the settlement agreement, combined with state and federal law; "in whatever capacity I serve, that we're not going to have radioactive waste dumped down here." She is correct, and there is nothing to suggest that her position has changed.

The Office of the Attorney General said that it is "prepared to take action to halt any violations of state and federal water discharge permits." We expect that it still is.

The EPA agrees that states have the authority to establish limits on radionuclides in discharges. (https://cfpub.epa.gov/ safewater/radionuclides/radionuclides.cfm?action= Rad_Disposal%20Options). States can have water quality regulations that are *more* stringent than those required by the Federal Clean Water Act or EPA regulations. See p 43..

The Supreme Court has decided four nuclear preemption cases in which the nuclear industry argued that state laws did not apply. In all four, the nuclear industry lost. Although none of those decisions involved a nuclear industry licensee's agreement to comply with state laws, the Supreme Court consistently held that the federal government is not "the sole regulator of all matters nuclear" (*Virginia Uranium, Inc. v. Warren,* 587 U.S ___ (2019). Slip Op, 8), and that the nuclear industry plaintiffs could not avoid state laws. .

The Supreme Court decisions are clear: a state law, and thus certainly an agreement to comply with state law, is enforceable unless "there is an irreconcilable conflict between the federal and state standards or whether the imposition of a state standard in a damages action would frustrate the objectives of the federal law" (*Silkwood v. Kerr-McGee Corp*., 464 U. S. 238, 256 (1984)), or the state law has "some direct and substantial effect on the decisions made by those who build or operate nuclear facilities concerning radiological safety levels." *English v. General Elec. Co.*, 496 U. S. 72 (1990).

Even absent Holtec's agreement not to assert that its agreement is preempted, there is no irreconcilable conflict between any federal law or regulation and Holtec's agreement to comply with state law. No constitutional text , federal law, or NRC regulation requires Holtec to dump Pilgrim's waste in Cape Cod Bay." *Virginia Uranium, Inc. v. Warren,* 587 U.S ___ (2019: "A litigant must point specifically to 'a constitutional text or a federal statute' that … conflicts with state law.")

Holtec signed the Settlement Agreement to settle pending litigation with the Commonwealth. That litigation threatened to prevent, and would certainly have delayed, Holtec's purchase and decommissioning of Pilgrim. The Holtec executives who made the decision to sign the agreement obviously decided that by settling, and agreeing to comply with Massachusetts laws and not to argue that the agreement was preempted, Holtec was opening the door to making hundreds of millions of dollars in decommissioning profit, and that the potential profit far outweighed any potential costs of its contractual agreement, including complying with Massachusetts state laws.

Holtec must live with what it agreed.

Massachusetts has the right to hold Holtec to its agreement to comply with state laws and regulations. Holtec's requested discharge would not comply.

In conclusion, I ask that DEP issue a Final Determination denying Holtec's application, not only because denial is mandated by the Ocean Sanctuaries Act, but also because the Endangered Species Act, Massachusetts Crimes Against Public Health, the Massachusetts Oil and Hazardous Material Release Prevention Act and 314 CMR 4 all prohibit discharging Pilgrim's wastewater into Cape Cod Bay.

Please feel free to contact me if you have any questions or would like more information.

Thanking you in advance for your attention and consideration, I am

Respectfully yours,

/s/ James B. Lampert

James B. Lampert

Tel: [redacted]

Email: [redacted]

Table of Contents

I. Relevant Facts ……..…... 2
A. Background ……..... 2
B. Pilgrim Nuclear Power Station ……..…..... 3
C. Pilgrim's Contaminated Water ……..…... 5
D. Pilgrim's 2020 Discharge Permits …….……7
E. Holtec' Application for a Modified Permit ……..8
F. Holtec's Options for Pilgrim's Industrial Wastewater …....10
G. Cape Cod Bay …….....11
H. Pilgrim's Contaminated Water is Prohibited Waste …….. 17
II. The Tentative Determination …….……...19
A. The Ocean Sanctuaries Act ……..19
1. Pilgrim's wastewater is industrial waste ……...20
2. The discharge does not qualify for any exemption …...22
a. The generation of electrical power ……...….22
b. Existing facilities and discharges ……..26
c. The August 24, 2023 public hearing ……...…..28
B. The Endangered Species Act …...…….….30
C. Crimes Against Public Health …….…31
D. Oil and Hazardous Material Release Prevention Act ….....32
III. DEP's Antidegradation Regulations …….…33
A. 314 CMR 4.04(2) ……34
B. 314 CMR 4.04(3) …….. 37
IV. DEP Cannot Certify that a Modified EPA NPDES Permit
Would Comply with Massachusetts Law ……..41
V. Other Possible Holtec Arguments …….…42
A. EPA Cannot Override a DEP Final Determination …….43
B. Holtec's Other Options are Feasible ……..…..44
C. Lack of a Permit has not Delayed Decommissioning. …....47
D. Pollutants in Pilgrim's Treated Water ……..……..49
E. Massachusetts Laws Cover Radionuclides ……....50
F. DEP can Deny the Permit ……...…51

Pilgrim Nuclear Power Station

Sarah Wolff [redacted]

Tue 8/29/2023 11:54 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

To whom it may concern,

I am writing to urge you to deny permission for Holtec to discharge any wastewater from the Pilgrim Nuclear Power Plant, whether treated or not, into Cape Cod Bay. Doing so would harm the delicate ecosystem of the area and would potentially affect the health of residents and tourists. In addition, it would hurt the seafood and tourism industries. Holtec's request ignores its agreement to uphold Massachusetts laws, specifically the Massachusetts Ocean Sanctuaries Act and the Endangered Species Act. We need to protect our waterways and ecosystems from dangerous pollutants for generations to come.

Thank you very much for your consideration of this important matter.

Best regards,
Sarah Wolff

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station

Dear Ms. Coniaris:

I am writing to support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act. The proposed discharge is therefore illegal.

Because Holtec's proposed discharge is illegal, the Department's final determination should deny its application.

Thank you,
Peter Dalton

[redacted]

member Stellwagen Bank Charterboat Association
Duxbury Shell Fish Advisory Board Member
Save Our Bay MA Board Member

Pilgrim Nuclear Waste Discharge and Holtec

George Oleyer [redacted]
Tue 8/29/2023 1:09 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114

Dear Ms. Coniaris,

As you are aware, the state of New York has now prohibited Holtec from discharging the same waste as Pilgrim into the Hudson River for the same concerns as ours for Cape Cod Bay and surrounding waters. see https://apnews.com/article/indian-point-hudson-river-nuclear-pollution-2c8d0f5d31acc701bbc41bdb573bfac5

I therefore strongly support the tentative determination by your department to deny Holtec's application for a modified Surface Water Discharge Permit that would allow Holtec to discharge such radioactive and chemically contaminated industrial wastewater into Cape Cod Bay. Such discharge is clearly prohibited by the Massachusetts Ocean Sanctuaries Act as the "dumping or discharge of commercial, municipal, domestic or industrial waste" into an ocean sanctuary.

The MassDEP must enforce the law not only to protect our ocean sanctuaries and also to protect our public health as these waste waters work their way up the food chains of heavily fished waters and for other health concerns expressed at the hearing.

Most sincerely, Susan Wall Oleyer MPH, [redacted]

Pilgrim Nuclear Power Station

Stephen Folding [redacted]
Tue 8/29/2023 1:44 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

I oppose Holtec discharging radioactive water into Cape Cod Bay.

Stephen A Folding
[redacted]

Pilgrim Nuclear Power Station

Carolyn Looker [redacted]
Tue 8/29/2023 2:21 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Massachusetts State Department of Environmental Protections,

To: Surface Water Discharge Program, Massachusetts Department of Environmental Protection

Re: In support of the "Tentative Determination to Deny a Surface Water Discharge permit modification requested by Holtec Decommissioning International LLC", (MA Permit No. MA0003557 issued to Holtec Pilgrim LLC)

I am writing to support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston and Duxbury Bays are all protected ocean sanctuaries under the act. The Department's final determination should deny its application.

Thank you,

Sincerely,
Carolyn Looker
[redacted]

Cathy Coniaris
Mass DEP
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station – DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit .

Dear Ms. Coniaris:

I am writing to support DEP's tentative decision to deny Holtec's application for a modified Surface Water Discharge Permit to discharge 1.1 million gallons of radioactive and chemically contaminated wastewater into Cape Cod Bay.

DEP's tentative determination that the state's Ocean Sanctuaries Act prohibits this discharge is correct:

- **The Massachusetts Ocean Sanctuaries Act** prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries.

In addition:

- **The Massachusetts Endangered Species Act** prohibits altering the habitat of any endangered or threatened species, including the right whale, roseate tern, least tern, and loggerhead turtle that inhabit Cape Cod Bay. The discharge of waste, wastewater, toxic, or hazardous materials is considered alteration of habitat.
- **The DEP's regulations also include antidegradation provisions** that prohibit Holtec's discharge:
    - *unless the discharge would be insignificant.* The discharge of 1.1 million gallons of contaminated water is in no way 'insignificant.'
    - *unless the "discharge is necessary to accommodate important economic or social development in the [Cape Cod Bay] area" or 'for the express purpose and intent of maintaining or enhancing" Cape Cod Bay*. This discharge will not enhance but only harm the beautiful coastal waters that we love and that drive our local economy through tourism, fishing, and recreation.

Holtec's proposed discharge is illegal. The department's final determination should deny the application.

Thank you.

Victoria W Wulsin

Victoria W. Wulsin (formerly of Cambridge, MA and Auburndale, MA, with many friends and relatives in Massachusetts)

[redacted]

Pilgrim Nuclear Power Station

[redacted]

Tue 8/29/2023 8:11 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Please please please deny Holtec's release of radioactive water into Cape Cod Bay! The magnitude of the effects on our coastal environment are unknown but surely deleterious.

Susan and Paul Miller and family
Monument Beach, Cape Cod

Please deny Holtec's permit to discharge into Cape Cod Bay

Daniel J McCullough [redacted]
Wed 8/30/2023 5:05 AM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,

I strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay.

DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law.

I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you,

Dan McCullough

[redacted]

[redacted]

Discharge of Pilgrim Wastewater and Ocean Sanctuaries Act

Riis Beech [redacted]

Wed 8/30/2023 5:54 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,

I strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law. I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you,

Roni King

[redacted]

Holtec public comment

Samantha Pilzer [redacted]
Wed 8/30/2023 6:44 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,

I strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law. I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you,

Samantha Pilzer

[redacted]

Holter discharge

Sue Smethurst [redacted]
Wed 8/30/2023 7:07 AM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Commissioner

I strongly agree with the determination to deny Holtec International's application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay.

I believe that the Ocean Sanctuaries Act explicitly states that discharges like the one proposed by Holtec, are prohibited under state law.

Cape Cod Bay is an already threatened ecosystem where the type of proposed discharge could cause irreparable damage.

I urge DEP to move forward in finalizing its draft decision, based on state law requirements, and permanently deny Holtec International from any discharge of Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Suzanne Smethurst

[redacted]

[redacted]

Sent from Yahoo Mail on Android

Holtec's permit to discharge wastewater

Sue Cochrane [redacted]
Wed 8/30/2023 7:56 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,
I strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law. I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you,

Susan Lynne Cochrane

[redacted]

Cape Cod Bay

Mary Ellen Alwardt [redacted]
Wed 8/30/2023 8:16 AM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Please don't allow Holtec to dump in Cape Cod Bay. Help us to preserve Cape Cod and keep it a healthy place to live and work. The Cape has more than its share of cancer among children and adults. Please, do the right thing?

Sent from my iPhone

Feedback on draft ruling to protect Cape Cod Bay

Jeff Provost [redacted]
Wed 8/30/2023 8:20 AM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,

I strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law. I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you,

Jeffrey Provost

[redacted]

Pilgrim plant dumping radioactive water into Cape Cod Bay

Jill Maraghy [redacted]
Wed 8/30/2023 8:30 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Please do not allow the Pilgrim Nuclear Plant to dump radioactive water into cape Cod Bay.
Thanks, Jill and Rob Maraghy

Sent from my iPhone

Pilgrim Nuclear Power Station

Susan Hadfield [redacted]
Wed 8/30/2023 8:50 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear People:

I live in Plymouth and stand with MassDEP in preferring that the Pilgrim Power Plant **not** dump its wastewater into the Cape Cod Bay. Are we not reprocessing the materials for recycling because of expense? Is burying it not geologically possible in MA?

My experience is that financial gain is the determining factor in these matters, rather than public safety. My husband and I have solar panels on our house, and drive an electric car. We try to put the environment first, and I hope that a different solution can be found.

Sincerely,
Susan Hadfield
John Noble
[redacted]

August 28, 2023

MassDEP Surface Water Discharge Permitting Program
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: Deny Holtec International's Permit

Dear Commissioner Heiple,

The Buzzards Bay Coalition, ("Coalition") urges the Massachusetts Department of Environmental Protection ("MassDEP") to finalize its draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay.

The Buzzards Bay Coalition is a membership-supported nonprofit organization dedicated to the restoration, protection, and sustainable use and enjoyment of our irreplaceable Bay and its watershed.

The increased discharge of radioactive waste into the Commonwealth's coastal waters is unacceptable. Alternatives exist for the radioactive waste Holtec seeks to dispose of. MassDEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that increased commercial and industrial discharges, such as the one pursued by Holtec, are prohibited under state law.

Sincerely,

Korrin N. Petersen, Esq.
Vice President of Clean Water Advocacy
petersen@savebuzzardsbay.org

Denial of Propsal to discharge radioactive wastewater into Cape Cod Bay

Christine Froula [redacted]

Wed 8/30/2023 9:30 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>;john austin [redacted];Kristin Andres <kandres@apcc.org>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

To the Massachusetts Department of Environmental Protection:

As ecologically concerned Massachusetts taxpayers, we applaud the Department's preliminary denial of Holtec's proposed permit to discharge 1.1 million gallons of radioactive wastewater into Cape Cod Bay.

We very strongly urge the Department to issue an absolute and permanent prohibition of any discharge of radioactive waste into Cape Cod Bay for the protection of our precious and fragile marine environment.

With warm thanks for your work,

Christine Froula and John Austin

[redacted]

APCC
Association to Preserve Cape Cod
Preserving the Very Nature of Cape Cod

Andrew Gottlieb
Executive Director

BOARD OF DIRECTORS

Eliza McClennen
President

Steven Koppel
Vice President

Bob Ciolek
Treasurer

Jack Looney
Clerk

Tom Cohn

John Cumbler

Margo Fenn

Joshua Goldberg

DeeDee Holt

Pat Hughes

Molly Karlson

Elysse Magnotto-Cleary

Blue Magruder

Wendy Northcross

Rick O'Connor

Kris Ramsay

Robert Summersgill

Charles Sumner

Taryn Wilson

August 30, 2023

Bonnie Heiple, Commissioner
Massachusetts Department of Environmental Protection
Attn: MassDEP Surface Water Discharge Permitting Program
100 Cambridge St., Suite 900
Boston, MA 02114

RE: Holtec International Preliminary Discharge Permit Denial

Dear Commissioner Heiple:

The Association to Preserve Cape Cod (APCC) writes in strong support of the Massachusetts Department of Environmental Protection's tentative determination to deny Holtec International's request for a permit modification to discharge pollutants into Cape Cod Bay. We urge MassDEP to issue a final determination to deny the permit.

Founded in 1968, APCC is the Cape region's leading nonprofit environmental advocacy and education organization, working for the adoption of laws, policies and programs that protect, preserve and restore Cape Cod's natural resources. APCC focuses our efforts on the protection of groundwater, surface water, and wetland resources, preservation of open space, the promotion of responsible, planned growth and the achievement of an environmental ethic.

MassDEP's preliminary decision to deny Holtec's permit correctly interprets the Massachusetts Ocean Sanctuaries Act (OSA), which explicitly states that new industrial discharges, such as the new discharges proposed by Holtec as part of the Pilgrim Nuclear Power Station's decommissioning activities, are prohibited under state law in waters designated as ocean sanctuaries. The Cape Cod Bay Ocean Sanctuary was designated as such in 1971. Therefore, Holtec's proposal to discharge wastewater into the bay is subject to the requirements and restrictions of the OSA state law.

On February 15, 2023, APCC submitted a letter to EEA Secretary Rebecca Tepper and

CZM Director Lisa Berry Engler that provides a comprehensive legal analysis establishing the relevance of the OSA to Holtec's permit application. It explains how discharging wastewater into Cape Cod Bay from the Pilgrim decommissioning process would be in direct violation of the OSA. **We have attached that February 15, 2023 correspondence along with this comment letter and request that it be included in the record for the public comment period for MassDEP's preliminary determination.**

MassDEP's basis for denial of the Holtec permit application, as required by state law, stands on firm legal ground and does not conflict with federal preemption rules. The rules on preemption as they relate to the Atomic Energy Act (AEA) are triggered if a state law expressly regulates radiation hazards. In that instance, the AEA preempts state law. However, if a state law on its face regulates a nuclear power plant with regard to actions other than radiation hazards, the AEA does not preempt state law. Unless there is a direct, targeted interference with the federal regulation of radiological hazards, the state law is not preempted. See Northern States Power Co. v. Minnesota, 447 F.2d 1143 (8th Cir. 1971); Pacific Gas & Electric Co. v. State Energy Resources Conservation & Development Comm., 461 U.S. 190 (1983).

The above distinction aptly applies to the Holtec discharge permit. The OSA regulates Holtec's proposed discharge of industrial pollutants into a state water designated as an ocean sanctuary, but it does not regulate radiological discharges. The OSA was enacted in 1971 by the State Legislature out of environmental concerns driven in large part by the threat of oil and gas exploration and industrial sources of pollution, not out of concern over nuclear issues. Compare Entergy Nuclear Vermont Yankee, LLC v. Shumlin, 733 F.3d 393 (2d Cir. 2013).

Importantly, the OSA does not leave Holtec without any options. Rather, it merely eliminates one of several options for the disposal of Pilgrim's decommissioning wastewater. The Nuclear Regulatory Commission does not dictate a single specific method for disposing of the wastewater; Holtec has the ability to choose other disposal methods that do not violate state law. In fact, the NRC's website states, "Holtec Decommissioning International (HDI) is responsible for determining how it will manage radioactive material in its liquid effluent. HDI may elect to use any of the methods allowed under the NRC's regulations, which allow discharge, shipment for disposal, or evaporation of the liquid and disposal of the resulting solid waste." See Capron v. Office of the Attorney General of Massachusetts, 944 F.3d 9 (1st Cir. 2019); compare Kerr-McGee Chemical Corp. v. City of West Chicago, 914 F.2d 820 (7th Cir. 1990).

We therefore urge MassDEP to move forward in finalizing its draft decision based on state law requirements and to issue a final permit denial to Holtec that prevents Pilgrim's wastewater

from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you for this opportunity to comment.

Sincerely,

Andrew Gottlieb
Executive Director

482 Main Street | Dennis, MA 02638
Tel: 508-619-3185 | info@apcc.org | www.apcc.org

Sugarman Rogers

Sugarman, Rogers, Barshak & Cohen, P.C.

LISA C. GOODHEART
GOODHEART@SUGARMANROGERS.COM

C. DYLAN SANDERS
SANDERS@SUGARMANROGERS.COM

ALESSANDRA W. WINGERTER
WINGERTER@SUGARMANROGERS.COM

February 15, 2023

Rebecca Tepper, Secretary
Executive Office of Energy and
Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
rebecca.tepper@state.ma.us

Lisa Berry Engler, Director
Office of Coastal Zone Management
100 Cambridge Street, Suite 900
Boston, MA 02114
lisa.engler@state.ma.us

Re: *The Ocean Sanctuaries Act's Prohibition of a Planned New Industrial Discharge of Radioactive Waste From the Decommissioned Pilgrim Nuclear Power Station Into the Cape Cod Bay Ocean Sanctuary*

Dear Secretary Tepper and Director Engler:

On behalf of the Association to Preserve Cape Cod ("APCC"), we write to request that the Office of Coastal Zone Management ("CZM") in particular, and the Executive Office of Energy and Environmental Affairs ("EEA") in general, exercise the full authority entrusted to your offices under the Commonwealth's Ocean Sanctuaries Act, G.L. c. 132A, §§ 12A-18 ("OSA"), to stop the proposed discharge of an estimated 1.1 million gallons of radioactive waste from the decommissioned Pilgrim Nuclear Power Station ("PNPS") into the Cape Cod Bay Ocean Sanctuary. As you know, the OSA entrusts ocean sanctuaries to CZM's "care, oversight, and control." G.L. c. 132A, § 14.

We have three specific requests, as follows:

1. We ask that CZM issue a letter informing Holtec Pilgrim, LLC and Holtec Decommissioning International, LLC (collectively, "Holtec"), as the owner and operator of PNPS, that the OSA prohibits the planned discharge of radioactive waste – or any new industrial discharge – from PNPS's decommissioning activities into Cape Cod Bay.

2. We ask that CZM advise the Massachusetts Department of Environmental Protection ("MassDEP") that its issuance of any state permit, authorization, or approval of any kind for such a discharge would not be consistent with the OSA. In particular, we ask CZM to notify MassDEP that Holtec's proposed discharge is not eligible for a new or modified Massachusetts Surface Water Discharge Permit, or for a new or modified state Water Quality Certification, which Holtec has announced it will seek in the near future.

3. We ask for an opportunity, at your earliest convenience and before mid-March in any event, to meet with you, and any others whom you may wish to include, to discuss the

various state actions that may be appropriate to ensure that Holtec will not discharge waste from decommissioning activities at PNPS into a protected ocean sanctuary.

As discussed in further detail below, Holtec has announced its intention to discharge spent fuel pool water and other radioactive waste into Cape Cod Bay as part of the expedited decommissioning, dismantlement, and demolition of PNPS. This would not be an "existing discharge" authorized as of 1971, when the Cape Cod Bay Ocean Sanctuary was created. Nor would this be a discharge associated with the "operation and maintenance" of the coolant system or any other activity, use or facility associated the generation, transmission, and distribution of electricity from an active power generation facility. To the contrary, the radioactive water in question has been generated during decommissioning activities, after PNPS ceased all power-generation operations as of June 1, 2019. A discharge to the Cape Cod Bay Ocean Sanctuary from the decommissioned PNPS would be a *new* industrial discharge, which cannot be authorized by any agency of the Commonwealth consistent with the OSA.

The OSA expressly prohibits any new industrial discharges into protected ocean sanctuaries, with certain narrow exceptions, none of which are applicable to Holtec's proposed discharge from PNPS of water associated with decommissioning activities. Moreover, the discharge of PNPS's radioactive waste into Cape Cod Bay is entirely unnecessary. Holtec acknowledges that it has other options to dispose of the radioactive waste that do not violate the OSA, and these options do not involve conducting a decades-long experiment with the unique environment of Cape Cod Bay, the ultimate outcome of which will only be learned long after Holtec has left. To be sure, these other options may involve their own risks and benefits, and additional expense; but that is what Holtec voluntarily assumed when it chose to acquire PNPS – not to operate for the purpose of producing electrical power – but solely for the purpose of profiting from decommissioning the plant.

Cape Cod Bay is a precious resource. Critical natural resources include shellfish beds, commercial and recreational fisheries, wildlife that includes rare, threatened, and endangered species, including the North Atlantic Right Whale, sea turtles, and Atlantic Sturgeon, and miles of coastal habitat including coastal beaches, bays, estuaries and salt marshes. Four state-recognized Areas of Critical Environmental Concern are on or within Cape Code Bay. Holtec acknowledges that it cannot treat the discharge so as to fully remove all radionuclides from the water, even if it meets standards required by Nuclear Regulatory Commission guidelines.

The critical point is this: to conclude that Holtec's proposed discharge is prohibited, **CZM is <u>not</u> required to find that it would harm, or pose a risk of harm, to human health or the environment, or that it would significantly alter the environment of Cape Cod Bay. The judgment that new industrial discharges pose unacceptable risks was already made by the Legislature, in establishing the Cape Cod Bay Ocean Sanctuary and broadly prohibiting <u>any</u> new discharge of industrial waste** (subject to a few narrow exceptions that do not apply here). No additional findings by CZM are needed or warranted; CZM need only ensure that the existing legislative prohibition is respected.

As an ocean sanctuary vital to the ecological and economic health of the Commonwealth, the Legislature has determined that Cape Cod Bay deserves an extraordinarily high level of public protection. CZM is the agency the Legislature has charged with providing that protection without a requirement that the

agency first find that a risk of harm is present. While we know CZM has a deep knowledge of the OSA and its legislative history, we think it's helpful to recap the essential legal context, to fully appreciate the Legislature's intention.

1. The History Of The Ocean Sanctuaries Act

1970: As a response to the threat of oil and gas exploitation, Massachusetts' first ocean sanctuary, the Cape Cod Ocean Sanctuary, was created in 1970 and signed into law as an emergency measure to "protect the unique scenic and natural resources of the outer Cape by preventing careless exploitation of the seabed." *See* Chapter 542 of the Acts of 1970. This act also established an initial list of prohibited activities in an ocean sanctuary. These included –

> the building of any structure on the seabed or under the subsoil; the removal of any sand, gravel or other minerals, except as hereinafter provided; drilling for subsoil minerals, gases or oils; commercial advertising; **or the dumping of any commercial or industrial wastes**

(Emphasis supplied.) It also provided for allowed activities – for example the laying of cables, sand and gravel extraction for beach restoration purposes, and fish and shellfish harvest – provided these activities had the necessary agency approvals. The Legislature initially placed this first ocean sanctuary under the "care and control" of the Department of Natural Resources, and empowered the Attorney General to "take such action as may be necessary from time to time to enforce the provisions of this [Act]."

1971: In 1971, the Legislature created two more ocean sanctuaries: Cape Cod Bay and Cape and Islands. *See* Chapter 742 of the Acts of 1971.

The 1971 Act prohibited "the dumping of any commercial or industrial wastes" in the Cape Cod Bay Ocean Sanctuary, with exceptions for "such quantities of industrial liquid coolant wastes to be dumped by the division of water pollution control on September the thirtieth, nineteen hundred and seventy-one, in connection with the public and private supply of electrical power." *Id*.

1972: In 1972, the Legislature created the North Shore Ocean Sanctuary. *See* Chapter 130 of the Acts of 1972.

1976: In 1976, the Legislature created the South Essex Ocean Sanctuary. *See* Chapter 369 of the Acts of 1976. In doing so, the Legislature first used the language similar to that found in today's OSA for electrical generating facilities, creating an exception in the South Essex Ocean Sanctuary for the following:

> the construction, reconstruction, or operation and maintenance of industrial liquid coolant discharge and intake systems and other facilities and activities in conjunction with the public and private supply of electrical power as allowed and licensed by the division of water pollution control, the

> department of environmental quality engineering or the department of environmental management

1977: In 1977, the Legislature comprehensively revised the OSA. *See* Chapter 897 of Acts of 1977. Among other changes, the 1977 amendments generally protected all ocean sanctuaries from "any exploitation, development, or activity that would seriously alter or otherwise endanger the ecology or the appearance of the ocean, seabed, or subsoil thereof, or the Cape Cod National Seashore."

Whether hitherto, the OSA's prohibitions and exceptions were codified by individual ocean sanctuaries, the 1977 acts reorganized the OSA such that going forward prohibitions and exceptions applied (unless specified otherwise) to all five ocean sanctuaries.

The Legislature continued to categorically prohibit "the dumping or discharge of commercial or industrial wastes," except as otherwise provided in the OSA. The 1977 amendments created exceptions allowing "existing municipal, commercial [and] industrial discharges" into an otherwise protected sanctuary. Specifically, the 1977 amendments allowed –

> the operation and maintenance of **existing municipal, commercial or industrial facilities** and **existing municipal, commercial or industrial discharges** where such discharges and facilities have been approved and licensed by appropriate federal and state agencies

(Emphasis supplied.)

The 1977 amendments allowing "existing municipal, commercial or industrial discharges" did not define a date for what were then "existing discharges." The 1977 amendments became effective on December 30, 1977. Thus, the statute as amended can be read as permitting "existing discharges" as of December 30, 1977, or as permitting only those discharges which existed as of 1971, the original enactment of the OSA. St.1977, c. 897.

The 1977 amendments also created an exception for discharges associated with the "planning, construction, reconstruction, operation and maintenance" of facilities associated with the generation of electrical power. Specifically, the 1977 amendments allowed –

> the planning, construction, reconstruction, operation and maintenance of industrial liquid coolant discharge and intake systems and all other activities, uses and facilities associated with the **generation, transmission, and distribution of electrical power**, provided that all certificates, licenses, permits and approvals required by law are obtained therefor, and provided, further, that such activities, uses and facilities shall not be undertaken or located except in compliance with any applicable general or special statutes, rules, regulations or orders lawfully promulgated

(Emphasis supplied.)

The 1977 amendments also created a provision that requires "[a]ll departments, divisions, commissions, or units of the executive office of environmental affairs and other affected agencies or departments of the commonwealth" to issue permits consistently with the Act. In doing so, all permit granting authorities were required to consult with the department of environmental management to ensure compliance.

1989*:* In 1989, the Legislature again amended the act, and officially named it the "Massachusetts Ocean Sanctuaries Act." *See* Chapter 728 of the Acts of 1989. It added a definitions section to the statute, establishing an "existing discharge" as one which is –

> a municipal, commercial or industrial discharge at the volume and locations authorized by the appropriate federal and state agencies on July fifteenth, nineteen hundred and seventy, in the case of the Cape Cod Ocean Sanctuary; **on December eighth, nineteen hundred and seventy-one, in the case of the Cape Cod Bay and Cape and Islands Ocean Sanctuary**; on June twenty-seventh nineteen hundred and seventy-two in the case of the North Shore Ocean Sanctuary; and on December thirtieth, nineteen hundred and seventy-six, in the case of the South Essex Ocean Sanctuary

(Emphasis supplied.)

2008: The 2008 amendments require the state to create an ocean management plan. Chapter 114 of the Acts of 2008.

2014: The OSA's most recent amendment in 2014, modified the OSA to allow for new or modified municipal waste discharges from a publicly owned treatment works without a variance, after specific requirements have been met and impact studies have been conducted. Chapter 259 of the Acts of 2014, §§ 28-45.

2. The OSA's Near-Categorical Ban of New Industrial Discharges Into an Ocean Sanctuary

Today, the OSA severely restricts all municipal, commercial, and industrial discharges into an Ocean Sanctuary. The presumption is that no discharges are permitted, and all are prohibited unless expressly authorized. G.L. c. 132A, § 15 provides that, except as otherwise provided in the OSA, the act prohibits "the dumping or discharge of commercial, municipal, domestic or industrial wastes."

The only exceptions to this categorical ban of discharges into an ocean sanctuary are the following three activities:

- An existing municipal, commercial or industrial discharge at the volume and locations authorized by the appropriate deferral and state agencies on December eight, nineteen hundred and seventy-one, in the case of the Cape Cod Bay;

- discharges from municipal wastewater treatment facilities if the discharge is approved under § 16G of the OSA; and

- industrial liquid coolant discharge "associated with the generation, transmission, and distribution of electrical power."

Because these are exceptions to the general prohibition of discharging of industrial wastes, they must be narrowly and strictly construed. *See Boston Globe Media Partners, LLC v. Department of Public Health*, 482 Mass. 427, 432 (2019) ("statutory exemptions" from the statute "must be strictly and narrowly construed"); *Hull Mun. Lighting Plant v. Massachusetts Mun. Wholesale Elec. Co*., 414 Mass. 609, 614 (1993) ("[s]tatutory exemptions are strictly construed").

3. <u>The OSA Prohibits Any New Industrial Discharge From the Now-Defunct PNPS</u>

Under the plain terms of the OSA, Holtec is prohibited from discharging pollutants from the spent fuel rods or other pollutants associated with PNPS decommissioning activities into the Cape Cod Bay Ocean Sanctuary. G.L. c. 132A, § 15(4) states, in no uncertain terms, that except as otherwise permitted in the OSA "the dumping or discharge of commercial, municipal, domestic or industrial wastes" "shall be prohibited in an ocean sanctuary." Holtec's proposed discharge into the Cape Cod Bay Ocean Sanctuary does not qualify for any of the narrow exceptions to this categorical presumption against the discharge of industrial pollutants to an ocean sanctuary, as explained below.

a. The Proposed Discharge of Waste Generated by Holtec's Decommissioning Activities at PNPS was Not an Existing Discharge as of December 8, 1971

Holtec's discharge cannot be considered an "existing discharge" as defined by the statute. This exception allows for "the operation and maintenance of existing municipal, commercial or industrial facilities and discharges where such discharges or facilities have been approved and licensed by appropriate federal and state agencies." G.L. c. 132A, § 16. The Legislature defined "existing discharge" in the 1989 amendments to mean, in relevant part:

> a municipal, commercial or industrial discharge at the volume and locations authorized by the appropriate federal and state agencies…on December eighth, nineteen hundred and seventy-one, in the case of the Cape Cod Bay and Cape and Islands Ocean Sanctuary

G.L. c. 132A, § 12B. *See also* 301 CMR 27.02.

b. The Proposed Discharge of Waste Generated by Holtec's Post-Operation Activities at a Defunct Power Plant Is Not a Discharge "Associated With the Generation, Transmission, or Distribution of Electrical Power"

Discharges of coolant and other pollutants related to PNPS's activities when it was generating electrical power may have been authorized under the OSA's exception for discharges associated with the

"generation, transmission, and distribution" of electrical power. As EPA, MassDEP, and Holtec have all acknowledged, the proposed discharge related to PNPS's decommissioning, however, is a new and different kind of discharge, which is not associated with the "generation, transmission, and distribution" of electrical power. As such, it is prohibited by the OSA.

The exception in G.L. c. 132A, § 16 for electrical power facilities states as follows:

> Nothing in this act is intended to prohibit…the **planning, construction, reconstruction, operation and maintenance** of industrial liquid coolant discharge and intake systems and all other activities, uses and facilities associated with the **generation, transmission, and distribution** of electrical power, provided that all certificates, licenses, permits and approvals required by law are obtained therefor, and provided, further, that such activities, uses and facilities shall not be undertaken or located except in compliance with any applicable general or special statutes, rules, regulations or orders lawfully promulgated

(Emphasis supplied.)

This exception is noteworthy in the specificity of its requirements. It covers only liquid coolant and other discharges connected with the "planning, construction, reconstruction, operation and maintenance of…uses and facilities associated with the generation, transmission, and distribution" of electrical power. Thus, to fit within this exception, a discharge must satisfy two prongs. *First*, the discharge must be associated with the "planning, construction, reconstruction, operation and maintenance" of a discharging facility. *Second*, the discharge must be from a facility associated with the "generation, transmission, and distribution" of electricity.

Holtec's proposed discharge from the decommissioned PNPS satisfies neither of these requirements. It is not a discharge connected with "planning, construction, reconstruction, operation and maintenance" of a facility for electrical power generation. Rather, it is associated with *decommissioning* of such a facility. The Legislature included "planning," "construction," "reconstruction," and "maintenance" as activities qualifying for the exception, and it notably did *not* include "decommissioning," or any term that can fairly be construed to encompass decommissioning. The statute must be interpreted and applied in accordance with its plain terms. *See Water Dep't of Fairhaven v. Department of Env't Prot.*, 455 Mass. 740, 744 (2010) ("the language of the statute" is "the principal source of insight into legislative intent"); *Provencal v. Commonwealth Health Ins. Connector Auth.*, 456 Mass. 506, 513 (2010) ("the primary source of insight into the intent of the Legislature is the language of the statute").

Holtec's proposed discharge from the decommissioned PNPS is also prohibited because it is not associated with the generation, transmission, or distribution of electrical power. The exception's reference to the active production of power – "generation, transmission, and distribution of electrical power" –

confirms the required link to the production or output of electricity and getting that electricity to people. That essential link is missing here.

The current NPDES permit for PNPS reflects the reissuance of an earlier NPDES permit to discharge various wastewaters and stormwater to Cape Cod Bay and to withdraw water from Cape Cod Bay for cooling uses, during PNPS's active operation. The discharges authorized under this NPDES permit may be considered part of the "maintenance" of PNPS. EPA and the Commonwealth re-issued the NPDES permit at a time when it was known that PNPS was to shut down, but the specifics of the decommissioning process were unknown. *See* NPDES Permit No. MA0003557, Part IV.5.1, Response to Comments. ("Neither Entergy nor Holtec…provided sufficient information by which to characterize decommissioning-related discharges.").

The NPDES permit expressly declares that the discharges of pollutants in spent pool water are unauthorized. *Id.* at "Unauthorized Discharges," Part I.B.2. Discharges of pollutants in stormwater associated with construction activity, "including activities…associated with the dismantlement and demolition of plant systems, structures and buildings" are likewise unauthorized. *Id.*, Part I.B.3. And for the avoidance of doubt, discharges of pollutants associated with dewatering, and "including but not limited to physical alterations or additions resulting in the discharge of pollutants associated with the dismantlement and decontamination of plant systems and structures and/or the demolition of buildings" are unauthorized. *Id.*, Part I.B.4.[1]

EPA has made clear that coverage for decommissioning discharges requires either a new NPDES permit or a modification of PNPS's existing NPDES permit. *See* June 17, 2022 EPA Letter to Holtec (informing Holtec that its current NPDES permit does not authorize PNPS's decommissioning discharge);[2] *see also* December 5, 2022 Letter to Holtec from EPA (same). With some apparent reluctance, Holtec has now conceded this point. *See* December 19, 2022 Holtec Letter to EPA ("Holtec determined that it would pursue a modification to the existing NPDES permit to appropriately address such discharges [associated with decommissioning activities]").

Of course, there are sound policy reasons for treating discharges associated with power-generating activities differently from discharges from decommissioned facilities that are no longer operating to power the grid. The Legislature clearly made the determination that electricity from planned and/or active power generation, distribution and transmission facilities is important to the economic health of the Commonwealth

---

[1] *See also id.* at Part IV.5.1, Response to Comments ("We clarify, therefore, that the Final Permit does not authorize the discharge of pollutants associated with the spent fuel pool water. Similarly, the Final Permit does not authorize the discharge of pollutants associated with other activities related to the decommissioning at PNPS, including, but not limited to, contaminated site dewatering, pipeline and tank dewatering, collection structure dewatering, dredge-related dewatering, or dismantlement and decontamination of plant systems and structures.").

[2] This letter suggests that EPA, too, considers decommissioning to be a different activity than operation and maintenance. *See* page 2 of the June 17, 2022 Letter ("'[P]ast discharge practices' occurred under a different NPDES Permit, specifically a Permit issued in 1990 when the facility was operational and generating electricity, not when it was being decommissioned.").

and the well-being of its residents. Those interests are not present, or certainly not as compelling, with a facility that has been permanently taken out of service.

In sum, because it does not fall under the OSA's three exceptions, any decommissioning process discharge that Holtec may wish to make is prohibited by the OSA. As the Energy Facilities Siting Board has noted, the language of the OSA is "not ambiguous." *In Re Cape Wind Assocs., LLC*, No. EFSB 02-2, 2005 WL 1264241 (May 10, 2005). Under the plain terms of the statute, discharges into Cape Cod Bay associated with a nuclear power plant's decommissioning and shutdown are not allowed.

4. <u>CZM Should Inform Holtec That its Planned Radioactive Discharge From PNPS is Prohibited Under the OSA</u>

Because the OSA clearly forbids Holtec's planned discharge of an estimated 1.1 million gallons of radioactive decommissioning process waste, CZM should inform Holtec in writing that it is not permitted to make such a discharge into the Cape Cod Bay Ocean Sanctuary, as a matter of state law.

Holtec is responsible for deciding how it will manage radioactive material in its liquid effluent, and it has other options, including some used at other decommissioned facilities, including: (1) shipment for off-site disposal; (2) evaporation of the liquid and disposal of the resulting solid waste; or (3) safe storage at the PNPS facilities. To be sure, these other options come with potential risks as well as potential relative benefits. But these other options do not involve discharge into an ocean sanctuary. Holtec well understood, when it voluntarily purchased PNPS for the sole purpose of profiting from the decommissioning of the facility, that it would be obligated to accomplish that decommissioning in accordance with all applicable state laws, including the OSA. Holtec has always known, or should have known, that it would need to dispose of its decommissioning process waste by some means other than dumping it into Cape Cod Bay.

5. <u>EEA and CZM Should Ensure That No State Agencies Permit or Otherwise Authorize the Discharge Into Cape Cod Bay</u>

Section 14 of the OSA provides that, "[a]ll ocean sanctuaries…shall be under the care, oversight, and control" of CZM. Section 12C provides that, "[CZM] shall integrate its implementation, administration and enforcement of the [OSA] with other programs and agencies responsible for the protection of the public health, safety, welfare and the environment."

And Section 18 requires that "[a]ll departments, divisions, commissions, [and] units of [EEA] and other affected agencies or departments of the commonwealth shall issue permits or licenses for activities…consistently with the act, and shall not permit or conduct any activity which is contrary to the provisions of the Act." Section 18 further directs "other departments, divisions, commissions, units, or other agencies" to "confer and consult" with CZM to "ensure compliance" with the OSA.

By virtue of these provisions, the Legislature has made CZM the trustee for the ocean sanctuaries, and given CZM the tools to protect them. It is incumbent on CZM, and all permitting agencies, to make certain that no state permits or licenses authorize activities prohibited under the OSA. *See* G.L. c. 132A, § 18. Accordingly, CZM should not only make clear to Holtec that the OSA forbids its proposed new

discharge, but also notify all pertinent state agencies that they should not issue any kind of permit, approval, or authorization for such a discharge. In particular, but without limitation, we ask CZM, backed by EEA, to advise MassDEP that Holtec is not eligible for a new or modified state Surface Water Discharge Permit under the Massachusetts Clean Waters Act, G.L. c. 21, §§ 26-53 and 314 CMR 3.00, for its proposed new discharge of decommissioning process waste from PNPS into Cape Cod Bay, which Holtec has announced it will seek in the near future, together with a modified NPDES permit. Likewise, we ask CZM, backed by EEA, to advise MassDEP that Holtec is not eligible for a state Water Quality Certification under G.L. c. 21, § 27 and 314 CMR 3.07.

6. Conclusion

Sanctuaries are places of refuge, where flora, fauna, and their ecosystems are supposed to be protected from threats. The Ocean Sanctuaries Act provides strong protections – such as an outright prohibition on most discharges – and CZM is entrusted with the authority and responsibility for ensuring that those protections are honored and respected by all state agencies. If Holtec's proposed new radioactive discharge into the Cape Cod Bay Ocean Sanctuary is allowed by state agencies, the Bay will become a sanctuary in name only. We ask CZM to exercise the power the Legislature has given to the agency, to the fullest extent possible, to keep the Cape Cod Bay Ocean Sanctuary from becoming a hollow designation.

We urge you to confirm to Holtec that the Ocean Sanctuaries Act prohibits Holtec's planned new discharge of decommissioning process waste from PNPS into Cape Cod Bay. We also encourage you to provide clear guidance and specific advice to MassDEP and other agencies on this same point. Thank you for your thoughtful consideration of these requests, and for the anticipated opportunity to meet with you to discuss these matters and such further actions as may be appropriate to protect Cape Cod Bay Ocean Sanctuary. We look forward to hearing from you.

Sincerely,

/s/ Lisa C. Goodheart
Lisa C. Goodheart

/s/ Dylan Sanders
Dylan Sanders

/s/ Alessandra Wingerter
Alessandra Wingerter

cc: The Honorable Maura Healey, Governor of the Commonwealth of Massachusetts
Gary Moran, Acting Commissioner, Department of Environmental Protection
The Honorable Andrea Joy Campbell, Attorney General for the Commonwealth of Massachusetts
Seth Schofield, Senior Appellate Counsel, Energy & Env't Bureau, Office of the Attorney General

4854-9744-9297, v. 1

Holtec water release

[redacted]

Wed 8/30/2023 11:01 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

I'd like to point out that if we permit Holtec to release "treated" radioactive water it sets a very bad precedent for other nuclear plant to follow.
There is no *good* place for radioactive materials to go but containment seems less bad than releasing it into our oceans.

Barb Lambdin
[redacted]

MassDEP Surface Water Discharge Permitting Program

Gordon Starr [redacted]
Wed 8/30/2023 11:04 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

To whom it may concern,
I am asking the DEP to deny Holtec's application for the disposal of water from the Plymouth power plant into Cape Cod Bay. The shellfishing/aquaculture farmers along the coast will be harmed even by the perception of contaminated water being released into Cape Cod Bay. These shellfishing businesses are in the middle of efforts to open up markets in Europe and this would be a disaster.

The Ocean Sanctuaries Act is clear, please do not allow these discharges.
Thanks,
Gordon Starr
Barnstable Town Council
[redacted]

Pilgrim Nuclear Power Station

Diane Thomas [redacted]
Wed 8/30/2023 11:44 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Coniaris,

I am writing in support of the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny a modified Surface Water Discharge Permit application by Holtec that would allow them to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

The Massachusetts Ocean Sanctuaries Act prohibits the requested discharge by Holtec. The act prohibits the "dumping or discharge of commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under this act. Thus, making the dumping plan of Holtec illegal and the tentative determination by the MassDEP to deny such a plan the correct decision by Mass DEP.

