

New Jersey Department of Environmental Protection
Bureau of Nuclear Engineering

Environmental Monitoring of the Fukushima Daiichi Japan Nuclear Accident-
Radioanalytical Results

June 23, 2011

Introduction

The New Jersey Department of Environmental Protection's (DEP) Bureau of Nuclear Engineering (BNE) routinely operates and maintains an independent Environmental Monitoring and Surveillance Program for the environs of the Oyster Creek and Salem/Hope Creek nuclear generating stations. This program includes the radiological environmental monitoring of air, potable (drinking) water, and milk samples collected by BNE staff. Other media (aquatic sediment, milk, fish/shellfish, surface water and vegetation) are collected by each nuclear power plant owner and split with the BNE for analysis by the Bureau's contract laboratory, GEL Laboratories, Charleston, South Carolina.

Increased Monitoring

In response to the Fukushima Daiichi Japan nuclear accident, the BNE has taken steps to increase its level of environmental monitoring by increasing the frequency of collection of samples, adding additional sampling media and requesting that additional lab analyses be performed:

- The frequency of the collection of air samples was increased from biweekly (every two weeks) to weekly. Gamma spectroscopy analysis of each individual air filter was added.
- Collection of potable (drinking) water samples was increased from quarterly to weekly
- BNE routinely collects non-pasteurized (raw) milk samples from a background location each quarter. Collection of these samples was increased to weekly. The collection of weekly pasteurized samples from this location was also added.
- The BNE does not routinely collect rainwater (precipitation) samples. In response to the Japan incident, the BNE initiated the collection of rainwater samples the week of March 28, 2011. Sampling rainwater for radioactivity helps to ensure that drinking water sources and food supplies are safe for the public.
- The BNE requested New Jersey's nuclear power plant utilities (Exelon Nuclear and PSEG Nuclear LLC) to adjust the collection period of some of their samples in order to provide current splits of those samples for analysis by the DEP's contract laboratory. The BNE will be receiving split samples of surface water, milk, fish/shellfish and vegetation (when available).
- BNE staff also support the U.S. Environmental Protection Agency's (EPA) nationwide radiation monitoring system (RadNet) by collecting weekly air samples and quarterly drinking water and milk samples. The past several weeks, drinking water and milk samples have been collected weekly. Results of that monitoring can be found on the EPA's RadNet website at <http://www.epa.gov/japan2011/index.html>.

Return to Routine Monitoring Schedule

Due to the declining radiation levels related to the Japanese nuclear incident, the BNE has returned to its routine Radiological Environmental Monitoring Program sampling schedule. Beginning the week of May 2, 2011, the BNE's sample collection will include biweekly air samples, monthly milk samples, and quarterly potable water samples. No additional precipitation samples will be collected.

Results to Date

To date, the DEP's air sampling and rainwater results have detected very low levels of Iodine-131. Trace levels of Cesium-137 were detected on two air filters collected from 3/28/11 to 4/5/11. No Cesium-134 was detected, above the NJDEP's contract laboratory's measured minimum detectable concentration (MDC), on the same filters. The air sampling and rainwater results obtained are far below levels of public health concern and consistent with what would be expected from the releases by the damaged nuclear reactors in Japan.

Trace levels of Iodine-131, far below any public health concern, were detected in one raw milk sample collected on 3/30/11. Raw milk is not consumed by the general public. No Iodine-131 was detected in any pasteurized milk samples.

As more data becomes available for all of the media being sampled, the DEP will continue to post the results on the BNE website at <http://www.state.nj.us/dep/rpp/bne/index.htm>. Increased sampling will continue for the duration of the Japan nuclear incident. Since many states and nuclear power plants are also increasing the frequency of their monitoring programs and are submitting these samples to a limited number of laboratories nationwide, this may cause a slight delay in posting DEP data in a timely manner.

Historical data from the BNE's Annual Environmental Surveillance and Monitoring Reports is available at <http://www.state.nj.us/dep/rpp/bne/index.htm>. Reports from the most recent prior years are still under internal review and will be posted as soon as the review is completed.

Rainwater Results

In response to the Fukushima Daiichi nuclear emergency in Japan, the BNE initiated the collection and analysis of rainwater samples the week of March 28, 2011 at the BNE Headquarters located in Ewing, New Jersey. Rainwater samples are being collected weekly in small pools. The initial rainwater sample, collected on April 1, 2011 was split with the New Jersey Department of Health and Human Services (DHHS) laboratory for analysis. Available results are reported below.

Samples were analyzed for gamma emitting radionuclides (Iodine-131 and Cesium-134/137) using gamma spectroscopy. Results are in picocuries per liter (pCi/L). The NJDEP's contract laboratory minimum detectable concentration (MDC) is provided as reference. The MDC is the minimum detectable activity measured in concentration units (i.e., pCi/L). It is the activity level that a specific instrument and technique can be expected to detect with a 95% confidence interval. "ND" means Non

Detect. This indicates that the radionuclide was not detected above the laboratory's measured MDC provided in parenthesis ().

