**Environmental Monitoring Report**

**Pilgrim, Seabrook, and Vermont Yankee Nuclear Power Station Emergency Planning Zones  
2012 - 2013**

November 2015

Prepared by

Environmental Toxicology Program

Bureau of Environmental Health

Massachusetts Department of Public Health

250 Washington Street

Boston, Massachusetts 02108

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# Executive Summary

The Massachusetts Department of Public Health (MDPH) Bureau of Environmental Health (BEH) conducts routine environmental monitoring in the 18 communities that are located within the three Emergency Planning Zones (EPZs) in the Commonwealth. The EPZs include communities located within a 10-mile radius of Pilgrim Nuclear Power Station (PNPS) in Plymouth, MA, Seabrook Nuclear Power Station (Seabrook) in Seabrook, NH, and the Vermont Yankee Nuclear Power Station (VY), in Vernon, VT. Communities outside of the EPZs serve as background locations. This report provides results from all routine monitoring conducted during calendar years 2012 and 2013. The report is organized by presenting sample location and analysis information for each of the three EPZs and provides a brief discussion of the analyses conducted on the samples, and finally, includes a discussion of results for each EPZ which are also summarized in tables.

BEH has a broad mission of protecting public health from a variety of environmental exposures. The Radiation Control Program (RCP) and Environmental Toxicology Program (ETP) within BEH collaborate in conducting routine environmental monitoring in EPZs in Massachusetts. Environmental media samples typically include food crops, milk, surface water, sediment, shellfish, fish, and air. Samples are analyzed for radiation by the Massachusetts Environmental Radiation Laboratory (MERL) within RCP. MERL maintains its standard of excellence in analytical capability through participation with a variety of federal agencies in inter-laboratory quality assurance activities. In addition, real-time direct radiation monitoring is conducted by MDPH within the communities in the PNPS EPZ, which is monitored via desktop computers by BEH staff. In communities within the Seabrook EPZ, the C-l0 Research & Education Foundation, Inc., a non-profit under contract with MDPH, conducts the direct radiation monitoring. The PNPS and Seabrook EPZs have had Massachusetts environmental monitoring programs in place since the 1980s. For Massachusetts communities within the EPZ for VY, the environmental monitoring program was initiated in 2011.

With one exception, radiation monitoring results in 2012 and 2013 for areas surrounding the three nuclear power stations affecting Massachusetts have been either non-detect, naturally occurring (i.e., Potassium-40, Beryllium-7, and Lead-214), at levels expected to be present in the environment from background fallout due to bomb testing in the 1950s and 1960s (i.e., Cesium-137), or otherwise attributable to a known source or man-made event (e.g., Fukushima, Chernobyl, sewage effluent). At PNPS, one Irish moss sample from 2013 showed a detection of Zinc-65 above the laboratory Reporting Level (RL) but below any level of health concern. All other Irish moss samples (n=3) from this location were less than the RL. Overall, no radiation indicators or radionuclides were detected at a level of health concern.

# INTRODUCTION

The Massachusetts Department of Public Health (MDPH) Bureau of Environmental Health (BEH) conducts routine environmental monitoring in the 18 communities that are located within the three Emergency Planning Zones (EPZs) in the Commonwealth. The EPZs include communities located within a 10-mile radius of Pilgrim Nuclear Power Station (PNPS) in Plymouth, MA, Seabrook Nuclear Power Station (Seabrook) in Seabrook, NH, and the Vermont Yankee Nuclear Power Station (VY), in Vernon, VT. Communities outside of the EPZs serve as background locations. This report provides results from all routine monitoring conducted during calendar years 2012 and 2013. The report is organized by presenting sample location and analysis information for each of the three EPZs and provides a brief discussion of the analyses conducted on the samples, and finally, includes a discussion of results for each EPZ which are also summarized in tables.

BEH has a broad mission of protecting public health from a variety of environmental exposures. The Radiation Control Program (RCP) and Environmental Toxicology Program (ETP) within BEH collaborate in conducting routine environmental monitoring in EPZs in Massachusetts. Environmental media samples typically include food crops, milk, surface water, sediment, shellfish, fish, and air. Samples are analyzed for radiation by the Massachusetts Environmental Radiation Laboratory (MERL) within RCP. MERL maintains its standard of excellence in analytical capability through participation with a variety of federal agencies in inter-laboratory quality assurance activities. In addition, real-time direct radiation monitoring is conducted by MDPH within the communities in the PNPS EPZ, which is monitored via desktop computers by BEH staff. In communities within the Seabrook EPZ, the C-l0 Research & Education Foundation, Inc., a non-profit under contract with MDPH, conducts the direct radiation monitoring. The PNPS and Seabrook EPZs have had Massachusetts environmental monitoring programs in place since the 1980s. For Massachusetts communities within the EPZ for VY, the environmental monitoring program was initiated in 2011.

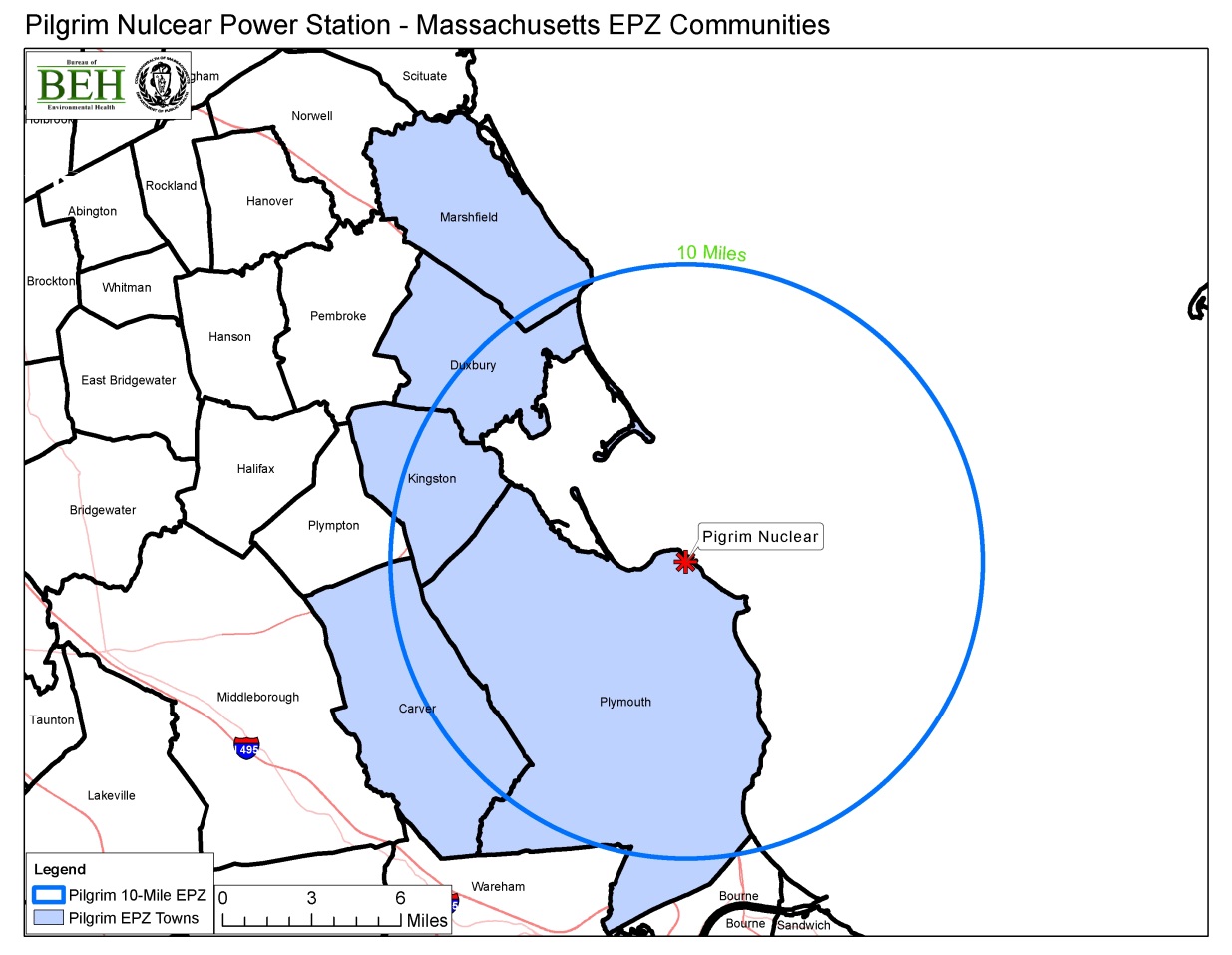
# Environmental monitoring conducted within each epz

This section provides descriptions of the three nuclear power plant 10-mile EPZs in Massachusetts along with a summary of environmental samples collected and analyzed in 2012 and 2013.

## Pilgrim Nuclear Power Station

The Pilgrim Nuclear Power Station (PNPS) is located in Plymouth, MA. There are five Massachusetts communities that are included in the 10-mile EPZ of PNPS: Carver, Duxbury, Kingston, Marshfield, and Plymouth (see Figure 1).

**Figure 1.**



Routine radiation monitoring conducted within and outside the PNPS EPZ includes: direct radiation, air, surface water, fish, lobsters, shellfish, sediment, Irish moss, crops, and milk. These are described in detail below. A focused investigation of tritium in groundwater at PNPS is ongoing and not part of this report; rather, regular updates on this monitoring effort, which includes sampling of groundwater and surface water, are posted on the MDPH website.

1. Air/Direct Radiation

MDPH collects air particulate filters weekly at PNPS that are collocated with Entergy’s air sampler. Filters are analyzed for gross beta and gross alpha radioactivity. A filter composite sample is also analyzed quarterly by gamma spectroscopy. Charcoal air cartridges are collected weekly at PNPS and analyzed for iodine-131. An air particulate filter and charcoal air cartridge, placed at a background location in Boston, are analyzed at the same frequency using the same analytical methods.

MDPH has a network of 15 monitoring stations that detect gamma radiation in real-time. A server with enhanced software purchased in 2010 provides remote access to real-time results for multiple MDPH staff including the BEH Radiation Control and Environmental Toxicology Programs. Emergency pager alerts are sent to senior MDPH officials in the event that radiation is detected above three times the typical background readings. Starting in 2012 and continuing through 2013, MDPH relocated three of the real-time monitors to locations that better represent the area’s coastal and more densely populated areas.

Finally, MDPH has thermoluminescent dosimeters (TLDs) placed at 39 locations throughout the PNPS EPZ area. These TLDs are collected by MDPH on a quarterly basis and provide measurement of total ambient gamma radiation in milliRoentgen (mR). TLD results are compared to a background location in Boston.

1. Surface Water

Seawater is typically collected on a monthly schedule from the PNPS discharge canal by Entergy and split surface water samples are analyzed by MERL using gamma spectroscopy. A quarterly composite of these surface water samples is analyzed for tritium. Seawater is also typically collected monthly at the Powder Point Bridge in Duxbury by Entergy, and MERL analyzes split samples using gamma spectroscopy. A quarterly composite of the Powder Point Bridge surface water samples is also analyzed for tritium.

1. Fish, Lobster, and Shellfish

Fish, lobsters, and shellfish are routinely collected from the PNPS discharge canal by Entergy, and split samples are analyzed by MERL using gamma spectroscopy. Fish and lobsters are also collected one to two times per year from Cape Cod Bay by Entergy, and MERL also analyzes spilt samples using gamma spectroscopy. Mussels are collected semiannually from Green Harbor in Marshfield by Entergy and clams from Duxbury Bay and Plymouth Harbor; these three locations are considered background locations by Entergy for federal reporting requirements, but considered “indicator” locations by MDPH because they fall within the 10 mile EPZ. The split samples are analyzed by MERL using gamma spectroscopy.

1. Sediment

Sediment is collected from the PNPS discharge canal semiannually by Entergy and split samples are analyzed by MERL using gamma spectroscopy. Sediment is also collected by Entergy at Green Harbor in Marshfield and Duxbury Bay in Duxbury. Samples are collected from Marshfield semiannually and from Duxbury annually. MERL analyzes split samples using gamma spectroscopy from both locations.

1. Irish Moss

Irish moss (chondrus) readily absorbs iodine and is a good indicator of any potential iodine-131 release in the environment. Samples of Irish moss are collected from the PNPS discharge canal semiannually by Entergy and split samples are analyzed by MERL using gamma spectroscopy. Irish moss is also collected at least semiannually by Entergy from a background location outside the 10-mile EPZ at Brant Rock in Marshfield and MERL also analyzes split samples by gamma spectroscopy.

1. Crops

Crops (e.g., corn, apples, gourds, gourd leaves, pumpkins, squash, and hay forage) are collected by Entergy from a Plymouth County farm located within the PNPS 10-mile EPZ annually and split samples are analyzed by MERL using gamma spectroscopy. Samples of vegetables and wild vegetation are also collected annually from several commercial gardens located in Plymouth by Entergy and MERL analyzes split samples by gamma spectroscopy. Crops, including cabbage and strawberries, are collected from two background locations outside the PNPS EPZ by Entergy on an annual basis from farms located in Bridgewater and Duxbury, and hay forage samples are collected by Entergy from another background location in Whitman. All crops from background locations are collected annually by Entergy and MERL analyzes split samples using gamma spectroscopy. Finally, cranberries are collected from cranberry bogs located in Plymouth and in Kingston on an annual basis by Entergy, and MERL analyzes split samples using gamma spectroscopy. In 2013, MDPH added a background cranberry sampling location in East Taunton.

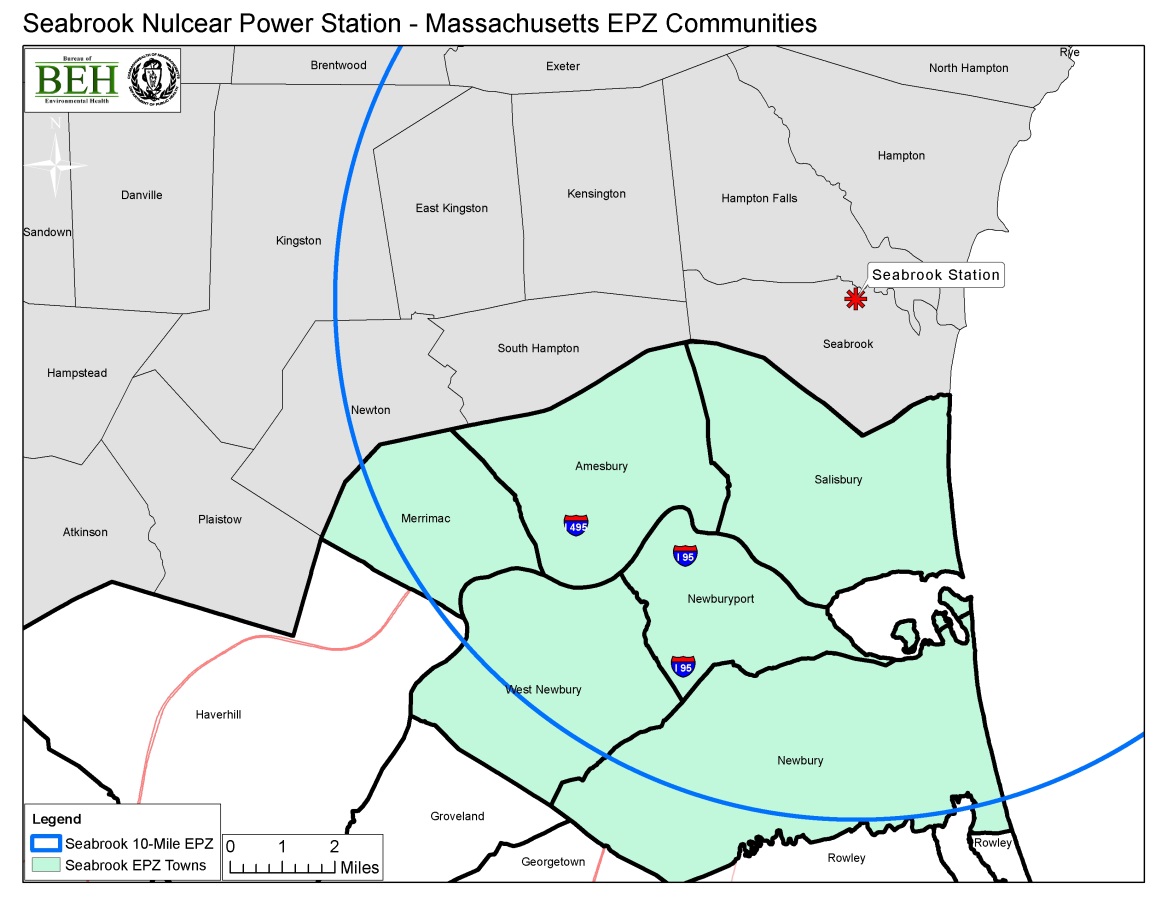
1. Milk

Samples of cow’s milk are collected monthly from a farm located in Duxbury by MDPH and are analyzed at MERL using gamma spectroscopy and for iodine-131. Although this farm is located just outside the EPZ (i.e., 11 miles from PNPS), it is currently the closest dairy farm to PNPS where milk samples are available.

## Seabrook Nuclear Power Station

The Seabrook Nuclear Power Station (Seabrook) is located in Seabrook, New Hampshire, approximately two miles north of the Massachusetts border. There are six Massachusetts communities included in the 10-mile EPZ of Seabrook: Amesbury, Merrimac, Newbury, Newburyport, Salisbury, and West Newbury (see Figure 2).

**Figure 2.**



Routine radiation monitoring conducted within and outside the Seabrook EPZ includes the following environmental media: air, surface water, fish, lobster, shellfish, sediment, Irish moss, crops, and milk. MDPH 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 in detail below.

1. Air/Direct Radiation

MDPH collects air particulate filters weekly at the Salisbury Fire Station and filters are analyzed by MERL for gross beta and gross alpha radioactivity. A filter composite is also analyzed quarterly by gamma spectroscopy. Charcoal air cartridges are also collected weekly at the Salisbury Fire station and are analyzed by MERL for iodine-131. The same analyses are done for air particulate filters and charcoal cartridges at the background location in Boston, MA.

MDPH has TLDs at 34 locations throughout the Seabrook EPZ in Massachusetts that are collected quarterly and measure total ambient gamma radiation in mR. TLD results are compared to a background location in Boston.

As previously mentioned, in 2012 and 2013 MDPH provided funding to the C-l0 Research & Education Foundation, Inc. to conduct airborne radiation monitoring in Massachusetts communities located in the Seabrook EPZ. The C-10 system consists of a network of 16 radiation sensors and weather probes. Beta, gamma, and weather data are collected and recorded on a continuous basis at 16 sites located in Massachusetts within a 10-mile radius of Seabrook Station, and then uploaded every 15 minutes to a secure web-based central repository. Additionally, the data are compiled and graphed monthly, with reports submitted electronically to MDPH. All 16 monitoring sites are located in private homes, schools, and businesses. MDPH and MEMA officials receive pager alerts from C-10 if levels go above three times the typical background readings.

1. Surface Water

Seawater samples are typically collected by Nextera monthly from a background location outside the 10-mile EPZ at Ipswich Bay, in Ipswich, MA and split samples are analyzed by MERL using gamma spectroscopy. A quarterly composite of these monthly surface water samples is also analyzed for tritium by MERL.

1. Fish, Lobster, and Shellfish

Samples of fish, lobster, and shellfish including modiolus (Atlantic mussels) and mytilus (blue mussels) are collected semiannually by Nextera from Ipswich Bay located outside the Seabrook EPZ, considered a background location, and split samples are analyzed by MERL using gamma spectroscopy.

1. Sediment

Sediment samples are collected from Ipswich Bay, a background location, by Nextera semiannually and analyzed by MERL using gamma spectroscopy. Sediment is also collected by Nextera from tidal flats on Plum Island, which is also considered a background location, semiannually and split samples are analyzed by MERL using gamma spectroscopy.

1. Irish Moss

As noted above, Irish moss (chondrus) readily absorbs iodine and is a good indicator of any potential iodine-131 release in the environment. Nextera collects samples of Irish moss (chondrus) semiannually from Ipswich Bay, considered a background location, and split samples are analyzed by MERL using gamma spectroscopy.

1. Crops

Crops (e.g., strawberries and tomatoes) are collected by Nextera from a farm located within the Seabrook EPZ in Salisbury, MA three times per year and split samples are analyzed by MERL using gamma spectroscopy. In addition, crops including strawberries, tomatoes, and squash are collected three times per year from a background location by Nextera at a farm in Ipswich, MAand split samples are analyzed by MERL using gamma spectroscopy.

1. Milk

Samples of cow’s milk are collected monthly by MDPH from a farm located in Rowley, MA and analyzed by MERL using gamma spectroscopy and are also analyzed for iodine-131. This farm is located outside the Seabrook EPZ and considered a background location.

## Vermont Yankee Nuclear Power Station

The Vermont Yankee Nuclear Power Station (VY) is located in Vernon, VT, approximately four miles north of the Massachusetts border. There are seven Massachusetts communities that have populations included in the 10-mile EPZ of VY: Bernardston, Colrain, Gill, Greenfield, Leyden, Northfield, and Warwick (see Figure 3).

**Figure 3.**

Vermont Yankee Nuclear Power Station (VY) located in Vernon, VT, approximately four miles north of the MA border. There are seven MA communities that have populations included in the 10-mile EPZ of VY: Bernardston, Colrain, Gill, Greenfield, Leyden, Northfield, and Warwick.



In spring 2011, a routine environmental monitoring program was initiated in Massachusetts communities located within the Vermont Yankee Nuclear Power Station EPZ. Routine radiation monitoring conducted within and outside the VY EPZ in Massachusetts includes the following environmental media: air, surface water, fish, sediment, grass, crops, and milk.

1. Air/Direct Radiation

In 2011 and 2012, MDPH established air cartridge/filter and TLD monitoring within the Vermont Yankee EPZ. Collection and analysis of air cartridge/filter and TLD samples commenced in late 2012. MDPH collects air particulate filters weekly at the Northfield Transfer Station and filters are analyzed by MERL for gross beta and gross alpha radioactivity. A filter composite is also analyzed quarterly by gamma spectroscopy. Charcoal air cartridges are collected weekly at the Northfield Transfer Station and analyzed by MERL for iodine-131. The same analyses are done for air particulate filters and charcoal cartridges at the background location in Boston, MA.

MDPH has TLDs at 7 locations within, or just outside, the VY EPZ in Massachusetts that are collected quarterly and measure total ambient gamma radiation in mR. TLD results are compared to a background location in Boston, MA.

1. Surface Water

MDPH collects surface water samples on a quarterly basis from the Connecticut River at two locations within the VY EPZ communities of Northfield and Gill, MA. Surface water samples are analyzed by MERL using gamma spectroscopy and samples are also analyzed for tritium. Surface water samples are also collected quarterly from a location outside the VY 10-mile EPZ communities at the Millers River in Athol. The background surface water samples are also analyzed by gamma spectroscopy and for tritium.

1. Fish

MDPH collects fish samples semiannually from the Connecticut River in Northfield and Gill, MA and from the Millers River in Athol, MA as a background location. Fish samples are analyzed by MERL using gamma spectroscopy.

1. Sediment

Sediment samples are collected semiannually from the Connecticut River at two locations within the VY EPZ communities of Northfield and Gill, MA. Sediment samples are analyzed by MERL using gamma spectroscopy. Sediment samples are also collected semiannually from a background location at the Millers River in Athol and analyzed by MERL using gamma spectroscopy.

1. Wild Grass

MDPH collects wild grass samples semiannually from locations within the VY EPZ communities near the Connecticut River in Northfield and Gill, MA. Grass samples are analyzed by MERL using gamma spectroscopy. Samples of grass are also collected semiannually from a background location near the Millers River in Athol,and analyzed by gamma spectroscopy.

1. Crops

Crops (e.g. pumpkins, elderberries, and pasture grass) are collected from several farms located within the VY EPZ in Bernardston and Northfield, MAannually by MDPH and are analyzed by MERL using gamma spectroscopy. Apples are also collected from a background location at an orchard located in Colrain by MDPH annually and are analyzed by MERL using gamma spectroscopy.

1. Milk

Samples of cow’s milk are collected monthly from a farm located within the VY EPZ in Bernardston, MA by MDPH. Milk samples are analyzed by MERL using gamma spectroscopy and are also analyzed for iodine-131.

# Sample Analysis Methods

The majority of environmental media samples are analyzed by MERL using gamma spectroscopy. Radionuclides detectable with the gamma spectroscopy instrument include Cesium-137 and Iodine-131. These radionuclides are good indicators for radiation associated with operations at a nuclear power plant. Gamma spectroscopy is also capable of detecting many naturally occurring radionuclides. It should be noted that Potassium-40 is a naturally occurring radioactive form of potassium, an essential nutrient. About one in 40 atoms of potassium are in the form of Potassium-40, including potassium that occurs naturally in the human body. Beryllium-7 is a naturally occurring radioactive element that is produced when cosmic energy collides with nitrogen and oxygen in the atmosphere. Lead-214 is a naturally occurring radioactive form of lead that is a product of the decay of naturally occurring radioactive radon gas. Gamma spectroscopy results for environmental media samples are compared to typical background levels. In the event that radionuclides detected with a gamma spectroscopy screen are found that cannot be attributed to typical background levels, a hard-to-detects (HTDs) analysis may be warranted. The analyses of HTDs, such as Strontium-90, would be conducted on an as needed basis as few laboratories in the country have the capability to analyze for HTDs.

