Environmental Monitoring Report

For 2019

Pilgrim and Seabrook

Nuclear Power Station

Emergency Planning Zones

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EXECUTIVE SUMMARY

The Massachusetts Department of Public Health (MDPH) Bureau of Environmental Health's (MDPH/BEH) Environmental Toxicology and Radiation Control Programs collaborate to conduct routine environmental monitoring in nuclear power station Emergency Planning Zones (EPZs) within the Commonwealth. This monitoring is part of the Department's regulatory responsibility. It provides a system of watchfulness over environmental radiation in Massachusetts communities surrounding nuclear power plants. These EPZs include communities located within a 10-mile radius of Pilgrim Nuclear Power Station (Pilgrim) in Plymouth, MA and Seabrook Nuclear Power Station (Seabrook) in Seabrook, NH. Pilgrim ceased operations on May 31, 2019 and is undergoing decommissioning[1]. This report summarizes the 2019 monitoring activities and results for the Pilgrim and Seabrook nuclear plant EPZs.

Report Highlights

- Overall, no radiation indicators or radionuclides were detected at a level of health concern.
- Radiation monitoring results in 2019 for areas surrounding the two nuclear power stations -- Pilgrim and Seabrook -- have been either non-detect, naturally occurring or at levels expected to be present in the environment from background fallout from historic bomb testing and past nuclear accidents.

[1]Pilgrim entered Phase I of plant decommissioning on June 11, 2019 when the nuclear fuel from the reactor was safely transferred into the spent fuel pool, and the site was certified by Federal regulators as having permanent cessation of operations and permanent removal of fuel. In August of 2019 Pilgrim was sold by the Entergy Corporation to Holtec International for completion of the remaining decommissioning steps.

1. INTRODUCTION

The MDPH/BEH radiation environmental monitoring program is designed to monitor radiation levels and to protect residents in the Commonwealth from exposure to radiation. Samples of environmental media collected within and just outside the EPZs surrounding nuclear power plants by MDPH/BEH, or provided by the utilities that operate the nuclear power plants, are analyzed for radiation by the MDPH/BEH Massachusetts Environmental Radiation Laboratory (MERL). Environmental media analyzed in 2019 include: air, surface water, milk, fish, shellfish, sediment, vegetation and food crops. In addition to the samples analyzed for radiation by MERL, MDPH/BEH has a network of stationary monitors surrounding Pilgrim that measures gamma radiation in real-time. This network is monitored online by MDPH/BEH staff. The C-l0 Research & Education Foundation, Inc., a non-profit organization under contract to MDPH/BEH, conducts direct radiation monitoring in Massachusetts communities within the Seabrook EPZ and provides summary reports to MDPH/BEH.

The radiation environmental monitoring of Pilgrim and Seabrook EPZs has been in place since the 1980s. A focused investigation of tritium in groundwater on the Pilgrim Nuclear Power Plant property is ongoing and not part of this report. Updates on this monitoring effort are posted on the MDPH website: Tritium investigation update reports.

The NRC requires specific environmental monitoring and annual reporting by operating nuclear power plants. The NRC reports summarizing Seabrook's and Pilgrim's environmental monitoring can be found on its website: Pilgrim's 2019 Radiological Environmental Operating Report and Seabrook's 2019 Radiological Environmental Operating Report.

This report contains background information regarding environmental radiation and laboratory methods used to analyze samples for radiation; sample location and analyses for the Pilgrim and Seabrook EPZs; and a summary of the monitoring results.

A. ENVIRONMENTAL RADIATION

Background radiation in the environment comes from three general sources: naturally occurring radiation, radioactive fallout from past weapons testing or nuclear accidents, and man-made sources.

Naturally occurring radionuclides, such as Potassium-40 and Beryllium-7, are present in most environmental media. Potassium-40 is a radioactive form of potassium, which is an essential nutrient. Beryllium-7 is produced when cosmic energy collides with nitrogen and oxygen in the atmosphere (Delaygue et al., 2015). Additional natural sources of radiation, including cosmic radiation, radon, and carbon-14, contribute to an annual background radiation dose of approximately 310 mrems/year (US NRC, 2017a, b). Man-made sources include medical procedures (e.g., diagnostic x-rays) and various consumer products (e.g., certain construction material, combustible fuels, televisions, smoke detectors) (US NRC 2017c). Background and man-made sources contribute to the estimated 620 mrem annual dose of environmental radiation for average U.S. residents (US NRC, 2017b).

Table 1. Background Radiation Dose for Average U.S. Resident

Source	Millirems/year
Natural background radiation	310
Man-made sources	310
Total of all sources	620

Source: US NRC, 2017c

Background radiation includes fallout radiation from historical weapons testing, which occurred primarily in the 1950s and 1960s, and from nuclear power plant accidents such as Chernobyl and Fukushima. This fallout includes radioisotopes such as Cesium-137 (Cs-137) and Strontium-90 (Sr-90), which persist in the environment due to their 28-30 year half-lives.

During active operation, nuclear power plants emit direct gamma radiation from nuclear reactor systems; noble gases, tritium, Iodine-131, Carbon-14, and particulates from the station's air stack; and discharge water containing tritium as well as other radionuclides that emit alpha, beta and gamma radiation (Luykx and Fraser, 1983; UNSCEAR, 2008). Noble gases are chemically inert, have short half-lives, disperse quickly in the environment, and do not bioconcentrate or easily incorporate into biological tissue. Tritium is created when water passes through the reactor core; the hydrogen atoms in the water molecules and other trace elements like boron absorb neutrons from the fission of the reactor fuel. Tritium is lighter and more mobile in water than other radionuclides and is a sentinel indicator of radionuclides in water bodies. Both Iodine-131 and particulates (notably Cesium-137, Cobalt-60, Iron-59, Magnesium-54, Stontium-90 and Zinc-65) have environmental and public health significance: their half-lives range from weeks to years, they are readily incorporated into biological tissue, and they will bioconcentrate. Iodine-131 is usually the first radioactive element detected in the event of an accidental release of power plant radiation (ATSDR, 2002). Carbon-14 is a naturally occurring radionuclide, which can also be released in relatively small amounts from nuclear power plants, primarily due to its formation in the coolant system (Yim and Caron, 2006).

Exposure to radiation from nuclear power plants may occur from permitted air or liquid discharges or from unmonitored releases or leaks. MDPH/BEH evaluates possible routes of exposure for radionuclides, particularly those that accumulate in the food chain, and samples environmental media along these routes to measure potential exposure to radiation.

B. LABORATORY METHODS

The MDPH/BEH Radiation Control Program's Massachusetts Environmental Radiation Laboratory (MERL) analyzes samples for a suite of more than 30 radioactive isotopes (e.g., radioisotopes, or radionuclides). Gamma spectroscopy is used to identify and detect environmentally significant and naturally-occurring radioisotopes; gas proportion counters measure gross beta and alpha radiation; and liquid scintillation counters measure tritium. Environmental media sample results are compared to typical background levels. In the event that gamma emitters are present above typical background, the MERL protocol calls for additional testing at an outside laboratory for alpha emitters, such as transuranic (high atomic number) elements, and beta emitters, such as Strontium-90. MERL maintains its standard of excellence in analytical capability through participation with several federal agencies in inter-laboratory quality assurance measures.

Analysis methods by media are summarized below:

AIR

Air filters are collected weekly and analyzed for gross alpha and gross beta radioactivity using a gas proportion counter. Gross alpha and beta analysis is a screening-level tool that does not identify individual radionuclides; therefore, air filters are also analyzed quarterly for gamma emitting radionuclides using gamma spectroscopy. Results are compared to results from a background monitor located in Boston.

Air cartridges are analyzed weekly for iodine-131 using gamma spectroscopy.

Direct gamma radiation in air is measured with thermoluminescent dosimeters (TLDs) and analyzed using gamma spectroscopy.

WATER

Surface water samples are tested for total alpha and beta radioactivity with a gas proportional counter, and for gamma-emitting radionuclides with a gamma spectrometer. Water samples are also tested for tritium with a liquid scintillation counter.

MILK

Milk is a good indicator media for radioactive elements, particularly iodine-131, which can be detected in milk soon after cows graze on contaminated pastures or feed. Hence, cow's milk is tested for gamma radionuclides, including iodine-131, using gamma spectroscopy.

SEAFOOD, SEDIMENT, VEGETATION, AND FOOD CROPS

Seafood, sediment, vegetation and food crops were chosen to represent various stages of the food chain where radionuclides may be identified. Mollusks (such as clams and mussels) filter-feed sediment and sand where heavy and sediment-bound radionuclides may accumulate; lobsters eat clams, mussels and small fish; and radionuclides biomagnify from smaller to larger surface-dwelling fish.

Analyses of vegetation and crop samples aim to identify radionuclides that may settle on surfaces or be absorbed through the roots. Samples are tested for gamma-emitting radionuclides using a gamma spectrometer.

QUALITY ASSURANCE

Laboratory sample detection levels are affected by sample size, time between collection and analysis, and equipment processing and counting time. Where detection levels fall outside our analytic sensitivity guidelines they are noted in the tables as “NR” (Result is not reported for quality control reason).

2. ENVIRONMENTAL MONITORING AND SAMPLING

This section describes the two nuclear power station EPZs in Massachusetts and summarizes the environmental samples collected and analyzed in 2019.

A. PILGRIM NUCLEAR POWER STATION

The Pilgrim Nuclear Power Station (Pilgrim) is located in Plymouth, MA. Five Massachusetts communities are included in the 10-mile EPZ of Pilgrim: Carver, Duxbury, Kingston, Marshfield, and Plymouth, all shown below in Figure 1.

