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U.S. Nuclear Regulatory Commission
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Docket Nos.	50-245
	50-336
	50-423
License Nos.	DPR-21
	DPR-65
	NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNITS 1, 2, AND 3
2013 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

This letter transmits the Annual Radiological Environmental Operating Report for the Millstone Power Station, for the period January 2013 through December 2013. This satisfies the provisions of Section 5.7.2 of Millstone Power Station Unit 1 Permanently Defueled Technical Specifications (PDTS), and Sections 6.9.1.6a and 6.9.1.3 of the Millstone Power Station Units 2 and 3 Technical Specifications, respectively.

If you have any questions or require additional information, please contact Mr. William D. Bartron at (860) 444 4301.

Sincerely,

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Attachments: 1

Commitments made in this letter:

1. None.

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ATTACHMENT 1

2013 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

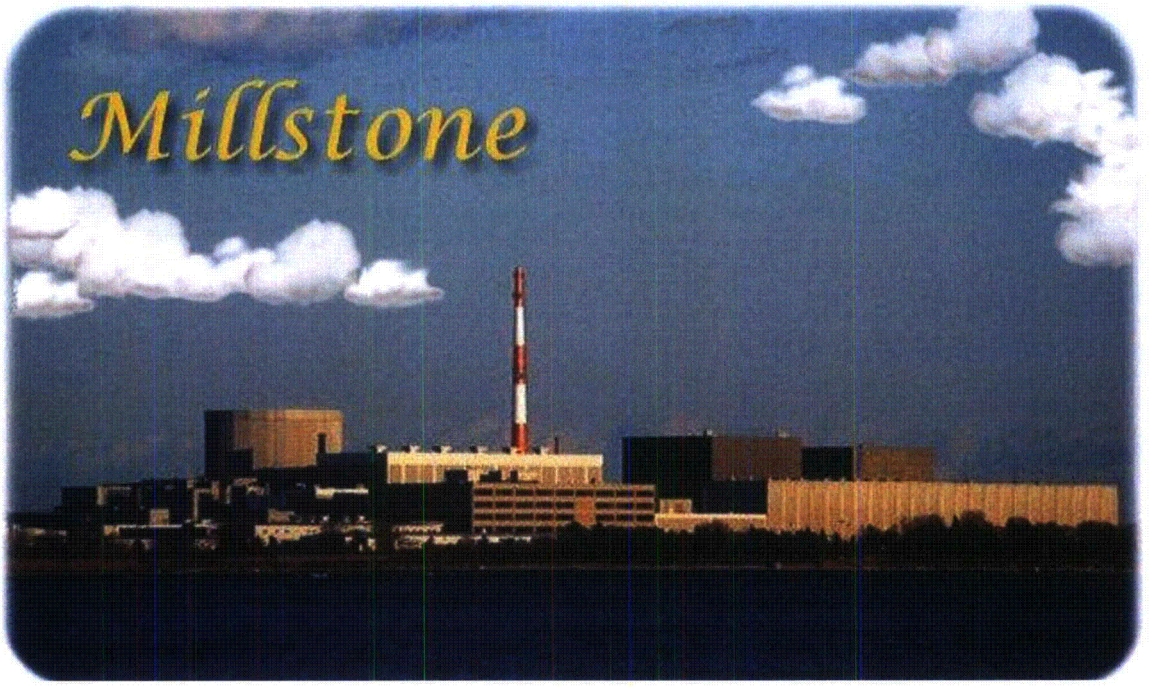
MILLSTONE POWER STATION UNITS 1, 2, AND 3
DOMINION NUCLEAR CONNECTICUT, INC. (DNC)

Millstone Power Station

2013

Radiological Environmental Operating Report

January 1, 2013 – December 31, 2013



Dominion Nuclear Connecticut, Inc.

Unit	License	Docket
1	DPR-21	50-245
2	DPR-65	50-336
3	NPF-49	50-423

Dominion

ANNUAL
RADIOLOGICAL ENVIRONMENTAL
OPERATING REPORT

MILLSTONE POWER STATION

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

2013

Millstone Power Station Unit 1, DOCKET NO. 50-245
Millstone Power Station Unit 2, DOCKET NO. 50-336
Millstone Power Station Unit 3, DOCKET NO. 50-423

Dominion Nuclear Connecticut, Inc.
Waterford, Connecticut

~ *TABLE OF CONTENTS* ~

EXECUTIVE SUMMARY

INTRODUCTION

This report summarizes the results of the Radiological Environmental Monitoring Program (REMP) conducted in the vicinity of the Millstone Nuclear Power Station (Millstone) during the period from January 1 to December 31, 2013. This document has been prepared in accordance with the requirements of the separate Technical Specifications for Millstone Units 1, 2 and 3.