Holtec's proposed discharge is illegal. The final determination by the Massachusetts Department of Environmental Protection should be to deny completely the discharging of radioactive and chemically contaminated wastewater into the bay, no matter how modified the permit application is submitted. Thank you for enforcing the law to protect our ocean sanctuaries.

Sincerely,
Diane Thomas
[redacted]

TOWN OF DUXBURY

BOARD OF HEALTH
TOWN OFFICES
878 TREMONT STREET
DUXBURY, MASSACHUSETTS 02332-4499

Tracy L. Mayo, R.S./R.E.H.S.
Health Agent

Telephone (781) 934-1100
Fax (781) 934-1118

August 18, 2023

Cathy Coniaris
Mass DEP
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station – DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

Dear Ms. Coniaris:

We write regarding DEP's tentative decision to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

It is the Duxbury Board of Health's view that DEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge of commercial, municipal, domestic or industrial waste into an Ocean Sanctuary." Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries.

We suggest that, in its final decision, the DEP should also deny Holtec's requested permit for at least two other reasons.

The first reason is that several other laws, including the Massachusetts Endangered Species Act (c. 31A), the Crimes Against Public Health Act (c. 270 §15) and the Massachusetts Oil and Hazardous Material Release Prevention Act (c. 21E) also prohibit Holtec's requested discharge.

The Endangered Species Act prohibits altering the habitat of any endangered or threatened species, including the right whale, roseate tern, least tern, piping plover, and loggerhead turtle that live in and along the shores of Cape Cod Bay, including along Duxbury's coastline. Massachusetts state regulations are explicit: the discharge of waste, wastewater, toxic or hazardous materials shall always be considered alterations of habitat.

TOWN OF DUXBURY

BOARD OF HEALTH
TOWN OFFICES
878 TREMONT STREET
DUXBURY, MASSACHUSETTS 02332-4499

Tracy L. Mayo, R.S./R.E.H.S.
Health Agent

Telephone (781) 934-1100
Fax (781) 934-1118

The Crimes Against Public Health act prohibits discharging any waste into the waters of the Commonwealth.

Chapter 21E states that anyone who discharges, or threatens to release, any "hazardous material into any of the "waters of the Commonwealth" is liable to both the Commonwealth and any person damaged by the release or threat.

The second reason is the antidegradation provisions of DEP's own regulations (314 CMR 4) and the Implementation Procedures for the Antidegradation Provisions of the Surface Water Quality Standards. 314 CMR 4.00.

These antidegradation regulations prohibit granting Holtec's requested permit. One regulation prohibits Holtec's discharge unless the department finds the new discharge would be insignificant, and Holtec demonstrates "that the discharge is necessary to accommodate important economic or social development in the [Cape Cod Bay] area." The illegal dumping of 1.1 million gallons of radioactive and chemically contaminated water is not "insignificant." Neither is Holtec's planned discharge necessary – for any reason. Holtec has other NRC-approved ways to dispose of its water; and dumping it into Cape Cod Bay accommodates nothing but Holtec's profit.

The other regulation requires DEP to determine that the discharge is "for the express purpose and intent of maintaining or enhancing" Cape Cod Bay. Holtec's "express purpose and intent" is to save money; it clearly is not to either maintain or enhance Cape Cod Bay.
In addition to denying Holtec's application on the basis of the Ocean Sanctuaries Act, DEP's final determination should deny Holtec's application for these other reasons as well.

Thank you for your time and consideration in this matter. We look forward to your early response.

Sincerely,
The Duxbury Board of Health

Karen Tepper, Chair

Dr. David Brumley

Bruce Bygate

Melissa Rosenbladt

Michael Count

Nicholas Leing (Alternate)

"The Mission of the Town of Duxbury is to deliver excellent services to the community in the most fiscally responsible and innovative manner while endeavoring to broaden our sense of community and preserve the unique character of our town."

Pilgrim Nuclear Power Station comment

Janet Domenitz <janet.domenitz@masspirg.org>
Wed 8/30/2023 1:11 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

294 Washington St, Suite 500, Boston MA 02108, 617-292-4800, www.masspirg.org

Massachusetts Department of Environmental Protection
Surface Water Discharge Program
massdep.npdes@mass.gov
Attn: Cathy Coniaris

August, 2023

RE: In support of the "Tentative Determination to Deny a Surface Water Discharge permit modification requested by Holtec Decommissioning International LLC", (MA Permit No. MA0003557 issued to Holtec Pilgrim LLC)

MASSPIRG is a nonpartisan, not for profit public interest advocacy organization working to protect the health of the environment and the well being of our residents.

MASSPIRG strongly supports the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit. The permit would have allowed Holtec to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

Discharging radioactive waste into the Cape Cod Bay poses a needless threat to marine life and public health and must be prevented.

Further, as stated in the tentative determination, the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston and Duxbury Bays are all protected ocean sanctuaries under the act. The Department's final determination should deny Hotlec's application.

Thank you for your consideration.

Janet S. Domenitz
Executive Director
MASSPIRG
Janet.Domenitz@masspirg.org

--
Janet S. Domenitz
Executive Director, MASSPIRG/MASSPIRG Education Fund
294 Washington St, Suite 500
Boston, MA 02108
617-292-4800
www.MASSPIRG.org
@Janet_MASSPIRG

Pilgrim Nuclear Power Station

Barbara Moser [redacted]
Wed 8/30/2023 1:25 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Coniaris,

I am writing in support of the tentative determination by the Massachusetts Dept. of Environmental Protection (MassDep) to deny
a modified Surface Water Discharge Permit application by Holtec that
would allow them to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

The MA Ocean Sanctuaries Act prohibits the requested discharge by Holtec. The act prohibits the "dumping or discharge of commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under this act. Thus, making the dumping plan of Holtec illegal and the tentative determination by the MassDep to deny such a plan the correct decision by MassDep.

Holtec's proposed discharge is illegal. The final determination by the Massachusetts's Dept. of Environmental Protection should be to deny completely the discharging of radioactive and chemically contaminated wastewater into the bay, no matter how modified the permit application is submitted. Thank you for enforcing the law to protect our ocean sanctuaries.

Sincerely,

Barbara Moser
[redacted]

Pilgrim Nuclear Power Station

Karen Gujarathi [redacted]
Wed 8/30/2023 1:34 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Coniaris:

Please don't let Holtec dump in our Bay! I moved to Plymouth three years ago, and if I knew that the Cape Cod Bay contained harmful radioactive chemicals, I would NEVER have moved here!!

I support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow Holtec to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under this act, making Holtec's dumping plan illegal. I hope you agree to deny Holtec's application.

Sincerely,

Karen Gujarathi

[redacted]

[redacted]

Holtec Radioactive Dumping

Ken M[redacted]

Wed 8/30/2023 1:42 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris Massachusetts Department of Environmental Protection 100 Cambridge Street Boston, MA 02114 massdep.npdes@mass.gov Re: Pilgrim Nuclear Power Station – DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit Dear Ms. Coniaris: I am writing to support the tentative decision by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay. MassDEP's tentative determination that requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries." The proposed discharge is therefore illegal. Because the proposed discharge is illegal, the Department's final determination should deny Holtec's application. Thank you, Kenneth Mendonca

[redacted]

Dangerous Evaporation Discharge from Pilgrim Nuclear

Debra Teehan [redacted]

Wed 8/30/2023 1:46 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Please protect us from Holtec!! The illegal release of radioactive waste must be investigated asap!!
Debra Teehan....Resident Buzzards Bay, MA

Keep Cape Cod Bay Safe!

Irene Checkovich [redacted]
Wed 8/30/2023 2:39 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Sir or Madam,

Please know that I strongly agree with the MA DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. I urge the MA DEP to finalizing its rulings in a way that would prevent Holtec International from discharging any/all of Pilgrim's wastewater into the Cape Cod Bay Ocean Sanctuary.

Thank you for your consideration.

Irene Checkovich

[redacted]

Save our Bay

joe waldstein [redacted]
Wed 8/30/2023 2:51 PM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station – DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

Dear Ms. Coniaris:

I am writing to support the tentative decision by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries." The proposed discharge is therefore illegal.

Because the proposed discharge is illegal, the Department's final determination should deny Holtec's application.

Thank you,

Joseph Waldstein
[redacted]

Holtec Decommissioning International, LLC Comments on Tentative Determination to Deny a Modification to the Massachusetts Permit to Discharge Pollutants to Surface Waters for Pilgrim Nuclear Power Station, NPDES MA0003557 (August 31, 2023)

Holtec Decommissioning International, LLC ("Holtec") submits these public comments in response to the July 24, 2023 Public Notice issued by the Massachusetts Department of Environmental Protection ("MassDEP") of the issuance of a Tentative Determination to Deny a Surface Water Discharge permit modification requested by Holtec ("Tentative Determination"). Throughout the permitting and operating history of Pilgrim Nuclear Power Station ("Pilgrim"), industrial wastes have been discharged from Pilgrim into Cape Cod Bay, including treated water containing radiological wastes and other effluents from various parts of the plant. For the first time, the National Pollutant Discharge Elimination System ("NPDES") Permit No. MA0003557 issued in 2020 expressly provided that "[t]he discharge of pollutants in spent fuel pool water (including, but not limited to, boron) is not authorized by this permit." (NPDES Permit § I.B.2), although discharges of industrial wastes were permitted from other sources. Holtec initially believed that a permit modification would not be needed to discharge treated water from the radwaste effluent outfall, because discharges from that point had never been regulated by MassDEP and the U.S. Environmental Protection Administration ("EPA") before. As EPA explained, "should Holtec wish to discharge any such water, it should first provide EPA with a full characterization of pollutants present in such water to determine whether Clean Water Act requirements apply. . . ." (Letter from EPA to Holtec (Feb. 17, 2022).

Holtec met with MassDEP and EPA, in good faith, several times over the following months to discuss what Holtec would need to demonstrate to allow such discharges. On May 18, 2022, Holtec made a presentation to MassDEP and EPA on the basic water quality of the source water. MassDEP and EPA advised that this information was not sufficient to make any

regulatory decisions, and they would not authorize a discharge without a detailed pollutant characterization and further analysis. On October 17, 2022, Holtec met with MassDEP and EPA at EPA Region 1 Headquarters in Boston to further discuss source water characterization and treatment processes. MassDEP and EPA advised that a more complete characterization would be required, including a more accurate analysis of low-level pollutants, to make a regulatory decision. Also, MassDEP and EPA insisted that any level of Clean Water Act pollutants in the source water would require a NPDES permit modification to discharge. It was informally agreed to at this meeting that Holtec would pursue a permit modification to authorize the discharge. On February 15, 2023, Holtec made a presentation to MassDEP and EPA on the sampling and analytical procedures to support the modification submittal. In addition to the parameters in the proposed application, Mass DEP and EPA advised that "new source" effluent limitation guidelines ("ELG") for an electric steam generator (40 CFR 423.15) were appropriate for the source water and effluent characterization to support the application. MassDEP also requested that PFAS be added to the analytical sampling suite to support the application. At no time did MassDEP ever suggest any objection that the Ocean Sanctuaries Act could prevent the modification. On April 4, 2023, Holtec applied to modify its Surface Water Discharge Permit to permit discharges from the existing radwaste effluent outfall (newly designated in the modification as Outfall #015) as a "new source" of industrial wastewater, exclusively for the purpose of characterizing extremely low levels of non-radiological pollutants and demonstrating that these pollutant levels were consistent with historic operational effluents from the same sources.

The Tentative Determination concludes that the Ocean Sanctuaries Act prohibits the proposed discharge and requires denial of the permit modification. This was based on a

misreading of the Ocean Sanctuaries Act resulting in two erroneous factual conclusions: (1) that the discharge of spent fuel pool water that continued to be used in the decommissioning process is not "associated with the generation . . . of electrical power," and (2) that the discharge of the treated radwaste effluent is not an "existing discharge" as defined by the Ocean Sanctuaries Act. (Tentative Determination at p. 2). Attached to the Public Notice is a July 21, 2023 correspondence from MassDEP to the Office of Coastal Zone Management ("CZM") presenting the same errors for CZM's consideration ("MassDEP Letter"). As a result, CZM's conclusions in its July 24, 2023 letter are also in error ("CZM Letter").

The MassDEP letter misreads the exception for "all other activities, uses and facilities associated with the generation . . . of electrical power" in Section 16 of the Ocean Sanctuaries Act as being limited to "the planning, construction, reconstruction, operation and maintenance" during the pre-operating and operating phases and excluding decommissioning. (MassDEP Letter at p. 5). The exception for generation "activities, uses or facilities" contains two separate clauses. The first is a specific authorization for "the planning, construction, reconstruction, operation and maintenance of industrial liquid coolant discharge and intake systems . . . ." The second is a catch all provision that covers "all other activities, uses and facilities associated with the generation, transmission, and distribution of electrical power" that have been permitted by federal and state agencies. G.L. c. 132A, § 16.

MassDEP and CZM must consider the historical development of the statute to understand why the two clauses are separate and why the first clause does not modify the second. The version of the exception that existed immediately prior to its existing form provided an exception only for "the construction, operation and maintenance of industrial liquid coolant discharge and intake systems in conjunction with the public and private supply of electrical power as allowed

and licensed by the division of water pollution control." St. 1974, c. 822, § 1. That is, the exception was limited to a specific activity, use, and facility: coolant discharge. In 1977, the Legislature amended the exception, as it is in its current form, specifically adding the distinctly separate catch all exception in terms that are necessarily broad and not limited to commercial generation of electricity, because it includes "*and all other* activities, uses and facilities *associated with*" generation. St. 1977, c. 897, § 1 (emphasis added). Nothing in the second clause suggests that it is limited to the commercial operation of the plant.

Indeed, a ruling that the provision excludes decommissioning activities would be entirely inconsistent with the current NPDES permit, which MassDEP approved in 2020, long after Pilgrim ceased generation of electricity, and which permits the discharge of industrial wastes from other outfalls into the Cape Cod Bay Ocean Sanctuary. Further, the Administrative Order on Consent ("AOC") of the 2020 NPDES permit (executed on November 23, 2020) was developed to manage and discharge industrial wastewater strictly associated with decommissioning activities post shutdown. The 2020 NPDES permit discharge conditions amended under the AOC (now expired) are reflective of waters that are "distinct from prior uses" (MassDEP Letter at pg. 3) due to reduced flow rate such that "increased pollutant concentrations," (MassDEP Letter at pg. 3) notably for total residual oxidants and temperature, could potentially be present in the waters discharged from Pilgrim during the effective period of the AOC.

The decommissioning of a nuclear power plant is inextricably "associated with" the plant's generation of electrical power. A nuclear power plant cannot be licensed to operate without the plant ultimately being decommissioned. Indeed, owners of every nuclear power station are required to maintain sufficient funding throughout each facility's respective lifecycle

from commercial operation through completion of decommissioning 10 C.F.R. §§ 50.75(b), (f); 50.82(a)(6), (a)(8)(v); 50.54(bb). The purpose of NRC regulations governing decommissioning of commercial reactors is to reduce on-site radioactivity that was generated during power operations. As NRC's decommissioning Generic Environmental Impact Statement ("GEIS") states, "[g]enerally, the major environmental impact from decommissioning, especially for power reactors, occurs when the decision is made to operate the reactor." (U.S. NRC, NUREG-0586, Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, at *x* (Aug. 1988)). Pilgrim is still subject to its NRC operating license and the provisions of 10 C.F.R. Part 50 governing operating reactors and cannot terminate its NRC operating license until the facility is fully decommissioned—including the spent fuel pool. *See* 10 C.F.R. §§ 50.51(b); 50.82(a)(9). As MassDEP and EPA recognized in the 2020 permit, cessation of power sales did not eliminate the need for ongoing discharges to support the continued operation, maintenance, and decommissioning of the Pilgrim power reactor.[1] MassDEP's conclusion that the removal of plant equipment and materials used to produce electricity for nearly fifty years is not "associated with the generation . . . of electrical power"—just because those activities are occurring after the facility has stopped generating power—is simply incorrect.

Further, the record does not support the conclusion that the pollutants in the treated radwaste effluent were "produced as a function of decommissioning activities." The testing of the samples can only provide the characterization of the pollutants contained in the water before

[1] *See, e.g.,* NPDES Permit, Response to Comments, p. 32 ("According to Entergy, the circulating water is primarily used for dilution to meet the NRC's requirements for the liquid radiological waste disposal system and for fire protection purposes, as well as for backflushing the circulating water pump lines to manage biofouling. While PNPS has ceased generating electricity, it is not certain at this point how long post-shutdown activities that require use of the circulating pumps will last. For this reason, the Final Permit does not include a date certain upon which the use of the circulating water pumps must cease.")

and after treatment, not before the decommissioning process began.[2] They do not demonstrate that new pollutants were added. The Tentative Decision ignores the fact that during the commercial operation of the plant, the water in the spent fuel pool was frequently commingled with water in the reactor cavity and dryer separator pit. The volume of water in the spent fuel pool that accumulated during commercial operations has not significantly changed. That is, water currently in the spent fuel pool includes water that, before decommissioning began, was previously in contact with plant components and surfaces such as the reactor vessel internal components. These components were, at times temporarily removed, modified, or replaced underwater during operational and refueling periods, using similar tooling and techniques to those currently being utilized for their ultimate removal and segmentation for disposal. The use of the water during the plant's operational period—radiation shielding—was the same as it is in the decommissioning process. The activities and use of the water in the decommissioning process are not distinctly "decommissioning activities." As NRC's decommissioning GEIS states, "[r]eview of the activities that occur during decommissioning showed that they are similar to the activities that occur during the construction, operation, maintenance, and refueling outages of a power reactor (e.g., decontamination, steam generator replacement, and pipe removal)." (NUREG-0586 Supp. 1, p. 2-1 (Nov. 2002)). Therefore, the activities and processes in place (including continuous local filtration) result in water quality level consistent with all phases of the plant's lifecycle. The proposed effluent discharge from the existing radwaste effluent outfall,

[2] The water in the torus is essentially unaffected by decommissioning activities as no work was performed within the torus volume. A single batch of water containing nitrates/chlorides was the only known or suspected introduction of water containing contaminants into the torus since the end of plant operation in May 2019.

now designated as Outfall #015, will undergo the same general treatment process that was applied to radwaste effluent while Pilgrim was in commercial operation.[3]

The Tentative Decision incorrectly concludes that because the current NPDES permit prohibits discharge of pollutants from the spent fuel pool, torus, reactor cavity, and dryer separator pit, "the proposed discharge is not the continuation of an existing discharge" and the exception for an "existing discharge" under Section 16 does not apply. (Tentative Decision at 2). An "existing discharge" is defined as "a municipal, commercial or industrial discharge at the volume and locations authorized by the appropriate federal and state agencies . . . on December eighth, nineteen hundred and seventy-one, in the case of the Cape Cod Bay . . . Sanctuary." It is irrelevant that in modifying the NPDES permit, the proposed discharge was designated as a "new source" *for the purpose of permitting* under the Federal Clean Water Act, 33 U.S.C. §§ 1251 *et seq.*, and the Massachusetts Clean Waters Act, G.L. c. 21, §§ 26-53. Those statutory schemes are entirely separate and cannot be used to construe the applicability of the Ocean Sanctuaries Act. What is relevant for the purpose of determining whether the Ocean Sanctuaries Act applies is what discharge was permitted on December 8, 1971. G.L. c. 132A, §§ 12, 16.

What is missing from the MassDEP Letter's representation to CZM that "Holtec did not provide any authorization for any discharge of pollutants related to plant operations prior to 1975" (MassDEP Letter a p. 7) is that MassDEP did not even ask Holtec to provide such documentation nor did Holtec provide any historical permitting as it is not required during the modification process unless requested. MassDEP never mentioned that it believed that the Ocean Sanctuaries Act might apply. Further, had MassDEP checked its own records, it would

[3] During early years of Pilgrim's commercial operation, large volumes were discharged through the same radwaste discharge point. The treatment process was modified over the decades of plant operation to leverage improved treatment technology. As a result, this discharge was significantly reduced in volume and significantly increased in water quality over the years.

have had to disclose to CZM that, on January 8, 1969, the Division of Water Pollution Control issued a permit pursuant to G.L. c. 21, § 43 "for the discharge of industrial wastes from Pilgrim Station into Cape Cod Bay." This permit was in effect on December 8, 1971. The only conditions were that radiological and ecological studies of the receiving waters would be conducted and modifications to the equipment or operations of the effluent discharge would be made if necessary, that the operator would develop a method for the operation and control of the use of chlorine in the circulation cooling water system, and that the operator would maintain and make available to the Division operating records that it considered necessary "pertaining to the treatment of liquid wastes including levels of radioactivity and to the discharge of effluents to Cape Cod Bay."

Notably, the 1969 permit did not set any limitations on the quantities or concentrations of pollutants in the discharges. In 1969, effluent limits were not required. At the time, G.L. c. 21, § 43 provided, in relevant part, only that:

> No person shall make or permit a new outlet for the discharge of sewage or industrial waste or wastes, or the effluent therefrom, into any of the waters of the commonwealth nor shall he construct or operate a new disposal system for the discharge of sewage or industrial or other wastes or the effluent therefrom into the waters, of the commonwealth without first obtaining a permit, which the director is hereby authorized to issue subject to such conditions as he may deem necessary to insure compliance with the standards established for the waters affected.

St. 1966, c. 685, § 1. At the time, Section 27 of Chapter 21 also did not require the Division of Water Pollution Control to establish effluent limits, but only required it to adopt water quality standards. *Id.* Surface water discharge permits were not required to establish effluent limits until 1973. St. 1973, c. 546, § 9. The regulatory scheme at the time also did not regulate specific outfalls, and thus the 1969 permit broadly authorized the discharge of any industrial wastes

"from Pilgrim Station into Cape Cod Bay." Because the 1969 permit set no limits on specific pollutants, MassDEP's observations that the authorized discharges "would not be the same as those proposed" and that "the proposed discharges contain pollutants resulting from decommissioning" are misplaced. (MassDEP Letter at p. 7). The authorized discharge—"industrial waste"—did not differentiate based on the constituent pollutants.

Because the discharge of *any* industrial waste from Pilgrim Station into Cape Cod Bay was authorized prior to December 8, 1971, subject to oversight by the Division of Water Pollution Control, the discharge of treated wastewater from the spent fuel pool, torus, dryer separator, and reactor cavity falls within the definition of "existing discharge" under the Ocean Sanctuaries Act and would not be prohibited by that Act. This is not to say that unlimited discharges of any pollutants should be permitted. Those limits would be governed by the Massachusetts Clean Waters Act, and not the Ocean Sanctuaries Act. Therefore, discharges to Cape Cod Bay would be allowed if authorized by a NPDES permit and a State Water Discharge Permit. MassDEP is required to make a determination whether the permit modification can be granted under the Massachusetts Clean Waters Act.

As documented in Holtec's March 31, 2023 application for a modification to its NPDES permit #MA0003557 for Pilgrim Nuclear Power Station, testing shows that the levels of EPA-regulated pollutants in the treated water are similar to or lower than what is present in the receiving waters or what is currently permitted from other outfalls, or they will be diluted to non-detectable levels before entering Cape Cod Bay. Given the characterization of the effluent pollutants, denial of the permit modification could only be pretext for an improper attempt to regulate radioactive materials that are regulated by the Nuclear Regulatory Commission. The treated water to be discharged is not environmentally harmful, and thus should not be

characterized as waste that is likely to "significantly alter" or otherwise endanger the ecology or appearance of Cape Cod Bay. 301 CMR 27.02. For these reasons, MassDEP is free to evaluate the requested permit modification for approval on its merits in accordance with the Massachusetts Clean Waters Act and consistent with the Ocean Sanctuaries Act.

Pilgrim Nuclear Power Station

Sandy Gujarathi [redacted]
Wed 8/30/2023 3:37 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Coniaris:

Please don't let Holtec dump in our Bay! I moved to Plymouth three years ago, and if I knew that the Cape Cod Bay contained harmful radioactive chemicals, I would NEVER have moved here!!

I support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow Holtec to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under this act, making Holtec's dumping plan illegal. I hope you agree to deny Holtec's application.

Sincerely,

Santosh Gujarathi

[redacted]

[redacted]

Please don't let Holtec make our Bay unsafe!

Paulette Fehlig [redacted]
Wed 8/30/2023 4:26 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,

I strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law. I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you,

Marie P Fehlig

[redacted]

Pilgrim Nuclear Power Station - DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

Anna Hofmann [redacted]
Wed 8/30/2023 6:48 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station

Dear Ms. Coniaris:
I am writing to support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act. The proposed discharge is therefore illegal.

Holtec's proposed discharge is illegal. The Department's final determination should deny its application.

Thank you,
Anna Hofmann
Cambridge, 02140

Deny Holtec International's Permit Application

Tim Crowley [redacted]
Wed 8/30/2023 8:16 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Commissioner Heiple,

I strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law. I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you,

Tim and Jennifer Crowley

[redacted]

Get Outlook for Android

Pilgrim Nuclear Power Station - DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

Jennifer Sawyer [redacted]
Wed 8/30/2023 8:32 PM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris

Massachusetts Department of Environmental Protection

100 Cambridge Street

Boston, MA 02114

massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station – DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

Dear Ms. Coniaris:

I am writing to support the tentative decision by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated
wastewater into Cape Cod Bay.

MassDEP's tentative determination that requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries. The proposed discharge is therefore illegal.

Because the proposed discharge is illegal, the Department's final determination should deny Holtec's application.
Thank you for your consideration,

Jennifer Sawyer
[redacted]

Pilgrim Nuclear Power Station – DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

Mark Sawyer [redacted]
Wed 8/30/2023 8:36 PM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris

Massachusetts Department of Environmental Protection

100 Cambridge Street

Boston, MA 02114

massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station – DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

Dear Ms. Coniaris:

I am writing to support the tentative decision by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated
wastewater into Cape Cod Bay.

MassDEP's tentative determination that requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries. The proposed discharge is therefore illegal.

Because the proposed discharge is illegal, the Department's final determination should deny Holtec's application.

Thank you,

Mark Sawyer
[redacted]

TOWN OF BARNSTABLE

OFFICE OF TOWN ATTORNEY

367 Main Street
Hyannis, Massachusetts 02601-3907
Phone 508-862-4620
FAX 508-862-4782

KAREN L. NOBER, Town Attorney
CHARLES S. McLAUGHLIN, Jr., Senior Counsel
KATHLEEN CONNOLLY, Assistant Town Attorney

karen.nober@town.barnstable.ma.us
charles.mclaughlin@town.barnstable.ma.us
kathleen.connolly@town.barnstable.ma.us

August 30, 2023

Massachusetts Department of Environmental Protection
Surface Water Discharge Program
100 Cambridge Street
Boston, MA 02114
Massdep.npdes@mass.gov

Attn: Commissioner Bonnie Heiple

Re: Town of Barnstable Support for DEP's Tentative Determination to Deny Holtec International's Request to Modify Its Surface Water Discharge Permit at Pilgrim Nuclear

Dear Commissioner Heiple,

I write on behalf of the Town Of Barnstable in support of DEP's Tentative Decision in the above-entitled matter and to request that it be affirmed for the persuasive reasons set forth in the Tentative Decision. The Tentative Decision affirms the Commonwealth's foresight in enacting the protections that the Ocean Sanctuaries Act ("OSA"), G.L. c. 132A, §§ 12A – 18 provides.

In particular, the OSA explicitly bans new discharges into Cape Cod Bay. Your Tentative Determination correctly analyzes the statutory language and distinguishes that water used to support decommissioning activities is not the same as water used to cool a plant actively producing electricity. While the latter is permissible, the former is clearly not. The distinction is not semantic and there is no credible analysis that can be or has been offered to overcome the clear language of the statute. The Tentative Decision carefully parses the statute, applies it to the facts, and reaches the correct legal conclusion.

While the analysis can end there, there are additional facts that could further support the Tentative Decision. First, the currents and eddies of Cape Cod Bay are not well understood or charted. It is our understanding that Woods Hole Oceanographic Institute is currently engaged in an effort to chart these currents and that the study will not be complete until well into 2024. The results of that study, reportedly confined to the top levels of the water column because of limited funding, are nevertheless vital to an understanding of sediment transport and deposit trajectories

that will inform identification of risk parameters. Under no circumstances should a release ever be sanctioned unless and until the dynamics of Cape Cod Bay are thoroughly understood. Proposing a release into Cape Cod Bay without any credible idea of how the release will both disburse and potentially concentrate is a risk that cannot and should not be sanctioned, particularly when, as is the case here, there are alternative disposal methods that are less dangerous.

Secondly, like all communities that border Cape Cod Bay, Barnstable's economy relies heavily on tourism and the region's well-deserved reputation for the purity of its waters and beaches. So, too, the region's seafood industry relies on that same reputation for its success. It is beyond debate that, in the public eye, perception is reality in the tourist and food industries. The mere thought that the region's waters, beaches and marshes, and its seafood could be contaminated with radioactive waste could produce a public response that would be devastating to our regional economy. One need only recall the flood of worried inquiries that the Chambers of Commerce on the Cape and Islands received from around the county, and internationally, when news of the infamous Bouchard Oil Spill in Buzzard's Bay hit the airways.

The Supreme Judicial Court said it best in *Allen v. Boston Redevelopment Authority*, 450 Mass 242 (2007). *Allen* stands strongly for the proposition that it matters not that the risk of an adverse incident is small; rather, if the worst happens, what is the damage that will result? *Allen* of course dealt with a proposed Level 4 biomedical lab proposed for Boston's South End. The Supreme Judicial Court reversed the Secretary's approval of the project's Environmental Impact Report because it failed to analyze the "worst case" scenario of a pathogen release and failed to consider reasonable site alternatives that would lessen the damage if a release did in fact occur. Holtec has not undertaken a rigorous analysis of risk parameters nor has it considered the very real effects of public perception. At the present time, Holtec cannot say with any certainty what the actual effects of a release into Cape Cod Bay would or might be. Nor can Holtec predict or control how such a release will be perceived by the public.

Cape Cod Bay should not be the subject of experimentation. We can do better. The Ocean Sanctuaries Act demands that we do better and the Draft Decision does so. The Draft Decision should be affirmed as written.

Respectfully,

Charles S. McLaughlin, Jr. /mf

Charles S. McLaughlin, Jr.
Senior Counsel

DO NOT ALLOW HOLTEC

Carol Elizabeth Rizzoli [redacted]
Wed 8/30/2023 9:51 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

to contaminate our waters on Cape Cod. This is of utmost importance for the health of everyone who lives here.

Pilgrim Nuclear Power Sta▤on. PUBLIC COMMENT BRIAN CAMPBELL ON Tenta▤ve Determina▤on to Deny HOLTEC Discharge>>UNFAIR!

BRIAN CAM[redacted]

Wed 8/30/2023 9:14 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

MASSACHUSETTS DEPT of Environmental Protection Supports BIG Offshore Wind, while Criminalizing Holtec Tritium HARMLESS discharge. https://www.youtube.com/watch?v=Cuxk2sro21c&t=3418s

My name is BRIAN CAMPBELL, retired Electrical Engineer and I strongly support discharging treated water, from Pilgrim Nuclear Station into Cape Cod Bay. Generation Atomic, calculates the water outside the plant, if one were to hypothetically consume it, they would need to drink approximately 80 gallons to equal the radiation dose from eating a Single Banana.

The presentations by Holtec to NDCAP, shows Holtec to be a good corporate citizen performing the Pilgrim Decommissioning in a truthful and open manner that should be commended.

Instead, Senator Markey expects Holtec to fund NGO, $263 Million / yr., Woods Hole Oceanographic Institution (WHOI), Study of the treated water discharges. Unfair! Holtec is right to refuse Markey's funding demands.

Markey is funding the WHOI Study, with taxpayer funded $75,000 provided by National Oceanic and Atmospheric Administration (**NOAA) Sea Grant. I question the bias of this Study? As $263 million/yr., WHOI, shifts its conclusions on studies depending on funding sources.**

On the Endangered Right Whale, Woods Hole marine ecologist Mark Baumgartner said in an interview: "We already have a fairly industrialized ocean, with shipping traffic and fishing activities. Adding these large wind farms with many, many, many turbines is certainly concerning." Woods Hole said they received $1/2 MILLION donation directly from Ørsted and supports offshore wind.

In a May 2022 memo, **Sean Hayes, the NOAA** chief of protected species, penned his concerns about how offshore wind construction and surveying could disrupt the endangered Atlantic right whale." The development of offshore wind poses risks to these species, which is magnified in southern New England waters due to species abundance and distribution.

SavetherightWhale.org 's, "Thrown to the Wind," documentary will bring attention to the correlation between the expansion of offshore wind energy and the rise in whale deaths along the East Coast. Where is MASS DEP on the REAL Dangers to the Endangered Right Whales? Or are they to be sacrificed on the altar of Green Profit$ PROFIT$

The Massachusetts Sierra Club, New England Aquarium, Environmental League of Massachusetts, Maine Audubon, Conservation Law Foundation, MASS Audubon and Greenpeace all support off-shore wind

REFERENCE

View in browser

Wind Industry Money Behind Media Misinformation About Whale Deaths

News media took money from big wind corporations while dismissing their links to increasing whale deaths

GABRIELLE HAIGH, MADELEINE ROWLEY, PHOEBE SMITH, ALEX GUTENTAG, AND MICHAEL SHELLENBERGER

AUG 30 • PAID

READ IN APP

Guardian Editor-in-Chief Katharine Viner at a fringe event on the first day of the Labour Party conference at the ACC on September 25, 2022 in Liverpool, England. (Photo by Christopher Furlong/Getty Images)

Increased boat traffic and high-decibel sonar mapping of the ocean floor by the wind energy industry are behind the rising deaths of whales and other cetaceans off the East Coast over the last six years and could make the North Atlantic Right whale extinct, according to researchers featured in a

new documentary, "Thrown To The Wind." Data analyst Lisa Linowes found that increased boat traffic from offshore wind construction strongly correlates with whale deaths. Researcher Rob Rand discovered the wind industry engaging in high-decibel sonar mapping, which scientists say can split mothers from their calves, send them to poorer feeding grounds to escape the noise, and drive them into highly trafficked boat lanes where they face a higher likelihood of being struck by a boat and killed.

The people who run the U.S. government agencies in charge of protecting the whales have either conducted similar research, come to the same conclusions, and covered them up, or they had not done the research, in which case they lied to the public when they claimed to have looked into the matter and determined that the wind industry was not behind the whale deaths. Either way, the killing of whales by the wind industry and the role of the US government is one of the greatest environmental scandals in the world.

And yet the mainstream news media have to date not only failed to cover it, they have themselves spread misinformation. The New York Times' top environment writer, Lisa Friedman, relied entirely on US government sources when she called the connection between the wind industry and whale deaths "misinformation." AP also relied entirely on government sources when it ran an article sub-headlined, "Whale Deaths Not Linked to Wind Prep Work." USA Today dismissed the connection as "cynical disinformation." And the Guardian falsely suggested that conservationists raising the alarm had secret ties to "right-wing think tanks" and the oil and gas industry.

Conservationist Lisa Linowes listening to high decibel sonar mapping by wind industry with Rob Rand (Credit: Jonah Markowitz, "Thrown to the Wind," 2023)

What's more, the New York Times, the AP, the Guardian, USA Today, and most other mainstream news publications that have published articles on the North Atlantic Right Whale's dwindling numbers either didn't mention offshore wind construction as a potential factor or inappropriately dismissed it.

Not all mainstream media publications waved away a potential connection between the wind industry and the dead whales or dismissed all opponents of the project as lackeys of the fossil fuel industry. Bloomberg last November reported, "Planned wind projects off the New England coast threaten to harm the region's dwindling population of endangered right whales, according to a US government marine scientist." The reporter, Jennifer Dlhouey, even filed a Freedom of Information Act to get the information.

Dlhouey was the only mainstream reporter to report on the strongly-worded warning by scientist Sean Hayes of the National Oceanic and Atmospheric Administration. "Additional noise, vessel traffic, and habitat modifications due to offshore wind development will likely cause added stress that could result in additional population consequences to a species that is already experiencing rapid decline," Hayes said in his letter, which Bloomberg quoted.

The Washington Post reported on the proximity of the dead whales to the wind turbine construction. "The [dead] humpback was one of nine large whales to get stranded over six weeks on or near beaches in the Northeast, not far from where developers of hundreds of offshore wind turbines are engaged in a flurry of preconstruction activity."

Map that correlates increased boat traffic (blue lines) from wind industry with whale deaths (red dots). (Credit: Lisa Linowes)

And the Post was rare among publications in at least suggesting the whale conservationists were sincere in their concern. "We have an unprecedented amount of whales dying here at the same time there is this industrial activity taking place on a scale that has never before happened in these waters," Cindy Zipf, executive director of Clean Ocean Action, told the Washington Post. "Why is this not being investigated? Why are these companies getting a pass?"

But even the piece by the Post suggested that most of the opposition to the wind industry was coming from the fossil fuel industry, and ran articles

headlined “The Value of Offshore Wind” and “An Ideal Setting For Offshore Wind Technology” about one of the East Coast wind farms.

What’s more, the Post, Bloomberg, and any of the news media organizations could have done what Environmental Progress and Public did and bought publicly available data on boat traffic and whale strandings, asked a data analyst to look for correlations, and worked with a scientist to conduct underwater acoustic measurements near a boat hired by the wind industry to map the ocean floor with sonar.

Instead, these publications promoted the wind industry. The Guardian ran an article headlined, “Winds of change: celebrating 30 years of offshore wind energy.” Politico called offshore wind a “green energy panacea” and the “key to European jobs, growth, and industrial revival.” And Reuters ran a story headlined, “Achieve 30 GW of Offshore Wind by 2030.

Why is that? Why, given the massive significance of this story, one involving the potential extinction of an entire whale species, and occurring so close to where most mainstream news reporters live, has their coverage been so biased?

Money Money Money

Daisy Veerasingham, CEO of the Associated Press

Mainstream news media organizations claim they cover environmental issues, from climate change to species extinction to energy, ethically and objectively. They say that they have strict rules and regulations on how they approach potential conflicts of interest and that there are clear boundaries between editorial teams and advertising departments.

However, an investigation by Environmental Progress and Public finds that the Hewlett Foundation, Rockefeller Foundation, and Walton Foundation, which invest hundreds of millions of dollars advocating for renewable energy subsidies, donated millions to the Associated Press for its journalism on energy and the environment.

Hewlett Foundation has long funded the Conservation Law Foundation, Grid Lab and other organizations advocating for building wind turbines along most of the East Coast. Hewlett's grants were specifically targeted for the "accelerated development of offshore wind."

Funding from George Soros' Open Society Foundations (OSF) helped pay for the Guardian's article falsely claiming that the only people concerned about a connection between the wind industry and whale deaths were "right-wing think tanks." Soros, over the last decade, invested a reported $1 billion in renewables and other climate technology. And recently, the new president of OSF, Alex Soros, said "civilization is in danger of collapsing because of the inexorable advance of climate change."

AP justified these grants to Public by insisting that they didn't affect their coverage. "No funder has any influence over AP journalism," a spokesperson for AP told Public. Hewlett says they take a "'hands-off' approach" and that they "exercise no editorial control." The Walton Family Foundation gave AP $2,500,000. According to Walton, "AP retains complete editorial control."

But the money was specifically part of an advocacy effort by the philanthropies and the Rockefeller Foundation, which makes its renewables-only bias clear to grantees. According to the Rockefeller Foundation's tax forms, its grant to AP was awarded "In support of launching a climate coverage initiative that will include reporting on the increased and urgent need for reliable, renewable electricity in underserved communities worldwide."

AP might argue that the grants were not a conflict of interest because they did not come from the wind industry but instead from philanthropy.

But wind corporations, including Orsted, GE, and Siemens Energy, with a direct interest in building the East Coast wind farms, funded several news media organizations directly, including the Associated Press, the Baltimore Sun, Bloomberg, Axios, Financial Times, Huffington Post, Insider NJ, the NJ Spotlight, the New York Times, Politico, Reuters, the Guardian, Time Magazine, the Wall Street Journal, and the Washington Post.

Public contacted 17 news media companies for this investigation, and nine responded. Several companies told Public that accepting money from the renewables industry was consistent with the practices of other media organizations and that their "ethics and values" sections delineate clear firewalls between the advertising and editorial departments.

"There is an absolute divide between the Guardian's journalism and the advertising that we carry," a spokesperson for the Guardian said, "which in no way affects our editorial coverage."

But the Guardian designed Orsted's paid advertisements to look like Guardian News content in a 12-part, two-year-long branded content project called "Power of Green." The project involved a "multimedia execution [that] leveraged a variety of formats including an animated explainer video, an interactive experience, an infinite scroll immersive journey, and feature articles." These posts are labeled as "paid for by Orsted," but many casual readers may not recognize the difference, especially since the paper has an entire section dedicated to wind energy reporting.

The Guardian's approach is typical of corporate media. The Washington Post has the "Creative Group." Bloomberg News has "Bloomberg Media Studios." The Financial Times has "FT Commercial." The New York Times has T-Brand. The Baltimore Sun has "Studio 1847."

Direct industry conflicts abound:

- The New York Times published an interactive article about how the wind industry has grown and how Orsted is at the forefront of the movement. One paid post read, "Transitioning to renewable energy will not only lead to a cleaner planet — it'll also be vital for economic growth";
- The Washington Post published sponsored content for Avangrid, Siemens, and Chevron and ran an article headlined "An Ideal Setting for Offshore Wind Technology" and "The Value of Offshore Wind";
- Reuters held an Offshore Wind conference that was sponsored by a number of energy companies, including Siemens Energy, National Grid

Ventures, and Shell;

- In July 2021, Axios hosted a virtual event called Energy Forward: The Future of Alternative Energy, sponsored by GE, which has a major wind energy division, and featured the former CEO of GE Renewable Energy as a panelist;
- The Baltimore Sun's expansive paid post in partnership with Orsted claims, "Our Future will be Powered by Wind," has a special pull-out box, "Preserve Marine Life," which claims that industrial offshore wind projects will serve as "marine preservation areas";
- Bloomberg's sponsors include wind industry component makers, Mitsubishi Heavy Industries, Siemens, and Cisco;
- The Financial Times published sponsored content for Vestas, EDP Renewables, Hekel, Fujitsu Global, and ENI. One FT article headline read, "Renewables drive stronger returns. It's time to redirect investment." The "partner content," as FT calls it, was sponsored by Vestas, the world's largest wind turbine manufacturer;
- Huffington Post produced a sponsored article for NRG Energy in 2014;
- Insider NJ had a paid contract with PSE&G and published "sponsored content" headlined, "An Environmentally Responsible Plan to Bring Clean Offshore Wind Energy to New Jersey," which claimed that "construction activities will be timed to avoid impacts on endangered species, such as the North Atlantic Right Whale, which migrates along the Jersey shore each year";
- Orsted and PSE&G help fund NJ Spotlight News;
- Politico published sponsored content from Enbridge, Orsted, Polska Grupa Energetycza, and Equinor;
- Time Magazine published sponsored content for ABB Energy Industries, which has a wind energy division;
- The Wall Street Journal published sponsored content for Deloitte, which has a robust renewable energy consultancy.

Why, in the end, did so many mainstream news journalists fail to investigate and otherwise fairly report on one of the biggest environmental stories in the world? Part of the reason is surely their spiritual bias toward renewables. Another is their monomania around climate change. But surely

another is that the corporations that stand to make billions of dollars building wind turbines along the East Coast gave their employers millions of dollars.

Betrayal Of Journalism And Philanthropy

Larry Kramer, President, Hewlett Foundation

We cannot prove that the wind industry money is what caused the poor reporting by mainstream news media companies. Journalists are also lazy, obedient, and ideological. And, as noted above, two news media outlets, Bloomberg and the Washington Post, did better than other publications. And one of the most biased stories came from a publication, USA Today, for which we could find no evidence of wind industry advertising.

But funding from the wind industry corporations that stand to benefit directly from the construction of massive new wind turbines to news media companies constitutes a financial conflict of interest by any definition, including the definition that mainstream news media companies use when evaluating others. For decades, the media have attacked fossil fuel companies for funding think tanks skeptical of climate change, for example, because it creates the very same conflict of interest created when the wind industry funds news media companies.

The fact that this is the standard operating procedure of mainstream news media companies doesn't change the fact that it's a conflict of interest. Nor should the insistence from spokespersons for the news media companies that there is a firewall between the advertising departments and the news departments reassure us. The fact of the matter is that without the advertising money, the news media companies would not have the resources to hire the staff and publish the stories. As such, without the advertiser funding, it's unlikely that the news media companies would exist, at least in their present form.

Conflicts of interest create biases in myriad other ways. While news organizations speak of "firewalls," they operate as a single business with a single staff. Employees talk with each other, and a common culture is

developed. Most employees want to see their employers succeed, and that includes financially. As such, employees, including supposedly objective news reporters, are biased in favor of the advertisements with their employer, whether they are involved in negotiating fees and accepting payments.

While the funding of news media organizations by philanthropies that advocate for wind energy may be less of a conflict of interest than funding from the wind industry directly, it's still a conflict of interest and may have played a larger role than corporate money.