**NJDEP Rainwater Monitoring
CORW01 – BNE Office – Trenton, NJ**

Sample Start Date	Sample Stop Date	Gross Beta (pCi/L)	Cs-134 (pCi/L)	Cs-137 (pCi/L)	I-131 (pCi/L)
MDC			10	18	15
03/31/11	04/01/11	20.6 ± 3.12	ND (< 4.17)	ND (< 4.20)	43.8 ± 7.1
03/31/11 *	04/01/11	28.6 ± 0.95	ND (< 1.30)	2.28 ± 0.94	43.8 ± 3.4
04/07/11	04/11/11	4.35 ± 2.28	ND (< 2.25)	ND (< 2.12)	11.4 ± 3.1
04/11/11	04/13/11	ND (< 2.96)	ND (< 2.52)	ND (< 1.99)	ND (< 4.48)
04/16/11	04/17/11	3.43 ± 2.41	ND (< 1.96)	ND (< 1.99)	ND (< 3.32)
04/22/11	04/24/11	7.90 ± 2.51	ND (< 2.95)	ND (< 2.56)	ND (< 4.13)

* Split sample analyzed by the New Jersey DHHS. This sample was analyzed to a minimum detectable concentration of 1.4 pCi/L

Air Sample Results

The frequency of the BNE's collection of air samples was increased from the routine biweekly (every two weeks) to weekly. Samples are obtained from twelve locations (seven in the environs of Oyster Creek, three in the environs of Salem/Hope Creek and two background locations).

Each air sample is comprised of two media. The first is an air filter that captures radioactive particulates and is counted for gross beta radioactivity. Gross beta is a measurement of all beta activity, regardless of the specific radionuclide source. It is used as a method to screen samples for relative levels of beta emitters. Normally after being analyzed for gross beta radioactivity, the air filters are stored until the end of each calendar quarter and subsequently analyzed for gamma emitting radionuclides and for Strontium-89/90. This is called an air particulate quarterly composite. In order to obtain analysis results for gamma emitting radionuclides more quickly, the BNE requested gamma spectroscopy analysis of each individual air filter at the end of the weekly collection period. The second air sample media collected is a charcoal canister (air cartridge) which is analyzed for Iodine-131 at the end of each week.

Collection of weekly air samples will continue for the duration of the Japan nuclear incident. Available results are reported below. Sample results are in picocuries per cubic meter (pCi/m³). The NJDEP's contract laboratory minimum detectable concentration (MDC) is provided as reference. The MDC is the minimum detectable activity measured in concentration units (i.e., pCi/L). It is the activity level that a specific instrument and technique can be expected to detect with a 95% confidence interval. "ND" means Non Detect. This indicates that the radionuclide was not detected above the laboratory's measured MDC provided in parenthesis (). Gamma isotopic and Strontium 89/90 results from each quarterly composite sample will be reported as soon as they are available.

**NJDEP Air Monitoring
CO01 – BNE Office – Trenton, NJ**

Sample Start Date	Sample Stop Date	Gross Beta (pCi/m ³)	I-131 Air Filter (pCi/m ³)	I-131 Cartridge (pCi/m ³)	Cs-134 Air Filter (pCi/m ³)	Cs-137 Air Filter (pCi/m ³)
MDC		0.01		0.07	0.01	0.01
03/09/11	03/21/11	0.020 ± 0.002	ND (< 0.005)	ND (< 0.013)	ND (< 0.002)	ND (< 0.002)
03/21/11	03/28/11	0.048 ± 0.004	0.032 ± 0.007	0.065 ± 0.024	ND (< 0.006)	ND (< 0.005)
03/28/11	04/05/11	0.043 ± 0.003	0.020 ± 0.007	0.087 ± 0.022	ND (< 0.006)	0.005 ± 0.003
04/05/11	04/12/11	0.036 ± 0.003	ND (< 0.004)	0.028 ± 0.013	ND (< 0.003)	ND (< 0.003)
04/12/11	04/19/11	0.024 ± 0.003	ND (< 0.007)	ND (< 0.013)	ND (< 0.003)	ND (< 0.004)
04/19/11	04/26/11	0.025 ± 0.003	ND (< 0.047)	ND (< 0.019)	ND (< 0.006)	ND (< 0.004)