The REMP has been established to monitor the radiation and radioactivity released to the environment as a result of Millstone's operation. This program, initiated in April 1967, includes the collection, analysis, and evaluation of radiological data in order to assess the impact of Millstone on the environment and on the general public.

SAMPLING AND ANALYSIS

The environmental sampling media collected in the vicinity of Millstone and at distant locations included terrestrial samples in the form of air particulate filters, charcoal cartridges, soil, cow milk, pasture grass, feed, hay, well water, broadleaf vegetation, fruits and vegetables; and aquatic samples in the form of seawater, bottom sediment, aquatic flora, fish, oysters, clams and lobster.

During 2013, there were 964 samples collected from the atmospheric, aquatic, and terrestrial environments. In addition, 176 exposure measurements were obtained using environmental thermoluminescent dosimeters (TLDs). A discussion of all discrepancies from the sample collection requirements in the Millstone Radiological Effluent Monitoring and Offsite Dose Calculation Manual (REMODCM) is given in Section 2.3 of this report.

Teledyne Brown Engineering, Inc. of Knoxville, Tennessee performed the sample analyses and Environmental Dosimetry Company of Sterling, Massachusetts performed the TLD analyses.

LAND USE CENSUS

The annual land use census in the vicinity of Millstone was conducted as required by the Millstone REMODCM. Typically the cow milk locations are identified by a review of the annual registration information obtained from the State of Connecticut Department of Agriculture. Gardens are located by a drive-by during the harvest season. Although broadleaf sampling was performed and may be used in lieu of a garden census, gardens were included in the 2013 census. Only vegetable gardens having an area of more than 500 square feet need to be identified. Due to the difficulty of measuring individual gardens, the nearest garden within each directional sector identified by a drive-by survey is listed. Garden distances are based on nearest resident assuming that a resident may plant a new garden. Goat locations are more difficult to determine, but best efforts are made to consult goat association records, contact previous owners or perform drive-bys, if necessary.

RADIOLOGICAL IMPACT TO THE ENVIRONMENT

The radioactivity detected in many samples was from non-plant related sources, such as fallout from past nuclear weapons tests and naturally occurring radionuclides.

There was plant related activity detected in one of the onsite well samples. Details are given in Section 4.10. All other terrestrial samples collected as part of the Millstone REMP did not show any plant related activity.

Several aquatic samples did show plant related activity. Monitoring of seawater in the area of the discharge indicated the presence of the tritium, a station related radionuclide. Tritium was only found onsite inside the mixing zone of the quarry discharge at levels that were expected from routine plant operation. Plant related radioactivity was found in four flora (seaweed) samples. Details are given in Section 4.16. Plant related radioactivity was also found in several fish and oysters samples. Details are given in Sections 4.17 and 4.19

Offsite ambient radiation measurements using environmental TLDs beyond the site boundary ranged between 43 and 96 milliRoentgens per year. The range of ambient radiation levels observed with the TLDs is consistent with natural background radiation levels for Connecticut.

RADIOLOGICAL IMPACT TO THE GENERAL PUBLIC

During 2013, radiation doses to the general public as a result of Millstone's operation continued to be well below the federal limits and much less than the dose due to other sources of man-made (e.g., X-rays, medical) and naturally-occurring (e.g., cosmic, radon) radiation.

The calculated total body dose to the maximally exposed member of the general public from radioactive effluents and ambient radiation resulting from Millstone operations for 2013 was approximately 0.2 mrem* for the year. This conservative estimate is well below the Environmental Protection Agency's (EPA) annual dose limit to any member of the general public and is a fraction of a percent of the typical dose received from natural and other sources of man-made radiation.

* The term 'mrem' used in this report is a unit of radiation dose. The letter 'm' is for 'milli', or one-thousandth of a 'rem.' The word 'rem' is an acronym for roentgen equivalent man. One rem is equal to a rad multiplied by factors to account for type of radiation and distribution within the body. The word 'rad' is an acronym for radiation absorbed dose. One rad is equal to the absorption of 100 ergs of energy per gram of tissue.

CONCLUSIONS

The 2013 REMP for Millstone resulted in the collection and analysis of over a thousand environmental samples and measurements. The data obtained were used to determine the impact of Millstone's operation on the environment and on the general public.