There is a common culture among many advocates of renewables and news reporters in organizations like the New York Times, Washington Post, and other publications. Anyone who has watched the interactions between renewable energy advocates and ostensibly objective and independent reporters on social media platforms like X, formerly Twitter, knows of the conviviality and camaraderie between the two groups that is grossly inappropriate, given that the latter are supposed to be skeptical of the former. Our research suggests that one reason for this may be that they share the same funders.

Whatever the case, the fact that practically the entire environmental press corps spent the last six years watching whales die at abnormal rates as the wind industry expanded its activities without asking hard questions, or doing the most basic research, is a serious indictment of their journalism.

It's also a serious indictment of philanthropy. Attempting to correlate increased boat traffic from the wind industry to whale deaths would have been precisely the kind of investigative journalism that Hewlett, Rockefeller, and Open Society Foundations claim to want to support. And yet one gets the feeling that nobody in any of those news media organizations would have dared suggesting anything like it for the simple fact that they know those philanthropies are in favor of industrializing the eastern seaboard with wind turbines, not against it.

The experience of researching the news media opened our eyes to the reality of what passes for environmental journalism, and we hope it changes how people think of the news media. Though they claim to be platforms for

fair, objective, and accurate investigative journalism, they have proven to be platforms for biased and oftentimes mean-spirited hit pieces against the people actually doing investigative journalism.

Please Protect Cape Cod Bay from Holtec's Radioactive Waste

Katherine Rothschild [redacted]
Wed 8/30/2023 9:57 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,

I strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law. I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you,

Katherine Kavetas Rothschild

[redacted]

[redacted]

Deny Holtec Internationa's Permit Application to discharge Wastewater into Cape Cod Bay

Marsha Salett [redacted]
Wed 8/30/2023 10:49 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,

I strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law. I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you,

****

Marsha Salett
[redacted]

****

Pilgrim Nuclear Power Station

Diane Robinson [redacted]
Thu 8/31/2023 12:23 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,

I strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law. I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you,

Clay Krevolin

[redacted]

[redacted]

[redacted]

Sent from Yahoo Mail for iPad

Holtec

Alethea Cozzi [redacted]
Thu 8/31/2023 2:45 AM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Do not permit Holtec to dump radioactive water into Cape Cod Bay.

Alethea Cozzi
West Yarmouth, MA

Sent from my iPhone

Pilgrim Nuclear Power Station - DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

[redacted]

Thu 8/31/2023 7:48 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Attn: Cathy Coniaris

Dear Ms. Coniaris,

Mass DEP has made the correct decision in denying a permit to Holtec for dumping into Cape Cod Bay. Since it is illegal, I am not sure what the question is. I am not sure why Holtec even applied. Isn't that why we have these laws?

I am reminded of a movie I saw recently called "Painkiller" about the opioid crisis and how big pharma contributed. The owner of Purdue caused untold misery for millions and he was the only one who benefited. This is a similiar situation. The only one who will benefit is the owner of Holtec. If he has to use a more costly method that is safer, it will cost more for only one person. If there is nothing good about this dumping, then why is the law of the land being challenged?

It's hard to understand why there is even a hearing.

Thank you for doing the right thing and using the laws in place to save our environment and our oceans -- and our economy!

Sincerely,

Marcia McChesney

[redacted]

[redacted]

Letter of Support MassDep

Nancy [redacted]>
Thu 8/31/2023 8:14 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Coniaris:

I am writing to support the tentative decision by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay. MassDEP's tentative determination that requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries." The proposed discharge is therefore illegal. Because the proposed discharge is illegal, the Department's final determination should deny Holtec's application. Thank you,

Nancy Paronich. [redacted],

[redacted]

Holtec's application

Joan Bernstein [redacted]
Thu 8/31/2023 8:30 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Coniaris:

I am writing to support the tentative decision by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay. MassDEP's tentative determination that requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries." The proposed discharge is therefore illegal. Because the proposed discharge is illegal, the Department's final determination should deny Holtec's application.

Sincerely,

Joan Bernstein
[redacted]

DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

Karen Brady [redacted]

Thu 8/31/2023 8:31 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>;Coniaris, Catherine (DEP) <Catherine.Coniaris@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Coniaris:

I am writing to support the tentative decision by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge **radioactive and chemically contaminated wastewater** into Cape Cod Bay.

MassDEP's tentative determination that requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries."

The proposed discharge is therefore illegal. Because the proposed discharge is illegal, the Department's final determination should deny Holtec's application.

Thank you,

Karen Brady
[redacted]

Holtec Nuclear Waste Permit

PAT COSTA [redacted]
Thu 8/31/2023 8:44 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Attn: Cathy Coniaris

Dear Ms. Coniaris,

Mass DEP has made the correct decision in temporarily denying a permit to Holtec for dumping radioactive nuclear waste into Cape Cod Bay. Please settle this issue once and for all, and permanently deny Holtec's permit request. Since it is illegal, I am not sure what the question is beyond Holtec's bottom line profits. Dumping radioactive and industrial waste into the Bay serves no economic, environmental, or political advantage to current and future residents of the area.

Holtec knew what they were signing on for; they must be made to adhere to the contract that they signed. In trying to avoid using a more costly method to safely dispose of the radioactive and industrial waste, they are risking destruction of a very delicate ecosystem vital to our children's future!

The attendance and public outcry at numerous meetings should clearly guide your decision as caretakers of the public trust - no radioactive waste dumping in our precious bay!

Sincerely,
Pat Costa
[redacted]

Plymouth Nuclear Plant

SUSAN KETTERLING [redacted]

Thu 8/31/2023 8:54 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Attn: Cathy Coniaris

Dear Ms. Coniaris,

Mass DEP has made the correct decision in denying a permit to Holtec for dumping into Cape Cod Bay. Since it is illegal, I am not sure what the question is. I am not sure why Holtec even applied. Isn't that why we have these laws?

I am reminded of a movie I saw recently called "Painkiller" about the opioid crisis and how big pharma contributed. The owner of Purdue caused untold misery for millions and he was the only one who benefited. This is a similiar situation. The only one who will benefit is the owner of Holtec. If he has to use a more costly method that is safer, it will cost more for only one person. If there is nothing good about this dumping, then why is the law of the land being challenged?

It's hard to understand why there is even a hearing.

Thank you for doing the right thing and using the laws in place to save our environment and our oceans -- and our economy.

Sincerely,

Susan Ketterling

[redacted]

Discharge of Nuclear Waste

SUSAN KETTERLING [redacted]
Thu 8/31/2023 8:58 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Coniaris:

I am writing to support the tentative decision by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay. MassDEP's tentative determination that requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries." The proposed discharge is therefore illegal. Because the proposed discharge is illegal, the Department's final determination should deny Holtec's application.

Thank you,

Susan Ketterling
[redacted]

Fwd: Pilgrim Nuclear Power Station - DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

Al Mcchesney[redacted]
Thu 8/31/2023 8:59 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Sent from my iPad
Al McChesney
[redacted]

Begin forwarded message:

I am writing to support the tentative decision by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay. MassDEP's tentative determination that requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries." The proposed discharge is therefore illegal. Because the proposed discharge is illegal, the Department's final determination should deny Holtec's application.
Thank you,
Albert Mcchesney, [redacted]

Jones River Watershed Association

781-585-2322 • 55 LANDING ROAD KINGSTON MASSACHUSETTS 02364 • WWW.JONESRIVER.ORG

31 August 2023

Commissioner Bonnie Heiple
Department of Environmental Protection
100 Cambridge St., Suite 900.
Boston, MA 02114

Cc: Climate Chief Melissa Hoffer

Re: Pilgrim Nuclear Power Station, NPDES Draft Denial of Permit

Dear Commissioner and NPDES permit related Staff,

I write to further elaborate on my oral testimony of August 24th before the Director of Watershed Management Lealdon Langley, et al. I am attaching a copy of that testimony with this extended comment.

I moved to Massachusetts in 1973, after Pilgrim Station was generating electricity, and prior to NPDES permit authorization. My understanding is that Boston Edison, the builder and first owner of Pilgrim Station, applied for a permit for the use of Cape Cod Bay for once through cooling of the reactor under the Massachusetts Clean Water Act, and this was granted only by court order following an appeal by the power company of the Water Pollution Control denial of the permit. The Federal Clean Water Act, Ocean Sanctuaries Act, DEP and even EPA were established after Pilgrim Station began generating electrical power. I know the public pressure being exerted for the DEP and EPA to deny authorization for Holtec International to treat and discharge the much discussed remaining 1.1 million gallons of industrial water is unrelenting. Yet, this is not "new water", because it has been in the facility since the last refueling in 2015. Further, it has been used to prevent exposure of workers to radioactive isotopes from fuel rods and dismantling of the reactor core, which was used only for the generation of electricity. The workers are engaged in active decommissioning of this electric generating station. It is only a "new" application, because the 2020 amended NPDES permit specifically excluded the release of water from the Spent Fuel Pool while allowing a multitude of other discharges; further, now Mass DEP must issue its own NPDES permit following the 2020 EPA decision. In about 2004 we all became aware that tritium from the facility had leaked into the groundwater when DPH required monitoring wells to be installed. This groundwater has been discharging within a few hundred feet into the bay every day since. So, the tritium is not a new discharge—it is from the same place. It has also been evaporated from Pilgrim for its entire operating life.

I do not disagree that the requested discharge needs a NPDES permit. I disagree that DEP cannot grant one because Pilgrim is no longer generating electricity. Because decommissioning is inherently bound with a limited operation life, it is part of an electrical generating station. Much like our life/death—others must do something with our remains, and most lawyers ask us to plan for our disposal.

I work along the Jones River estuary, eight miles from Pilgrim, where Jones River Watershed Association (JRWA) purchased the country's oldest operating boatyard in 2003. In the two decades since I have had to deal with the reality of sea level rise. The astronomical high tide today is over a foot higher than it was twenty years ago. The storms that bring water into the buildings are more frequent. Water is not only wet, it is powerful. Half of our seawall recently collapsed into the river. Yet we are over a mile upstream, with no huge waves to deal with, just surge brought with nor'easters, and generally higher tidal flux. Pilgrim is different. Like others along the open water, it faces velocity from waves that can be 30-feet high, and no doubt will be higher with our critically disturbed climate. As a member of Pilgrim NDCAP, I visit Pilgrim regularly to monitor progress on decommissioning, and meet with Holtec leaders and employees to evaluate, for myself, their commitment to a thorough decommissioning and cleanup. I am aware of the remaining contamination and threats to the environment, and I very much want it rationally and completely resolved.

I served a total of sixteen years as a Conservation Commissioner in Kingston, and then as Hingham's conservation agent. I am deeply committed to a clean and healthy environment for all—people and all creatures. With JRWA I am completely dedicated to re-establishing healthy populations of fish and American eels to our ecosystem. This is why JRWA was opposed to the operating condition of Pilgrim with its permitted intake of 480-mgd of Cape Cod Bay water with impingement and entrainment of tens of thousands of fish, and heated discharge to the bay.

DEPs denial of the Holtec application for discharge of the remainder of that industrial water from that electrical operating system needs to go a step farther. Massachusetts government needs to address the disposition of that waste here, in-state. We know most of it can be filtered and treated. A permit could require levels of treatment, and analysis prior to any disposal. I can require batch release as Holtec has proposed, in a timely way and seasonally deliberate to take advantage of ocean circulation. It can be highly diluted to prevent any negative impact on the habitats of the bay to set a precedent for all other on-going problematic discharges.

We also know it can be held on site until the tritium degrades, and then released. We know there are other proposed methods less injurious than during the 47 years of power output. This problem is not nearly as damaging as the Plymouth municipal discharge of 1-mgd wastewater, nor the continuous flow from Deer Island that comes our way and likely is the reason for the oxygen crash we have experienced in the bay in recent years.
More study is certainly needed. Massachusetts, including CZM, DEP and others need to step up the learning, the study, and the fixes as the waters continue to creep up and overwhelm coastal infrastructure. There is so much more to the decommissioning, but to get to the removal of the reactor building and associated infrastructure, we must deal with this remaining water. Where will it go? Denial is not enough. We must solve the problem. We cannot blame Holtec. The cause was our demand for electricity, and the fix is in our hands.

Oral Testimony attached. Thank you for your consideration,

Executive Director
pine@jonesriver.org

Pine duBois, resident of Kingston. I have served on the Pilgrim NDCAP since 2017. I work for the non-profit Jones River Watershed Association (JRWA) as Executive director. From the late 70's, I was involved in various levels of environmental monitoring of Pilgrim Station, including serving with the town's Emergency management. JRWA was active in commenting on the Pilgrim license renewal in 2012[1] and long-expired NPDES permit for the 480-million-gallon a day intake and discharge to the Bay. With Cape Cod Bay Watch, we were mostly concerned with recurring death of thousands of fish, and the discharge of heated water to the bay. In 2015 & 16 we reviewed Pilgrim's required flooding analysis after the Fukushima disaster in 2011.

JRWA's consultants showed that the information used in that Areva Report was old and out of date and that sea level rise and the incidence of flooding would be worse than projected. We asked for more accurate mapping, and provided our findings to the NRC, DOE, Entergy, and others.

We have known for a long time about tritium in the groundwater, which interacts with the tides and flows to the sea. Cape Cod Bay has had inputs of tritium from Pilgrim for the 47 years it was operating, and since. Tritium is not new and is not at levels that should inspire concern. What concerns me the most is that a delay in dealing with the remaining wastewater will most certainly delay decommissioning of the entire site.

Sea level is in fact rising more quickly than previously projected. It is rising here faster than almost anywhere in the world. If we fail to expeditiously clean up the remainder of the Pilgrim site—including removing the reactor building, the spent fuel pool, torus and all components; if we fail to remediate the stormwater systems and the contamination that we know are in the soils, virtually all of that contamination will migrate to the Bay. This will be much more than the remaining wastewater, which can be filtered and treated multiple times and controlled with strategic releases, but only if we work toward that end to protect the ecological interests in the bay.

Nowhere in the DEP or CZM letters do the agencies mention any concern for sea level rise or the timeline for site clean-up.

To imply the daily discharge of one million gallons of water from the Plymouth municipal sewer into Plymouth harbor, and the daily dispersion of between 360-million gallons and 1000-million gallons of Deer Island wastewater that flows our way each day with the prevailing current is of no consequence, but this million gallons is very harmful is impossible to believe. I have participated in long term sampling of the River and the Bays and have worked with both DEP and CZM, make improvements to the water quality of our ecosystem. It is my belief that we must approach this as our problem to solve, because it is.

[1] 2005-2012- Entergy applied for renewal of license in 2005 and which was issued in 2012 after appeal

Nuclear New York

Independent Advocates for Reliable Carbon-Free Energy
3961 47th St, Sunnyside, NY 11104
http://NuclearNY.org
info@NuclearNY.org

August 30, 2023

VIA ELECTRONIC MAIL

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

RE: Pilgrim Nuclear Power Station – Tentative Denial of Modification to Draft Permit No. MA0003557 pertaining to surface water discharges

Nuclear New York is an independent, non-partisan, non-profit organization that advocates for a prosperous decarbonized future and nature conservation. Please accept the following comments on the tentative determination by the Massachusetts Department of Environment Protection ("MassDEP" or "the Department") to deny the application by Holtec Decommissioning International for the discharge of treated water from Pilgrim Nuclear Power Station. We respectfully urge the Department to reconsider its position and allow discharge to proceed pursuant to the rules and regulations of federal agencies, including the Nuclear Regulatory Commission (NRC) and Environmental Protection Agency (EPA), so that decommissioning can be completed in a timely and effective manner. Our comments respond to the tentative determination dated July 24, 2023 and accompanying letter from MassDEP dated July 21, 2023. Both scientific and administrative aspects of the Department's tentative determination are addressed.

As its name suggests, the principal function of MassDEP is to protect the environment. Thus, to deny an application, it is incumbent upon the Department to demonstrate reasonable potential for environmental harm resulting from the proposed action. This has not been done. Following treatment to remove heavy radionuclides, the only measurable radionuclides within water from the Pilgrim facility will be tritium—a very low-energy beta emitter that does not bio-accumulate and has a biological half-life of about ten days.[1] Water at the facility contains approximately 100,000 becquerels per liter of tritium, and has been proposed for release in batches diluted at a ratio of 20:1. This translates to 5000 becquerels per liter *at the point of*

[1] Biological half-life refers to the amount of time that tritium remains in the body before it is naturally flushed out. "Organically-bound tritium" has a biological half-life of about 40 days, but it does not bio-accumulate either.

discharge during those controlled batch events. Flow modeling on the movement of water within Cape Cod Bay has shown that beyond the point of discharge, concentrations of tritium above naturally-occurring background levels would be undetectable or nearly so: far below drinking water standard (740 Bq/l) and far below levels demonstrably harmful to marine life.[2]

Discharge levels proposed by Holtec readily comply with federal limits. Moreover, the Department has cited no scientific evidence to dispute the validity of those limits, or to demonstrate that discharging tritium at the extremely low concentrations planned poses any threat to the environment or to public health. Indeed, numerous studies reveal no correlation between very low levels of tritium and harm to people or the environment.[3] Comparable quantities of tritiated water have been released from Pilgrim Power Station many times since the facility became operational in 1972, with no detectible negative health of environmental consequences. This includes the discharge of 325,000 gallons in 2011 and 310,000 gallons in 2013. In each of those cases the total dosage corresponding to both liquid and evaporative releases were more than a thousand times lower than the NRC limit.[4]

Failing to demonstrate any potential for environmental harm, the Department attempts to justify its tentative determination by citing various provisions of the Massachusetts Ocean Sanctuaries Act. As MassDEP notes, Section 16 of the Act exempts "activities, uses and facilities associated with the generation, transmission, and distribution of electrical power." However, the Department then suggests that because the proposed discharge of tritiated water would occur during decommissioning, it cannot be associated with electricity generation which has ceased. This is a *non-sequitur*. The production of tritiated water is a direct result of electricity generation. Therefore, the discharge of tritiated water is "associated" with generation, regardless of whether that discharge occurs simultaneously with electricity production or later. Indeed, prior legal discharges from the facility usually occurred during refueling rather than while electricity was being produced. Furthermore, the canal and equipment used to dilute and discharge water from the facility is the same canal and equipment that has been used for decades. It is clearly possible for the discharge of tritiated water to be associated *both* with

---

[2] A 0.1% mixing of discharged water from Pilgrim Power Station with seawater in Cape Cod Bay would result in 49 pCi/l = 1.8 Bq/l of tritium. By comparison, other naturally-occurring radionuclides in seawater total about 350 pCi/l = 13 Bq/l, mostly from heavier radioactive elements like K-40, Rb-87, U-238, and Th-232 with much higher energies than tritium. Dr. James Conca, *Tritium,* presentation to Massachusetts Nuclear Decommissioning Citizens Advisory Panel, September 2022. https://www.mass.gov/doc/pilgrim-tritium-presentation/download ; It should also be noted that the 740 Bq/l drinking water limit is based on a person drinking 2 liters per day of tritiated water for an entire year. (In 1991, it was determined that this could be increased three-fold, but the original standard was retained.)
Canadian Nuclear Safety Commission, *Standards and Guidelines for Tritium in Drinking Water,* INFO-0766, January 2008. https://www.nrc.gov/docs/ML1029/ML102990104.pdf

[3] Dingwall S, Mills CE, Phan N, Taylor K, Boreham DR. *Human Health and the Biological Effects of Tritium in Drinking Water: Prudent Policy Through Science - Addressing the ODWAC New Recommendation.* Dose Response. 2011 Feb 22;9(1):6-31. doi: 10.2203/dose-response.10-048.Boreham. PMID: 21431084; PMCID: PMC3057633. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3057633/

[4] Holtec Decommissioning International, In*formation Sheet for Pilgrim Station Stakeholders.* https://holtecinternational.com/wp-content/uploads/2022/01/Info-Sheet-for-Stakeholder-Water-Disposal-Final.pdf

decommissioning *and* with the "generation, transmission, and distribution of electrical power." One association does not obviate the other.

Similarly, MassDEP acknowledges that Section 16 provides a possible exemption for the "operation and maintenance of *existing* municipal, commercial, or industrial facilities and *discharges* where such discharges or facilities have been approved and licensed by appropriate federal and state agencies," placing emphasis on the word "existing" and "discharges." However, the Department then argues that because the discharge would be *new* rather than *existing* (presumably a discharge still in progress) that it must prohibited. However, this ignores the full meaning of the statutory provision which allows an exemption for the "operation and maintenance of existing… industrial facilities…" Although electricity generation has ceased at the Pilgrim Power Station, it remains an industrial facility, and it will continue to remain an industrial facility until it is fully decommissioned and dismantled. Legally permitted discharges were a normal aspect of the facility's function in the past and they continue to be now. The fact that Holtec has submitted an application to continue those discharges does not alter these circumstances. Indeed, if such an application were illegal on its face, then no existing "municipal, commercial, or industrial facility" appurtenant to a Massachusetts Ocean Sanctuary could ever have a permit renewed or modified.

In closing, we would remind MassDEP that it has a responsibility to ensure that its actions are protective of the environment holistically and in the public interest. The consequence of not discharging mildly tritiated water from Pilgrim Power Station is that other methods that are less environmentally protective must be pursued. This could include evaporation of tritiated water to the atmosphere, which would require additional heat produced by fossil fuel combustion, or it could involve trucking large volumes of water from the site to distant locations, which would also consume more fossil fuels. Moreover, surrendering to imagined fears regarding carbon-free nuclear power is not in the public interest as society tries to meaningfully respond to the very real threat of global climate change.

For all of the above reasons, we respectfully encourage MassDEP to reconsider its tentative determination and grant a conditional permit for Holtec to discharge from Pilgrim Power Station pursuant to federal regulations.

Sincerely,

Isuru Seneviratne
Nuclear New York, Executive Director
isuru@nuclearny.org
646-462-9018

Keith Schue
Nuclear New York, government relations
keith@nuclearny.org
407-470-9433

CC: Dr. Geraldine Thomas, OBE, expert contributor
former Professor of Molecular Pathology - Imperial College
former Director of the Chernobyl Tissue Bank

Nuclear plant shutdown

Phyllis Cotter[redacted]
Thu 8/31/2023 11:22 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Get Outlook for

Dear Ms. Coniaris:

I am writing to support the tentative decision by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay. MassDEP's tentative determination that requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries." The proposed discharge is therefore illegal. Because the proposed discharge is illegal, the Department's final determination should deny Holtec's application. Thank you.

Phyllis J Cotter
[redacted]

Pilgrim Nuclear Power Station - DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

Rosemary Shields [redacted]
Thu 8/31/2023 11:26 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.
To: Cathy Coniaris

Here is a written copy of my oral testimony given to MADEP at the Pilgrim Townhall on August 24, 2023

LWV LEAGUE OF WOMEN VOTERS® OF THE CAPE COD AREA

Oral testimony given at the MA DEP Plymouth Townhall on August 24, 2023

I am Rosemary Shields with The League of Women Voters of the Cape Cod Area (LWVCCA). The LWVCCA fully commends and supports the state Department of Environmental Protection's (DEP) tentative determination to deny Holtec-Pilgrim's permit application to discharge radioactive and chemically contaminated water into Cape Cod Bay. This decision is correctly based on the DEP legal finding that discharge by industrial sites such as Pilgrim is definitely prohibited by the state Ocean Sanctuaries Act. Holtec must comply with state laws. I urge you to issue a final determination to deny the permit, thereby upholding state regulations so our Ocean Sanctuaries in Plymouth, Duxbury, Kingston, and Cape Cod Bay remain protected.

I just heard from another speaker that we have to hurry this process along before the ocean starts swallowing up the Pilgrim site. This is a good point but it isn't the MA DEP who is holding up this process nor the citizens who are protesting the dumping of a million gallons of radioactive wastewater into Cape Cod Bay. It is Holtec itself.

The latest of Holtec's practices in bad faith is when Pat O'Brien claimed that the process of finding out what was in the water has added 4 years to the decommissioning (according to the Cape Cod Times article by Heather McCarron on July 24, 2023.) This statement is blatantly disingenuous. For at the previous Nuclear Decommissioning Citizens

Advisory Panel (NDCAP) meeting in May, David Noyes of Holtec announced that Holtec itself was halting work for four additional years in order to grow revenues of the ratepayers' decommissioning fund in the market and flatten labor cost curves. The delay is Holtec's alone, and distorts the work of the MA DEP. And if you're looking for the harm Tritium has been doing, all you need to do is check out the cancer clusters near Plymouth. Information of the rates of cancers in all the towns of MA has been kept by the Department of Health for decades.

(see https://archive.org/details/pactvma-NDCAP_Meeting_-_5_22_23_-_Nuclear_Decommissioning_Citizens_Advisory_Panel_Plymouth 1:36:05).

Holtec

Mary Dever [redacted]
Thu 8/31/2023 11:28 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Attn: Cathy Coniaris

Dear Ms. Coniaris,

Mass DEP has made the correct decision in temporarily denying a permit to Holtec for dumping radioactive nuclear waste into Cape Cod Bay. Please settle this issue once and for all, and permanently deny Holtec's permit request. Since it is illegal, I am not sure what the question is beyond Holtec's bottom line profits. Dumping radioactive and industrial waste into the Bay serves no economic, environmental, or political advantage to current and future residents of the area.

The attendance and public outcry at numerous meetings should clearly guide your decision as caretakers of the public trust - no radioactive waste dumping in our precious bay!

Thank you
Mary Dever

Sent from my iPad

Protect Cape Cod Bay

[redacted]

Thu 8/31/2023 11:44 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

Cc:[redacted]

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,

Thank you for listening to concerns about the importance of protecting Cape Cod Bay.

We strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law. We urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you for all you do to protect the natural environment of Massachusetts.

Sincerely,

Herb & Eliza

~~~~~~~~~~~~~~~~~~~~~~~~

Herb Heidt & Eliza McClennen
MapWorks
[redacted]
~~~~~~~~~~~~~~~~~~~~~~~~

[redacted]

[redacted]

[redacted]

~~~~~~~~~~~~~~~~~~~~~~~~
~~~~~~~~~~~~~~~~~~~~~~~~

Pilgrim Nuclear Power Station

Pandiscio, Paul [DPYUS] [redacted]
Thu 8/31/2023 11:45 AM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station

Dear Ms. Coniaris:

I am writing to support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act. The proposed discharge is therefore illegal.

Holtec's proposed discharge is illegal. The Department's final determination should deny its application.

Kind regards,

Paul Pandiscio
[redacted]

Pilgrim Nuclear Power Station

David Reich [redacted]

Thu 8/31/2023 11:45 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Massachusetts State Department of Environmental Protections,

To: Surface Water Discharge Program, Massachusetts Department of Environmental Protection

Re: In support of the "Tentative Determination to Deny a Surface Water Discharge permit modification requested by Holtec Decommissioning International LLC", (MA Permit No. MA0003557 issued to Holtec Pilgrim LLC)

I am writing to support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston and Duxbury Bays are all protected ocean sanctuaries under the act. The Department's final determination should deny its application.

Thank you,

Sincerely,
David Reich
[redacted]

Pilgrim Nuclear Power Station

Barbara Mearls [redacted]

Thu 8/31/2023 11:58 AM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Coniaris:

My family have been renters, homeowners and permanent residents at Priscilla Beach since the 1950's. It is a wonderful community that has seen generations of families continue to rent, own and grow, expanding to create a neighborhood that cares about each other, looks out for one another and loves that we have this special place to do so.

I support the tentative determination by the Massachusetts Department of Environmental Protection to deny Holtec's application for a modified Surface Water Discharge Permit that would allow them to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

It is my understanding that the discharge is prohibited by the Massachusetts Ocean Sanctuaries Act. It is also my understanding that the act prohibits the 'dumping or discharge or commercial, municipal, domestic or industrial waste' into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston and Duxbury are all protected ocean sanctuaries under this act. That would make Holtec's plan illegal.

I feel very strongly that the Department should deny Holtec's application. Thank you for your consideration in this very important matter.

Very truly yours,

Barbara Mearls
[redacted]

PS. As a resident of Woburn, I am quite familiar with what happens when industrial waste is allowed to enter our waterways. I also know several families who were affected with illness and/or death as a result of the discharge of chemicals and wastewater. Let's not allow this to happen in Plymouth.

To: Commissioner Bonnie Heiple
From: Suzanne Phillips, vice-chairperson
Orleans Shellfish & Waterways Improvement Advisory Committee
Re: Pilgrim Nuclear Power Station
Date: August 30, 2023

I'm writing on behalf of the Orleans Shellfish & Waterways Improvement Advisory Committee ("Shellfish/Waterways Committee") regarding the Department of Environmental Protection draft decision to deny Holtec Decommissioning International a surface water discharge permit for wastewater from the Pilgrim Nuclear Power Station into Cape Cod Bay.

The Shellfish/Waterways Committee is made up of local fishermen, shellfishermen, and recreational water users, and includes several long-term residents of the Cape, and Orleans in particular.

The committee addressed the discharge issue at its regularly-scheduled meeting on August 8, 2023.

At the beginning of the discussion a couple of members stated they didn't have enough information to make a recommendation. Specifically, there was a lack of knowledge about other potential methods of disposal, but there was agreement that discharge created an unacceptable risk for Cape Cod Bay. Members also didn't want the waste material to become "a problem in someone else's back yard".

Over the years, committee members have repeatedly raised concerns about the health of our waters. And several of us participate in the Massachusetts Estuary Project monitoring of local waters. In addition, some of us worked with then-state senator Robert O'Leary to ensure passage of the Ocean Sanctuaries Act [many years ago].

Committee members are deeply concerned about the health and sustainability of our marine ecosystem and its resources; many of us have made our living from our local waters.

Last year, the committee was instrumental in raising concerns about fertilizer run-off and the ensuing problems with nitrogen-loading in our estuaries. We made a recommendation to the Select Board, which passed a home rule petition to allow for local regulation of fertilizers. It is moving through the legislative process.

Committee members are also well-informed about, and frequently discuss, other issues involving water quality, including the rapid rise of temperatures in the Gulf of Maine, ocean and coastal acidification, microplastics in the ocean, and the increase of "pollutants of emerging concern". All can affect the larger ecosystem.

At the end of the discussion, the committee strongly supported the DEP draft decision to deny Holtec's request for a permit to discharge waste water from the Pilgrim Nuclear Power Station into Cape Cod Bay, and strongly urges the DEP to finalize the decision and deny the permit.

Thank you for your consideration of our comments.

Orleans Shellfish & Waterways Improvement Advisory Committee
Suzanne Phillips, vice-chairperson

PILGRIM NUCLEAR POWER STATION

Rozsa Herczeg Rozembersky [redacted]
Thu 8/31/2023 1:02 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Coniaris:

I am writing to ask you, and the Mass Department of Environmental Protection, to deny Holtec's application to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

Under the Ocean Sanctuaries Act, this can be prohibited. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries, which means that dumping or discharge of any waste into the Bay is prohibited, thus Holtec's plan is illegal.

Please deny their application. Thank you in advance for enforcing the law to protect our ocean sanctuaries.

Sincerely,

Rozalia H Rozembersky

[redacted]

Pilgrim Nuclear Power Station

Molly Meyersohn [redacted]
Thu 8/31/2023 1:18 PM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Please make permanently illegal the dumping of radioactive waste water into Cape Cod Bay. Dumping is the cheapest and speediest method to get rid of the contaminated water. If it isn't Holtec, another greedy business operation will take its place. They seek to save money and not take responsibility for the cancer deaths and the ruined environment it will leave in Massachusetts and thereby the world at large.
I am now a single disabled, cancer-surviving mom of 3 writing to you from the bottom of my heart. Sorry to have missed the deadline by a day. Hopefully this will be considered nonetheless.

Be well,
Molly Meyersohn

Denial of Surface Water Discharge Permit requst by Holtec

[redacted]

Thu 8/31/2023 1:25 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

1 attachments (18 KB)

DEP 8-31-2023 submittal.docx;

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Please see my attached comment on the subject tentative denial of the Holtec modification application.

Charles W. Adey

[redacted]

My name is Chuck Adey. I received my BS in Mechanical Engineering from Northeastern University in 1965. I have worked on the construction, startup testing, operations and refueling of 5 nuclear power plants. I held Reactor operator and Senior Reactor Operator licenses on 3 nuclear power plants. I have been involved with the decommissioning of the Shoreham, Trojan and San Onofre unit 1 nuclear power plants. I was a project manager for the Brookhaven Graphite Research Reactor and High Flux Beam Reactor at the Department of Energy Brookhaven National Laboratory on Long Island.

I have been living here in Plymouth since March of 1971. I moved to Plymouth with my family as part of the GE team to start up the Pilgrim Nuclear Power Station. I was also responsible for GE support services including refueling outages for the first two fuel cycles. My career in the industry has spanned over 50 years. As you may suspect, I am a lifelong advocate for nuclear power. I was appointed a member of the initial Town of Plymouth Nuclear Matters Committee on which I served until travel and work precluded further participation. I was subsequently re-appointed in 2013, and, during this time, the Board of Selectmen requested that the Committee develop a list of the current top five issues facing the Town of Plymouth regarding the PNPS with a discussion about each issue. In April 2015 the committee issued a report in which one of the top five issues was the Socioeconomic Impact of Pilgrim Permanent Shutdown where a premature shutdown could also lead to a situation of inadequate PNPS decommissioning funds being available. I continued serving on the committee until falling membership precluded a quorum and after which the Selectboard declined to appoint any further members.

As an avid sailor, I have enjoyed sailing the waters of Cape Cod Bay. While only anecdotal, I have not seen any adverse effects on the bay from Pilgrim operation. But, as one who likes seafood and clam chowder in particular, I frequently obtain my shellfish permit and have noted over the years the opening of additional areas for harvesting. And over the years I have seen the establishment and growth of the oyster industry which further suggests our local waters are not being degraded.

In reviewing the Holtec application, none of the proposed discharges would have any more impact on Cape Cod Bay than what has been going on for over the 47 years of Pilgrim's operation. The concentration of some of the contaminants proposed for release are far below what already exists in the

waters of Cape Cod Bay. Continual oversight, including comprehensive sampling and analysis, since before startup and throughout plant operation by your agency or its predecessors has been found to have no adverse effect on the bay. Neither would the discharge of the proposed 1.1 million gallons of the spent fuel pool, torus, dryer separator and reactor cavities water. While the Holtec application addresses the technical bases for allowing the planned discharges, your provisional ruling relies only on the primacy of the Commonwealth's Ocean Sanctuaries Act and classifying Pilgrim as an industrial site rather than a power plant. The decommissioning process is part of the life cycle of all power plants. And, so I believe this reclassification to only be a political convenience in light of the organized opposition to the planned discharges by Holtec. The squeaky wheel always gets the oil. And as a further aside the DEP has the responsibility for protection of the Commonwealth's overall environment, should you not consider the impact on air quality of the hundreds of truckloads required to ship the wastewater to some distant facility compared to the impact discharge of these waters into the bay.

There is a long history of opposition to the construction and operation of the Pilgrim plant. That has not abated with shutdown of plant operations. Nor do I expect it will cease until long after the last spent cask has left the site. I believe that this opposition has become smarter, more organized, better funded and more powerful politically. In the Commonwealth this can be seen by the open opposition to anything nuclear by many elected officials up to and including the Governor. It can also be seen in the fact that the energy committee responsible for the new Commonwealth Energy Plan refuses to even include the word nuclear in any plan. However, and paradoxically, it was recently reported that our governor is looking to buy some of the output from the Millstone Nuclear Power Plant in Connecticut in order for the state to meet its green energy goals. I can sympathize with many of the opposition because they firmly believe in the bases of their opposition, but that does not make all of what they believe true.

As the regulator, you are charged with protecting the environment. That means to me your actions must also be fiscally responsible. While it is nice to think that no one in the commonwealth will pay for the substantial costs of this decision, nothing could be further from the truth. I believe with the technical resources at your disposal that you can and should reach a basis for the disposal of these waters. I would ask that you reconsider this proposed final resolution.

Cape Cod Bay

Sara Higgins[redacted]
Thu 8/31/2023 1:31 PM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,

I strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law. I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you,

Sara Higgins

[redacted]

[redacted]

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of National Marine Sanctuaries
Stellwagen Bank National Marine Sanctuary
175 Edward Foster Rd Scituate, Massachusetts 02066

August 31, 2023

Massachusetts Department of Environmental Protection
Attn: Cathy Coniaris
100 Cambridge Street Suite 900
Boston, MA 02114

Dear Ms Coniaris,

I am writing in support of the Massachusetts Department of Environmental Protection's (MassDEP's) tentative determination to deny a surface water discharge permit modification as requested by Holtec Decommissioning International LLC, for Pilgrim Nuclear Power Station (PNPS) (MA Permit No. MA0003557 issued to Holtec Pilgrim LLC). Your tentative determination to deny this permit modification is of importance to Stellwagen Bank National Marine Sanctuary (SBNMS or the sanctuary) because the discharge of nuclear wastewater in Cape Cod Bay could enter and potentially harm resources in the sanctuary. The potential impacts should be rigorously analyzed before any discharge is allowed.

SBNMS is a national marine sanctuary approximately 638 square nautical miles in area, located entirely in federal waters, at the mouth of Massachusetts Bay between Cape Ann and Cape Cod. The sanctuary is an area of high primary and secondary productivity, as well as biological diversity. It serves as critical habitat for a wide variety of marine mammals, including humpback and the highly endangered North Atlantic right whales, seabirds, fish, and invertebrates. In addition, there are a number of commercial and recreational uses that occur within the sanctuary that drive local economies, including boating, whale watching, and the highly productive commercial and recreational fishing industries.

At this time, we do not have a complete understanding of all the short and long-term impacts to sanctuary resources if this radioactive wastewater were to be discharged from PNPS. Holtec has only released data on the pre-treatment contamination concentrations of the wastewater. However, there is growing evidence that radioactive wastewater may enter the sanctuary if a permit modification were approved and radioactive wastewater discharged from PNPS. Based on the recent research by Rypina et al. (2022)[1], should radioactive wastewater be discharged from

[1] Rypina II, Macdonald A, Yoshida S, Manning JP, Gregory M, Rozen N, Buesseler K. Spreading pathways of Pilgrim Nuclear Power Station wastewater in and around Cape Cod Bay: Estimates from ocean drifter observations.

PNPS, it will enter the sanctuary (see Figure 1). Importantly, the authors note that "without knowing the exact content of the wastewater, it is not possible to predict resulting concentrations of radionuclides in the ocean water, sediments, or beaches nor their impacts on the health and safety of humans and animals."

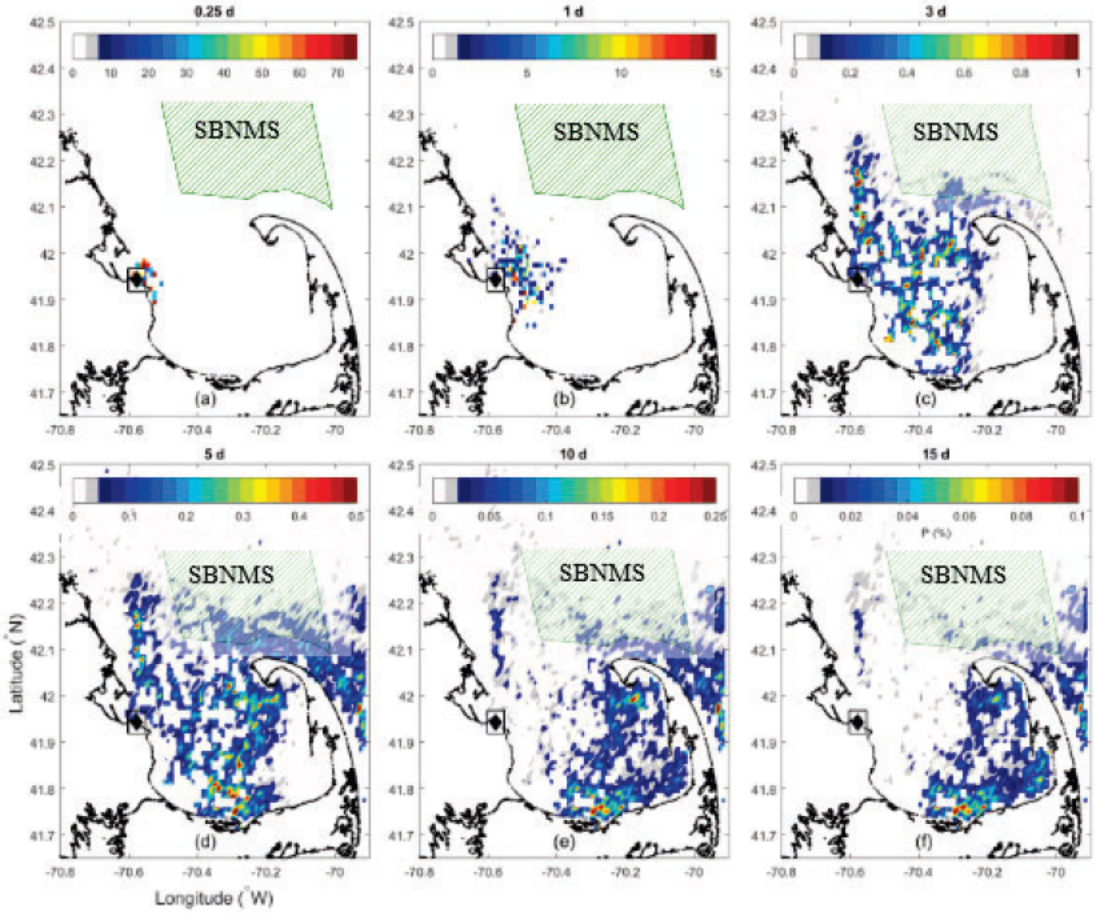


Figure 1. Evolution of the wastewater plume computed using the transit matrix approach. (a–f) Percentage (P in %) of the initial wastewater concentration per bin after 0.5, 1, 3, 5, 10, and 15 days since release. Black rectangle around PNPS (black diamond) shows the release domain (Rypina et al. 2022). *This chart was overlaid with Stellwagen Bank National Marine Sanctuary's boundaries (green hatched area).

According to a summary of an interview with Dr. Buessler, a radiochemist at Woods Hole Oceanographic Institution, the water inside PNPS is "highly contaminated and should not be released without an extensive cleanup."[2] Dr. Buessler also emphasized that not all radionuclides can be removed by treatment, and it is important to know the post-treatment contaminant levels compared with the background concentrations in Cape Cod Bay in order to determine the potential impacts on human health and the marine environment. Based on the current information

---

Journal of Environmental Radioactivity. 2022 Oct 19;255:107039. doi: 10.1016/j.jenvrad.2022.107039. Epub ahead of print. PMID: 36272273.

[2] Barnes J, Flanary, P.. 'Great concern': WHOI scientist says radiation levels are high in Pilgrim nuclear plant water. *Capeandislands.org*. 2023. https://www.capeandislands.org/local-news/2023-06-02/great-concern-whoi-scientist-says-radiation-levels-are-high-in-pilgrim-nuclear-plant-water. June 7, 2023.

provided, we are greatly concerned that we do not know all the potential impacts to sanctuary resources that may occur from the discharge of the nuclear wastewater from PNPS into Cape Cod and Massachusetts Bays, especially impacts to sanctuary resources such as the critically endangered North Atlantic Right Whales.

As the Superintendent of New England's only national marine sanctuary, I am committed to protecting its resources and habitat. I fully support your tentative determination to deny a surface water discharge permit modification to discharge nuclear wastewater into Cape Cod and Massachusetts Bays. I would encourage and support a safer, land-based means to dispose of the nuclear wastewater from PNPS.

Thank you for the opportunity to provide these written comments.

Sincerely,

Captain Peter DeCola
U.S. Coast Guard (retired)
Superintendent,
Stellwagen Bank National Marine Sanctuary

cc:

Todd Callaghan, Massachusetts Department of Coastal Zone Management
Mike Pentony, NOAA Greater Atlantic Regional Fisheries Office
Jon Hare, NOAA Northeast Fisheries Science Center
Matt Brookhart, NOAA Office of National Marine Sanctuaries
Ken Moraff, EPA
Damien Houlihan, EPA
John Lubinski, NRC
David Lew, NRC

Cape Cod Bay

Collin Campbell [redacted]
Thu 8/31/2023 1:32 PM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,

I strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law. I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you,

Collin Campbell
[redacted]

COMMUNITY ACTION WORKS

Confront polluters. Seed solutions.

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station

Dear Ms. Coniaris,

On behalf of Community Action Works, please accept our letter signed by 125 community members in support of the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

Community Action Works is a nonprofit organization that works side by side with communities who are dealing with environmental threats.

We have been working alongside a stakeholder coalition of groups called Save Our Bay MA. We have been fighting to protect Cape Cod Bay from Holtec International, the company decommissioning Plymouth's Pilgrim Nuclear Power Station, who have proposed to dump 1.1 million gallons of radioactive wastewater from the now-closed station into Cape Cod Bay.

We support Massachusetts Department of Environmental Protection's tentative determination to deny Holtec's application to dump, based on the Ocean Sanctuaries Act. That act prohibits the "dumping or discharge of commercial, municipal, domestic or industrial waste" into an Ocean sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act. The proposed discharge is therefore illegal.