Air filters collected from each of the three EPZs are analyzed weekly for gross alpha and gross beta radioactivity. Gross alpha and beta analysis is a screening-level tool that does not identify individual radionuclides; therefore, air filters are also analyzed quarterly for individual gamma radionuclides (e.g., Cesium-137) using gamma spectroscopy. Results are compared to results from a background monitor located in Boston and provide a useful tool to monitor any differences between alpha and beta levels within the three EPZs as compared to background. The air cartridges are specifically designed to be analyzed weekly for Iodine-131, which is usually the first radionuclide detected in any potential accidental release. Iodine-131 results from air monitors within EPZs are also compared to Iodine-131 analysis from the cartridge at the background location in Boston. Air sample analyses provide a complete picture of radiation types within the EPZ as compared to the background location.

In addition to gamma spectroscopy, surface water samples are analyzed for tritium. Tritium exists in the environment primarily as tritiated water; thus, it is more mobile in groundwater and surface water than other radionuclides, and provides a good indicator to evaluate potential radioactive impacts to water bodies in the vicinity of the power stations.

# MDPH Environmental Monitoring Results

## 2012 Environmental Monitoring Results

In 2012, radiation monitoring results for Massachusetts have been either non-detect, naturally occurring (i.e., Potassium-40, Beryllium-7, and Lead-214), or at levels expected to be present in the environment from background fallout due to bomb testing in the 1950s and 1960s (i.e., Cesium-137). No detectible radionuclides were at levels of health concern or were indicative of an unintentional release of radiation at PNPS, Seabrook, or VY. Results of environmental monitoring conducted by MDPH in the Massachusetts communities in the vicinity of each of the three nuclear power stations are discussed below and presented in Tables 1 – 9.

1. Pilgrim Nuclear Power Station

Naturally occurring Potassium-40, Beryllium-7, and Lead-214 were detected in nearly all samples of environmental media for which they were analyzed from both within and outside of the PNPS EPZ (for specific values see Tables 1, 2 and 3 below). Potassium-40, Beryllium-7, and Lead-214 occur naturally in varying amounts in air, water bodies, soils, and sediments.

Although Cesium-137 was detected in a bluefish sample collected from the PNPS discharge canal on July 16, 2012, at a concentration of 10.1 picocuries per kilogram (pCi/kg), this detection is consistent with levels measured in fish from other locations reported in the scientific literature and considered attributable to historical fallout from bomb testing in the 1950s and 1960s (Burger et. al., 2007; Amund et. al., 1996). Cs-137 was below detection limits in all other fish samples from the discharge canal (See Table 2).

Air filter and cartridge analyses indicated low levels of gross alpha and gross beta radiation, as well as naturally occurring Beryllium-7 and Potassium-40 for most samples. The results are consistent with results obtained from the background location in Boston.

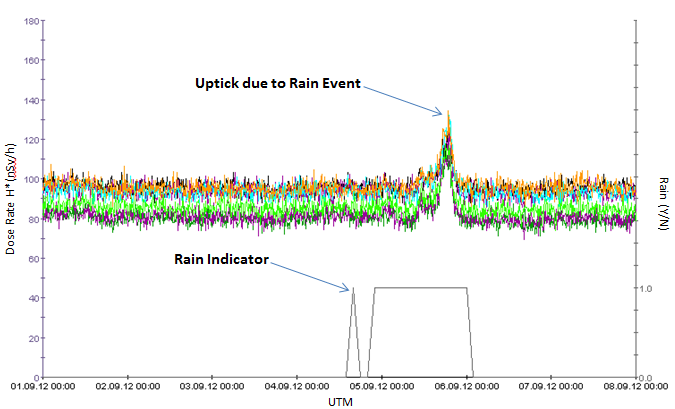
In 2012, real-time monitoring for the PNPS EPZ did not show radiation levels above typical background levels (i.e., approximately 0.010 mrem/hour) with the exception of brief increases (e.g., 0.020 mrem/hour) that are expected due to rainfall washout from naturally occurring radionuclides (Beryllium-7, Potassium-40, and Lead-214). For reference, Figure 4 below puts these doses into context. According to the NRC, the average U.S. resident is exposed to approximately 310 mrem per year (or 0.035 mrem/hr) from natural background radiation sources.

In 2012, TLDs in the PNPS EPZ ranged between 11.5 and 21.2 mR/quarter, which compares to an average of 13.35 mR/quarter for the background location in Boston. TLD readings can vary with location, due to proximity to objects with naturally occurring radiation such as bricks and granite.

**Figure 4**.   
Background Dose Information for Average U.S. Resident (Source: NRC 2014)

|  |  |
| --- | --- |
| **Dose** | **Millirems/year** |
| Annual Dose – All Sources | 620 per year |
| Annual Dose – Due to Natural Background Radiation | 310 per year |

**Figure 5.**    
Real-Time Monitoring System Output Showing Increased Activity During Rain Event



\* Results are reported in nanosieverts per hour by the computer system (1 nanosievert per hour = 0.0001 mrem per hour)

1. Seabrook Nuclear Power Station

Naturally occurring Potassium-40, Beryllium-7, and Lead-214 were detected in nearly all samples of environmental media for which they were analyzed from both within and outside of the Seabrook EPZ (for specific values see Tables 4, 5 and 6 below). As mentioned, Potassium-40, Beryllium-7, and Lead-214 occur naturally in varying amounts in air, water bodies, soils, and sediments.

Although not detected at levels of concern with respect to human health (FDA, 2005), the MERL split sample for the Irish moss background location for the Seabrook EPZ, located approximately 20 miles from the plant, had a detection of iodine-131 at 24.6 pCi/kg on May 21, 2012 and 82.8 pCi/kg on November 26, 2012. It should be noted that the indicator location for Irish moss located at the Seabrook facility in New Hampshire right at the discharge in the Atlantic ocean has historically been non-detect for iodine-131 according to Nextera. Given that this detection occurred at the background location, MDPH believes it is unlikely attributable to Seabrook. According to Larsen et al. 2001, in Oak Ridge, TN, iodine-131 can be detected up to 50,000,000 picocuries per liter (pCi/L) in sewage effluent in the sewer lines immediately downstream of a hospital treating someone for thyroid cancer. Once the raw sewage effluent gets to the sewage treatment plant it can still be approximately 30,000 pCi/L. MDPH determined that there are sewage discharges near this background location and iodine-131 will concentrate in Irish moss because it takes up iodine.

Air filter and cartridge analyses indicated low levels of gross alpha and gross beta radiation, as well as naturally occurring Beryllium-7 and Potasium-40 for most samples. The results are consistent with results obtained from the background location in Boston.

In 2012, real-time monitoring for the Seabrook EPZ did not show gamma radiation levels above typical background levels (i.e., approximately 0.010 mrem/hour) with the exception of brief increases (e.g., 0.020 mrem/hour) that are expected due to rainfall washout from naturally occurring radionuclides such as Beryllium-7, Potassium-40, and Lead-214. Beta readings are also collected and typically range around 40 to 50 counts per minute with the exception of brief increases that occur due to rainfall washout from naturally occurring radionuclides.

TLD results for the Seabrook EPZ ranged from 14.3 to 22.5 mR /quarter, compared to an average of 13.83 mR/quarter for the background location in Boston. TLD readings can vary with location, due to proximity to objects with naturally occurring radiation such as bricks and granite.

1. Vermont Yankee Nuclear Power Station

Naturally occurring Potassium-40, Beryllium-7, and Lead-214 were detected in nearly all samples of environmental media for which they were analyzed from both within and outside of the VY EPZ (for specific values see Tables 7, 8, and 9 below). As mentioned, Potassium-40, Beryllium-7, and Lead-214 occur naturally in varying amounts in air, water bodies, soils, and sediments.

Background soil and sediment in the U.S. typically has between 10 and 1000 pCi/kg of Cesium-137 from atmospheric bomb testing conducted mainly in the 1950s and 1960s. Cesium-137 most likely attributable to bomb testing from the 1950s and 1960s was detected in sediment from the Connecticut River in the Vermont Yankee EPZ between 56.8 and 123.0 pCi/kg, compared with 96.3 pCi/kg for the background location at the Millers River in Athol, 10 miles outside the Vermont Yankee EPZ.

Although Cesium-137 was detected at 9.7 pCi/kg in a large mouth bass sample collected from the Connecticut River, this detection is consistent with levels measured in fish from other locations reported in the scientific literature and considered attributable to historical fallout from bomb testing in the 1950s and 1960s (VTDOH, 2012; Burger et. al. 2007; ATSDR, 2004; Amund et.al., 1996). Cs-137 was below detection limits in all other fish samples from the Connecticut River (See Table 8).

Iodine-131 was detected in the background surface water sample at the Millers River in Athol at 8.1 pCi/L (9.2 pCi/L confirmatory duplicate) on May 23, 2012. There is a sewage treatment plant approximately 1 mile upstream of this sampling location and this detection was likely due to a medical source in sewage effluent. An additional follow-up sample was taken from the same location on June 20, 2012 and indicated no detectable iodine-131. Iodine-131 was not detected in any other samples taken at this location in 2012.

Air filter and cartridge analyses indicated low levels of gross alpha and gross beta radiation, as well as naturally occurring Beryllium-7 and Potasium-40 for most samples. The results are consistent with results obtained from the background location in Boston.

As described above, a TLD program was established in the fourth quarter of 2012 for the VY EPZ. Results for TLDs ranged from 13.5 to 15.8 mR for the fourth quarter within and near the VY EPZ, which compares to 13.8 mR for the fourth quarter for the background location in Boston. TLD readings can vary with location, due to proximity to objects with naturally occurring radiation such as bricks and granite.

## 2013 Environmental Monitoring Results

In 2013, with one exception most radiation monitoring results for Massachusetts have been either non-detect, naturally occurring (i.e., Potassium-40, Berylium-7, and Lead-214), or at levels expected to be present in the environment from background fallout due to bomb testing in the 1950s and 1960s (i.e., Cesium-137). The one exception was a detection of Zinc-65 in an Irish moss sample collected near the PNPS Discharge Canal. No detectible radionuclides were at levels of health concern or were indicative of an unintentional release of radiation at PNPS, Seabrook, or VY. Results of environmental monitoring conducted by MDPH in the Massachusetts communities in the vicinity of each of the three nuclear power stations are discussed below and presented in Tables 10-18.

1. Pilgrim Nuclear Power Station

Naturally occurring Potassium-40, Beryllium-7, and Lead-214 were detected in most samples of environmental media for which they were analyzed from both within and outside of the PNPS EPZ (see Tables 10, 11, and 12). As mentioned, Potassium-40, Beryllium-7, and Lead-214 occur naturally in varying amounts in air, water bodies, soils, and sediments.

Although Cesium-137 was detected in a bluefish sample collected from the PNPS discharge canal on July 15, 2013, at a concentration of 7.9 pCi/kg, this detection is consistent with levels measured in fish from other locations reported in the scientific literature and considered attributable to historical fallout from bomb testing in the 1950s and 1960s (Burger et. al. 2007; Amund et.al., 1996) . Cs-137 was below detection limits in all other fish samples from the discharge canal (see Table 11).

The MERL split sample for the Irish moss collected at the PNPS Discharge Canal had a detection of Zinc-65 at 43.8 pCi/kg on May 22, 2013. The detection is likely related to the permitted discharge of cooling water at PNPS. Irish moss has been shown to have high sorption values for zinc (Romera et. al., 2007), which may contribute to the enrichment of Zinc-65. Results of Irish moss samples from 2012 and the subsequent sample for 2013, collected on October 16, showed no detectable activity above the laboratory reporting levels for Zinc-65 which ranged from <30 - <52.8 pCi/L.

In 2013, like 2012, real-time monitoring for the PNPS EPZ did not show radiation levels above typical background levels (i.e., approximately 0.010 mrem per hour) with the exception of brief increases (e.g., 0.020 mrem per hour) that are expected due to rainfall washout from naturally occurring radionuclides (Beryllium-7, Potassium-40, and Lead-214). For reference, Figure 4 above puts these doses into context.

Air filter and cartridge analyses indicated low levels of gross alpha and gross beta radiation, as well as naturally occurring Beryllium-7 and Potasium-40 for most samples. The results are consistent with results obtained from the background location in Boston.

Results of TLDs deployed in the PNPS EPZ in 2013 ranged from 10.7 and 21.4 mR per quarter, which compares to an average of 12.5 mR per quarter for the background location in Boston. TLD readings can vary with location, due to proximity to objects with naturally occurring radiation such as bricks and granite.

1. Seabrook Nuclear Power Station

Naturally occurring Potassium-40, Beryllium-7, and Lead-214 were detected in most samples of environmental media for which they were analyzed from both within and outside of the Seabrook EPZ (see Tables 13, 14, and 15). As mentioned, Potassium-40, Beryllium-7, and Lead-214 occur naturally in varying amounts in air, water bodies, soils, and sediments.

Although not detected at levels of concern with respect to human health (FDA, 2005), the MERL split sample for the Irish moss background location for the Seabrook EPZ, located approximately 20 miles from the plant, had a detection of iodine-131 at 21.1 pCi/kg on May 21, 2013. As previously noted, this sample is collected downgradient and proximate to a sewage discharge point, and the indicator sample for Seabrook has been historically non-detect.

In 2013, like 2012, real-time monitoring for the Seabrook EPZ did not show gamma radiation levels above typical background levels (i.e., approximately 0.010 mrem per hour) with the exception of brief increases (e.g., 0.020 mrem per hour) that are expected due to rainfall washout from naturally occurring radionuclides. Beta readings are also collected and typically range around 40 to 50 counts per minute with the exception of brief increases that also occur due to rainfall washout of naturally occurring radionuclides.

Air filter and cartridge analyses indicate low levels of gross alpha and gross beta radiation, as well as naturally occurring Beryllium-7 and Potasium-40 for most samples. The results are consistent with results obtained from the background location in Boston.

Results of TLDs deployed in the Seabrook EPZ in 2013 ranged from 12.0 to 21.0 mR per quarter, compared to an average of 13.2 mR per quarter for the background location in Boston. TLD readings can vary with location, due to proximity to objects with naturally occurring radiation such as bricks and granite.

1. Vermont Yankee Nuclear Power Station

In 2013, naturally occurring Potassium-40, Beryllium-7, and Lead-214 were detected in most samples of environmental media for which they were analyzed from both within and outside of the VY EPZ (see Tables 16, 17, and 18). As mentioned, Potassium-40, Beryllium-7, and Lead-214 occur naturally in varying amounts in air, water bodies, soils, and sediments.

Cesium-137, most likely attributable to bomb testing from the 1950s and 1960s, was detected in sediment from one sample collected at the Connecticut River in the Vermont Yankee EPZ at 63.3 pCi/kg. Cesium-137 was also detected in two background sediment samples collected at the Millers River in Athol, 10 miles outside the Vermont Yankee EPZ, at concentrations of 70.3 and 121.0 pCi/L. Cesium-137 was also detected in grass collected at the Athol background location at a concentration of 26.0 pCi/L. Cesium-137 was not detected in any of the samples collected within the EPZ.

Although Cesium-137 was detected at 15.8 pCi/kg in a composite fish sample collected from the Connecticut River, this detection is consistent with levels measured in fish from other locations reported in the scientific literature and considered attributable to historical fallout from bomb testing in the 1950s and 1960s (VTDOH, 2012; Burger et. al. 2007; ATSDR, 2004; Amund et.al., 1996). Cs-137 was below detection limits in all other fish samples from the Connecticut River in 2013 (see Table 17).

Air filter and cartridge analyses indicate low levels of gross alpha and gross beta radiation, as well as naturally occurring Beryllium-7 and Potasium-40 for most samples. The results are consistent with results obtained from the background location in Boston.

Results of TLDs deployed within and near the VY EPZ in 2013 ranged from 10.1 to 15.7 mR per quarter, compared to an average of 13.4 mR per quarter for the background location in Boston. TLD readings can vary with location, due to proximity to objects with naturally occurring radiation such as bricks and granite.

# Summary

With one exception (one Irish moss sample in 2013), radiation monitoring results for areas surrounding the three nuclear power stations affecting Massachusetts have been either non-detect, naturally occurring (i.e., Potassium-40, Beryllium-7, and Lead-214), at levels expected to be present in the environment from background fallout due to bomb testing in the 1950s and 1960s (i.e., Cesium-137), or otherwise attributable to a known source or man-made event (e.g., Fukushima, Chernobyl, sewage effluent). At PNPS, one Irish moss sample showed a detection of Zinc-65 above the laboratory reporting level. No radiation indicators or radionuclides were detected at a level of health concern.

# Tables

Table 1. Pilgrim Nuclear Power Station 2012 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) | 1-131\* (pCi/L) | Cs-134\* (pCi/L) | Cs-137\* (pCi/L) | Ba-140\* (pCi/L) | H-3\*  (pCi/L) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Surface Water | Powder Point Bridge (Background)1 | 1/31/2012 | 258 | <5.6 | <10.8 | <5.8 | <17.7 | <7.0 | - | <6.0 | - | - |
| Surface Water | Powder Point Bridge Quarterly Tritium Composite (Background) 1 | 2/15/2012 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Powder Point Bridge (Background)1 | 2/28/2012 | <341 | <7.6 | <16.0 | <7.8 | <20.9 | <9.0 | - | <8.3 | - | - |
| Surface Water | Powder Point Bridge (Background) 1 | 4/3/2012 | 307 | <5.7 | <11.1 | <5.9 | <18.4 | <7.4 | - | <6.1 | - | - |
| Surface Water | Powder Point Bridge (Background) 1 | 5/1/2012 | <420 | <10.0 | <20.5 | <10.9 | <27.2 | <10.7 | - | <10.7 | - | - |
| Surface Water | Powder Point Bridge Quarterly Tritium Composite (Background) 1 | 5/15/2012 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Powder Point Bridge (Background) 1 | 5/29/2012 | 322 | <5.1 | <10.8 | <5.5 | <14.1 | <6.1 | - | <5.7 | - | - |
| Surface Water | Powder Point Bridge (Background) 1 | 7/2/2012 | <342 | <6.7 | <15.6 | <7.8 | <17.8 | <9.8 | - | <7.7 | - | - |
| Surface Water | Powder Point Bridge (Background) 1 | 7/31/2012 | 413 | <5.2 | <10.5 | <5.5 | <13.7 | <6.4 | - | <5.7 | - | - |
| Surface Water | Powder Point Bridge Quarterly Tritium Composite (Background) 1 | 8/15/2012 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Powder Point Bridge (Background) 1 | 8/28/2012 | <341 | <7.3 | <15.8 | <7.5 | <18.2 | <8.9 | - | <8.3 | - | - |
| Surface Water | Powder Point Bridge (Background) 1 | 10/2/2012 | 433 | <5.5 | <13.2 | <6.0 | <15.6 | <12.7 | - | <5.9 | - | - |
| Surface Water | Powder Point Bridge (Background) 1 | 10/30/2012 | 436 | <6.0 | <12.3 | <5.9 | <16.0 | <10.2 | - | <5.7 | - | - |
| Surface Water | Powder Point Bridge Quarterly Tritium Composite (Background) 1 | 11/15/2012 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Powder Point Bridge (Background) 1 | 11/26/2012 | <186 | <6.3 | <15.3 | <6.9 | <18.1 | <11.0 | - | <6.8 | - | - |
| Surface Water | Powder Point Bridge (Background) 1 | 1/2/2013 | <292 | <6.6 | <15.0 | <7.0 | <19.9 | <9.6 | - | <6.9 | - | - |
| Surface Water | PNPS Discharge Canal | 1/31/2012 | <341 | <7.6 | <16.1 | <8.1 | <22.1 | <9.4 | - | <8.5 | - | - |
| Surface Water | PNPS Discharge Canal Quarterly Tritium Composite | 2/15/2012 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | PNPS Discharge Canal | 2/28/2012 | <343 | <7.3 | <15.3 | <7.8 | <20.4 | <7.6 | - | <8.4 | - | - |
| Surface Water | PNPS Discharge Canal | 4/2/2012 | <272 | <10.3 | <21.9 | <10.7 | <28.8 | <13.9 | - | <10.8 | - | - |
| Surface Water | PNPS Discharge Canal | 5/1/2012 | <342 | <7.5 | <15.6 | <7.7 | <21.7 | <8.7 | - | <8.1 | - | - |
| Surface Water | PNPS Discharge Canal Quarterly Tritium Composite | 5/15/2012 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | PNPS Discharge Canal | 5/29/2012 | <420 | <9.9 | <21.3 | <10.2 | <25.7 | <11.8 | - | <10.7 | - | - |
| Surface Water | PNPS Discharge Canal | 7/2/2012 | <184 | <6.5 | <13.2 | <6.5 | <15.5 | <9.1 | - | <6.7 | - | - |
| Surface Water | PNPS Discharge Canal | 7/31/2012 | <293 | <6.7 | <13.7 | <7.1 | <17.2 | <8.0 | - | <7.3 | - | - |
| Surface Water | PNPS Discharge Canal Quarterly Tritium Composite | 8/15/2012 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | PNPS Discharge Canal | 8/28/2012 | <185 | <6.9 | <13.3 | <6.8 | <16.4 | <8.3 | - | <6.9 | - | - |
| Surface Water | PNPS Discharge Canal | 10/2/2012 | 805 | <6.0 | <13.4 | <6.2 | <16.0 | <12.4 | - | <6.5 | - | - |
| Surface Water | PNPS Discharge Canal | 10/30/2012 | 905 | <6.4 | <13.5 | <6.6 | <17.1 | <11.7 | - | <6.8 | - | - |
| Surface Water | PNPS Discharge Canal Quarterly Tritium Composite | 11/15/2012 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | PNPS Discharge Canal | 11/26/2012 | 890 | <6.4 | <13.9 | <6.4 | <17.3 | <11.4 | - | <6.5\_ | - | - |
| Surface Water | PNPS Discharge Canal | 1/2/2013 | 864 | <6.3 | <13.2 | <6.4 | <17.6 | <9.6 | - | <6.9 | - | - |
| Milk | Duxbury | 1/27/2012 | 1140 | - | - | - | - | <2.5 | <13.0 | <12.0 | <40.8 | - |
| Milk | Duxbury | 2/14/2012 | 1330 | - | - | - | - | <2.4 | <10.8 | <11.4 | <36.5 | - |
| Milk | Duxbury | 3/6/2012 | 1260 | - | - | - | - | <2.6 | <7.4 | <9.1 | <28.4 | - |
| Milk | Duxbury | 4/3/2012 | 1220 | - | - | - | - | <2.0 | <7.8 | <8.8 | <29.1 | - |
| Milk | Duxbury | 5/8/2012 | 1200 | - | - | - | - | <1.9 | <10.5 | <19.7 | <37.9 | - |
| Milk | Duxbury | 6/5/2012 | 1260 | - | - | - | - | <2.0 | <7.5 | <8.9 | <28.9 | - |
| Milk | Duxbury | 7/3/2012 | 1180 | - | - | - | - | <2.4 | <6.7 | <8.4) | <27.5 | - |
| Milk | Duxbury | 8/7/2012 | 1170 | - | - | - | - | <2.0 | <8.0 | <7.5 | <25.3 | - |
| Milk | Duxbury | 9/11/2012 | 1200 | - | - | - | - | <2.2 | <7.6 | <7.6 | <25.5 | - |
| Milk | Duxbury | 10/2/2012 | 1910 | - | - | - | - | <2.0 | <6.1 | <6.8 | <21.4 | - |
| Milk | Duxbury | 11/20/2012 | 1950 | - | - | - | - | <2.0 | <6.1 | <6.9 | <22.0 | - |
| Milk | Duxbury | 12/4/2012 | 1940 | - | - | - | - | <2.1 | <6.1 | <6.8 | <21.8 | - |

1. Sample considered “background” for the purpose of monitoring required by federal regulations, but considered “indicator” by MDPH because it falls within the 10-mile EPZ.