CO02 – Brendan T. Byrne State Forest – New Lisbon, NJ

Sample Start Date	Sample Stop Date	Gross Beta (pCi/m ³)	I-131 Air Filter (pCi/m ³)	I-131 Cartridge (pCi/m ³)	Cs-134 Air Filter (pCi/m ³)	Cs-137 Air Filter (pCi/m ³)
MDC		0.01		0.07	0.01	0.01
03/09/11	03/21/11	0.022 ± 0.002	ND (< 0.005)	ND (< 0.014)	ND (< 0.003)	ND (< 0.003)
03/21/11	03/28/11	0.046 ± 0.004	0.028 ± 0.007	0.064 ± 0.023	ND (< 0.005)	ND (< 0.004)
03/28/11	04/05/11	0.037 ± 0.003	0.014 ± 0.009	0.088 ± 0.027	ND (< 0.006)	ND (< 0.005)
04/05/11	04/12/11	0.041 ± 0.004	ND (< 0.008)	0.039 ± 0.019	ND (< 0.008)	ND (< 0.004)
04/12/11	04/19/11	0.025 ± 0.003	ND (< 0.010)	ND (< 0.016)	ND (< 0.005)	ND (< 0.006)
04/19/11	04/26/11	0.026 ± 0.003	ND (< 0.049)	ND (< 0.019)	ND (< 0.006)	ND (< 0.005)

OC01 – Waretown Municipal Building – Waretown, NJ

Sample Start Date	Sample Stop Date	Gross Beta (pCi/m ³)	I-131 Air Filter (pCi/m ³)	I-131 Cartridge (pCi/m ³)	Cs-134 Air Filter (pCi/m ³)	Cs-137 Air Filter (pCi/m ³)
MDC		0.01		0.07	0.01	0.01
03/09/11	03/21/11	0.022 ± 0.002	ND (< 0.003)	ND (< 0.015)	ND (< 0.002)	ND (< 0.002)
03/21/11	03/28/11	0.056 ± 0.004	0.031 ± 0.007	0.067 ± 0.022	ND (< 0.004)	ND (< 0.006)
03/28/11	04/05/11	0.032 ± 0.003	0.013 ± 0.007	0.069 ± 0.026	ND (< 0.005)	ND (< 0.005)
04/05/11	04/12/11	0.044 ± 0.004	ND (< 0.011)	ND (< 0.014)	ND (< 0.006)	ND (< 0.004)
04/12/11	04/19/11	0.024 ± 0.003	ND (< 0.009)	ND (< 0.013)	ND (< 0.006)	ND (< 0.005)
04/19/11	04/26/11	0.027 ± 0.003	ND (< 0.039)	ND (< 0.017)	ND (< 0.005)	ND (< 0.005)

OC02 – Sands Point Harbor – Waretown, NJ

Sample Start Date	Sample Stop Date	Gross Beta (pCi/m ³)	I-131 Air Filter (pCi/m ³)	I-131 Cartridge (pCi/m ³)	Cs-134 Air Filter (pCi/m ³)	Cs-137 Air Filter (pCi/m ³)
MDC		0.01		0.07	0.01	0.01
03/09/11	03/21/11	0.022 ± 0.002	ND (< 0.004)	ND (< 0.019)	ND (< 0.003)	ND (< 0.002)
03/21/11	03/28/11	0.044 ± 0.004	0.025 ± 0.007	0.073 ± 0.025	ND (< 0.004)	ND (< 0.004)
03/28/11	04/05/11	0.039 ± 0.003	ND (< 0.006)	0.081 ± 0.021	ND (< 0.007)	ND (< 0.005)
04/05/11	04/12/11	0.047 ± 0.004	ND (< 0.008)	ND (< 0.013)	ND (< 0.005)	ND (< 0.005)
04/12/11	04/19/11	0.020 ± 0.003	ND (< 0.009)	ND (< 0.024)	ND (< 0.005)	ND (< 0.005)
04/19/11	04/26/11	0.026 ± 0.003	ND (< 0.036)	ND (< 0.027)	ND (< 0.005)	ND (< 0.003)

NJDEP Air Monitoring (continued)
OC03 – Forked River Marina – Forked River, NJ

Sample Start Date	Sample Stop Date	Gross Beta (pCi/m ³)	I-131 Air Filter (pCi/m ³)	I-131 Cartridge (pCi/m ³)	Cs-134 Air Filter (pCi/m ³)	Cs-137 Air Filter (pCi/m ³)
MDC		0.01		0.07	0.01	0.01
03/09/11	03/21/11	0.019 ± 0.002	ND (< 0.004)	ND (< 0.016)	ND (< 0.002)	ND (< 0.003)
03/21/11	03/28/11	0.051 ± 0.004	0.029 ± 0.008	0.100 ± 0.029	ND (< 0.004)	ND (< 0.004)
03/28/11	04/05/11	0.034 ± 0.003	0.015 ± 0.007	0.061 ± 0.023	ND (< 0.005)	ND (< 0.003)
04/05/11	04/12/11	0.044 ± 0.004	ND (< 0.009)	0.042 ± 0.022	ND (< 0.004)	ND (< 0.006)
04/12/11	04/19/11	0.021 ± 0.002	ND (< 0.008)	ND (< 0.019)	ND (< 0.005)	ND (< 0.003)
04/19/11	04/26/11	0.023 ± 0.003	ND (< 0.029)	ND (< 0.015)	ND (< 0.005)	ND (< 0.003)