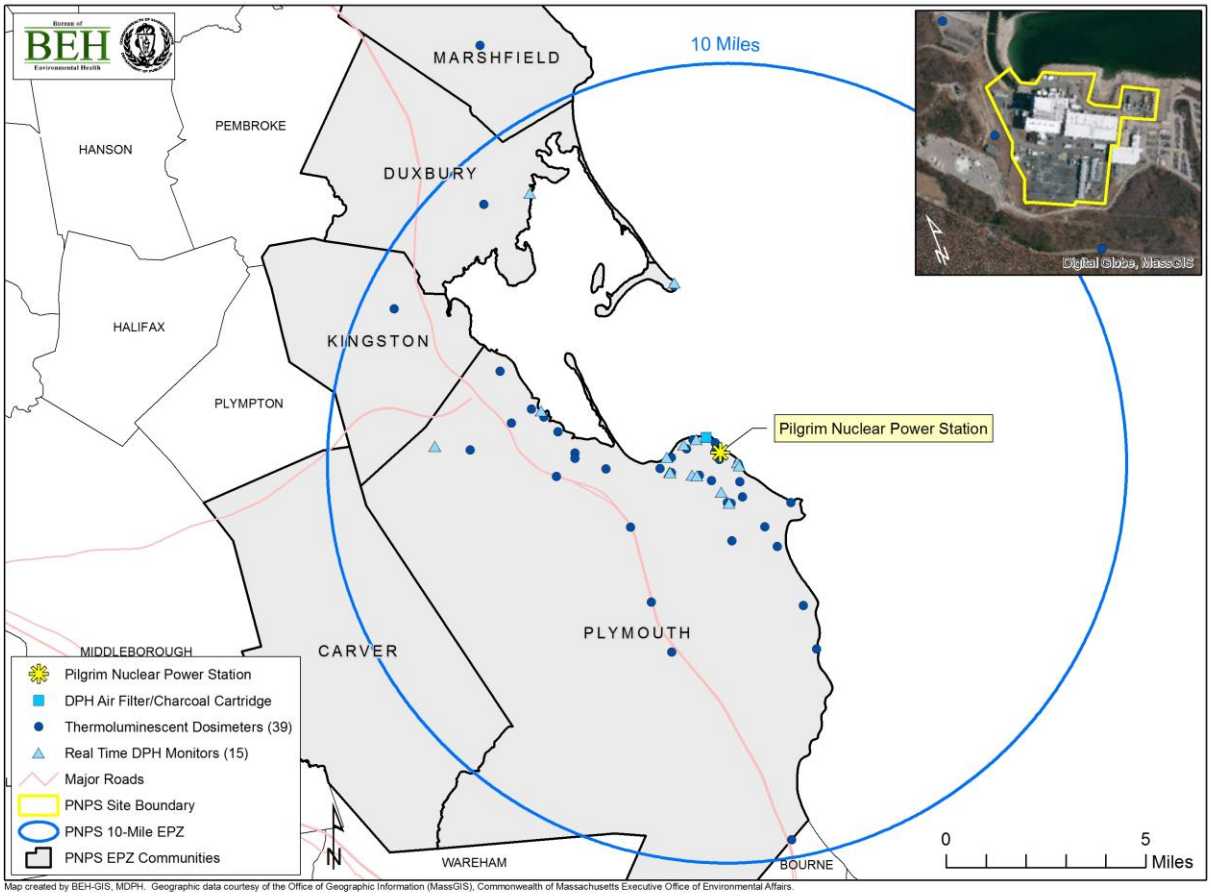

Figure 1. The MDPH/BEH Radiation -monitoring network at Pilgrim

MDPH/BEH's radiation monitoring conducted within and outside the Pilgrim EPZ is a combination of independent direct monitoring of airborne radiation; air, milk and cranberry sampling; and analysis of split samples provided by either Entergy or Holtec[2], of water, fish, shellfish, sediment, Irish moss, food

[2] Entergy sold the PNPS to Holtec International in August, 2019

crops, silage, and vegetation. Figure 1 shows locations of the air monitors for Pilgrim. Sample locations for water, fish, shellfish, sediment, Irish moss, food crops, silage and vegetation are shown in Figure 2.

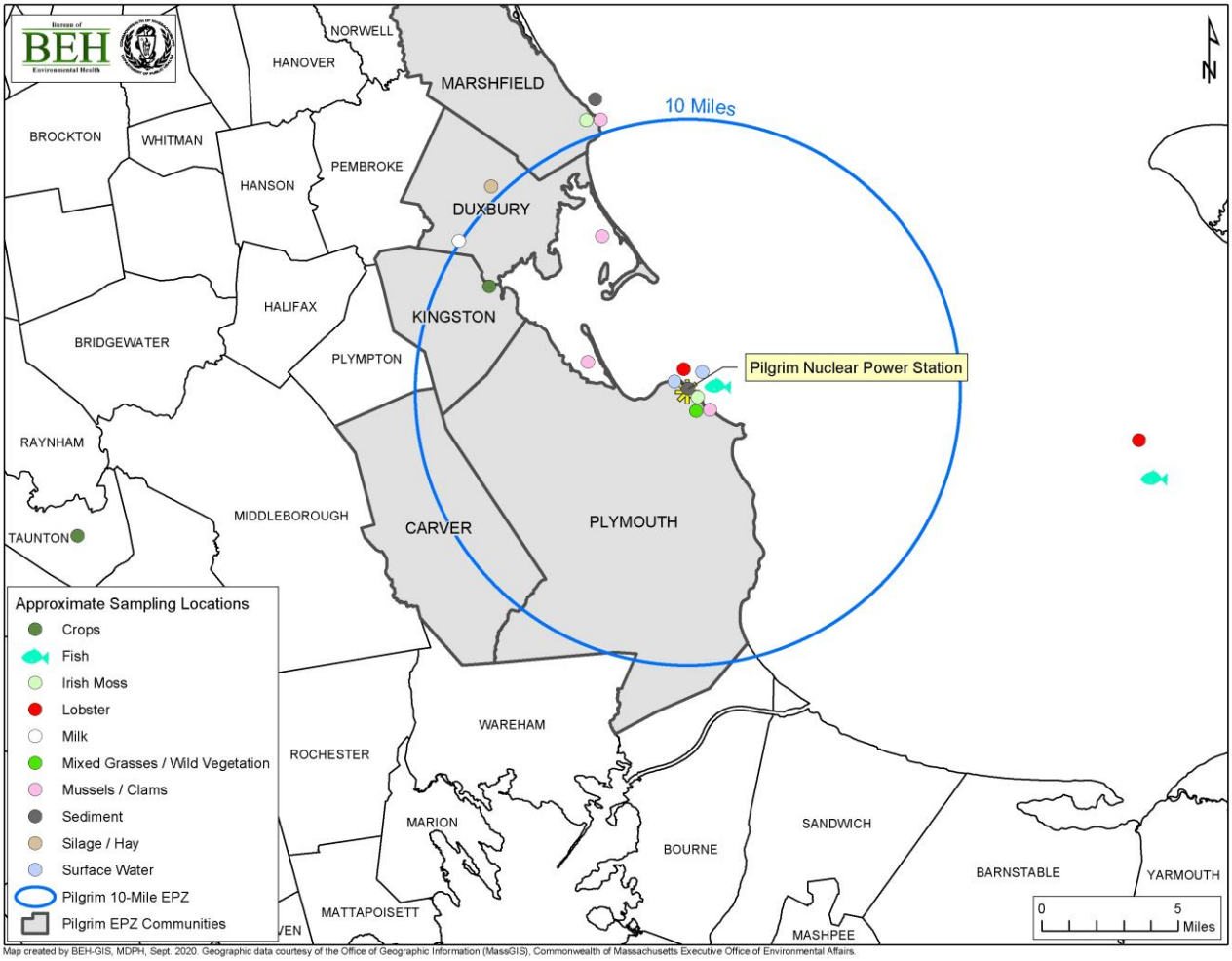

Figure 2. Pilgrim EPZ and sampling locations

Air/Direct Radiation

MDPH/BEH's direct radiation monitoring at Pilgrim is comprised of three systems operating on real-time, weekly, and quarterly bases. The redundant systems are designed to independently monitor the land areas within the 10-mile EPZ and to verify the utility's radiation monitoring.

MDPH/BEH maintains a network of 15 stationary radiation monitoring stations that detects gamma radiation in real-time and transmits data to a computer which is remotely accessed by staff. Emergency alerts are sent to MDPH and Massachusetts Emergency Management Agency (MEMA) officials if radiation is detected at levels greater than three times the typical background level. In 2016, MDPH/BEH completely replaced the older system with new monitors and servers, and installed an internet-based communication system.

MDPH/BEH analyzes samples collected from an air particulate filter and a charcoal air cartridge located just outside the Pilgrim utility's fence. Filters are analyzed for gross beta and gross alpha radioactivity

and cartridges are analyzed for iodine-131. A filter composite sample is also analyzed quarterly for additional gamma-emitting radionuclides. The same analyses are done for an air particulate filter and charcoal cartridge collected from a background location in Boston.

MDPH/BEH also has a network of 39 TLDs placed throughout the Pilgrim EPZ and surrounding communities, which measure total gamma radiation in milliroentgen (mR). The majority of the TLDs are located in the inner region of the EPZ, and three are near the plant border. These TLDs are collected and analyzed quarterly, and the results are compared to those of a background location in Boston.

Surface Water

Entergy/Holtec collects seawater on a monthly basis from the Pilgrim discharge canal and the Powder Point Bridge in Duxbury and provides split samples to MDPH/BEH for analysis of gamma-emitting radionuclides. MERL also analyzes monthly composites of weekly surface water samples from both locations for tritium.

Milk

MDPH/BEH collects samples of cow's milk monthly from a farm in Duxbury.[3] The milk is analyzed for gamma-emitting radionuclides, including Iodine-131. Although this farm is located just outside the EPZ (11 miles from Pilgrim), it is the closest dairy farm to Pilgrim with available milk samples.

Fish and Shellfish

Entergy/Holtec provides annual split samples of fish and lobster collected from the Pilgrim discharge canal to MERL for analysis. Entergy also provides MERL with split samples of background fish and lobster from Cape Cod Bay.

Entergy/Holtec collects Mytilus (i.e., blue or common mussels) semiannually from Green Harbor in Marshfield and collects soft shell clams semiannually from Duxbury Bay and Plymouth Harbor. These three locations are reported to be background locations by Entergy/Holtec for federal reporting requirements, but are considered to be "indicator" locations by MDPH/BEH because they fall within the 10-mile EPZ. MERL analyzes the split samples for gamma-emitting radionuclides. Entergy/Holtec also collects mussels from the Pilgrim discharge canal.

Sediment

In 2019 Entergy/Holtec collected semi-annual sediment samples from the Pilgrim discharge canal and Green Harbor in Marshfield; MERL analyzed the split samples.

Irish moss

Irish moss (i.e., Chondrus) readily absorbs iodine and is a good reference indicator of iodine-131 in the environment. Entergy/Holtec collects samples of Irish moss from the Pilgrim discharge canal and a background location at Brant Rock in Marshfield semiannually; split samples are analyzed by MERL.

Crops

MDPH/BEH collects and analyzes background cranberry samples from a bog in East Taunton annually.

In 2019 MDPH collected samples of strawberries, tomatoes, and zucchini during the growing season, from a farm in Kingston.

[3] In January, 2020, MDPH/BEH learned that the farm in Duxbury would no longer be selling milk.

Sileage

In 2019 MERL analyzed split samples of sileage, including feed pellets and hay, collected by Entergy/Holtec.

Vegetation

In 2019 MERL analyzed a split sample of vegetation, collected by Entergy/Holtec from the beach area parking lot at Pilgrim.

B. SEABROOK NUCLEAR POWER STATION

The Seabrook Nuclear Power Station (Seabrook) is located in Seabrook, New Hampshire, approximately two miles north of the Massachusetts border. Six Massachusetts communities are included in the 10-mile EPZ of Seabrook: Amesbury, Merrimac, Newbury, Newburyport, Salisbury, and West Newbury as shown in Figure 3.