We ask that MassDEP finalize this tentative determination, as Holtec's proposed plan to dump is a huge threat to the environment and public health for Massachusetts residents.

Thank you,

Leigh-Anne Cole, Milton, Director Community Action Works

Suzanne Severin, Amherst

COMMUNITY ACTION WORKS

Confront polluters. Seed solutions.

Karen Tauchman, Cambridge
Erin Haugh, Hampden
Craig Bailey, Boston
Carol Kelly, Bedford
Nancy Savage, Acton
Eric Cornetta, Hingham
Robert Dulgarian, Somerville
Jonathan Clapp, Harwich
Mark Cram, Townsend
Elizabeth Van Ranst, Cambridge
Pat Neary, Bridgewater
Toni Frances Borge, Gloucester
Paul Hartshorn, South Deerfield
Jean Martin, Cambridge
Robert Dorson, Lynn
Ailsa Hermann-Wu, Waltham
Sherry Weiland, Hudson
Carole Smudin, Bridgewater
Daniel Petrie, Arlington
David White, Mansfield
John Hess, Roslindale
Kate Hermann-Wu, Waltham
Sarah Parsons, Lynnfield
Sara Brenner, Reading
Karyl Stoia, Lynn
Judith Cooper, Lexington
Judy Walker, North Andover
Diana Raphael, South Dartmouth
George Paquin, Chelmsford
Peg Mikkola, Acton
Debra Scoon, Pelham
Marian Comenetz, Belmont
Paul Fulton, Newton Center
Mary Wendell, Milton
Matthew Agen, Bedford
Grant Ingle, Conway
Heather Fox, Wilmington
Russell Fanelli, Longmeadow
Rebecca Leiter, Newton Highlands
Libby Shaw, Watertown
Mary Barroll, Clinton
Bruce Hermann, Melrose
Stuart O'Brien, North Falmouth

COMMUNITY ACTION WORKS

Confront polluters. Seed solutions.

Jennifer Glass, Lincoln
Barbara Abraham, Leominster
Curt Johnson, Williamstown
Gabi Loeffler, Westboro
Barry De Jasu, Montague
Bryan Anthony, Scituate
Ileana Jones, Cambridge
Dennis Stein, West Roxbury
Deirdre Morris, Medford
Miriam Bronstein, Brookline
Patricia Matthews, Somerville
Teresa Stock, Needham
Miriam Leeser, Jamaica Plain
Erika DelCioppo, Somerville
John Cox, Natick
Lydia Howe, Wayland
Pamela Eagar, Belmont
Patricia Frederick, Ashburnham
Jean LaRoche-Owens, Westford
Gwynneth Centore, Norfolk
Martha Lynch, Acton
Shela Hadley, Cambridge
Kira Williams, Williamstown
Neil Miller, Newton
L Sulda, Malden
Susan Holland, Lincoln
Crystal Tiala, West Roxbury
Matthew Sirum, Greenfield
Nancy Colburn, Bedford
Gabriela Romanow, Cambridge
Jack Fultz, Lincoln
Alan Papscun, Stockbridge
Deb Stringham, Sharon
Thomas Dorsey, Belmont
Alley Stoughton, Jamaica Plain
Leanne Soylemez, Lexington
Korine Vitiello, Billerica
Suzanne Cashman, Newtonville

COMMUNITY ACTION WORKS

Confront polluters. Seed solutions.

Andrea Doukas, Brookline
Kim Welch, Charlton
Stephanie Blumenthal, Sheffield
Carol Lorente, Somerville
Richard Hassinger, Newton
Dudley Goar, Concord
Eleanor Perkins, Wellesley
Jacob Barth, Natick
Katie Maloney, Newton
Andrew Smith, Sudbury
Diana Hamill, Easthampton
Marc Laverdiere, Bellingham
Laurie Denis, Salem
Mike McCool, Millbury
Carolynn Luby, Carlisle
Jodi Ross, New Salem
Janet Petrella, Plymouth
Paul Rogati, Essex
Robert Markey, Ashfield
Andrew Costigan, Medway
Rennie Zimmerman, Belmont
Jun-Shik Whang, Cambridge
Peter Greenwald, Amherst
Nancy Smallenberger, Bedford
Martin Silberberg, Pelham
Susan Dowds, Cambridge
Ruth Rin, Burlington
Lisa Germanowski, Northampton
Al Blake, Becket
William Maurer, Falmouth
Ken Kipen, Ashfield
Laura Derr, Easthampton
Cheri Rigby, Ashland
Inge Knudson, Concord
Jonathan Kennedy, Montague
Jill Rosenkranz, West Tisbury
Susan Hosking, Medfield
So Allen, Mashpee

COMMUNITY ACTION WORKS

Confront polluters. Seed solutions.

Paul Lauenstein, Sharon
Mary McCarthy, Brighton
Rebecca Backman, Andover
Robert Garritt, Falmouth
Rebecca Moss, Natick

Additional comments from Massachusetts communities:

Eric Cornetta from Hingham, MA writes "...Discharge radioactive and chemically contaminated wastewater into Cape Cod Bay. No brainer, ...NO WAY!"

George Paquin from Chelmsford, MA writes "Allowing the dumping of any kind of wastes is just one more example of privatizing profits while socializing losses and public health hazards across the public. I implore you to have the courage to hold manufacturers responsible for the waste they generate."

Jennifer Glass from Lincoln, MA writes "It's hard to believe the decision to deny Holtec's application is even a question!"

L Sulda from Malden, MA writes "...Please do the right thing and deny Holtec's request. The Earth can't take much more destruction and we have nowhere else to go once the damage is done."

Laura Derr from Easthampton, MA writes "I know they made a gamble when they bought this old plant, hoping the decommissioning costs would be less than their purchase price, but the Earth cannot tolerate this permanent poisoning. They live on this Earth too, and they would be poisoning their own Home."

Jill Rosenkranz from West Tisbury, MA writes "This is the most outrageous request put forward. If we want to continue to live on this planet, people need to behave with reciprocity towards all forms of life (plants, waters, and all of God's creatures). Do unto others as you would have them do unto you. Placing radioactive waste of ANY amount into the beautiful Bay of Cape Cod should NEVER even be considered."

Re: Pilgrim Nuclear Power Station

J Palmer [redacted]
Thu 8/31/2023 2:49 PM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

On Sat, Aug 12, 2023 at 12:44 PM J Palmer <jpalmer0624@gmail.com> wrote:

> Cathy Coniaris
> Massachusetts Department of Environmental Protection
> 100 Cambridge Street
> Boston, MA 02114
> massdep.npdes@mass.gov
>
> Re: Pilgrim Nuclear Power Station
>
> Dear Ms. Coniaris:
>
> I am writing to support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.
>
> MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act. The proposed discharge is therefore illegal.
>
> Because Holtec's proposed discharge is illegal, the Department's final determination should deny its application.
>
> Thank you,
>
> Judith P.Cronin
> [redacted]

Re: Pilgrim Nuclear Power Station-DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

Diane Teed [redacted]

Thu 8/31/2023 2:54 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

Cc:Diane Teed [redacted]

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge St.
Boston, MA 02114

Re: Pilgrim Nuclear Power Station-DEP's Tentative Determination to Deny Holtec's Application for a Modified Permit

Dear Ms. Coniaris,

I have lived for more than 59 years of my life on the South and North Shores of Boston. I respect the ocean and waterways that have been and continue to be a gem to the people who are fortunate to live in these areas and recognize the historical and financial importance to the fishing and tourism industries. In addition, with the increasing threats of climate change our responsibility to protect the environment for current and future generations has never been more critical.

Holtec's application for a modified Surface Water Discharge Permit should be denied.

Among my reasons:

1. To my knowledge the justification for the permit and the radioactive water contents have not been peer reviewed by independent qualified experts.
Although Holtec and the NRC acknowledge that the water holds both radioactive and non-radioactive pollutants, no one has as yet identified the exact quantities or risk of each.

2. Decommissioning funds were paid by the citizens during the plant's operation. It is unfair for Holtec to push payment for required decommissioning studies onto the public ratepayers.

3. Actions not in good faith began with the transfer from Entergy to Holtec without local input. The license transfer was approved by the NRC despite opposition from Pilgrim Watch, Cape Downwinders and caution urged by the MA Attorney General (now MA Governor) Maura Healy.

4. Actions related to decommissioning require transparency not only to the NRC but more importantly to the citizens who will have to live with the consequences of Holtec's conduct.

5. If the heating and evaporation of the Pilgrim wastewater are supposedly benign as to method and impact then why did it take a whistleblower to alert the general public?

6. Most notably, MassDEP's tentative determination that Holtec's application for a modified Surface Water Discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge of commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary.
Cape Cod, Plymouth, Kingston and Duxbury Bays are all protected ocean sanctuaries. The proposed discharge is therefore illegal.

For all of the above reasons (most notably #6) the Department's final determination should deny Holtec's application.

Thank you.

Diane M. Teed
[redacted]

Holtec's proposed illegal dumping of radioactive waste water into Cape Cod Bay

Robert Emmett Cronin [redacted]

Thu 8/31/2023 2:55 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Re: Pilgrim Nuclear Power Station

Dear Ms. Coniaris:

I am writing to support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act. The proposed discharge is therefore illegal.

Because Holtec's proposed discharge is illegal, the Department's final determination should deny its application.

Thanks for your time and consideration,

Robert E. Cronin
[redacted]

To:

Cathy Coniaris
Mass Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114

Re:

Pilgrim Nuclear Power Station

From:

Diane Turco, Director
Cape Downwinders
P.O. Box 303
South Harwich, MA 02661
August 28, 2023

Dear Ms. Coniaris,

Cape Downwinders strongly supports the Mass DEP tentative determination to deny Holtec International a Surface Water Discharge permit (NPDES) because it is illegal for Holtec to discharge industrial wastewater into Cape Cod Bay under the Ocean Sanctuaries Act. The Mass DEP clearly has made the correct decision and must finalize their denial in order to uphold the law that protects our environment. We also applaud Governor Healey, who continually affirmed her opposition to the proposed illegal Holtec dumping.

We thank our elected officials at the federal, state, and local levels who have consistently supported the prohibition of discharge into our bay. Senator Markey, Senator Warren, and Representative Keating have protested Holtec's plan since inception.[1] When the federal Environmental Protection Agency [EPA] warned Holtec that their dumping was prohibited[2] and Holtec challenged that position[3], the federal delegation continued to hold Holtec accountable.[4]

After months of back and forth letters with Holtec insisting they could discharge with impunity, the EPA remained adamant in their position. It wasn't until EPA actually

---

[1] Markey, Warren, Keating Press release 1.12.22: https://www.markey.senate.gov/imo/media/doc/letter_to_holtec.pdf

[2] EPA response to Holtec: https://files.constantcontact.com/4ef44f21401/bd0a82c0-189d-4684-96af-671cf3fda027.pdf

[3]Provincetown Independent: https://provincetownindependent.org/news/2022/12/14/epa-threatens-holtec-officials-with-fines-and-imprisonment/

[4] Markey, Warren, Keating letter 11.02.22: https://www.markey.senate.gov/news/press-releases/markey-warrenkeatingurge-holtec-to-committo-complying-with-epa-regulations

threatened jail time in December 2022 that Holtec backed down. [5] [6]

Senator Susan Moran has led the state delegation to file legislation and speak out against Holtec's plan.[7] Locally, every town on Cape Cod and Martha's Vineyard along with Duxbury, Scituate, and Plymouth have voiced their support for no dumping via the ballot box or town government petition.[8] The Cape Cod Assembly of Delegates and County Commissioners have also sent notice.[9] Over 300,000 people signed a petition urging Holtec CEO Kris Singh to reconsider the plan and not dump into the bay.[10] Petitioner Ryan Collins wrote a heartfelt message directly to Singh to refrain from dumping. He never received a courtesy response. The entire community has spoken out loud and clear; all major stakeholders unanimously oppose Holtec's radioactive and chemical industrial wastewater planned discharge into our bay.

We also thank the Association to Preserve Cape Cod, the Conservation Law Foundation, Mary and Jim Lampert, and Dr. Benjamin Cronin for their supportive legal arguments.

Clearly, Holtec is bound by the **MA AGO Settlement Agreement** and must abide by state laws.[11] In addition, Holtec is exempt from federal pre-emption due to the agreement.[12]

In 2019 when Holtec came to Plymouth, they promised openness and transparency. We got neither. They promised to work with the community, then ignored our input.

Never before had Holtec decommissioned a nuclear power plant. This private corporation bought Pilgrim from Entergy for about $1,000 to profit from the ratepayers' $1.1 billion Decommissioning Trust Fund [DTF]. The monies remaining in the DTF when the site is released go into Holtec's pocket. So the incentive is a cheap, dirty, and fast decommissioning; dumping the industrial wastewater into the bay. There are other options to consider such as trucking or on-site storage but those would cut into Holtec's profit.

---

[5] EPA letter to Holtec: https://files.constantcontact.com/4ef44f21401/0e572790-cbce-496d-865d-f75a0fb72a6e.pdf

[6] EPA-Holtec: https://www.epa.gov/npdes-permits/pilgrim-nuclear-power-station

[7] Cape Delegation letter to DEP: https://files.constantcontact.com/4ef44f21401/b9f5b4e7-92df-4e64-b57f-7bdd1a450b7c.pdf

[8] Cape Cod election resolution and results: https://files.constantcontact.com/4ef44f21401/a263e4b9-adb5-4f86-b64d-e5722e83b33b.pdf https://files.constantcontact.com/4ef44f21401/28ed5389-61f1-4694-a20d-0b9743b872ac.pdf

[9] Barnstable County Government: https://www.capenews.net/regional_news/county-boards-support-massdep-denial-of-holtec-permit/article_acbd8987-729c-5af2-ad9f-645105caa56d.html

[10] change.org petition to Holtec: https://provincetownindependent.org/news/2023/04/05/fisherman-launches-petition-against-pilgrim-release/

[11] MA AGO-Holtec Settlement Agreement page 14 (l) https://www.mass.gov/doc/pilgrim-settlement-agreement/download

[12] IBID: page 29 #48

On May 22, 2022, Senator Ed Markey held a special Senate Committee on Environment and Public Works Hearing in Plymouth.[13] At that meeting via Zoom, Holtec CEO and owner Krishna Singh said, "We will not discharge any water in the Cape Cod Bay unless we have major stakeholder concurrence. We will not do that."[14] He also said Holtec would not dump contaminated water into the bay and, on the other hand, said the water was not contaminated. See the video clip here after Rep. Keating's comment: https://conta.cc/3ktQoR2 At this time, the EPA had already warned Holtec that the dumping was prohibited but Holtec insisted they could do so.

Jan. 12, 2022 Senator Markey, Senator Warren, Rep. Keating: "We write to express **our opposition to the proposed discharge of radioactive water** from Pilgrim Nuclear Power Station (Pilgrim) into Cape Cod Bay. Given the impact that the discharge of this radioactive water could have on the Cape Cod Bay community, we urge Holtec to pursue — and publicly share information about — alternative methods of disposal."

Feb. 17, 2022 EPA: "Contrary to the implication in the letter that discharges of spent fuel pool water are allowed by the EPA, **any such discharge is explicitly prohibited** by the company's Clean Water Act discharge permit, unless there are no CWA-regulated pollutants present".

May 24, 2022 HOLTEC: A radwaste discharge complies with the permit as written. The radwaste system is a comingled waste steam regulated by the NRC. Such an interpretation is **well within the plain language of the NPDES permit** and would be consistent with the MOU and past discharge practices.

June 17, 2022 EPA "In summary, **Holtec Pilgrim is not authorized under the current NPDES Permit to discharge pollutants in spent fuel pool water."**

July 7, 2022 EPA: In your letter, you state for the first time that you now believe that the **discharge of "treated" wastewater** from the spent fuel pool **"complies with" the current NPDES permit** and assert that this interpretation is **"well within the plain language of the NPDES permit and would be consistent with the MOU and past discharge practices." EPA does not agree with your position.**

November 17, 2022 HOLTEC: "We expect that all methods of water treatment will be utilized including **treated water release,** evaporation, transport for final disposition, or onsite storage."

November 28, 2022 HOLTEC: David Noyes, Holtec's senior compliance manager, said the company believes it is already legally allowed to dump the water. **When asked if there would be no discharge prior to the resolution of the permit issue, Noyes said, "I can't say that."**

December 5, 2022 EPA: "Discharges of pollutants in water stored in the spent fuel pool, dryer/separator pit, torus, or reactor cavity are **not authorized under the current NPDES permit."**

December 19,2022 HOLTEC: **All water volumes will be independently processed and then combined for a single water volume for final processing/treatment prior to discharge.**

At the July 2022 **Nuclear Decommissioning Citizens Advisory Panel**[15] meeting, Jim Lampert of Pilgrim Watch asked Holtec if they would abide by state laws and not dump. The clear answer from Senior Compliance Manager David Noyes was "NO".

---

[13] Senator Markey EPW hearing: https://www.markey.senate.gov/news/press-releases/icymi-senator-markey-secures-environmental-financial-protections-for-pilgrim-nuclear-power-plant-at-congressional-hearing-on-nuclear-plant-decommissioning

[14] Transcript US Committee on Environment and Public Works Hearing, Plymouth 5.6.22, page 132-133: https://www.markey.senate.gov/news/press-releases/icymi-senator-markey-secures-environmental-financial-protections-for-pilgrim-nuclear-power-plant-at-congressional-hearing-on-nuclear-plant-decommissioning

[15] Nuclear Decommissioning Citizens Advisory Panel site: https://www.mass.gov/orgs/nuclear-decommissioning-citizens-advisory-panel

See the video here.[16] Holtec continued to insist they could and would dump against the clear prohibition of the EPA. At the November 2022 NDCAP meeting, Noyes responded to a question by Association to Preserve Cape Cod Executive Director Andrew Gottlieb with the same answer. When asked, "And there will be no discharge prior to the resolution of the permit issue?", Noyes replied for Holtec, "I can't say that." See video here.[17]

Holtec has a history of ignoring state authority and violating laws to their advantage. The display of mendacity and malfeasance in other states is astonishing. However, Holtec corporation is meeting resistance not only here but across the US.

Here are just a few of the highlights:

In **New Jersey**, former Holtec Chief Financial Officer Kevin O'Rourke was fired when he refused to cook the books with "false and misleading statements" to project company profit. He filed a whistleblower lawsuit against Holtec owner Kris Singh and others.[18]

In **Michigan**, a request has been submitted for an investigation of Holtec for misappropriation or misuse of $44 million of the Decommissioning Trust Funds. Holtec conceived a scheme to finance the illegal restart of Palisades Nuclear Plant with funds meant for decommissioning. [19]

In **New Mexico**, Attorney General Hector Balderas filed a lawsuit citing collusion between the Nuclear Regulatory Commission [NRC] and Holtec and misrepresentation and misleading statements by Holtec as the corporation tries to build an illegal nuclear waste storage facility against strong opposition by the state and people.[20]

In **New York**, citizens fought Holtec's plan to dump radioactive wastewater into the Hudson River, drinking water for tens of thousands of people. The NY legislature passed a law that was recently signed by Governor Hochul which prohibits Holtec's planned dump.[21] Yet Holtec is "disappointed" and plans to pursue legal actions, all against the will of the people.[22]

---

[16] Video of Holtec comment to Lampert: https://vimeo.com/manage/videos/859740607

[17] Video of Noyes comment to Gottlieb: https://vimeo.com/859777617

[18] Source NM: Lawsuit claims Holtec made "false" statements on proposed New Mexico nuclear storage site July 13, 2023 https://sourcenm.com/2023/07/13/lawsuit-claims-holtec-made-false-statements-on-proposed-new-mexico-nuclear-storage-site/

[19] :https://files.constantcontact.com/4ef44f21401/22fe3ead-21d0-44e1-bee7-c164eb187c0e.pdf

[20] Complaint of former Holtec CFO Kevin O'Rouke: https://beyondnuclear.org/wp-content/uploads/2023/07/6-1-23-Complt-ORourke-v.-Holtec-1.pdf

[21] Gov. Houchel press release: https://www.governor.ny.gov/news/governor-hochul-signs-bill-protect-hudson-river-indian-point-decommissioning-wastewater

[22] NY Bans Holtec Release: https://files.constantcontact.com/4ef44f21401/2d13c0e5-6265-461a-8997-ee1649db414b.pdf

Recently, a serious **anonymous letter from a Pilgrim insider** revealed that Holtec is "forcing evaporation" of the radiological industrial wastewater.[23] Holtec can't dump in the bay so now they are using our airways as their sewer, spewing radionuclides into our neighborhoods. Tritium is even more dangerous when airborne, impacting the most vulnerable; the fetus, child, and female.[24] Holtec spokesperson Pat O'Brien said the evaporation began in December and had two purposes, one being "worker comfort".[25] However, in an email, NRC contact Neil Sheehan reports that the heaters were not installed until February/March, not December as O'Brien stated, debunking the Holtec claim the heaters are for "worker comfort". The letter writer continues that even the Plant Radiation Protection personnel are critical of the heaters and are concerned about worker and public safety. Just like the Pilgrim union workers who were locked out by Holtec, someone is at risk for telling the truth.[26] Currently, state agencies and Senator Markey's office are looking into the letter allegations.

The **Holtec Annual Financial Report to the NRC** includes information that Holtec is delaying decommissioning work and "some layoffs may occur" due to poor market return on the DTF from their sites including Oyster Creek, Indian Point, Palisades, and Pilgrim. In the report, Holtec documents, *"Funding margins are lower than HDI's year-end 2021 report due to the combined effect of poor market performance and higher than usual inflation during 2022. These economic factors are not unique to HDI. The lower market value of trust fund investments in 2022, compounded over the life of the project in the cash flow reporting format, account for the considerable majority of the reduced funding margins. HDI is taking steps to mitigate the long term effect of current market conditions by (1) deferring withdrawals of 2022 costs to avoid locking in market losses, and (2) flattening the schedule for some projects, where prudent, to defer costs until broader economic conditions return to historical norms."*[27]

While it is clear that Holtec is stopping work at the shuttered nuclear plants due to market decline, Holtec also notes the potential DEP decision in Massachusetts may be part of the delay here. This is a red herring. Holtec spokesperson Patrick O'Brien attempts to put blame on the DEP that their denial would be a reason for work delays for fours years. As WCAI reported recently, "O'Brien took the position that the permitting process has slowed economic development at the site. His statement continued: "This process has already delayed the completion of the project for an additional four years, impacted the workforce

---

[23] Anonymous letter: https://files.constantcontact.com/4ef44f21401/e0e77198-a227-4c8b-8fb5-c8324c7221b6.pdf

[24] Arjun Makhijani, Ph.D. Exploring Tritium Dangers: https://beyondnuclear.org/exploring-tritium-dangers/

[25] Evaporation of radioactive water increases at Pilgrim Station/:https://www.capeandislands.org/local-news/2023-08-23/evaporation-of-radioactive-water-increases-at-pilgrim-station

[26] Workers locked out-Provincetown Independent: https://files.constantcontact.com/4ef44f21401/2e53ed21-ddeb-4860-9a84-ba40fe613b52.pdf

[27] Holtec NRC Financial Report 2022 page 2: https://www.mass.gov/doc/holtecs-annual-decommissioning-fund-report-to-the-nrc/download

on site and further changes when the site can be returned to be an economic driver for the Plymouth Community."[28] The permit process timeline should have been no surprise to Holtec. In fact, at a NDCAP meeting, we were originally told by Holtec that the permitting would not hold up the decommissioning timeline.

Holtec still plans to dump. This DEP denial will be the first step in halting Holtec's illegal plan. We understand the EPA also needs certification from the state that all state laws were considered and applied to their permit process. DEP must not certify.
While DEP appears ready to finalize the permit denial, Holtec has made statements that they will continue pursue a federal permit through the EPA otherwise.

In the State House News, Holtec challenges the state: *"We will continue with the EPA modification process and will look to evaluate all options related to ultimate disposition of the water used in plant operations for the last 50 years," Holtec Director of Government Affairs and Communications Patrick O'Brien said Monday. "This process has already delayed the completion of the project for an additional four years, impacted the workforce on site and further changes when the site can be returned to be an economic driver for the Plymouth Community."*

"Ultimately, radiological discharges are strictly the purview of the federal government and the [Nuclear Regulatory Commission], and right now we're going through the process with the EPA to amend our permit," O'Brien said. "We anticipate it to take at least a year for that process, in addition to the state one which we've looked to amend as well. So we're going to let those play out."[29]

[28] State Agency Denies Holtec Permit Change/Legere 7.26.23: https://files.constantcontact.com/4ef44f21401/5b0ed032-58ba-4998-af0f-21539c01e8ba.pdf

[29] State House News Service: DEP Says No to Effort to Dump Nuclear Plant Waste Into Cape Cod Bay 7.24.23 https://www.statehousenews.com/email/a/20231041?key=749f613

Even up until the August 24 DEP public hearing on the permit, Holtec continued to be in opposition to their original promise.[30] At the May 2022 special Senate hearing, Holtec CEO Kris Singh said he would only dump if stakeholders agreed to the plan. How many ways can we say NO? Holtec must now abide by state law-clearly illegal and no pre-emption- and eliminate discharging Pilgrim's industrial wastewater into Cape Cod Bay as their disposal plan.

Until then, given the history of this unethical and predatory corporation, we must remain vigilant.

As Cape Downwinders joins the global outrage as the Fukushima radioactive wastewater is being dumped into the Pacific, we are resolved that the decommissioning by Holtec must not contaminate our environment. We therefore urge the DEP to make a final determination to deny Holtec's application for a modified NPDES permit.

We greatly appreciate your service to our beautiful Commonwealth. Thank you for upholding the law and protecting our communities and Cape Cod Bay.

Diane Turco, Director
Cape Downwinders
Save Our Bay MA coalition

[30] Boston Globe, Damiano Activists criticize evaporation: https://files.constantcontact.com/4ef44f21401/538819d4-5da2-447d-b619-d8bc3da56cea.pdf

Holtec's illegal activity

Florence Gregg [redacted]
Thu 8/31/2023 3:23 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Thank you for halting Holtec's plan to discharge radioactive waste into cape cod bay. Our lives and the lives of future generations will be affected. This poison doesn't go away and someone needs to stop the big corporations from making obscene amounts of money at the public's expense.

Florence Gregg
[redacted]

Discharge of Water from the Pilgrim Nuclear Plant into Cape Cod Bay

Jim [redacted]

Thu 8/31/2023 3:27 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Hello Commissioner Heiple,

I strongly agree with the Department of Environmental Protection's (DEP) draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay.

DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law. I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Not only could the discharge of this water be devastating to the environment, there could also be economic damage.

As we've seen from the recent Fukushima discharge decision, there could be significant economic damage if various organizations and people shun shellfish and finned fish caught or harvested in the Cape Cod area. Cape Cod Bay is home to several small-scale shellfish farms. If they lose their markets, then they'll go out of business. Not only is this bad for the famers and their families, we'd also loose the environmental benefits the farms provide in terms of contaminant filtering.

The Cape Cod, Southeast Massachusetts, and, in general, the Massachusetts tourist economies could also be adversely impacted if people decide it is too dangerous to swim in the waters of, or consume any product from, Cape Cod Bay.

Thank you for your time.

Regards,
James O'Rourke
[redacted]

Cathy Coniaris
Massachusetts Department of Environmental Protection
100 Cambridge Street
Boston, MA 02114
massdep.npdes@mass.gov

Re: Pilgrim Nuclear Power Station

Dear Ms. Coniaris,

I am submitting this joint testimony signed by residents across Massachusetts and on behalf of Save Our Bay MA, a stakeholder coalition of conservation groups, industry groups, local leaders, and concerned citizens organized around a single goal: stopping Holtec and/or any of its subsidiaries from releasing or discarding any materials from the closed Pilgrim Nuclear Power Station into Cape Cod Bay or any nearby water source or drainage systems.

We, the undersigned 1,472 residents of Massachusetts, support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under the act. The Department's final determination should deny its application.

Thank you,

Max Haworth,
Community Organizer and Member with Save Our Bay MA

Philip Messier, Sharon
Gloria Grace, Belchertown
Alan Crandon, Duxbury
Christine Nelson, Sterling

Carey Laliberte, Acton
Michael Desario, Boston
Emily Fritz Endres, Cambridge
Lionel Zupan, West Newbury
Thomas Fortini, Springfield
Michelle Dodge, Belchertown
Darrin Fitzgerald, Hingham
Danna Fortunato, Jamaica Plain
James Sefton, Shrewsbury
Todd Cronan, Winchester
Judy Chalmers, Orleans
Daniel Totten,Cambridge
Martha Frahm, Winchester
Alex Hassinger, Concord
Erica Schuling, Swampscott
Susan Stathoplos, Newton
Stover Mardis, Concord
Lauren Balest , South Hamilton
Miriam Blankenship, Waban
Jack Peterson,Scituate
Juliana Brinkley, Brookline
Adrienne Paquin, Hull
Blair Brown, Newburyport
Gregory Clute, Concord
Diane Heart, Brewster
Linda Orlando, East Walpole
Catherine Crow, Ashland
Katherine Kratt, Sturbridge
Karen Tysver, Rockport
Maggie Galloway, Groton
Aleida Inglis, Cambridge
Robert Cain, Holden
Nancy Leblanc, Vineyard Haven
Rachel Either Rosenbaum, Auburndale
Rj Darabant, Lexington
Gina Steele, Scituate

Emily Lombardo, Carver
Jessica Paiva, Wakefield
Bruce Scofield, Amherst
Rand Barthel, Mendon
Fredericka Veikley, Boton
Karen Wright, Stow
Victoria Walker-Sperling, Jamaica Plain
Rosie Heidkamp, Wendell
Mary McKitrick, Florence
Kathy Bell, Hull
Rochard Jewdrysik, Salem
April Foster, Brookline
Mike King, Sheffield
Robert Rand, Pepperell
Lynne Glazer, Framingham
Sam White, Boston
Laura Kiesel, Arlington
Suzanne Martin, Abington
Hindell Grossman, Brookline
Virginia Grew, Wellesley
Janel Showalter, Lexington
Kate Conroy, Natick
Susan Chase, Newburyport
Christina Fluet, Newburyport
Richard Saulnier, Groveland
Laura Welch Marstons, Mills
Michael Basmajian, Somerville
Amanda Von Rumohr, Lexington
Virginia Palazzo, Wellfleet
Tim Blancke, Concord
Kathy Spragoe, Dalton
George Leblanc, Wendell
Gail Bird, Nahant
Dorothy Stoops, Wayland
Suzanne Buchanan, Hingham
Alex Andriata, Cambridge

Claire Gosselin, Roslindale
John Marsh Sr, Lynnfield
Nicolas Roth, Cambridge
Christy Cullen, Westborough
Gayle Kolodziej, Southampton
Renee Sylvestre, Belchertown
Alla Powers, Brookline
Noah Slovin, Somerville
Lynne Boudreau, Newton Highlands
Joseph Dougherty, Charlestown
Rachel Wencek, Quincy
Violet Walker , Greenfield
Albert Wolff, Concord
Daniel Holbrook, Newburyport
Stephanie Smoot, Concord
Eileen Garvin, Hingham
David Maclean, Newton
Jackie Senior, Somerville
Patricia Mele, Newburyport
William Madden, Swampscott
Paul Stodulski, Grafton
Anson John-Thomas, Wellesley
Jeffrey Dishman, Arlington
Jennifer Turner, North Easton
Kylie Lorenzo, Newbury
Barbara Quinn, Newton Center
Tina Terry, Acton
Stu Bailey, Bedford
Robin Rhoades, Newburyport
Charles Evan, Newton
Meredith Suzuki, Belmont
Jana Marotta, Belmont
Mia Smith, Bedford
Marilyn Patnode, Deerfield
Lorraine Barrack, Williamsburg
Marisa Kelso, Belmont

Yongzhi Zhang, Wayland
Ann Harter, Newburyport
Benjamin Barone, Newburyport
Catharine Uyenoyama, Milton
Jessie Klitus Flaim, Brighton
Katherine Schmeckpeper, Marblehead
Wen Yang, Andover
Kristine McMillan, Belmont
Erin Anderson, Marblehead
Paul Quain, Newton
Patrick Collins, Somerville
Aji Sjamsu, Somerville
David Parada, Brookline
Sophia Mello, Brookline
Lauri Murphy, Watertown
Aaron McPherson, Boston
Molly Macgregor, South Chatham
Clarissa Rodriguez, Arlington
Ellen Burton, Granville
Janice Frye, Belmont
Nancy Connor, Wellesley
Bill Wilson, South Dartmouth
Mustafa Firik, Concord
Nathan Albert, Hull
Don Trisler, Cohasset
Thomas Hochard, Provincetown
Leah Dawley, Swampscott
Paulette Johnson, Great Barrington
Susan Kaput, Dartmouth
Nan Stromberg, Jamaica Plain
Jeremiah M. Potts, Medfield
Rose Hausman, Peabody
Eric H. Ferguson, Weston
Ellen Frye, Chesterfield
Stephen Chase, Upton
Sid Sibley, Dorchester

Susan Burritt, Easthampton
Joan Angelosanto, Melrose
Jonathan Leitner, Shelburne Falls
Ann McLaughlin, Amherst
Majorie Montero, Jamaica Plain
Ann Marie Ruotolo, Danvers
Aaron Piziali, Florence
Joseph Kurland, Colrain
Brendan Barry, Somerville
Laura Vance, Gloucester
Tyne Cavanagh, Rockport
Parker King, Wellesley Hills
Connie Saems, Cambridge
Paul Blomerth, Wilbraham
Ken Baltin, Needham
Janet Collett, Belmont
Brian Dawson, Arlington
Kevin Nessman, Maynard
Cynthia Piltch, Lexington
Joseph Mello, Gloucester
Audrey Loria, Plymouth
Deanna Haas, Granby
Kate Domas, Woburn
Jed Lenon, Boston
Katherine Mills, Holden
Tatyana, Swampscott
Audrey Greene, South Hadley
Helen Thomas, Needham
Laura Lambaiase, Jamaica Plain
Larry Todisco, Maynard
Susanne Squire, Watertown
Edward Stahl, Chilmark
Michael Pallone, Winchester
June Davenport, Princeton
Arielle Schwalm, Cambridge
Seneca Francione, Jamaica Plain

Leslie Fedge, Brewster
Margaret Rawson, Groveland
Aniela Jakubowski, Brookline
Jessica Lutz, Woburn
Susan Piaggio-Okeefe, Salem
Sheila Lafarge, Bedford
Valerie Miller, Newton
Rihard Kangas, Bourne
Elaine Hansen, Foxborough
Karen Sargent, Westminster
Matthew Schreiner, Cambridge
Claire Doyle, Hopkinton
Marcia Sexton, S. Wellfleet
Ethan Contini-Field, Somerville
Candace Barone, Hull
Elizabeth Gilman, Revere
Richard Langley, Brookline
Shanti Cooper, Concord
Bob Howland, Scituate
John Hopkins, Wakefield
Douglas Sacra, Wayland
Glenn Somers, Gloucester
Judy Dufour, Auburn
Nancy Irwin, Needham
Patrick Iannoli, Leeds
Phyllis Cohen, Wayland
Stacey Clark, Harwich
Jialin Su, Longmeadow
Joshua Korzenik, Waban
Mary Ellen Goodrow, Wilbraham
Sandra Mayo, Northfield
Jenene Cook, Dorchester
Sybylla Smith, Cambridge
Richard Kettyle, Duxbury
Tracey Lea Dorgan, Quincy
Megan McCullough, Acton

Kathleen Leavey, Arlington
Randi Shenkman, Belchertown
Paul Wainwright, Pittsfield
Cynthia Ann Nasiatka, Andover
Anthony Mariano, Carlisle
James Zimmerman, Provincetown
Clarice Mushlin, Brookline
Shelly Martin, Hingham
Isabela Smirne, Salem
Dorthy Bulridge, Newton
Tylor Hamel, Whitinsville
Anthony Campenni, West Newton
Saba Mostafavi, Watertown
Nancy Athridye, Wakefield
Elena Proakis, Wakefield
Dorothy Filanowska, Washington
Marcy Leblanc, Harwich
Richard Russell, Chelmsford
Annette Wells, Medfield
Jody Newman, Nantucket
Peter Cook, Provincetown
Gennady Agranovich, Needham
Marcy Rizzo, West Newton
Bruce Walton, Needham
Eliot Moss, Amherst
Judith Weeks, Concord
Janis Carreiro, Nantucket
Louie Avila, East Taunton
Patricia Lee, Newton
Jamie Davenport, Scituate
Beth Nast, Boston
John Farrell-Clancy, Canton
Jeffrey Dwoskin, Somerville
Vera Dos Santos, West Tisbury
Edward Madolny, Sandwich
Paul Densmore, Cambridge

David Southwick, Haydenville
Richard Barran, Cambridge
Melissa Regan, Springfield
Craig Mannett, Brockton
Deirdre Rynne, Brookline
Michael Downey, Natick
E R St.Germain, Ashland
Josh Dolby, Watertown
Kimberly Wass, Cambridge
Phoebe Chatfield, Lincoln
Matthew Albert, Pittsfield
David Mooney, Wellesley
Amy Alpert, Becket
Kandace Carlin, Belchertown
Eric Weber, Williamsburg
Bryan Khan, Wellesley Hills
Dongwei Zhu, Lexington
Celeste Laulen, Amherst
Adele Mathieu, Brookline
Sheila Spalding, Newburyport
Lisa Cohen, Newtonville
Mary Ward, Newtonville
Linda Velde, South Hamilton
Joseph Gavin, North Reading
Phillip Moreau, Dalton
Derek Chu, Brighton
George Hutt, Hingham
Laura Elvins, Littleton
Scott Gallant, Gardner
Lisa Templeton, Gloucester
Nancy Hite, Somerville
Sean Mooney, Dennis
Kim Richards, Newburyport
Hareena Harindra, Acton
Walter Lewis, Winchester
Kathryn Runyan, Belchertown

Francis Cunningham, Nantucket
Margot Phillips, Wellesley
Mary Sacksteder, Worcester
Richard E. Caliri, Arlington
Virginia Bonnici, Shrewsbury
Ruth F P Brazier, North Falmouth
Dana Keeth, Belmont
Rajiv Bhatnagar, Acton
Anke Kreisher, Bedford
Alicia Morency, Danvers
Alexsandria Watts, Springfield
Jane Forest, Wilmington
Mary Whelan, Attleboro
Donna Lanza, Leominster
Joan Christopher, Orleans
Ronald Huppi, Winchester
Kaja Savasta, Swampscott
John S. Bowden, Beverly
Catherine Van Praagh, Bedford
Stephen Jamieson, Scituate
Janice Pelosi, North Truro
Kimberly Barzola, Salem
Leanne Ungar, Newton
Kimberly Jackson, Newton Center
Robert Templeton, Longmeadow
Daniel Schleifer, Chestnut Hill
Christopher Skillin, Milton
Lorance Cooper, Marlborough
Meaghan Albert, Lanesborough
Francis Gallo, Williamsburg
Alfred Karlson, Amherst
Rachel Canfield, Medford
Patrick Burke, Humarock
Lucille Sliker, Marblehead
Alicia McNamara, Marblehead
Robert Matorin, Chestnut Hill

Barbara and Charles Bliss, Cohasset
Nancy Lannom, Waltham
Alexander Peebles-Capin, Brookline
Robert Poudrier, Florence
Brooke Welch, Newburyport
Karen Zieff, Marblehead
Allison Richardson, Maynard
Martine Gantrel-Ford, Northampton
John Spears, Boston
Nicola Blake, Vineyard Haven
Jane Laforce, Manchaug
Peter Lowitt, Concord
Lisbeth Farnum, Winchester
Frank Stiebel, Florence
Cynthia Pyle, South Hadley
Lori Yurgelun, Newton
Tamari Campbell, Amherst
Sandra Diener, Cambridge
Diane Boover, Worcester
Theresa Swist, South Deerfield
Carly Manion, Concord
Ping Li, Winchester
James Lane, Needham
Nathalie Gassenbach, Winchester
Kelly Gorman, Leverett
Andrew Swanson, Quincy
Shannon Curtis, Winchester
Nathaniel Price, Cambridge
Donna McKenna, Hopkinton
Shannon Robinson, Burlington
Gregory Beatrice, Marblehead
Oliver Wolf, Arlington
Jesse Robertson-Dubois, Northfield
Katherine Picard, Bedford
Emily Wood, Wellesley
Kathleen Curley, Hingham

Richard Elliott, Hingham
Kristen Ortyl, South Hadley
John Crowley, Scituate
Peter Viris, Newton
Debra Fusia, Hadley
Diane Pierce, Wellesley
Mary Russo, Wellesley
Dan Brault, Lancaster
Bridget Allison, Maynard
Gloria Healy, Holyoke
Marcia Hobster, Mansfield
Chris Barth, Sudberry
Sean Hurley, Boston
Migdali Rivera-Lorenzo, Boston
Michael Medina, Medfield
Erik Peckar, West Tisbury
Karen Paton, Sherborn
Corey Hess-Mahan, West Newton
David Cabot, Cambridge
Ashima Agarwal, Brookline
Hanna Baranchuk, Cambridge
Maisam Dadgar-Kiani, Cambridge
Joseph Connell, Williamsburg
Valerie Natoli , Newburyport
Linda Bobe, Huntington
Noreen Martin, Shelburne Falls
Camron Nazor, Great Barrington
Rhonda Newman, Hadley
Andrew Ayres, Hadley
Don Ackerman, Norwood
Beth Rothschild, Wayland
Tyler Marcet, Stoneham
Marybeth Lavoie, Hopkinton
Cuan Coulter, Gloucester
Amin Feizpour, Newton
Daniel Proulx , Marblehead

Donna Ashworth, Belchertown
Eve Spencer, Lexington
Kimberly Nestor, Marblehead
Michael Conoby, Acton
Brenda Oconnor, Scituate
Ross Weisman, Holliston
Eleanor Wilson, Vineyard Haven
Anne Lutz, Westminster
Douglas Plympton, Westwood
Ayelet Geri, Brookline
Susan English, Wellesley
Keeghan Obrien, Tyngsboro
Megan Postal,Cambridge
Karina Gordin, Wayland
Celeste Kracke, Reading
Marc Joseph, West Newton
Tara Freeman, Concord
Kate Paradis, Pelham
Husam Fayez, Acton
Sheila Delehanty, Amesbury
Bhaswati Ghosh, Newton
Robert Benson, Swampscott
Inger Bergom, Arlington
David Singer, Swampscott
Jonathan Ambrosino, Arlington
Kathleen Marcos, Belmont
Cassidy Buchanangauthier, Greenfield
Michael Rodriguez, Belmont
Diane Curran,Marblehead
Jacob Albanese, Belmont
Keith Fernlund, Salisbury
Joel Altstein, Cambridge
Lauren Bavuso, Natick
Isabel Ryavec , Pelham
Kristen Grossman, Hingham
Gregg Ferreira, Cohasset

Jodi Elliott, Hull
Roseanne Cody, Gloucester
Matthew Bilbo, Duxbury
Kaci Ruh, Easthampton
Elizabeth Wheeler, Amherst
Walburga Silva, Bedford
Deborah, Brookline
Michael Minahan, Chestnut Hill
Jill Bouchard, Newburyport
Catherine Murphy, Newton Upper Falls
Rachel Ferullo, Medfield
Ingrid Johnston, Belmont
Emily Klotz, West Roxbury
Bob Chebator, Arlington
Mary Birnbaum, Jamaica Plain
Francis Dibella, Boston
Nicole Dambrosio, Lynn
Leonard Norton, Littleton
Geoffrey Stuart, Milton
Will Duggan, Concord
Samuel E. Demerit, Cambridge
Ronald Kalin, Cambridge
Janet Randall, Cambridge
Deborah Sheehan, Newton
Alice Wood, Newtonville
Rosanna Babbage, Cambridge
David Ouellette, East Freetown
Seema Madgaonkar, Lexington
Kristen Cottreau, North Reading
Wendy Moran, Jamaica Plain
Rachel Horn, Roxbury
John Rich, Brookline
Alexander Arlos, Cambridge
Aaron Fleishman, Malden
Steven Hopengarten, Wellesley
Juliannaa Young, Newton

Donald Polcaro, Medford
Treesa Zachariah, Acton
Dina Stroopinsky, Newton
Kimberly Haley, Hingham
Margaret Eklind, Essex
Carol Ann Hartwell, Newburyport
James Hood, Hardwick
Paul Trayers, Scituate
Ethan Young, Arlington
Kim Browne, W Springfield
Taylor Stokes-Roller, Wellesley
Laurent Brabo, Belmont
Justin Gaumond, Rutland
Peter Wyatt, Newburyport
Cynthia Macbain, Southampton
Paul McNeeley, Natick
Lori Clark, Newburyport
George Georges, Lincoln
Jill Tomasello, Acton
Chloe Koval, Concord
David Lis, Concord
Kara Melisurgo, Northampton
Michael Proscia, Swampscott
Nicole Schneider, Swampscott
Jacob Fong, Wayland
Robert Minetti, Natick
Ihsan Speede, Wellesley
George Crownover, Winchester
Christina Taylor, Cambridge
Thomas Wasson, Wellesley Hills
Lawrence Quinn, Natick
Diana Pineau, Upton
Gloria Jemery, Salem
Conrad Casarjian, Everett
Shane Medeiros, Medfield
Emily Myron, Arlington