“-“ = not analyzed

“ND” = not detected

\* K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, I-131 = idodine-131, Cs-134 = Cesium-134, Cs-137 = Cesium-137, Ba-140 = barium-140, H-3 = tritium

Table 2. Pilgrim Nuclear Power Station 2012 Environmental Monitoring Data - Solid Matrices

| Sample Type | 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) | 1-131\* (pCi/kg) | Cs-137\* (pCi/kg) | Pb-214\* (pCi/kg) | H-3\* (pCi/kg) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Chondrus | Brant Rock Marshfield (Background) 1 | 5/2/2012 | 268 | 5620 | <18.5 | <48.1 | <19.7 | <50.6 | <61.8 | <18.9 | - | - |
| Chondrus | PNPS – Discharge Canal | 5/9/2012 | 56 | 8750 | <9.7 | <26.2 | <11.4 | <30.0 | <17.3 | <9.4 | - | - |
| Chondrus | Brant Rock Marshfield (Background) 1 | 9/19/2012 | 138 | 7510 | <15.4 | <72.4 | <15.2 | <45.9 | <1590 | <14.7 | - | - |
| Chondrus | PNPS – Discharge Canal | 10/23/2012 | 110 | 5470 | <11.9 | <28.4 | <14.1 | <35.4 | <12.9 | <12.8 | - | - |
| Chondrus | Brant Rock Marshfield (Background) 1 | 10/17/2012 | 418 | 5380 | <10.1 | <25.2 | <10.4 | <28.6 | <17.4 | <9.5 | - | - |
| Mussels | Green Harbor Marshfield (Background) 1 | 5/2/2012 | <237 | 2340 | <15.9 | <71.6 | <15.9 | <44.8 | - | <14.9 | <35.3 | - |
| Clams | Duxbury Bay (Background) 1 | 5/2/2012 | <124 | 2260 | <8.2 | <36.8 | <7.7 | <22.2 | - | <7.9 | <25.2 | - |
| Mussels | Plymouth Harbor  (Background) 1 | 5/5/2012 | <130 | 1630 | <9.3 | <43.4 | <9.8 | <27.2 | - | <9.4 | <19.5 | - |
| Clams | Plymouth Harbor  (Background) 1 | 5/7/2012 | <115 | 1970 | <8.1 | <34.8 | <8.2 | <24.4 | - | <7.6 | 45.7 | - |
| Mussels | PNPS – Discharge Canal | 6/11/2012 | <96 | 1750 | <9.0 | <27.5 | <9.0 | <25.6 | - | <9.5 | <19.7 | - |
| Mussels | Green Harbor Marshfield (Background) 1 | 9/19/2012 | <192 | 1320 | <13.7 | <64.5 | <13.4 | <44.8 | - | <13.4 | 111.0 | - |
| Mussels | PNPS – Discharge Canal | 10/23/2012 | <91 | 1990 | <8.3 | <24.4 | <8.4 | <23.6 | - | <8.5 | 81.8 | - |
| Clams | Duxbury Bay (Background) 1 | 10/18/2012 | <91 | 1310 | <8.8 | <27.1 | <8.3 | <24.7 | - | <7.9 | 54.6 | - |
| Clams | Plymouth Harbor  (Background) 1 | 10/18/2012 | <160 | 2310 | <14.1 | <48.8 | <14.2 | <45.3 | - | <14.9 | 116.0 | - |
| Winter Flounder | PNPS Discharge Canal | 4/26/2012 | <542 | 3230 | <35.8 | <169 | <34.6 | <105 | - | <35.5 | 159.0 | - |
| Winter Flounder | Cape Cod Bay (Background) 1 | 4/27/2012 | <634 | 3110 | <42.1 | <201 | <41.5 | <113 | - | <41.6 | 151.0 | - |
| Tautog | PNPS – Discharge Canal | 7/16/2012 | <505 | 3100 | <41.2 | <137 | <38.0 | <106 | - | <40.8 | 219 | - |
| Striped Bass | PNPS Discharge Canal | 7/16/2012 | <132 | 3740 | <11.7 | <45.6 | <12.8 | <37.1 | - | <9.4 | 44.7 | - |
| Bluefish | PNPS – Discharge Canal | 7/16/2012 | <169 | 4130 | <14.7 | <54.4 | <14.9 | <40.8 | - | **10.6** | 96.6 | - |
| Striped Bass | Cape Cod Bay (Background) 1 | 9/22/2012 | <129 | 4320 | <9.6 | <46.9 | <9.2 | <29.8 | - | <6.2 | 57.4 | - |
| Bluefish | Cape Cod Bay (Background) 1 | 9/22/2012 | <117 | 4920 | <8.6 | <37.6 | <9.2 | <25.0 | - | <6.1 | 37.3 | - |
| Tautog | Narragansett Bay  (Background) 1 | 9/28/2012 | <561 | 2930 | <43.0 | <168 | <39.5 | <121 | - | <41.8 | 377 | - |
| Winter Flounder | PNPS Discharge Canal | 10/23/2012 | <564 | 3200 | <55.6 | <165 | <53.3 | <162 | - | <59.0 | 298 | - |
| Lobster | PNPS Discharge Canal | 6/26/2012 | <105 | 2730 | <12.3 | <30.1 | <13.5 | <33.0 | - | <12.5 | <26.8 | - |
| Lobster | Cape Cod Bay (Background) 1 | 8/1/2012 | <92 | 3070 | <9.1 | <25.9 | <9.9 | <24.2 | - | <8.9 | <21.1 | - |
| Sediment | Green Harbor (Background) 1 | 5/2/2012 | - | 8710 | - | - | <57.0 | - | - | <57.7 | 348.0 | - |
| Sediment | Duxbury (Background) 1 | 5/2/2012 | - | 9280 | - | - | <40.8 | - | - | <41.7 | 253.0 | - |
| Sediment | PNPS Discharge Canal | 6/11/2012 | - | 9220 | - | - | <48.1 | - | - | <45.6 | 206.0 | - |
| Sediment | PNPS Discharge Canal | 10/23/2012 | - | 10100 | - | - | <48.4 | - | - | <46.7 | 271.0 | - |
| Sediment | Green Harbor (Background) 1 | 10/24/2012 | - | 10100 | - | - | <38.6 | - | - | <39.8 | 315.0 | - |
| Lettuce | Kingston | 6/28/2012 | 49.7 | 3620 | <8.2 | <18.4 | <9.6 | <21.8 | - | <8.7 | <18.7 | - |
| Lettuce | Bridgewater  (Background) | 7/6/2012 | 52.6 | 2330 | <8.2 | <20.2 | <9.2 | <23.3 | - | <8.9 | <18.8 | - |
| Tomatoes | Plymouth | 8/16/2012 | <96.2 | 1920 | <12.2 | <25.5 | <13.0 | <32.6 | - | <9.6 | <29.5 | - |
| Tomatoes | Bridgewater (Background) | 8/16/2012 | <47.5 | 1670 | <5.7 | <12.4 | ND6.7 | <15.1 | - | <6.4 | <14.8 | - |
| Mixed Greens and Leaves | Plymouth | 9/24/2012 | 561.0 | 6690 | <12.0 | <34.0 | <13.4 | <36.7 | - | <12.7 | <26.7 | - |
| Tomatoes | Bridgewater (Background) | 9/27/2012 | <102 | 2500 | <13.1 | <32.2 | <14.1 | <38.8 | - | <13.8 | <32.8 | - |
| Corn | Bridgewater (Background) | 9/27/2012 | <610 | 2200 | <73.1 | <164 | <72.8 | <195 | - | <79.4 | <183 | - |
| Squash | Bridgewater (Background) | 9/27/2012 | <71.7 | 1710 | <8.6 | <18.6 | <9.3 | <23.1 | - | <8.5 | 39.7 | - |
| Squash | Bridgewater  (Background) | 9/27/2012 | <112 | 4540 | <13.6 | <37.1 | <15.0 | <40.4 | - | <14.7 | <32.8 | - |
| Cabbage | Bridgewater (Background) | 9/27/2012 | <109 | 2800 | <13.6 | <34.9 | <14.1 | <40.1 |  | <13.8 | 63.3 |  |
| Beets | Plymouth | 9/28/2012 | 134.0 | 4810 | <10.9 | <25.7 | <11.0 | <29.4 | - | <10.9 | 71.4 | - |
| Large  Cucumbers | Plymouth | 9/28/2012 | <53.8 | 2330 | <6.2 | <14.1 | <6.6 | <16.8 | - | <6.8 | 17.5 | - |
| Onions | Plymouth | 9/28/2012 | <645 | 3210 | <72.2 | <158 | <62.7 | <165 | - | <68.6 | <183 | - |
| Kale | Plymouth | 9/28/2012 | <1800 | <5010 | <187 | <459 | <185 | <528 | - | <211 | <516 | - |
| Squash | Plymouth | 9/28/2012 | <393 | 3420 | <46.4 | <99.5 | <44.8 | <113 | - | <46.9 | <120 | - |
| Cranberries | Kingston  (Background) | 9/28/2012 | 44.7 | 1570 | <7.0 | <18.4 | <7.7 | <18.5 | - | <7.5 | <21.4 | - |
| Pumpkin | Plymouth | 10/5/2012 | <58.7 | 1750 | <6.5 | <19.5 | <7.1 | <19.7 | - | <7.1 | <16.1 | - |
| Cranberries | Plymouth | 10/5/2012 | 48.6 | 1040 | <7.4 | <19.2 | <8.3 | <19.8 | - | <7.6 | <19.1 | - |
| Cranberries | Plymouth | 1/14/2012 | 55.4 | 1450 | <7.2 | <14.4 | <7.7 | <19.7 | - | <8.0 | 51.4 | - |
| Pasture Grass/ Silage | Plymouth | 10/5/2012 | <99.0 | 2430 | <11.0 | <29.0 | <12.0 | <33.0 | - | <12.0 | <27.0 | - |
| Pasture Grass/ Silage | Plymouth | 10/5/2012 | <99.0 | 2650 | <8.0 | <29.0 | <12.0 | <33.0 | - | <12.0 | <27.0 | - |
| Pasture Grass/ Silage | Duxbury (Background) | 11/20/2012 | 277 | 25900 | <57.0 | <129.0 | <61.0 | <161 | - | <61.0 | 415.0 | - |

1. Sample considered “background” for the purpose of monitoring required by federal regulations, but considered “indicator” by MDPH because it falls within the 10-mile EPZ.

“-“ = not analyzed

“ND” = not detected

\* Be-7 = Beryllium 7, K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, I-131 = iodine-131, Cs-137 = Cesium-137, Pb-214 – Lead-214, H-3 = tritium

Table 3. Pilgrim Nuclear Power Station 2012 Environmental Monitoring Data - Air Samples

| Sample Type | Location | Date | 1-131\*  (pCi/m3) | Be-7\* (pCi/m3) | K-40\* (pCi/m3) | Mn-54\* (pCi/m3) | Fe-59\* (pCi/m3) | Co-60\* (pCi/m3) | Zn-65\* (pCi/m3) | Cs-134\* (pCi/m3) | Cs-137 \* (pCi/m3) | Pb-214\* (pCi/m3) | Gross Alpha (pCi/m3) | Gross Beta (pCi/m3) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Air | Pilgrim Station | 1/3/2012 | <0.0531 | - | - | - | - | - | - | - | - | - | 0.00493 | 0.0164 |
| Air | Pilgrim Station | 1/10/2012 | <0.0626 | - | - | - | - | - | - | - | - | - | 0.00684 | 0.0212 |
| Air | Pilgrim Station | 1/17/2012 | <0.0490 | - | - | - | - | - | - | - | - | - | 0.00432 | 0.0197 |
| Air | Pilgrim Station | 1/25/2012 | <0.0461 | - | - | - | - | - | - | - | - | - | 0.00316 | 0.0159 |
| Air | Pilgrim Station | 1/31/2012 | <0.0681 | - | - | - | - | - | - | - | - | - | 0.00434 | 0.0191 |
| Air | Pilgrim Station | 2/7/2012 | <0.0527 | - | - | - | - | - | - | - | - | - | 0.00593 | 0.0228 |
| Air | Pilgrim Station | 2/14/2012 | <0.0544 | - | - | - | - | - | - | - | - | - | 0.00462 | 0.0200 |
| Air | Pilgrim Station  Quarterly Filter Composite | 2/15/2012 | - | 0.094 | <0.037 | <0.001 | <0.013 | <0.001 | <0.004 | - | <0.001 | 0.005 | - | - |
| Air | Pilgrim Station | 2/21/2012 | <0.0384 | - | - | - | - | - | - | - | - | - | 0.00626 | 0.0304 |
| Air | Pilgrim Station | 2/28/2012 | <0.0396 | - | - | - | - | - | - | - | - | - | 0.00286 | 0.0156 |
| Air | Pilgrim Station | 3/6/2012 | <0.0432 | - | - | - | - | - | - | - | - | - | 0.00444 | 0.0241 |
| Air | Pilgrim Station | 3/13/2012 | <0.0524 | - | - | - | - | - | - | - | - | - | 0.00495 | 0.0206 |
| Air | Pilgrim Station | 3/20/2012 | <0.0677 | - | - | - | - | - | - | - | - | - | 0.00391 | 0.0222 |
| Air | Pilgrim Station | 3/27/2012 | <0.0637 | - | - | - | - | - | - | - | - | - | 0.00307 | 0.0212 |
| Air | Pilgrim Station | 4/3/2012 | <0.0419 | - | - | - | - | - | - | - | - | - | 0.00187 | 0.0172 |
| Air | Pilgrim Station | 4/10/2012 | <0.0487 | - | - | - | - | - | - | - | - | - | 0.00413 | 0.0213 |
| Air | Pilgrim Station | 4/19/2012 | <0.0326 | - | - | - | - | - | - | - | - | - | 0.00277 | 0.0177 |
| Air | Pilgrim Station | 4/25/2012 | <0.0764 | - | - | - | - | - | - | - | - | - | 0.00359 | 0.0144 |
| Air | Pilgrim Station | 5/01/2012 | <0.0507 | - | - | - | - | - | - | - | - | - | 0.00469 | 0.0229 |
| Air | Pilgrim Station | 5/08/2012 | <0.0407 | - | - | - | - | - | - | - | - | - | 0.00147 | 0.0125 |
| Air | Pilgrim Station Quarterly Filter Composite | 5/15/2012 | - | 0.090 | 0.230 | <0.002 | <0.009 | <0.002 | <0.005 | - | <0.002 | 0.006 | - | - |
| Air | Pilgrim Station | 5/15/2012 | <0.0390 | - | - | - | - | - | - | - | - | - | 0.00148 | 0.0151 |
| Air | Pilgrim Station | 5/22/2012 | <0.0554 | - | - | - | - | - | - | - | - | - | 0.00191 | 0.0136 |
| Air | Pilgrim Station | 5/29/2012 | <0.0552 | - | - | - | - | - | - | - | - | - | 0.00155 | 0.0137 |
| Air | Pilgrim Station | 6/05/2012 | <0.0408 | - | - | - | - | - | - | - | - | - | 0.00057 | 0.0120 |
| Air | Pilgrim Station | 6/12/2012 | <0.0618 | - | - | - | - | - | - | - | - | - | 0.00065 | 0.0177 |
| Air | Pilgrim Station | 6/20/2012 | <0.0537 | - | - | - | - | - | - | - | - | - | 0.00087 | 0.0100 |
| Air | Pilgrim Station | 6/26/2012 | <0.0608 | - | - | - | - | - | - | - | - | - | 0.00269 | 0.0230 |
| Air | Pilgrim Station | 7/03/2012 | <0.0496 | - | - | - | - | - | - | - | - | - | 0.00130 | 0.0248 |
| Air | Pilgrim Station | 7/10/2012 | <0.0406 | - | - | - | - | - | - | - | - | - | 0.00641 | 0.0206 |
| Air | Pilgrim Station | 7/17/2012 | <0.0359 | - | - | - | - | - | - | - | - | - | 0.00647 | 0.0172 |
| Air | Pilgrim Station | 7/24/2012 | <0.0407 | - | - | - | - | - | - | - | - | - | 0.00462 | 0.0196 |
| Air | Pilgrim Station | 7/31/2012 | <0.0535 | - | - | - | - | - | - | - | - | - | 0.00406 | 0.0199 |
| Air | Pilgrim Station | 8/7/2012 | <0.0596 | - | - | - | - | - | - | - | - | - | 0.00404 | 0.0262 |
| Air | Pilgrim Station Quarterly Filter Composite | 8/15/2012 | - | 0.080 | 0.173 | <0.002 | <0.008 | <0.001 | <0.004 | - | <0.001 | 0.007 | - | - |
| Air | Pilgrim Station | 8/14/2012 | <0.0580 | - | - | - | - | - | - | - | - | - | 0.00438 | 0.0245 |
| Air | Pilgrim Station | 8/21/2012 | <0.0372 | - | - | - | - | - | - | - | - | - | 0.00255 | 0.0153 |
| Air | Pilgrim Station | 8/28/2012 | <0.0615 | - | - | - | - | - | - | - | - | - | 0.00410 | 0.0237 |
| Air | Pilgrim Station | 9/04/2012 | <0.0371 | - | - | - | - | - | - | - | - | - | 0.00224 | 0.0230 |
| Air | Pilgrim Station | 9/11/2012 | <0.0633 | - | - | - | - | - | - | - | - | - | 0.00261 | 0.0176 |
| Air | Pilgrim Station | 9/18/2012 | <0.0580 | - | - | - | - | - | - | - | - | - | 0.00275 | 0.0235 |
| Air | Pilgrim Station | 9/25/2012 | <0.0549 | - | - | - | - | - | - | - | - | - | 0.00254 | 0.0165 |
| Air | Pilgrim Station | 10/02/2012 | <0.0376 | - | - | - | - | - | - | - | - | - | 0.00169 | 0.0203 |
| Air | Pilgrim Station | 10/09/2012 | <0.0356 | - | - | - | - | - | - | - | - | - | 0.00986 | 0.0259 |
| Air | Pilgrim Station | 10/16/2012 | <0.0554 | - | - | - | - | - | - | - | - | - | 0.00584 | 0.0198 |
| Air | Pilgrim Station | 10/23/2012 | <0.0397 | - | - | - | - | - | - | - | - | - | 0.00893 | 0.0228 |
| Air | Pilgrim Station | 10/30/2012 | <0.0366 | - | - | - | - | - | - | - | - | - | 0.00601 | 0.0179 |
| Air | Pilgrim Station | 11/06/2012 | <0.0416 | - | - | - | - | - | - | - | - | - | 0.00383 | 0.0131 |
| Air | Pilgrim Station | 11/13/2012 | <0.0385 | - | - | - | - | - | - | - | - | - | 0.00714 | 0.0280 |
| Air | Pilgrim Station Quarterly Filter Composite | 11/15/2012 | - | 0.063 | 0.067 | <0.002 | <0.011 | <0.001 | <0.005 | - | <0.001 | 0.008 | - | - |
| Air | Pilgrim Station | 11/20/2012 | <0.0363 | - | - | - | - | - | - | - | - | - | 0.00556 | 0.0196 |
| Air | Pilgrim Station | 11/27/2012 | <0.0390 | - | - | - | - | - | - | - | - | - | 0.00649 | 0.0260 |
| Air | Pilgrim Station | 12/04/2012 | <0.0379 | - | - | - | - | - | - | - | - | - | 0.00508 | 0.0221 |
| Air | Pilgrim Station | 12/11/2012 | <0.0595 | - | - | - | - | - | - | - | - | - | 0.00645 | 0.0249 |
| Air | Pilgrim Station | 12/19/2012 | <0.0296 | - | - | - | - | - | - | - | - | - | 0.00384 | 0.0161 |
| Air | Pilgrim Station | 12/26/2012 | <0.0609 | - | - | - | - | - | - | - | - | - | 0.00290 | 0.0189 |
| Air | Pilgrim Station | 1/02/2013 | <0.0566 | - | - | - | - | - | - | - | - | - | 0.00354 | 0.0182 |
| Air | Background | 1/3/2012 | <0.0547 | - | - | - | - | - | - | - | - | - | 0.00203 | 0.0126 |
| Air | Background | 1/10/2012 | <0.0541 | - | - | - | - | - | - | - | - | - | 0.00609 | 0.0238 |
| Air | Background | 1/17/2012 | <0.0573 | - | - | - | - | - | - | - | - | - | 0.00421 | 0.0165 |
| Air | Background | 1/24/2012 | <0.0669 | - | - | - | - | - | - | - | - | - | 0.00376 | 0.0192 |
| Air | Background | 1/31/2012 | <0.0718 | - | - | - | - | - | - | - | - | - | 0.00707 | 0.0217 |
| Air | Background | 2/7/2012 | <0.0740 | - | - | - | - | - | - | - | - | - | 0.00668 | 0.0241 |
| Air | Background | 2/14/2012 | <0.0687 | - | - | - | - | - | - | - | - | - | 0.00528 | 0.0254 |
| Air | Background Quarterly Composite | 2/15/2012 | - | 0.103 | 0.035 | <0.002 | <0.014 | <0.001 | <0.005 | - | <0.001 | 0.005 | - | - |
| Air | Background | 2/21/2012 | <0.0447 | - | - | - | - | - | - | - | - | - | 0.00710 | 0.0299 |
| Air | Background | 2/28/2012 | <0.0609 | - | - | - | - | - | - | - | - | - | 0.00756 | 0.0278 |
| Air | Background | 3/6/2012 | <0.0573 | - | - | - | - | - | - | - | - | - | 0.00481 | 0.0211 |
| Air | Background | 3/13/2012 | <0.574 | - | - | - | - | - | - | - | - | - | 0.00433 | 0.0247 |
| Air | Background | 3/20/2012 | <0.0467 | - | - | - | - | - | - | - | - | - | 0.00509 | 0.0253 |
| Air | Background | 3/27/2012 | <0.0710 | - | - | - | - | - | - | - | - | - | 0.00448 | 0.0224 |
| Air | Background | 4/3/2012 | <0.0584 | - | - | - | - | - | - | - | - | - | 0.00349 | 0.0197 |
| Air | Background | 4/10/2012 | <0.0748 | - | - | - | - | - | - | - | - | - | 0.00149 | 0.0155 |
| Air | Background | 4/17/2012 | <0.0549 | - | - | - | - | - | - | - | - | - | 0.00243 | 0.0167 |
| Air | Background | 4/24/2012 | <0.0594 | - | - | - | - | - | - | - | - | - | 0.00172 | 0.0147 |
| Air | Background | 5/1/2012 | <0.0457 | - | - | - | - | - | - | - | - | - | 0.00196 | 0.0174 |
| Air | Background | 5/8/2012 | <0.0558 | - | - | - | - | - | - | - | - | - | 0.00090 | 0.0086 |
| Air | Background Quarterly Composite | 5/15/2012 | - | 0.077 | 0.241 | <0.002 | <0.010 | <0.002 | <0.006 | - | <0.002 | 0.007 | - | - |
| Air | Background | 5/15/2012 | <0.0729 | - | - | - | - | - | - | - | - | - | 0.00138 | 0.0171 |
| Air | Background | 5/22/2012 | <0.0628 | - | - | - | - | - | - | - | - | - | 0.00068 | 0.0149 |
| Air | Background | 5/29/2012 | <0.0429 | - | - | - | - | - | - | - | - | - | 0.00079 | 0.0118 |
| Air | Background | 6/5/2012 | <0.0693 | - | - | - | - | - | - | - | - | - | 0.00398 | 0.0175 |
| Air | Background | 6/12/2012 | <0.0608 | - | - | - | - | - | - | - | - | - | 0.00261 | 0.0127 |
| Air | Background | 6/19/2012 | <0.0646 | - | - | - | - | - | - | - | - | - | 0.00178 | 0.0122 |
| Air | Background | 6/26/2012 | <0.0565 | - | - | - | - | - | - | - | - | - | 0.00109 | 0.0173 |
| Air | Background | 7/3/2012 | <0.0562 | - | - | - | - | - | - | - | - | - | 0.00269 | 0.0206 |
| Air | Background | 7/10/2012 | <0.0560 | - | - | - | - | - | - | - | - | - | 0.00352 | 0.0181 |
| Air | Background | 7/17/2012 | <0.0615 | - | - | - | - | - | - | - | - | - | 0.00815 | 0.0249 |
| Air | Background | 7/24/2012 | <0.0578 | - | - | - | - | - | - | - | - | - | 0.00648 | 0.0213 |
| Air | Background | 7/31/2012 | <0.0601 | - | - | - | - | - | - | - | - | - | 0.00818 | 0.0256 |
| Air | Background | 8/7/2012 | <0.0555 | - | - | - | - | - | - | - | - | - | 0.00479 | 0.0209 |
| Air | Background Quarterly Composite | 8/15/2012 | - | 0.072 | 0.040 | <0.001 | <0.008 | <0.001 | <0.004 | - | <0.001 | 0.006 | - | - |
| Air | Background | 8/14/2012 | <0.0554 | - | - | - | - | - | - | - | - | - | 0.00529 | 0.0218 |
| Air | Background | 8/21/2012 | <0.0574 | - | - | - | - | - | - | - | - | - | 0.00179 | 0.0175 |
| Air | Background | 8/28/2012 | <0.0549 | - | - | - | - | - | - | - | - | - | 0.00389 | 0.0282 |
| Air | Background | 9/04/2012 | <0.0593 | - | - | - | - | - | - | - | - | - | 0.00333 | 0.0200 |
| Air | Background | 9/11/2012 | <0.0600 | - | - | - | - | - | - | - | - | - | 0.00378 | 0.0203 |
| Air | Background | 9/18/2012 | <0.0702 | - | - | - | - | - | - | - | - | - | 0.00133 | 0.0168 |
| Air | Background | 9/25/2012 | <0.0666 | - | - | - | - | - | - | - | - | - | 0.00204 | 0.0224 |
| Air | Background | 10/2/2012 | <0.0618 | - | - | - | - | - | - | - | - | - | 0.00299 | 0.0176 |
| Air | Background | 10/09/2012 | <0.0623 | - | - | - | - | - | - | - | - | - | 0.00812 | 0.0289 |
| Air | Background | 10/16/2012 | <0.0418 | - | - | - | - | - | - | - | - | - | 0.00338 | 0.0167 |
| Air | Background | 10/23/2012 | <0.0386 | - | - | - | - | - | - | - | - | - | 0.00726 | 0.0273 |
| Air | Background | 10/30/2012 | <0.0427 | - | - | - | - | - | - | - | - | - | 0.00205 | 0.0137 |
| Air | Background | 11/06/2012 | <0.0419 | - | - | - | - | - | - | - | - | - | 0.00193 | 0.0148 |
| Air | Background | 11/13/2012 | <0.0678 | - | - | - | - | - | - | - | - | - | 0.00498 | 0.0239 |
| Air | Background | 11/20/2012 | <0.0581 | - | - | - | - | - | - | - | - | - | 0.00646 | 0.0240 |
| Air | Background Quarterly Composite | 11/15/2012 | - | 0.059 | 0.221 | <0.002 | <0.013 | <0.002 | <0.006 | - | <0.002 | 0.011 | - | - |
| Air | Background | 11/27/2012 | <0.0417 | - | - | - | - | - | - | - | - | - | 0.00395 | 0.0213 |
| Air | Background | 12/4/2012 | <0.0620 | - | - | - | - | - | - | - | - | - | 0.00573 | 0.0305 |
| Air | Background | 12/11/2012 | <0.0611 | - | - | - | - | - | - | - | - | - | 0.00495 | 0.0202 |
| Air | Background | 12/18/2012 | <0.0596 | - | - | - | - | - | - | - | - | - | 0.00529 | 0.0256 |
| Air | Background | 12/26/2012 | <0.0386 | - | - | - | - | - | - | - | - | - | 0.00311 | 0.0133 |
| Air | Background | 1/2/2013 | <0.0645 | - | - | - | - | - | - | - | - | - | 0.00471 | 0.0238 |