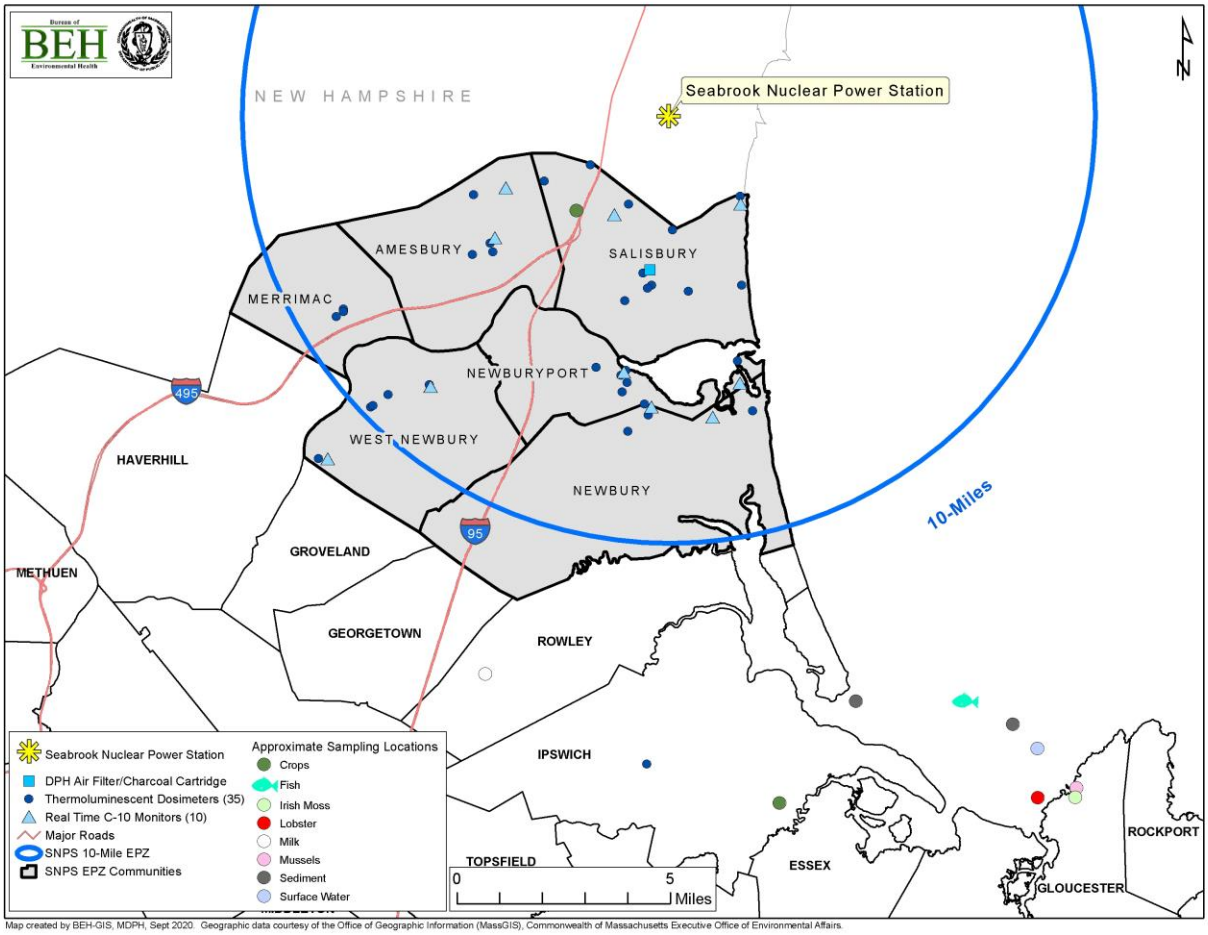

Figure 3. Seabrook EPZ and sampling locations within Massachusetts

Radiation monitoring conducted within and outside the Seabrook EPZ includes the following environmental media: air, surface water, fish, shellfish, sediment, Irish moss, crops, and milk. MDPH/BEH receives split samples from Nextera, the utility that owns Seabrook, for all media except milk and air. Sampling locations and activities within Massachusetts are described below. Sampling locations are shown in Figure 3.

Air/Direct Radiation

MDPH/BEH collects air particulate filters and charcoal cartridges weekly at the Salisbury Fire Station. Filters are analyzed for gross beta and alpha radioactivity, and cartridges for iodine-131. Additionally, a filter composite is analyzed quarterly for gamma-emitting radionuclides. The same analyses are done for air particulate filters and charcoal cartridges collected at the background location in Boston.

MDPH/BEH measures total ambient gamma radiation using a network of 34 TLDs placed at locations throughout the Seabrook EPZ in Massachusetts. These are collected and analyzed quarterly and results are compared to those of a background location in Boston.

MDPH/BEH contracts with the C-l0 Research & Education Foundation, Inc. to conduct radiation monitoring in Massachusetts communities located in the Seabrook EPZ. The C-10 system consists of a network of 14 real-time radiation sensors and weather probes located in Massachusetts within a 10-mile radius of Seabrook station. Beta, gamma, and weather data are collected and uploaded every 15 minutes to a secure web-based central repository. C-10 compiles and graphs the data monthly and sends reports to MDPH/BEH. The 14 monitoring sites within the Seabrook 10-mile EPZ are located at private homes, schools, and businesses. MDPH and MEMA officials receive text alerts from C-10 if levels are greater than three times the typical background readings.

Surface Water

Seawater samples are typically collected monthly by Nextera from a background location in Ipswich Bay. MERL analyzes split samples for gamma-emitting radionuclides. MERL also analyzes surface water samples for tritium.

Milk

MDPH/BEH collects samples of cow's milk monthly from a farm located in Rowley and MERL analyzes the samples for gamma-emitting radionuclides, including iodine-131.

Fish and Shellfish

Nextera semi-annually collects samples of fish and shellfish, including lobster, Modiolus (i.e, Atlantic ribbed mussels) and Mytilus (i.e., blue or common mussels), from Ipswich Bay, which is considered a background location; MERL analyzes the split samples for gamma-emitting radionuclides.

Sediment

Nextera semi-annually collects sediment samples from Ipswich Bay and the tidal flats on Plum Island, both background locations; MERL analyzes the split samples for gamma-emitting radionuclides.

Irish moss

As noted earlier, Irish moss readily absorbs iodine and is a sentinel indicator of environmental iodine-131. Nextera collects samples of Irish moss semiannually from a background location in Ipswich Bay, and split samples are analyzed by MERL for gamma-emitting radionuclides.

Crops

In 2019 MDPH collected strawberries, tomatoes, and zucchini, from a farm located within the Seabrook EPZ in Salisbury, and also collected strawberries, tomatoes, and zucchini from a farm in Ipswich, which is outside the Seabrook EPZ.

3. 2019 ENVIRONMENTAL MONITORING RESULTS

Results of environmental monitoring conducted by MDPH/BEH in the Massachusetts communities in the vicinity of the Pilgrim and Seabrook nuclear power stations are discussed below and presented in Tables 2-7. The tables are organized by nuclear power station and by sample media.

A. PILGRIM NUCLEAR POWER STATION

Sampling results for Pilgrim are provided in Tables 2, 3 and 4. Only two radionuclides –, Beryllium-7 and Potassium-40, were detected in samples collected either within or outside the Pilgrim EPZ. Naturally occurring Potassium-40 was detected in all samples of environmental media analyzed for Potassium-40 from both within and outside of the Pilgrim EPZ, with the exception of the first quarter composite sample collected at the Pilgrim station. Beryllium-7, which is also naturally occurring, was detected in: 1) all four of the quarterly composite air samples; 2) clams from Plymouth Harbors; 3) Irish moss samples from both the Pilgrim discharge canal and the background location at Brant Rock; 4) cranberries, which are collected outside the EPZ; 5) mixed grasses/wild vegetation collected at Pilgrim station; and 6) sileage (hay) collected from a background location in Duxbury. For both Potassium-40 and Beryllium-7, levels detected in samples collected within the EPZ are generally consistent with levels detected in background samples.

In addition to naturally occurring Beryllium-7 and Potassium-40, which were detected at levels consistent with background levels, air filter and cartridge analyses indicated low levels of gross alpha and gross beta radiation. Levels of gross alpha and beta radiation measured in the Pilgrim EPZ ranged from 0.003 – 0.015 and 0.013 – 0.043 pico curies (pCi)/m^3, respectively. These levels are consistent with those measured at the background location in Boston, of 0.004 – 0.017 and 0.019 – 0.042 pCi/m^3, respectively. No gamma-emitting radionuclides of concern were detected in quarterly composite air samples.

Real-time monitoring did not detect radiation greater than typical background levels of approximately 0.007 - 0.009 mRoentgen/hour with the exception of brief increases up to 0.02 mRoentgen/hour. Brief increases are expected due to rainfall washout from naturally occurring radionuclides such as airborne radon daughters and cosmic radiation events. No alerts at three times background were recorded. TLD total gamma exposure results ranged from 11.6 to 27.4 mRoentgen/quarter (i.e., 0.005 – 0.013 mRoentgen/hour) with an average of 15.3 mRoentgen/quarter (0.007 mRoentgen/hour). This value is compared to an average value of 13.5 mRoentgen/quarter measured at a background location in Boston, and corresponds to an average gamma exposure of 1.8 mRoentgen/quarter above background.

B. SEABROOK NUCLEAR POWER STATION

Seabrook sampling results are provided in Tables 5, 6 and 7. As with Pilgrim, the only radionuclides detected either within or outside the Seabrook EPZ were Potassium-40 and Beryllium-7.

Naturally occurring Potassium-40 was detected in all samples of environmental media from both within and outside the Seabrook EPZ. Naturally occurring Beryllium-7 was detected in Irish moss (i.e.,

chondrus) and mussels (i.e., modiolus and mytilus) collected from the background sampling location in Ipswich Bay, in strawberries collected from the farm in Salisbury, and in the four quarterly air samples collected at the Salisbury Fire Station. As with Pilgrim, levels of Potassium-40 and Beryllium-7 detected within the Seabrook EPZ are consistent with background levels.

In addition to naturally occurring Beryllium-7 and Potassium-40, detected at levels consistent with background, analyses of air filter and cartridge samples found low levels of gross alpha (0.004 – 0.014 pCi/m^3) and gross beta (0.015 – 0.040 pCi/m^3) radiation, consistent with levels measured at the background location in Boston (0.004 – 0.017 pCi/m^3 and 0.019 – 0.042 pCi/m^3, for gross alpha and gross beta radiation, respectively). No gamma radionuclides of concern were detected in quarterly composite air samples.

In 2019, real-time monitoring for the Seabrook EPZ did not show gamma radiation levels above typical background levels at most stations (approximately 0.010 mRoentgen/hour) with the exception of brief increases (typically up to approximately 0.02 mRoentgen/hour). Brief increases are expected due to rainfall washout from naturally occurring radionuclides such as airborne radon daughters and cosmic radiation events. Beta readings ranged from approximately 40 to 50 counts per minute with the exception of brief increases similar to the gamma results.

TLD results for total gamma exposure ranged from 11.4 to 21.9 mRoentgen/quarter (0.005 – 0.010 mRoentgen/hour) with an average exposure of 17.3 mRoentgen/quarter (0.008 mRoentgen/hour), compared to an average of 14.0 mRoentgen/quarter at the background location in Boston. The result is an average gamma exposure level of 3.3 mRoentgen/quarter over background.