OC04 – Lacey Township Recreation Building – Forked River, NJ

Sample Start Date	Sample Stop Date	Gross Beta (pCi/m ³)	I-131 Air Filter (pCi/m ³)	I-131 Cartridge (pCi/m ³)	Cs-134 Air Filter (pCi/m ³)	Cs-137 Air Filter (pCi/m ³)
MDC		0.01		0.07	0.01	0.01
03/09/11	03/21/11	0.021 ± 0.002	ND (< 0.004)	ND (< 0.009)	ND (< 0.002)	ND (< 0.002)
03/21/11	03/29/11	0.048 ± 0.004	0.031 ± 0.007	0.063 ± 0.021	ND (< 0.004)	ND (< 0.003)
03/28/11	04/05/11	0.040 ± 0.003	0.008 ± 0.008	0.098 ± 0.038	ND (< 0.004)	ND (< 0.002)
04/05/11	04/12/11	0.040 ± 0.003	ND (< 0.007)	ND (< 0.015)	ND (< 0.005)	ND (< 0.005)
04/12/11	04/19/11	0.028 ± 0.003	ND (< 0.007)	ND (< 0.019)	ND (< 0.005)	ND (< 0.004)
04/19/11	04/26/11	0.026 ± 0.003	ND (< 0.044)	ND (< 0.022)	ND (< 0.006)	ND (< 0.005)

OC05 – JCP&L Substation – Bayville, NJ

Sample Start Date	Sample Stop Date	Gross Beta (pCi/m ³)	I-131 Air Filter (pCi/m ³)	I-131 Cartridge (pCi/m ³)	Cs-134 Air Filter (pCi/m ³)	Cs-137 Air Filter (pCi/m ³)
MDC		0.01		0.07	0.01	0.01
03/09/11	03/21/11	0.021 ± 0.002	ND (< 0.006)	ND (< 0.021)	ND (< 0.003)	ND (< 0.003)
03/21/11	03/29/11	0.057 ± 0.005	0.027 ± 0.007	0.074 ± 0.030	ND (< 0.006)	ND (< 0.004)
03/28/11	04/05/11	0.044 ± 0.004	0.013 ± 0.009	0.085 ± 0.024	ND (< 0.007)	ND (< 0.006)
04/05/11	04/12/11	0.043 ± 0.004	ND (< 0.011)	ND (< 0.024)	ND (< 0.008)	ND (< 0.005)
04/12/11	04/19/11	0.026 ± 0.003	ND (< 0.012)	ND (< 0.019)	ND (< 0.007)	ND (< 0.005)
04/19/11	04/26/11	0.025 ± 0.003	ND (< 0.045)	ND (< 0.019)	ND (< 0.005)	ND (< 0.005)

OC06 – Oyster Creek Dredge Site on Finninger Farm, Forked River, NJ

Sample Start Date	Sample Stop Date	Gross Beta (pCi/m ³)	I-131 Air Filter (pCi/m ³)	I-131 Cartridge (pCi/m ³)	Cs-134 Air Filter (pCi/m ³)	Cs-137 Air Filter (pCi/m ³)
MDC		0.01		0.07	0.01	0.01
03/23/11	03/30/11	0.059 ± 0.007	ND (< 0.081)	ND (< 0.035)	ND (< 0.008)	ND (< 0.006)
03/30/11	04/06/11	0.050 ± 0.006	0.016 ± 0.009	ND (< 0.036)	ND (< 0.009)	ND (< 0.006)
04/06/11	04/13/11	0.056 ± 0.007	ND (< 0.012)	ND (< 0.070)	ND (< 0.008)	ND (< 0.006)
04/13/11	04/20/11	0.041 ± 0.006	ND (< 0.013)	ND (< 0.049)	ND (< 0.008)	ND (< 0.009)
04/20/11	04/27/11	0.032 ± 0.005	ND (< 0.066)	ND (< 0.037)	ND (< 0.007)	ND (< 0.005)

NJDEP Air Monitoring (continued)
OC07 – Finninger Farm Property (ENE Sector) – Forked River, NJ