Melvin Downes, Cambridge
John Taranto, Natick
Donny Hearn, Amherst
Farouk Donor, Marblehead
Nicole Robillard, Cambridge
Susan Coffill, Newton
Thomas Biggins, Sudbury
Joshua Trask, Lexington
John Reine, East Falmouth
Taylor Barstow, Cambridge
Tim Dupuis, Florence
Jeffrey Laplante, South Hadley
Nathaniel Adamian, Cambridge
Alexi Vrouvlianis, Newton
Kristine St. Jean, Salisbury
Sophie Samdperil, Boston
Roosevelt Segura, Belmont
Drusilla Slattery, Marblehead
Nicole Hildreth, Marblehead
Don Swanson ,South Easton
Catherine Horan, Watertown
Naeem Charles, Hyde Park
Mollie Vanhorn, Auburndale
Robert Mulligan, Medford
Nancy Schiff, Brighton
Robert Penta, Medford
Barry Ehrlich, Newton
Steven Grossman, Newton
Mary Gill, Shrewsbury
Barry Bergman, Newton
Julie Frohlich, Arlington
Sarah Lamstein Newton
Guntram Mueller, Newton Center
Franelise Mermelstein, Newton
Sandra Klich, Southampton
Navid Madani, West Newton

Jeremiah Jordan, Somerville
Phyllis Pagano, West Newton
Glenn Koenig, Maynard
Mary Stec, Quincy
Peter Villa, Brookline
John Mulliken, Brookline
Paul Yang, Brookline
Kathryne Martin, Watertown
Nate Durning, Haydenville
Amanda Halstead, Marshfield
Kristi Marshall, Marion
Karen Patalano, Boylston
Hillary Teran, Harwich
Amy M, Somerville
Toria Harr, East Taunton
Maryann Palchak, South Hadley
Joan Loewenberg, Bedford
Paul Orszulak, Ware
Kendall Sisson, Cheshire
Nathan Gibson, Newton
Joe Viola, Boston
Joanne Massaro, Cotuit
Lynn Carlson, East Dennis
Anita Feins, Boston
John Rokosz, Belmont
Daniel Uribe, Amherst
Chery Hanley, Watertown
Ruth Romberg, Milton
Mary Ryan, Milton
Elizabeth Pontius, Wellfleet
Robert Plaskon, North Weymouth
Thomas Jarvis, Needham
Rhonda Meisel, Canton
Susan Feuer, Sheffield
Warren Goldstein, Somerville
Sonya McKnight, Newton Highlands

Susan Goldscheid, Newton Highlands
Gene Kalb, Bedford
Patricia McNally, Princeton
Karin Gavish, Boston
Ross Williams, Belmont
Maggie Ohanlon, Milton
Laura Iulvestad, Boston
Shane Lafond, Boston
Liesje Quinto,Sudbury
Richard Griffin, Salem
Rhys Hogue-Rodley, Cambridge
Namishu Patel, Medfield
Bill Davis, Medfield
Joel Walker, Scituate
Yamiley Cayemitte, Concord
Declan Keefe,Concord
Katie Burke, Swampscott
Cecile Carpentier, Swansea
Pooja Kumaravel, Lexington
Mekhi Taylor, Winchester
S Grant Richards, Kingston
Kurt Landry, Andover
Edward Fuller, Ashfield
James Kamitses, Wellesley Hills
Frank Fleisher, Newburyport
Stephen Smith, Newburyport
Joan Gonsalves, South Yarmouth
Lorraine Pantano, Winchester
Kathleen Massey, West Bridgewater
Lisa Zeidenberg, Belmont
Divyanka Kapoor, Cambridge
Leah Dreyfus,Newton
Phoebe Fallon, Roslindale
Catie Fledderjohn, Concord
Gwendolyn Hanrahan, Wayland
Teddy Jiganti, Concord

Leo Weisberger, Wayland
Beatrice Brunkhorst, Bedford
Maureen Mulhern, Westford
Gavin Sherman, Dorchester
Chris Mountain, Littleton
Donna Powell, Westford
Anna Dos Santos, Falmouth
Anna Beltramini, Somerville
Chris Tatnall, Lexington
John Peter, Malden
Todd Harrison, Cambridge
Catherine Coloney, Stoneham
Greg Bodrie, Sagamore
Gregg Massard, Mashpee
Sara Beck, Topsfield
Bob Clesby, Brewster
Nancy Walker, Brewster
Barbera Uhl, Orleans
Deborah Tsoleridis, Centerville
George Jackson, Barnstable
Allen Guiel, Williamsburg
Susan Makowski, Dennis
Kerry Meehan, Easthampton
Amy Meltzer, Cambridge
Alice Cyr, Wilbraham
Jon W. Mc Ewan, Westfield
Walter Dzik, Brookline
Robert Lawrence, Brookline
David Connelly, Milton
Julie Conroy, South Yarmouth
Jay Devin, Hingham
Kid & Kaboodle Attn Cathy, Orleans
Diane Hanscom, Andover
Alan Mond, Belmont
Peter Karalekas Sr., Ludlow
Roseanne Jardin, Assonet

Ernest Mc Imes, Fitchburg
Maria Leonardo, Somerset
John Sampieri, North Dartmouth
Susan King, Acton
Carole Dupont, Springfield
Harvey Mace, Seekonk
Bernhard Metzger, Newton Highlands
Barbara Hill, Stow
Jay Glushien, Longmeadow
Michelle Millerd, Cohasset
Susie Nacco, Medford
Samantha Seguins, Nahant
Craig Lockwood, Winchester
Sherry Bissell, Greenfield
Suzanne Whitehead, Rochester
Dianne Sampson, Gloucester
Margaret Cororal, Gloucester
Emma Weiler , Cambridge
Donald Graham, Hanover
Joreen White, Rockport
John Rumpler, Brookline
Julie Schlack, Northampton
Gale Monk, Vineyard Haven
Denise Capto, Springfield
Vincent Rumasuglia, Malden
Karen Gerard, Weston
Regina Hajjar, Dennis
Pasquale Caruso, West Newton
Maureen Pompeo, Nahant
Peter Velz, S. Lancaster
Sandra Lawrence, Gloucester
Thomas Henderson, Cambridge
Hilary Beadell, Stockbridge
Scott Mortimer, Newburyport
Donna Bizarro, Belchertown
Cindy Ryan, Concord

Gary Hendren, Chestnut Hill
Anna Dicecca, Somerville
Pete Boolos, Somerville
William Cole, Lexington
James Maxwell, Winchester
Ann Hablanian, Watertown
Tad Sudnick, Medford
Martha Singer, Cambridge
Michele Cutting, Amherst
Marta Vasquez, Brookline
Maria Rota, Milton
Lauren Ellis, Revere
Laurie Nehring, Ayer
Mary Taddeo, South Yarmouth
Joanne Demetra, Rockport
Doris Feldman, Brookline
Paul Newman, Lakeville
Carl Salmons-Perez, Ipswich
David Schochet, Shelburne Falls
Craig Carvier, Westfield
Michael Punzak, Cambridge
John Mongell North Andover
Jana Kiely, Cambridge
Ken Cossingham, North Andover
Rhonda Wainshilbaum, Leyden
Bruce Jacobs, Brookline
Janice Goodell, Falmouth
Hermine Bogin, Gloucester
Paul Collins, Southborough
Barbara Hirsh, Cambridge
Heleni Thayre, Brookline
Todd Leclaire, South Weymouth
Paul M. Rahilly, Melrose
Gita Manaktala, Cambridge
Patricia Labendz, North Adams
Jean Martin, Greenfield

Gary Winitzer, Royalston
Tony Nardella, Medford
Alex Halsey, Weymouth
Richard Kean, Plymouth
Richard Nicholson, Princeton
Kathleen Geagan, Brewster
Desolier, Gardner
Karen Oakley, Somerville
Terra Samuels, Marblehead
Carrie Fraga, Waltham
William Carlson, South Wellfleet
Marjorie Candiano, Huntington
Ernest Jordan Lenox, Dale
Jeff Bellas, Orleans
Donald Keller, Auburn
Judith Wiseman, Marstons Mills
Eric Corp, Amherst
Carol Abbot, Milford
Suzanne Bach, Lenox
Beverly Brooks, Peabody
Jane Malick, Ashland
Ann Andelman, Burlington
Nelly Jansa-C, Randolph
Greg Stewart, Maynard
Gina Mesick, Fiskdale
Sheila Katz, Belmont
Nancy Syverson, Falmouth
Karen Nastuk, Danvers
Juliet Cunningham, Hyde Park
Molly Hamill,Boston
Gerald Horne,Stow
Christopher Nephew, Winchester
Mark Yasewicz, Salem
Daniel Bouchard, Arlington
Christine A. Binger, Sterling
Nicole Fontaine, Salem

Ilene Cohen, Salem
Ray Lewis, Ipswich
Ann Grassetti, Gloucester
William Howland, Pembroke
Rosalie Anders, Cambridge
Majic Potsaid Vineyard, Haven
Suzanne Benfield, Ipswich
Matthew Moore, Jamaica Plain
Josh Nichols-barrer, Cambridge
Jan Gilpin, Newton
Paul Holt, Newton Highlands
Dawn Barrett, Waban
Jenifer La, Quincy
Nancy Dankert, Andover
Jean Stevenson, Weymouth
Joseph Jurgelonis, Millbury
Ellen Thompson, West Newton
Kathleen Johnstone, Boston
Cynthia Boettner, Shelburne Falls
Elizabeth Weiss, Sudbury
Howard Beale Jr, Northborough
Judy Gillis, Hanover
Maribeth Fisher, Worcester
Nancy Geitz, South Hadley
Sheri Caseau, Vineyard Haven
Niamh Kelly, Wayland
Matt Muro, Scituate
Rachel Pitarri, Medford
Jason Nichol, Topsfield
Roz Brezenoff, Auburndale
John Carey, Amherst
Adell Rawson, Falmouth
Kara McKenna, Stow
Mary OBoyle, Southwick
Alison Leary, Newton
Kathleen Shcotmann, Falmouth

James Zimmerman, Chester
Paul Brunelle, Westford
Margaret Dasha, Needham
Judy Suriner, Cummington
Cynthia Kuhn, Medford
Debra Gass, Bernardston
Garrett Scheck, Somerville
Dana Goold, Boxford
Jason Shields, Sudbury
Debbie Frechette, Northfield
Nina Greenwald, Barnstable
Antonio Barros, Cambridge
Margo Ball, Needham Heights
David Eastzer, Lenox
Heather Grossman, Auburn
Mary Ann Powers, Cambridge
Carla Szymanski, Boylston
Gloria G. McMemiaren, Lexington
Andrea Masiello, Belmont
Eliza Jones, Concord
Alison Landoni, Rockport
Mary Abigail Peck, Roslindale
Joan Lerner, Hingham
Josh Selby, Jamaica Plain
Edith Hunsberger, Shutesbury
Mary Packard, Worcester
Ross Kobidoux, Brimfield
Florence Mahoney, Wellesley
Beatrice Tegria, Brighton
John Ruffing Jr, Lexington
Gail Freeman, Arlington
Micheal Mahoney, Quincy
Jackie Horne, Cambridge
Ruth Marsh, Truro
Katherine Fite, Hadley
Martin Browne, Newton Center

Susan Nulsen, Cambridge
Cathy Campaigne, Cambridge
Erin Hull, Boston
Louisa Stephens, Somerville
Julia Green, Watertown
Susan Saunders, Melrose
Thomas Ghazil, Ludlow
Jay Levy, Amherst
Len Reno, Yarmouth Port
Biju Nair, Lexington
Carlene Wallace, Dorchestr Ctr
Ruth Osgood, Plainfield
Laurie McDardy, Lee
Carl Kaplan, Winchester
Sara Amaral, Cambridge
Michael Reidy, Cambridge
Greg Smith, Roslindale
Nathan Proctor, Arlington
Arlene Marshall, Northborough
Tim Horan, Marshfield
Fabiana Tzizik, Andover
Sallie Marini, Natick
Cassie Foley, Harwich
Mark Friery, Newburyport
Amber OShea, Nahant
Graham Higgins, North Andover
Shavahn Best, Shutesbury
Feng Chen, Belmont
Michael Cadogali, Belmont
Mary White, Somerville
Christy Lawrence, Belmont
Camille Catone, Wakefield
Laura Rodgers, Burlington
Philip Tracey, Brighton
Shirly Oren, Cambridge
Vincent Coutaino, South Easton

Jeffrey Turner, Pittsfield
Eliandra Lima, Somerville
Bridget Rodrigue, Concord
Anne Muola, Stoneham
Susan Fontaine, Duxbury
Michiko Keefe, Concord
Ramon Bred, Jamaica Plain
Marcelo Da Luz, Saugus
Audrey Mariner, Brighton
Nicholas Vincent Butt, Lynn
Tony Saizon, Acton
Thomas Broom, Jamaica Plain
Emily Mathis, West Newton
Kristen Black, Marblehead
Anne Marie Edenhofner, Lexington
Grethe Reddick, North Easton
Priscilla Wass, Watertown
S. Jordan, Salem
Sarah Barowski, Bedford
Karen Lostracco, Marblehead
Linda Menkis , Arlington
Edward Crowley, Salem
Mark Zaccheo, Greenfield
Mary Demattio, Hingham
Cindy Duma, Methuen
Kelly Wennik, Sudbury
Richard Margil, Sharon
Emily Smith Lee, Sharon
Marie Doyle, Buzzard Bay
Chris Skroski, South Deerfield
Richard Hannon, Turners Falls
Donna Larivee, Framingham
Adam Sacks, Cambridge
Scott Taylor, South Hadley
Robert Pierce, Newton Upper Falls
Donna Laemmle, Dennis

Richard Albert, Vineyard Haven
Donald Crowley, Vineyard Haven
Kathleen Wolf, Arlington
James Tasker, Sudbury
Yan Lei, Melrose
Dub Fraize, Cambridge
Mary Fairbanks, Hingham
Steve Shirk, Pepperell
Madeleine Charney, Amherst
Paula Hite, Amherst
Kristina Watkins, Harvard
Elizabeth Smith, Williamstown
Betty Freedman, Framingham
Randi Soltysiak, Somerville
Christoph Maywald, Weymouth
Lawrence Bourdeau, Haverhill
Janet Norris, Ashby
Patrick Heaney, Harwich
Karen Bishop, Three Rivers
Deborah Tapp, South Hadley
Brett Figliozzi, East Walpole
Rebecca Libby, East Bridgewater
Alisan Pomeroy, Hanson
Barbara White, Osterville
Mary Torelli, Newton
Janet Serman, Plymouth
James Bourgue, Newburyport
Lucy Tirk, Northampton
Joshua Bevins, Danvers
Elaina Griffith, Watertown
William Regan, Wilbraham
Monica Tagne, Waltham
Jodie Moreau, Belmont
Edward Bing, Arlington
Marie Causey, Wayland
Sara Frost Azzam, Wellesley

Louise Powers, Paxton
Donald Bermont, Concord
Sharon Barrett, Beverly
Alison Moore , Dorchester
Briana Pearson, Cambridge
Ken Eisenstein, Shelburne Falls
Yen Tieu, Medford
Jennifer Kuhns, Gloucester
Paul Lipman, Amherst
Charles Peck, Springfield
Barbara Passero, Waltham
Tamara Berton, Milton
Sandra Bryer, Marlboro
Beverly Alba, Winthrop
Susan Bachelder, South Egremont
Monique Ouimette, Arlington
Alicia Byrd, Somerville
Jesse Gordon, Randolph
Jackie Orent-Nathan, Andover
Clare Hurley, Woburn
Judy Woods, East Falmouth
Nora Hussey, Boston
Judith Phillips, Sharon
Todd Steglinski, West Springfield
Edward Ganshirt, Lexington
Andi Gibson, Holyoke
Jessie Powell, Middleboro
James OKeefe, Somerville
Rodney Dennis, Chestnut Hill
Callie Curran Marrell, West Roxbury
Peter Kahigian, Haverhill
Bruce Harvey, Cambridge
Betsy Fleche, Williamsburg
Phyllis Muldoon, Northampton
Albert Leisinger, Newton
Robert Dellelo, Cambridge

Mary Ann Arabadjis, Charlestown
Kyle Young, Hatfield
Daniel Wallack, Amherst
Barbara Kelly, Southampton
Joseph Nagarya, Boston
Claire Grandalski, Tyngsboro
Pat Conant, Westfield
Matt Kirchman, Salem
Paul Flanagan, Winthrop
Stephanie Carberry, Marshfield
Chrystian Dennis, Quincy
John Clarke, Arlington
Kelly Donohue, Jamaica Plain
Donna Kmelius, Granby
Karen Biemann, Cambridge
Ron Majdalany, Great Barrington
Chris Heithoff, Acton
Rebecca Wuenchel, Rockport
Joanne Baker, Rockport
Sean Boyre, Wayland
Deborah Lavailey, Pembroke
Catherine Reese, Quincy
Amy Cuzzupoli, Boston
Laura Tumasz, Bedford
Robert Hunt, Lowell
Joel Perlmutter, Stow
Amy Clark, Brookline
Alexander Heimon, Haydenville
Susan Cnudde, Cambridge
Margaretta Sangree, Cambridge
Marie Sevigny, North Chelmsford
Jon Oneal, Littleton
Deborah Chouinard, Gardner
Holly Varela, Salem
Julie Stepanek, Shutesbury
Greg Malfatto, Nantucket

Perrin Montalto, Holliston
Nancy Goddard, Tyngsboro
Robert Murphy, Westford
Sheila Donovan, Swampscott
Susan Wood, Gloucester
Angela Getchell, Ipswich
George Knight, Granby
Arlene Generazzo, Peabody
Kelley Strickland, Ludlow
Eugenia Byalik, Wayland
Phyllis George, Sterling
Patricia Fitzmaurice, Truro
Angie Schmider, Brookline
Susan Whiteley, Cambridge
Thomas Mangan, Wendell
Kristine Barker, Lincoln
Suzanne Werner, Sturbridge
Elizabeth McCormack, Glendale
Patricia Rotondi, Hingham
Richard Kmon, Holyoke
Sheila Lipson Marshfield
Karen Ressue, Cambridge
Laura Meyer, Belmont
Sid Shrivastava, Wayland
Jay Woodruff, Wayland
Elizabeth Harrington, Andover
Olivia Gomez, Cambridge
Tariq Malik, Hopkinton
Erin McKay, Gloucester
Laureen Cronin, Medfield
William Hackett, Brighton
Sarah Lubin, Winchester
Rachael Murphy, Belmont
Ched Barredo, Brookline
Florence Reddish, Jamaica Plain
Thomas Congoran, Cambridge

Brendon Gray, Norwood
Stephen Bettencourt, Acton
Katherine Bates, Jamaica Plain
Jennifer White, Arlington
Robert Granich, Belmont
Elizabeth Marsh, Amherst
Adrian Bauer, Jamaica Plain
Linda McDonald, North Reading
Elisabeth Burdick, Newtonville
Paul Gregory, Watertown
Gabriella Jones, Cambridge
Miriam Modricamin, Brookline
Megan Tanner, Boston
Roberta Kolovson, Needham
Bruce Sinthavong, Boston
David Le Sage, Belmont
Peter Chopur, Natick
Thomas Weiner, Northampton
Lace Garland, Roslindale
Jason Uzzell, Medfield
Sharon Levy, Northampton
Susan Patterson, Newton Center
Eric Giroux, Belmont
Jessica Letwin, Marblehead
Mia Silvestri, Brookline
Cammy Brothers, Brookline
Owen Smith, Wayland
William Garan, Waban
Mike Lubash, Cotuit
Marci Linker, Florence
Don Becker, Waltham
Angelic Shea, Newburyport
Nathan Garcia, Fairhaven
Elliot Levine, Cambridge
Margaret Naughton, Milton
Jeanne Zimmermann, Milton

Jeannie Costantino, Hanson
Daniel Cohen, Auburndale
Logan Adams, Sharon
Lauren Chagnon, Adams
John Slete, Beverly
Deb Craft, Rehoboth
Jeanne Phaneuf, Somerset
Hannah Perls, Brighton
Rebecca Schwartz, Leverett
Scott Serpa, Chelmsford
Vanessa Leida, Bedford
Maria Nicolazzo, Dedham
Beverly Everett, North Andover
Andrea Humez, Somerville
Christina Stout, Salem
Heidi Roberts, Beverly
Diana Jones, Belchertown
Ann Geary, Haydenville
Susan Widmer, North Reading
Carol Letson, Greenfield
Margaret Charette, Medway
Nancy Belval,Rowe
Gabrielle R. Harrington, South Deerfield
Gabriell Debear Paye, Jamaica Plain
Paul Slavinski, Somerville
Jason Anker, Watertown
Zhong Zhang, Concord
Maura Gearin, Haverhill
Marc Cassano,Mendon
Arthur Driscoll, Chatham
Mildred Martin, South Chatham
Stacie Sarra, Newburyport
Janet Klein, Needham
Linda Berube, Chicopee
Robert OLeary, East Sandwich
Mary Eirich Tom, Watertown

Page Brody, Northampton
Alok Vora, Cambridge
Carolyn Villanova, Pittsfield
Brian Antunes, Leominster
Matt Malachowsky, Arlington
Elena Bob, Amherst
Janice Hoffman, Granby
Karen Umans, Hopkinton
Elizabeth Sarno, Belchertown
Lory Southworth, North Brookfield
Rebecca Nisby, Wakefield
Amy Donahue, Southampton
Kathleen Connolly, Grafton
Jonathan Visminas, Framingham
Maureen Rodgers, Newburyport
Amy Williams, Townsend
Stella Wasswa, Leominster
Jamie Douglass, Amherst
Mary Dow, Centerville Road
Daryl Beardsley, Sherborn
E. Sarchioni, Cambridge
Judith Medeiros-Adams, Cambridge
Lewis Ward, Swampscott
Steven Sarasin, Ashburnham
Sunil Shroff, Chestnut
Fred Josey, Newton Highlands
Erik Thelen, Salem
Amy Schoeff, Wayland
Keith Allshouse, Melrose
Jay Wittes, Nantucket
Yolanda Lenzy, Wilbraham
Xiongwei Mei, Arlington
Charles Noyes, Waltham
Catherine Crawford, Chelmsford
Jen Stott, Jamaica Plain
Mark Greenlaw, West Stockbridge

Brad Johnson,Somerville
Catherine Bowen, Belmont
Leslie Arslanian, Belmont
Carolyn Looker, Newton
Michael and Blair Walker, South Dartmouth
Susan Kaminski, Ashfield
Alexander Margulis, Needham Heights
Mary Neff, Sudbury
Michael Archbald, Whately
Brooke Mars, Great Barrington
Amy Pallenberg, Nantucket
Richard Knowles, Chelmsford
Deirdre Olson, Northfield
Andrea Doremus Cuetara, West Roxbury
Donna Jameson, Winchester
Donna Withers, South Yarmouth
Paul Saint-Amand, Rockport
Stephen Jerome, Marblehead
Tracey Hoffenberg, Andover
Kristen Avonti, Shutesbury
Mai-Lis Tria, Nahant
Tara Greco, Cambridge
Donna Hazard, Weston
Bob Armstrong, Conway
Beverly Wodicka, Easthampton
Sarah Hickler , Cambridge
Dawn Caruso, Natick
Robert Muhlhausen, Everett
Susanne Wickham, Lenox
Isidro Lemus, Nantucket
Tim Zajac, Worcester
Ann Appavoo, Brookline
Zachary Chapline, Hyde Park
Alan Palm, Belmont
Robert Shapiro, Wellfleet
Tina Laramie-Biggs, Marblehead

Meghan Toft, Quincy
Elizabeth Thomison, Milton
Nicole Chiasson, Wayland
Nicholas Repucci, Somerville
Gonzalo Gonzalez-Del Pino, Cambridge
Carol Guerrero, Acton
Kathryn McGowan, Ipswich
David Zieja, North Andover
Noel Ochtman, Newburyport
Kevin Balcom, Sudbury
Stefanos Servitopoulos, Belmont
Sandra Publicover, Cambridge
Joseph Baker, Jamaica Plain
Meredith Crouse, Boston
Harriet Diamond, Northampton
Victoria Solomon, Cambridge
Ken Geiser, Somerville
Monique Clarke, Jamaica Plain
Peter Krawczyk, Warren
Aaron Flanagan, Newburyport
Tonia Goshgarian, Natick
Becky Sarah, Cambridge
Heidi Fischer, Needham
Benjamin Mulvoy, Walpole
Krishnaprasad Rao, Sudbury
Michelle Scheier, Belchertown
David Wiley
Eleanor Yeomans, Framingham
Olivia Hewitt, Concord
Thomas Hannaford, South Weymouth
Karen Troy, Acton
Claire Duffy, Worcester
Bill White, Milton
Linda B. Colvin, Becket
Halley Markarian, Wayland
Casey Lenson, Newton Center

David Elliot, Newburyport
William Varteresian, Lexington
Tonya Jiang, Medford
Sandra Slavet, Randolph
Susan L Marr, Rockport
G. Robbins, Harwich
Giuseppe Aurilio, Arlington
Rudy Termini, Cambridge
Diane Shen, Andover
Martha Nikas, Ipswich
Helena Evans, Marion
Steven Maio, Manchester
Robert Salvaggio, South Orleans
Alfred Gertsberg, West Newton
Sarah Fitzgerald, Brookline
Ronaldo Cheek, Hyde Park
Christine Downing, Rockport
Laura Flint, Stockbridge
Susan Radtke, Amherst
Rich Wolfe, North Adams
Thomas Coish, Greenfield
Billy Grout, North Brookfield
Danielle Gray, Auburndale
Jean Cleary, Littleton
Sheila Rowe, Wendell Depot
G. Keogh, Braintree
Barry Megquier, South Easton
Miriam Defant, Shutesbury
Lisa Morace, Hampden
Paula Roberts Needham
Esther Snyder, Newtonville
Gary Whited, Cambridge
Jesse Hlava, South Deerfield
Royce Magnusson, Winchester
Steve Asky, Acton
Kristine Kamikawa, Winchester

Kathryn Korostoff, Southborough
Katherine McHugh, Cambridge
Stefanie Pietras, Cambridge
Shawn Padeni, Charlton
Jenniffer Gallegos, Norwood
Juan Rivera, Westfield
John Turner, Marion
Doug Townsend, Florence
Eugene Moody, Boston
Joanne Tavores, Pembroke
Ann Heinemann, Sterling
Cathleen Mandeville, Dudley
Victoria Keiser, Wellesley
Kathleen Hara, Worcester
Joan Stiles, Duxbury
Sue Wachter, Acton
Brett Constantine, Florence
Lucinda Graham, Brewster
Dwight Branch, Brookline
Jeane Whitehouse, Brookline
Bryan Falchok, Lexington
Curtiss Hoffman, Ashland
Arra Avakian, Concord
Kathy Scanlan, Boston
Meridith Palmer, Sudbury
Fergus Marshall, Chicopee
Maryann White, West Newton
Richard Winer, Framingham
Catherine Starr, Andover
Julia Flannery, Holyoke
Caryl Sprague-Cloutier, Charlton
Jen Hahn, Arlington
Holly Anderson, Cummington
Steve Kurtz, Salem
Marta Stojda, Chatham
Gregory Dann, Rockport

Dave Kennedy, Brighton
Amy Paquette, Sudbury
John Bailey, Winthrop
Linda Davis, Dartmouth
Diana Esposito, Dorchester
John Wojdak, Brookfield
Jerry Grenier, Weymouth
Bonnie Pomfret, Wayland
Kirstin Beatty, Holyoke
Anne Callahan, Boston
Suvi Totterman, Winchester
Dan Nash, Westfield
Catherine Offenberg, Newton
Jeffreyjohn Lynch, Hingham
Debra Shepard, Newburyport
Edward Kelley, Melrose
Sanja Roth, Hampden
Malcolm Kottler, Arlington
Sarah Murphy, Salem
Richard Schwenterly, Concord
Merilyn Eldridge, Wakefield
Jay Mankita, Amherst
Stephen Clairmont, Newton
Robert Frechette, Leominster
Carole Plourde, Amesbury
Cynthia Randall, Newburyport
Peter Warrington, Cambridge
Kerry Bartlett, Winchester
Kate Allard, Duxbury
Kathleen Birkeland, Manchester
John Guthrie, Wellesley
Donna Dooley, North Reading
Raina McManus, Wellesley Hills
Vc Zeizel, Newton
Lyn Holian, Marblehead
Brian Rodgers, Beverly

Alaine Cipriano, Lexington
Amy Lipton, Brookline
Andrew Collins, Canton
Antonio Baccari, West Newton
Laurie Gordon, Newton
Bill Lammi, Foxboro
Phillip Newey, West Stockbridge
Dave Ehrenthal, Concord
William Ness, Lancaster
Thomas Nash, West Newton
Gwynneth Centore, Norfolk
Jin Ma, Sudbury
Stephen Tocci, Newton Upper Falls
Peter Roy Jr., Belmont
J Gregorian, Newton
Carey Azzara, Newtonville
William Reed, Arlington
Robert Harper, Ipswich
Nour Khreim, Shrewsbury
Matt Shenton, Concord
Max Morrisey Tarburton, Hatfield
Alexandra Wight, Concord
Laurie Mass, Belmont
Alanna Nelson, Marion
Steven Ebrecht, Melrose
Susan Koehler Arsenault, Rockport
Julie Morrison, Needham
Caroline Wheelihan, Hingham
Margaret Nelson, Boston
Joan Jordan, Somerville
Judith Weinstock, Cambridge
Isaiah Shalom, West Brookfield
Corvus Sylvia, Amherst
Joseph Crowley, Concord
Drake Blodgett, Marblehead
Hope Haff, Jamaica Plain

Christopher Kelly, Scituate
Thomas Cunningham, Medfield
Greg King, Cambridge
Jeff Stiles, Plymouth
Peter Dean, Marion
Laura Chandra, Newton Highlands
Michelle Wiggins, Concord
Elizabeth Amaral, Dartmouth
Ani Sarkisian, South Hamilton
Barry Connell, Newburyport
James Schuster, Sudbury
Sarah Abts, Brookline
Patricia Payne, South Hamilton
Richard Welch, Lancaster
Maisie Tuck, Northampton
Nathan Mahan, Roxbury
Robert Brown, Wellesley Hills
Nicholas Bernier, Newtonville
Darcy Foreman, Wayland
Louise Harrison Lepera, Watertown
Diane Poth, Marblehead
Lucien Aibel, Concord
Katie Bosse, Cambridge
Dan Olk, Cohasset
Jack Weinhold, Nantucket
Elizabeth Bourne, Centerville
Jana Argiros, Westwood
Scot Kenworthy, Nahant
Leslie Spaneas, Brookline
Diane Chates, Amherst
Natalie Dias, Dartmouth
Mark Schneider, Weymouth
David Bouchard, Lexington
Maureen Tardelli, Medford
Chris OBrien, Somerville
Eric Wapner, Florence

Tanya Abbott, Hopkinton
Amy Knowlton, Cambridge
Judith Combs, North Brookfield
Andrew Barto, Somerville
Cathryn Morreale, Hardwick
Mary Gard, Wellesley Hills
Daphne Stevens, Northampton
Charlene Hayden, Waban
Patricia Frederick, Ashburnham
Soledad Vera, Jamaica Plain
Karin Mandavi, Wellesley
Carol Stewart, Springfield
Donald Welch, East Longmeadow
George Daly, Milton
Barry Elkin, Lexington
Amelia Turner, Arlington
Dara Casey, Andover
Caroline Kurtz, Sudbury
Lucien Miller, Pelham
Eileen Stevens, Groton
Art Bettencourt, Norfolk
John Westwater, Medford
June Fontaine, Hanover
Fred Momaney, Greenfield
Robert James, Medfield
April Clark, Greenfield
Scott Thomson, Jamaica Plain
Phillip Dwyer, Brookline
Ricardo Jean-Baptiste, Everett
Jennifer Casunduan-Sumi, South Hadley
Monica Wright, Sudbury
Amy Nichols, Chestnut Hill
Robyn Maltz-Gross, Auburndale
Colette King, Brookline
Erin Mahoney, Belmont
Joseph Su, Lexington

Sandra Chaet, Natick
Kathy Amesoeder, Andover
William Webber, Ashburnham
Tom Reynolds, Milton
Melissa Spinks, Brookline
Johari Frasier, Cambridge
Nicole Dettmann, Sudbury
Jovanna Garcia Soto, Roxbury
Kathryn Marks, Plymouth
Susan Benstead, Shrewsbury
Pauline Malvey, Sturbridge
Colleen Hartley, Belmont
Jerry Reily, Newton
Shannon Dillard, Florence
Vivian Bendix, Framingham
Delores Larque, South Dennis
Anthony Miceli, Framingham
Mary Link, Ashfield
Jeremy Sharrard, Needham
Claire Richards, Great Barrington
James Ayres, Haydenville
Victor Wallis, Somerville
E. English, Watertown
Alan Beardsley, Bedford
Vid Sivan, Allston
Walter Birge, Concord
Traci Puckett, Northampton
Elaine Barnett-Goldstein, Sudbury

RE: Pilgrim Nuclear Power Station

holly h [redacted]
Thu 8/31/2023 3:49 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cathy Coniaris
Massachusetts DEP
100 Cambridge St.
Boston, MA 02114

Dear Ms. Coniaris:

I am writing to support the tentative determination by the Massachusetts Department of Environmental Protection (MassDEP) to deny Holtec's application for a modified Surface Water Discharge Permit that would allow Holtec to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay.

MassDEP's tentative determination that the requested discharge is prohibited by the Massachusetts Ocean Sanctuaries Act is entirely correct. That act prohibits the "dumping or discharge or commercial, municipal, domestic or industrial waste" into an Ocean Sanctuary. Cape Cod, Plymouth, Kingston, and Duxbury Bays are all protected ocean sanctuaries under this act, making Holtec's dumping plan illegal.

Because Holtec's proposed discharge is illegal, the Department's final determination should deny its application. Thank you for enforcing the law to protect our ocean sanctuaries.

As a child in the 1960's, I spent summer vacation time at my Aunt's cottage in Dennis, MA. What an amazing experience with nature! PLEASE don't endanger us and many more generations. PLEASE enforce this law to protect ALL LIFE and our ONLY HOME - OUR LIFE SUSTAINING, BEAUTIFUL PLANET EARTH.

Thank you,

Holly K. Hensel

[redacted]

[redacted]

[*Though I am a member of the Duxbury Nuclear Advisory Committee and the grassroots Save Our Bay MA coalition, following are my own views; I speak for no one in this document but myself as a citizen and an historian of the Commonwealth of Massachusetts. Portions of this comment have appeared in stories I have written in my publication,* The Plymouth County Observer (plymouthcountyobserver.substack.com)]

Arguments Against Holtec's Application to Modify Its Surface Water Discharge Permit

by J. Benjamin Cronin, Ph.D.

[redacted]; August 31st, 2023

I. Introduction

I write and respectfully submit the following comment in opposition to a proposed modification by Holtec to its existing Surface Water Discharge (NPDES) Permit (Permit No. MA0003557) for Pilgrim Nuclear Power Station in Plymouth, Massachusetts. The modification would allow Holtec to discharge approximately 1.1 million gallons of chemically and contaminated industrial wastewater stored in Pilgrim's spent fuel pool, torus, reactor cavity, and dryer separator pit into Cape Cod Bay. By Holtec's own representations, the filtration processing of this wastewater will 90 to 95% of the contaminants present, necessarily leaving 5 to 10% present, including the radiological pollutant tritium. Because Holtec agreed to follow Massachusetts laws and regulations in the June, 2020 Settlement Agreement, and because Massachusetts laws and regulations plainly prohibit the discharge of the wastewater in question, the proposed permit modification is facially illegal and therefore must be denied.

Indeed, the arguments against Holtec's permit application are several and varied, and require detailed explication. Taken together, they present an overwhelming weight of evidence – legal, historical, scientific, economic, and more – which impel the same conclusion that MassDEP came to in its July 24, 2023 tentative determination: that the proposed discharge is illegal, and therefore Holtec's permit modification application must be denied.

II. Procedural History

On March 31, 2023, Holtec applied to both MassDEP and the United States Environmental Protection Agency (US EPA) for a permit modification that would allow the discharge of approximately 1.1 million gallons of radioactively and chemically contaminated wastewater located in reactor core, the dryer-separator pit, and the torus. Holtec characterized the proposed modification in its application:

"Under the terms of this proposed NPDES Permit modification, the water will be filtered using a Solids Collection Filter Top-Loading Canister System, routed to a mixed bed resin/charcoal demineralizer for radiological and chemical (including organic) contaminant removal, radiologically characterized, and then discharged via Outfall #015 in batches of approximately 19,000 gallons and diluted into the plant['']s discharge canal and further diluted in the Cape Cod Bay."[1]

Significantly, in its application, Holtec characterized the proposed discharge as both "new" and as "industrial wastewater." In Section E of the application, it writes "This application for modification of NPDES Permit No. MA0003557 to authorize discharge of a new

---

[1] Holtec Decommissioning International, LLC, APPLICATION FOR MODIFICATION TO NPDES PERMIT NO. MA0003557, https://www.mass.gov/doc/holtec-wm07-application-for-a-swd-permit-modification/download, Section D, Description of Proposed Modification.

source of industrial wastewater is submitted as required by Section 301(a) and 402 of the Clean Water Act, and 40 CFR 122.21 and 122.62."[2] Further, in Section F, Holtec states that "The industrial wastewater proposed for discharge is a New Source," confirming what it stated immediately above in Section E.[3]

It should be noted here as well that Holtec did not apply for this permit modification freely and at the outset of this process. Rather, from the start, when it first announced its intention to dump in late 2021, through most of calendar year 2022, Holtec strenuously resisted its obligations to follow its permit. Holtec, in correspondence between it and the United States Environmental Protection Agency, continually, baselessly and baldly asserted that it could, contrary to the language of its existing permit, discharge the water in question without seeking a new permit or modifying its existing permit – in effect, that the laws of the Commonwealth and the United States do not bind it – despite multiple communications from the EPA confirming that it could not violate its NPDES permit, and that Holtec, like the rest of us, was in fact bound by the law. It was only when the EPA made clear that willfully violating its permit constituted a violation of Federal law, a violation which could face serious criminal sanction, that Holtec relented, and began the process of seeking the permit modification presently before the Department.[4]

---

[2] Ibid., Section E– Regulation of Spent Fuel Pool.
[3] Ibid., Section F, Effluent Limit Guidelines.
[4] See correspondence between Holtec and the EPA:
a) Holtec Information Sheet, Jan. 27, 2022:
Information Sheet for Pilgrim Station Stakeholders, Holtec Decommissioning International, January 27, 2022 (epa.gov)
b) EPA Reply to Holtec, Feb. 17, 2022.
Letter from EPA to Holtec Decommissioning International, February 17, 2022
c) Holtec reply to EPA, May 24, 2022.
Letter from Holtec Decommissioning International to EPA, May 24, 2022
d) EPA to Holtec, June 17, 2022.
Letter from EPA to Holtec Decommissioning International, June 17, 2022
e) EPA Enforcement Warning Letter to Holtec, Dec. 5, 2022.
Letter from EPA to Holtec Decommissioning International, December 5, 2022
f) Holtec response to EPA Enforcement Warning Letter, Dec. 19, 2022.

As noted above, that application was made to the Department on March 31st, 2023.

This summer, MassDEP correctly found in its July 24, 2023 tentative determination denying Holtec's application for a permit modification that the proposed discharge of the wastewater in question violated the Ocean Sanctuaries Act. Before discussion of that statute below, I believe it necessary to step back, and explain the significance of this question in both jurisprudential and historical terms. This comment will then examine the bases in constitutional, statutory, and regulatory law for denying Holtec's application, followed by a consideration of scientific and economic evidence supporting the denial of Holtec's application. We will then turn to the significance of public lands and waters, the inherent rights of the people of the region surrounding Cape Cod Bay to democratic self determination, and, finally, to a rebuttal of several erroneous arguments put forward by Holtec and its allies, before concluding.

The evidence before the Department, including in this paper, will impel the following conclusion: that Holtec's proposed discharge of industrial wastewater into Cape Cod Bay is facially illegal, and that therefore, as the Department did in its tentative determination, MassDEP must deny Holtec's application for modifying its permit.

III. Precedent: the Commons and the Common Law

The public nature of the ocean is of great antiquity at law, and not only in the Common Law, but also the Roman Law before it. More than eight centuries of jurisprudence bolsters and confirms the public nature of the sea and its arms; indeed, when the Roman Civil Law is considered, the weight of precedent becomes even more overwhelmingly powerful.

Nor is this merely of academic concern. My own view as an historian of the Towns of

---

Letter from Holtec Decommissioning International to EPA, December 19, 2022
g). Holtec Permit Modification Application, March 31, 2023.
https://www3.epa.gov/region1/npdes/pilgrim/permit-modification-application-from-holtec-march-31-2023.pdf

Plymouth County and the New England commons tradition (on which more below) is that the reason the question of the potential discharge of Holtec's industrial wastewater into the bay has aroused such fierce public opposition is precisely how profoundly contrary it stands to the vast corpus of precedent which stands behind the public nature of the sea, and the attendant duty of bodies politic, including the Commonwealth and the Department, to hold and safeguard these resources in the public trust. When examined in historical perspective, it becomes clear that Holtec's proposed discharge stands contrary to the entire edifice of Common Law jurisprudence with respect to public waters.

Before proceeding to the Common Law, it is necessary to at least cursorily examine the Roman Civil Law and how it treats the subject of public waters. The 6th century Code of Justinian, a summation and codification of centuries of Roman law, is quite clear regarding the public ownership and character of the sea:

"By the law of nature these things are common to mankind---the air, running water, the sea, and consequently the shores of the sea. No one, therefore, is forbidden to approach the seashore, provided that he respects habitationes, monuments, and buildings which are not, like the sea, subject only to the law of nations."[5]

Beyond the Roman law, the roots of these common liberties reach deep into the Common Law, being formally codified in both Magna Carta and its companion document, the 1217 Charter of the Forests.

With respect to public waters and the doctrine of the public trust, a clause in Magna Carta relating to the commons, understood as physical resources, must be examined. Clause 33 of the

[5] The Code of Justinian, Book II (I)(1), https://thelatinlibrary.com/law/institutes.html

1215 Magna Carta, which becomes Clause 23 in the 1225 confirmation of Magna Carta by Henry III, prohibits the erection of weirs in the Rivers Thames and Medway:

"All fish-weirs are in future to be entirely removed from the Thames and the Medway, and throughout the whole of England, except on the sea-coast."[6]

Weirs, found all over the world, are structures used to direct, and ultimately to trap, fish, historically largely made of wood and stone. Because they impede the flow of the river, they are responsible for silting of rivers, and the consequent obstruction of navigation.

Medieval historian Nicholas Vincent, Professor at the University of East Anglia, described the significance of Clause 33/Clause 23:

The clause "demanded the removal of all fish-weirs from the Thames, the Medway and all other rivers of England. Fish-weirs were large V-shaped structures, generally built of wooden stakes, into which fish might swim but from which they could not escape. Since weirs slowed the flow of water, they led to silting and in due course the closure of waterways vital to London's trade. In this way the extensive use of fish-weirs represented the denial of a rather more general principle: that of free navigation, itself already of significance under Roman law, and in due course a major theme in the debates on British imperial power….."[7]

Both the 1215 Magna Carta, as well as its companion document, the 1217 Charter of the Forests, were confirmed by Edward I in the Confirmation of the Charters (25 Edward I c.1 sec. 1) in 1297.[8] Taken together, these documents form the original source of the common law public trust doctrine with respect to our oceanic commons.

---

[6] The 1215 Magna Carta: Clause 33', The Magna Carta Project, trans. H. Summerson et al. [http://magnacartaresearch.org/read/magna_carta_1215/Clause_33 accessed 07 July 2023]
[7] Nicholas Vincent, "The Clauses of Magna Carta," March 13th, 2015; https://www.bl.uk/magna-carta/articles/the-clauses-of-magna-carta

[8] https://statutes.org.uk/site/the-statutes/thirteenth-century/1297-25-edward-1-c-1-confirmation-of-the-charters/

My understanding is that the foremost authority among common law jurists on the subject of the sea itself is the 17th century Chief Justice of the King's Bench Matthew Hale, author of the treatise *De Jure Maris* ("Of the Law of The Sea"). Lord Hale identifies Magna Carta as the source of the common law's doctrine of public waters:

"Again, there be other rivers, as well fresh as salt, that are of common or publick use for carriage of boats and lighters. And these, whether they are fresh or salt, whether they flow and reflow or not, are *prima facie publici juris*, common highways for man or goods or both from one land town to another…. And therefore all nuisances and impediments of passages of boats and vessels, though in the private soil of any person, may be punished by indictments, and removed; and this was the reason of the statute of Magna Charta cap. 23."[9]

Crucially, Lord Hale observed that the right of the common people of England to fish in the sea and its arms was indefeasible:

"The right of fishing in this sea and the creeks and armes thereof is originally lodged in the crown….But though the king is the owner of this great wast, and as a consequent of his propriety hath the primary right of fishing in the sea and the creekes and armes thereof; yet the common people of England have regularly a liberty of fishing in the sea and the creekes and armes thereof, as a publick common of piscary, and may not without injury to their right be restrained of it, unless in such places creeks or navigable rivers, where either the king or some particular subject hath gained a propriety exclusive of the common liberty."[10]

I would suggest that this is precisely one of the issues brought forth by this public controversy: Holtec is essentially seeking to exercise, contrary to law, "a propriety exclusive of

---

[9] Lord Chief Justice Matthew Hale, *De Jure Maris*, cap. 3, 8-9; Francis Hargrave, editor, A Collection of Tracts Relative to thje Law of England from Manuscripts, Vol. I, 1786. (Abingdon, England: Professional Books, Ltd.), 19. Hale refers here to the 1225 Magna Carta, in which Cap. 23, rather than Cap. 33 as in the 1215 Magna Carta, relates to public waters.