C. SUMMARY

Radiation monitoring results in 2019 for Massachusetts have been either non-detect or naturally occurring (i.e., Potassium-40, Beryllium-7). No detectible radionuclides were at levels of health concern or were indicative of an unintentional release of radiation at Pilgrim or Seabrook.

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D. RESULTS TABLES

Table 2. Pilgrim Nuclear Power Station 2019 Environmental Monitoring Data - Air Samples

Sample Type	Location	Date	I-131* (pCi/m^3)	Be-7* (pCi/m^3)	K-40* (pCi/m^3)	Mn-54* (pCi/m^3)	Fe-59* (pCi/m^3)	Co-60* (pCi/m^3)	Zn-65* (pCi/m^3)	Cs-137* (pCi/m^3)	Gross Alpha (pCi/m^3)	Gross Beta (pCi/m^3)
Air	Pilgrim Station	1/4/2019	<0.0141	-	-	-	-	-	-	-	0.00993	0.0236
Air	Pilgrim Station	1/9/2019	<0.0228	-	-	-	-	-	-	-	0.01450	0.0355
Air	Pilgrim Station	1/25/2019	<0.0081	-	-	-	-	-	-	-	0.00529	0.0165
Air	Pilgrim Station	2/1/2019	<0.0128	-	-	-	-	-	-	-	0.00983	0.0358
Air	Pilgrim Station	2/7/2019	<0.0201	-	-	-	-	-	-	-	0.01320	0.0398
Air	Pilgrim Station	2/14/2019	<0.0137	-	-	-	-	-	-	-	0.00887	0.0232
Air	Pilgrim Station Quarterly Composite	2/15/2019	-	0.149	<0.016	<0.001	<0.003	<0.001	<0.001	<0.001	-	-
Air	Pilgrim Station	2/22/2019	<0.0125	-	-	-	-	-	-	-	0.01050	0.0315
Air	Pilgrim Station	3/1/2019	<0.0182	-	-	-	-	-	-	-	0.01060	0.0364
Air	Pilgrim Station	3/8/2019	<0.0177	-	-	-	-	-	-	-	0.01140	0.0346
Air	Pilgrim Station	3/14/2019	<0.0228	-	-	-	-	-	-	-	0.01120	0.0410
Air	Pilgrim Station	3/21/2019	<0.0145	-	-	-	-	-	-	-	0.00982	0.0382
Air	Pilgrim Station	3/28/2019	<0.0183	-	-	-	-	-	-	-	0.00975	0.0284
Air	Pilgrim Station	4/5/2019[1]	<0.0157	-	-	-	-	-	-	-	0.00925	0.0248
Air	Pilgrim Station	4/23/2019[1]	<0.0187	-	-	-	-	-	-	-	0.00725	0.0234
Air	Pilgrim Station	5/3/2019	<0.0099	-	-	-	-	-	-	-	0.00280	0.0160
Air	Pilgrim Station	5/9/2019	<0.0172	-	-	-	-	-	-	-	0.00484	0.0230
Air	Pilgrim Station	5/15/2019	<0.0163	-	-	-	-	-	-	-	0.00614	0.0216
Air	Pilgrim Station Quarterly Composite	5/15/2019	-	0.122	0.099^	<0.001	<0.003	<0.001	<0.002	<0.001	-	-
Air	Pilgrim Station	5/22/2019	<0.0174	-	-	-	-	-	-	-	0.00829	0.0272
Air	Pilgrim Station	5/31/2019	<0.0131	-	-	-	-	-	-	-	0.00604	0.0176
Air	Pilgrim Station	6/6/2019	<0.0197	-	-	-	-	-	-	-	0.01090	0.0287
Air	Pilgrim Station	6/13/2019	<0.0168	-	-	-	-	-	-	-	0.00938	0.0270
Air	Pilgrim Station	6/21/2019	<0.0156	-	-	-	-	-	-	-	0.00767	0.0274
Air	Pilgrim Station	6/28/2019	<0.0160	-	-	-	-	-	-	-	0.00858	0.0267
Air	Pilgrim Station	7/5/2019	<0.0149	-	-	-	-	-	-	-	0.00834	0.0248
Air	Pilgrim Station	7/12/2019	<0.0164	-	-	-	-	-	-	-	0.00621	0.0241
Air	Pilgrim Station	7/25/2019	<0.0081	-	-	-	-	-	-	-	0.00564	0.0195
Air	Pilgrim Station	7/30/2019	<0.0234	-	-	-	-	-	-	-	0.00814	0.0306
Air	Pilgrim Station	8/8/2019	<0.0138	-	-	-	-	-	-	-	0.00928	0.0275

-" = Not analyzed

* I-131 = iodine 131; Ba-140 = Barium 140; Be-7 = Beryllium 7; Co-60 = Cobalt 60; Cs-134 = Cesium 134; Cs-137=Cesium 137; Fe-59=Iron 59; H-3* = Tritium; K-40 = Potassium-40; Mn-54=Manganese-54; Zn-65=Zinc 65

"<" = value is less than the listed MDA (Minimum Detectable Activity) value

"NR"= result not reported for quality control reasons.

Sample Type	Location	Date	I-131* (pCi/m^3)	Be-7* (pCi/m^3)	K-40* (pCi/m^3)	Mn-54* (pCi/m^3)	Fe-59* (pCi/m^3)	Co-60* (pCi/m^3)	Zn-65* (pCi/m^3)	Cs-137* (pCi/m^3)	Gross Alpha (pCi/m^3)	Gross Beta (pCi/m^3)
Air	Pilgrim Station Quarterly Composite	8/15/2019	-	0.112	0.267	<0.001	<0.004	<0.001	<0.002	<0.001	-	-
Air	Pilgrim Station	8/16/2019	<0.0150	-	-	-	-	-	-	-	0.00910	0.0253
Air	Pilgrim Station	8/21/2019	<0.0226	-	-	-	-	-	-	-	0.01260	0.0347
Air	Pilgrim Station	8/29/2019	<0.0136	-	-	-	-	-	-	-	0.00623	0.0193
Air	Pilgrim Station	9/6/2019	<0.0158	-	-	-	-	-	-	-	0.00755	0.0262
Air	Pilgrim Station	9/13/2019	<0.0165	-	-	-	-	-	-	-	0.00733	0.0250
Air	Pilgrim Station	9/18/2019	<0.0264	-	-	-	-	-	-	-	0.01010	0.0277
Air	Pilgrim Station	9/26/2019	<0.0147	-	-	-	-	-	-	-	0.00751	0.0298
Air	Pilgrim Station	10/4/2019	<0.0143	-	-	-	-	-	-	-	0.00287	0.0129
Air	Pilgrim Station	10/9/2019	<0.0237	-	-	-	-	-	-	-	0.00921	0.0382
Air	Pilgrim Station	10/18/2019	<0.0102	-	-	-	-	-	-	-	0.00432	0.0199
Air	Pilgrim Station	10/24/2019	<0.0154	-	-	-	-	-	-	-	0.00983	0.0272
Air	Pilgrim Station	10/31/2019	<0.0119	-	-	-	-	-	-	-	0.00750	0.0223
Air	Pilgrim Station	11/7/2019	<0.0155	-	-	-	-	-	-	-	0.00812	0.0283
Air	Pilgrim Station	11/15/2019	<0.0488	-	-	-	-	-	-	-	0.00876	0.0300
Air	Pilgrim Station Quarterly Composite	11/15/2019	-	0.086	0.272	<0.001	<0.003	<0.001	<0.002	<0.001	-	-
Air	Pilgrim Station	11/22/2019	<0.0151	-	-	-	-	-	-	-	0.00731	0.0232
Air	Pilgrim Station	11/26/2019	<0.0282	-	-	-	-	-	-	-	0.01180	0.0434
Air	Pilgrim Station	12/5/2019	<0.0133	-	-	-	-	-	-	-	0.00691	0.0223
Air	Pilgrim Station	12/13/2019	<0.0151	-	-	-	-	-	-	-	0.00492	0.0254
Air	Pilgrim Station	12/19/2019	<0.0197	-	-	-	-	-	-	-	0.00762	0.0266
Air	Pilgrim Station	12/26/2019	<0.0156	-	-	-	-	-	-	-	0.00784	0.0410
Air	Background	1/7/2019	<0.0139	-	-	-	-	-	-	-	0.01130	0.0295
Air	Background	1/14/2019	<0.0171	-	-	-	-	-	-	-	0.00834	0.0233
Air	Background	1/23/2019	<0.0146	-	-	-	-	-	-	-	0.00916	0.0252
Air	Background	2/4/2019	<0.0175	-	-	-	-	-	-	-	0.01280	0.0390
Air	Background	2/11/2019	<0.0144	-	-	-	-	-	-	-	0.01050	0.0315
Air	Background Quarterly Composite	2/15/2019	-	0.119	0.318^	<0.001	<0.004	<0.001	<0.002	<0.001	-	-
Air	Background	2/19/2019	<0.0136	-	-	-	-	-	-	-	0.00971	0.0281
Air	Background	2/25/2019	<0.0202	-	-	-	-	-	-	-	0.01160	0.0396
Air	Background	3/5/2019	<0.0157	-	-	-	-	-	-	-	0.00969	0.0340

-" = Not analyzed

* I-131 = iodine 131; Ba-140 = Barium 140; Be-7 = Beryllium 7; Co-60 = Cobalt 60; Cs-134 = Cesium 134; Cs-137=Cesium 137; Fe-59=Iron 59; H-3* = Tritium; K-40 = Potassium-40; Mn-54=Manganese-54; Zn-65=Zinc 65

"<" = value is less than the listed MDA (Minimum Detectable Activity) value

"NR"= result not reported for quality control reasons.