Sample Start Date	Sample Stop Date	Gross Beta (pCi/m ³)	I-131 Air Filter (pCi/m ³)	I-131 Cartridge (pCi/m ³)	Cs-134 Air Filter (pCi/m ³)	Cs-137 Air Filter (pCi/m ³)
MDC		0.01		0.07	0.01	0.01
03/09/11	03/21/11	0.019 ± 0.002	ND (< 0.005)	ND (< 0.017)	ND (< 0.003)	ND (< 0.003)
03/21/11	03/28/11	0.055 ± 0.005	0.026 ± 0.011	0.073 ± 0.023	ND (< 0.007)	ND (< 0.004)
03/28/11	04/05/11	0.047 ± 0.004	0.019 ± 0.009	0.068 ± 0.026	ND (< 0.006)	ND (< 0.004)
04/05/11	04/12/11	0.042 ± 0.004	ND (< 0.011)	ND (< 0.010)	ND (< 0.006)	ND (< 0.005)
04/12/11	04/19/11	0.020 ± 0.003	ND (< 0.006)	ND (< 0.014)	ND (< 0.002)	ND (< 0.004)
04/19/11	04/26/11	0.026 ± 0.003	ND (< 0.052)	ND (< 0.016)	ND (< 0.006)	ND (< 0.004)

AI01 – Fort Elfsborg Road – Elsinboro Twp., NJ

Sample Start Date	Sample Stop Date	Gross Beta (pCi/m ³)	I-131 Air Filter (pCi/m ³)	I-131 Cartridge (pCi/m ³)	Cs-134 Air Filter (pCi/m ³)	Cs-137 Air Filter (pCi/m ³)
MDC		0.01		0.07	0.01	0.01
03/09/11	03/21/11	0.022 ± 0.002	ND (< 0.004)	ND (< 0.015)	ND (< 0.003)	ND (< 0.002)
03/21/11	03/28/11	0.058 ± 0.004	0.025 ± 0.007	0.082 ± 0.036	ND (< 0.006)	ND (< 0.005)
03/28/11	04/05/11	0.046 ± 0.004	0.016 ± 0.006	0.114 ± 0.030	ND (< 0.004)	ND (< 0.005)
04/05/11	04/12/11	0.040 ± 0.004	ND (< 0.007)	0.041 ± 0.022	ND (< 0.005)	ND (< 0.003)
04/12/11	04/19/11	0.024 ± 0.003	ND (< 0.007)	ND (< 0.013)	ND (< 0.004)	ND (< 0.004)
04/19/11	04/26/11	0.028 ± 0.003	ND (< 0.050)	ND (< 0.024)	ND (< 0.005)	ND (< 0.004)

AI02 – Plant Access Road – Hancocks Bridge, NJ

Sample Start Date	Sample Stop Date	Gross Beta (pCi/m ³)	I-131 Air Filter (pCi/m ³)	I-131 Cartridge (pCi/m ³)	Cs-134 Air Filter (pCi/m ³)	Cs-137 Air Filter (pCi/m ³)
MDC		0.01		0.07	0.01	0.01
03/09/11	03/21/11	0.025 ± 0.002	ND (< 0.004)	ND (< 0.024)	ND (< 0.003)	ND (< 0.003)
03/21/11	03/28/11	0.053 ± 0.004	0.034 ± 0.008	0.061 ± 0.022	ND (< 0.007)	ND (< 0.003)
03/28/11	04/05/11	0.045 ± 0.003	0.021 ± 0.008	0.089 ± 0.023	ND (< 0.005)	0.004 ± 0.003
04/05/11	04/12/11	0.044 ± 0.004	ND (< 0.008)	ND (< 0.034)	ND (< 0.006)	ND (< 0.006)
04/12/11	04/19/11	0.026 ± 0.003	ND (< 0.008)	ND (< 0.016)	ND (< 0.005)	ND (< 0.005)
04/19/11	04/26/11	0.024 ± 0.003	ND (< 0.040)	ND (< 0.023)	ND (< 0.004)	ND (< 0.005)

AI03 – Lower Alloways Creek School – Canton, NJ

Sample Start Date	Sample Stop Date	Gross Beta (pCi/m ³)	I-131 Air Filter (pCi/m ³)	I-131 Cartridge (pCi/m ³)	Cs-134 Air Filter (pCi/m ³)	Cs-137 Air Filter (pCi/m ³)
MDC		0.01		0.07	0.01	0.01
03/09/11	03/21/11	0.022 ± 0.002	ND (< 0.003)	ND (< 0.022)	ND (< 0.003)	ND (< 0.002)
03/21/11	03/28/11	0.053 ± 0.004	0.023 ± 0.007	0.058 ± 0.022	ND (< 0.005)	ND (< 0.004)
03/28/11	04/05/11	0.041 ± 0.003	0.019 ± 0.010	0.083 ± 0.024	ND (< 0.006)	ND (< 0.005)
04/05/11	04/12/11	0.032 ± 0.003	ND (< 0.010)	0.031 ± 0.014	ND (< 0.006)	ND (< 0.004)
04/12/11	04/19/11	0.025 ± 0.003	ND (< 0.006)	ND (< 0.015)	ND (< 0.004)	ND (< 0.003)
04/19/11	04/27/11	0.008 ± 0.002	ND (< 0.041)	ND (< 0.020)	ND (< 0.006)	ND (< 0.004)

Potable Water Results

The collection of potable water samples was increased from quarterly to weekly. Samples are collected from six locations (two in the environs and onsite at Oyster Creek and four in the environs and onsite at Salem/Hope Creek).