An evaluation of direct radiation measurements, environmental sample analyses, and dose calculations indicates all applicable federal criteria were met. Furthermore, radiation levels and resulting doses from station operation were a small fraction of those attributed to natural and man-made background radiation.

Based on this information, there is no significant radiological impact on the environment or on the general public due to Millstone's operation.

1. INTRODUCTION

This section provides an overview of the Millstone REMP. It also includes background information to allow a reader to have an informed understanding of radiation and nuclear power operation.

1.1 Overview

The REMP for 2013 performed by Dominion Nuclear Connecticut (DNC) for Millstone is discussed in this report. Since the operation of a nuclear power plant results in the release of small amounts of radioactivity and low levels of radiation, the Nuclear Regulatory Commission (NRC) requires a program be established to monitor radiation and radioactivity in the environment (References 1, 6 & 10). This report, published annually per Millstone's Technical Specifications (section 5.7.2 for Millstone Unit 1, section 6.9.1.6 for Millstone Unit 2 and Section 6.9.1.3 for Millstone Unit 3), summarizes the results of measurements of radiation and radioactivity in the environment in the vicinity of the Millstone and at distant locations during the period January 1 to December 31, 2013.

The REMP consists of taking radiation measurements and collecting samples from the environment, analyzing them for radioactivity content, and interpreting the results. With emphasis on the critical radiation exposure pathways to humans, samples from the aquatic, atmospheric, and terrestrial environments are collected. These samples include, but are not limited to: air, soil, cow milk, pasture grass, hay, well water, broadleaf vegetation, fruits, vegetables, seawater, bottom sediment, aquatic flora, fish, mussels, oysters, clams and lobster. Thermoluminescent dosimeters (TLDs) are placed in the environment to measure gamma radiation levels. The TLDs are processed and the environmental samples are analyzed to measure the very low levels of radiation and radioactivity present in the environment as a result of Millstone operation and other natural and man-made sources. These results are reviewed by Millstone's radiological staff and have been reported semiannually or annually to the NRC and others for over 30 years.

In order to more fully understand how a nuclear power plant impacts humans and the environment, background information on radiation and radioactivity, natural and man-made sources of radiation, reactor operations, radioactive effluent controls, and radiological impact on humans is provided. It is believed that this information will assist the reader in understanding the radiological impact on the environment and humans from the operation of Millstone.

1.2 Radiation and Radioactivity

All matter is made of atoms. An atom is the smallest component into which matter can be broken down and still maintain all its chemical properties. Nuclear radiation is energy, in the form of waves or particles that is given off from atoms in an excited state (e.g., unstable, radioactive atoms).

Radioactive material exists naturally and has always been a part of our environment. The earth's crust, for example, contains radioactive uranium, radium, thorium, and potassium. Some radioactivity is a result of nuclear weapons testing. Examples of radioactive fallout that is normally present in environmental samples are cesium-137 and strontium-90. Some examples of radioactive materials released from a nuclear power plant are cesium-137, iodine-131, strontium-90, and cobalt-60.

Radiation is measured in units of mrem, much like temperature is measured in degrees. A mrem (mrem) is a measure of the biological effect of the energy deposited in tissue. The letter 'm' is for 'milli', or one-thousandth of a 'rem.' The word 'rem' is an acronym for roentgen equivalent man. One rem is equal to a 'rad' multiplied by factors to account for type of radiation and distribution within the body. The word 'rad' is an acronym for radiation absorbed dose. One rad is equal to the absorption of 100 ergs of energy per gram of tissue. The natural and man-made radiation dose received in one year by the average American is 300 to 600 mrem (References 2, 3, 4 & 5). The per capita dose has increased since the mid 1980's because of the increased usage of medical procedures involving exposure to radiation (see Reference 3).

Radioactivity is measured in Curies. Levels of radioactivity commonly seen in the environment are typically a small fraction of a Curie, therefore radioactivity in the environment is typically measured in picocuries. One picocurie (pCi) is one-trillionth of a Curie and is equal to 0.037 disintegrations per second (2.22 disintegrations per minute).

1.3 Sources of Radiation

As mentioned previously, naturally occurring radioactivity has always been a part of our environment. Table 1.3 shows the sources and doses of radiation from natural and man-made sources.