Sample Type	Location	Date	I-131* (pCi/m^3)	Be-7* (pCi/m^3)	K-40* (pCi/m^3)	Mn-54* (pCi/m^3)	Fe-59* (pCi/m^3)	Co-60* (pCi/m^3)	Zn-65* (pCi/m^3)	Cs-137* (pCi/m^3)	Gross Alpha (pCi/m^3)	Gross Beta (pCi/m^3)
Air	Background	3/11/2019	<0.0198	-	-	-	-	-	-	-	0.01410	0.0409
Air	Background	3/18/2019	<0.0190	-	-	-	-	-	-	-	0.01090	0.0405
Air	Background	3/25/2019	<0.0189	-	-	-	-	-	-	-	0.00800	0.0330
Air	Background	4/1/2019	<0.0188	-	-	-	-	-	-	-	0.00491	0.0246
Air	Background	4/8/2019	<0.0207	-	-	-	-	-	-	-	0.00692	0.0237
Air	Background	4/16/2019	<0.0175	-	-	-	-	-	-	-	0.00359	0.0187
Air	Background	4/22/2019	<0.0220	-	-	-	-	-	-	-	0.00517	0.0210
Air	Background	4/29/2019	<0.0260	-	-	-	-	-	-	-	0.00638	0.0219
Air	Background	5/6/2019	<0.0221	-	-	-	-	-	-	-	0.01160	0.0334
Air	Background	5/13/2019	<0.0233	-	-	-	-	-	-	-	0.01350	0.0408
Air	Background Quarterly Composite	5/15/2019	-	0.108	0.112^	<0.001	<0.004	<0.001	<0.002	<0.001	-	-
Air	Background	5/20/2019	<0.0254	-	-	-	-	-	-	-	0.01490	0.0424
Air	Background	5/28/2019	<0.0253	-	-	-	-	-	-	-	0.01690	0.0396
Air	Background	6/3/2019	<0.0186	-	-	-	-	-	-	-	0.01080	0.0246
Air	Background	6/10/2019	<0.0179	-	-	-	-	-	-	-	0.00951	0.0263
Air	Background	6/17/2019	<0.0165	-	-	-	-	-	-	-	0.01050	0.0307
Air	Background	6/24/2019	<0.0164	-	-	-	-	-	-	-	0.00980	0.0315
Air	Background	7/1/2019	<0.0160	-	-	-	-	-	-	-	0.00668	0.0209
Air	Background	7/8/2019	<0.0149	-	-	-	-	-	-	-	0.00687	0.0230
Air	Background	7/15/2019	<0.0152	-	-	-	-	-	-	-	0.00655	0.0211
Air	Background	7/22/2019	<0.0179	-	-	-	-	-	-	-	0.00830	0.0249
Air	Background	7/29/2019	<0.0160	-	-	-	-	-	-	-	0.00797	0.0257
Air	Background	8/5/2019	<0.0163	-	-	-	-	-	-	-	0.01000	0.0319
Air	Background	8/12/2019	<0.0154	-	-	-	-	-	-	-	0.00858	0.0267
Air	Background Quarterly Composite	8/15/2019	-	0.128	0.240	<0.001	<0.003	<0.001	<0.001	<0.001	-	-
Air	Background	8/19/2019	<0.0175	-	-	-	-	-	-	-	0.00955	0.0312
Air	Background	8/26/2019	<0.0146	-	-	-	-	-	-	-	0.00855	0.0268
Air	Background	9/3/2019	<0.0138	-	-	-	-	-	-	-	0.00856	0.0239
Air	Background	9/9/2019	<0.0178	-	-	-	-	-	-	-	0.01050	0.0304
Air	Background	9/16/2019	<0.0147	-	-	-	-	-	-	-	0.00837	0.0259
Air	Background	9/23/2019	<0.0137	-	-	-	-	-	-	-	0.00732	0.0357
Air	Background	9/30/2019	<0.0144	-	-	-	-	-	-	-	0.00746	0.0307

-" = Not analyzed

* I-131 = iodine 131; Ba-140 = Barium 140; Be-7 = Beryllium 7; Co-60 = Cobalt 60; Cs-134 = Cesium 134; Cs-137=Cesium 137; Fe-59=Iron 59; H-3* = Tritium; K-40 = Potassium-40; Mn-54=Manganese-54; Zn-65=Zinc 65

"<" = value is less than the listed MDA (Minimum Detectable Activity) value

"NR"= result not reported for quality control reasons.

Sample Type	Location	Date	I-131* (pCi/m^3)	Be-7* (pCi/m^3)	K-40* (pCi/m^3)	Mn-54* (pCi/m^3)	Fe-59* (pCi/m^3)	Co-60* (pCi/m^3)	Zn-65* (pCi/m^3)	Cs-137* (pCi/m^3)	Gross Alpha (pCi/m^3)	Gross Beta (pCi/m^3)
Air	Background	10/2/2019	<0.0133	-	-	-	-	-	-	-	0.00488	0.0203
Air	Background	10/15/2019	<0.0104	-	-	-	-	-	-	-	0.00710	0.0211
Air	Background	10/21/2019	<0.0187	-	-	-	-	-	-	-	0.00802	0.0252
Air	Background	10/28/2019	<0.0143	-	-	-	-	-	-	-	0.01010	0.0286
Air	Background	11/4/2019	<0.0141	-	-	-	-	-	-	-	0.00697	0.0199
Air	Background	11/12/2019	<0.0211	-	-	-	-	-	-	-	0.01010	0.0287
Air	Background Quarterly Composite	11/15/2019	-	0.106	0.262	<0.001	<0.003	<0.001	<0.002	<0.001	-	-
Air	Background	11/18/2019	<0.0179	-	-	-	-	-	-	-	0.00718	0.0284
Air	Background	11/25/2019	<0.0150	-	-	-	-	-	-	-	0.00959	0.0248
Air	Background	12/2/2019	<0.0147	-	-	-	-	-	-	-	0.00781	0.0290
Air	Background	12/9/2019	<0.0158	-	-	-	-	-	-	-	0.00742	0.0253
Air	Background	12/16/2019	<0.0159	-	-	-	-	-	-	-	0.00696	0.0229
Air	Background	12/23/2019	<0.0157	-	-	-	-	-	-	-	0.00624	0.0348
Air	Background	12/30/2019	<0.0164	-	-	-	-	-	-	-	0.00607	0.0358

^K-40 not identified in peak search

(1) New air pump installed between 4/5 and 4/23

-" = Not analyzed

* I-131 = iodine 131; Ba-140 = Barium 140; Be-7 = Beryllium 7; Co-60 = Cobalt 60; Cs-134 = Cesium 134; Cs-137=Cesium 137; Fe-59=Iron 59; H-3* = Tritium; K-40 = Potassium-40; Mn-54=Manganese-54; Zn-65=Zinc 65

"<" = value is less than the listed MDA (Minimum Detectable Activity) value

"NR"= result not reported for quality control reasons.

Table 3. Pilgrim Nuclear Power Station 2019 Environmental Monitoring Data – Liquid Matrices

Sample Type	Location	Date	K-40* (pCi/L)	Mn-54* (pCi/L)	Fe-59* (pCi/L)	Co-60* (pCi/L)	Zn-65* (pCi/L)	I-131* (pCi/L)	Cs-134* (pCi/L)	Cs-137* (pCi/L)	Ba-140* (pCi/L)	H-3* (pCi/L)
Surface water	Discharge Canal	1/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Discharge Canal	1/29/2019	308	<3.1	<6.0	<2.9	<6.5	<5.4	-	<2.9	-	-
Surface water	Discharge Canal	2/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Discharge Canal	2/26/2019	302	<3.2	<6.9	<2.9	<6.6	<8.3	-	<3.0	-	-
Surface water	Discharge Canal	3/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Discharge Canal	4/2/2019	350	<3.1	<6.2	<2.9	<6.4	<5.6	-	<3.1	-	-
Surface water	Discharge Canal	4/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Discharge Canal	4/30/2019	365	<3.0	<6.5	<2.8	<6.7	<7.9	-	<3.1	-	-
Surface water	Discharge Canal	5/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Discharge Canal	5/28/2019	1460	<3.1	<6.8	<3.0	<6.7	<10.4	-	<3.0	-	-
Surface water	Discharge Canal	6/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Discharge Canal	7/2/2019	*900	<3.3	<6.9	<3.3	<6.5	<9.7	-	<3.4	-	-
Surface water	Discharge Canal	7/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Discharge Canal	7/30/2019	1450	<3.2	<6.5	<2.9	<6.4	<6.8	-	<3.1	-	-
Surface water	Discharge Canal	8/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Discharge Canal	9/3/2019	280	<2.4	<5.0	<2.5	<5.3	<3.8	-	<2.7	-	-
Surface water	Discharge Canal	9/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Discharge Canal	10/1/2019	1480	<3.2	<8.5	<2.8	<6.5	NR	-	<3.0	-	-
Surface water	Discharge Canal	10/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Discharge Canal	10/29/2019	1440	<3.1	<6.8	<2.9	<6.7	<11.0	-	<2.9	-	-
Surface water	Discharge Canal	11/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Discharge Canal	12/2/2019	1450	<3.2	<7.2	<2.8	<6.3	<14.2	-	<3.1	-	-
Surface water	Discharge Canal	12/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Discharge Canal	12/31/2019	1420	<3.1	<6.9	<2.8	<6.6	<10.5	-	<3.1	-	-
Surface water	Powder Point Bridge[1]	1/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Powder Point Bridge[1]	1/29/2019	383	<3.0	<6.2	<2.9	<6.1	<7.3	-	<2.9	-	-
Surface water	Powder Point Bridge[1]	2/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Powder Point Bridge[1]	2/26/2019	256	<2.5	<5.3	<2.7	<5.3	<5.7	-	<2.8	-	-
Surface water	Powder Point Bridge[1]	3/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Powder Point Bridge[1]	4/2/2019	306	<2.5	<4.8	<2.9	<5.7	<4.0	-	<2.6	-	-
Surface water	Powder Point Bridge[1]	4/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Powder Point Bridge[1]	4/30/2019	279	<3.1	<7.3	<2.9	<6.6	<13.1	-	<2.9	-	-
Surface water	Powder Point Bridge[1]	5/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Powder Point Bridge[1]	5/28/2019	1420	<3.2	<6.5	<3.1	<6.8	<7.7	-	<3.0	-	-

-" = Not analyzed

* I-131 = iodine 131; Ba-140 = Barium 140; Be-7 = Beryllium 7; Co-60 = Cobalt 60; Cs-134 = Cesium 134; Cs-137=Cesium 137; Fe-59=Iron 59; H-3* = Tritium; K-40 = Potassium-40; Mn-54=Manganese-54; Zn-65=Zinc 65

"<" = value is less than the listed MDA (Minimum Detectable Activity) value

"NR"= result not reported for quality control reasons.