Samples were analyzed for tritium and gamma emitting radionuclides (Iodine-131 and Cesium-134/137). Results are in picocuries per liter (pCi/L). The NJDEP’s contract laboratory minimum detectable concentration (MDC) is provided as reference. The MDC is the minimum detectable activity measured in concentration units (i.e., pCi/L). It is the activity level that a specific instrument and technique can be expected to detect with a 95% confidence interval. “ND” means Non Detect. This indicates that the radionuclide was not detected above the laboratory’s measured MDC provided in parenthesis ().

**NJDEP Potable Water Monitoring
OCWW01 – OCNGS Administration Building – Forked River, NJ**

Sample Collection Date	Cs-134 (pCi/L)	Cs-137 (pCi/L)	I-131 (pCi/L)
MDC	10	18	1
03/28/11	ND (< 2.40)	ND (< 2.13)	ND (< 0.80)
04/05/11	ND (< 4.04)	ND (< 4.35)	ND (< 0.93)
04/12/11	ND (< 2.01)	ND (< 1.60)	ND (< 0.48)
04/19/11	ND (< 3.19)	ND (< 2.88)	ND (< 0.88)
04/26/11	ND (< 1.89)	ND (< 1.65)	ND (< 0.83)

OCWW02 – Forked River Marina – Forked River, NJ

Sample Collection Date	Cs-134 (pCi/L)	Cs-137 (pCi/L)	I-131 (pCi/L)
MDC	10	18	1
03/28/11	ND (< 2.35)	ND (< 2.08)	ND (< 0.83)
04/05/11	ND (< 4.15)	ND (< 5.18)	ND (< 0.62)
04/12/11	ND (< 1.99)	ND (< 1.78)	ND (< 0.45)
04/19/11	ND (< 2.64)	ND (< 2.39)	ND (< 0.86)
04/26/11	ND (< 2.63)	ND (< 2.55)	ND (< 0.88)

AIWW01 – Elsinboro School – Elsinboro Twp., NJ

Sample Collection Date	Cs-134 (pCi/L)	Cs-137 (pCi/L)	I-131 (pCi/L)
MDC	10	18	1
03/30/11	ND (< 3.07)	ND (< 2.65)	ND (< 0.65)
04/05/11	ND (< 3.16)	ND (< 3.06)	ND (< 0.59)
04/12/11	ND (< 2.69)	ND (< 3.66)	ND (< 0.61)
04/19/11	ND (< 2.53)	ND (< 2.39)	ND (< 0.83)
04/26/11	ND (< 2.42)	ND (< 2.06)	ND (< 0.87)

NJDEP Potable Water Monitoring (continued)
AIWW02 – Lower Alloways Creek Police Station – Hancocks Bridge, NJ

Sample Collection Date	Cs-134 (pCi/L)	Cs-137 (pCi/L)	I-131 (pCi/L)
MDC	10	18	1
03/30/11	ND (< 3.79)	ND (< 3.35)	ND (< 0.88)
04/05/11	ND (< 3.94)	ND (< 3.19)	ND (< 0.78)
04/12/11	ND (< 2.10)	ND (< 1.93)	ND (< 0.81)
04/19/11	ND (< 2.55)	ND (< 2.01)	ND (< 0.91)
04/26/11	ND (< 2.37)	ND (< 2.05)	ND (< 0.85)

AIWW03 – Salem NGS Administration Building – Hancocks Bridge, NJ

Sample Collection Date	Cs-134 (pCi/L)	Cs-137 (pCi/L)	I-131 (pCi/L)
MDC	10	18	1
03/30/11	ND (< 5.16)	ND (< 4.63)	ND (< 0.67)
04/05/11	ND (< 2.82)	ND (< 2.41)	ND (< 0.95)
04/12/11	ND (< 2.40)	ND (< 1.98)	ND (< 0.72)
04/19/11	ND (< 2.49)	ND (< 2.42)	ND (< 0.82)
04/27/11	ND (< 2.52)	ND (< 2.17)	ND (< 0.87)

AIWW04 – Lower Alloways Creek School – Canton, NJ

Sample Collection Date	Cs-134 (pCi/L)	Cs-137 (pCi/L)	I-131 (pCi/L)
MDC	10	18	1
03/30/11	ND (< 3.95)	ND (< 3.39)	ND (< 0.88)
04/05/11	ND (< 2.28)	ND (< 2.06)	ND (< 0.93)
04/12/11	ND (< 2.21)	ND (< 1.78)	ND (< 0.50)
04/19/11	ND (< 2.96)	ND (< 2.48)	ND (< 0.89)
04/27/11	ND (< 2.21)	ND (< 1.95)	ND (< 0.85)

Surface Water Results

The BNE requested PSEG Nuclear, LLC to change the collection period of their routine sampling program in order to provide splits of surface water samples during the Fukushima Daiichi nuclear incident. As a result, the DEP received split samples of surface water from two locations (AISW01 and AISW02) for analysis by the DEP’s contract laboratory.