[10] Lord Hale, *De Jure Maris*, Pars Prima, Cap. IV.

the common liberty" with respect to Cape Cod Bay – a propriety which they simply do not possess.

Lord Hale set out legal principles with respect to both public waters and that were already ancient in the 17th century, and become the basis for later case law on the nature of the sea.

An 1821 English case, *Blundell v. Caterall*, is significant in part for a dissent by Justice Best which, per New Hampshire Chief Justice Doe's arguments in *Concord Mfg. Co. v. Robertson*, expresses well the importance of Magna Carta (see Cap. 33 above) with respect to the doctrine of public waters; Justice Best's dissent, it should be noted, more closely represents the actual law of the land in the United States (see *Concord Mfg. Co. v. Robertson*, below), but this is not the case in England, where the commons tradition was significantly eroded by aristocratic dominance with respect to the commons.[11]

Justice Best wrote:

"My opinion is founded on these grounds. The shore of the sea is admitted to have been at one time the property of the king. From the general nature of this property, it could never be used for exclusive occupation. It was holden by the king, like the sea and the highway, for all his subjects. The soil could only be transferred, subject to this public trust; and general usage shows that the public right has been excepted out of the grant of the soil. . . . Unless I felt myself bound by an authority as strong and clear as an act of parliament, I would hold on principles of public policy, I might say public necessity, that the interruption of free access to the sea is a public nuisance. In the first ages of all countries, not only the sea and its shores, but all perennial rivers,

[11] Indeed, Holtec's arguments – such as they are – in favor of their application are essentially aristocratic ones – that they, rather than what Herman Melville called "the kingly commoners" – possess a propriety over the entirety of the sea, contrary to Magna Carta and descending precedents.

were left open to the public use. In all countries it has been matter of just complaint, that individuals have encroached on the rights of the people. In England, our ancestors put the public rights in rivers under the safeguard of Magna Charta."[12]

In the syllabus for the 1842 US Supreme Court Case *Martin v. Waddell*, 41 U.S. 367 (1842), the Court states that the authority over public waters held formerly by the Crown had been vested in the several States upon the Revolution.

"The country granted by King Charles the Second to the Duke of York [i.e., the colony of East Jersey, today part of the State of New Jersey], was held by the King in his public and regal character, as the representative of the nation, and in trust for them. The discoveries made by persons acting under the authority of the government were for the benefit of the nation, and the Crown, according to the principles of the British Constitution, was the proper organ to dispose of the public domain. Cited, *Johnson v. McIntosh*, 8 Wheat. 595.

When the Revolution took place, the people of each state became themselves sovereign, and in that character held the absolute right to all their navigable waters and the soils under them for their own common use, subject only to the rights since surrendered by the Constitution to the general government…."[13] (see arguments below on the lack of any grounds for arguing federal preemption.)

The Court continued, writing that "The dominion and property in navigable waters and the lands under them being held by the King as a public trust, the grant to an individual of an exclusive fishery in any portion of it is so much taken from the common fund entrusted to his care for the common benefit. In such cases, whatever does not pass by the grant remains in the Crown for the benefit and advantage of the whole community. Grants of that description are

---

[12] Justice Best, in *Blundell v. Catterall*, 5 B. Al. 268, quoted by Justice Doe, *Concord Co. v. Robertson*, 66 N.H., 11 (N.H. 1889)
[13] *Martin v. Waddell*, 41 U.S. 367-68 (1842).

therefore, construed strictly, and it will not be presumed that the King intended to part from any portion of the public domain unless clear and special words are used to denote it."[14]

The Court further stated in the syllabus that:

"The land under the navigable waters within the limits of the charter [of the colony of East Jersey, today part of the State of New Jersey, granted by Charles II to his brother, James, Duke of York, later James II] passed to the grantee as one of the royalties incident to the powers of government, and were to be held by him in the same manner and for the same purposes that the navigable waters of England and the soils under them are held by the Crown. The policy of England since Magna Charta -- for the last six hundred years -- has been carefully preserved to secure the common right of piscary for the benefit of the public[footnote Lord Hale]. It would require plain language in the letters patent to the Duke of York to persuade the Court that the public and common right of fishing in navigable waters, which has been so long and so carefully guarded in England, and which was preserved in every other colony founded on the Atlantic borders, was intended in this one instance to be taken away. There is nothing in the [colonial] charter that requires this conclusion."[15]

Justice Taney, in his opinion, and writing for the Court, wrote that

"The principle here stated by Hale, as to "the public common of piscary" belonging to the common people of England, is not questioned by any English writer upon that subject. The point upon which different opinions have been expressed is whether, since Magna Charta, "either the King or any particular subject can gain a propriety exclusive of the common liberty." For undoubtedly, rights of fishery, exclusive of the common liberty, are at this day held and enjoyed by private individuals under ancient grants. But the existence of a doubt as to the right of the

---

[14] *Martin v. Waddell*, 41 U.S. 368 (1842).

[15] *Martin v. Waddell*, 41 U.S. 368 (1842).

King to make such a grant, after Magna Charta, would of itself show how fixed has been the policy of that government on this subject for the last six hundred years, and how carefully it has preserved this common right for the benefit of the public."[16]

Five decades later, U.S. Supreme Court Associate Justice Horace Gray, writing for the Court, like Chief Justice Taney in *Martin v. Waddell*, relies on Lord Hale's summation of Common Law in *Shively v. Bowlby*, 152 U.S. 1 (1894):

"By the common law, both the title and the dominion of the sea, and of rivers and arms of the sea, where the tide ebbs and flows, and of all the lands below high water mark, within the jurisdiction of the Crown of England, are in the King. Such waters, and the lands which they cover, either at all times or at least when the tide is in, are incapable of ordinary and private occupation, cultivation, and improvement, and their natural and primary uses are public in their nature, for highways of navigation and commerce, domestic and foreign, and for the purpose of fishing by all the King's subjects. Therefore the title, jus privatum, in such lands, as of waste and unoccupied lands, belongs to the King, as the sovereign, and the dominion thereof, jus publicum, is vested in him as the representative of the nation and for the public benefit."[17]

Per *Martin v. Waddell* above, the Crown, of course, as the guardian of the sea in public trust, has been replaced in our situation since the American Revolution with the Commonwealth of Massachusetts and the United States.

A more recent and more local case demonstrates the continuing relevance for the corpus of our legal commons legacy reaching back to Magna Carta here in Massachusetts. A 1979 decision by the Massachusetts Supreme Judicial Court, *Boston Waterfront Development Corp. v. Commonwealth*, demonstrates this well. In that case, concerning a land dispute between the

---

[16] *Martin v. Waddel*l, 41 U.S. 412-413 (1842).
[17] *Shively v. Bowlby*, 152 U.S. 11 (1894).

Boston Waterfront Development Corporation and the Commonwealth over a parcel of land at one end of a wharf that extended into Boston Harbor. Justice Francis J. Quirico wrote for the Court:

"The conflict between king and citizens that preceded the Magna Charta concerned, among other things, opposition to this absolute power of the Crown to grant private rights in the shore, particularly as these rights interfered with the free navigation which was so essential to the rising commercial classes. Note, The Public Trust in Tidal Areas, supra at 765. After Magna Charta, the competing interests were accommodated by a legal theory that divided the Crown's rights to shore land below high water mark into two categories: a proprietary jus privatum, or ownership interest, and a governmental jus publicum, by which the king held the land in his sovereign capacity as a representative of all the people. *Shively v. Bowlby*, 152 U.S. 1, 11-14 (1894). *Commonwealth v. Alger*, 7 Cush. 53, 90 (1851). *Commonwealth v. Roxbury*, 9 Gray 451, 482-484 (1857). This latter interest the Crown could not convey into private hands, since it was 'held as a public trust for all subjects and their free exercise of the common rights of navigation and fishery....' Rice, supra at 1…."[18]

In addition to those decisions, there is a body of New England common law relating to Great Ponds which, while certainly not dispositive on this question, do demonstrate that the direction and tendency of jurisprudence relating to public waters, not only in this Commonwealth and in our sister states of New Hampshire and Maine, has been from a very early date in the direction of greater rights for the public with respect to these waters, and not any particular

---

[18] *Boston Waterfront Development Corp. v. Commonwealth*, 393 NE 2d 356 (1979), 632.

private economic interest. In this sense, Holtec's proposal is contrary to the entire direction of New England common law, which extends public protection of waters.[19]

One of the most significant commentaries on the legal aspects of this matter comes from an 1889 decision of the New Hampshire Supreme Court, *Concord Co. v. Robertson*, 66 N.H. 1, 4 (N.H. 1889).

The decision's greatest significance is Justice Doe's affirmation that Great Ponds are public waters, and that public waters extend beyond tide waters in the United States.

"In respect to title, the law divides natural fresh-water ponds into two classes, — the small, which pass by an ordinary grant of land, like brooks and rivers, from which, as conveyable property, they are not distinguished, — and the large, which are exempted from the operation of such a grant for reasons that stop private ownership at the water's edge of the sea and its estuaries. Tide-waters and large ponds are public waters. Whatever exceptions, if any, may be found, this is the rule," wrote Justice Doe.[20]

Public waters are determined primarily by their navigability, said Justice Doe. "For the purposes of admiralty jurisdiction and the federal power of regulating commerce, 'the doctrine of

---

[19] Alfred, Lord Tennyson, sings a paean that can be applied to all common law jurisdictions:

"You ask me, why, tho' ill at ease,
Within this region I subsist,
Whose spirits falter in the mist,
And languish for the purple seas.

It is the land that freemen till,
That sober-suited Freedom chose,
The land, where girt with friends or foes
A man may speak the thing he will;

A land of settled government,
A land of just and old renown,
Where Freedom slowly broadens down
From precedent to precedent…."

https://www.poetryfoundation.org/poems/45393/you-ask-me-why-tho-ill-at-ease

[20] *Concord Co. v. Robertson*, 66 N.H. 1, 4 (N.H. 1889), 4.

the common law as to the navigability of waters has no application in this country. Here the ebb and flow of the tide do not constitute the usual test, as in England, or any test at all of the navigability of waters. There no waters are navigable in fact, or, at least, to any considerable extent, which are not subject to the tide; and from this circumstance tidewater and navigable water there signify substantially the same thing. But in this country the case is widely different…. A different test must, therefore, be applied to determine the navigability of our rivers, and that is found in their navigable capacity. Those rivers must be regarded as public navigable rivers in law which are navigable in fact.' *The Daniel Ball,* 10 Wall. 557, 563; *The Genesee Chief* 12 How. 443, 454, 455; *Fretz v. Bull*, 12 How. 446 *The Magnolia*, 20 How. 296, 299; *The Commerce*, 1 Black 574; *The Hine v. Trevor*, 4 Wall. 555; *The Eagle*, 8 Wall. 15; *The Montello*, 20 Wall. 430; *Miller v. Mayor*, 109 U.S. 385, 395."[21]

Indeed, as future Associate Justice of the United States Supreme Court Louis D. Brandeis wrote, in 1890, "political, social, and economic changes entail the recognition of new rights, and the common law, in its eternal youth, grows to meet the demands of society."6So it was in America, argued Justice Doe. He pointed in particular to the 1641 Massachusetts Liberties (see below in the section on constitutional law).

"But in both jurisdictions [New Hampshire and Massachusetts] large ponds are withheld from private ownership for reasons that are distinctively American. 'Every inhabitant that is an howseholder shall have free fishing and fowling in any great ponds, and bayes, coves, and rivers so farre as the sea ebbes and flowes within the precincts of the towne where they dwell, unlesse the free men of the same towne or the generall court have otherwise appropriated them, provided that this shall not be extended to give leave to any man to come upon others proprietie without there leave.' Mass. Body of Liberties (enacted in 1641), art. 16, printed in 8 Mass. Hist. Coll. (3d

[21] *Concord Manufacturing Co.* v. *Robinson*, 5.

series) 219, Mass. Colonial Laws 1660 to 1672 (ed. of 1889), p. 37, and 9 Gray 465. 'The great purpose of the 16th article of the Body of Liberties was to declare a great principle of public light, to abolish the forest laws, the game laws, and the laws designed to secure several and exclusive fisheries, and to make them all free.' *Com. v. Alger*, 7 Cush. 53, 68; *West Roxbury v. Stoddard*, 7 Allen 158, 165."[22]

These laws extended to those jurisdictions, such as Plymouth Colony, that were later absorbed into Massachusetts, wrote Justice Doe, quoting earlier decisions to that effect:

Here is Justice Doe, with the initial quotation drawn from *Com v. Alger*:

" 'Whether the ordinance is a part of the statutory or of the common law in territory of the Massachusetts Colony, it is perhaps unnecessary to determine. It was never extended over Plymouth by an act of the General Court. It is, however, the law throughout the whole Commonwealth.' It 'has been extended to Plymouth, to Nantucket, to the county of Dukes, and to Maine, and this has been done by usage and by judicial decision.' Litchfield v. Scituate, 136 Mass. 39, 46. "It is in force throughout the whole territory of this state, including those parts which were formerly the Colony of Plymouth, Nantucket, and Dukes County, and also in Maine, although non[e] of these were under jurisdiction of the Colony of Massachusetts Bay." *Watuppa R. Co. v. Fall River*, 147, Mass. 548, 556; Com. v. Alger, 7 Cush. 53, 75, 76, 79; *Weston v. Sampson*, 8 Cush. 347, 354; 9 Gray 523. "When the ordinance of 1647 is said to be part of the common law of Plymouth Colony, all that is meant is that . . . it has been extended to that territory by usage and by judicial decision." *Watuppa R. Co. v. Fall River*, 154 Mass. 305, 308."[23]

In New England, then, not just tidewater but navigable freshwater is public at law. To grant Holtec's permit would stand counter to this long established expansion of the public's

---

[22] *Concord Co. v. Robertson*, 66 N.H. 1, 4 (N.H. 1889), 24.
[23] *Concord Co. v. Robertson*, 25-26.

rights in navigable waters.

Taken together, these decisions demonstrate just how vast is the weight of precedent standing against Holtec's application. Over eight centuries of legal precedent, from Magna Carta on, stand entirely counter to Holtec's application to modify its permit, which is preeminently an example of the elevation of a private and particular economic interest above the "the common rights of navigation and fishery," and which constitutes an unlawful attemp tto exercise a propriety over the sea which Holtec simply does not possess. Indeed, this is not simply of antiquarian or academic interest: as the cases above show, Magna Carta remains an active and integral part of "the life of the law," to use Justice Holmes' phrase, one which continues to protect the people of this Commonwealth and our rights, including our rights over public things (*res publicae*) like the sea.

IV. Article 97 and Constitutional Law

The Massachusetts Constitution is likewise important for the Department to consider as it weighs the evidence in the process of rendering its decision in this matter. The text of the Constitution of the Commonwealth provides further reason for MassDEP to deny Holtec's application to modify its permit.

Article 97 (XCVII) is most relevant for our purposes. It reads, in part:

"The people shall have the right to clean air and water, freedom from excessive and unnecessary noise, and the natural, scenic, historic, and esthetic qualities of their environment; and the protection of the people in their right to the conservation, development and utilization of

the agricultural, mineral, forest, water, air and other natural resources is hereby declared to be a public purpose.

The general court shall have the power to enact legislation necessary or expedient to protect such rights."[24]

Article 97 enters the Constitution of the Commonwealth at the same historical moment as the Ocean Sanctuaries Act became law: "The ninety-fifth, ninety-sixth, ninety-seventh, ninety-eighth, ninety-ninth and one hundredth Articles of Amendment were adopted by the General Court during the sessions of 1969 and 1971, and all six Articles were approved and ratified by the people on the seventh day of November, 1972."[25]

Note that the Article guarantees "the right to clean air and water" to the people of the Commonwealth. This is a fundamental right that may not be abrogated, particularly by any private corporation. The discharge of radioactively and chemically contaminated industrial wastewater into Cape Cod Bay is quite plainly contrary to that guaranteed right to "clean water."

Article 97, to paraphrase Walt Whitman, contains multitudes: it encompasses and resolves divergent interests, both preservation value ("the natural, scenic, historic, and esthetic qualities of their environment") and utility value ("utilization"). Under Article 97, the ancient public common of piscary is not extinguished, but protected, as a use-value, alongside the explicit constitutional guarantee to a clean environment (a guarantee which had been implicit prior to this Article's incorporation into the Constitution).

Indeed, where the Article explicitly guarantees these rights, nowhere does it say that any private corporation shall have the right to use the public waters of the Commonwealth as a waste disposal site for chemically and radioactively contaminated wastewater. This is no mere

---

[24] Constitution of Massachusetts, Article XCVII. https://malegislature.gov/Laws/Constitution.
[25] Constitution of Massachusetts, Note. https://malegislature.gov/Laws/Constitution.

absurdity for the sake of argument: the language of Article 97 is so explicit that Holtec would have to find some kind of actual text in the Constitution of the Commonwealth with which to meet the challenge posed to their argument by Article 97.

I think it is worth noting here that even a specific Act of the legislature allowing the sorts of discharge which Holtec proposes would be unconstitutional, being in direct and open contradiction with the terms of Article 97. This level of protection is extraordinary, and the Department must ensure that rights guaranteed under the Constitution of the Commonwealth are enjoyed by all citizens.

It is likewise important to point out that the common right of fishing in Massachusetts is included in the organic law and/or foundational law of all of the legitimate predecessor governments of the Commonwealth – namely, Plymouth Colony, the Colony of Massachusetts Bay, and the Royal Province of Massachusetts Bay – include rights to fishing in their fundamental organic law (the equivalent of their constitutions).

The Plymouth Colony lacked a single Charter *per se*, unlike the Colony of Massachusetts Bay and the Royal Province of Massachusetts Bay. Nevertheless, it possessed a written body of law, including a founding, constitutional document, the Mayflower Compact, and in its first legislative session in 1623, it declared "That ffowling fishing and Hunting be free:" – and further, guaranteed shore access to all: "that eve[ry] man be allowed a conveanient way to the water where[soever] the lott fall:"[26]

The 1641 Massachusetts Body of Liberties constituted the organic law of the Bay Colony. As noted above, at Clause 16, guaranteed the rights of fishing to the public: "“ Every Inhabitant

---

[26] David Pulsifer, Editor. *Records of the Colony of New Plymouth in New England, Printed by Order of the Legislature of the Commonwealth of Massachusetts*. *Laws 1623-1682.* (Boston, William White, Publisher to the Commonwealth, 1861), 5.

that is an howse holder shall have free fishing and fowling in any great ponds and Bayes, Coves and Rivers, so farre as the sea ebbes and flowes within the presincts of the towne where they dwell, unlesse the free men of the same Towne or the Generall Court have otherwise appropriated them, provided that this shall not be extended to give leave to any man to come upon others proprietie without there leave."[27]

The 1691 Charter of the Royal Province of Massachusetts Bay mentions fish and fishing extensively, affirming the inhabitants' "free Libertie of Fishing in or within any of the Rivers and Waters within the bounds and limitts aforesaid and the Seas thereunto adjoyning and of all Fishes Royall Fishes Whales Balene Sturgeon and other Fishes of what kind or nature soever that should at any time thereafter be taken in or within the said Seas or Waters…"[28] The Charter is quite explicit regarding the importance of the public common of piscary in Massachusetts: "*And further* Our expresse Will and Pleasure is And Wee doe by these present for Vs Our Heires and Successors Ordaine and appoint that these Our Letters Patents shall not in any manner Enure or be taken to abridge bar or hinder any of Our loveing Subjects whatsoever to vse and exercise the Trade of Fishing vpon the Coasts of New England but that they and every of them shall have full and free power and Libertie to continue and vse their said Trade of Fishing vpon the said Coasts in any of the seas therevnto adjoyning or any Arms of the said Seas or Salt Water Rivers where they have been wont to fish…."[29]

The evidence from constitutional law, both prior to and subsequent to the American Revolution is clear: the enjoyment of the natural resources of the Commonwealth is deeply and firmly established at the level of the organic law of Massachusetts.

---

[27] The Massachusetts Body of Liberties, Article 16. https://history.hanover.edu/texts/masslib html

[28] The Charter of Massachusetts Bay - 1691. https://avalon.law.yale.edu/17th_century/mass07.asp.
[29] Ibid.

V. History: Town, Colony, Province, and State Commons Regimes; the New England Commons Tradition in Historical Context

During the colonial period, the regulation of water resources occupied a position of *primus inter pares* among the concerns, and subjects for legislation, of the Towns of southeastern Massachusetts.

In Plymouth, at a Town Meeting held on April 22nd, 1672 – when Hale was Lord Chief Justice of England – the Town acted collectively to protect its anadromous fishery and valuable piscine resources; in other words, to guard its "publick common of piscary": "It was ordered by the Towne that the ffish Called the alewives be not hindered by the mills or otherwise in theire goeing np ; and that they be afforded water sufficient to Repaire to the salt water when the tfiood Gates are shutt downe and that none shall take any such ftish in theire Goeing up except for eating ; and that the wastgate be drawn up every Night in the season the ffish are goeing up and that Initt one ware be made for thein in theire Coming downe[.]"

To enforce this law, "Serjeant harlow and Jaboz howland are appointed l)y the Towne to see these orders Respecting the ffish be duely executed and pformed[.]"[30]

Alewives (*Alosa pseudoharengus*), a migratory and anadramous fish, annually enter Town Brook in Plymouth, and similar streams in her sister Towns, in vast profusion, passing through Cape Cod Bay on their way to their spawning grounds in the glacially-carved ponds of the region. Their preservation has been a concern since the 17th century in the government of the Town of Plymoiuth

Similar action guarding the Town of Plymouth's herring fishery was taken in the 18th century. At a Town Meeting held on March 18th, 1728, the Town "Voated that there be a Committe to prevent the Wasting & destroying of the fish called alewives the Committe are

[30] William T. Davis, *Records of the Town of Plymouth* (Plymouth: Avery & Doten, 1889), Vol. I, 131-32.

Decon John Foster Stephen Churchell Decon Haviland Torry Timothy Morton and Thomas Spoouer. Voted that none of the Inhabitants of the Town of Plymouth whatsoever shall take any of sd alewives fish either with nets or saines nor by beating of them in the Town Brooke or any where in the harbour of Plymouth and to put them into or auy other cask & Expose them to sale Excepting what they may have occation for to use themselves for baite & their families use."[31]

Similar measures were undertaken in Plymouth's sister Towns in their early centuries.

In Duxbury, the 1693 Town Meeting voted to enact a Town bylaw that stands as a direct, lineal descendant of Magna Carta's guarantee of the public nature of public waters.

Second, "At this Town meeting, the town do agree, that if the fisher men of Duxbury, shall clear Island Creek brook, that said men shall have liberty then to get herring for bait from time to time, without molestation; and to that end the town do agree, that if any, either English or Indian, do hinder them herein, by making of weirs, or hindering the fish from coming to the Pond, or going down, they shall thereby forfit five shillings for every time they so do, to be taken by distraint (from the person so transgressing) by the Constable, which the complainer shall have for his pains."[32] Fluvial legislation relating to the maintenance of the numerous teeming anadromous fish runs of Plymouth County would occupy the single clearest locus through which to see the ancient guardianship by the several towns of common rights and common liberties, including the public liberty of piscary referred to by Lord Hale above.

Indeed, the 17th, 18th, and 19th century Towns of Plymouth County were deeply concerned to preserve their supplies of anadromous fish, especially alewives – a tradition which continues today, with the regular, community-wide celebration of the fish in the form of the

---

[31] William T. Davis, *Records of the Town of Plymouth* (Plymouth: Avery & Doten, 1889), Vol. II, 257.

[32] George Etheridge, copyist. *Copy of the Old Records of the Town of Duxbury, From 1642 to 1770, Made in the Year 1892*. (Plymouth, Mass.: Avery and Doten, Book and Job Printers, 1893), 183-4.

annual Plymouth Herring Festival.[33]

Shellfish, too, were carefully stewarded by the Towns of Plymouth County. This can be seen in the Town of Wareham's early records. At the Wareham Town Meeting held on March 20th, 1775, the Town "Voted that there Should be no Shell fish nor Shells Sold nor carryed out of town."[34] The fact that the shellfish were reserved to the residents of the Town only is significant, since it shows the lineal ancestor of the contemporary means of shellfish regulation by the coastal Towns of Massachusetts via Town shellfishing license, overseen, typically, by an organ of Town Government, whether a Shellfish Committee (or Board), the Town's Harbormaster's Office, or both. Indeed, 1813 witnessed the creation of, so far as I can tell, the Town's first formal Shellfish Committee: the Town Meeting took action "for the purpose of chuseing a Committee to protect the Shell fish + act on all matters."[35]

Again, the several Towns of the region are shown by the historical record to have practiced a careful and exacting regulation of their natural resources, even in this early period.

In addition to the several Towns, the Government of the Colony of Massachusetts Bay (1630-1691), the Royal Province of Massachusetts Bay (1691-1774) into which the Colony of New Plymouth was absorbed, and which came under the aegis of Massachusetts law, per Watuppa v Fall River, and the Commonwealth of Massachusetts (1780-Present) all passed statutes carefully guarding the fisheries of our public waters.

---

[33] Evelyn Strawn, "Herring return to Plymouth," *The Old Colony Memorial*, April 16, 2022. https://www.wickedlocal.com/story/old-colony-memorial/2022/04/16/herring-return-plymouth/7270198001/

[34] Wareham Town Meeting, March 20, 1775, in Wareham Town Book. The only extant copy of the great majority of the town records, made by hand around the turn of the 20th century from the disintegrating originals, is located at the Wareham Free Library, 59 Marion Road, Wareham MA 02571.

[35] Wareham Town Meeting, July 26th, 1813, adjourned to August 3rd, when the members of the committee concerning shellfish were chosen.

The 1641 Massachusetts Body of Liberties, which extended to the former Plymouth Colony when the latter was absorbed into the new Royal Province of Massachusetts Bay, is likewise instructive in terms of making real, in the New World, Hale's public common of piscary in the 17th century:

" Every Inhabitant that is an howse holder shall have free fishing and fowling in any great ponds and Bayes, Coves and Rivers, so farre as the sea ebbes and flowes within the presincts of the towne where they dwell, unlesse the free men of the same Towne or the Generall Court have otherwise appropriated them, provided that this shall not be extended to give leave to any man to come upon others proprietie without there leave."[36]

During the period of the Royal Province of Massachusetts Bay, the General Court passed dozens of statutes relating to the preservation of the fishery. One may stand in for all of them, namely Chapter 21 of the 1735-36 Province Laws, 3rd Session, "An Act To Prevent the Destruction of the Fish Called Alewives" (1735). In this statute, the General Court came down squarely on the side of preserving the "publick common of piscary" rather than encouraging private industrial activity:

"Notwithstanding the provision by law already made for removing incumbrances obstructing the natural or usual course of fish, in their season, in brooks or rivers, yet no sufficient remedy is provided where such obstruction is occasioned by dams erected for mills, &c., which is to the grievous damage of his majesty's good subjects in diverse parts of this province, more especially where such dams have been made across rivers through which alewives or other fish have been wont to pass, in great plenty, into ponds, there to cast their spawns ; wherefore, to prevent the like inconvenience and damage for the future,

[36] The Massachusetts Body of Liberties, Article 16. https://history.hanover.edu/texts/masslib html

Be it enacted by His Excellency the Governour, Council and Representatives in General Court assembled, and by the authority of the same,

[Sect. 1.] That no dam shall, hereafter, be erected across any river or stream, thro' which alewives or other fish have been accustomed to pass into ponds, in which there is not made and left a convenient sluice or passage for such fish, on penalty that the owner or owners of such dam shall, upon conviction of failure or neglect therein, before any' court proper to try the same, forfeit and pay the sum of fifty pounds….”[37]

Even at this early date, then, the Great and General Court took very seriously its duty to protect the fishery, and enacted laws to carry out that purpose.

With the advent of the American Revolution and the establishment of the new, republican government of the Commonwealth of Massachusetts in 1780, the duty to preserve the fishery passed to the new General Court (John Adams excised “Great” from the title of the legislature in the new constitution). That it did so can be seen from an 1836 statute passed by the legislature, “An Act To Regulate The Alewive Fishery In The Town Of Wellfleet,” on the eastern shore of Cape Cod Bay.

Section 1 of the Statute empowered the Selectmen of Wellfleet to regulate the time and place of the taking of alewives: “Thc Selectmen of thc town of Wellfleet, for the time being, may, in the month of March or April annually, prescribe the time, place or places, and manner of taking alewives, in the creeks and brooks in the town of Wellfleet, such time not to exceed four days in a week….”[38]

---

[37] “An Act to Prevent the Destruction of the Fish Called Alewives,” (1735); https://archives.lib.state ma.us/handle/2452/117878.
[38] 1836 Chap. 0056 An Act To Regulate The Alewive Fishery In The Town Of Wellfleet, Sec. 1. https://archives.lib.state ma.us/bitstream/handle/2452/106983/1836acts0056.pdf?sequence=4&isAllowed=y

The penalty for violating the act set forth in Section 3, like that from the alewife statute a century prior, was again significant, a sign of just hnow seriously the General Court took its duty to preserve the fishery.

"If any person shall take any of the fish Penalty. aforesaid in the creeks or brooks or ponds in which said fish cast their spawn, at any time or in anv place or manner, other than shall be allowed by said selectmen as aforesaid, each person so offending, for each and every offence on conviction thereof, shall pay a fine not exceeding twenty dollars."[39]

Nearly a hundred years later, the legislature's concern with the preservation of the alewife fishery had extended beyond the coastal herring runs and fluvial commons to the waters of the sea and its arms. This can be seen via an examination of a 1933 statute, Chapter 118 of the Acts of 1933, "An Act Prohibiting The Taking Of Certain Herring Or Alewives From The Waters Of Plymouth Harbor, Kingston Bay, Duxbury Bay And Certain Waters Of Plymouth Bay":

"Whoever takes any herring or alewives less than four inches in length from the waters of Plymouth harbor, Kingston bay, Duxbury bay or from that part of the waters of Plymouth bay lying westerly of an imaginary line drawn from the northeasterly extremity of Rocky Point to Gurnet Light, shall be punished by a fine of not less than five nor more than fifty dollars."[40]

Here, then, approximately four decades prior to the enactment of the Massachusetts Ocean Sanctuaries Act and the designation of Cape Cod, Duxbury, Kingston, and Plymouth Bays as ocean sanctuaries (on which more below at Section _), we see a significant precedent: the legislature extending its concern with the alewife fishery beyond coastal streams and into the waters of the several bays of the region.

---

[39] Ibid., Sec. 3.

[40] 1933 Chap. 0118. An Act Prohibiting The Taking Of Certain Herring Or Alewives From The Waters Of Plymouth Harbor, Kingston Bay, Duxbury Bay And Certain Waters Of Plymouth Bay. https://archives.lib.state ma.us/bitstream/handle/2452/63064/1933acts0118.pdf?sequence=3&isAllowed=y

Why all of the above is relevant is for the simple reason that *precedent matters*. Precedent is the ultimate guiding principle of the Common Law as a larger system of jurisprudence, and the historical precedents, in addition to the legal precedents cited above, are very clear: from a very early date, the Towns of Plymouth County, and our sibling Towns on Cape Cod and beyond, have exercised an extremely close and careful control over their natural resources and the stewardship thereof. Holtec's proposed discharge, in support of which they have applied to modify their existing permit, stands contrary to this long continuity of historical precedent, and to the enduring and continuing commons tradition – both *de jure* and *de facto* – in the several Towns surrounding Cape Cod Bay.

In its totality, the historical evidence evinces the existence of a legal-social-political-economic structure, extremely rare if not singular in global terms, which I call The New England Commons Tradition.[41] There is a historical reason why the New England states have, compared with their sister states both near and far, a more vigorous complex of public preservation, conservation, and use of public lands and waters. Compared with their sister states, especially in the West, the New England states possess a very active and powerful system of state parks, forests, beaches, and other public lands, just as we possess active and powerful state governments. The several Towns since their earliest human occupation, and their inception as bodies politic starting in the 17th century, have likewise exercised directly democratic authority over their natural resources, and indeed, jealously guarded their commons, including their oceanic and piscine commons. There has even developed a unique body of New England common law, for instance, as relates to Great Ponds and their inherently and indefeasibly public

[41] My thinking here follows Robert McCullough, *The Landscape of Community: A History of Communal Forests in New England* (Hanover, NH: University Press of New England, 1995).

nature.[42]

When the numerous non-profit land trusts, reservations, and other institutions that have put land into conservation across New England – land that, though held privately, is open to public purpose and enjoyment – are included in this calculus, the strength and depth of the New England Commons tradition can be further seen, undergirded by a veritable thicket of institutions. Indeed, at the level of public opinion, the results of a 2014 Pew poll are relevant. This poll found that the overwhelming majorities of the public New England states show overwhelming support for the statement "Stricter environmental laws and regulations are worth the cost." (In Connecticut, 64% of respondents agreed with the statement; in Maine, 62%; in Massachusetts, 63%; in New Hampshire, 66%; in Rhode Island, 65%; in Vermont, 70%).[43]

In a very direct sense, the fact is that compared with other states, Massachusetts's beaches bear remarkably few high-rise luxury hotels perched on ephemeral barrier beaches. I am not saying that in jest, either – the preservation of public lands and waters, understood as public things, *res publicae*, flowed from the communitarian culture of the early Puritan and Separatist settlers of New England, shaped itself shaped both by the influences of 17th century Reformed Protestantism and the distinctive East Anglian regional culture of the early settlers. This juridical and political-economic tradition has, in "the eternal youth" (Louis D. Brandeis) of the Common Law, adapted to conditions far removed from its inception: it guides, in the present, a multicultural, 21st century democracy, the Commonwealth of Massachusetts, as it faces new

---

[42] *Concord Co. v. Robertson,* 66 N.H. 1, 4 (N.H. 1889). For an examination of New England Common Law, see Lincoln Smith, "The Great Pond Ordinance - Collectivism in Northern New England," 30 B.U. L. Rev. 178 (1950).

[43] Pew Research Center 2014 Religious Landscape Survey (RLS-II)
Topline, June 4-September 30, 2014, N=35,071.
https://assets.pewresearch.org/wp-content/uploads/sites/12/2016/02/topline-RLS-environment-regs-by-state-NUM-CHECKED-2-18-16.pdf

challenges like climate change[44] and the broader ecological crisis.

[44] The argument that nuclear energy is somehow carbon neutral and even a force for climate justice recalls lines from Act I, Scene 3, of William Shakespeare's *Othello*: "twas strange, 'twas passing strange,/ 'Twas pitiful, 'twas wondrous pitiful."

This viewpoint neglects to factor into the equation the fact that the mining and processing of uranium are carbon-intensive activities. As Ann Wills, of London, United Kingdom, wrote in a letter published in *New Scientist*, on September 27, 2017, "Eric Kvaalen points out that nuclear energy production isn't green because no way has been found to deal with the problem of nuclear waste (Letters, 2 September). Nuclear power is being "sold" to the public by saying it doesn't emit carbon dioxide. Though nuclear reactors emit little CO2 at the point of generation, they are just a small part of the nuclear fuel cycle.

Uranium mining, milling the ore, converting it to uranium hexafluoride, enriching that and fabricating fuel rods all emit large amounts of CO2. Much energy is also used in the treatment, conditioning, transport and disposal of nuclear products.

Jan Willem Storm van Leeuwen and Philip Smith found that nuclear generation produces a third as much CO2 per unit of electricity generated as conventional, mid sized, gas-fired electricity generation – and more if lower-grade ores have to be mined. Decommissioning old radioactive nuclear power stations also consumes energy."

https://www.newscientist.com/letter/mg23531450-700-7-generating-nuclear-power-also-emits-carbon/

Moreover, while advocates of a putatively "green" nuclear energy frequently point to industrialized countries like France and its reliance on nuclear energy as its primary source of power. What they do not mention is that in order to obtain the requisite uranium for its nuclear energy production, France has relied on an extension of its old colonial empire in West Africa, known to observers as *Francafrique*, an informal system of neocolonial economic and military control, to provide uranium for its nuclear industry. The Coup in Niger in the summer of 2023 has taken place in a place where France is deeply concerned to control supplies of uranium:
https://www.theguardian.com/commentisfree/2023/aug/05/niger-crisis-france-empire-africa-coup-colony

I would posit that neocolonial mining operations across the Sahel are not the shining example of social justice that some of our interlocutors appear to believe them to be.

This is to say nothing of the environmental consequences of radioactive waste produced by the mining of uranium – which surely should enter the calculus of any voices which profess concern for climate justice. Interestingly, as we shall note below in the section discussing Massachusetts Environmental Justice populations, those voices which argue, tendentiously, for Holtec's discharge on the grounds of a blanched and attenuated vision of environmental justice, somehow never seem to take the view that principles of environmental justice apply not just in distant locales, but in their own and neighboring Towns, as well. Principles of environmental justice apply universally – to environmental justice populations in Plymouth and Barnstable Counties, Massachusetts, as well as to populations in counties where licensed radioactive waste facilities are located.

Yet, tendentious arguers for pro-nuclear industry policies on spurious grounds of environmental justice rarely seek to apply these principles locally – only in far away places, and only in far away places where uranium is not mined (for some reason, these locales, too, are granted an exception). Query why that is.

Indeed, the notion that the nuclear industry is a force for environmental justice is frankly either jejunely naive, highly partial, materially interested, or some combination of the three.

The proper answer of the Commonwealth to the climate crisis must be a continuation of our commons tradition, both *de jure* and *de facto*. That emphatically **does not** include allowing private corporation's to treat public waters as the dumping ground for industrial waste. Prudential considerations and the experience of nuclear accidents in the United States, USSR, and Japan militate against accepting any form of energy with such a grievously dangerous tail-end risk.

The New England Commons Tradition is a rare and precious heritage, one that the Department must carefully guard and ensure the continuation of; this entire tradition, with its enormous weight of historical and legal precedent, stands counter to Holtec's application to modify its permit. In defense of this tradition, the Department should therefore deny Holtec's application.

VI. There Is No Federal Preemption In This Instance

In the June, 2020 Settlement Agreement between the Massachusetts Attorney General's office and Holtec – a contract into which Holtec freely entered – both parties agreed that "Holtec shall comply with all applicable environmental and human-health based standards and regulations of the Commonwealth;" (Settlement Agreement, III (10)(l)).[45]

Further, No. 16 in the Settlement Agreement states that "Nothing in this Agreement shall release any person from the obligation to investigate and remediate new, undiscovered, or undisclosed releases of radiological contamination or non-radiological oil or hazardous materials in accordance with federal or Massachusetts statutes and regulations."[46]

Critically, at No. 48 in the Settlement Agreement, **Holtec agreed not to make any Federal preemption arguments**.

"48. Validity. No Party to this Agreement (or any person or entity affiliated or related to a Party to this Agreement) shall assert that any provision of this Agreement (or the Agreement

---

[45] Settlement Agreement III (10) (l), https://www.nrc.gov/docs/ML2109/ML21096A083.pdf, 14.

[46] Settlement Agreement III (16), https://www.nrc.gov/docs/ML2109/ML21096A083.pdf, 17-18.

itself) is invalid under any federal law or any provision of the U.S. Constitution."[47]

Contracts are not preempted, and Holtec is contractually bound **not to argue preemption**.

Even if the Settlement Agreement did not exist – and it is a very good thing that it does – United States case law supports the contention that there is no preemption. The United States Supreme Court has held on four separate occasions that while Congress granted the field of nuclear safety to the Nuclear Regulatory Commission (NRC), under the United States Constitution, States retain their legitimate authority to regulate their individual economies, and that states may regulate nuclear matters in that capacity, and indeed, in those capacities not ceded by Congress to the NRC, i.e., those not relating to nuclear safety. The Court ruled that there is only preemption if there is a contradiction between Federal and State laws and regulations. Since there is no Federal law or regulation requiring Holtec to discharge this water – it simply wishes to, for financial reasons – there is no contradiction between Massachusetts and Federal laws and regulations. Precedent therefore impels the conclusion that there is no federal preemption in this instance.

See *Pacific Gas & Electric Co. v. State Energy Resources Conservation & Development Commission*, 461 U.S. 190 (1983); *English v. General Electric Co*., 496 U.S. 72 (1990); *Silkwood v. Kerr-McGee Corp*., 464 U.S. 238 (1984); *Virginia Uranium, Inc. v. Warren*, 587 U.S. ___ (2019).

Justice Harry Blackmun, joined by Justice John Paul Stevens in a concurring opinion in *Pacific Gas & Electric Co. v. State Energy Resources Conservation & Development Commission,* dismissed the idea that Federal preemption could be use as a kind of blank check by the nuclear

[47] Settlement Agreement VI (48), https://www.nrc.gov/docs/ML2109/ML21096A083.pdf, 29.

industry to avoid regulation by the several states:

"Federal pre-emption of the States' authority to decide against nuclear power would create a regulatory vacuum. See Wiggins, Federalism Balancing and the Burger Court: California's Nuclear Law as a Preemption Case Study, 13 U. C. D. L. Rev. 3, 64 (1979). In making its traditional policy choices about what kinds of power are best suited to its needs, a State would be forced to ignore the undeniable fact that nuclear power entails certain risks. While the NRC does evaluate the dangers of generating nuclear power, it does not balance those dangers against the risks, costs, and benefits of other choices available to the State or consider the State's standards of public convenience and necessity."[48]

Writing for the unanimous Court in *English v. General Electric*, Justice Harry Blackmun noted the logically absurd conclusions towards which the arguments from the nuclear industry drive: "In addressing this issue, we must bear in mind that not every state law that in some remote way may affect the nuclear safety decisions made by those who build and run nuclear facilities can be said to fall within the preempted field. We have no doubt, for instance, that the application of state minimum wage and child labor laws to employees at nuclear facilities would not be preempted, even though these laws could be said to affect tangentially some of the resource allocation decisions that might have a bearing on radiological safety."[49]

Thus, even if the Settlement Agreement did not exist, the decisions of the high court would argue against any preemption claims from Holtec – claims, it should be noted, which they *agreed not to make in the Settlement Agreement*.

---

[48] *Pacific Gas & Elec. Co. v. State Energy Resources Conservation and Development Comm'n,* 461 US 225 (1983).
[49] *English v. General Electric Co*., 496 U.S. 85 (1990).

VII. Massachusetts Statutory Law

Because there is no preemption, Massachusetts laws are relevant in the question of Holtec's proposed discharge of the 1.1 million gallons of industrial wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. At least four statutes are relevant, and all plainly prohibit the discharge for which Holtec seeks a permit modification: The Massachusetts Ocean Sanctuaries Act, the Massachusetts Endangered Species Act, the Oil and Hazardous Waste Act, and the Crimes Against Public Health Act. Let us examine each of these in turn.

The Massachusetts Ocean Sanctuaries Act, M.G.L. c.132A Secs 12A-16J inclusive and Sec. 18, is the statute which the Department correctly relies upon in its July 24th determination denying Holtec's application to modify its permit. Multiple provisions in this law forbid Holtec from dumping.

The first is in Section §13(b), in which the statute defines all of Cape Cod Bay, inclusive of Duxbury, Kingston, and Plymouth Bays, as a protected Ocean Sanctuary:

"The Cape Cod Bay Ocean Sanctuary is bounded and described as follows: That body of water known as Cape Cod Bay and lying southerly of the Bay Closing Line between Brant Rock in the Town of Marshfield and Race Point in the town of Provincetown as established on the aforementioned Marine Boundary Map of the Commonwealth, and lying seaward of the mean low-water line; meaning and intending to include: all of that water area and seabed lying in a southerly direction from the aforementioned closing line; all of Provincetown Harbor including portions which may be easterly or northerly of the aforementioned closing line, Wellfleet, Plymouth, and Barnstable Harbors; Plymouth, Kingston, and Duxbury Bays; and the Cape Cod Canal Northerly of the Bourne–Sandwich town boundary, and excluding the water area and

seabed of the Cape Cod National Seashore as established by Act on Congress (1961, P.L. 87–126)."[50]

Section 14 of the Ocean Sanctuaries Act affirms the power and the duty of the Office of Coastal Zone Management (CZM) and the Department of Environmental Protection (MassDEP) to care for Ocean Sanctuaries. "All ocean sanctuaries as described in section thirteen shall be under the care, oversight and control of the office and shall be protected from any exploitation, development, or activity that would significantly alter or otherwise endanger the ecology or the appearance of the ocean, the seabed, or subsoil thereof, or the Cape Cod National Seashore."[51]

Section 15(4) of the Act prohibits the "the dumping or discharge of commercial, municipal, domestic or industrial wastes" into any ocean sanctuary:

"Except as otherwise provided in this section, the following activities shall be prohibited in an ocean sanctuary: ….(4) the dumping or discharge of commercial, municipal, domestic or industrial wastes; provided, however, that the department may approve a new or modified discharge of municipal wastewater from a POTW in accordance with section 16G;"[52] as will be shown below, the proposed wastewater discharge in question does not qualify for the exemptions laid out at Section 16.