Sample Type	Location	Date	K-40* (pCi/L)	Mn-54* (pCi/L)	Fe-59* (pCi/L)	Co-60* (pCi/L)	Zn-65* (pCi/L)	I-131* (pCi/L)	Cs-134* (pCi/L)	Cs-137* (pCi/L)	Ba-140* (pCi/L)	H-3* (pCi/L)
Surface water	Powder Point Bridge[1]	6/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Powder Point Bridge[1]	7/2/2019	267	<2.6	<5.5	<2.6	<5.3	<8.2	-	<2.4	-	-
Surface water	Powder Point Bridge[1]	7/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Powder Point Bridge[1]	7/30/2019	268	<2.6	<5.0	<2.7	<5.5	<4.8	-	<2.8	-	-
Surface water	Powder Point Bridge[1]	8/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Powder Point Bridge[1]	9/3/2019	1420	<2.9	<6.2	<3.1	<6.2	<6.1	-	<2.9	-	-
Surface water	Powder Point Bridge[1]	9/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Powder Point Bridge[1]	10/1/2019	268	<2.5	<6.3	<2.6	<5.6	<24.8	-	<2.6	-	-
Surface water	Powder Point Bridge[1]	10/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Powder Point Bridge[1]	10/29/2019	1480	<3.0	<7.2	<2.8	<6.7	<12.2	-	<2.9	-	-
Surface water	Powder Point Bridge[1]	11/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Powder Point Bridge[1]	12/2/2019	1470	<3.0	<6.1	<3.0	<6.4	<11.0	-	<2.8	-	-
Surface water	Powder Point Bridge[1]	12/15/2019	-	-	-	-	-	-	-	-	-	<300
Surface water	Powder Point Bridge[1]	12/31/2019	1420	<3.0	<6.2	<2.7	<6.5	<7.8	-	<2.9	-	-
Milk	Duxbury	1/25/2019	1280	-	-	-	-	<4.4	<2.6	<3.1	<12.3	-
Milk	Duxbury	2/7/2019	1360	-	-	-	-	<3.4	<2.8	<3.2	<11.5	-
Milk	Duxbury	3/1/2019	1220	-	-	-	-	<3.5	<2.5	<3.0	<11.7	-
Milk	Duxbury	4/11/2019	1340	-	-	-	-	<3.6	<2.8	<3.1	<11.0	-
Milk	Duxbury	5/9/2019	1850	-	-	-	-	<3.5	<2.8	<3.4	<11.4	-
Milk	Duxbury	6/6/2019	1350	-	-	-	-	<2.4	<2.6	<2.9	<9.9	-
Milk	Duxbury	7/12/2019	2610	-	-	-	-	<4.3	<2.6	<3.2	<12.1	-
Milk	Duxbury	8/8/2019	2430	-	-	-	-	<3.5	<2.8	<3.3	<11.6	-
Milk	Duxbury	9/26/2019	2470	-	-	-	-	<3.4	<2.6	<3.3	<11.3	-
Milk	Duxbury	10/10/2019	2530	-	-	-	-	<3.3	<2.6	<3.1	<10.9	-
Milk	Duxbury	11/7/2019	1270	-	-	-	-	<2.4	<2.4	<2.8	<9.3	-
Milk	Duxbury	12/5/2019	2590	-	-	-	-	<3.4	<2.8	<3.2	<10.6	-

[1]Sample considered "background" for the purpose of NRC regulations, but considered "indicator" by MDPH because it falls within the 10-mile EPZ.

-" = Not analyzed

* I-131 = iodine 131; Ba-140 = Barium 140; Be-7 = Beryllium 7; Co-60 = Cobalt 60; Cs-134 = Cesium 134; Cs-137=Cesium 137; Fe-59=Iron 59; H-3* = Tritium; K-40 = Potassium-40; Mn-54=Manganese-54; Zn-65=Zinc 65

"<" = value is less than the listed MDA (Minimum Detectable Activity) value

"NR"= result not reported for quality control reasons.

Table 4. Pilgrim Nuclear Power Station 2019 Environmental Monitoring Data – Solid matrices

Sample	Location	Date	Be-7* (pCi/kg)	K-40* (pCi/kg)	Mn-54* (pCi/kg)	Fe-59* (pCi/kg)	Co-60* (pCi/kg)	Zn-65* (pCi/kg)	Cs-137* (pCi/kg)	I-131* (pCi/kg)
Bluefish	PNPS Discharge Canal	11/16/2019	<84	3720	<7.5	<24.9	<6.8	<17.0	<7.3	-
Cod	Cape Cod Bay (background)	12/4/2019	<256	11400	<24.3	<65.9	<23.2	<51.4	<23.6	
Cod	PNPS Discharge Canal	11/16/2019	<392	13700	<30.5	<108.0	<24.8	<64.0	<26.5	
Flounder	PNPS Discharge Canal	11/16/2019	<75	3810	<6.1	<22.7	<5.7	<13.9	<5.8	
Smelt	Cape Cod Bay (background)	12/3/2019	<47	1450	<4.0	<13.9	<4.3	<9.4	<4.2	-
Winter Flounder	PNPS Discharge Canal	5/17/2019	<50	4050	<4.5	<15.2	<5.4	<11.3	<3.9	-
Yellowtail Flounder	Cape Cod Bay (background)	5/16/2019	<51	3310	<4.9	<15.6	<4.7	<11.5	<4.3	-
Lobster	Cape Cod Bay (background)	8/22/2019	<54	4040	<4.6	<15.4	<4.7	<11.3	<4.2	-
Lobster	PNPS Discharge Canal	7/22/2019	<78	3980	<4.8	<24.2	<4.2	<11.4	<4.1	-
Mytilus[1]	Green Harbor, Marshfield (background)	5/18/2019	<44	1250	<4.2	<11.6	<3.8	<9.4	<3.9	-
Mytilus[1]	PNPS Discharge Canal	6/25/2019	<35	2640	<3.7	<8.6	<4.0	<9.0	<3.9	-
Softshell Clams	Duxbury	5/19/2019	<47	1510	<4.2	<12.7	<4.0	<9.4	<3.7	-
Softshell Clams	Duxbury	11/17/2019	NR	9160	<24.0	NR	<20.6	<48.6	NR	-
Softshell Clams	Plymouth Harbor	5/18/2019	72.2	1440	<3.6	<11.5	<3.8	<8.6	<3.6	-
Softshell Clams	Plymouth Harbor	9/29/2019	<69	1490	<5.1	<19.6	<4.4	<11.1	<4.3	-
Sediment	Green Harbor, Marshfield	5/19/2019	-	18600	-	-	<22.7	-	<24.9	-
Sediment	Green Harbor, Marshfield	9/29/2019	-	7290	-	-	NR	-	<24.2	-
Sediment	PNPS Discharge Canal	6/25/2019	-	17600	-	-	<20.7	-	<21.2	-
Sediment	PNPS Discharge Canal	12/1/2019	-	7640	-	-	<21.5	-	<22.2	-
Irish Moss	Brant Rock (background)	5/19/2019	600	26100	<12.5	<32.2	<13.2	<32.1	<12.1	<34.5
Irish Moss	Brant Rock (background)	9/29/2019	2360	22100	<15.2	<60.2	<14.2	<36.8	<13.5	NR
Irish Moss	PNPS Discharge Canal	6/25/2019	3190	42500	NR	<89.3	NR	NR	NR	<65.4
Cranberries	E. Taunton (background)	10/16/2019	63.9	2660	<4.8	<9.2	<4.5	<10.1	<4.9	-
Strawberries	Cretinon's Farm, Kingston	6/21/2019	<40.5	3260	<4.6	<9.1	<4.6	<9.9	<4.6	-
Tomatoes	Cretinon's Farm, Kingston	8/21/2019	<30.7	3670	<3.9	<7.2	<4.0	<8.6	<3.9	-
Zucchini	Cretinon's Farm, Kingston	7/25/2019	<39.6	4300	<4.9	<9.9	<4.9	<11.1	<5.1	
Mixed Grasses/Wild Vegetation	PNPS Beach Parking Lot	8/8/2019	1390	10300	<16.2	<32.5	<16.1	-	<16.5	
Silage – feed pellets	Duxbury (background)	8/8/2019	<45	6730	<5.6	<13.4	<6.4	<14.6	<5.8	
Silage – hay	Duxbury (background)	8/8/2019	4980	28500	<42.7	<82.9	<39.1	<92.6	<42.9	-

[1]Blue, or common mussel

-" = Not analyzed

* I-131 = iodine 131; Ba-140 = Barium 140; Be-7 = Beryllium 7; Co-60 = Cobalt 60; Cs-134 = Cesium 134; Cs-137=Cesium 137; Fe-59=Iron 59; H-3* = Tritium; K-40 = Potassium-40; Mn-54=Manganese-54; Zn-65=Zinc 65

"<" = value is less than the listed MDA (Minimum Detectable Activity) value

"NR"= result not reported for quality control reasons.

Table 5. Seabrook Nuclear Power Station 2019 Environmental Monitoring Data - Air Samples

Sample Type	Location	Date	I-131* (pCi/m^3)	Be-7* (pCi/m^3)	K-40* (pCi/m^3)	Mn-54* (pCi/m^3)	Fe-59* (pCi/m^3)	Co-60* (pCi/m^3)	Zn-65* (pCi/m^3)	Cs-137* (pCi/m^3)	Gross Alpha (pCi/m^3)	Gross Beta (pCi/m^3)
Air	Salisbury Fire Station	1/2/2019	<0.0271	-	-	-	-	-	-	-	0.00932	0.0262
Air	Salisbury Fire Station	1/9/2019	<0.0204	-	-	-	-	-	-	-	0.01190	0.0253
Air	Salisbury Fire Station	1/16/2019	<0.0172	-	-	-	-	-	-	-	0.01080	0.0197
Air	Salisbury Fire Station	1/23/2019	<0.0158	-	-	-	-	-	-	-	0.01140	0.0240
Air	Salisbury Fire Station	2/6/2019	<0.0179	-	-	-	-	-	-	-	0.01280	0.0346
Air	Salisbury Fire Station	2/13/2019	<0.0184	-	-	-	-	-	-	-	0.00906	0.0276
Air	Salisbury Fire Station Quarterly Composite	2/15/2019	-	0.108	0.028	<0.001	<0.004	<0.001	<0.002	<0.001	-	-
Air	Salisbury Fire Station	2/20/2019	<0.0173	-	-	-	-	-	-	-	0.01340	0.0377
Air	Salisbury Fire Station	2/28/2019	<0.0196	-	-	-	-	-	-	-	0.00893	0.0286
Air	Salisbury Fire Station	3/6/2019	<0.0203	-	-	-	-	-	-	-	0.01120	0.0383
Air	Salisbury Fire Station	3/13/2019	<0.0137	-	-	-	-	-	-	-	0.00903	0.0331
Air	Salisbury Fire Station	3/20/2019	<0.0159	-	-	-	-	-	-	-	0.01020	0.0402
Air	Salisbury Fire Station	3/26/2019	<0.0205	-	-	-	-	-	-	-	0.01020	0.0211
Air	Salisbury Fire Station	4/3/2019	<0.0156	-	-	-	-	-	-	-	0.00882	0.0248
Air	Salisbury Fire Station	4/10/2019	<0.0183	-	-	-	-	-	-	-	0.00909	0.0232
Air	Salisbury Fire Station	4/16/2019	<0.0266	-	-	-	-	-	-	-	0.00751	0.0248
Air	Salisbury Fire Station	4/25/2019	<0.0176	-	-	-	-	-	-	-	0.00672	0.0170
Air	Salisbury Fire Station	5/1/2019	<0.0200	-	-	-	-	-	-	-	0.00861	0.0263
Air	Salisbury Fire Station	5/7/2019	<0.0249	-	-	-	-	-	-	-	0.01330	0.0300
Air	Salisbury Fire Station	5/15/2019	<0.0208	-	-	-	-	-	-	-	0.00946	0.0254
Air	Salisbury Fire Station Quarterly Composite	5/15/2019	-	0.085	0.325	<0.001	<0.005	<0.001	<0.002	<0.001	-	-
Air	Salisbury Fire Station	5/22/2019	<0.0405	-	-	-	-	-	-	-	0.01020	0.0309
Air	Salisbury Fire Station	5/29/2019	<0.0263	-	-	-	-	-	-	-	0.01010	0.0248
Air	Salisbury Fire Station	6/5/2019	<0.0206	-	-	-	-	-	-	-	0.00945	0.0260
Air	Salisbury Fire Station	6/11/2019	<0.0273	-	-	-	-	-	-	-	0.01300	0.0302
Air	Salisbury Fire Station	6/19/2019	<0.0185	-	-	-	-	-	-	-	0.01190	0.0267
Air	Salisbury Fire Station	6/24/2019	<0.0310	-	-	-	-	-	-	-	0.01400	0.0388
Air	Salisbury Fire Station	7/3/2019	<0.0148	-	-	-	-	-	-	-	0.00400	0.0151
Air	Salisbury Fire Station	7/10/2019	<0.0173	-	-	-	-	-	-	-	0.00452	0.0160
Air	Salisbury Fire Station	7/16/2019	<0.0204	-	-	-	-	-	-	-	0.00751	0.0222
Air	Salisbury Fire Station	7/24/2019	<0.0160	-	-	-	-	-	-	-	0.00762	0.0218

-" = Not analyzed

* I-131 = iodine 131; Ba-140 = Barium 140; Be-7 = Beryllium 7; Co-60 = Cobalt 60; Cs-134 = Cesium 134; Cs-137=Cesium 137; Fe-59=Iron 59; H-3* = Tritium; K-40 = Potassium-40; Mn-54=Manganese-54; Zn-65=Zinc 65

"<" = value is less than the listed MDA (Minimum Detectable Activity) value

"NR"= result not reported for quality control reasons.