Table 1.3
Radiation Sources and Corresponding Doses [1]

NATURAL		MAN-MADE	
Source	Radiation Dose (mrem/year)	Source	Radiation Dose (mrem/year)
Internal, inhalation[2]	228	Medical[3]	300
External, space	33	Consumer[4]	13
Internal, ingestion	29	Industrial, security, [5]	0.3
External, terrestrial	21	Occupational	0.5
		Weapons Fallout	< 1
		Nuclear Power Plants	< 1
Approximate Total	311	Approximate Total	314

(1) information from References 3 and 4
(2) from radon and thoron
(3) includes computerized tomography (147 mrem), nuclear medicine (77 mrem), interventional fluoroscopy (43 mrem) and conventional radiography and fluoroscopy (33 mrem)
(4) primarily from cigarette smoking (4.6 mrem), commercial air travel (3.4 mrem), building materials (3.5 mrem) and mining and agriculture (0.8 mrem)
(5) Industrial, security, medical, educational and research

Cosmic radiation (external, space) from the sun and outer space penetrates the earth's atmosphere and continuously bombards us with rays and charged particles. Some of this cosmic radiation interacts with gases and particles in the atmosphere, making them radioactive. These radioactive byproducts from cosmic ray bombardment are referred to as cosmogenic radionuclides. Isotopes such as beryllium-7 and carbon-14 are formed in this way. Exposure to cosmic and cosmogenic sources of radioactivity results in about 30 mrem of radiation dose per year.

Additionally, natural radioactivity is in our body and in the food we eat (about 30 mrem/year), the ground we walk on (about 20 mrem/year) and the air we breathe (about 230 mrem/year). The majority of a person's annual dose results from exposure to radon and thoron in the air we breathe. These gases and their radioactive decay products arise from the decay of naturally occurring uranium, thorium and radium in the soil and building products such as brick, stone, and concrete. Radon and thoron levels vary greatly with location, primarily due to changes in the concentration of uranium and thorium in the soil. Residents at some locations in Colorado, New York, Pennsylvania, New Jersey and even Connecticut have a higher annual dose as a result of higher levels of radon/thoron gases in these areas. In total, these various sources of naturally-occurring radiation and radioactivity contribute to a total dose of about 310 mrem per year.

In addition to natural radiation, we are normally exposed to radiation from a number of man-made sources. The single largest doses from man-made sources result from therapeutic and diagnostic applications of x-rays and radiopharmaceuticals. The annual dose to an individual in the United States from medical and dental exposure is approximately 300 mrem. Consumer products/uses, such as cigarettes, building materials and commercial air travel contribute about 10 mrem/year. Much smaller doses result from weapons fallout (less than 1 mrem/year) and nuclear power plants (less than 1 mrem/year). Typically, the average person in the United States receives approximately 310 mrem per year from man-made sources.

1.4 Nuclear Reactor Operations

Millstone generates about 2100 megawatts of electricity at full power, which provides approximately one-third of the power consumed in the State of Connecticut. Millstone Unit 2 and Millstone Unit 3 are pressurized water reactors (Millstone Unit 1, which is permanently shutdown, was a boiling water reactor). The nuclear station is located on an approximate 500-acre site about 5 kilometers (three miles) west of New London, Connecticut. Commercial operation of Millstone Unit 2 began in December 1975 and Millstone Unit 3 in May 1986.

Millstone was operational during most of 2013, with the exception of a refueling outage at Millstone Unit 3 in April. The annual capacity factor for Millstone Unit 2 was 98.3% and for Millstone Unit 3 was 89.2%.

Nuclear-generated electricity is produced by many of the same techniques used for conventional oil and coal-generated electricity. Both systems use heat to boil water in order to produce steam. The steam turns a turbine, which turns a generator, producing electricity. In both cases, the steam passes through a condenser where it changes back into water and re-circulates back through the system. The cooling water source for Millstone is the Niantic Bay.

The key difference between nuclear power and conventional power is the source of heat used to boil the water. Conventional plants burn fossil fuels in a boiler, while nuclear plants use uranium fission in a nuclear reactor.

Inside the reactor, a nuclear reaction called fission takes place. Particles, called neutrons, strike the nucleus of a uranium-235 atom, causing it to split into fragments called radioactive fission products. The splitting of the atoms releases both heat and more neutrons. The newly-released neutrons then collide with and split other uranium atoms, thus making more heat and releasing even more neutrons, and on and on until the uranium fuel is depleted or spent. This process is called a chain reaction. When this chain reaction is self sustaining, the reactor is called "critical."