“-“ = not analyzed

“ND” = not detected

\* I-131 = iodine-131, Be-7 = Beryllium-7, K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, Cs-134 = Cesium-134, Cs-137, = Cesium-137, Pb-214 = lead-214

Table 4. Seabrook Nuclear Power Station 2012 Environmental Monitoring Data - Liquid Matrix

| Sample Type | Location | Date | K-40\* (pCi/L) | Mn-54\* (pCi/L) | Fe-59\* (pCi/L) | Co-60\* (pCi/L) | Zn-65\* (pCi/L) | 1-131\* (pCi/L) | Cs-134\* (pCi/L) | Cs-137\* (pCi/L) | Ba-140\* (pCi/L) | H-3\* (pCi/L) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Surface Water | Ipswich Bay (Background) | 1/26/2012 | <268 | <9.8 | <22.8 | <10.5 | <27.5 | <19.6 | - | <10.9 | - | - |
| Surface Water | Ipswich Bay (Background) Quarterly Composite | 2/15/2012 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Ipswich Bay (Background) | 2/21/2012 | <342 | <7.5 | <14.7 | <7.8 | <20.1 | <8.3 | - | <8.0 | - | - |
| Surface Water | Ipswich Bay (Background) | 3/21/2012 | <266 | <10.6 | <22.0 | <10.6 | <30.4 | <15.4 | - | <10.7 | - | - |
| Surface Water | Ipswich Bay (Background) | 4/17/2012 | <266 | <9.8 | <20.3 | <10.1 | <25.5 | <12.3 | - | <10.5 | - | - |
| Surface Water | Ipswich Bay (Background) Quarterly Composite | 5/15/2012 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Ipswich Bay (Background) | 5/21/2012 | <420 | <9.7 | <21.9 | <10.0 | <26.2 | <21.1 | - | <10.6 | - | - |
| Surface Water | Ipswich Bay (Background) | 6/21/2012 | 361 | <5.0 | <10.2 | <5.2 | <12.7 | <6.0 | - | <5.7 | - | - |
| Surface Water | Ipswich Bay (Background) | 7/17/2012 | <341 | <7.0 | <16.2 | <7.5 | <19.2 | <11.3 | - | <7.9 | - | - |
| Surface Water | Ipswich Bay (Background) Quarterly Composite | 8/15/2012 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Ipswich Bay (Background) | 8/21/2012 | <341 | <7.1 | <15.1 | <7.4 | <18.9 | <8.6 | - | <7.4 | - | - |
| Surface Water | Ipswich Bay (Background) | 9/18/2012 | 867 | <6.1 | <15.4 | <6.2 | <15.4 | <26.1 | - | <6.6 | - | - |
| Surface Water | Ipswich Bay (Background) | 10/25/2012 | 821 | <6.0 | <13.0 | <6.6 | <14.6 | <9.1 | - | <6.3 | - | - |
| Surface Water | Ipswich Bay (Background) Quarterly Composite | 11/15/2012 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Ipswich Bay (Background) | 11/19/2012 | 855 | <6.5 | <14.2 | <6.8 | <17.7 | <12.9 | - | <6.6 | - | - |
| Surface Water | Ipswich Bay (Background) | 12/12/2012 | 825 | <6.3 | <13.9 | <6.6 | <15.0 | <12.9 | - | <6.3 | - | - |
| Milk | Rowley (Background) | 1/11/2012 | 1300 | - | - | - | - | <1.9 | <11.7 | <11.3 | <37.7 | - |
| Milk | Rowley (Background) | 2/8/2012 | 1360 | - | - | - | - | <2.3 | <12.3 | <11.2 | <39.4 | - |
| Milk | Rowley (Background) | 3/8/2012 | 1330 | - | - | - | - | <1.9 | <7.8 | <8.9 | <28.1 | - |
| Milk | Rowley (Background) | 4/11/2012 | 1430 | - | - | - | - | <2.3 | <10.6 | <11.6 | <35.7 | - |
| Milk | Rowley (Background) | 5/2/2012 | 1540 | - | - | - | - | <2.6 | <5.7 | <5.6 | <19.8 | - |
| Milk | Rowley (Background) | 6/13/2012 | 1310 | - | - | - | - | <2.0 | <6.6 | <7.3 | <25.3 | - |
| Milk | Rowley (Background) | 7/11/2012 | 1650 | - | - | - | - | <2.2 | <5.9 | <6.2 | <21.4 | - |
| Milk | Rowley (Background) | 8/8/2012 | 1390 | - | - | - | - | <2.0 | <7.5 | <8.8 | <27.9 | - |
| Milk | Rowley (Background) | 9/6/2012 | 1350 | - | - | - | - | <2.0 | <6.8 | <7.4 | <25.1 | - |
| Milk | Rowley (Background) | 10/3/2012 | 2010 | - | - | - | - | <2.2 | <5.8 | <6.6 | <21.2 | - |
| Milk | Rowley (Background) | 11/7/2012 | 2060 | - | - | - | - | <2.3 | <6.5 | <6.8 | <22.6 | - |
| Milk | Rowley (Background) | 12/5/2012 | 2040 | - | - | - | - | <2.2 | <6.0 | <6.8 | <22.5 | - |

“-“ = not analyzed

“ND” = not detected

\* K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, I-131 = iodine-131, Cs-134 = Cesium-134, Cs-137 = Cesium-137, Ba-140 = barium-140, H-3 = tritium

Table 5. Seabrook Nuclear Power Station 2012 Environmental Monitoring Data - Solid Matrix

| Sample Type | 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) | 1-131\* (pCi/kg) | Cs-137\* (pCi/kg) | Pb-214\* (pCi/kg) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Chondrus | Ipswich Bay | 5/21/2012 | 251 | 9890 | <11.4 | <31.1 | <12.9 | <33.8 | 21.8 | <11.4 | - |
| Chondrus | Ipswich Bay | 5/21/2012 (Duplicate) | 228 | <730 | <14.2 | <38.8 | <15.9 | <42.4 | 24.6 | <14.7 | - |
| Chondrus | Ipswich Bay | 11/26/2012 | 188 | 22500 | <13.8 | <33.9 | <15.6 | <40.6 | 82.8 | <13.9 | - |
| Winter Flounder | Ipswich Bay | 5/21/2012 | <142 | 4390 | <12.5 | <46.5 | <13.3 | <34.9 | - | <11.9 | MD(24.9 |
| Winter Flounder | Ipswich Bay | 8/21/2012 | <100 | 4250 | <8.3 | <33.7 | <9.3 | <21.6 | - | <8.2 | 35.2 |
| Skate fish | Ipswich Bay | 11/19/2012 | <1260 | <2600 | <104 | <391 | <102 | <319 | - | <106 | 898.0 |
| Lobster | Ipswich Bay | 5/24/2012 | <97 | 1920 | <7.8 | <28.1 | <7.7 | <21.0 | - | <7.4 | <16.9 |
| Lobster | Ipswich Bay | 11/20/2012 | <92 | 3580 | <9.8 | <25.5 | <10.1 | <27.6 | - | <9.9 | 97.8 |
| Mytilus | Ipswich Bay | 5/23/2012 | <101 | 1560 | <8.3 | <28.8 | <8.1 | <22.3 | - | <8.1 | <18.0 |
| Modiolus | Ipswich Bay | 5/21/2012 | <140 | 1500 | <11.9 | <43.6 | <11.2 | <34.5 | - | <12.0 | <24.9 |
| Mytilus | Ipswich Bay | 11/19/2012 | <64.0 | 918 | <6.8 | <18.5 | <7.4 | <21.6 | - | <7.4 | 40.3 |
| Modiolus | Ipswich Bay | 11/26/2012 | <57.0 | 1920 | <6.6 | <16.4 | <6.9 | <18.5 | - | <6.4 | 29.0 |
| Sediment | Ipswich Bay (Subtidal) | 5/21/2012 | - | 10400 | - | - | <53.6 | - | - | <55.6 | 1740 |
| Sediment | Ipswich Bay (Subtidal) | 5/21/2012 | - | 13300 | - | - | <50.9 | - | - | <58.5 | 1130 |
| Sediment | Ipswich Bay (Subtidal) | 5/21/2012 | - | 12600 | - | - | <55.0 | - | - | <55.7 | 680 |
| Sediment | Ipswich Bay (Beach) | 5/23/2012 | - | 15400 | - | - | <50.4 | - | - | <49.2 | 289 |
| Sediment | Ipswich Bay (Beach) | 5/23/2012 | - | 16000 | - | - | <49.4 | - | - | <47.1 | 243 |
| Sediment | Ipswich Bay (Beach) | 5/23/2012 | - | 17200 | - | - | <39.4 | - | - | <39.5 | 223 |
| Sediment | Ipswich Bay (Beach) | 11/19/2012 | - | 12300 | - | - | <46.3 | - | - | <44.5 | 219 |
| Sediment | Ipswich Bay (Beach) | 11/19/2012 | - | 14100 | - | - | <38.0 | - | - | <39.4 | 297 |
| Sediment | Ipswich Bay (Beach) | 11/19/2012 | - | 12000 | - | - | <40.6 | - | - | <40.2 | 246 |
| Sediment | Ipswich Bay (Subtidal) | 11/19/2012 | - | 12900 | - | - | <46.6 | - | - | <52.0 | 1360 |
| Sediment | Ipswich Bay (Subtidal) | 11/19/2012 | - | 10200 | - | - | <55.9 | - | - | <59.8 | 1730 |
| Sediment | Ipswich Bay (Subtidal) | 11/19/2012 | - | 12400 | - | - | <46.1 | - | - | <51.7 | 1600 |
| Strawberries | Salisbury | 6/19/2012 | <61.6 | 933 | <7.1 | <15.7 | <7.3 | <19.5 | - | <7.4 | <17.3 |
| Strawberries | Ipswich  (Control) | 6/19/2012 | <42.5 | 1300 | <5.7 | <13.1 | <5.9 | <15.2 | - | <5.7 | <19.9 |
| Garden Tomatoes | Ipswich  (Control) | 7/26/2012 | <86.3 | 2470 | <10.5 | <23.6 | <11.7 | <27.3 | - | <10.9 | <24.1 |
| Garden Tomatoes | Salisbury | 7/26/2012 | <57.5 | 2380 | <7.1 | <14.8 | <7.6 | <18.7 | - | <7.2 | <16.2 |
| Garden Tomatoes | Ipswich  (Control) | 8/21/2012 | <73.3 | 1950 | <9.4 | <21.4 | <10.5 | <26.2 | - | <10.0 | <21.5 |
| Garden Tomatoes | Salisbury | 8/21/2012 | <60.2 | 2550 | <7.4 | <15.7 | <8.6 | <19.2 | - | <7.7 | <18.0 |
| Corn | Rowley | 10/3/2012 | <928 | <2700 | <98.6 | <247 | <95.8 | <256 | - | <112 | <252 |
| Apples | Amesbury | 10/3/2012 | <56.2 | 1430 | <6.1 | <15.5 | <6.3 | <15.8 | - | <6.1 | <28.2 |

“-“ = not analyzed

“ND” = not detected

\* Be-7 = Beryllium 7, K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, I-131 = iodine-131, Cs-137 = Cesium-137, Pb-214 – Lead-214

Table 6. Seabrook Nuclear Power Station 2012 Environmental Monitoring Data - Air Samples

| Sample Type | Location | Date | 1-131\*  (pCi/m3) | Be-7\* (pCi/m3) | K-40\* (pCi/m3) | Mn-54\* (pCi/m3) | Fe-59\* (pCi/m3) | Co-60\* (pCi/m3) | Zn-65\* (pCi/m3) | Cs-134\* (pCi/m3) | Cs-137 \* (pCi/m3) | Pb-214\* (pCi/m3) | Gross Alpha (pCi/m3) | Gross Beta (pCi/m3) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Air | Salisbury Fire Station | 1/4/2012 | <0.0704 | - | - | - | - | - | - | - | - | - | 0.01020 | 0.0253 |
| Air | Salisbury Fire Station | 1/11/2012 | <0.0822 | - | - | - | - | - | - | - | - | - | 0.00871 | 0.0238 |
| Air | Salisbury Fire Station | 1/18/2012 | <0.0843 | - | - | - | - | - | - | - | - | - | 0.00575 | 0.0238 |
| Air | Salisbury Fire Station | 1/25/2012 | <0.0663 | - | - | - | - | - | - | - | - | - | 0.00480 | 0.0176 |
| Air | Salisbury Fire Station | 2/1/2012 | <0.0633 | - | - | - | - | - | - | - | - | - | 0.00447 | 0.0167 |
| Air | Salisbury Fire Station | 2/8/2012 | <0.0591 | - | - | - | - | - | - | - | - | - | 0.00646 | 0.0269 |
| Air | Salisbury Fire Station | 2/15/2012 | <0.0476 | - | - | - | - | - | - | - | - | - | 0.00783 | 0.0275 |
| Air | Salisbury Fire Station (Quarterly Composite) | 2/15/2012 | - | 0.093 | 0.294 | <0.003 | <0.022 | <0.002 | <0.007 | - | <0.002 | 0.007 | - | - |
| Air | Salisbury Fire Station | 2/22/2012 | <0.0775 | - | - | - | - | - | - | - | - | - | 0.01100 | 0.0424 |
| Air | Salisbury Fire Station | 2/29/2012 | <0.1000 | - | - | - | - | - | - | - | - | - | 0.00916 | 0.0305 |
| Air | Salisbury Fire Station | 3/7/2012\*\* | <6.19 | - | - | - | - | - | - | - | - | - | 0.03990 | 0.1290 |
| Air | Salisbury Fire Station | 3/14/2012 | <0.0543 | - | - | - | - | - | - | - | - | - | 0.00670 | 0.0317 |
| Air | Salisbury Fire Station | 3/21/2012 | <0.0595 | - | - | - | - | - | - | - | - | - | 0.00583 | 0.0238 |
| Air | Salisbury Fire Station | 3/28/2012 | <0.0662 | - | - | - | - | - | - | - | - | - | 0.00495 | 0.0232 |
| Air | Salisbury Fire Station | 4/3/2012 | <0.0564 | - | - | - | - | - | - | - | - | - | 0.00473 | 0.0228 |
| Air | Salisbury Fire Station | 4/10/2012 | <0.0607 | - | - | - | - | - | - | - | - | - | 0.00147 | 0.0173 |
| Air | Salisbury Fire Station | 4/17/2012 | <0.0803 | - | - | - | - | - | - | - | - | - | 0.00507 | 0.0242 |
| Air | Salisbury Fire Station | 4/25/2012 | <0.0471 | - | - | - | - | - | - | - | - | - | 0.00181 | 0.0133 |
| Air | Salisbury Fire Station | 5/2/2012 | <0.0622 | - | - | - | - | - | - | - | - | - | 0.00216 | 0.0183 |
| Air | Salisbury Fire Station | 5/9/2012 | <0.0501 | - | - | - | - | - | - | - | - | - | 0.00217 | 0.0146 |
| Air | Salisbury Fire Station (Quarterly Composite) | 5/15/2012 | - | 0.085 | 0.275 | <0.002 | <0.011 | <0.002 | <0.006 | - | <0.002 | 0.014 | - | - |
| Air | Salisbury Fire Station | 5/16/2012 | <0.0498 | - | - | - | - | - | - | - | - | - | 0.00307 | 0.0284 |
| Air | Salisbury Fire Station | 5/23/2012 | <0.0496 | - | - | - | - | - | - | - | - | - | 0.00114 | 0.0133 |
| Air | Salisbury Fire Station | 5/30/2012 | <0.0553 | - | - | - | - | - | - | - | - | - | 0.00269 | 0.0178 |
| Air | Salisbury Fire Station | 6/6/2012 | <0.0842 | - | - | - | - | - | - | - | - | - | 0.00109 | 0.0162 |
| Air | Salisbury Fire Station | 6/13/2012 | <0.0683 | - | - | - | - | - | - | - | - | - | 0.00172 | 0.0138 |
| Air | Salisbury Fire Station | 6/20/2012 | <0.0700 | - | - | - | - | - | - | - | - | - | 0.00018 | 0.0163 |
| Air | Salisbury Fire Station | 6/27/2012 | <0.0469 | - | - | - | - | - | - | - | - | - | 0.00232 | 0.0231 |
| Air | Salisbury Fire Station | 7/5/2012 | <0.0575 | - | - | - | - | - | - | - | - | - | 0.00050 | 0.0179 |
| Air | Salisbury Fire Station | 7/11/2012 | <0.0790 | - | - | - | - | - | - | - | - | - | 0.00494 | 0.0221 |
| Air | Salisbury Fire Station | 7/18/2012 | <0.0695 | - | - | - | - | - | - | - | - | - | 0.00751 | 0.0361 |
| Air | Salisbury Fire Station | 7/25/2012 | <0.0643 | - | - | - | - | - | - | - | - | - | 0.00646 | 0.0198 |
| Air | Salisbury Fire Station | 8/1/2012 | <0.0477 | - | - | - | - | - | - | - | - | - | 0.00437 | 0.0232 |
| Air | Salisbury Fire Station | 8/8/2012 | <0.0483 | - | - | - | - | - | - | - | - | - | 0.00585 | 0.0246 |
| Air | Salisbury Fire Station | 8/15/2012\*\* | <0.1300 | - | - | - | - | - | - | - | - | - | 0.00464 | 0.0383 |
| Air | Salisbury Fire Station (Quarterly Composite) | 8/15/2012 | - | 0.086 | <0.046 | <0.002 | <0.011 | <0.002 | <0.006 | - | <0.002 | 0.008 | - | - |
| Air | Salisbury Fire Station | 8/22/2012 | <0.0651 | - | - | - | - | - | - | - | - | - | 0.00239 | 0.0222 |
| Air | Salisbury Fire Station | 8/29/2012 | <0.0718 | - | - | - | - | - | - | - | - | - | 0.00329 | 0.0265 |
| Air | Salisbury Fire Station | 9/5/2012 | <0.0694 | - | - | - | - | - | - | - | - | - | 0.00254 | 0.0250 |
| Air | Salisbury Fire Station | 9/12/2012 | <0.0823 | - | - | - | - | - | - | - | - | - | 0.00239 | 0.0235 |
| Air | Salisbury Fire Station | 9/19/2012 | <0.0626 | - | - | - | - | - | - | - | - | - | 0.00172 | 0.0211 |
| Air | Salisbury Fire Station | 9/26/2012 | <0.0472 | - | - | - | - | - | - | - | - | - | 0.00111 | 0.0232 |
| Air | Salisbury Fire Station | 10/3/2012 | <0.0716 | - | - | - | - | - | - | - | - | - | -0.00047 | 0.0186 |
| Air | Salisbury Fire Station | 10/10/2012 | <0.0704 | - | - | - | - | - | - | - | - | - | 0.01080 | 0.0284 |
| Air | Salisbury Fire Station | 10/17/2012 | <0.0523 | - | - | - | - | - | - | - | - | - | 0.00831 | 0.0178 |
| Air | Salisbury Fire Station | 10/25/2012 | <0.0589 | - | - | - | - | - | - | - | - | - | 0.00698 | 0.0245 |
| Air | Salisbury Fire Station | 10/31/2012 | <0.0807 | - | - | - | - | - | - | - | - | - | 0.00595 | 0.0190 |
| Air | Salisbury Fire Station | 11/7/2012 | <0.0773 | - | - | - | - | - | - | - | - | - | 0.00431 | 0.0135 |
| Air | Salisbury Fire Station | 11/14/2012 | <0.0842 | - | - | - | - | - | - | - | - | - | 0.00936 | 0.0315 |
| Air | Salisbury Fire Station | 11/21/2012 | <0.0668 | - | - | - | - | - | - | - | - | - | 0.01310 | 0.0427 |
| Air | Salisbury Fire Station | 11/28/2012 | <0.0682 | - | - | - | - | - | - | - | - | - | 0.01060 | 0.0363 |
| Air | Salisbury Fire Station | 12/5/2012 | <0.0478 | - | - | - | - | - | - | - | - | - | 0.00997 | 0.0347 |
| Air | Salisbury Fire Station | 12/12/2012 | <0.0712 | - | - | - | - | - | - | - | - | - | 0.00509 | 0.0157 |
| Air | Salisbury Fire Station (Quarterly Composite) | 11/15/2012 | - | 0.076 | 0.251 | <0.002 | <0.015 | <0.002 | <0.007 | - | <0.002 | 0.008 | - | - |
| Air | Salisbury Fire Station | 12/19/2012 | <0.0514 | - | - | - | - | - | - | - | - | - | 0.00751 | 0.0261 |
| Air | Salisbury Fire Station | 12/26/2012 | <0.0469 | - | - | - | - | - | - | - | - | - | 0.00680 | 0.0236 |
| Air | Salisbury Fire Station | ½/2013 | <0.0518 | - | - | - | - | - | - | - | - | - | 0.00632 | 0.0231 |
| Air | Background | 1/3/2012 | <0.0547 | - | - | - | - | - | - | - | - | - | 0.00203 | 0.0126 |
| Air | Background | 1/10/2012 | <0.0541 | - | - | - | - | - | - | - | - | - | 0.00609 | 0.0238 |
| Air | Background | 1/17/2012 | <0.0573 | - | - | - | - | - | - | - | - | - | 0.00421 | 0.0165 |
| Air | Background | 1/24/2012 | <0.0669 | - | - | - | - | - | - | - | - | - | 0.00376 | 0.0192 |
| Air | Background | 1/31/2012 | <0.0718 | - | - | - | - | - | - | - | - | - | 0.00707 | 0.0217 |
| Air | Background | 2/7/2012 | <0.0740 | - | - | - | - | - | - | - | - | - | 0.00668 | 0.0241 |
| Air | Background | 2/14/2012 | <0.0687 | - | - | - | - | - | - | - | - | - | 0.00528 | 0.0254 |
| Air | Background Quarterly Composite | 2/15/2012 | - | 0.103 | 0.035 | <0.002 | <0.014 | <0.001 | <0.005 | - | <0.001 | 0.005 | - | - |
| Air | Background | 2/21/2012 | <0.0447 | - | - | - | - | - | - | - | - | - | 0.00710 | 0.0299 |
| Air | Background | 2/28/2012 | <0.0609 | - | - | - | - | - | - | - | - | - | 0.00756 | 0.0278 |
| Air | Background | 3/6/2012 | <0.0573 | - | - | - | - | - | - | - | - | - | 0.00481 | 0.0211 |
| Air | Background | 3/13/2012 | <0.0574 | - | - | - | - | - | - | - | - | - | 0.00433 | 0.0247 |
| Air | Background | 3/20/2012 | <0.0467 | - | - | - | - | - | - | - | - | - | 0.00509 | 0.0253 |
| Air | Background | 3/27/2012 | <0.0710 | - | - | - | - | - | - | - | - | - | 0.00448 | 0.0224 |
| Air | Background | 4/3/2012 | <0.0584 | - | - | - | - | - | - | - | - | - | 0.00349 | 0.0197 |
| Air | Background | 4/10/2012 | <0.0748 | - | - | - | - | - | - | - | - | - | 0.00149 | 0.0155 |
| Air | Background | 4/17/2012 | <0.0549 | - | - | - | - | - | - | - | - | - | 0.00243 | 0.0167 |
| Air | Background | 4/24/2012 | <0.0594 | - | - | - | - | - | - | - | - | - | 0.00172 | 0.0147 |
| Air | Background | 5/1/2012 | <0.0457 | - | - | - | - | - | - | - | - | - | 0.00196 | 0.0174 |
| Air | Background | 5/8/2012 | <0.0558 | - | - | - | - | - | - | - | - | - | 0.00090 | 0.0086 |
| Air | Background Quarterly Composite | 5/15/2012 | - | 0.077 | 0.241 | <0.002 | <0.010 | <0.002 | <0.006 | - | <0.002 | 0.007 | - | - |
| Air | Background | 5/15/2012 | <0.0729 | - | - | - | - | - | - | - | - | - | 0.00138 | 0.0171 |
| Air | Background | 5/22/2012 | <0.0628 | - | - | - | - | - | - | - | - | - | 0.00068 | 0.0149 |
| Air | Background | 5/29/2012 | <0.0429 | - | - | - | - | - | - | - | - | - | 0.00079 | 0.0118 |
| Air | Background | 6/5/2012 | <0.0693 | - | - | - | - | - | - | - | - | - | 0.00398 | 0.0175 |
| Air | Background | 6/12/2012 | <0.0608 | - | - | - | - | - | - | - | - | - | 0.00261 | 0.0127 |
| Air | Background | 6/19/2012 | <0.0646 | - | - | - | - | - | - | - | - | - | 0.00178 | 0.0122 |
| Air | Background | 6/26/2012 | <0.0565 | - | - | - | - | - | - | - | - | - | 0.00109 | 0.0173 |
| Air | Background | 7/3/2012 | <0.0562 | - | - | - | - | - | - | - | - | - | 0.00269 | 0.0206 |
| Air | Background | 7/10/2012 | <0.0560 | - | - | - | - | - | - | - | - | - | 0.00352 | 0.0181 |
| Air | Background | 7/17/2012 | <0.0615 | - | - | - | - | - | - | - | - | - | 0.00815 | 0.0249 |
| Air | Background | 7/24/2012 | <0.0578 | - | - | - | - | - | - | - | - | - | 0.00648 | 0.0213 |
| Air | Background | 7/31/2012 | <0.0601 | - | - | - | - | - | - | - | - | - | 0.00818 | 0.0256 |
| Air | Background | 8/7/2012 | <0.0555 | - | - | - | - | - | - | - | - | - | 0.00479 | 0.0209 |
| Air | Background Quarterly Composite | 8/15/2012 | - | 0.072 | 0.040 | <0.001 | <0.008 | <0.001 | <0.004 | - | <0.001 | 0.006 | - | - |
| Air | Background | 8/14/2012 | <0.0554 | - | - | - | - | - | - | - | - | - | 0.00529 | 0.0218 |
| Air | Background | 8/21/2012 | <0.0574 | - | - | - | - | - | - | - | - | - | 0.00179 | 0.0175 |
| Air | Background | 8/28/2012 | <0.0549 | - | - | - | - | - | - | - | - | - | 0.00389 | 0.0282 |
| Air | Background | 9/04/2012 | <0.0593 | - | - | - | - | - | - | - | - | - | 0.00333 | 0.0200 |
| Air | Background | 9/11/2012 | <0.0600 | - | - | - | - | - | - | - | - | - | 0.00378 | 0.0203 |
| Air | Background | 9/18/2012 | <0.0702 | - | - | - | - | - | - | - | - | - | 0.00133 | 0.0168 |
| Air | Background | 9/25/2012 | <0.0666 | - | - | - | - | - | - | - | - | - | 0.00204 | 0.0224 |
| Air | Background | 10/2/2012 | <0.0618 | - | - | - | - | - | - | - | - | - | 0.00299 | 0.0176 |
| Air | Background | 10/09/2012 | <0.0623 | - | - | - | - | - | - | - | - | - | 0.00812 | 0.0289 |
| Air | Background | 10/16/2012 | <0.0418 | - | - | - | - | - | - | - | - | - | 0.00338 | 0.0167 |
| Air | Background | 10/23/2012 | <0.0386 | - | - | - | - | - | - | - | - | - | 0.00726 | 0.0273 |
| Air | Background | 10/30/2012 | <0.0427 | - | - | - | - | - | - | - | - | - | 0.00205 | 0.0137 |
| Air | Background | 11/06/2012 | <0.0419 | - | - | - | - | - | - | - | - | - | 0.00193 | 0.0148 |
| Air | Background | 11/13/2012 | <0.0678 | - | - | - | - | - | - | - | - | - | 0.00498 | 0.0239 |
| Air | Background | 11/20/2012 | <0.0581 | - | - | - | - | - | - | - | - | - | 0.00646 | 0.0240 |
| Air | Background Quarterly Composite | 11/15/2012 | - | 0.059 | 0.221 | <0.002 | <0.013 | <0.002 | <0.006 | - | <0.002 | 0.011 | - | - |
| Air | Background | 11/27/2012 | <0.0417 | - | - | - | - | - | - | - | - | - | 0.00395 | 0.0213 |
| Air | Background | 12/4/2012 | <0.0620 | - | - | - | - | - | - | - | - | - | 0.00573 | 0.0305 |
| Air | Background | 12/11/2012 | <0.0611 | - | - | - | - | - | - | - | - | - | 0.00495 | 0.0202 |
| Air | Background | 12/18/2012 | <0.0596 | - | - | - | - | - | - | - | - | - | 0.00529 | 0.0256 |
| Air | Background | 12/26/2012 | <0.0386 | - | - | - | - | - | - | - | - | - | 0.00311 | 0.0133 |
| Air | Background | 1/2/2013 | <0.0645 | - | - | - | - | - | - | - | - | - | 0.00471 | 0.0238 |