Sample Type	Location	Date	I-131* (pCi/m^3)	Be-7* (pCi/m^3)	K-40* (pCi/m^3)	Mn-54* (pCi/m^3)	Fe-59* (pCi/m^3)	Co-60* (pCi/m^3)	Zn-65* (pCi/m^3)	Cs-137* (pCi/m^3)	Gross Alpha (pCi/m^3)	Gross Beta (pCi/m^3)
Air	Salisbury Fire Station	7/31/2019	<0.0151	-	-	-	-	-	-	-	0.00927	0.0322
Air	Salisbury Fire Station	8/6/2019	<0.0252	-	-	-	-	-	-	-	0.01030	0.0297
Air	Salisbury Fire Station	8/14/2019	<0.0170	-	-	-	-	-	-	-	0.00911	0.0249
Air	Salisbury Fire Station Quarterly Composite	8/15/2019	-	0.074	0.105^	<0.001	<0.003	<0.001	<0.002	<0.001	-	-
Air	Salisbury Fire Station	8/20/2019	<0.0235	-	-	-	-	-	-	-	0.01340	0.0331
Air	Salisbury Fire Station	8/27/2019	<0.0230								0.00863	0.0244
Air	Salisbury Fire Station	9/2/2019	<0.0277								0.01020	0.0265
Air	Salisbury Fire Station	9/11/2019	<0.0116	-	-	-	-	-	-	-	0.00686	0.0223
Air	Salisbury Fire Station	9/18/2019	<0.0206	-	-	-	-	-	-	-	0.00912	0.0288
Air	Salisbury Fire Station	9/24/2019	<0.0189	-	-	-	-	-	-	-	0.00734	0.0230
Air	Salisbury Fire Station	10/2/2019	<0.0173	-	-	-	-	-	-	-	0.00775	0.0255
Air	Salisbury Fire Station	10/9/2019	<0.0180	-	-	-	-	-	-	-	0.00551	0.0210
Air	Salisbury Fire Station	10/15/2019	<0.0284	-	-	-	-	-	-	-	0.00625	0.0260
Air	Salisbury Fire Station	10/23/2019	<0.0387	-	-	-	-	-	-	-	0.00892	0.0214
Air	Salisbury Fire Station	10/29/2019	<0.0175	-	-	-	-	-	-	-	0.00821	0.0234
Air	Salisbury Fire Station	11/7/2019	<0.0144	-	-	-	-	-	-	-	0.00893	0.0261
Air	Salisbury Fire Station	11/13/2019	<0.0330	-	-	-	-	-	-	-	0.00984	0.0302
Air	Salisbury Fire Station Quarterly Composite	11/15/2019	-	0.063	0.188^	<0.001	<0.005	<0.001	<0.002	<0.001	-	-
Air	Salisbury Fire Station	11/20/2019	<0.0276	-	-	-	-	-	-	-	0.00740	0.0271
Air	Salisbury Fire Station	11/27/2019	<0.0224	-	-	-	-	-	-	-	0.00788	0.0297
Air	Salisbury Fire Station	12/4/2019	<0.0217	-	-	-	-	-	-	-	0.00731	0.0271
Air	Salisbury Fire Station	12/12/2019	<0.0243	-	-	-	-	-	-	-	0.00733	0.0211
Air	Salisbury Fire Station	12/18/2019	<0.0494	-	-	-	-	-	-	-	0.01190	0.0333
Air	Background	1/7/2019	<0.0139	-	-	-	-	-	-	-	0.01130	0.0295
Air	Background	1/14/2019	<0.0171	-	-	-	-	-	-	-	0.00834	0.0233
Air	Background	1/23/2019	<0.0146	-	-	-	-	-	-	-	0.00916	0.0252
Air	Background	2/4/2019	<0.0175	-	-	-	-	-	-	-	0.01280	0.0390
Air	Background	2/11/2019	<0.0144	-	-	-	-	-	-	-	0.01050	0.0315
Air	Background Quarterly Composite	2/15/2019	-	0.119	0.318^	<0.001	<0.004	<0.001	<0.002	<0.001	-	-
Air	Background	2/19/2019	<0.0136	-	-	-	-	-	-	-	0.00971	0.0281
Air	Background	2/25/2019	<0.0202	-	-	-	-	-	-	-	0.01160	0.0396

-" = Not analyzed

* I-131 = iodine 131; Ba-140 = Barium 140; Be-7 = Beryllium 7; Co-60 = Cobalt 60; Cs-134 = Cesium 134; Cs-137=Cesium 137; Fe-59=Iron 59; H-3* = Tritium; K-40 = Potassium-40; Mn-54=Manganese-54; Zn-65=Zinc 65

"<" = value is less than the listed MDA (Minimum Detectable Activity) value

"NR"= result not reported for quality control reasons.

Sample Type	Location	Date	I-131* (pCi/m^3)	Be-7* (pCi/m^3)	K-40* (pCi/m^3)	Mn-54* (pCi/m^3)	Fe-59* (pCi/m^3)	Co-60* (pCi/m^3)	Zn-65* (pCi/m^3)	Cs-137* (pCi/m^3)	Gross Alpha (pCi/m^3)	Gross Beta (pCi/m^3)
Air	Background	3/5/2019	<0.0157	-	-	-	-	-	-	-	0.00969	0.0340
Air	Background	3/11/2019	<0.0198	-	-	-	-	-	-	-	0.01410	0.0409
Air	Background	3/18/2019	<0.0190	-	-	-	-	-	-	-	0.01090	0.0405
Air	Background	3/25/2019	<0.0189	-	-	-	-	-	-	-	0.00800	0.0330
Air	Background	4/1/2019	<0.0188	-	-	-	-	-	-	-	0.00491	0.0246
Air	Background	4/8/2019	<0.0207	-	-	-	-	-	-	-	0.00692	0.0237
Air	Background	4/16/2019	<0.0175	-	-	-	-	-	-	-	0.00359	0.0187
Air	Background	4/22/2019	<0.0220	-	-	-	-	-	-	-	0.00517	0.0210
Air	Background	4/29/2019	<0.0260	-	-	-	-	-	-	-	0.00638	0.0219
Air	Background	5/6/2019	<0.0221	-	-	-	-	-	-	-	0.01160	0.0334
Air	Background	5/13/2019	<0.0233	-	-	-	-	-	-	-	0.01350	0.0408
Air	Background Quarterly Composite	5/15/2019	-	0.108	0.112^	<0.001	<0.004	<0.001	<0.002	<0.001	-	-
Air	Background	5/20/2019	<0.0254	-	-	-	-	-	-	-	0.01490	0.0424
Air	Background	5/28/2019	<0.0253	-	-	-	-	-	-	-	0.01690	0.0396
Air	Background	6/3/2019	<0.0186	-	-	-	-	-	-	-	0.01080	0.0246
Air	Background	6/10/2019	<0.0179	-	-	-	-	-	-	-	0.00951	0.0263
Air	Background	6/17/2019	<0.0165	-	-	-	-	-	-	-	0.01050	0.0307
Air	Background	6/24/2019	<0.0164	-	-	-	-	-	-	-	0.00980	0.0315
Air	Background	7/1/2019	<0.0160	-	-	-	-	-	-	-	0.00668	0.0209
Air	Background	7/8/2019	<0.0149	-	-	-	-	-	-	-	0.00687	0.0230
Air	Background	7/15/2019	<0.0152	-	-	-	-	-	-	-	0.00655	0.0211
Air	Background	7/22/2019	<0.0179	-	-	-	-	-	-	-	0.00830	0.0249
Air	Background	7/29/2019	<0.0160	-	-	-	-	-	-	-	0.00797	0.0257
Air	Background	8/5/2019	<0.0163	-	-	-	-	-	-	-	0.01000	0.0319
Air	Background	8/12/2019	<0.0154	-	-	-	-	-	-	-	0.00858	0.0267
Air	Background Quarterly Composite	8/15/2019	-	0.128	0.240	<0.001	<0.003	<0.001	<0.001	<0.001	-	-
Air	Background	8/19/2019	<0.0175	-	-	-	-	-	-	-	0.00955	0.0312
Air	Background	8/26/2019	<0.0146	-	-	-	-	-	-	-	0.00855	0.0268
Air	Background	9/3/2019	<0.0138	-	-	-	-	-	-	-	0.00856	0.0239
Air	Background	9/9/2019	<0.0178	-	-	-	-	-	-	-	0.01050	0.0304
Air	Background	9/16/2019	<0.0147	-	-	-	-	-	-	-	0.00837	0.0259
Air	Background	9/23/2019	<0.0137	-	-	-	-	-	-	-	0.00732	0.0357

-" = Not analyzed

* I-131 = iodine 131; Ba-140 = Barium 140; Be-7 = Beryllium 7; Co-60 = Cobalt 60; Cs-134 = Cesium 134; Cs-137=Cesium 137; Fe-59=Iron 59; H-3* = Tritium; K-40 = Potassium-40; Mn-54=Manganese-54; Zn-65=Zinc 65

"<" = value is less than the listed MDA (Minimum Detectable Activity) value

"NR"= result not reported for quality control reasons.