The operation of a nuclear reactor results in the release of small amounts of radioactivity and low levels of radiation. The radioactivity originates from two major sources, radioactive fission products and radioactive activation products. Radioactive fission products, as illustrated in Figure 1.4-1, originate from the fissioning of the nuclear fuel. These fission products get into the reactor coolant from their release by minute amounts of uranium on the outside surfaces of the fuel cladding, by diffusion through the fuel pellets and cladding and, on occasion, through defects or failures in the fuel cladding. These fission products circulate along with the reactor coolant water and will deposit on the internal surfaces of pipes and equipment. The radioactive fission products on the pipes and equipment emit radiation. Examples of some fission products are krypton-85 (Kr-85), strontium-90 (Sr-90), iodine-131 (I-131), xenon-133 (Xe-133), and cesium-137 (Cs-137).

Nuclear Fission

Fission is the splitting of atoms (e.g., uranium-235) by a neutron to release heat and more neutrons, creating a chain reaction. Radiation and fission products are by-products of the process.

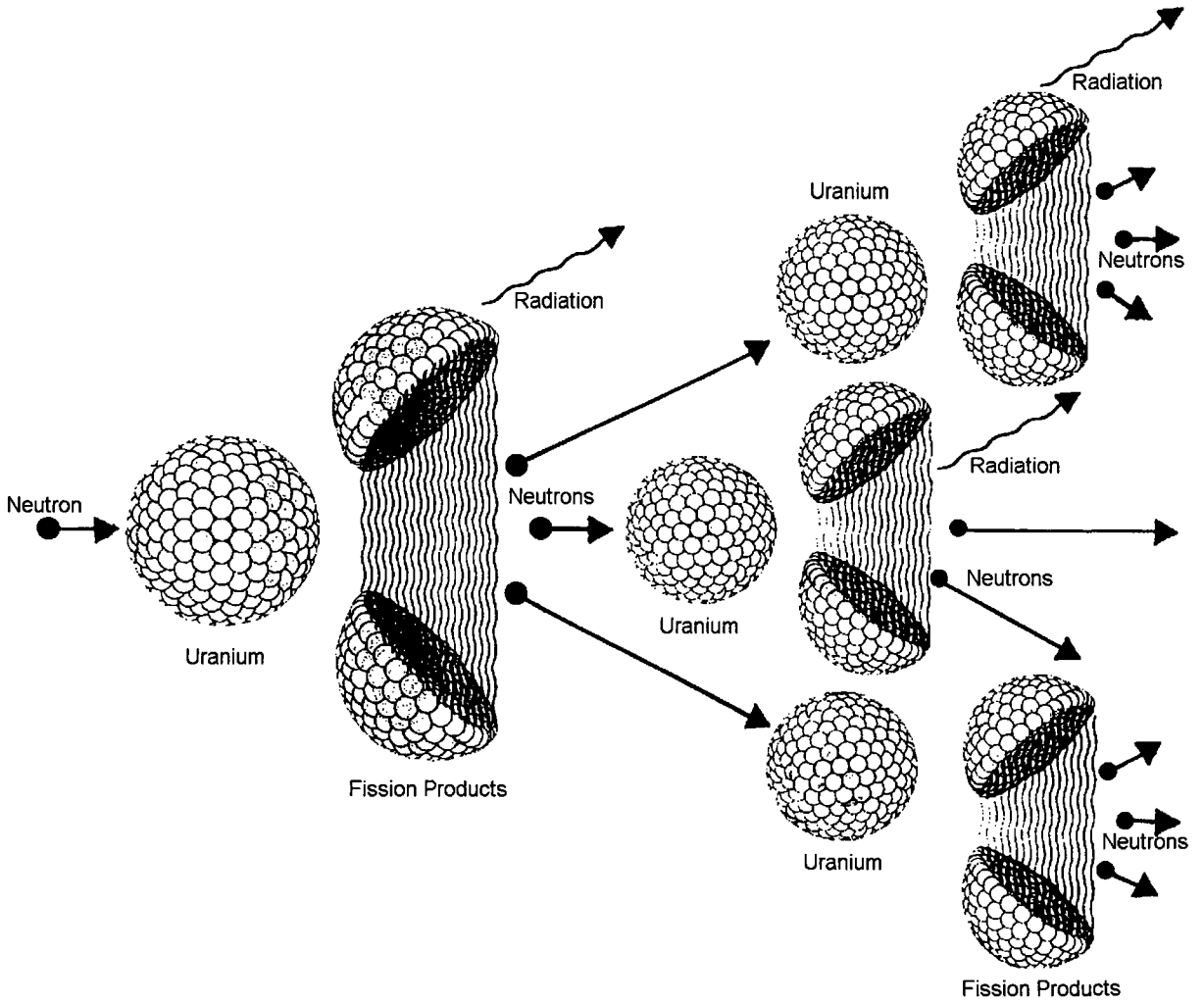


Figure 1.4-1
Radioactive Fission Product Formation