“-“ = not analyzed

“ND” = not detected

\* I-131 = iodine-131, Be-7 = Beryllium-7, K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, Cs-134 = Cesium-134, Cs-137, = Cesium-137, Pb-214 = Lead-214

\*\* Power Outage resulted in lower air volumes, and therefore higher detection limits.Table 7. Vermont Yankee Nuclear Power Station 2012 Environmental Monitoring Data - Liquid Matrix

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample Type | Location | Date | K-40\* (pCi/L) | Mn-54\* (pCi/L) | Fe-59\* (pCi/L) | Co-60\* (pCi/L) | Zn-65\* (pCi/L) | 1-131\* (pCi/L) | Cs-134\* (pCi/L) | Cs-137\* (pCi/L) | Ba-140\*  (pCi/L) | H-3\* (pCi/L) |
| Surface Water | Connecticut River, Northfield | 3/22/2012 | <199 | <6.9 | <14.4 | <7.3 | <18.4 | <6.5 | - | <8.1 | - | <300 |
| Surface Water | Connecticut River, Northfield | 5/23/2012 | <195 | <7.0 | <14.5 | <7.0 | <19.4 | <7.9 | - | <7.8 | - | <300 |
| Surface Water | Connecticut River, Northfield | 8/28/2012 | <208 | <7.3 | <15.2 | <7.5 | <19.4 | <7.9 | - | <8.0 | - | <300 |
| Surface Water | Connecticut River, Northfield | 11/28/2012 | <170 | <5.4 | <11.6 | <5.5 | <14.7 | <8.2 | - | <5.5 | - | <300 |
| Surface Water | Connecticut River, Gill | 3/22/2012 | <248 | <9.8 | <19.9 | <10.3 | <26.4 | <10.5 | - | <10.2 | - | <300 |
| Surface Water | Connecticut River, Gill | 5/23/2012 | <238 | <9.7 | <20.2 | <10.1 | <23.6 | <10.9 | - | <10.1 | - | <300 |
| Surface Water | Connecticut River, Gill | 8/28/2012 | <175 | <6.6 | <13.3 | <6.7 | <17.8 | <8.2 | - | <7.2 | - | <300 |
| Surface Water | Connecticut River, Gill | 11/28/2012 | <169 | <6.4 | <14.4 | <6.7 | <17.9 | <10.3 | - | <7.1 | - | <300 |
| Surface Water | Millers River Athol  (Background) | 3/22/2012 | <106 | <4.8 | <9.7 | <5.3 | <13.3 | <5.4 | - | <5.6 | - | <300 |
| Surface Water | Millers River Athol  (Background) | 5/23/2012 | <103 | <4.7 | <9.5 | <5.3 | <12.1 | 8.1 (9.2 confirmatory duplicate) | - | <5.3 | - | <300 |
| Surface Water | Millers River Athol  (Background) | 6/20/2012 | <214 | <7.4 | <14.7 | <7.6 | <17.0 | <6.7 | - | <8.3 | - | <300 |
| Surface Water | Millers River Athol  (Background) | 8/28/2012 | <169 | <5.2 | <10.6 | <5.6 | <14.5 | <6.6 |  | <5.9 |  | <300 |
| Surface Water | Millers River Athol  (Background) | 11/28/2012 | <168 | <6.0 | <14.5 | <6.5 | <17.7 | <11.0 | - | <6.6 | - | <300 |
| Milk | Bernardston | 1/19/2012 | 1400 | - | - | - | - | <2.4 | <12.6 | <11.2 | <38.9 | - |
| Milk | Bernardston | 2/16/2012 | 1390 | - | - | - | - | <2.0 | <11.6 | <10.8 | <38.6 | - |
| Milk | Bernardston | 3/22/2012 | 1290 | - | - | - | - | <1.2 | <10.0 | <10.5 | <35.5 | - |
| Milk | Bernardston | 4/28/2012 | 1350 | - | - | - | - | <2.7 | <7.3 | <8.9 | <29.0 | - |
| Milk | Bernardston | 5/23/2012 | 1340 | - | - | - | - | <2.3 | <9.8 | <10.7 | <36.7 | - |
| Milk | Bernardston | 6/20/2012 | 1530 | - | - | - | - | <2.5 | <5.7 | <6.4 | <19.7 | - |
| Milk | Bernardston | 7/17/2012 | 1150 | - | - | - | - | <2.2 | <6.4 | <7.7 | <24.1 | - |
| Milk | Bernardston | 8/28/2012 | 1140 | - | - | - | - | <2.1 | <6.6 | <7.6 | <24.8 | - |
| Milk | Bernardston | 9/25/2012 | 1540 | - | - | - | - | <2.5 | <5.7 | <6.2 | <20.8 | - |
| Milk | Bernardston | 10/24/2012 | 1970 | - | - | - | - | <2.3 | <6.1 | <6.7 | <21.6 | - |
| Milk | Bernardston | 11/28/2012 | 1570 | - | - | - | - | <2.3 | <5.6 | <5.7 | <18.4 | - |
| Milk | Bernardston | 12/26/2012 | 1930 | - | - | - | - | <2.1 | <6.3 | <7.0 | <22.3 | - |

“-“ = not analyzed

“ND” = not detected

\* K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, I-131 = iodine-131, Cs-134 = Cesium-134, Cs-137 = Cesium-137, Ba-140 = barium-140, H-3 = tritium

Table 8. Vermont Yankee Nuclear Power Station 2012 Environmental Monitoring Data - Solid Matrix

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample Type | 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) | Pb-214\* (pCi/kg) |
| Elderberries | Northfield | 9/25/2012 | 198.0 | 6180 | <14.0 | <32.8 | <15.2 | <41.0 | <15.1 | <31.1 |
| Pumpkins | Northfield | 9/25/2012 | <54.9 | 4780 | <6.8 | <16.5 | <7.6 | <19.1 | <6.8 | <18.4 |
| Apples | Colrain (Background) | 10/10/2012 | <50.1 | 994 | <5.6 | <13.0 | <6.0 | <16.1 | <5.7 | 33.8 |
| Pasture Grass/ Silage | Bernardston | 10/24/2012 | 2880 | 6860 | <25.1 | <51.0 | <27.5 | <66.0 | <27.2 | 118 |
| Grass | Northfield Routes 5 & 10 | 4/18/2012 | 1580 | 6760 | <25.9 | <60.2 | <28.6 | - | <27.9 | 95.1 |
| Grass | Millers River Athol (Background) | 4/18/2012 | 753 | 9410 | <18.0 | <41.9 | <20.0 | - | <14.3 | 74.5 |
| Grass | Gill, CT River | 4/18/2012 | 517 | 11500 | <27.7 | <71.9 | <32.3 | - | <32.0 | <86.6 |
| Grass | Northfield, CT River | 4/18/2012 | <164 | 9840 | <30.6 | <67.8 | <32.0 | - | <31.1 | 215.0 |
| Grass | Millers River Athol (Background) | 9/25/2012 | 1190 | 5480 | <26.2 | <54.6 | <26.6 | - | <27.3 | 182.0 |
| Grass | Northfield Routes 5 & 10 | 9/25/2012 | 1110 | 8990 | <28.2 | <59.2 | <29.0 | - | <28.0 | 97.0 |
| Grass | Gill, CT River | 9/25/2012 | 2330 | 11400 | <24.7 | <54.1 | <27.1 | - | <25.4 | 89.4 |
| Grass | Northfield, CT River | 9/25/2012 | 2290 | 9650 | <31.1 | <71.4 | <34.2 | - | <21.4 | <75.0 |
| Sediment | Northfield, CT River | 4/18/2012 |  | 7260 | - | - | <28.5 | - | <32.6 | 448.0 |
| Sediment | Gill, CT River | 4/18/2012 | - | 10700 | - | - | <45.8 | - | 123.0 | 787.0 |
| Sediment | Athol, Millers River  (Background) | 4/18/2012 | - | 7550 | - | - | <28.4 | - | <23.9 | 535.0 |
| Sediment | Northfield, CT River | 8/28/2012 | - | 10200 | - | - | <58.3 | - | 56.8 | 533.0 |
| Sediment | Gill, CT River | 8/28/2012 | - | 8280 | - | - | <41.6 | - | <47.5 | 432.0 |
| Sediment | Athol, Millers River  (Background) | 8/28/2012 | - | 10300 | - | - | <56.9 | - | 93.6 | 698.0 |
| Fish (composite sample) | Athol, Millers River (Background) | 6/20/2012 | <1640 | 5530 | <105 | <432 | <108 | <283 | <114 | <255 |
| Fish (composite sample) | Gill/Northfield, CT River | 6/21/2012 | <1710 | 2630 | <122 | <441 | <105 | <298 | <117 | <244 |
| Fish (composite sample) | Athol, Millers River (Background) | 10/24/2012 | <997 | 5270 | <64.0 | <284 | <53.0 | <164 | <43.0 | <197 |
| Large Mouth Bass | Gill/Northfield, CT River | 10/25/2012 | <188 | 4050 | <13.0 | <71.0 | <12.0 | <39.0 | 9.7 | 52.0 |
| Fish (composite sample) | Gill/Northfield, CT River | 10/25/2012\*\* | <2560 | 8830 | <150 | <727 | <133 | <435 | <140 | <1260 |

“-“ = not analyzed

“ND” = not detected

\* Be-7 = Beryllium-7, K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65 , Cs-137 = Cesium-137, Pb-214 = Lead-214

\*\* Small sample size resulted in larger detection limits.Table 9. Vermont Yankee Nuclear Power Station 2012 Environmental Monitoring Data - Air Samples

| Sample Type | Location | Date | 1-131\*  (pCi/m3) | Be-7\* (pCi/m3) | K-40\* (pCi/m3) | Mn-54\* (pCi/m3) | Fe-59\* (pCi/m3) | Co-60\* (pCi/m3) | Zn-65\* (pCi/m3) | Cs-134\* (pCi/m3) | Cs-137 \* (pCi/m3) | Pb-214\* (pCi/m3) | Gross Alpha (pCi/m3) | Gross Beta (pCi/m3) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Air | Northfield Transfer Station | 12/4/2012 | <0.0709 | - | - | - | - | - | - | - | - | - | 0.00759 | 0.0361 |
| Air | Northfield Transfer Station | 12/12/2012 | <0.0528 | - | - | - | - | - | - | - | - | - | 0.00379 | 0.0180 |
| Air | Northfield Transfer Station (Quarterly Composite) | 12/15/2012 | - | 0.063 | <0.102 | <0.005 | <0.020 | <0.004 | <0.013 | - | <0.004 | 0.019 | - | - |
| Air | Northfield Transfer Station | 12/19/2012 | <0.0641 | - | - | - | - | - | - | - | - | - | 0.00418 | 0.0262 |
| Air | Northfield Transfer Station | 12/26/2012 | <0.0395 | - | - | - | - | - | - | - | - | - | 0.00308 | 0.0202 |
| Air | Northfield Transfer Station | 1/2/2013 | <0.0691 | - | - | - | - | - | - | - | - | - | 0.00483 | 0.0293 |
| Air | Background | 12/4/2012 | <0.0620 | - | - | - | - | - | - | - | - | - | 0.00573 | 0.0305 |
| Air | Background | 12/11/2012 | <0.0611 | - | - | - | - | - | - | - | - | - | 0.00495 | 0.0202 |
| Air | Background | 12/18/2012 | <0.0596 | - | - | - | - | - | - | - | - | - | 0.00529 | 0.0256 |
| Air | Background | 12/26/2012 | <0.0386 | - | - | - | - | - | - | - | - | - | 0.00311 | 0.0133 |
| Air | Background | 1/2/2013 | <0.0645 | - | - | - | - | - | - | - | - | - | 0.00471 | 0.0238 |

“-“ = not analyzed

“ND” = not detected

\* I-131 = iodine-131, Be-7 = Beryllium-7, K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, Cs-134 = Cesium-134, Cs-137, = Cesium-137, Pb-214 = Lead-214

Table 10. Pilgrim Nuclear Power Station 2013 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) | 1-131\* (pCi/L) | Cs-134\* (pCi/L) | Cs-137\* (pCi/L) | Ba-140\* (pCi/L) | H-3\* (pCi/L) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Surface Water | Powder Point Bridge (Background)1 | 1/29/2013 | 450 | <5.6 | <10.7 | <5.7 | <15.3 | <7.0 | - | <5.9 | - | - |
| Surface Water | Powder Point Bridge Quarterly Tritium Composite (Background) 1 | 2/15/2013 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Powder Point Bridge (Background)1 | 2/26/2013 | 539 | <6.3 | <12.6 | <6.2 | <17.9 | <7.2 | - | <6.4 | - | - |
| Surface Water | Powder Point Bridge (Background) 1 | 4/2/2013 | <184 | <6.6 | <14.5 | <6.5 | <17.0 | <12.1 | - | <6.9 | - | - |
| Surface Water | Powder Point Bridge (Background) 1 | 4/30/2013 | <293 | <6.2 | <14.5 | <6.6 | <16.5 | <11.9 | - | <6.6 | - | - |
| Surface Water | Powder Point Bridge Quarterly Tritium Composite (Background) 1 | 5/15/2013 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Powder Point Bridge (Background) 1 | 5/28/2013 | <292 | <6.7 | <15.8 | <6.4 | <17.7 | <14.6 | - | <7.0 | - | - |
| Surface Water | Powder Point Bridge (Background) 1 | 7/2/2013 | 823 | <6.0 | <13.1 | <6.4 | <16.2 | <11.0 | - | <6.6 | - | - |
| Surface Water | Powder Point Bridge (Background) 1 | 7/30/2013 | <293 | <6.3 | <14.4 | <6.9 | <17.0 | <8.3 | - | <7.0 | - | - |
| Surface Water | Powder Point Bridge Quarterly Tritium Composite (Background) 1 | 8/15/2013 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Powder Point Bridge (Background) 1 | 9/3/2013 | 347 | <6.8 | <14.5 | <7.1 | <18.0 | <8.8 | - | <7.3 | - | - |
| Surface Water | Powder Point Bridge (Background) 1 | 10/1/2013 | 837 | <6.1 | <14.4 | <6.4 | <15.9 | <14.5 | - | <6.4 | - | - |
| Surface Water | Powder Point Bridge (Background) 1 | 10/29/2013 | 392 | <5.3 | <9.8 | <5.0 | <13.1 | <5.5 | - | <5.0 | - | - |
| Surface Water | Powder Point Bridge Quarterly Tritium Composite (Background) 1 | 11/15/2013 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Powder Point Bridge (Background) 1 | 12/2/2013 | 324 | <7.6 | <16.3 | <7.5 | <20.2 | <16.0 | - | <7.8 | - | - |
| Surface Water | Powder Point Bridge (Background) 1 | 12/30/2013 | 331 | <5.4 | <12.1 | <5.6 | <16.3 | <12.7 | - | <5.7 | - | - |
| Surface Water | PNPS Discharge Canal | 1/29/2013 | <293 | <6.6 | <14.2 | <7.1 | <19.8 | <8.4 | - | <7.1 | - | - |
| Surface Water | PNPS Discharge Canal Quarterly Tritium Composite | 2/15/2013 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | PNPS Discharge Canal | 2/26/2013 | <292 | <6.5 | <13.8 | <7.3 | <19.9 | <7.7 | - | <7.4 | - | - |
| Surface Water | PNPS Discharge Canal | 4/2/2013 | 833 | <5.9 | <14.0 | <6.1 | <15.6 | <12.2 | - | <6.3 | - | - |
| Surface Water | PNPS Discharge Canal | 5/1/2013 | 886 | <5.8 | <13.1 | <6.1 | <15.0 | <10.9 | - | <6.4 | - | - |
| Surface Water | PNPS Discharge Canal Quarterly Tritium Composite | 5/15/2013 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | PNPS Discharge Canal | 5/28/2013 | 816 | <6.1 | <14.2 | <6.5 | <15.7 | <14.4 | - | <6.4 | - | - |
| Surface Water | PNPS Discharge Canal | 7/2/2013 | 888 | <6.2 | <12.5 | <6.4 | <15.4 | <8.6 | - | <6.5 | - | - |
| Surface Water | PNPS Discharge Canal | 7/30/2013 | 920 | <6.0 | <12.8 | <6.4 | <15.5 | <7.9 | - | <6.4 | - | - |
| Surface Water | PNPS Discharge Canal Quarterly Tritium Composite | 8/15/2013 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | PNPS Discharge Canal | 9/3/2013 | 903 | <6.1 | <12.4 | <6.3 | <15.1 | <8.0 | - | <6.5 | - | - |
| Surface Water | PNPS Discharge Canal | 10/1/2013 | 830 | <6.0 | <13.8 | <6.5 | <16.5 | <12.6 | - | <6.6 | - | - |
| Surface Water | PNPS Discharge Canal | 10/29/2013 | 802 | <5.8 | <11.9 | <6.1 | <14.9 | <6.8 | - | <6.1 | - | - |
| Surface Water | PNPS Discharge Canal Quarterly Tritium Composite | 11/15/2013 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | PNPS Discharge Canal | 12/2/2013 | 290 | <5.4 | <11.5 | <5.6 | <15.2 | <10.3 | - | <5.6 | - | - |
| Surface Water | PNPS Discharge Canal | 12/30/2013 | 298 | <6.1 | <13.8 | <6.2 | <18.2 | <14.2 | - | <6.6 | - | - |
| Milk | Duxbury | 1/15/2013 | 1910 | - | - | - | - | <2.0 | <6.4 | <7.0 | <22.7 | - |
| Milk | Duxbury | 2/5/2013 | 1940 | - | - | - | - | <2.4 | <6.5 | <7.2 | <22.6 | - |
| Milk | Duxbury | 3/5/2013 | 1920 | - | - | - | - | <2.3 | <6.4 | <7.2 | <22.2 | - |
| Milk | Duxbury | 4/2/2013 | 1930 | - | - | - | - | <2.4 | <6.2 | <7.0 | <22.2 | - |
| Milk | Duxbury | 5/7/2013 | 1890 | - | - | - | - | <2.3 | <5.8 | <6.7 | <21.4 | - |
| Milk | Duxbury | 6/4/2013 | 1990 | - | - | - | - | <2.3 | <6.0 | <7.0 | <21.7 | - |
| Milk | Duxbury | 7/2/2013 | 1960 | - | - | - | - | <2.4 | <5.9 | <6.9 | <22.0 | - |
| Milk | Duxbury | 8/6/2013 | 1980 | - | - | - | - | <2.4 | <6.0 | <6.9 | <22.0 | - |
| Milk | Duxbury | 9/10/2013 | 1930 | - | - | - | - | <2.7 | <6.0 | <6.9 | <21.4 | - |
| Milk | Duxbury | 10/1/2013 | 1430 | - | - | - | - | <2.6 | <5.7 | <5.9 | <18.8 | - |
| Milk | Duxbury | 11/5/2013 | 1840 | - | - | - | - | <2.7 | <6.2 | <6.7 | <21.6 | - |
| Milk | Duxbury | 12/3/2013 | 1230 | - | - | - | - | <2.8 | <6.5 | <7.0 | <20.8 | - |

1. Sample considered “background” for the purpose of monitoring required by federal regulations, but considered “indicator” by MDPH because it falls within the 10-mile EPZ.