Sample Type	Location	Date	I-131* (pCi/m^3)	Be-7* (pCi/m^3)	K-40* (pCi/m^3)	Mn-54* (pCi/m^3)	Fe-59* (pCi/m^3)	Co-60* (pCi/m^3)	Zn-65* (pCi/m^3)	Cs-137* (pCi/m^3)	Gross Alpha (pCi/m^3)	Gross Beta (pCi/m^3)
Air	Background	9/30/2019	<0.0144	-	-	-	-	-	-	-	0.00746	0.0307
Air	Background	10/2/2019	<0.0133	-	-	-	-	-	-	-	0.00488	0.0203
Air	Background	10/15/2019	<0.0104	-	-	-	-	-	-	-	0.00710	0.0211
Air	Background	10/21/2019	<0.0187	-	-	-	-	-	-	-	0.00802	0.0252
Air	Background	10/28/2019	<0.0143	-	-	-	-	-	-	-	0.01010	0.0286
Air	Background	11/4/2019	<0.0141	-	-	-	-	-	-	-	0.00697	0.0199
Air	Background	11/12/2019	<0.0211	-	-	-	-	-	-	-	0.01010	0.0287
Air	Background Quarterly Composite	11/15/2019	-	0.106	0.262	<0.001	<0.003	<0.001	<0.002	<0.001	-	-
Air	Background	11/18/2019	<0.0179	-	-	-	-	-	-	-	0.00718	0.0284
Air	Background	11/25/2019	<0.0150	-	-	-	-	-	-	-	0.00959	0.0248
Air	Background	12/2/2019	<0.0147	-	-	-	-	-	-	-	0.00781	0.0290
Air	Background	12/9/2019	<0.0158	-	-	-	-	-	-	-	0.00742	0.0253
Air	Background	12/16/2019	<0.0159	-	-	-	-	-	-	-	0.00696	0.0229
Air	Background	12/23/2019	<0.0157	-	-	-	-	-	-	-	0.00624	0.0348
Air	Background	12/30/2019	<0.0164	-	-	-	-	-	-	-	0.00607	0.0358

^K-40 not identified in peak search

-" = Not analyzed

* I-131 = iodine 131; Ba-140 = Barium 140; Be-7 = Beryllium 7; Co-60 = Cobalt 60; Cs-134 = Cesium 134; Cs-137=Cesium 137; Fe-59=Iron 59; H-3* = Tritium; K-40 = Potassium-40; Mn-54=Manganese-54; Zn-65=Zinc 65

"<" = value is less than the listed MDA (Minimum Detectable Activity) value

"NR"= result not reported for quality control reasons.

Table 6. Seabrook Nuclear Power Station 2019 Environmental Monitoring Data – Liquid Matrices

Sample Type	Location	Date	K-40* (pCi/L)	Mn-54* (pCi/L)	Fe-59* (pCi/L)	Co-60* (pCi/L)	Zn-65* (pCi/L)	I-131* (pCi/L)	Cs-134* (pCi/L)	Cs-137* (pCi/L)	Ba-140* (pCi/L)	H-3* (pCi/L)
Surface water	Ipswich bay[1]	1/17/2019	303	<3.0	<7.3	<2.8	<6.4	<16.1	-	<2.9	-	<300
Surface water	Ipswich bay[1]	2/20/2019	304	<3.1	<8.3	<2.8	<7.5	<43.0 NR = 29	-	<3.1	-	<300
Surface water	Ipswich bay[1]	3/19/2019	338	<3.0	<7.4	<2.9	<6.3	<11.8	-	<3.0	-	<300
Surface water	Ipswich bay[1]	4/11/2019	189	<2.6	<7.4	<2.8	<6.3	<30.0	-	<2.8	-	<300
Surface water	Ipswich bay[1]	5/23/2019	282	<2.5	<6.1	<2.8	<5.4	<8.4	-	<2.8	-	<300
Surface water	Ipswich bay[1]	6/12/2019	1440	<3.2	<9.9	<3.0	<6.6	<58.8	-	<3.1	-	<300
Surface water	Ipswich bay[1]	7/10/2019	295	<2.7	<7.4	<2.9	<5.8	<29.2	-	<2.8	-	<300
Surface water	Ipswich bay[1]	8/13/2019	1430	<3.0	<8.4	<3.0	<6.2	<32.4	-	<3.0	-	<300
Surface water	Ipswich bay[1]	9/11/2019	281	<2.6	<9.7	<2.6	<5.6	<131.0	-	<2.7	-	<300
Surface water	Ipswich bay[1]	10/9/2019	277	<2.7	<8.5	<2.8	<5.7	<41.1	-	<2.7	-	<300
Surface water	Ipswich bay[1]	11/14/2019	1470	<3.2	<9.8	<2.6	<7.1	<74.3	-	<3.0	-	<300
Surface water	Ipswich bay[1]	12/17/2019	1410	<3.3	<7.8	<3.2	<7.0	<22.9	-	<3.0	-	<300
Milk	Rowley	1/9/2019	1300	-	-	-	-	<2.5	<2.5	<2.8	<9.7	
Milk	Rowley	2/6/2019	1450	-	-	-	-	<3.3	<2.8	<3.0	<11.5	
Milk	Rowley	3/6/2019	1290	-	-	-	-	<3.2	<2.5	<3.0	<10.3	
Milk	Rowley	4/3/2019	1360	-	-	-	-	<2.4	<2.5	<2.8	<9.5	
Milk	Rowley	5/1/2019	1430	-	-	-	-	<3.5	<2.8	<3.0	<11.6	
Milk	Rowley	6/19/2019	2660	-	-	-	-	<3.4	<2.8	<3.0	<10.6	
Milk	Rowley	7/17/2019	2600	-	-	-	-	<3.3	<2.7	<3.0	<11.2	
Milk	Rowley	8/14/2019	2630	-	-	-	-	<3.5	<2.7	<3.2	<11.4	
Milk	Rowley	9/11/2019	2600	-	-	-	-	<3.3	<2.7	<3.1	<10.4	
Milk	Rowley	10/2/2019	1480	-	-	-	-	<2.4	<2.4	<2.6	<9.4	
Milk	Rowley	11/7/2019	2600	-	-	-	-	<3.3	<2.6	<3.1	<11.0	
Milk	Rowley	12/4/2019	2550	-	-	-	-	<3.4	<2.7	<3.0	<11.1	

[1]Background sample

-" = Not analyzed

* I-131 = iodine 131; Ba-140 = Barium 140; Be-7 = Beryllium 7; Co-60 = Cobalt 60; Cs-134 = Cesium 134; Cs-137=Cesium 137; Fe-59=Iron 59; H-3* = Tritium; K-40 = Potassium-40; Mn-54=Manganese-54; Zn-65=Zinc 65

"<" = value is less than the listed MDA (Minimum Detectable Activity) value

"NR"= result not reported for quality control reasons.

Table 7. Seabrook Nuclear Power Station 2019 Environmental Monitoring Data –Solid Matrices

Sample	Location	Date	Be-7* (pCi/kg)	K-40* (pCi/kg)	Mn-54* (pCi/kg)	Fe-59* (pCi/kg)	Co-60* (pCi/kg)	Zn-65* (pCi/kg)	Cs-137* (pCi/kg)	I-131* (pCi/kg)
Cod	Ipswich Bay (background)	11/18/2019	<52	3860	<5.0	<15.1	<5.0	<11.6	<4.7	-
Flounder	Ipswich Bay (background)	8/13/2019	<134	3880	<5.9	<49.1	<4.6	<14.9	<4.5	-
Long Horn Sculpin	Ipswich Bay (background)	5/23/2019	NR	3110	NR	NR	<36.5	<132.0	<38.9	
Pollock	Ipswich Bay (background)	6/12/2019	<414	4200	<9.2	<164	<7.1	<24.3	<6.6	
Lobster	Ipswich Bay (background)	5/23/2019	<56	2750	<5.3	<16.3	<5.2	<12.4	<4.8	-
Lobster	Ipswich Bay (background)	11/25/2019	<39	2050	<4.3	<9.8	<3.9	<9.4	<4.0	-
Modiolus[1]	Ipswich Bay (background)	5/23/2019	<47	1410	<4.0	<11.8	<3.7	<9.3	<3.7	-
Modiolus[1]	Ipswich Bay (background)	11/14/2019	76	1740	<5.1	<13.4	<4.6	<10.6	<4.4	-
Mytilus[1]	Ipswich Bay (background)	5/14/2019	65	1140	<3.7	<11.6	<3.8	<8.2	<3.6	-
Mytilus[1]	Ipswich Bay (background)	11/21/2019	61	1060	<4.9	<12.2	<4.3	<10.2	<4.4	-
Sediment	Ipswich Bay - beach (background)	5/14/2019	-	19600	-	-	<25.9	-	<22.5	-
Sediment	Ipswich Bay - beach (background)[2]	11/18/2019	-	11300	-	-	<20.6	-	<21.4	-
Sediment	Ipswich Bay - beach (background)[3]	11/18/2019	-	10400	-	-	<22.5	-	<22.3	-
Sediment	Ipswich Bay - subtidal (background)	5/23/2019	-	21900	-	-	<26.3	-	<28.8	-
Sediment	Ipswich Bay - subtidal (background)[2]	11/15/2019	-	9460	-	-	<25.9	-	<27.6	
Sediment	Ipswich Bay - subtidal (background)[3]	11/15/2019	-	9500	-	-	<26.2	-	<26.8	
Irish Moss	Ipswich Bay (background)	5/23/2019	4010	35100	<16.2	<49.9	<20.7	<47.3	<16.1	<85.8
Irish Moss	Ipswich Bay (background)	11/16/2019	1910	31700	<17.2	<48.2	<16.8	<43.4	<16.3	NR
Strawberries	Bartlett Farm, Salisbury	6/18/2019	33.5	1130	<3.3	<6.5	<3.7	<7.2	<3.5	-
Strawberries	Russell Orchards, Ipswich	6/18/2019	<31.5	1130	<3.5	<6.7	<3.8	<8.3	<3.8	-
Tomatoes	Bartlett Farm, Salisbury	8/14/2019	<28.6	2030	<3.6	<7.0	<3.3	<7.1	<3.6	-
Tomatoes	Russell Orchards, Ipswich	8/14/2019	<27.2	2270	<3.5	<6.6	<3.7	<7.7	<3.6	-
Zucchini	Bartlett Farm, Salisbury	7/16/2019	<42.4	923	<5.1	<9.7	<5.5	<11.8	<5.3	
Zucchini	Russell Orchards, Ipswich	7/16/2019	<35.6	1500	<4.2	<8.7	<4.8	<9.5	<4.4	-

[1]Mytilus (i.e., blue or common mussel) samples collected on Plum Island; Modiolus (i.e., Atlantic ribbed mussel) samples collected offshore.
[2]Sample depth is 0-3"
[3]Sample depth is 3-6"

-" = Not analyzed
* I-131 = iodine 131; Ba-140 = Barium 140; Be-7 = Beryllium 7; Co-60 = Cobalt 60; Cs-134 = Cesium 134; Cs-137=Cesium 137; Fe-59=Iron 59; H-3* = Tritium; K-40 = Potassium-40; Mn-54=Manganese-54; Zn-65=Zinc 65
"<" = value is less than the listed MDA (Minimum Detectable Activity) value
"NR"= result not reported for quality control reasons.