Samples were analyzed for tritium and gamma emitting radionuclides (Iodine-131 and Cesium-134/137). Results are in picocuries per liter (pCi/L). The NJDEP’s contract laboratory minimum detectable concentration (MDC) is provided as reference. The MDC is the minimum detectable activity measured in concentration units (i.e., pCi/L). It is the activity level that a specific instrument and technique can be expected to detect with a 95% confidence interval. “ND” means Non Detect. This

indicates that the radionuclide was not detected above the laboratory’s measured MDC provided in parenthesis ().

**NJDEP Surface Water Monitoring
AISW01 – Surface Water Inlet Building Discharge (Onsite)
Hancocks Bridge, NJ**

Sample Collection Date	Cs-134 (pCi/L)	Cs-137 (pCi/L)	I-131 (pCi/L)
MDC	10	18	1
04/07/11	ND (< 2.18)	ND (< 2.03)	ND (< 0.75)

AISW02 – Western Bank, Delaware River, Odessa, DE

Sample Collection Date	Cs-134 (pCi/L)	Cs-137 (pCi/L)	I-131 (pCi/L)
MDC	10	18	1
04/07/11	ND (< 2.16)	ND (< 1.94)	ND (< 0.91)

Milk Results

Milk is sampled because it is a readily available food source consumed by a large portion of the population. Each calendar quarter, the DEP routinely collects non-pasteurized (raw) milk samples from a background location outside of Trenton, New Jersey. This provides an extremely conservative indicator since raw milk is not normally consumed by the general public. In response to the nuclear incident in Japan, collection of raw milk samples was increased to weekly. The collection of pasteurized milk samples started the week of March 28, 2011 at the same location. The DEP also received split samples of milk, from three private farms (AIMI01, AIMI02 and AIMI03) collected by PSEG Nuclear LLC. Specific to the environs of Oyster Creek, there are no dairy farms within a 10-mile radius of Oyster Creek. Hence the DEP will not be receiving split samples from Exelon Nuclear.

All milk samples are analyzed for gamma emitting radionuclides (Iodine-131 and Cesium-134/137) and for Strontium-89/90. Available results are reported below. Results are in picocuries per liter (pCi/L). The NJDEP’s contract laboratory minimum detectable concentration (MDC) is provided as reference. The MDC is the minimum detectable activity measured in concentration units (i.e., pCi/L). It is the activity level that a specific instrument and technique can be expected to detect with a 95% confidence interval. “ND” means Non Detect. This indicates that the radionuclide was not detected above the laboratory’s measured MDC provided in parenthesis ().

**NJDEP Milk Monitoring
COMI01 – Background Milk Location**

Sample Collection Date	Cs-134 (pCi/L)	Cs-137 (pCi/L)	I-131 (pCi/L)	Sr-89 (pCi/L)	Sr-90 (pCi/L)
MDC	15	18	1	1	1
03/23/11 (Raw Milk)	ND (< 2.47)	ND (< 2.18)	ND (< 0.52)	ND (< 0.79)	ND (< 0.86)
03/30/11 (Raw Milk)	ND (< 2.96)	ND (< 2.53)	0.94 ± 0.39	ND (< 0.85)	ND (< 0.82)
03/30/11 (Pasteurized)	ND (< 2.81)	ND (< 2.30)	ND (< 0.75)	ND (< 0.89)	ND (< 0.85)
04/06/11 (Raw Milk)	ND (< 6.65)	ND (< 5.46)	ND (< 0.76)	ND (< 0.95)	ND (< 0.87)
04/06/11 (Pasteurized)	ND (< 4.38)	ND (< 3.68)	ND (< 0.94)	ND (< 0.95)	ND (< 0.87)
04/13/11 (Raw Milk)	ND (< 2.84)	ND (< 2.42)	ND (< 0.64)	ND (< 0.97)	ND (< 0.93)
04/13/11 (Pasteurized)	ND (< 3.71)	ND (< 3.15)	ND (< 0.94)	ND (< 0.57)	ND (< 0.81)
04/20/11 (Raw Milk)	ND (< 3.67)	ND (< 4.53)	ND (< 0.91)	ND (< 0.92)	ND (< 0.95)
04/20/11 (Pasteurized)	ND (< 2.93)	ND (< 2.42)	ND (< 0.79)	ND (< 0.91)	ND (< 0.88)
04/27/11 (Raw Milk)	ND (< 2.35)	ND (< 1.98)	ND (< 0.94)	ND (< 0.90)	ND (< 0.84)
04/27/11 (Pasteurized)	ND (< 3.21)	ND (< 3.20)	ND (< 0.47)	ND (< 0.83)	ND (< 0.84)