“-“ = not analyzed

\* K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, I-131 = Iodine-131, Cs-134 = Cesium-134, Cs-137 = Cesium-137, Ba-140 = Barium-140, H-3 = Tritium

Table 11. Pilgrim Nuclear Power Station 2013 Environmental Monitoring Data - Solid Matrices

| Sample Type | 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) | 1-131\* (pCi/kg) | Cs-137\* (pCi/kg) | Pb-214\* (pCi/kg) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Chondrus | Brant Rock Marshfield (Background) 1 | 4/27/2013 | <116 | 7990 | <10.1 | <35.0 | <11.0 | <29.9 | <126.0 | <10.1 | - |
| Chondrus | PNPS – Discharge Canal | 5/22/2013 | <116 | 9690 | <17.1 | <36.6 | <13.9 | 43.8 | <17.1 | <18.2 | - |
| Chondrus | Brant Rock Marshfield (Background) 1 | 10/15/2013 | 133 | 5750 | <8.2 | <19.7 | <9.1 | <22.8 | <12.7 | <8.4 | - |
| Chondrus | PNPS – Discharge Canal | 10/16/2013 | 148 | 9110 | <18.5 | <42.1 | <20.4 | <52.8 | <21.4 | <19.7 | - |
| Clams | Duxbury Bay (Background) 1 | 4/27/2013 | <191 | 2610 | <15.5 | <61.4 | <16.2 | <49.1 | - | <15.5 | 119.0 |
| Mussels | Green Harbor Marshfield (Background) 1 | 4/27/2013 | <189 | 2020 | <15.5 | <63.6 | <15.3 | <47.7 | - | <16.2 | 62.1 |
| Clams | Plymouth Harbor (Background) 1 | 5/22/2013 | <98 | 2150 | <12.5 | <26.7 | <12.8 | <35.8 | - | <12.9 | 71.3 |
| Mussels | PNPS – Discharge Canal | 6/12/2013 | <70 | 2100 | <7.8 | <18.2 | <7.7 | <18.4 | - | <7.5 | <21.1 |
| Mussels | Green Harbor Marshfield (Background) 1 | 10/15/2013 | <239 | 1390 | <14.4 | <64.6 | <12.7 | <44.2 | - | <13.3 | 52.5 |
| Clams | Duxbury Bay (Background) 1 | 10/15/2013 | <262 | 2100 | <13.1 | <61.3 | <13.5 | <39.8 | - | <13.2 | 53.7 |
| Clams | Plymouth Harbor (Background) 1 | 10/24/2013 | <214 | 1900 | <11.6 | <48.1 | <12.3 | <37.7 | - | <12.9 | 83.3 |
| Mussels | PNPS – Discharge Canal | 11/7/2013 | <815 | 1420 | <61.0 | <205.0 | <56.7 | <167.0 | - | <61.9 | 688.0 |
| Winter Flounder | PNPS Discharge Canal | 4/25/2013 | <166 | 4240 | <13.1 | <58.6 | <14.0 | <38.9 | - | <13.7 | 60.3 |
| Winter Flounder | Cape Cod Bay (Background) 1 | 4/26/2013 | <474 | 2680 | <35.9 | <143.0 | <35.3 | <98.7 | - | <37.8 | 220.0 |
| Bluefish | BuzzardsBay (Background) 1 | 6/26/2013 | <99 | 5240 | <9.9 | <28.6 | <10.4 | <28.0 | - | <7.5 | 37.4 |
| Striped Bass | Buzzards Bay (Background) 1 | 6/27/2013 | <107 | 5260 | <12.2 | <37.0 | <12.6 | <34.9 | - | <12.5 | 50.0 |
| Striped Bass | PNPS – Discharge Canal | 7/15/2013 | <65 | 4490 | <6.9 | <19.1 | <7.5 | <19.3 | - | <4.6 | 35.3 |
| Bluefish | PNPS – Discharge Canal | 7/15/2013 | <72 | 4430 | <7.5 | <23.6 | <7.8 | <20.3 | - | 7.9 | <19.7 |
| Tautog | Buzzards Bay (Background) 1 | 9/27/2013 | <263 | 4950 | <15.1 | <85.7 | <14.7 | <45.5 | - | <14.2 | 102.0 |
| Tautog | PNPS Discharge Canal | 9/27/2013 | <260 | 5940 | <13.4 | <73.3 | <13.4 | <42.5 | - | <13.6 | 166.0 |
| Lobster | PNPS Discharge Canal | 6/20/2013 | <126 | 2760 | <13.1 | <40.2 | <13.4 | <37.2 | - | <13.5 | 110 |
| Lobster | Cape Cod Bay (Background) 1 | 7/25/2013 | <98 | 2420 | <12.5 | <30.2 | <13.8 | <35.4 | - | <13.4 | <44.8 |
| Sediment | Green Harbor (Background) 1 | 4/27/2013 | - | 7660 | - | - | <33.7 | - | - | <35.7 | 241 |
| Sediment | PNPS Discharge Canal | 5/22/2013 | - | 8500 | - | - | <32.0 | - | - | <30.6 | 135 |
| Sediment | Duxbury (Background) 1 | 10/15/2013 | - | 9720 | - | - | <34.6 | - | - | <34.7 | 462 |
| Sediment | Green Harbor (Background) 1 | 10/15/2013 | - | 9020 | - | - | <42.4 | - | - | <43.2 | 526 |
| Sediment | PNPS Discharge Canal | 10/16/2013 | - | 10400 | - | - | <35.2 | - | - | <35.3 | <91 |
| Snap Peas | Plymouth | 6/21/2013 | <69.5 | 2080 | <8.5 | <17.2 | <8.9 | <20.7 | - | <8.9 | 30.6 |
| Snap Peas | Kingston | 6/25/2013 | <59.6 | 2590 | <7.3 | <15.5 | <8.0 | <19.3 | - | <7.7 | <21.9 |
| Lettuce/Boc Choi | Brookline (Background) | 7/1/2013 | 80.1 | 2550 | <6.7 | <14.3 | <7.3 | <17.5 | - | <6.9 | 26.9 |
| Tomatoes | Plymouth | 8/21/2013 | <110.0 | 2920 | <13.7 | <29.2 | <15.7 | <37.0 | - | <14.7 | <34.3 |
| Tomatoes | Kingston | 8/27/2013 | <49.3 | 2540 | <6.3 | <13.3 | <6.9 | <16.7 | - | <6.8 | <18.6 |
| Tomatoes | Brookline (Background) | 8/29/2013 | <50.0 | 2850 | <6.3 | <13.4 | <6.9 | <16.3 | - | <6.8 | <14.9 |
| Tomatillos | Taunton | 9/22/2013 | <34.9 | 2580 | <5.8 | <13.7 | <6.9 | <16.1 | - | <6.0 | 23.8 |
| Corn | Bridgewater | 9/20/2013 | <109.0 | 3050 | <12.7 | <30.6 | <12.8 | <33.0 | - | <12.5 | <27.2 |
| Tomatoes | Bridgewater | 9/20/2013 | <48.4 | 1930 | <5.6 | <14.7 | <6.0 | <15.0 | - | <5.7 | <11.5 |
| Cranberries | East Taunton (Background) | 9/30/2013 | <53.5 | 812 | <7.1 | <16.8 | <8.2 | <21.1 | - | <8.0 | 21.9 |
| Tomatoes | Plymouth | 9/27/2013 | <73.3 | 2310 | <8.6 | <19.7 | <9.5 | <23.1 | - | <8.8 | 23.5 |
| Cucumbers | Plymouth | 9/27/2013 | <47.2 | 1710 | <5.5 | <12.6 | <6.2 | <15.4 | - | <5.9 | 16.5 |
| Butternut Squash | Plymouth | 9/27/2013 | <52.0 | 2300 | <6.0 | <14.9 | <7.0 | <17.3 | - | <6.1 | 26.1 |
| Pumpkins | Plymouth | 9/27/2013 | <50.5 | 2810 | <6.1 | <16.3 | <6.2 | <16.4 | - | <5.9 | 22.3 |
| Pumpkin Leaves | Plymouth | 9/27/2013 | 493.0 | 4840 | <9.0 | <24.0 | <9.8 | <26.5 | - | <9.2 | 40.2 |
| Cranberries | Kingston | 10/3/2013 | <140.0 | 777 | <13.7 | <34.5 | <13.2 | <34.4 | - | <13.6 | <33.1 |
| Cranberries | Plymouth | 10/8/2013 | 29.8 | 567 | <3.8 | <9.7 | <4.6 | <11.0 | - | <4.1 | 20.0 |

1. Sample considered “background” for the purpose of monitoring required by federal regulations, but considered “indicator” by MDPH because it falls within the 10-mile EPZ.

“-“ = not analyzed

\* Be-7 = Beryllium 7, K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, I-131 = Iodine-131, Cs-137 = Cesium-137, Pb-214 – Lead-214

Table 12. Pilgrim Nuclear Power Station 2013 Environmental Monitoring Data - Air Samples

| Sample Type | Location | Date | 1-131\*  (pCi/m3) | Be-7\* (pCi/m3) | K-40\* (pCi/m3) | Mn-54\* (pCi/m3) | Fe-59\* (pCi/m3) | Co-60\* (pCi/m3) | Zn-65\* (pCi/m3) | Cs-137 \* (pCi/m3) | Pb-214\* (pCi/m3) | Gross Alpha (pCi/m3) | Gross Beta (pCi/m3) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Air | Pilgrim Station | 1/8/2013 | <0.0497 | - | - | - | - | - | - | - | - | 0.01200 | 0.0413 |
| Air | Pilgrim Station | 1/15/2013 | <0.0373 | - | - | - | - | - | - | - | - | 0.00583 | 0.0216 |
| Air | Pilgrim Station | 1/22/2013 | <0.0601 | - | - | - | - | - | - | - | - | 0.00359 | 0.0172 |
| Air | Pilgrim Station | 1/29/2013 | <0.0594 | - | - | - | - | - | - | - | - | 0.00432 | 0.0199 |
| Air | Pilgrim Station | 2/5/2013 | <0.0406 | - | - | - | - | - | - | - | - | 0.00322 | 0.0170 |
| Air | Pilgrim Station | 2/12/2013 | <0.0633 | - | - | - | - | - | - | - | - | 0.00300 | 0.0148 |
| Air | Pilgrim Station | 2/19/2013 | <0.0410 | - | - | - | - | - | - | - | - | 0.00329 | 0.0171 |
| Air | Pilgrim Station | 2/26/2013 | <0.0722 | - | - | - | - | - | - | - | - | 0.00179 | 0.0160 |
| Air | Pilgrim Station | 3/5/2013 | <0.0406 | - | - | - | - | - | - | - | - | 0.00181 | 0.0201 |
| Air | Pilgrim Station | 3/12/2013 | <0.0605 | - | - | - | - | - | - | - | - | 0.00153 | 0.0174 |
| Air | Pilgrim Station | 3/20/2013 | <0.0418 | - | - | - | - | - | - | - | - | 0.00222 | 0.0151 |
| Air | Pilgrim Station | 3/26/2013 | <0.1150 | - | - | - | - | - | - | - | - | <0.00220 | 0.0179 |
| Air | Pilgrim Station | 4/2/2013 | <0.0411 | - | - | - | - | - | - | - | - | <0.00135 | 0.0121 |
| Air | Pilgrim Station  Quarterly Filter Composite | 2/15/2013 | - | <0.085 | <0.064 | <0.030 | <0.028 | <0.003 | <0.009 | <0.003 | <0.006 | - | - |
| Air | Pilgrim Station | 4/9/2013 | <0.0639 | - | - | - | - | - | - | - | - | 0.00562 | 0.0252 |
| Air | Pilgrim Station | 4/17/2013 | <0.0352 | - | - | - | - | - | - | - | - | 0.00240 | <0.00146 |
| Air | Pilgrim Station | 4/23/2013 | <0.0410 | - | - | - | - | - | - | - | - | 0.00428 | 0.0209 |
| Air | Pilgrim Station | 4/30/2013 | <0.6400 | - | - | - | - | - | - | - | - | <0.01960 | 0.0978 |
| Air | Pilgrim Station | 5/7/2013 | <0.0404 | - | - | - | - | - | - | - | - | 0.00215 | 0.0188 |
| Air | Pilgrim Station | 5/14/2013 | <0.0436 | - | - | - | - | - | - | - | - | <0.00194 | 0.0134 |
| Air | Pilgrim Station | 5/21/2013 | <0.0387 | - | - | - | - | - | - | - | - | 0.00232 | 0.0188 |
| Air | Pilgrim Station | 5/28/2013 | <0.0394 | - | - | - | - | - | - | - | - | <0.00186 | 0.0106 |
| Air | Pilgrim Station | 6/4/2013 | <0.0363 | - | - | - | - | - | - | - | - | 0.00290 | 0.0240 |
| Air | Pilgrim Station | 6/11/2013 | <0.0367 | - | - | - | - | - | - | - | - | <0.00171 | 0.0110 |
| Air | Pilgrim Station | 6/18/2013 | <0.0411 | - | - | - | - | - | - | - | - | <0.00176 | 0.0191 |
| Air | Pilgrim Station | 6/25/2013 | <0.0374 | - | - | - | - | - | - | - | - | <0.00180 | 0.0119 |
| Air | Pilgrim Station | 7/2/2013 | <0.0377 | - | - | - | - | - | - | - | - | <0.00181 | 0.0142 |
| Air | Pilgrim Station Quarterly Filter Composite | 5/15/2013 | - | 0.097 | <0.067 | <0.003 | <0.016 | <0.003 | <0.008 | <0.003 | 0.013 | - | - |
| Air | Pilgrim Station | 7/9/2013 | <0.0364 | - | - | - | - | - | - | - | - | 0.00364 | 0.0152 |
| Air | Pilgrim Station | 7/16/2013 | <0.0375 | - | - | - | - | - | - | - | - | 0.00258 | 0.0169 |
| Air | Pilgrim Station | 7/23/2013 | <0.0403 | - | - | - | - | - | - | - | - | 0.00280 | 0.0195 |
| Air | Pilgrim Station | 7/30/2013 | <0.0381 | - | - | - | - | - | - | - | - | 0.00344 | 0.0186 |
| Air | Pilgrim Station | 8/6/2013 | <0.0410 | - | - | - | - | - | - | - | - | 0.00183 | 0.0127 |
| Air | Pilgrim Station | 8/13/2013 | <0.0343 | - | - | - | - | - | - | - | - | 0.00235 | 0.0170 |
| Air | Pilgrim Station | 8/20/2013 | <0.0398 | - | - | - | - | - | - | - | - | 0.00378 | 0.0243 |
| Air | Pilgrim Station | 8/27/2013 | <0.0434 | - | - | - | - | - | - | - | - | 0.00276 | 0.0249 |
| Air | Pilgrim Station | 9/3/2013 | <0.0433 | - | - | - | - | - | - | - | - | 0.00423 | 0.0273 |
| Air | Pilgrim Station | 9/10/2013 | <0.0402 | - | - | - | - | - | - | - | - | 0.00210 | 0.0181 |
| Air | Pilgrim Station | 9/17/2013 | <0.0391 | - | - | - | - | - | - | - | - | <0.00151 | 0.0239 |
| Air | Pilgrim Station | 9/24/2013 | <0.0438 | - | - | - | - | - | - | - | - | <0.00163 | 0.0160 |
| Air | Pilgrim Station | 10/1/2013 | <0.0460 | - | - | - | - | - | - | - | - | <0.00165 | 0.0145 |
| Air | Pilgrim Station Quarterly Filter Composite | 8/15/2013 | - | 0.096 | <0.064 | <0.003 | <0.015 | <0.003 | <0.007 | <0.002 | <0.005 | - | - |
| Air | Pilgrim Station | 10/8/2013 | <0.0439 | - | - | - | - | - | - | - | - | 0.00621 | 0.0256 |
| Air | Pilgrim Station | 10/16/2013 | <0.0391 | - | - | - | - | - | - | - | - | 0.00551 | 0.0191 |
| Air | Pilgrim Station | 10/22/2013 | <0.0562 | - | - | - | - | - | - | - | - | 0.00458 | 0.0247 |
| Air | Pilgrim Station | 10/29/2013 | <0.0451 | - | - | - | - | - | - | - | - | 0.00306 | 0.0174 |
| Air | Pilgrim Station | 11/5/2013 | <0.0456 | - | - | - | - | - | - | - | - | <0.00262 | 0.0187 |
| Air | Pilgrim Station | 11/12/2013 | <0.0468 | - | - | - | - | - | - | - | - | <0.00258 | 0.0160 |
| Air | Pilgrim Station | 11/19/2013 | <0.0475 | - | - | - | - | - | - | - | - | 0.00386 | 0.0237 |
| Air | Pilgrim Station | 11/26/2013 | <0.0496 | - | - | - | - | - | - | - | - | <0.00270 | 0.0154 |
| Air | Pilgrim Station | 12/3/2013 | <0.0315 | - | - | - | - | - | - | - | - | <0.00280 | 0.0173 |
| Air | Pilgrim Station | 12/10/2013 | <0.0436 | - | - | - | - | - | - | - | - | 0.00422 | 0.0282 |
| Air | Pilgrim Station | 12/17/2013 | <0.0516 | - | - | - | - | - | - | - | - | 0.00462 | 0.0278 |
| Air | Pilgrim Station | 12/24/2013 | <0.0381 | - | - | - | - | - | - | - | - | 0.00384 | 0.0305 |
| Air | Pilgrim Station | 12/31/2013 | <0.0417 | - | - | - | - | - | - | - | - | <0.00276 | 0.0197 |
| Air | Pilgrim Station Quarterly Filter Composite | 11/15/2013 | - | <0.098 | 0.076 | <0.003 | <0.044 | <0.002 | <0.008 | <0.002 | <0.005 | - | - |
| Air | Background | 1/8/2013 | <0.0745 | - | - | - | - | - | - | - | - | 0.00511 | 0.0250 |
| Air | Background | 1/15/2013 | <0.0618 | - | - | - | - | - | - | - | - | 0.00794 | 0.0259 |
| Air | Background | 1/22/2013 | <0.0645 | - | - | - | - | - | - | - | - | 0.00328 | 0.0166 |
| Air | Background | 1/29/2013 | <0.0671 | - | - | - | - | - | - | - | - | 0.00322 | 0.0183 |
| Air | Background | 2/5/2013 | <0.0443 | - | - | - | - | - | - | - | - | 0.00366 | 0.0168 |
| Air | Background | 2/12/2013 | <0.0438 | - | - | - | - | - | - | - | - | 0.00248 | 0.0184 |
| Air | Background | 2/19/2013 | <0.0419 | - | - | - | - | - | - | - | - | 0.00354 | 0.0161 |
| Air | Background | 2/26/2013 | <0.0742 | - | - | - | - | - | - | - | - | 0.00171 | 0.0119 |
| Air | Background | 3/5/2013 | <0.0690 | - | - | - | - | - | - | - | - | <0.00153 | 0.0127 |
| Air | Background | 3/12/2013 | <0.0442 | - | - | - | - | - | - | - | - | <0.00154 | 0.0130 |
| Air | Background | 3/19/2013 | <0.0450 | - | - | - | - | - | - | - | - | 0.00232 | 0.0155 |
| Air | Background | 3/26/2013 | <0.0421 | - | - | - | - | - | - | - | - | 0.00161 | 0.0167 |
| Air | Background | 4/2/2013 | <0.0725 | - | - | - | - | - | - | - | - | <0.00144 | 0.0108 |
| Air | Background Quarterly Composite | 2/15/2013 | - | <0.082 | <0.067 | <0.003 | <0.027 | <0.003 | <0.009 | <0.003 | <0.006 | - | - |
| Air | Background | 4/9/2013 | <0.0408 | - | - | - | - | - | - | - | - | 0.00531 | 0.0287 |
| Air | Background | 4/16/2013 | <0.0431 | - | - | - | - | - | - | - | - | 0.00374 | 0.0124 |
| Air | Background | 4/23/2013 | <0.0693 | - | - | - | - | - | - | - | - | 0.00401 | 0.0200 |
| Air | Background | 4/30/2013 | <0.0657 | - | - | - | - | - | - | - | - | 0.00245 | 0.0146 |
| Air | Background | 5/7/2013 | <0.0462 | - | - | - | - | - | - | - | - | 0.00235 | 0.0174 |
| Air | Background | 5/14/2013 | <0.0441 | - | - | - | - | - | - | - | - | <0.00209 | 0.0136 |
| Air | Background | 5/21/2013 | <0.0421 | - | - | - | - | - | - | - | - | <0.00206 | 0.0133 |
| Air | Background | 5/28/2013 | <0.0480 | - | - | - | - | - | - | - | - | <0.00205 | 0.0084 |
| Air | Background | 6/4/2013 | <0.0458 | - | - | - | - | - | - | - | - | 0.00208 | 0.0165 |
| Air | Background | 6/11/2013 | <0.0411 | - | - | - | - | - | - | - | - | <0.00210 | 0.0126 |
| Air | Background | 6/18/2013 | <0.0398 | - | - | - | - | - | - | - | - | 0.00222 | 0.0209 |
| Air | Background | 6/25/2013 | <0.0422 | - | - | - | - | - | - | - | - | <0.00208 | 0.0162 |
| Air | Background | 7/2/2013 | <0.0458 | - | - | - | - | - | - | - | - | <0.00205 | 0.0233 |
| Air | Background Quarterly Composite | 5/15/2013 | - | 0.074 | <0.069 | <0.003 | <0.015 | <0.003 | <0.009 | <0.028 | 0.010 | - | - |
| Air | Background | 7/9/2013 | <0.0442 | - | - | - | - | - | - | - | - | 0.00273 | 0.0150 |
| Air | Background | 7/16/2013 | <0.0427 | - | - | - | - | - | - | - | - | 0.00401 | 0.0247 |
| Air | Background | 7/23/2013 | <0.0441 | - | - | - | - | - | - | - | - | 0.00479 | 0.0208 |
| Air | Background | 7/29/2013 | <0.0462 | - | - | - | - | - | - | - | - | 0.00287 | 0.0184 |
| Air | Background | 8/6/2013 | <0.0342 | - | - | - | - | - | - | - | - | 0.00341 | 0.0210 |
| Air | Background | 8/13/2013 | <0.0372 | - | - | - | - | - | - | - | - | 0.00250 | 0.0152 |
| Air | Background | 8/20/2013 | <0.0401 | - | - | - | - | - | - | - | - | 0.00406 | 0.0228 |
| Air | Background | 8/27/2013 | <0.0388 | - | - | - | - | - | - | - | - | 0.00353 | 0.0265 |
| Air | Background | 9/3/2013 | <0.0401 | - | - | - | - | - | - | - | - | 0.00351 | 0.0286 |
| Air | Background | 9/10/2013 | <0.0488 | - | - | - | - | - | - | - | - | <0.00156 | 0.0181 |
| Air | Background | 9/17/2013 | <0.0445 | - | - | - | - | - | - | - | - | 0.00217 | 0.0292 |
| Air | Background | 9/24/2013 | <0.0387 | - | - | - | - | - | - | - | - | <0.00157 | 0.0149 |
| Air | Background | 10/1/2013 | <0.0411 | - | - | - | - | - | - | - | - | <0.00155 | 0.0154 |
| Air | Background Quarterly Composite | 8/15/2013 | - | 0.087 | <0.070 | <0.002 | <0.011 | <0.002 | <0.005 | <0.002 | <0.004 | - | - |
| Air | Background | 10/8/2013 | <0.0417 | - | - | - | - | - | - | - | - | 0.00887 | 0.0255 |
| Air | Background | 10/15/2013 | <0.0403 | - | - | - | - | - | - | - | - | 0.00424 | 0.0175 |
| Air | Background | 10/22/2013 | <0.0406 | - | - | - | - | - | - | - | - | 0.00760 | 0.0244 |
| Air | Background | 10/29/2013 | <0.0420 | - | - | - | - | - | - | - | - | <0.00239 | 0.0161 |
| Air | Background | 11/5/2013 | <0.0406 | - | - | - | - | - | - | - | - | 0.00555 | 0.0217 |
| Air | Background | 11/12/2013 | <0.0306 | - | - | - | - | - | - | - | - | 0.00339 | 0.0165 |
| Air | Background | 11/19/2013 | <0.0428 | - | - | - | - | - | - | - | - | <0.00243 | 0.0177 |
| Air | Background | 11/26/2013 | <0.0303 | - | - | - | - | - | - | - | - | <0.00243 | 0.0131 |
| Air | Background | 12/3/2013 | <0.0257 | - | - | - | - | - | - | - | - | <0.00241 | 0.0139 |
| Air | Background | 12/10/2013 | <0.0339 | - | - | - | - | - | - | - | - | 0.00444 | 0.0293 |
| Air | Background | 12/17/2013 | <0.0358 | - | - | - | - | - | - | - | - | 0.00370 | 0.0269 |
| Air | Background | 12/24/2013 | <0.0461 | - | - | - | - | - | - | - | - | 0.00321 | 0.0235 |
| Air | Background | 12/31/2014 | <0.0368 | - | - | - | - | - | - | - | - | 0.00353 | 0.0289 |
| Air | Background Quarterly Composite | 11/15/2013 | - | 0.086 | <0.040 | <0.002 | <0.032 | <0.002 | <0.006 | <0.001 | <0.003 | - | - |

“-“ = not analyzed

\* I-131 = Iodine-131, Be-7 = Beryllium-7, K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, Cs-134 = Cesium-134, Cs-137, = Cesium-137, Pb-214 = Lead-214

Table 13. Seabrook Nuclear Power Station 2013 Environmental Monitoring Data - Liquid Matrix

| Sample Type | Location | Date | K-40\* (pCi/L) | Mn-54\* (pCi/L) | Fe-59\* (pCi/L) | Co-60\* (pCi/L) | Zn-65\* (pCi/L) | 1-131\* (pCi/L) | Cs-134\* (pCi/L) | Cs-137\* (pCi/L) | Ba-140\* (pCi/L) | H-3\* (pCi/L) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Surface Water | Ipswich Bay (Background) | 1/29/2013 | 900 | <6.4 | <13.8 | <6.7 | <17.3 | <10.5 | - | <6.6 | - | - |
| Surface Water | Ipswich Bay (Background) Quarterly Composite | 2/15/2013 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Ipswich Bay (Background) | 2/19/2013 | 578 | <6.5 | <14.3 | <6.9 | <21.8 | <11.0 | - | <6.6 | - | - |
| Surface Water | Ipswich Bay (Background) | 3/21/2013 | 756 | <6.4 | <14.5 | <6.1 | <17.1 | <16.3 | - | <6.7 | - | - |
| Surface Water | Ipswich Bay (Background) | 4/16/2013 | 762 | <5.8 | <12.2 | <6.2 | <15.1 | <7.2 | - | <6.5 | - | - |
| Surface Water | Ipswich Bay (Background) Quarterly Composite | 5/15/2013 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Ipswich Bay (Background) | 5/21/2013 | <283 | <5.5 | <13.0 | <5.6 | <14.4 | <12.3 | - | <5.7 | - | - |
| Surface Water | Ipswich Bay (Background) | 6/18/2013 | 759 | <5.9 | <12.3 | <6.2 | <15.7 | <7.3 | - | <6.4 | - | - |
| Surface Water | Ipswich Bay (Background) | 7/16/2013 | 779 | <6.4 | <13.1 | <6.2 | <16.3 | <10.3 | - | <6.7 | - | - |
| Surface Water | Ipswich Bay (Background) Quarterly Composite | 8/15/2013 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Ipswich Bay (Background) | 8/19/2013 | 834 | <6.1 | <12.6 | <6.2 | <15.2 | <8.4 | - | <6.4 | - | - |
| Surface Water | Ipswich Bay (Background) | 9/18/2013 | <292 | <6.7 | <15.1 | <7.3 | <16.9 | <10.7 | - | <7.0 | - | - |
| Surface Water | Ipswich Bay (Background) | 10/21/2013 | 382 | <5.2 | <10.4 | <5.5 | <13.3 | <6.3 | - | <5.2 | - | - |
| Surface Water | Ipswich Bay (Background) Quarterly Composite | 11/15/2013 | - | - | - | - | - | - | - | - | - | <300 |
| Surface Water | Ipswich Bay (Background) | 11/15/2013 | 383 | <7.2 | <15.4 | <7.3 | <19.9 | <11.0 | - | <7.5 | - | - |
| Surface Water | Ipswich Bay (Background) | 12/11/2013 | 276 | <5.3 | <11.6 | <5.8 | <16.4 | <11.2 | - | <5.5 | - | - |
| Milk | Rowley (Background) | 1/2/2013 | 2060 | - | - | - | - | <2.4 | <6.4 | <7.0 | <22.8 | - |
| Milk | Rowley (Background) | 2/6/2013 | 2090 | - | - | - | - | <2.4 | <6.5 | <6.8 | <22.9 | - |
| Milk | Rowley (Background) | 3/6/2013 | 2000 | - | - | - | - | <2.4 | <6.3 | <7.0 | <22.4 | - |
| Milk | Rowley (Background) | 4/3/2013 | 2030 | - | - | - | - | <2.3 | <6.2 | <7.0 | <22.2 | - |
| Milk | Rowley (Background) | 5/1/2013 | 2050 | - | - | - | - | <2.3 | <5.7 | <6.3 | <23.3 | - |
| Milk | Rowley (Background) | 6/5/2013 | 2110 | - | - | - | - | <2.3 | <5.9 | <6.5 | <22.1 | - |
| Milk | Rowley (Background) | 7/3/2013 | 2080 | - | - | - | - | <2.4 | <6.0 | <6.6 | <22.7 | - |
| Milk | Rowley (Background) | 8/7/2013 | 2080 | - | - | - | - | <2.5 | <5.9 | <6.8 | <22.5 | - |
| Milk | Rowley (Background) | 9/4/2013 | 2090 | - | - | - | - | <2.6 | <5.9 | <6.5 | <21.9 | - |
| Milk | Rowley (Background) | 10/2/2013 | 1530 | - | - | - | - | <2.6 | <5.9 | <5.5 | <18.8 | - |
| Milk | Rowley (Background) | 11/6/2013 | 1910 | - | - | - | - | <2.7 | <5.8 | <6.3 | <21.3 | - |
| Milk | Rowley (Background) | 12/4/2013 | 1450 | - | - | - | - | <6.6 | <6.1 | <5.7 | <18.9 | - |