Finally, at Section 18, the Act forbids the Commonwealth from permitting any activities which are prohibited under the Act: "All departments, divisions, commissions, or units of the executive office of energy and environmental affairs and other affected agencies or departments of the commonwealth shall issue permits or licenses for activities or conduct their activities consistently with the act, and shall not permit or conduct any activity which is contrary to the provisions of the Act."

---

[50] M.G.L. c.132A Sec. 13(b).
[51] M.G.L. 132A § 14.
[52] M.G.L. 132A § 15(4).

It is therefore useful to see how Holtec characterizes the industrial wastewater in question in its application. In Section G of the application, Holtec writes that "The pollutants detected in the treated water that are not subject to promulgated ELGs [effluent limit guidelines] for the industry category and discharge type associated with Outfall 015 include chemical oxygen demand (COD), boron, copper, lead, nickel and zinc."[53] The application continues: "Copper (1.39 µg/L) and lead (0.660 µg/L) are present in the treated water at very low concentrations and will be further reduced in the untreated wastewater after blending with the volumes in the Spent Fuel Pool and Reactor Cavity/Dryer Separator Pit which do not contain detectable concentrations of these metals. Zinc is present at 36.1 µg/L in the treated water and also will be reduced in the blended water. Lead and zinc will likely be diluted to non-detectable levels after mixing with the Ouŋall 010 flow in the discharge canal. The concentration of copper in the treated water (1.39 µg/L) is similar to the concentration in the intake water (1.69 µg/L) and will therefore have little to no effect on the receiving water ambient concentration."[54]

What these statements from Holtec show are three things: the first is that there will be, even after treatment, by their own admission, pollutants in the water, thereby contravening the Ocean Sanctuaries Act. The second point that is necessary to note is that Holtec seems to operate under a mistaken premise, that effluent guideline limits, or ESGs, are relevant here: but they are not. The Ocean Sanctuaries Act does not admit of ESGs, and its standard is clear, and it is strict: no industrial waste, including wastewater, may be discharged into any ocean sanctuary, including Cape Cod Bay. The third thing to note is that Holtec is essentially admitting, in plain sight, how it intends to "game the system" in order to make its pollutants undetectable. But undetectable, as the above shows, is not the same as "not present." And by Holtec's own admission, both the

---

[53] Holtec application,
https://www mass.gov/doc/holtec-wm07-application-for-a-swd-permit-modification/download,Section G.
[54] Ibid.

radiological pollutant tritium, as well as chemical pollutants – together constituting "industrial waste" (see below) under the meaning of the act – are present.

Indeed, the 1.1 million gallons of industrial wastewater which Holtec seeks to discharge into Cape Cod Bay is in fact covered by the Ocean Sanctuary Act's definition of "waste." By Holtec's own admission, the water in question will contain not only the chemical pollutants discussed above, but also tritium, a radioactive isotope of hydrogen which cannot be filtered out. Because of this, the water in question is plainly waste under the definition given at 301 CMR 27.02: "Wastes means any unwanted, discarded, or environmentally harmful solid, liquid, or gaseous materials resulting from commercial, municipal, domestic, or industrial Activities…."[55]

Holtec appears to operate under the illusion that Massachusetts statutes treat pollutants in the same fashion as Federal laws. Massachusetts laws draw no distinction between radiological and non-radiological pollutants, and the Ocean Sanctuaries Act in particular lays down a very exacting standard: *no industrial waste may be discharged into an ocean sanctuary.*

For all of these reasons, the Ocean Sanctuaries Act prohibits the discharge in question. The petitioner's application is facially illegal and must be denied.

Spurious and pettifogging assertions that the industrial wastewater in question for the present permit application will be rebutted in the section below dealing with counter-arguments. In addition, as will be explained below, the permit modification application before the Department is not covered by any of the exceptions or legacy uses specified under the Act.

The Mass. Endangered Species Act, M.G.L. c.131A, likewise prohibits the discharge of the industrial wastewater in question. At Section 2, the Act states that "Except as otherwise provided in this chapter, no person may take, possess, transport, export, process, sell or offer for

[55] 301 CMR 27.02.

sale, buy or offer to buy, nor shall a common or contract carrier knowingly transport or receive for shipment, any plant or animal species listed as endangered, threatened or of special concern or listed under the Federal Endangered Species Act."[56]

In addition, "Except as otherwise provided in this chapter, no person may alter significant habitat."[57]

The definitions of these relevant terms are provided at Section 1. According to that section, "take" means "in reference to animals, 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, and in reference to plants, to collect, pick, kill, transplant, cut or process or attempt to engage or to assist in any such conduct."[58] This definition, it should be noted, is echoed in the definition of "take" included in the MESA regulations at 321 CMR 10.02: "Take, in reference to animals, means 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, and in reference to plants, means to collect, pick, kill, transplant, cut or process or attempt to engage or to assist in any such conduct. **Disruption of nesting, breeding, feeding or migratory activity may result from, but is not limited to, the modification, degradation or destruction of Habitat.**" (Emphasis added).

"Endangered species" is defined as "any species of plant or animal in danger of extinction throughout all or a significant portion of its range including, but not limited to, species listed from time to time as "endangered" under the provisions of the Federal Endangered Species Act of 1973, as amended, and species of plants or animals in danger of extirpation, as

---

[56] M.G.L. c.131A Sec. 2.
[57] Ibid.
[58] M.G.L. c.131A Sec. 1

documented by biological research and inventory."[59]

"Alter" is defined as "to change the physical or biological condition of a habitat in any way that detrimentally affects the capacity of the habitat to support a population of endangered or threatened species."[60]

"Special habitat" is defined as "specific areas of the commonwealth, designated in accordance with section four, in which are found the physical or biological features important to the conservation of a threatened or endangered species population and which may require special management considerations or protection."[61]

321 CMR 10 is the relevant portion of Commonwealth regulations, promulgated by the Mass. Division pursuant to M.G.L. c.131A. At 321 CMR 10.01(2), describing the purpose of the regulations, it states "The purpose of 321 CMR 10.00 is to define and clarify the procedures and rules necessary for the agency to carry out responsibilities under M.G.L. c. 131A, Massachusetts Endangered Species Act. 321 CMR 10.00 establishes a comprehensive approach to the protection of the Commonwealth's Endangered, Threatened, and Special Concern species and their habitats. Regulations include provisions for the protection of habitat areas (Significant Habitat) where in the Division's opinion a Project or Activity would result in the Take of any Threatened or Endangered species."[62]

At 321 CMR 10.90, the Commonwealth lists the following species, all of which are found in Cape Cod Bay, and which constitutes their habitat: the North Atlantic Right Whale (*Eubalaena glacialis*) is listed as Endangered; Humpback Whales (*Megaptera novaeangliae*) are

---

[59] Ibid.
[60] Ibid.
[61] Ibid.
[62] 321 CMR 10.01(02)

listed as Endangered; the Roseate tern (*Sterna dougallii*) is listed as Endangered; the Piping Plover (*Charadrius melodus*) is listed as Threatened.[63]

The North Atlantic Right Whale and Roseate Tern are listed as Endangered, and the Piping Plover as Threatened, by the Federal government at 50 CFR § 17.11.[64] The North Atlantic population of the Humpback Whale is not a federally listed species, though the species is covered by the U.S. Marine Mammals Protection Act of 1972 (16 U.S.C. 1361),[65] and, as noted above, is listed as Endangered by the Commonwealth of Massachusetts.

All of these species have been found in Cape Cod Bay, and some in particular rely on Cape Cod Bay for feeding activity and/or the rearing of their offspring.

The North Atlantic Right Whale is listed as Endangered at 321 CMR 10. According to the Massachusetts Natural Heritage and Endangered Species Program (NHESP),"North Atlantic Right Whales concentrate in Cape Cod Bay and the Great South Channel east of Nantucket Island in small numbers from December to March, and in larger numbers in April and May. These areas are important feeding grounds for the species because of the unusually dense concentrations of zooplankton." NHESP notes that "North Atlantic Right Whales are occasionally observed from the beaches of Cape Cod in the spring, where they generally feed on zooplankton, including copepods, euphausiids, and cyprids."[66]

NHESP describes the North Atlantic Right Whale population: "It is believed that the western North Atlantic Right Whale population now includes about 450 individuals."[67] According to an April 2nd, 2023, story by Emma Bowman of National Public Radio, approximately 70 Right Whales were observed last spring in Cape Cod Bay, constituting about

---

[63] 321 CMR 10.90
[64] 50 CFR § 17.11. https://www.law.cornell.edu/cfr/text/50/17.11.
[65] See https://www.fisheries noaa.gov/species/humpback-whale#overview
[66] Natural Heritage and Endangered Species Program, Mass. Division of Fisheries & Wildlife, "The North Atlantic Right Whale, *Eubalaena glacialis*," https://www.mass.gov/doc/north-atlantic-right-whale/download, 1.
[67] Ibid, 2.

one fifth of the total population of the species.[68] The National Marine Fisheries Service (NOAA Fisheries) designates Cape Cod Bay and adjacent waters as Critical Habitat for Right Whales, as shown in the map below, and as described in a December, 2015 source document. Cape Cod Bay is particularly important as a feeding ground in the late winter and early spring, according to this document: "In New England, peak abundance of feeding right whales occurs in Cape Cod Bay, usually beginning in late winter: "In New England, peak abundance of feeding right whales occurs in Cape Cod Bay, usually beginning in late winter. In early spring (May), peak right whale abundance occurs in Wilkinson Basin to the Great South Channel (Kenney et al. 1995). In late June and July, right whale distribution gradually shifts to the Northern Edge of Georges Bank. In summer and fall, much of the population is found in the Bay of Fundy and around Roseway Basin (Winn et al. 1986, Kenney et al. 1995, Kenney et al. 2001)."[69]

The document further describes the importance of Cape Cod Bay as habitat for the North Atlantic Right Whale: "Within the geographical area occupied by the species, the specific area on which are found the combination of physical and biological features of foraging habitat that are essential to the conservation of North Atlantic right whales encompasses a large area within the Gulf of Maine-Georges Bank region, including the large embayments of Cape Cod Bay and Massachusetts Bay and deep underwater basins. This area incorporates state waters from Maine through Massachusetts, as well as federal waters."[70]

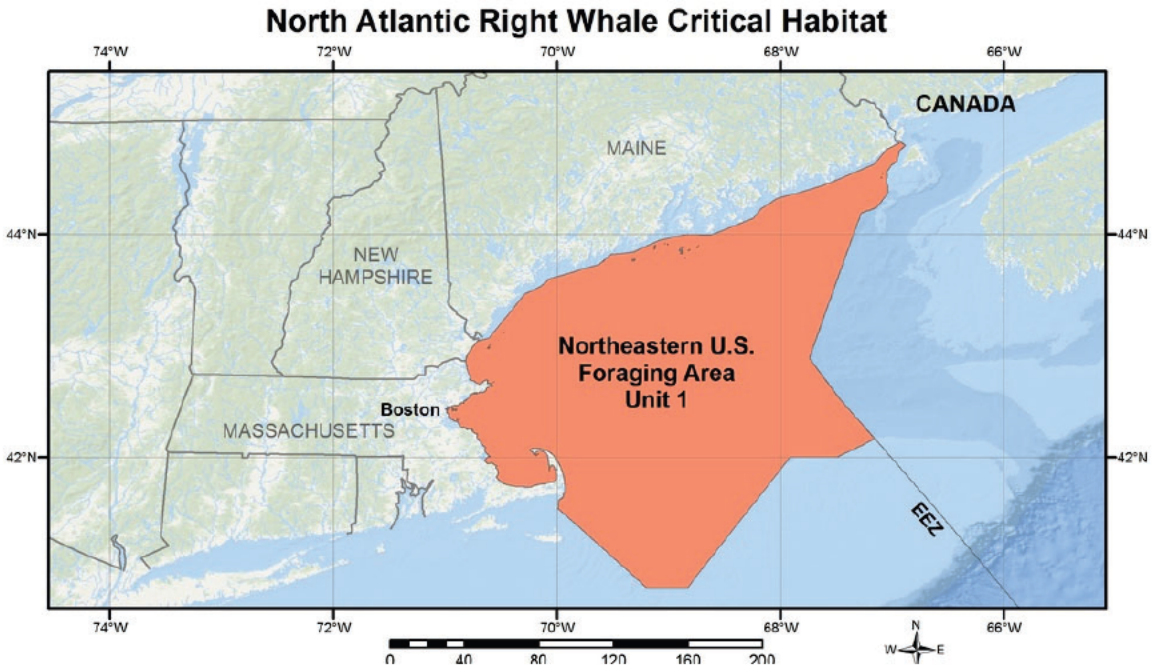
---

[68] Emma Bowman, "Up to 70 North Atlantic right whales were spotted in Cape Cod Bay," NPR, April 2, 2023, https://www.npr.org/2023/04/02/1167631441/north-atlantic-right-whale-cape-cod-tangled.

[69] NOAA Fisheries, *North Atlantic Right Whale (Eubalaena glacialis)*
Source Document for the Critical Habitat Designation: A review of information pertaining to the definition of "critical habitat", December 2015.
https://media.fisheries.noaa.gov/dam-migration/16narwchbiologicalsourcedocument122115-508.pdf, 13.

[70] Ibid., 73.

NOAA Fisheries provides the following map of designated critical habitat for North Atlantic Right Whales, including Cape Cod Bay.



(*North Atlantic Right Whale Critical Habitat Northeastern US Foraging Area Unit 1, via NOAA Fisheries:* *https://www.fisheries.noaa.gov/resource/map/north-atlantic-right-whale-critical-habitat-map-and-gis-data*[71])

As with both Piping Plovers under M.G.L. c. 131A below, and as with the Crimes Against Public Health Act below, there is an issue of fundamental fairness and of equal treatment under the law here. Both fishermen and state and federal regulators have made great effort – and it should be noted, often under contentious conditions – to balance the continued operation and existence of the Massachusetts fishing and seafood industry with the requirements of state and federal laws and regulations with respect to Atlantic Right Whale Habitat.[72] It is fundamentally

[71] https://www.fisheries.noaa.gov/resource/map/north-atlantic-right-whale-critical-habitat-map-and-gis-data.

[72] See, for example, Mary Whitfill, "Lobster closure extended; Massachusetts fishermen prepare for shortened season," *The Patriot Ledger*, May 3, 2022.

and flagrantly unfair that these efforts should be required of these parties, while Holtec seeks to openly violate the laws with what it presumes to be impunity.

But the laws do apply to Holtec, and they must comply with them, just as every other inhabitant of the Commonwealth and the United States must. Holtec is not entitled to ignore the laws simply because it is a multi-billion dollar corporation.

The Humpback Whale (*Megaptera novaeangliae*) is listed as Endangered at 321 CMR 10.90, and is found in the waters of Cape Cod Bay, though not in the same numbers and magnitude as the North Atlantic Right Whale. Nevertheless, as shown in a July, 2022, story in *The Boston Globe*, humpback whales do in fact venture into the waters of Cape Cod Bay for the purposes of feeding:

> "According to Chisholm and the Whale and Dolphin Conservation, a Plymouth-based nonprofit, humpback whales have been coming close to shore off Manomet Point to feed on an abundance of bait fish.
>
> "Although not commonly seen this close to shore, humpback whales will follow their food to shallower waters," the conservation group said.[73]

According to Massachusetts NHESP, "Humpbacks can be found feeding in the Massachusetts area from spring through fall. Common feeding grounds for these whales include Jeffery's Ledge, Stellwag[e]n Bank, and waters off the coasts of Maine, New Hampshire, Cape

---

[73] Shannon Lawson, "They take up every parking space': Whale watchers have been flocking to this spot in Plymouth; Humpbacks have been putting on a show off Manomet Point. But officials and business owners are asking people to be respectful of the area," *The Boston Globe,* July 22, 2022. https://www.bostonglobe.com/2022/07/22/metro/they-take-up-every-parking-space-whale-watchers-have-been-flocking-this-spot-plymouth/

Ann, and Cape Cod in the months of April through October. Northern whales bring their calves here to feed."[74]

The Piping Plover is listed as Threatened at 321 CMR 10.90. Critical habitat for Piping Plovers occurs throughout coastal Massachusetts, including the many sandy beaches surrounding Cape Cod Bay. NHESP describes Piping Plover (*Charadrius melodus*) habitat thus: "Piping Plovers in Massachusetts nest on sandy coastal beaches and dunes, which are relatively flat and free of vegetation. Piping Plovers often build their nests in a narrow area of land between the high tide line and the foot of the coastal dunes; they also nest in Least Tern colonies. Nesting may also occur on vegetated dunes and in eroded areas behind dunes."[75] According to NHESP, "Massachusetts has the largest breeding population of Piping Plovers along the Atlantic Coast."[76]

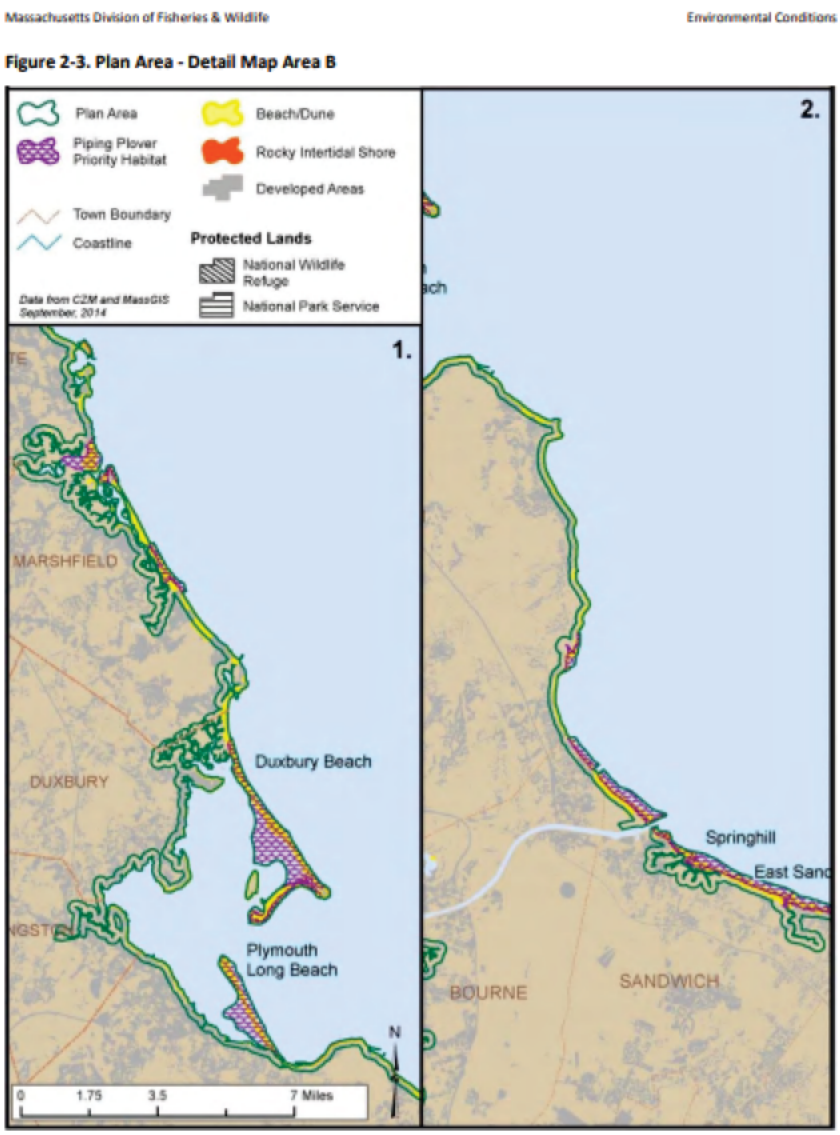
In the Massachusetts Piping Plover Habitat Conservation Plan, priority habitat for piping plovers is shown by Figures 2-3, 2-5, and 2-6 – on the western, eastern, and southern shores of Cape Cod Bay, respectively:

---

[74] NHESP Fact Sheet, Humpback Whale, *Megaptera novaeangliae*, https://www.mass.gov/doc/humpback-whale/download, 1.

[75] NHESP Fact Sheet, Piping Plover, *Charadrius melodus*. https://www.mass.gov/files/documents/2016/08/rp/charadrius-melodus.pdf, 1.

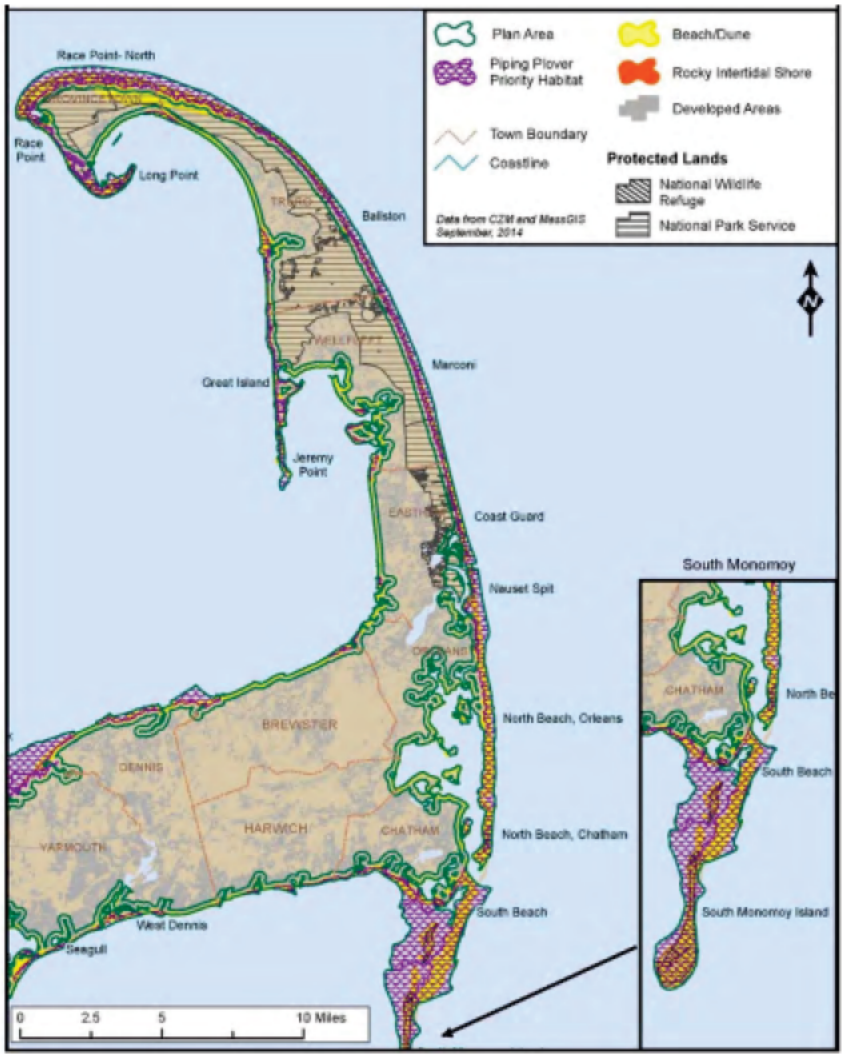
[76] Ibid., 2.



(Figure 2-3 from the 2015 Mass. Piping Plover Habitat Conservation Plan, showing Piping Plover Priority Habitat on the western shore of Cape Cod Bay, including Duxbury, Kingston and Plymouth Bays, as well as Ellisville Harbor, a Massachusetts Area of Critical Environmental Concern.)[77]

[77] https://www.mass.gov/doc/piping-plover-habitat-conservation-plan/download; on Ellisville Harbor ACEC, see https://www mass.gov/info-details/ellisville-harbor-acec.

Figure 2-5. Plan Area - Detail Map Area D (East)



(Figure 2-5 from 2015 Mass. Piping Plover Habitat Conservation Plan, showing the eastern shore of Cape Cod Bay, including the Wellfleet Harbor Area of Critical Environmental Concern.)[78]

[78] https://www.mass.gov/doc/piping-plover-habitat-conservation-plan/download; on Wellfleet Harbor ACEC, see https://www.mass.gov/info-details/wellfleet-harbor-acec.

Figure 2-6. Plan Area - Detail Map Area D (West)

(Figure 2-6 from the 2015 Mass. Piping Plover Habitat Conservation Plan, showing Piping Plover Priority Habitat on the southern shore of Cape Cod Bay, including the Sand Neck Barrier Beach System ACEC)[79]

The preservation of Piping Plover populations under both the U.S. and Massachusetts Endangered Species Acts has been a source of considerable controversy and heated comment in recent decades in the Towns of Plymouth County. The Federal and state governments, the governments of the several Towns, non-profit environmental and conservation organizations, and

[79] https://www.mass.gov/doc/piping-plover-habitat-conservation-plan/download; on Sandy Neck Barrier Beach System ACEC, see https://www mass.gov/info-details/sandy-neck-barrier-beach-system-acec.

the citizens of the Commonwealth have struggled to balance established use rights with the strictures of both the US and Massachusetts Endangered Species Acts and attendant regulations. Great and significant efforts have thus been made by a number of local actors to preserve this species. This burden has been significant, and has been the source of considerable rancor in our Towns.[80] Holtec is not exempt from the same standards with respect to Piping Plovers which apply to the several Towns and everyday beach-goers on the shores of Cape Cod Bay.

As with Atlantic Right Whales above, and as with the Crimes Against Public Health Act below, we approach here an issue of fundamental fairness and equality of treatment under the law. Holtec is not entitled to ignore the law simply because it is economically powerful, and simply because it believes laws ought not and therefore do not apply to it. They do apply to Holtec, and Holtec must respect the US and Massachusetts Endangered Species Acts in precisely the same ways the several Towns and environmental/conservation non-profit organizations, and the people of the Commonwealth must with respect to Piping Plover habitat.

The Roseate Tern is listed as Endangered at 321 CMR 10.90. NHESP notes that "In a sense, the Roseate Tern is emblematic of the Commonwealth, because for the past century, about half the northeastern population has nested in Buzzards Bay and outer Cape Cod." However, recent population trends are cause for concern: The Roseate is now considered an Endangered Species. The population, which increased from the 1980s through 2000, is now in decline. Several projects are in progress to restore the Roseate to historical breeding locations in Massachusetts."[81]

---

[80] See, e.g., Matthew Nadler, "Beachside Back and Forth," *The Duxbury Clipper*, August 16, 2023. https://www.duxburyclipper.com/articles/beachside-back-and-forth/
[81] NHESP Fact Sheet, "Roseated Tern *Sterna dougallii*," https://www.mass.gov/files/documents/2016/08/wh/roseate-tern.pdf, 1.

According to NHESP, there are three nesting Roseate Tern colonies located on Cape Cod Bay: one in the vicinity of Wellfleet Harbor, one in the vicinity of Barnstable Harbor, and one in the vicinity of Plymouth-Kingston-Duxbury Bays. The former two colonies were established prior to 1997; the latter colony was established after 1997.[82]

With respect to the petitioner's proposed discharge into Cape Cod Bay, MassDEP should apply in this instance the reasoning laid out by Justice Stevens in *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, that merely modifying a listed species' habitat constitutes a take under the U.S. Endangered Species Act (16 U.S.C. §1531 et seq.); precisely the same logic applies to the Massachusetts Endangered Species Act. Justice Stevens, writing for the Court, stated:

"The [United States] Secretary [of the Interior], on the other hand, submits that the § 9 prohibition on takings, which Congress defined to include "harm," places on respondents a duty to avoid harm that habitat alteration will cause the birds unless respondents first obtain a permit pursuant to § 10.

The text of the Act provides three reasons for concluding that the Secretary's interpretation is reasonable. First, an ordinary understanding of the word "harm" supports it. The dictionary definition of the verb form of "harm" is "to cause hurt or damage to: injure." Webster's Third New International Dictionary 1034 (1966). In the context of the ESA, that definition naturally encompasses habitat modification that results in actual injury or death to members of an endangered or threatened species.

---

[82] Ibid., 1.

Respondents argue that the Secretary should have limited the purview of "harm" to direct applications of force against protected species, but the dictionary definition does not include the word "directly" or suggest in any way that only direct or willful action that leads to injury constitutes "harm."[10] Moreover, unless the statutory term "harm" encompasses indirect as well as direct injuries, the word has no meaning that does not duplicate the meaning of other words that § 3 uses to define "take." A reluctance to treat statutory terms as surplusage supports the reasonableness of the Secretary's interpretation. See, *e. g., Mackey* v. *Lanier Collection Agency & Service, Inc.*, 486 U. S. 825, 837, and n. 11 (1988).[11]

Second, the broad purpose of the ESA supports the Secretary's decision to extend protection against activities that cause the precise harms Congress enacted the statute to avoid. In *TVA* v. *Hill*, 437 U. S. 153 (1978), we described the Act as "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation." *Id.,* at 180. Whereas predecessor statutes enacted in 1966 and 1969 had not contained any sweeping prohibition against the taking of endangered species except on federal lands, see *id.,* at 175, the 1973 Act applied to all land in the United States and to the Nation's territorial seas. As stated in § 2 of the Act, among its central purposes is "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved . . . ." 16 U. S. C. § 1531(b)."[83]

Given the language of c.131A, as well as the regulations at 321 CMR 10; and given the biological and ecological evidence regarding the importance of Cape Cod Bay for listed Endangered and Threatened Species, and interpreting these facts in light of Justice Stevens'

---

[83] *Babbitt, Secretary of Interior, et al. v. Sweet Home Chapter of Communities For a Great Oregon et al.* 515 U.S. 687 (1995), 697-698.

decision above in *Babbitt v. Sweet Home*, we are impelled to the conclusion that the discharge of 1.1 million gallons of radioactively and chemically contaminated wastewater would modify the critical breeding and offspring-raising habitat of Cape Cod Bay for the Right Whale, the Roseate Tern, and the Piping Plover. It would therefore constitute a "take" under the Massachusetts Endangered Species Act, as well as under the United States Endangered Species Act.

There are at least two further Massachusetts statutes which prohibit the discharge proposed by Holtec, and therefore impel the conclusion that MassDEP must deny Holtec's permit modification application.

The Mass. Oil and Hazardous Hazardous Material Release Prevention Act, M.G.L. c. 21E, is likewise relevant here – it prohibits the proposed discharge, and therefore provides further reason that MassDEP should deny Holtec's permit modification request. The industrial wastewater in question plainly falls under the definition of "hazardous material" under the Act (M.G.L. c. 21E Sec. 2): "Hazardous material" is defined as "material including but not limited to, any material, in whatever form, which, because of its quantity, concentration, chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to human health, safety, welfare, or to the environment, when improperly stored, treated, transported, disposed of, used, or otherwise managed."[84]

Again at Section 2, the Act defines "waters of the commonwealth" as "all waters within the jurisdiction of the commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, coastal waters and groundwaters. The term shall not include impoundments of chemical wastes."[85]

---

[84] M.G.L. c.21E Sec. 2
[85] Ibid.

"Response action" is defined as "assess, assessment, contain, containment, remove and removal."[86]

Section 4 of Chapter 21E seems relevant to the present situation with Holtec's industrial wastewater and MassDEP's authority to prevent the release of hazardous material:

"The department, whenever it has reason to believe that oil or hazardous material has been released or that there is a threat of release of oil or hazardous material, is authorized to take or arrange for such response actions as it reasonably deems necessary."[87]

In addition, MassDEP is authorized at Section 6 of the Act to prevent the release of hazardous material:

"The department may specify reasonable requirements, applicable to sites and vessels where releases of hazardous material or oil might occur and to activities which might cause, contribute to, or exacerbate a release of hazardous material or oil, to prevent and control, and to counter the effects of, such releases."[88]

The Crimes Against Public Health Act, M.G.L. c. 270 Sec. 16, is also relevant here. This section states that "Whoever places, throws, deposits or discharges or whoever causes to be placed, thrown, deposited or discharged, trash, bottles or cans, refuse, rubbish, garbage, debris, scrap, waste or other material of any kind on a public highway or within 20 yards of a public highway, or on any other public land, or in or upon coastal or inland waters, as defined in section 1 of chapter 131, or within 20 yards of such waters, or on property of another, or on lands dedicated for open space purposes, including lands subject to conservation restrictions and agricultural preservation restrictions as defined in chapter 184, shall be punished by a fine of not

[86] Ibid.
[87] M.G.L. c. 21E Sec. 4.
[88] M.G.L. c. 21E Sec. 6

more than $5,500 for the first offense and a fine not to exceed $15,000 for each subsequent offense….”[89]

Particularly relevant here is an issue of fundamental fairness: the other economic actors who operate in and around Cape Cod Bay are all under obligations to follow the sections strictures against the discharge of waste into waters of the Commonwealth. Holtec is no different. Simply because a company has significant financial resources does not mean that it is entitled to any kind of special treatment; rather, it must obey the same laws as everyone else in the Commonwealth.

VII. Massachusetts Regulatory Law

Under MassDEP’s regulations, the Department must deny Holtec’s application to modify its permit, because the application fails to meet the requirements laid out by those regulations.MassDEP’s own regulations with respect to antidegradation standards likewise prohibit the proposed discharge. Discharge into Outstanding Resource Waters, such as the waters off the Cape Cod National Seashore, is simply prohibited (314 CMR 4.04(3)(b)(1)). Moreover, discharge into High Quality Waters, which I understand the Department presumes the majority of Cape Cod Bay to be, is allowed only if “the discharge is necessary to accommodate important economic or social development in the area in which the waters are located.” (314 CMR 4.05(a)(1)).

But the opposite is the case: the only thing the proposed discharge will “accomodate” is Holtec’s bottom line; in fact, the discharge precisely threatens “important economic and social development” in our area. Cape Cod Bay is home to a Blue Economy – including fishing, marine transport, recreation, marine science, and marine infrastructure – that is worth at least $1.78

[89] M.G.L. c.270 Sec. 16.

billion, and probably considerably more (see below). These would not be "accommodated" by discharge – indeed, the opposite is the case.

VIII. Scientific Evidence

The weight of scientific evidence likewise stands counter to Holtec's proposed permit modification.

The National Academies of Science Biological Effects of Ionizing Radiation VII Report notes that even low levels of radiation can produce effects at the level of the basic genetic code of biological cells:

"At low doses, damage is caused by the passage of single particles that can produce multiple, locally damaged sites leading to DNA double-strand breaks (DSBs)."[90]

A paper by Clapp and Cobb, in its abstract, describes its findings with respect to leukemia, other cancers, and birth defects in the Plymouth area. "We investigated the patterns of leukemia, other cancers, and adverse birth outcomes in the communities surrounding the Pilgrim Nuclear Power Plant in Plymouth, Massachusetts. Data were taken from state vital records and cancer registry files. Information about coastal meteorologic conditions was used to estimate the population exposed to radioactive emissions in the mid-1970s. The temporal relationships of infant mortality, leukemia, thyroid cancer, and other diseases suggest that residents of local communities around and to the north of the power plant are at increased risk of health effects resulting from exposure to ionizing radiation. Leukemia (excluding chronic lymphocytic

[90] National Academies of Sciences, Engineering, and Medicine. 2006. Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2. Washington, DC: The National Academies Press. https://doi.org/10.17226/11340, 313.

leukemia), in particular, was approximately 75% more frequent in 1982-1984 in the Plymouth area compared to the rest of the State."[91]

It is worthwhile to examine the likely flow patterns of the wastewater in question. Dr. Irina Rypina, a physical oceanographer, is the lead author on a paper that was published last year in the *Journal of Environmental Radioactivity*. The authors describe the study thusly:

"Near-surface drifter observations were used to study the spreading pathways in and around the Cape Cod Bay from a source region located just offshore of the Pilgrim Nuclear Power Station. The study was motivated by the recent closing of the power plant and a possible release of accumulated wastewater. The investigation applies several different techniques to the drifter data set to estimate and quantify various aspects of the circulation and spreading…. . Our analysis suggests weaker spreading of the wastewater plume inside the Bay than outside, and sensitivity of the advection pathways to the location of the release. Statistical techniques predicted that part of the plume would likely be advected cyclonically around the inner coastline of the Bay towards the more quiescent eastern regions, while another part of the plume would likely pass close to the tip of Cape Cod and the beaches of the Outer Cape."[92]

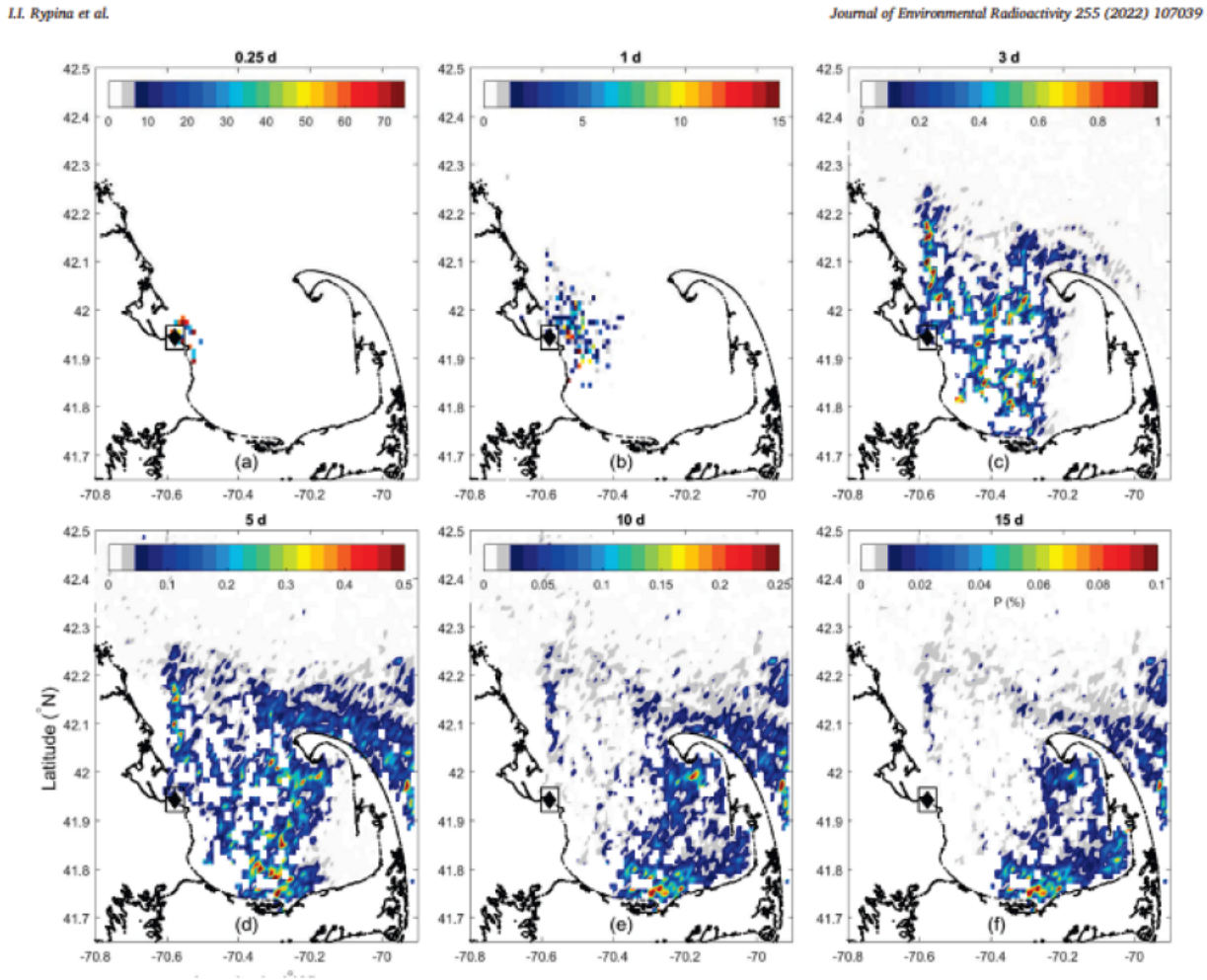
According to Dr. Rypina, "The southward flowing component makes its way into the southeastern bay in approximately 7–10 days; the offshore flowing portion reaches Race Point in 3–6 days, hugs the tip of Cape Cod and merges with the coastal current along the Outer Cape; and the northward-flowing component proceeds north for about 1 day before turning to the

---

[91] Clapp, R W, & Cobb, S. Leukemia and other health outcomes in the vicinity of the Pilgrim Nuclear Power Station, Plymouth, MA. United States. *Archives of Environmental Health*. Delivered at a conference held in Upton, NY, Sept. 13-15, 1989.

[92] Irina Rypina, *et al*.Spreading pathways of Pilgrim Nuclear Power Station wastewater in and around Cape Cod Bay: Estimates from ocean drifter observations. *Journal of Environmental Radioactivity* 255 (2022) 10703, 1.
https://www.sciencedirect.com/journal/journal-of-environmental-radioactivity/vol/255/suppl/C

southeast and heading towards Race Point to join the current flowing southward along the Outer Cape. The probability map shows a distinct location of higher accumulation (yellow/orange) in the Bay near 70.2◦W, as well as elevated probability in the vicinity of Race Point and near the Outer Cape beaches."[93]



(Rypina et al., "Fig. 3. Evolution of the wastewater plume computed using the transit matrix approach. (a–f)

[93] Rypina et al., 6.

Percentage (P in %) of the initial wastewater concentration per bin after 0.5, 1, 3, 5, 10, and 15 days since release. Black rectangle around PNPS (black diamond) shows the release domain."[94])

Cape Cod Bay already faces a number of environmental and ecological threats. Adding radioactively and chemically contaminated wastewater to it will emphatically not be to its betterment, but to its detriment.

The Bay has been plagued by incidents of hypoxia in recent years. According to the Division of Marine Fisheries, "During late summer 2019 and 2020, bottom waters in southern Cape Cod Bay (CCB) became depleted of dissolved oxygen (DO). Bottom DO levels became severely hypoxic (<2mg/L) in water depths from 10 to 25 m (~30–80 ft) from west of the Cape Cod Canal east to Barnstable Harbor. In mid-September 2019, there were numerous reports of dead lobsters and scallops from the local fishing community indicating that DO levels had dropped to lethal levels in this region. In response to this unprecedented event, DMF began working with other scientists and the local lobster fleet to begin to understand what was driving hypoxia in southern CCB."[95]

Notably, this is the same region of the bay in which Dr. Rypina's research indicates there will likely be significant lingering of the contaminated industrial wastewater in question.

Eel grass die-off is a significant concern in regional waters, including in Duxbury, Kingston, and Plymouth Bays, arms of Cape Cod Bay and included in a protected ocean sanctuary per the Ocean Sanctuaries Act. According to a May, 2016, paper by Kathryn Ford and Jillian Carr on behalf of the Massachusetts Division of Marine Fisheries, looking at data

---

[94] Rypina et al., Figure 3, p. 6.
[95] https://www.mass.gov/news/monitoring-and-understanding-low-dissolved-oxygen-in-cape-cod-bay.