Radioactive activation products (see Figure 1.4-2), on the other hand, originate from two sources. The first is by neutron bombardment of the hydrogen, oxygen and other gas (helium, argon, nitrogen) molecules in the reactor cooling water. The second is a result of the fact that the internals of any piping system or component are subject to minute yet constant corrosion from the reactor cooling water. These minute metallic particles (for example: nickel, iron, cobalt, or magnesium) are transported through the reactor core into the fuel region, where neutrons may react with the nuclei of these particles, producing radioactive products. So, activation products are nothing more than ordinary naturally-occurring atoms that are made unstable or radioactive by neutron bombardment. These activation products circulate along with the reactor coolant water and will deposit on the internal surfaces of pipes and equipment. The radioactive activation products on the pipes and equipment emit radiation. Examples of some activation products are manganese-54 (Mn-54), iron-59 (Fe-59), cobalt-60 (Co-60), and zinc-65 (Zn-65).

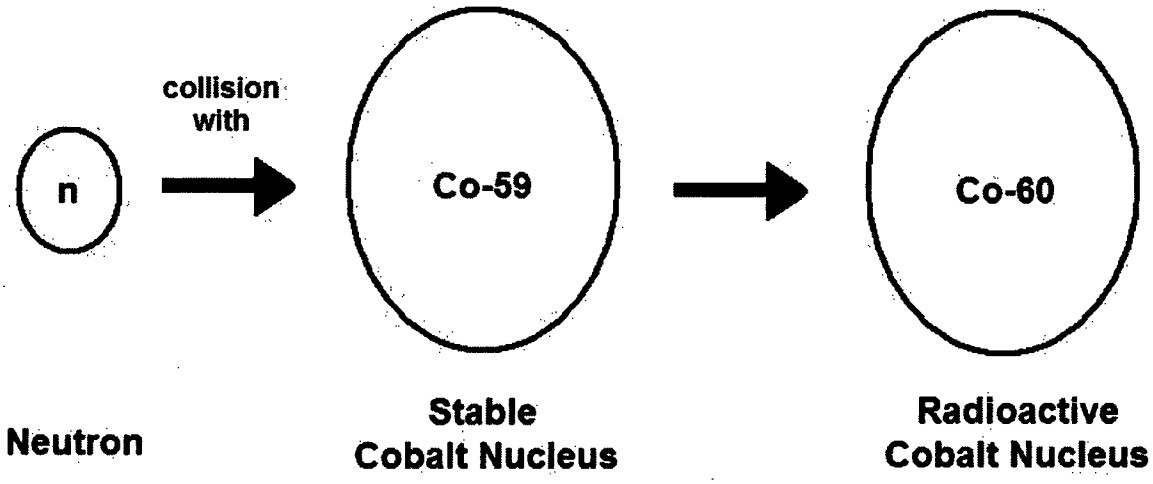


Figure 1.4-2
Radioactive Activation Product Formation

At Millstone there are five independent protective barriers that confine these radioactive materials. These five barriers, which are shown in Figure 1.4-3, are:

- fuel pellets;
- fuel cladding;
- reactor vessel and associated piping and equipment;
- primary containment and,
- secondary containment (enclosure building).