AIMI01 – Private Farm (ENE wind compass sector 12 miles from Salem / Hope Creek NGS)

Sample Collection Date	Cs-134 (pCi/L)	Cs-137 (pCi/L)	I-131 (pCi/L)	Sr-89 (pCi/L)	Sr-90 (pCi/L)
MDC	15	18	1	1	1
04/04/11	ND (< 2.67)	ND (< 2.27)	ND (< 0.74)	ND (< 0.92)	ND (< 0.84)
04/18/11	ND (< 3.82)	ND (< 3.30)	ND (< 0.63)	ND (< 0.89)	ND (< 0.88)
05/02/11	ND (< 4.12)	ND (< 2.81)	ND (< 0.95)	ND (< 0.90)	ND (< 0.83)

AIMI02 – Private Farm (NE wind compass sector 17 miles from Salem / Hope Creek NGS)

Sample Collection Date	Cs-134 (pCi/L)	Cs-137 (pCi/L)	I-131 (pCi/L)	Sr-89 (pCi/L)	Sr-90 (pCi/L)
MDC	15	18	1	1	1
04/04/11	ND (< 3.50)	ND (< 3.14)	ND (< 0.92)	ND (< 0.96)	ND (< 0.86)
04/18/11	ND (< 3.18)	ND (< 2.77)	ND (< 0.66)	ND (< 0.89)	ND (< 0.91)
05/02/11	ND (< 2.44)	ND (< 2.16)	ND (< 0.71)	ND (< 0.91)	ND (< 0.81)

AIMI03 – Private Farm (WNW wind compass sector 7.6 miles from Salem / Hope Creek NGS)

Sample Collection Date	Cs-134 (pCi/L)	Cs-137 (pCi/L)	I-131 (pCi/L)	Sr-89 (pCi/L)	Sr-90 (pCi/L)
MDC	15	18	1	1	1
04/04/11	ND (< 2.58)	ND (< 2.13)	ND (< 0.95)	ND (< 0.98)	ND (< 0.87)
04/18/11	ND (< 2.85)	ND (< 2.19)	ND (< 0.80)	ND (< 0.88)	ND (< 0.87)
05/02/11	ND (< 2.45)	ND (< 2.03)	ND (< 0.57)	ND (< 0.92)	ND (< 0.99)

Vegetation Results

The DEP requested PSEG Nuclear, LLC to sample vegetables from several local farms in the environs of the Salem/Hope Creek nuclear plants in response to the Japanese nuclear incident. Vegetables grown locally are readily available and represent a viable food source that is potentially consumed by a large portion of the population. The DEP received split samples of asparagus from three locations (AIVE04, AIVE05 and AIVE11).

Samples were analyzed for gamma emitting radionuclides (Iodine-131 and Cesium-134/137). Results are in picocuries per liter (pCi/kg). The NJDEP's contract laboratory minimum detectable concentration (MDC) is provided as reference. The MDC is the minimum detectable activity measured in concentration units (i.e., pCi/kg). It is the activity level that a specific instrument and technique can be expected to detect with a 95% confidence interval. "ND" means Non Detect. This indicates that the radionuclide was not detected above the laboratory's measured MDC provided in parenthesis ().

NJDEP Vegetation Monitoring

AIVE04 – Private Farm (NNE wind compass sector 13.5 miles from Salem / Hope Creek NGS)

Sample Collection Date	Cs-134 (pCi/kg)	Cs-137 (pCi/kg)	I-131 (pCi/kg)
MDC	60	80	60
05/01/11	ND (< 13.0)	ND (< 13.1)	ND (< 57.0)

AIVE05 – Private Farm (NNE wind compass sector 7.5 miles from Salem / Hope Creek NGS)

Sample Collection Date	Cs-134 (pCi/kg)	Cs-137 (pCi/kg)	I-131 (pCi/kg)
MDC	60	80	60
05/01/11	ND (< 10.7)	ND (< 8.80)	ND (< 41.3)

AIVE11 – Private Farm (NE wind compass sector 25.0 miles from Salem / Hope Creek NGS)

Sample Collection Date	Cs-134 (pCi/kg)	Cs-137 (pCi/kg)	I-131 (pCi/kg)
MDC	60	80	60
05/01/11	ND (< 11.5)	ND (< 9.88)	ND (< 41.1)