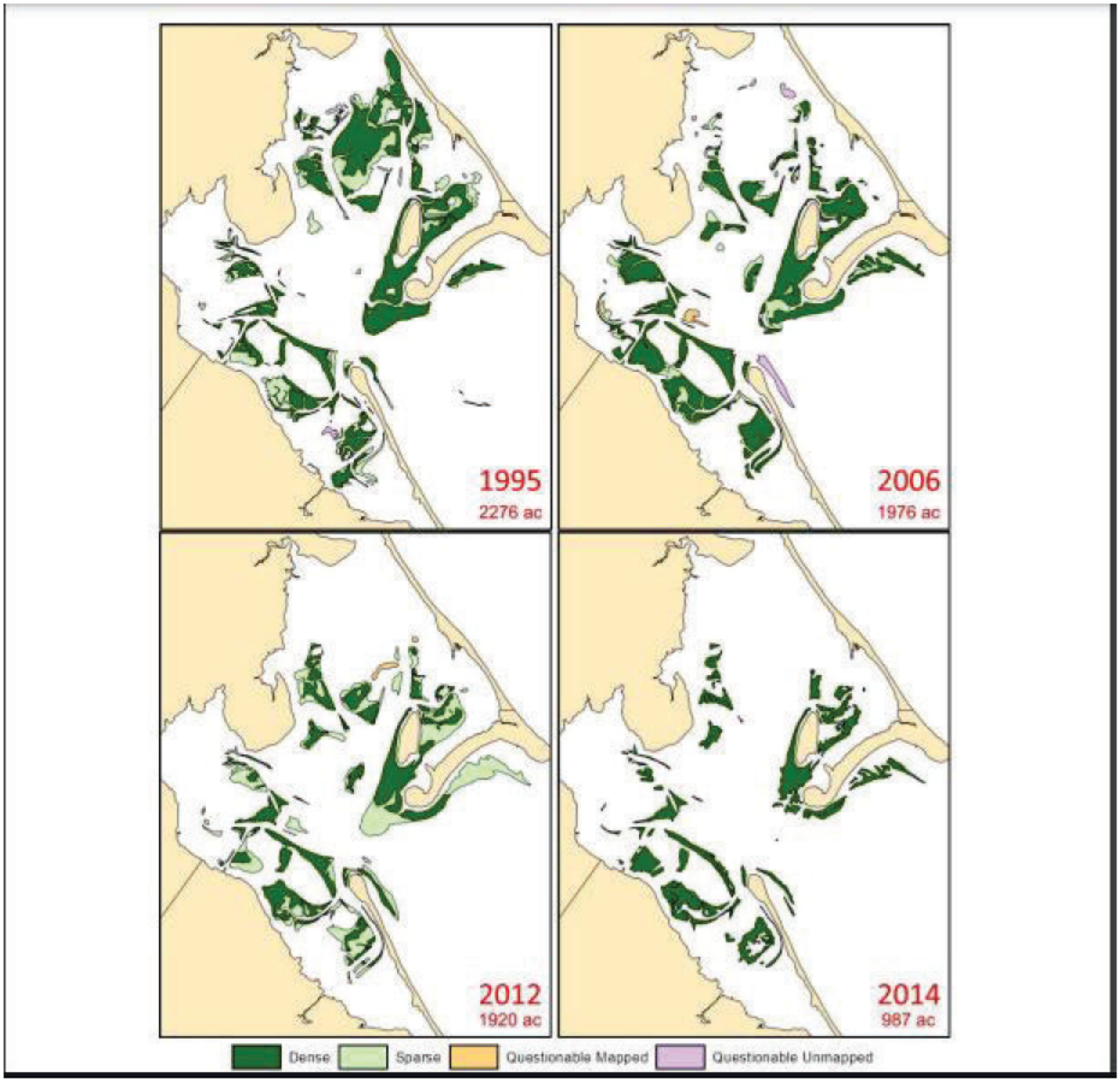
extending back to 1951, the Duxbury-Kingston-Plymouth embayment had also experienced significant and disturbing losses in eel grass cover:

"DMF [Division of Marine Fisheries] remapping of DEP [Dept. of Environmental Protection] aerial photographs has confirmed large losses of eelgrass in DKP [Duxbury-Kingston-Plymouth Bays]. The embayment has lost as much as 71% of its eelgrass between 1951 and 2014, with many beds shrinking and some disappearing altogether," wrote Ford and Carr.[96]

"The median loss rate is 27 [acres per] year and the loss rate dramatically accelerated between 2012 and 2014. The loss is characterized by dense beds thinning over time and eventually disappearing. All areas of DKP are affected and losses are occurring at a variety of water depths. The loss is likely caused primarily by degrading environmental conditions due to water quality impairments from runoff and wastewater, the effects of which are exacerbated by temperature increase. Once stressed and impaired in such a way, eelgrass is more vulnerable to weather and hydrodynamic related impacts," wrote Ford and Carr.[97]

---

[96]Kathryn Ford and Jillian Carr, for Mass. Division of Marine Fisheries, *Eelgrass loss over time in Duxbury, Kingston, and Plymouth Bays, Massachusetts Final Report*, May 9th, 201, https://www.mass.gov/files/2017-08/2015%20DuxburyKingstonPlymouth%20Eelgrass.pdf, 30.
[97] Ibid., 30-31.



(*Shrinking eelgrass beds over time in Duxbury, Kingston, and Plymouth Bays; photo credit — Ford and Carr for the MA Division of Marine Fisheries, 2016.*[98])

Nutrient loading also poses a threat to our bays. A paper by Dr. Matthew H. Long, a coastal geochemist at the Woods Hole Oceanographic Institution (WHOI), and Jordan W. Mora,

[98] Map found in Ford and Carr, 16.

a restoration ecologist at the Association to Preserve Cape Cod (APCC), demonstrates that human-associated activities, particularly eutrophication, or nutrient-loading, primarily from runoff, and climate change, have played a significant role in fundamentally changing the ecology of Waquoit Bay, on the southern shore of Cape Cod and forming part of the boundary between the Towns of Falmouth and Mashpee. Though Waquoit Bay is not an arm of Cape Cod Bay, the physical processes observed by Long and Mora apply to all shallow coastal estuaries and embayments, including those in Cape Cod Bay, such as Wellfleet Harbor, Barnstable Harbor, Ellisville Harbor, and Duxbury-Kingston-Plymouth Bays.[99]

IX. Economic Threats Posed by Discharge: The Blue Economy, Recreation and Tourism, and Real Estate

The economic consequences of discharge could prove extremely grave. As the present experience of Japanese fishermen demonstrates, perception of radioactive contamination alone – irrespective of the many serious biological and health concerns associated with the proposed discharge – is enough to seriously damage and render unmarketable a once-thriving fishing industry. This summer, in response to the decision by the Government of Japan and TEPCO to discharge radioactive wastewater into the North Pacific Ocean, China,banned seafood from Japan, according to an August 24th story in *The Los Angeles Times*:

> "People inside and outside the country protested the wastewater release, with Japanese fishing groups fearing it will further damage the reputation of their seafood and groups in China and South Korea raising concerns, making it a political and diplomatic issue.

[99] Long, M.H., Mora, J.W. Deoxygenation, Acidification and Warming in Waquoit Bay, USA, and a Shift to Pelagic Dominance. *Estuaries and Coasts* (2023). https://doi.org/10.1007/s12237-022-01166-7,

In response to the wastewater release, Chinese customs authorities banned seafood from Japan, customs authorities announced Thursday. The ban started immediately and will affect all imports of 'aquatic products' including seafood, according to the notice. Chinese authorities said they would 'dynamically adjust relevant regulatory measures as appropriate to prevent the risks of nuclear-contaminated water discharge to the health and food safety of our country.'"[100]

This serves as a cautionary note for the Cape Cod Bay region and for the Commonwealth and the United States as a whole.

The larger Blue Economy in Massachusetts as a whole, and the greater Cape Cod Bay regions, including the South Shore (Plymouth County), Cape Cod (Barnstable County), and the Islands (Nantucket and Dukes County) is of great significance.

According to the 2016 Cape Cod Blue Economy Project Implementation Plan, the Blue Economy can be defined as the larger economic complex made up by the following eight sectors: Tourism andRecreation; Ship Boat-Building; Renewable Living Resources; Marine Transportation; Marine Construction and Facilities; Physical Resource Extraction; Marine Technology; and Research, Education, Advocacy & SupportServices. Taken together, the Blue Economy on Cape Cod (Barnstable County), southern Plymouth County (Plymouth and Wareham), and the Islands (Dukes and Nantucket Counties) totaled $1.4 billion in 2016.[101] Given inflation, that is equivalent to approximately $1.78 billion in 2023 dollars, according to the Bureau of Labor Statistics' inflation calculator.[102]

---

[100] Mari Yamiguchi, The Associated Press, "China bans seafood from Japan after Fukushima nuclear plant begins releasing wastewater," *The Los Angeles Times*, August 24, 2023; https://www.latimes.com/world-nation/story/2023-08-24/china-bans-japan-seafood-fukushima-nuclear-plant-wastewater.

[101] Leslie-Ann McGee et al., *Cape Cod Blue Economy Project A Call to Action*, https://www.bluecapecod.org/wp-content/uploads/2019/07/Cape-Cod-Blue-Economy-Project-Implementation-Plan-012219.pdf, 11.

[102] https://www.bls.gov/data/inflation_calculator htm

A critical source in the characterization of the local economic impacts of any potential discharge comes from a May 31, 2023, letter from my friends and colleagues Mary and James Lampert, writing as individuals to MassDEP, requesting a classification change for Cape Cod Bay in terms of antidegradation standards. In the course of that letter, Mr. and Mrs. Lampert, who are members of the Town of Duxbury Nuclear Advisory Committee (Mrs. Lampert is chair), sit on the Massachusetts Nuclear Decommissioning Citizens Advisory Panel (NDCAP), and are like myself members of the grassroots Save Our Bay MA coalition, describe sectors of the economy that are threatened by Holtec's proposed discharge.[103]

Dozens of shellfish farms, including the globally recognized Island Creek Oysters, are located and grow and harvest seafood in Duxbury, Kingston, and Plymouth Bays, providing hundreds of both permanent and seasonal jobs and providing an important boost to the local economy. Across Cape Cod Bay, Wellfleet Harbor likewise hosts a thriving shellfishing and aquacultural economy.

According to a 2017 report from the UMass Dartmouth Public Policy center entitled *Navigating the Global Economy: A Comprehensive Analysis of the Massachusetts Maritime Economy*, "aquaculture in Massachusetts is dominated by shellfish, with more than 85 percent of the state's aquaculture operations farming oysters and clams. In 2015, the Massachusetts Division of Marine Fisheries issued shellfish propagation permits to 331 private aquaculture growers cultivating over 1,100 acres in 30 municipalities throughout the Commonwealth. These operations landed over 37 million American oysters with a value of $21.5 million, while more

[103] Mary and James Lampert to MassDEP, DESIGNATE CAPE COD BAY, AND ASSOCIATED EMBAYMENT'S, ORWSAND REQUIRE TIER 2 ½ REVIEW - RATIONALE, May 31, 2023.

than 6.5 quahog pieces were landed for a total value of 1.4 million. The number of oysters landed increased by over 25 million from 2004 to 2014."[104]

Recreation and Tourism constitute a vital sector of the economy of the Cape Cod Bay region. In October, 2000 — over 2 decades ago — the Cape Cod Commission estimated the region saw 5.23 million tourists annually; with population growth, that number has surely increased.[105] In 2020, according to the National Park Service, there were over 4 million visitors to just the Cape Cod National Seashore[106] – which touches Cape Cod Bay in Provincetown and Wellfleet, and includes its eastern bounds, Race Point.

According to Mr. and Mrs. Lampert's May 31st letter to the Department, the value of direct domestic tourism spending in Barnstable County was approximately $1.37 billion.[107]

Evidence of the effect of the present public controversy on the local real estate sector, to say nothing of the effects of the actual discharge itself were it to occur, were provided by Plymouth Realtor and Save Our Bay MA Member Christine Silva to the July 25th, 2022, meeting of NDCAP:

"Currently we are now experiencing the impact of the proposed plan within our markets. Clients are losing interest in our area due to the concerns about pollution, negative health impacts, and long term value loss. The numbers correlate with our observations with fewer sales, lower prices, as compared to our statewide averages. The average Single Family home sale from Jan-April 2022, home to the Pilgrim Nuclear Power Plant was 12% lower

---

[104] David Borges et al. for the Public Policy Center at UMass Dartmouth, Navigating the Global Economy: A Comprehensive Analysis of the Massachusetts Maritime Economy, 2017, https://www.mass.gov/files/documents/2018/01/24/Maritime_Economy.pdf, 23.

[105] Cape Cod Commission, "Help! Wanted Cape Cod's Seasonal Workforce, Oct. 2000. https://archives.lib.state.ma.us/bitstream/handle/2452/202400/ocn182755979.pdf?sequence=1&isAllowed=y.

[106] https://www.nps.gov/caco/learn/news/cape-cod-national-seashore-among-top-20-national-park-areas-for-visitation-in-2021.htm

[107] Mary and James Lampert to MassDEP, May 31, 2023, 7.

than statewide averages. Meanwhile the number of homes sold dropped across the South Shore, a decrease of 50% more than statewide averages. This data comes from the Massachusetts Association of Realtors.

Just last week I overheard a woman telling her daughter not to order oysters in a local restaurant, exclaiming that the plant is probably dumping now.

There are alternatives to dumping even if those alternatives are expensive. Considerable financial resources have already [been] provided to Holtec by the taxpayers."[108]

Taken as a whole, it is safe the economic value of the maritime economy, recreation and tourism, and real estate in the Cape Cod Bay region reaches into the billions of dollars. It is gravely threatened by the proposed discharge of industrial wastewater into Cape Cod Bay, as the deeply concerning example of the recent wastewater release from Fukushima in Japan, and the subsequent Chinese banning of Japanese seafood, demonstrates. Perception and reputation are real economic factors, and Holtec must not be allowed to threaten a multi-billion dollar regional economy in order to save a miniscule portion of its already massive profit margins.

X. Environmental Justice and Environmental Justice Populations

The Department must take cognizance of those neighborhoods and populations in the Commonwealth which it designates as Environmental Justice Populations. According to MassDEP, "In Massachusetts, an environmental justice population is a neighborhood where one or more of the following criteria are true:

1. the annual median household income is 65 percent or less of the statewide annual median household income

[108] Christine Silva to NDCAP, July 25, 2022, as quoted in Lampert and Lampert to MassDEP, above, 8-9.

2. minorities make up 40 percent or more of the population
3. 25 percent or more of households identify as speaking English less than "very well"
4. minorities make up 25 percent or more of the population and the annual median household income of the municipality in which the neighborhood is located does not exceed 150 percent of the statewide annual median household income.

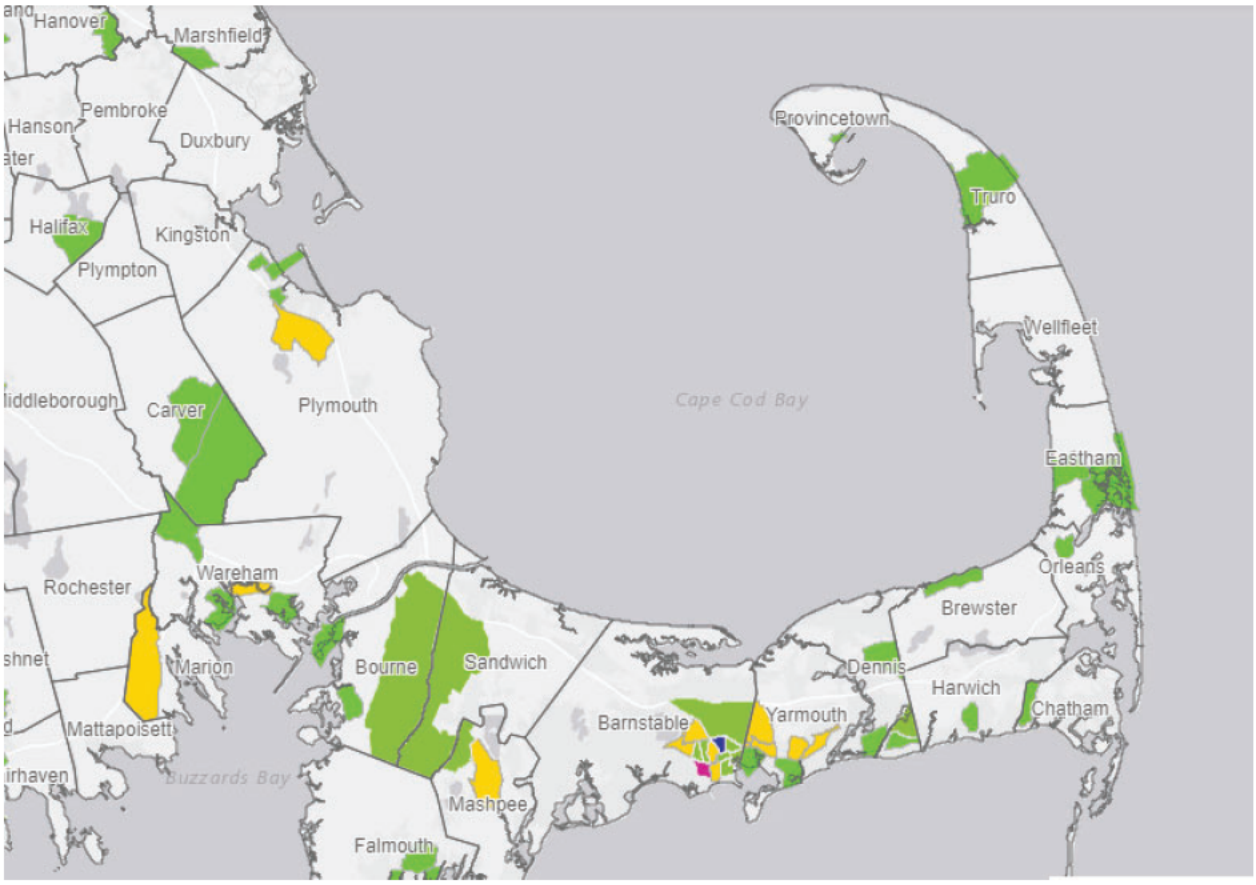
The Executive Office of Energy and Environmental Affairs (EEA) uses data from the 2019 American Community Survey to identify environmental justice population areas in Massachusetts."[109]

In our region, the following Towns on or near Cape Cod Bay are home to environmental justice populations: Marshfield, Halifax, Plymouth, Carver, Wareham, Bourne, Sandwich, Mashpee, Falmouth, Barnstable, Yarmouth, Dennis, Brewster, Orleans, Eastham, Truro, and Provincetown.

Surely any genuine and universally applied concern for the requirements of environmental justice would include these populations here in Plymouth and Barnstable Counties, and not just those in (some, but not other) far away places.

The Department and the Executive Office of Energy and Environmental Affairs, for their part, must likewise take cognizance of these populations, and guard their rights in this matter.

[109] https://www.mass.gov/info-details/environmental-justice-populations-in-massachusetts.



(Environmental Justice Populations in the Cape Cod Region, via MassDEP.[110])

XI. The Department's Duty to Steward and Guard Public Lands and Waters

Cape Cod Bay is lined with public lands and waters. They are owned by, variously, the United States via the Federal Government, the Commonwealth of Massachusetts, and the several Towns of the region. In addition, as noted above at Section __, numerous private non-profit organizations also hold land that, though not public *per se*, are put to public use.

[110]https://www mass.gov/info-details/environmental-justice-populations-in-massachusetts#interactive-maps-about-environmental-justice-populations-

There is, as with public waters, a clause of Magna Carta, Clause 47, which provides ancient precedent for the Commonwealth's just powers to preserve common lands and adjacent waters. Clause 47 of the 1215 Magna Carta, concerning the placing of afforested (meaning royally-enclosed land rather than woodland ecosystems per se; "disafforested" below means, somewhat counter-intuitively, placing the enclosed land back into common possession) land back into the common sphere of the realm, directly concerns the common natural resources of England:

"All forests that have been created in our reign shall at once be disafforested. River-banks that have been enclosed in our reign shall be treated similarly."[111]

. The Charter of the Forests made actual, with respect to the commons of the realm, what Magna Carta had guaranteed more broadly. It was the fulfillment of the promises contained in Magna Carta. [112]

---

[111] Magna Carta, Clause 47, via the British Library: https://www.bl.uk/magna-carta/articles/magna-carta-english-translation, taking as its source G.R.C. Davis, *Magna Carta* (London: British Museum, 1963), pp. 23–33.

[112] The Charter of the Forests made actual, with respect to the commons of the realm, what Magna Carta had guaranteed more broadly. It was the fulfillment of the promises contained in Magna Carta.

A look at some of the specific measures of the Charter of the Forests is illuminating.

Chapter I of the Charter of the Forests relates to the disafforestation mentioned in Magna Carta:

"We will, that all Forests, which King Henry our Grandfather afforested, shall be view'd by good and lawfull men; and if he hath afforested any other Wood, more than his own Demesne, by which the Owner of the Wood hath dammage, it shall be forthwith disafforested; and if he hath afforested his own Wood, then it shall remain Forest: saving the Common of Herbage, and of other things in the same Forest, to them who before were accustomed to have the same." (UMich Version 1680)

Chapter XVII contains a critically significant passage: "These liberties concerning the forests we have granted to everybody, saving to archbishops, bishops, abbots, priors, earls, barons, knights, and other persons, ecclesiastical and secular, Templars and Hospitallers, the liberties and free customs, in forests and outside, in warrens [a type of hunting ground - Ed.] and other things, which they had previously," it states.

Note that the Charter does not trample on the legitimate rights of private property – indeed, certain liberties are preserved to their existing owners.

"All these aforesaid customs and liberties which we have granted to be observed in our kingdom as far as it pertains to us towards our men, all of our kingdom, clerks as well as laymen, shall observe as far as it pertains to

The commons tradition from the colonial and early republican era in Massachusetts have been dealt with above, when the Towns took an overwhelming preeminence of position in the regulation of the commons. In the 19th and 20th centuries, in the period subsequent to the industrial revolution, the Commonwealth played an increasingly important role in the preservation of lands and waters.[113] In the years after the Second World War, especially with the creation of the Cape Cod National Seashore in 1961, the Federal Government came to play an increasingly important role in the regulation of the commons of the region.[114]

A listing of both public lands and waters – municipal, state, and federal – as well as a number of quasi-public open spaces held by non-profits, either adjacent to the Bay and its arms and tributaries, or directly abutting it, is illustrative. The following are owned either by individual Towns, or by conservation non-profits and devoted to their preservation and public enjoyment; this list is a sampling, and non-exhaustive; the owners are in parentheses: in Marshfield, Wharf Creek-Estes Woods (Town of Marshfield) and adjacent Daniel Webster Wildlife Sanctuary (Massachusetts Audubon Society), on Green Harbor River, which empties into the Bay; in Duxbury, Common Island (Town of Duxbury) on Duxbury Bay, and Duxbury Beach (Duxbury Beach Reservation), dividing Duxbury Bay from Cape Cod Bay; in Kingston, Grays Beach Park (Town of Kingston), on Kingston Bay; in Plymouth, Holmes Field (The Trustees of Reservations), and adjacent Nelson Memorial Park (Town of Plymouth), above the

---

them towards their men."

In a medieval age, marked by a vast distinction between clergy and laity, the fact that these laws apply to "all of our kingdom, clerks as well as laymen," was of great import, and real significance (the struggle between Church Law and the law of the civil state and authorities was a lengthy one in European history).

The language of the Charter of the Forests thus not only preserves a commons tradition, it does so in a fashion that encompassed the entirety of the English kingdom.

[113]See McCullough, *Landscapes of Community*, 166, for the prominent role of state foresters in New England communal forestry..

[114] See, e.g., Master Plan, Cape Cod National Seashore (1974), http://npshistory.com/publications/caco/mp-1974.pdf.

mouth of Plymouth Harbor; in Bourne, The Strand (Town of Bourne), on Cape Cod Bay; in Sandwich, Town Neck Beach (Town of Sandwich), on Cape Cod Bay; in Barnstable, Great Marshes Conservation Area (Town of Barnstable), on Barnstable Harbor; in Yarmouth, Lonetree Creek Conservation Area (Town of Yarmouth), at the mouth of Barnstable Harbor; in Dennis, The George H. Chapin Memorial Beach (Town of Dennis), on Cape Cod Bay; Saint's Landing (Town of Brewster), in Brewster, on Cape Cod Bay; Skaket Beach (Town of Orleans), on Cape Cod Bay in Orleans; Hatch Beach (Town of Eastham), on Cape Cod Bay, in Eastham; in Wellfleet, Mayo Beach, on We (Town of Wellfleet); Fisher Beach (Town of Truro), separating Pamet Harbor from Cape Cod Bay, and across the harbor, Little Island Meadow (Truro Conservation Trust); and in Provincetown, MacMillan Wharf (Town of Provincetown), on Provincetown Harbor.[115]

These public lands constitute an essential resource of the Commonwealth, in ecological, economic, recreational, aesthetic, and spiritual terms, and the Department should protect them by denying Holtec's permit application.

XII. Arguments from Self-Determination: The Democratic Will of the Several Towns.

The proposed discharge by Holtec of the industrial wastewater in question has galvanized a remarkable mass movement across the Cape Cod Bay region, garnering overwhelming support at the level of Town Meetings, ballot questions, and the continually expressed and eloquent support of the local State and Federal legislative delegations. This coalition has been extremely broad, uniting people of widely disparate views and diverse backgrounds; indeed, there are few matters besides the manifest illegality, injustice, and imprudence of Holtec's proposed dumping, and this coalition has achieved remarkable majorities locally. Taken together, these provide one

[115] Via MassMapper, https://maps.massgis.digital.mass.gov/MassMapper/MassMapper.html.

of the most compelling arguments to deny Holtec's application to modify its permit: that dumping stands contrary to the manifest democratic will of the several Towns surrounding Cape Cod Bay.

Every Town on Cape Cod, as well as on Martha's Vineyard, and in Plymouth County, Duxbury and Scituate, has either passed an article at Town Meeting, or approved ballot questions expressing opposition to and disapproval of dumping.

The Plymouth Select Board has been unanimous and outspoken in its opposition to Holtec's proposed discharge. It has been joined in this by the Select Boards of her sister towns, including Duxbury, Scituate, and Wareham.

The democratic will of the people of the several Towns surrounding Cape Cod Bay is clear, it is opposed to dumping, and the Department must take cognizance of this democratic right to self-determination when rendering its decision.

XIII. Refuting Holtec and Supporter's Arguments

Before closing, it is necessary to refute some of the counter-arguments that have been made by Holtec and their allies and supporters in favor of their application to modify their permit. These arguments are of varying degrees of seriousness. Some are simply logical *non sequiturs*: whether or not nuclear power is good or bad, whether or not a particular individual has a positive or a negative view of wind energy are irrelevant to the question before the Department: which is, should Holtec's application to modify its permit be granted or denied, based upon relevant legal and factual criteria; this paper has argued that the weight of evidence clearly impels the conclusion that it must be denied.

Nevertheless, it is important to rebut several arguments that were made at the August 24th public hearing held at Plymouth Town Hall.

The first of these is that the discharge is not in fact new. But the discharge is in fact new, and we know it is new because Holtec tells us it is new in its application, repeatedly: ("This application for modification of NPDES Permit No. MA0003557 to authorize discharge of a new source of industrial wastewater", at Section E; "The industrial wastewater proposed for discharge is a New Source," at Section F).

One former Holtec employee, who sits on NDCAP, has made the specious and pettifogging assertion that the industrial wastewater which Holtec seeks to discharge is not actually "waste." However, this is contradicted by Holtec's own application, which refers on multiple occasions to the water in question as "industrial wastewater" ("This application for modification of NPDES Permit No. MA0003557 to authorize discharge of a new source of industrial wastewater", at Section E; "The industrial wastewater proposed for discharge is a New Source," at Section F.)

In addition, the industrial wastewater in question is "waste" under the plain meaning of the Ocean Sanctuaries act under the definition given at 301 CMR 27.02: "Wastes means any unwanted, discarded, or environmentally harmful solid, liquid, or gaseous materials resulting from commercial, municipal, domestic, or industrial Activities, including, but not limited to garbage, snow, thermal discharges, saline discharges, and sewage. Waste does not include approved and licensed dredge spoils, approved and licensed stormwater discharges, or snow disposal consistent with Department guidance."[116] The water is quite clearly "unwanted," since Holtec wishes to dump it into the bay; it is "environmentally harmful," containing both radionuclides and chemical pollutants, including heavy metals; it is "liquid"; and it is quite

[116] 301 CMR 27.02.

clearly "resulting from industrial Activities." It is therefore a "waste" under the Act; simply because the petitioner and its allies and former employees may not like this definition does not make it any less binding as a legal definition. We do not get to pick and choose which laws we would like to follow, and which we would not; rather, we are required to follow them all or face sanction, either civil, criminal, or both.

Nor is the proposed discharge covered under any of the exemptions listed in Section 16 of the Ocean Sanctuaries Act. The plant no longer produces electricity. This is relevant because Section 16 states, in part, that the Act does not apply to "the planning, construction, reconstruction, operation and maintenance of industrial liquid coolant discharge and intake systems and all other activities, uses and facilities associated with the generation, transmission, and distribution of electrical power, provided that all certificates, licenses, permits and approvals required by law are obtained therefor, and provided, further, that such activities, uses and facilities shall not be undertaken or located except in compliance with any applicable general or special statutes, rules, regulations or orders lawfully promulgated; the operation and maintenance of existing municipal, commercial or industrial facilities and discharges where such discharges or facilities have been approved and licensed by appropriate federal and state agencies…."[117]

Pilgrim did not begin commercial operation until December 1, 1972.[118]

The original Ocean Sanctuaries Act was enacted in 1970.[119] The Cape Cod Bay Ocean Sanctuary was established through an Act of the Legislature on September 9th, 1971.[120]

Pilgrim was not an operating power plant on Sept. 9th, 1971, and therefore was not an

---

[117] M.G.L. c. 132A Sec. 16.
[118] https://www.eia.gov/nuclear/state/archive/2010/massachusetts/.
[119] See Massachusetts Ocean Sanctuaries | Mass.gov, and for the actual Act, https://archives.lib.state ma.us/bitstream/handle/2452/19109/1970acts0542.pdf?sequence=3&isAllowed=y.
[120] https://archives.lib.state.ma.us/bitstream/handle/2452/20189/1971acts0742.pdf?sequence=3&isAllowed=y.

"existing" industrial use under the meaning of Section 16 of the Act. Nor is the plant presently engaged in the " the generation, transmission, and distribution of electrical power."

This counter-argument therefore fails on these grounds. It fails additionally to meet the requirements laid out in Section 16, namely, compliance with relevant laws, such as the Massachusetts Ocean Sanctuaries Act, the Massachusetts Endangered Species Act, the Massachusetts Oil and Hazardous Materials Act, and the Crimes Against Public Health Act.and as shown above, the application fails to meet the standards laid out under Massachusetts regulatory law, particularly antidegradation standards laid out at 314 CMR 4.

On the whole, the arguments made by Holtec and its allies fail to meet muster, and must be rejected.

To rebut a frequent assertion of Holtec and its erstwhile allies: the industrial wastewater in question is not "ours" – it is Holtec's – Holtec bought it, and Holtec owns it. Conversely, the logic of this tendentious and frankly *post facto* argument is such that it holds to have validity in perpetuity a decision made five decades ago, upon partial information, and the terms of which one party is seeking to change (the agreement was to host a nuclear power plant – not to consent to violation of environmental and human health laws and regulation), and further that this decision is thereby fixed immutably and forever, binding future generations, to be inherited by their heirs and assigns forever, like some radiological Mark of Cain.

This is not supportable. If the unwisdom of prior generations must override any democratic will expressed by a present generation, then we should be in a situation where we have a House of Lords and not a Senate, a King and not a President. That is not the situation,

obviously, because that entire logic is contrary to not only the American historical experience, but even to attempts to ameliorate and improve social and economic conditions more generally.

XIV. Conclusion

The Department was correct in its July 24th tentative determination. Holtec's proposed discharge is illegal in a number of ways, being contrary to precedent extending back to Magna Carta, and contrary as well to statutes, regulations, and contractual agreements alike. It stands contrary to a vast corpus of historical precedent and tradition which it is the Department's sacred duty to guard and continue, including the stewardship of public lands and waters under New England's Commons Tradition. Strong scientific and economic evidence argues against Holtec's permit modification, and the company's proposed actions possess no democratic legitimacy. Considerations of environmental justice, including the numerous environmental justice populations in the Towns surrounding and nearby Cape Cod Bay, also argue against the granting of Holtec's application to modify its permit. The arguments relied upon by Holtec and its supporters are erroneous, and fundamentally are incapable of rebutting the factual record laid out above. From an early date, the life of the law has recognized that common rights and liberties supersede any particular private interest with respect to the sea and to navigable waters more generally. Following Hale, the sea is in the Commonwealth of Massachusetts and the United States for the nation, and the public common of piscary is held by the people of Massachusetts and the United States, and it is indefeasible.

For all of the foregoing reasons, MassDEP must deny Holtec's application to modify its permit.

attention Ms. Cathy Coniaris, MDEP

JANET AZAROVITZ [redacted]
Thu 8/31/2023 4:08 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Coniaris,

I write in support of the tentative determination by the Massachusetts Department of Environmental Protection to deny Holtec Corporation's application for a modified Surface Water Discharge Permit that would allow it to discharge radioactive and chemically contaminated wastewater into Cape Cod Bay. I do so as a resident of Massachusetts
whose move to the state over 43 years ago was because my husband's vocation as a Marine Biologist for NOAA, Woods Hole, necessitated the move. And as a biologist also, I couldn't have been more pleased.

Our young family became a part of a community that placed a high value on the protection of our environment and a love and respect for the land and waters that have surrounded us. We now have grandchildren who have the same respect because we know the responsibility we all have for our planet. And I, as a teacher, always tried to convey that feeling of responsibility and a love of our earth to the many students who sat in my classroom through the years.

The oil spill off the coast of California in 1969 brought national attention to what could happen to marine ecosystems and so the United States Congress responded with Marine Protection, Research and Sanctuaries Act which allowed for the creation of marine sanctuaries in 1972. The Massachusetts Ocean Sanctuaries Act established Ocean Sanctuaries which defines prohibited and allowed activities in Ocean Sanctuaries, and also requires state agencies to protect these Sanctuaries from exploitation, development, or any activity that would significantly alter and endanger their ecology or appearance in the issuance of Authorizations for Activities subject to jurisdiction. In addition, we have the Massachusetts Ocean Management Plan protects critical habitat and important water-dependent uses. How can any of this be denied? Our laws say, the dumping of the radioactive waters in Cape Cod Bay is illegal! With Pilgrim Nuclear Power Station sited on the shore of Cape Cod Bay it is one such industrial plant which falls under the aegis of the Ocean Sanctuaries Law. And the Holtec Corporation has proposed to defy this law. Being a boiling water reactor, water was constantly circulated through the reactor vessel and nuclear fuel, converting it to steam to spin the turbine. This same water was cooled and recirculated and in the process picked up radioactive contamination. This

radioactive contamination, waste, threatens and significantly changes and endangers the ecology of the ocean sanctuaries, including marine life and resources, mammals, sea turtles, fish, shellfish and other invertebrates, mussel reefs (and other biogenic habitats), the water quality which would include nutrients affected by flushing and the flow as well as sediment movement and transport dynamics. Fish, oysters, clams, mussels filter the water for their food. Anything consumed, including radionuclides bioaccumulate as they move up to the food chain and on to our dinner tables. The currents in Cape Cod Bay circulate all the way around the bay as proven by Woods Hole Oceanographic Institution studies. The Bay is the lifeblood, the livelihood of hundreds of thousands of workers. Concerns of the fishermen and women, where seafood represents 2% of the entire state economy, a billion dollar industry, include the fear that even the idea of radioactive water in the bay may have an impact on the seafood industry. Even the perception of toxicity in seafood would harm the economy. I can only imagine the vacationer coming to the Cape, hearing about how radioactive water has accumulated in the oysters that so many now rave about. the public perception of contamination of our waters could destroy the aquaculture and other fishing industries. And we are well aware of the tourism industry to out State and to our beautiful Cape Cod.

Governor Healey, Lt. Governor Kim Driscoll, Massachusetts Attorney General Campbell, Senator Markey, Senator Warren, Representative Keating, Senator Moran, 20 towns on the Cape and Islands, Duxbury, Scituate, The Conservation Law Foundation, Association to Preserve Cape Cod, the Herring Pond Wampanoag, Plymouth Board of Health, MA Seafood Collaborative, Massachusetts Association of Realtors, Duxbury Board of Health, Cape Cod Commercial Fisherman's Alliance, MA Lobstermen's Association, Plymouth Cruises, Tom and myself (retired teacher, educator), Michael, Jeanne, Josephine, Benjamin, Jacob and Trevor, who are, most importantly, our family and , future generations, say Do Not Allow Holtec Corporation to dump radioactive water into our lifeblood and that of our state, Cape Cod Bay. The proposed plan, already set in motion by money grabbing Holtec, only interested in the dollar and how much they can take us for, is anathema to the people who've raised their voices having heard the science and who've become familiar with the laws. We live on it's shores and our livelihoods and future depend on it. Please be steadfast. Please deny Holtec's application to modify their permit and don't let Cape Cod Bay be just the cheapest way to rid themselves of this toxic radioactive waste.

Thank you for giving us the opportunity to be heard. Please remember <u>all</u> of the many voices who are also thankful for the opportunity to speak to you.

Sincerely, Janet Azarovitz

[redacted]

[redacted]

Pilgrim Nuclear Power Staton

Nathan Murphy [redacted]
Thu 8/31/2023 4:21 PM

To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>;Langley, Lealdon (DEP) <lealdon.langley@mass.gov>

Cc:Nuclear Decommissioing CAP (EEA) <NDCAP@mass.gov>;internet, env (EEA) <env.internet@mass.gov>;Engler, Lisa Berry (EEA) <lisa.engler@mass.gov>;Gutro, Doug (DEP) <Doug.Gutro@mass.gov>;Coniaris, Catherine (DEP) <Catherine.Coniaris@mass.gov>;Boyer, David (DEP) <david.boyer@mass.gov>;Pickering, Seth (DEP) <seth.pickering@mass.gov>;Martin, Gerard (DEP) <gerard.martin@mass.gov>;Handrahan, John (DEP) <john.handrahan@mass.gov>;papadopoulos.george@epa.gov <papadopoulos.george@epa.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Director Langley and all whom it concerns,

I am writing, entirely on my own accord, to encourage the Massachusetts Department of Environmental Protection (MassDEP) to reverse its tentative determination to deny application to modify Massachusetts Permit to Discharge Pollutants to Surface Waters and to ***approve*** the requested modification to Permit No. MA0003557 dated January 30, 2020. The statement of reasons provided by MassDEP amount to a flawed interpretation of the Ocean Sanctuaries Act, M.G.L. c. 132A, §§ 12A – 18 (Act). Further, the letter from the Office of Coastal Zone Management (CZM) to MassDEP that is included in the draft determination provides a greater level of detail for the logic supporting the draft determination, however, this logic is also flawed. This entire decision rests on the assertion that, "none of the exceptions in Section 16 applies to the proposed discharge." I will show that Section 16 is applicable. Furthermore, MassDEP has already signed off on existing Permit No. MA0003557, effectively circumventing the argument that the permit modification request can be denied based on the Ocean Sanctuaries Act.

Statement of reasons (8) states:

> Section 16 of the Act exempts "activities, uses and facilities associated with the generation, transmission, and distribution of electrical power." M.G.L. c. 132A, § 16. It is undisputed that the Facility has ceased electrical power generation, is no longer transmitting or distributing power, and is in the process of decommissioning. The waters proposed for discharge have been used for decommissioning processes, including dismantlement of plant systems, not electrical power generation, and require disposal as part of the decommissioning process. Since the proposed discharge is associated with the decommissioning of the Facility, not the generation, transmission, or distribution of electric power, this exception does not apply.

This is a false reading of the law and does not capture the intent of the exception. The name of the facility is, "**Pilgrim Nuclear Power Station**". It is true that the facility is currently being decommissioned, but this does not disassociate the facility with the generation of electricity. Broadly speaking, the exception covers generating facilities. Excluded from the quotation from Section 16 within reason (8) are the words "all other activities."

CZM's response to MassDEP provides greater support for the argument that the exception from Section 16 of the Act do not apply. The full text of the exception is provided:

> In all ocean sanctuaries except the Cape Cod Ocean Sanctuary the planning, construction, reconstruction, operation and maintenance of industrial liquid coolant discharge and intake systems and all other activities, uses and facilities associated with the generation, transmission, and distribution of electrical power, provided that all certificates, licenses, permits and approvals required by law are obtained therefor, and provided, further, that such activities, uses and

> facilities shall not be undertaken or located except in compliance with any applicable general or special statutes, rules, regulations or orders lawfully promulgated;

CZM's analysis:

> Section 16 permits "the *planning, construction, reconstruction, operation and maintenance* of industrial liquid coolant discharge and intake systems and all other activities, uses and facilities *associated with the generation, transmission, and distribution of electrical power*" provided such activities, uses and facilities are otherwise properly authorized and conducted in accordance with applicable law. Id. (emphasis added). By its plain terms, this permitted activity does not apply to discharges associated with decommissioning. See id. The text limits permitted discharges to the pre-operating and operating phases of the life-cycle of a power plant —"planning, construction, reconstruction, operation and maintenance"—and does not mention post-operating phases such as dismantling or decommissioning. See id. This omission indicates that the legislature did not intend to include discharges associated with decommissioning in this exception. See Metro. Prop. & Casualty Ins. v. Emerson Hosp., 99 Mass. App. Ct. 513, 522 (2021) ("It is a 'maxim of statutory construction . . . that a statutory expression of one thing is an implied exclusion of other things omitted from the statute.'"

and

> In this instance, this omission indicates that the legislature made a reasonable policy determination that the economic and social benefits associated with constructing, operating, and maintaining facilities for electric power generation— not least, ensuring the availability and reliability of sufficient electrical power to meet the needs of the Commonwealth and its citizens— are absent once such facilities have been taken out of service and are being dismantled.

First, CZM does not accurately interpret the language in the exception. The language provides for the planning, construction, reconstruction, operation and maintenance of industrial liquid coolant discharge and intake systems AND ***all other activities, uses, and facilities associated with the generation of electric power.*** There is nothing in the language that would indicate that decommissioning activities for an electric generating facility would not be covered by the term, "all other activities." CZM attempts to construct the legislatures intent by pointing out that decommissioning is not explicitly called out and by misconstruing the blanket statement "all other activities" to be bound by pre-operating and operating activities. The use of the language, "planning, construction, reconstruction, operation and maintenance" relates to industrial liquid coolant discharge and intake systems. The use of the language, "all other activities" is simply associated with the generation of electric power. Here, MassDEP and CZM are inventing a false distinction based on the operating status of the facility. A reasonable person would not conclude that the economic and social benefits associated with electric power generating facilities are not inclusive of the eventual decommissioning of such facilities. Looking at the broader picture, the legislature created the act to protect valuable ocean habitat, but carved out an exception for grid related facilities and uses, provided that applicable laws are followed and permits acquired. It doesn't make sense that decommissioning activities would be implicitly excluded from this exception, particularly because there is the blanket statement, "all other activities."

Lastly, certain discharges have already been allowed, as of the initial issuance of the permit in 2020, and after the facility ceased commercial operation. In light of MassDEP's position on the applicability of the Ocean Sanctuaries Act, it is unclear to me how these discharges have been allowed, but the discharges specified in the permit modification request would not. While the discharge sources sought in the permit modification request are prohibited under the existing permit, the reason for this is, "neither Entergy nor Holtec has provided information to the Agencies to characterize discharges related to the dismantlement of plant structures at this time" and that Entergy did not "provide the Agencies prior to the issuance of the Draft Permit with any explanation for how it would dispose of spent fuel pool water." (See EPA's "Response to Comments for the National Pollutant Discharge Elimination System (NPDES) Permit No. MA0003557 - Pilgrim Nuclear Power Station (PNPS), Plymouth, MA. pgs. 274-275.) With respect to the applicability of the Ocean Sanctuaries Act to discharges under Permit No. MA0003557, the final permit notes, "the Act and its associated regulations permit the "operation and maintenance of industrial liquid coolant

discharge and intake systems and all other activities, uses and facilities associated with the generation . . . of electrical power" as "allowed activities" in the Cape Cod Bay sanctuary, they specify that such activities shall be in compliance with applicable general or special statutes, rules, regulations, and orders. M.G.L. Ch. 132A, § 16." Additionally, the permit provides for monitoring requirements for the various discharges allowed by the permit and water quality standards with respect to different pollutants that may be present in the discharges. It is apparent that this permit was initially issued with the understanding that it meets the exception provided for in Section 16, and further, that the prohibition of discharges related to decommissioning activities was not based on a finding that it would violate the Ocean Sanctuaries Act but rather due to a lack of information provided by the applicant.

I have pointed out fundamental flaws in the draft determination and associated consultancy between MassDEP and CZM. Taking into account what the condition of the treated water would be in the proposed discharge along with the recent issuance of a discharge permit after PNPS shut down, the reasons MassDEP has provided for denial are arbitrary and capricious. It is obvious after reviewing Holtec's permit modification application that the proposed discharges, with appropriate conditions in place, would have infinitesimal environmental impact. There has clearly been substantial opposition to the proposed discharge, both from members of the public and from politicians. Despite claims to the contrary, the arguments against the discharge are not based in science or a reasonable assessment of risk, rather the opposition is ideologically and emotionally driven. The laws of the Commonwealth must not be misinterpreted in response to public and political pressure, especially when doing so would cause undue harm to any person or entity and does not result in any detectable benefit to the environment or the public good. It is the obligation of those at MassDEP to fairly and consistently interpret the law. Do the right thing and approve the permit modification request.

Kind regards,

Nathan Murphy

Cape Cod Bay

Paul Higgins [redacted]
Thu 8/31/2023 4:55 PM
To:MassDEP NPDES (DEP) <MassDEP.NPDES@mass.gov>

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Commissioner Heiple,

I strongly agree with DEP's draft determination to deny Holtec International's permit application to discharge wastewater from Pilgrim Nuclear Power Station into Cape Cod Bay. DEP's permit denial correctly interprets the Ocean Sanctuaries Act, which explicitly states that discharges such as the one pursued by Holtec are prohibited under state law. I urge DEP to move forward in finalizing its draft decision based on state law requirements and issue a permit denial to Holtec that prevents Pilgrim's wastewater from being released into the Cape Cod Bay Ocean Sanctuary.

Thank you,

Paul Higgins

[redacted]

[redacted] Sent from my iPad