SIMPLIFIED DIAGRAM OF A PRESSURIZED WATER REACTOR

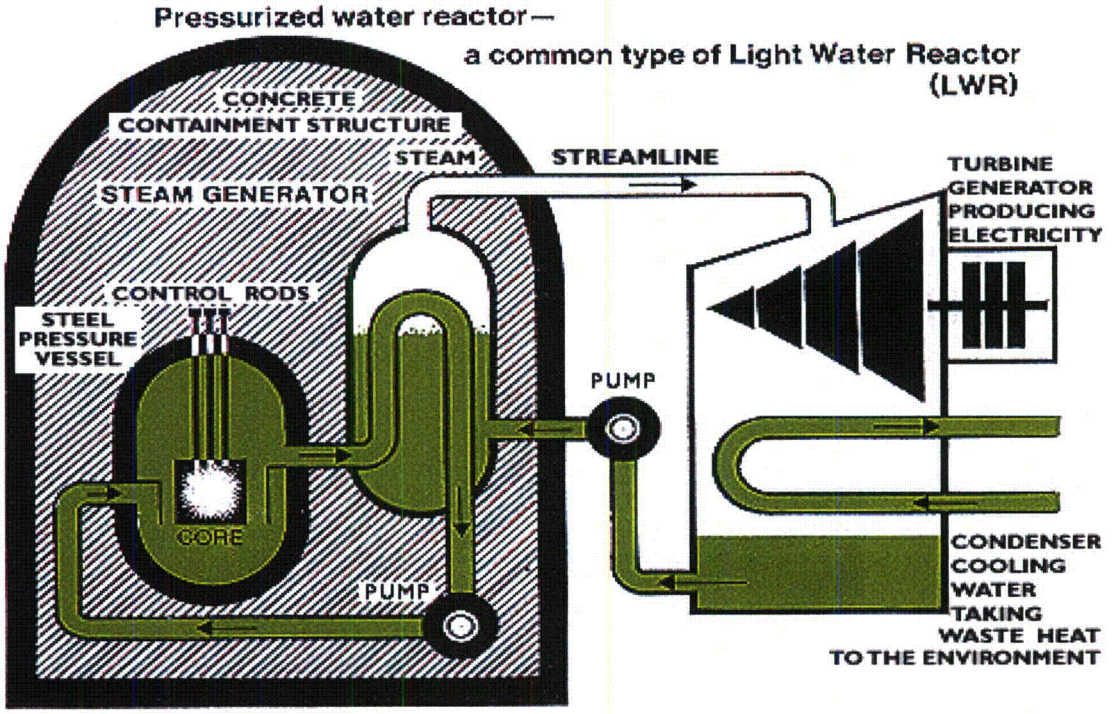


Figure 1.4-3

The ceramic uranium fuel pellets provide the first barrier. Most of the radioactive fission products are either physically trapped or chemically bound between the uranium atoms, where they will remain. However, a few fission products that are volatile or gaseous may diffuse through the fuel pellets into small gaps between the pellets and the fuel cladding.

The second barrier, the fuel cladding, consists of zirconium alloy tubes that confine the fuel pellets. The small gaps between the fuel and the cladding contain the noble gases and volatile iodines that are types of radioactive fission products. This radioactivity can diffuse to a small extent through the fuel cladding into the reactor coolant water.

The third barrier consists of the reactor pressure vessel, steel piping and equipment that confine the reactor cooling water. The reactor pressure vessel, which holds the reactor fuel, is typically a steel tank 40 feet high by 14 feet in diameter with walls about five to nine inches thick. These vessels and associated piping provide containment for radioactivity in the primary coolant and the reactor core. However, during the course of operations and maintenance, small amounts of radioactive fission and activation products can escape through valve leaks or upon breaching of the primary coolant system for maintenance.

The fourth barrier is the primary containment. It is a cylindrical enclosure with approximately five-foot thick steel reinforced concrete walls lined by steel on the inside. Small amounts of radioactivity may be released from primary containment during operation to maintain proper containment pressure and during maintenance and refueling outages.

The fifth barrier is the secondary containment or enclosure building. The enclosure building is a steel building that surrounds the primary containment. This barrier is an additional safety feature at Millstone's reactor units to contain radioactivity that may escape from the primary containment. This enclosure building is equipped with a filtered ventilation system that is used when needed to reduce the radioactivity that escapes from the primary containment.

The five barriers confine most of the radioactive fission and activation products. However, small amounts of radioactivity do escape via mechanical failures and maintenance on valves, piping, and equipment associated with the reactor cooling water system. The small amounts of radioactive liquids and gases that do escape the various containment systems are further controlled by the liquid purification and ventilation filtration systems. Also, prior to a release to the environment, control systems exist to collect and purify the radioactive effluents in order to reduce releases to the environment to as low as is reasonably achievable. The control of radioactive effluents at Millstone will be discussed in more detail in the next section.

1.5 Radioactive Effluent Control

The small amounts of radioactive liquids and gases that might escape the first two barriers are purified in the liquid and gaseous waste treatment systems, then monitored for radioactivity, and released only if the radioactivity levels are below the federal release limits.

Radioactivity released from the liquid effluent system to the environment is limited, controlled, and monitored by a variety of systems and procedures which include:

- reactor water cleanup system;
- liquid radwaste treatment system;
- sampling and analysis of the liquid radwaste tanks; and,
- liquid waste effluent discharge radioactivity monitor.