“-“ = not analyzed

\* K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, I-131 = Iodine-131, Cs-134 = Cesium-134, Cs-137 = Cesium-137, Ba-140 = Barium-140, H-3 = Tritium

Table 14. Seabrook Nuclear Power Station 2013 Environmental Monitoring Data - Solid Matrix

| Sample Type | 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) | 1-131\* (pCi/kg) | Cs-137\* (pCi/kg) | Pb-214\* (pCi/kg) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Chondrus | Ipswich Bay (Background) | 5/21/2013 | 94 | 10500 | <10.4 | <28.3 | <12.0 | <33.1 | 21.1 | <10.7 | - |
| Chondrus | Ipswich Bay (Background) | 11/21/2013 | 264 | 6670 | <10.4 | <25.2 | <11.6 | <29.7 | <14.2 | <10.5 | - |
| Winter Flounder | Ipswich Bay (Background) | 5/21/2013 | <186 | 4370 | <15.6 | <69.8 | <15.4 | <48.1 | - | <15.0 | 73.2 |
| Winter Flounder | Ipswich Bay (Background) | 8/19/2013 | <149 | 5150 | <16.5 | <41.0 | <17.9 | <45.8 | - | <17.3 | 84.7 |
| Skate fish | Ipswich Bay (Background) | 11/21/2013 | <1580 | 2730 | <140.0 | <426.0 | <138.0 | <401.0 | - | <143.0 | 1230 |
| Lobster | Ipswich Bay (Background) | 5/24/2013 | <74 | 2900 | <7.0 | <20.4 | <7.4 | <18.8 | - | <7.2 | <19.7 |
| Lobster | Ipswich Bay (Background) | 11/14/2013 | <65 | 2100 | <6.2 | <20.8 | <6.6 | <17.5 | - | <6.1 | 40.6 |
| Mytilus | Ipswich Bay (Background) | 5/20/2013 | <79 | 2470 | <7.5 | <20.7 | <7.9 | <19.5 | - | <7.6 | <21.6 |
| Modiolus | Ipswich Bay (Background) | 5/21/2013 | <161 | 1850 | <14.2 | <52.2 | <14.0 | <36.8 | - | <14.0 | 52.8 |
| Modiolus | Ipswich Bay (Background) | 11/21/2013 | <126 | 1640 | <11.0 | <34.0 | <11.8 | <35.3 | - | <11.3 | 59.7 |
| Mytilus | Ipswich Bay (Background) | 11/22/2013 | <86 | 1690 | <7.9 | <23.5 | <7.6 | <25.2 | - | <8.1 | 42.3 |
| Sediment (Beach) | Ipswich (Background) | 5/20/2013 | - | 16600 | - | - | <49.2 | - | - | <46.1 | 228 |
| Sediment (Beach) | Ipswich (Background) | 5/20/2013 | - | 13700 | - | - | <42.7 | - | - | <41.8 | 173 |
| Sediment (Beach) | Ipswich (Background) | 5/20/2013 | - | 13100 | - | - | <45.4 | - | - | <45.4 | 190 |
| Sediment (Subtidal) | Ipswich (Background) | 5/21/2013 | - | 10900 | - | - | <56.2 | - | - | <62.1 | 2020 |
| Sediment (Subtidal) | Ipswich (Background) | 5/21/2013 | - | 12000 | - | - | <53.8 | - | - | <55.1 | 784 |
| Sediment (Subtidal) | Ipswich (Background) | 5/21/2013 | - | 11200 | - | - | <48.3 | - | - | <48.9 | 650 |
| Sediment (Subtidal) | Ipswich (Background) | 11/21/2013 | - | 12600 | - | - | <62.9 | - | - | <69.9 | 2150 |
| Sediment (Subtidal) | Ipswich (Background) | 11/21/2013 | - | 12400 | - | - | <41.8 | - | - | <43.2 | 808 |
| Sediment (Subtidal) | Ipswich (Background) | 11/21/2013 | - | 12200 | - | - | <39.6 | - | - | <40.8 | 753 |
| Sediment (Beach) | Ipswich (Background) | 11/22/2013 | - | 14100 | - | - | <34.5 | - | - | <32.6 | 296 |
| Sediment (Beach) | Ipswich (Background) | 11/22/2013 | - | 14300 | - | - | <38.0 | - | - | <40.0 | 278 |
| Sediment (Beach) | Ipswich (Background) | 11/22/2013 | - | 14600 | - | - | <36.3 | - | - | <33.9 | 150 |
| Strawberries | Ipswich (Background) | 6/25/2013 | <53.7 | 1320 | <7.0 | <15.7 | <7.8 | <20.1 | - | <7.7 | 65.6 |
| Strawberries | Salisbury | 6/25/2013 | <55.4 | 2020 | <6.8 | <14.3 | <7.4 | <18.3 | - | <7.1 | 32.6 |
| Green Beans | Salisbury | 7/25/2013 | <6.2 | 3050 | <7.7 | <16.7 | <8.5 | <20.3 | - | <8.1 | 24.3 |
| Green Beans | Ipswich (Background) | 7/25/2013 | <61.8 | 2390 | <8.3 | <19.3 | <8.8 | <23.4 | - | <9.1 | 59.8 |
| Green Beans | Ipswich (Background) | 8/21/2013 | <56.3 | 2520 | <7.0 | <14.9 | <7.5 | <18.3 | - | <7.4 | <19.4 |
| Swiss Chard | Salisbury | 8/21/2013 | 57.6 | 3860 | <7.9 | <17.0 | <8.9 | <21.7 | - | <8.6 | 27.1 |

“-“ = not analyzed

\* Be-7 = Beryllium-7, K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, I-131 = Iodine-131, Cs-137 = Cesium-137, Pb-214 – Lead-214

Table 15. Seabrook Nuclear Power Station 2013 Environmental Monitoring Data - Air Samples

| Sample Type | Location | Date | 1-131\*  (pCi/m3) | Be-7\* (pCi/m3) | K-40\* (pCi/m3) | Mn-54\* (pCi/m3) | Fe-59\* (pCi/m3) | Co-60\* (pCi/m3) | Zn-65\* (pCi/m3) | Cs-137 \* (pCi/m3) | Pb-214\* (pCi/m3) | Gross Alpha (pCi/m3) | Gross Beta (pCi/m3) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Air | Salisbury Fire Station | 1/9/2013 | <0.0724 | - | - | - | - | - | - | - | - | 0.00518 | 0.0300 |
| Air | Salisbury Fire Station | 1/16/2013 | <0.0529 | - | - | - | - | - | - | - | - | 0.00727 | 0.0281 |
| Air | Salisbury Fire Station | 1/23/2013 | <0.0695 | - | - | - | - | - | - | - | - | 0.00462 | 0.0181 |
| Air | Salisbury Fire Station | 1/30/2013 | <0.0514 | - | - | - | - | - | - | - | - | 0.00425 | 0.0233 |
| Air | Salisbury Fire Station | 2/6/2013 | <0.0870 | - | - | - | - | - | - | - | - | 0.00509 | 0.0256 |
| Air | Salisbury Fire Station | 2/13/2013 | <0.0854 | - | - | - | - | - | - | - | - | 0.00256 | 0.0190 |
| Air | Salisbury Fire Station | 2/20/2013 | <0.0771 | - | - | - | - | - | - | - | - | 0.00385 | 0.0221 |
| Air | Salisbury Fire Station | 2/27/2013 | <0.0515 | - | - | - | - | - | - | - | - | <0.00171 | 0.0119 |
| Air | Salisbury Fire Station | 3/6/2013 | <0.0816 | - | - | - | - | - | - | - | - | 0.00221 | 0.0111 |
| Air | Salisbury Fire Station | 3/13/2013 | <0.0529 | - | - | - | - | - | - | - | - | <0.00171 | 0.0153 |
| Air | Salisbury Fire Station | 3/20/2013 | <0.0844 | - | - | - | - | - | - | - | - | 0.00273 | 0.0158 |
| Air | Salisbury Fire Station | 3/27/2013 | <0.0796 | - | - | - | - | - | - | - | - | 0.00231 | 0.0162 |
| Air | Salisbury Fire Station | 4/3/2013 | <0.0818 | - | - | - | - | - | - | - | - | <0.00175 | 0.0136 |
| Air | Salisbury Fire Station (Quarterly Composite) | 2/15/2013 | - | <0.083 | <0.077 | <0.004 | <0.034 | <0.003 | <0.010 | <0.003 | <0.006 | - | - |
| Air | Salisbury Fire Station | 4/10/2013 | <0.0518 | - | - | - | - | - | - | - | - | 0.00540 | 0.0231 |
| Air | Salisbury Fire Station | 4/17/2013 | <0.0472 | - | - | - | - | - | - | - | - | <0.00236 | 0.0153 |
| Air | Salisbury Fire Station | 4/24/2013 | <0.0452 | - | - | - | - | - | - | - | - | <0.00221 | 0.0148 |
| Air | Salisbury Fire Station | 5/1/2013 | <0.0448 | - | - | - | - | - | - | - | - | 0.00254 | 0.0219 |
| Air | Salisbury Fire Station | 5/8/2013 | <0.0481 | - | - | - | - | - | - | - | - | <0.00209 | 0.0171 |
| Air | Salisbury Fire Station | 5/15/2013 | <0.0474 | - | - | - | - | - | - | - | - | <0.002190 | 0.0154 |
| Air | Salisbury Fire Station | 5/22/2013 | <0.0683 | - | - | - | - | - | - | - | - | <0.00230 | 0.0155 |
| Air | Salisbury Fire Station | 5/29/2013 | <0.0520 | - | - | - | - | - | - | - | - | <0.00219 | 0.0110 |
| Air | Salisbury Fire Station | 6/5/2013 | <0.0433 | - | - | - | - | - | - | - | - | 0.00244 | 0.0230 |
| Air | Salisbury Fire Station | 6/12/2013 | <0.0515 | - | - | - | - | - | - | - | - | <0.00212 | 0.0109 |
| Air | Salisbury Fire Station | 6/19/2013 | <0.0506 | - | - | - | - | - | - | - | - | <0.00222 | 0.0220 |
| Air | Salisbury Fire Station | 6/26/2013 | <0.0534 | - | - | - | - | - | - | - | - | <0.00221 | 0.0320 |
| Air | Salisbury Fire Station | 7/3/2013 | <0.0544 | - | - | - | - | - | - | - | - | <0.00215 | 0.0143 |
| Air | Salisbury Fire Station (Quarterly Composite) | 5/15/2013 | - | 0.076 | <0.078 | <0.003 | <0.022 | <0.003 | <0.010 | <0.003 | <0.007 | - | - |
| Air | Salisbury Fire Station | 7/10/2013 | <0.0514 | - | - | - | - | - | - | - | - | 0.00561 | 0.0198 |
| Air | Salisbury Fire Station | 7/17/2013 | <0.0477 | - | - | - | - | - | - | - | - | 0.00371 | 0.0184 |
| Air | Salisbury Fire Station | 7/24/2013 | <0.0571 | - | - | - | - | - | - | - | - | 0.00202 | 0.0131 |
| Air | Salisbury Fire Station | 7/31/2013 | <0.0506 | - | - | - | - | - | - | - | - | <0.00192 | 0.0159 |
| Air | Salisbury Fire Station | 8/7/2013 | <0.0453 | - | - | - | - | - | - | - | - | 0.00307 | 0.0216 |
| Air | Salisbury Fire Station | 8/14/2013 | <0.0489 | - | - | - | - | - | - | - | - | <0.00193 | 0.0173 |
| Air | Salisbury Fire Station | 8/21/2013 | <0.0534 | - | - | - | - | - | - | - | - | 0.00410 | 0.0243 |
| Air | Salisbury Fire Station | 8/28/2013 | <0.0514 | - | - | - | - | - | - | - | - | 0.00581 | 0.0343 |
| Air | Salisbury Fire Station | 9/4/2013 | <0.0507 | - | - | - | - | - | - | - | - | 0.00558 | 0.0289 |
| Air | Salisbury Fire Station | 9/11/2013 | <0.0558 | - | - | - | - | - | - | - | - | 0.00212 | 0.0198 |
| Air | Salisbury Fire Station | 9/18/2013 | <0.0597 | - | - | - | - | - | - | - | - | 0.00258 | 0.0247 |
| Air | Salisbury Fire Station | 9/25/2013 | <0.0563 | - | - | - | - | - | - | - | - | <0.00199 | 0.0203 |
| Air | Salisbury Fire Station | 10/2/2013 | <0.0577 | - | - | - | - | - | - | - | - | <0.00200 | 0.0198 |
| Air | Salisbury Fire Station (Quarterly Composite) | 8/15/2013 | - | 0.071 | <0.079 | <0.004 | <0.020 | <0.003 | <0.010 | <0.003 | <0.008 | - | - |
| Air | Salisbury Fire Station | 10/9/2013 | <0.0609 | - | - | - | - | - | - | - | - | 0.00378 | 0.0262 |
| Air | Salisbury Fire Station | 10/16/2013 | <0.0533 | - | - | - | - | - | - | - | - | 0.00478 | 0.0248 |
| Air | Salisbury Fire Station | 10/23/2013 | <0.3690 | - | - | - | - | - | - | - | - | <0.02420 | 0.0589 |
| Air | Salisbury Fire Station | 10/30/2013 | <0.0515 | - | - | - | - | - | - | - | - | <0.00289 | 0.0120 |
| Air | Salisbury Fire Station | 11/6/2013 | <0.0542 | - | - | - | - | - | - | - | - | 0.00745 | 0.0303 |
| Air | Salisbury Fire Station | 11/13/2013 | <0.0381 | - | - | - | - | - | - | - | - | <0.00296 | 0.0168 |
| Air | Salisbury Fire Station | 11/20/2013 | <0.0354 | - | - | - | - | - | - | - | - | 0.00534 | 0.0251 |
| Air | Salisbury Fire Station | 11/27/2013 | <0.0555 | - | - | - | - | - | - | - | - | <0.00227 | 0.0131 |
| Air | Salisbury Fire Station | 12/4/2013 | <0.0344 | - | - | - | - | - | - | - | - | <0.00236 | 0.0162 |
| Air | Salisbury Fire Station | 12/11/2013 | <0.0487 | - | - | - | - | - | - | - | - | 0.00372 | 0.0305 |
| Air | Salisbury Fire Station | 12/18/2013 | <0.0387 | - | - | - | - | - | - | - | - | 0.00301 | 0.0252 |
| Air | Salisbury Fire Station | 12/26/2013 | <0.0311 | - | - | - | - | - | - | - | - | 0.00349 | 0.0278 |
| Air | Salisbury Fire Station (Quarterly Composite) | 11/15/2013 | - | 0.105 | <0.031 | <0.002 | <0.037 | <0.002 | <0..006 | <0.001 | <0.004 | - | - |
| Air | Background | 1/8/2013 | <0.0745 | - | - | - | - | - | - | - | - | 0.00511 | 0.0250 |
| Air | Background | 1/15/2013 | <0.0618 | - | - | - | - | - | - | - | - | 0.00794 | 0.0259 |
| Air | Background | 1/22/2013 | <0.0645 | - | - | - | - | - | - | - | - | 0.00328 | 0.0166 |
| Air | Background | 1/29/2013 | <0.0671 | - | - | - | - | - | - | - | - | 0.00322 | 0.0183 |
| Air | Background | 2/5/2013 | <0.0443 | - | - | - | - | - | - | - | - | 0.00366 | 0.0168 |
| Air | Background | 2/12/2013 | <0.0438 | - | - | - | - | - | - | - | - | 0.00248 | 0.0184 |
| Air | Background | 2/19/2013 | <0.0419 | - | - | - | - | - | - | - | - | 0.00354 | 0.0161 |
| Air | Background | 2/26/2013 | <0.0742 | - | - | - | - | - | - | - | - | 0.00171 | 0.0119 |
| Air | Background | 3/5/2013 | <0.0690 | - | - | - | - | - | - | - | - | <0.00153 | 0.0127 |
| Air | Background | 3/12/2013 | <0.0442 | - | - | - | - | - | - | - | - | <0.00154 | 0.0130 |
| Air | Background | 3/19/2013 | <0.0450 | - | - | - | - | - | - | - | - | 0.00232 | 0.0155 |
| Air | Background | 3/26/2013 | <0.0421 | - | - | - | - | - | - | - | - | 0.00161 | 0.0167 |
| Air | Background | 4/2/2013 | <0.0725 | - | - | - | - | - | - | - | - | <0.00144 | 0.0108 |
| Air | Background Quarterly Composite | 2/15/2013 | - | <0.082 | <0.067 | <0.003 | <0.027 | <0.003 | <0.009 | <0.003 | <0.006 | - | - |
| Air | Background | 4/9/2013 | <0.0408 | - | - | - | - | - | - | - | - | 0.00531 | 0.0287 |
| Air | Background | 4/16/2013 | <0.0431 | - | - | - | - | - | - | - | - | 0.00374 | 0.0124 |
| Air | Background | 4/23/2013 | <0.0693 | - | - | - | - | - | - | - | - | 0.00401 | 0.0200 |
| Air | Background | 4/30/2013 | <0.0657 | - | - | - | - | - | - | - | - | 0.00245 | 0.0146 |
| Air | Background | 5/7/2013 | <0.0462 | - | - | - | - | - | - | - | - | 0.00235 | 0.0174 |
| Air | Background | 5/14/2013 | <0.0441 | - | - | - | - | - | - | - | - | <0.00209 | 0.0136 |
| Air | Background | 5/21/2013 | <0.0421 | - | - | - | - | - | - | - | - | <0.00206 | 0.0133 |
| Air | Background | 5/28/2013 | <0.0480 | - | - | - | - | - | - | - | - | <0.00205 | 0.0084 |
| Air | Background | 6/4/2013 | <0.0458 | - | - | - | - | - | - | - | - | 0.00208 | 0.0165 |
| Air | Background | 6/11/2013 | <0.0411 | - | - | - | - | - | - | - | - | <0.00210 | 0.0126 |
| Air | Background | 6/18/2013 | <0.0398 | - | - | - | - | - | - | - | - | 0.00222 | 0.0209 |
| Air | Background | 6/25/2013 | <0.0422 | - | - | - | - | - | - | - | - | <0.00208 | 0.0162 |
| Air | Background | 7/2/2013 | <0.0458 | - | - | - | - | - | - | - | - | <0.00205 | 0.0233 |
| Air | Background Quarterly Composite | 5/15/2013 | - | 0.074 | <0.069 | <0.003 | <0.015 | <0.003 | <0.009 | <0.028 | 0.010 | - | - |
| Air | Background | 7/9/2013 | <0.0442 | - | - | - | - | - | - | - | - | 0.00273 | 0.0150 |
| Air | Background | 7/16/2013 | <0.0427 | - | - | - | - | - | - | - | - | 0.00401 | 0.0247 |
| Air | Background | 7/23/2013 | <0.0441 | - | - | - | - | - | - | - | - | 0.00479 | 0.0208 |
| Air | Background | 7/29/2013 | <0.0462 | - | - | - | - | - | - | - | - | 0.00287 | 0.0184 |
| Air | Background | 8/6/2013 | <0.0342 | - | - | - | - | - | - | - | - | 0.00341 | 0.0210 |
| Air | Background | 8/13/2013 | <0.0372 | - | - | - | - | - | - | - | - | 0.00250 | 0.0152 |
| Air | Background | 8/20/2013 | <0.0401 | - | - | - | - | - | - | - | - | 0.00406 | 0.0228 |
| Air | Background | 8/27/2013 | <0.0388 | - | - | - | - | - | - | - | - | 0.00353 | 0.0265 |
| Air | Background | 9/3/2013 | <0.0401 | - | - | - | - | - | - | - | - | 0.00351 | 0.0286 |
| Air | Background | 9/10/2013 | <0.0488 | - | - | - | - | - | - | - | - | <0.00156 | 0.0181 |
| Air | Background | 9/17/2013 | <0.0445 | - | - | - | - | - | - | - | - | 0.00217 | 0.0292 |
| Air | Background | 9/24/2013 | <0.0387 | - | - | - | - | - | - | - | - | <0.00157 | 0.0149 |
| Air | Background | 10/1/2013 | <0.0411 | - | - | - | - | - | - | - | - | <0.00155 | 0.0154 |
| Air | Background Quarterly Composite | 8/15/2013 | - | 0.087 | <0.070 | <0.002 | <0.011 | <0.002 | <0.005 | <0.002 | <0.004 | - | - |
| Air | Background | 10/8/2013 | <0.0417 | - | - | - | - | - | - | - | - | 0.00887 | 0.0255 |
| Air | Background | 10/15/2013 | <0.0403 | - | - | - | - | - | - | - | - | 0.00424 | 0.0175 |
| Air | Background | 10/22/2013 | <0.0406 | - | - | - | - | - | - | - | - | 0.00760 | 0.0244 |
| Air | Background | 10/29/2013 | <0.0420 | - | - | - | - | - | - | - | - | <0.00239 | 0.0161 |
| Air | Background | 11/5/2013 | <0.0406 | - | - | - | - | - | - | - | - | 0.00555 | 0.0217 |
| Air | Background | 11/12/2013 | <0.0306 | - | - | - | - | - | - | - | - | 0.00339 | 0.0165 |
| Air | Background | 11/19/2013 | <0.0428 | - | - | - | - | - | - | - | - | <0.00243 | 0.0177 |
| Air | Background | 11/26/2013 | <0.0303 | - | - | - | - | - | - | - | - | <0.00243 | 0.0131 |
| Air | Background | 12/3/2013 | <0.0257 | - | - | - | - | - | - | - | - | <0.00241 | 0.0139 |
| Air | Background | 12/10/2013 | <0.0339 | - | - | - | - | - | - | - | - | 0.00444 | 0.0293 |
| Air | Background | 12/17/2013 | <0.0358 | - | - | - | - | - | - | - | - | 0.00370 | 0.0269 |
| Air | Background | 12/24/2013 | <0.0461 | - | - | - | - | - | - | - | - | 0.00321 | 0.0235 |
| Air | Background | 12/31/2014 | <0.0368 | - | - | - | - | - | - | - | - | 0.00353 | 0.0289 |
| Air | Background Quarterly Composite | 11/15/2013 | - | 0.086 | <0.040 | <0.002 | <0.032 | <0.002 | <0.006 | <0.001 | <0.003 | - | - |

“-“ = not analyzed

\* I-131 = Iodine-131, Be-7 = Beryllium-7, K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, Cs-134 = Cesium-134, Cs-137, = Cesium-137, Pb-214 = Lead-214

Table 16. Vermont Yankee Nuclear Power Station 2013 Environmental Monitoring Data - Liquid Matrix

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample Type | Location | Date | K-40\* (pCi/L) | Mn-54\* (pCi/L) | Fe-59\* (pCi/L) | Co-60\* (pCi/L) | Zn-65\* (pCi/L) | 1-131\* (pCi/L) | Cs-134\* (pCi/L) | Cs-137\* (pCi/L) | Ba-140\*  (pCi/L) | H-3\* (pCi/L) |
| Surface Water | Connecticut River, Northfield | 3/20/2013 | 824 | <6.4 | <13.1 | <7.0 | <19.1 | <7.5 | - | <7.0 | - | <300 |
| Surface Water | Connecticut River, Gill | 3/20/2013 | 553 | <6.2 | <12.0 | <6.2 | <16.2 | <7.5 | - | <6.6 | - | <300 |
| Surface Water | Millers River Athol  (Background) | 3/20/2013 | 240 | <5.9 | <11.6 | <5.8 | <15.5 | <7.0 | - | <6.1 | - | <300 |
| Surface Water | Connecticut River, Northfield | 5/29/2013 | 561 | <5.1 | <10.4 | <5.0 | <12.4 | <6.2 | - | <5.4 | - | <300 |
| Surface Water | Connecticut River, Gill | 5/29/2013 | 523 | <6.0 | <14.2 | <6.1 | <14.8 | <17.0 | - | <6.3 | - | <300 |
| Surface Water | Millers River Athol  (Background) | 5/29/2013 | 557 | <6.2 | <14.3 | <6.1 | <15.1 | <19.5 | - | <6.3 | - | <300 |
| Surface Water | Connecticut River, Northfield | 10/1/2013 | 1020 | <6.9 | <13.8 | <7.0 | <16.6 | <9.0 | - | <7.2 | - | <300 |
| Surface Water | Connecticut River, Gill | 10/1/2013 | <168 | <4.8 | <9.7 | <5.0 | <12.1 | <6.4 | - | <5.2 | - | <300 |
| Surface Water | Millers River Athol  (Background) | 10/1/2013 | 1080 | <6.8 | <14.8 | <6.7 | <16.8 | <12.5 | - | <7.1 | - | <300 |
| Surface Water | Connecticut River, Northfield | 11/13/2013 | 450 | <5.5 | <11.2 | <6.0 | <14.3 | <6.7 | - | <6.0 | - | <300 |
| Surface Water | Connecticut River, Gill | 11/13/2013 | 410 | <5.6 | <11.8 | <5.9 | <14.6 | <8.6 | - | <6.0 | - | <300 |
| Surface Water | Millers River Athol  (Background) | 11/13/2013 | 504 | <5.8 | <11.4 | <5.7 | <15.0 | <6.3 | - | <6.2 | - | <300 |
| Milk | Bernardston | 1/23/2013 | 1970 | - | - | - | - | <2.2 | <7.1 | <7.5 | <23.6 | - |
| Milk | Bernardston | 2/19/2013 | 1930 | - | - | - | - | <2.3 | <6.4 | <7.0 | <21.8 | - |
| Milk | Bernardston | 3/20/2013 | 2030 | - | - | - | - | <2.5 | <6.1 | <6.9 | <22.3 | - |
| Milk | Bernardston | 4/23/2013 | 1890 | - | - | - | - | <2.3 | <6.0 | <6.8 | <22.0 | - |
| Milk | Bernardston | 5/29/2013 | 1940 | - | - | - | - | <1.6 | <5.9 | <6.8 | <21.9 | - |
| Milk | Bernardston | 6/18/2013 | 1790 | - | - | - | - | <2.4 | <5.9 | <7.0 | <21.5 | - |
| Milk | Bernardston | 7/23/2013 | 1760 | - | - | - | - | <2.5 | <5.9 | <7.1 | <22.2 | - |
| Milk | Bernardston | 8/20/2013 | 1970 | - | - | - | - | <2.6 | <6.0 | <6.8 | <21.5 | - |
| Milk | Bernardston | 9/24/2013 | 1360 | - | - | - | - | <2.6 | <8.0 | <7.5 | <27.9 | - |
| Milk | Bernardston | 10/23/2013 | 1780 | - | - | - | - | <2.9 | <6.0 | <6.5 | <21.8 | - |
| Milk | Bernardston | 11/19/2013 | 1840 | - | - | - | - | <2.7 | <6.4 | <6.6 | <20.8 | - |
| Milk | Bernardston | 12/18/2013 | 1470 | - | - | - | - | <1.8 | <9.5 | <8.4 | <28.6 | - |

“-“ = not analyzed

\* K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, I-131 = Iodine-131, Cs-134 = Cesium-134, Cs-137 = Cesium-137, Ba-140 = Barium-140, H-3 = Tritium

Table 17. Vermont Yankee Nuclear Power Station 2013 Environmental Monitoring Data - Solid Matrix

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample Type | 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) | Pb-214\* (pCi/kg) |
| Butternut Squash | Northfield | 10/1/2013 | <68 | 3030 | <8.1 | <20.7 | <9.6 | <24.1 | <8.2 | 35.6 |
| Pumpkins | Northfield | 10/1/2013 | <67 | 5470 | <7.5 | <20.8 | <8.7 | <21.7 | <7.7 | <15.8 |
| Apples | Northfield | 10/1/2013 | <75 | 1060 | <8.0 | <18.9 | <8.2 | <20.6 | <7.8 | 44.0 |
| Apples | Colrain (Background) | 10/8/2013 | <50 | 906 | <5.4 | <12.3 | <5.9 | <14.8 | <5.7 | <13.2 |
| Pasture Grass/Silage | Bernardston | 10/8/2013 | 1470 | 4830 | <15.4 | <35.4 | <17.1 | <44.9 | <16.8 | 64.0 |
| Grass | Northfield, CT River | 5/29/2013 | 559 | 13700 | <37.7 | <83.1 | <40.2 | - | <37.8 | 190.0 |
| Grass | Gill, CT River | 5/29/2013 | 2190 | 13200 | <33.0 | <79.4 | <36.2 | - | <36.6 | 311.0 |
| Grass | Northfield Routes 5 & 10 | 5/29/2013 | 549 | 9010 | <26.4 | <64.3 | <29.1 | - | <27.5 | <64.1 |
| Grass | Millers River Athol (Background) | 5/29/2013 | 1130 | 11900 | <33.8 | <90.8 | <38.9 | - | <37.3 | 255.0 |
| Grass | Northfield Routes 5 & 10 | 10/1/2013 | 2980 | 6840 | <50.1 | <119.0 | <54.0 | - | <54.8 | 169.0 |
| Grass | Northfield, CT River | 10/1/2013 | 1040 | 6030 | <34.7 | <77.1 | <38.7 | - | <33.5 | 102.0 |
| Grass | Gill, CT River | 10/1/2013 | 2800 | 8070 | <50.2 | <116.0 | <52.2 | - | <54.1 | 137.0 |
| Grass | Millers River Athol (Background) | 10/1/2013 | 3900 | 10500 | <36.4 | <87.6 | <43.6 | - | 26.0 | <83.8 |
| Sediment | Northfield, CT River | 5/29/2013 | - | 15400 | - | - | <56.0 | - | 63.3 | 580 |
| Sediment | Gill, CT River | 5/29/2013 | - | 6750 | - | - | <40.8 | - | <44.6 | 307 |
| Sediment | Athol, Millers River  (Background) | 5/29/2013 | - | 11200 | - | - | <50.4 | - | 121.0 | 739 |
| Sediment | Northfield, CT River | 10/1/2013 | - | 12100 | - | - | <53.4 | - | <46.3 | 493 |
| Sediment | Gill, CT River | 10/1/2013 | - | 7240 | - | - | <41.9 | - | <41.5 | 354 |
| Sediment | Athol, Millers River  (Background) | 10/1/2013 | - | 11600 | - | - | <49.3 | - | 70.3 | 642 |
| Fish (composite) | Athol, Millers River (Background) | 8/20/2013 | <648 | 4340 | <75.9 | <153.0 | <78.2 | <187.0 | <86.8 | 318 |
| Fish (composite) | Gill/Northfield, CT River | 8/22/2013 | <79 | 5140 | <8.9 | <24.1 | <8.9 | <23.7 | 15.8 | <23 |
| Fish (Bass) | Gill/Northfield, CT River | 10/22/2013 | <674 | 3950 | <46.5 | <179.0 | <41.7 | <124.0 | <32.9 | 396 |
| Fish (Bass) | Gill/Northfield, CT River | 10/22/2013 | <582 | 3670 | <42.8 | <160.0 | <39.1 | <118.0 | <42.1 | 365 |
| Fish (composite) | Athol, Millers River (Background) | 10/23/2013 | <1430 | 4460 | <109.0 | <393.0 | <99.4 | <315.0 | <67.6 | 308 |

“-“ = not analyzed

\* Be-7 = Beryllium-7, K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65 , Cs-137 = Cesium-137, Pb-214 = Lead-214

Table 18. Vermont Yankee Nuclear Power Station 2013 Environmental Monitoring Data - Air Samples

| Sample Type | Location | Date | 1-131\*  (pCi/m3) | Be-7\* (pCi/m3) | K-40\* (pCi/m3) | Mn-54\* (pCi/m3) | Fe-59\* (pCi/m3) | Co-60\* (pCi/m3) | Zn-65\* (pCi/m3) | Cs-137 \* (pCi/m3) | Pb-214\* (pCi/m3) | | Gross Alpha (pCi/m3) | Gross Beta (pCi/m3) | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Air | Northfield Transfer Station | 1/9/2013 | <0.0574 | - | - | - | - | - | - | - | - | | 0.01160 | 0.0443 | |
| Air | Northfield Transfer Station | 1/15/2013 | <0.0846 | - | - | - | - | - | - | - | - | | 0.01050 | 0.0327 | |
| Air | Northfield Transfer Station | 1/23/2013 | <0.0348 | - | - | - | - | - | - | - | - | | 0.00749 | 0.0231 | |
| Air | Northfield Transfer Station | 1/29/2013 | <0.0774 | - | - | - | - | - | - | - | - | | 0.00561 | 0.0246 | |
| Air | Northfield Transfer Station | 2/5/2013 | <0.0769 | - | - | - | - | - | - | - | - | | 0.00962 | 0.0289 | |
| Air | Northfield Transfer Station | 2/12/2013 | <0.0727 | - | - | - | - | - | - | - | - | | 0.00545 | 0.0269 | |
| Air | Northfield Transfer Station | 2/19/2013 | <0.0388 | - | - | - | - | - | - | - | - | | 0.00529 | 0.0213 | |
| Air | Northfield Transfer Station | 2/26/2013 | <0.0508 | - | - | - | - | - | - | - | - | | 0.00268 | 0.0154 | |
| Air | Northfield Transfer Station | 3/5/2013 | <0.0456 | - | - | - | - | - | - | - | - | | 0.00238 | 0.0180 | |
| Air | Northfield Transfer Station | 3/12/2013 | <0.0990 | - | - | - | - | - | - | - | - | | 0.00266 | 0.0146 | |
| Air | Northfield Transfer Station | 3/20/2013 | <0.0573 | - | - | - | - | - | - | - | - | | 0.00247 | 0.0218 | |
| Air | Northfield Transfer Station | 3/26/2013 | <0.0556 | - | - | - | - | - | - | - | - | | 0.00198 | 0.0191 | |
| Air | Northfield Transfer Station | 4/2/2013 | <0.0744 | - | - | - | - | - | - | - | - | | <0.00129 | 0.0180 | |
| Air | Northfield Transfer Station (Quarterly Composite) | 2/15/2013 | - | <0.092 | <0.060 | <0.003 | <0.034 | <0.002 | <0.008 | <0.002 | <0.005 | | - | - | |
| Air | Northfield Transfer Station | 4/9/2013 | <0.0462 | - | - | - | - | - | - | - | - | | 0.00739 | 0.0237 | |
| Air | Northfield Transfer Station | 4/16/2013 | <0.0541 | - | - | - | - | - | - | - | - | | 0.00311 | 0.0133 | |
| Air | Northfield Transfer Station | 4/23/2013 | <0.0384 | - | - | - | - | - | - | - | - | | 0.00511 | 0.0204 | |
| Air | Northfield Transfer Station | 4/30/2013 | <0.0599 | - | - | - | - | - | - | - | - | | 0.00488 | 0.0277 | |
| Air | Northfield Transfer Station | 5/7/2013 | <0.0603 | - | - | - | - | - | - | - | - | | 0.00358 | 0.0196 | |
| Air | Northfield Transfer Station | 5/14/2013 | <0.0496 | - | - | - | - | - | - | - | - | | 0.00287 | 0.0150 | |
| Air | Northfield Transfer Station | 5/21/2013 | <0.0440 | - | - | - | - | - | - | - | - | | 0.00200 | 0.0140 | |
| Air | Northfield Transfer Station | 5/29/2013 | <0.0347 | - | - | - | - | - | - | - | - | | 0.00183 | 0.0142 | |
| Air | Northfield Transfer Station | 6/4/2013 | <0.0513 | - | - | - | - | - | - | - | - | | 0.00315 | 0.0222 | |
| Air | Northfield Transfer Station | 6/11/2013 | <0.0436 | - | - | - | - | - | - | - | - | | <0.00181 | 0.0144 | |
| Air | Northfield Transfer Station | 6/18/2013 | <0.0400 | - | - | - | - | - | - | - | - | | 0.00244 | 0.0194 | |
| Air | Northfield Transfer Station | 6/25/2013 | <0.0451 | - | - | - | - | - | - | - | - | | 0.00351 | 0.0212 | |
| Air | Northfield Transfer Station | 7/2/2013 | <0.0386 | - | - | - | - | - | - | - | - | | <0.00180 | 0.0208 | |
| Air | Northfield Transfer Station (Quarterly Composite) | 5/15/2013 | - | 0.108 | <0.063 | <0.003 | <0.020 | <0.003 | <0.008 | <0.002 | <0.005 | | - | - | |
| Air | Northfield Transfer Station | 7/9/2013 | <0.0489 | - | - | - | - | - | - | - | - | | 0.00423 | 0.0182 | |
| Air | Northfield Transfer Station | 7/16/2013 | <0.0494 | - | - | - | - | - | - | - | - | | 0.00510 | 0.0216 | |
| Air | Northfield Transfer Station | 7/23/2013 | <0.0402 | - | - | - | - | - | - | - | - | | 0.00923 | 0.0284 | |
| Air | Northfield Transfer Station | 7/30/2013 | <0.0503 | - | - | - | - | - | - | - | - | | 0.00496 | 0.0193 | |
| Air | Northfield Transfer Station | 8/6/2013 | <0.0444 | - | - | - | - | - | - | - | - | | 0.00733 | 0.0182 | |
| Air | Northfield Transfer Station | 8/13/2013 | <0.0558 | - | - | - | - | - | - | - | - | | 0.00346 | 0.0195 | |
| Air | Northfield Transfer Station | 8/20/2013 | <0.0457 | - | - | - | - | - | - | - | - | | 0.00425 | 0.0236 | |
| Air | Northfield Transfer Station | 8/27/2013 | <0.0512 | - | - | - | - | - | - | - | - | | 0.00683 | 0.0278 | |
| Air | Northfield Transfer Station | 9/3/2013 | <0.0499 | - | - | - | - | - | - | - | - | | 0.00507 | 0.0285 | |
| Air | Northfield Transfer Station | 9/10/2013 | <0.0493 | - | - | - | - | - | - | - | - | | 0.00323 | 0.0185 | |
| Air | Northfield Transfer Station | 9/17/2013 | <0.0555 | - | - | - | - | - | - | - | - | | 0.00351 | 0.0274 | |
| Air | Northfield Transfer Station | 9/24/2013 | <0.0473 | - | - | - | - | - | - | - | - | | 0.00198 | 0.0200 | |
| Air | Northfield Transfer Station | 10/1/2013 | <0.0513 | - | - | - | - | - | - | - | - | | <0.00166 | 0.0174 | |
| Air | Northfield Transfer Station (Quarterly Composite) | 8/15/2013 | - | 0.110 | <0.071 | <0.002 | <0.013 | <0.002 | <0.005 | <0.002 | <0.004 | | - | - | |
| Air | Northfield Transfer Station | 10/8/2013 | <0.0472 | - | - | - | - | - | - | - | - | | 0.01370 | 0.0338 | |
| Air | Northfield Transfer Station | 10/15/2013 | <0.0582 | - | - | - | - | - | - | - | - | | 0.00997 | 0.0309 | |
| Air | Northfield Transfer Station | 10/23/2013 | <0.0399 | - | - | - | - | - | - | - | - | | 0.01180 | 0.0330 | |
| Air | Northfield Transfer Station | 10/29/2013 | <0.0659 | - | - | - | - | - | - | - | - | | 0.00502 | 0.0202 | |
| Air | Northfield Transfer Station | 11/5/2013 | <0.0523 | - | - | - | - | - | - | - | - | | 0.00677 | 0.0275 | |
| Air | Northfield Transfer Station | 11/13/2013 | <0.0298 | - | - | - | - | - | - | - | - | | 0.00290 | 0.0164 | |
| Air | Northfield Transfer Station | 11/19/2013 | <0.0370 | - | - | - | - | - | - | - | - | | 0.00886 | 0.0344 | |
| Air | Northfield Transfer Station | 11/26/2013 | <0.0759 | - | - | - | - | - | - | - | - | | <0.00258 | 0.0188 | |
| Air | Northfield Transfer Station | 12/3/2013 | <0.0459 | - | - | - | - | - | - | - | - | | 0.00427 | 0.0191 | |
| Air | Northfield Transfer Station | 12/10/2013 | <0.0618 | - | - | - | - | - | - | - | - | | 0.00591 | 0.0325 | |
| Air | Northfield Transfer Station | 12/18/2013 | <0.0321 | - | - | - | - | - | - | - | - | | 0.00421 | 0.0332 | |
| Air | Northfield Transfer Station | 12/23/2013 | <0.0999 | - | - | - | - | - | - | - | - | | 0.00579 | 0.0334 | |
| Air | Northfield Transfer Station | 12/31/2013 | <0.0444 | - | - | - | - | - | - | - | - | | 0.00484 | 0.0341 | |
| Air | Northfield Transfer Station (Quarterly Composite) | 11/15/2013 | - | 0.135 | 0.069 | <0.003 | <0.050 | <0.002 | <0.008 | <0.002 | <0.005 | | - | - | |
| Air | Background | 1/8/2013 | <0.0745 | - | - | - | - | - | - | - | - | | 0.00511 | 0.0250 |
| Air | Background | 1/15/2013 | <0.0618 | - | - | - | - | - | - | - | - | 0.00794 | | 0.0259 |
| Air | Background | 1/22/2013 | <0.0645 | - | - | - | - | - | - | - | - | | 0.00328 | 0.0166 |
| Air | Background | 1/29/2013 | <0.0671 | - | - | - | - | - | - | - | - | | 0.00322 | 0.0183 |
| Air | Background | 2/5/2013 | <0.0443 | - | - | - | - | - | - | - | - | | 0.00366 | 0.0168 |
| Air | Background | 2/12/2013 | <0.0438 | - | - | - | - | - | - | - | - | | 0.00248 | 0.0184 |
| Air | Background | 2/19/2013 | <0.0419 | - | - | - | - | - | - | - | - | | 0.00354 | 0.0161 |
| Air | Background | 2/26/2013 | <0.0742 | - | - | - | - | - | - | - | - | | 0.00171 | 0.0119 |
| Air | Background | 3/5/2013 | <0.0690 | - | - | - | - | - | - | - | - | | <0.00153 | 0.0127 |
| Air | Background | 3/12/2013 | <0.0442 | - | - | - | - | - | - | - | - | | <0.00154 | 0.0130 |
| Air | Background | 3/19/2013 | <0.0450 | - | - | - | - | - | - | - | - | | 0.00232 | 0.0155 |
| Air | Background | 3/26/2013 | <0.0421 | - | - | - | - | - | - | - | - | | 0.00161 | 0.0167 |
| Air | Background | 4/2/2013 | <0.0725 | - | - | - | - | - | - | - | - | | <0.00144 | 0.0108 |
| Air | Background Quarterly Composite | 2/15/2013 | - | <0.082 | <0.067 | <0.003 | <0.027 | <0.003 | <0.009 | <0.003 | <0.006 | | - | - |
| Air | Background | 4/9/2013 | <0.0408 | - | - | - | - | - | - | - | - | | 0.00531 | 0.0287 |
| Air | Background | 4/16/2013 | <0.0431 | - | - | - | - | - | - | - | - | | 0.00374 | 0.0124 |
| Air | Background | 4/23/2013 | <0.0693 | - | - | - | - | - | - | - | - | | 0.00401 | 0.0200 |
| Air | Background | 4/30/2013 | <0.0657 | - | - | - | - | - | - | - | - | | 0.00245 | 0.0146 |
| Air | Background | 5/7/2013 | <0.0462 | - | - | - | - | - | - | - | - | | 0.00235 | 0.0174 |
| Air | Background | 5/14/2013 | <0.0441 | - | - | - | - | - | - | - | - | | <0.00209 | 0.0136 |
| Air | Background | 5/21/2013 | <0.0421 | - | - | - | - | - | - | - | - | | <0.00206 | 0.0133 |
| Air | Background | 5/28/2013 | <0.0480 | - | - | - | - | - | - | - | - | | <0.00205 | 0.0084 |
| Air | Background | 6/4/2013 | <0.0458 | - | - | - | - | - | - | - | - | | 0.00208 | 0.0165 |
| Air | Background | 6/11/2013 | <0.0411 | - | - | - | - | - | - | - | - | | <0.00210 | 0.0126 |
| Air | Background | 6/18/2013 | <0.0398 | - | - | - | - | - | - | - | - | | 0.00222 | 0.0209 |
| Air | Background | 6/25/2013 | <0.0422 | - | - | - | - | - | - | - | - | | <0.00208 | 0.0162 |
| Air | Background | 7/2/2013 | <0.0458 | - | - | - | - | - | - | - | - | | <0.00205 | 0.0233 |
| Air | Background Quarterly Composite | 5/15/2013 | - | 0.074 | <0.069 | <0.003 | <0.015 | <0.003 | <0.009 | <0.028 | 0.010 | | - | - |
| Air | Background | 7/9/2013 | <0.0442 | - | - | - | - | - | - | - | - | | 0.00273 | 0.0150 |
| Air | Background | 7/16/2013 | <0.0427 | - | - | - | - | - | - | - | - | | 0.00401 | 0.0247 |
| Air | Background | 7/23/2013 | <0.0441 | - | - | - | - | - | - | - | - | | 0.00479 | 0.0208 |
| Air | Background | 7/29/2013 | <0.0462 | - | - | - | - | - | - | - | - | | 0.00287 | 0.0184 |
| Air | Background | 8/6/2013 | <0.0342 | - | - | - | - | - | - | - | - | | 0.00341 | 0.0210 |
| Air | Background | 8/13/2013 | <0.0372 | - | - | - | - | - | - | - | - | | 0.00250 | 0.0152 |
| Air | Background | 8/20/2013 | <0.0401 | - | - | - | - | - | - | - | - | | 0.00406 | 0.0228 |
| Air | Background | 8/27/2013 | <0.0388 | - | - | - | - | - | - | - | - | | 0.00353 | 0.0265 |
| Air | Background | 9/3/2013 | <0.0401 | - | - | - | - | - | - | - | - | | 0.00351 | 0.0286 |
| Air | Background | 9/10/2013 | <0.0488 | - | - | - | - | - | - | - | - | | <0.00156 | 0.0181 |
| Air | Background | 9/17/2013 | <0.0445 | - | - | - | - | - | - | - | - | | 0.00217 | 0.0292 |
| Air | Background | 9/24/2013 | <0.0387 | - | - | - | - | - | - | - | - | | <0.00157 | 0.0149 |
| Air | Background | 10/1/2013 | <0.0411 | - | - | - | - | - | - | - | - | | <0.00155 | 0.0154 |
| Air | Background Quarterly Composite | 8/15/2013 | - | 0.087 | <0.070 | <0.002 | <0.011 | <0.002 | <0.005 | <0.002 | <0.004 | | - | - |
| Air | Background | 10/8/2013 | <0.0417 | - | - | - | - | - | - | - | - | | 0.00887 | 0.0255 |
| Air | Background | 10/15/2013 | <0.0403 | - | - | - | - | - | - | - | - | | 0.00424 | 0.0175 |
| Air | Background | 10/22/2013 | <0.0406 | - | - | - | - | - | - | - | - | | 0.00760 | 0.0244 |
| Air | Background | 10/29/2013 | <0.0420 | - | - | - | - | - | - | - | - | | <0.00239 | 0.0161 |
| Air | Background | 11/5/2013 | <0.0406 | - | - | - | - | - | - | - | - | | 0.00555 | 0.0217 |
| Air | Background | 11/12/2013 | <0.0306 | - | - | - | - | - | - | - | - | | 0.00339 | 0.0165 |
| Air | Background | 11/19/2013 | <0.0428 | - | - | - | - | - | - | - | - | | <0.00243 | 0.0177 |
| Air | Background | 11/26/2013 | <0.0303 | - | - | - | - | - | - | - | - | | <0.00243 | 0.0131 |
| Air | Background | 12/3/2013 | <0.0257 | - | - | - | - | - | - | - | - | | <0.00241 | 0.0139 |
| Air | Background | 12/10/2013 | <0.0339 | - | - | - | - | - | - | - | - | | 0.00444 | 0.0293 |
| Air | Background | 12/17/2013 | <0.0358 | - | - | - | - | - | - | - | - | | 0.00370 | 0.0269 |
| Air | Background | 12/24/2013 | <0.0461 | - | - | - | - | - | - | - | - | | 0.00321 | 0.0235 |
| Air | Background | 12/31/2014 | <0.0368 | - | - | - | - | - | - | - | - | | 0.00353 | 0.0289 |
| Air | Background Quarterly Composite | 11/15/2013 | - | 0.086 | <0.040 | <0.002 | <0.032 | <0.002 | <0.006 | <0.001 | <0.003 | | - | - |

“-“ = not analyzed

\* I-131 = Iodine-131, Be-7 = Beryllium-7, K-40 = Potassium-40, Mn-54 = Manganese-54, Fe-59 = Iron-59, Co-60 = Cobalt-60, Zn-65 = Zinc-65, Cs-134 = Cesium-134, Cs-137, = Cesium-137, Pb-214 = Lead-214