The purpose of the reactor water cleanup system is to continuously purify the reactor cooling water by removing radioactive atoms and non-radioactive impurities that may become activated by neutron bombardment. A portion of the reactor coolant water is diverted from the primary coolant system and is directed through ion exchange resins where radioactive elements, dissolved and suspended in the water, are removed through chemical processes. The net effect is a substantial reduction of the radioactive material that is present in the primary coolant water and consequently the amount of radioactive material that might escape from the system.

Reactor cooling water that might escape the primary cooling system and other radioactive water sources are collected in floor and equipment drains. These drains direct this radioactive liquid waste to large holdup tanks. The liquid waste collected in the tanks is purified again using the liquid radwaste treatment system, which consists of a filter and ion exchange resins.

Processing of liquid radioactive waste results in large reductions of radioactive liquids discharged into Niantic Bay. Wastes processed through liquid radwaste treatment can be purified and when necessary the processed liquid is re-used in plant systems.

Prior to release, the radioactivity in the liquid radwaste tank is sampled and analyzed to determine if the level of radioactivity is below the release limits and to quantify the total amount of radioactive liquid effluent that would be released. If the levels are below the federal release limits, the tank is drained to the liquid effluent discharge header.

This liquid waste effluent discharge line is provided with a shielded radioactivity monitor. This detector is connected to a radiation level meter and a recorder in the Control Room. The radiation alarm is set so that the detector will alarm before radioactivity levels exceed the release limits. The liquid effluent discharge header has an isolation valve. If an alarm is received, the liquid effluent discharge valve will automatically close, thereby terminating the release to the Niantic Bay and preventing any liquid radioactivity from being released that may exceed the release limits. An audible alarm notifies the Control Room operator that this has occurred.

Some liquid waste sources, which have a low potential for containing radioactivity, and/or may contain very low levels of contamination, may be discharged directly to the Long Island Sound. One such source of liquid is the turbine building sump. However, periodic representative samples are collected for analysis of radioactivity content to track the amounts of radioactivity being discharged.

Another means for adjusting liquid effluent concentrations to below federal limits is by mixing plant cooling water from the condenser with the liquid effluents prior to release to the discharge canal. This larger volume of cooling water further lowers the radioactivity levels to below the release concentration limits.

The preceding discussion illustrates that many controls exist to reduce the radioactive liquid effluents released to the Niantic Bay to as far below the release limits as is reasonably achievable.

Radioactive releases from the radioactive gaseous effluent system to the environment are limited, controlled, and monitored by a variety of systems and procedures which include:

- containment building ventilation system;
- containment building radioactivity monitors;
- sampling and analysis of containment building vent and purge effluents;
- process gas treatment system;
- auxiliary building (and engineered safeguards and fuel building for Millstone Unit 3) ventilation system;
- stack and vent effluent radioactivity monitors;
- sampling and analysis of stack and vent effluents;
- process radiation monitors; and
- steam jet air ejector (SJAE) monitor

The primary sources of gaseous radioactive waste are degassing of the primary coolant, gaseous liquid drains, and gaseous vents. Additional sources of gaseous waste activity include ventilation air released from the auxiliary building and purging and venting of the containment building. The radiation level meter and recorders for the effluent radioactivity monitors are located in the Control Room. The plant process computer aids in tracking the monitor readings. To supplement the information continuously provided by the detector, air samples are taken periodically from the containment, stack and vents. These samples are analyzed to quantify the total amount of tritium and radioactive gaseous and particulate effluents released.

Gases from the primary coolant are held up in waste gas decay tanks for decay at Millstone Unit 2. Gaseous waste at Millstone Unit 3 is purified through a process gas system, consisting of high-efficiency particulate air filters and charcoal adsorber beds. Gases from periodic venting of the Millstone Unit 2 containment are released through a similar process system (Enclosure Building Filtration System) while gases from the Millstone Unit 3 containment vacuum pumps are released without treatment. If necessary, Millstone Unit 3 containment air can be filtered by an internal particulate and charcoal treatment system. Containment purges (purge is the forced ventilation process while containment vents are pressure releases) for Millstone Unit 2 are filtered by high-efficiency particulate filters while at Millstone Unit 3 these are not normally filtered. If necessary, particulate and charcoal filters can be used for these purges.

The auxiliary building ventilation system provides for ventilation of the auxiliary building and enclosure building (and service building and contiguous areas, waste disposal building, and fuel building for Millstone Unit 3, for Millstone Unit 2 these are all part of the auxiliary building). Normally, the air from the ventilation of these areas will exhaust through the ventilation vent (which has a particulate filter for Millstone Unit 2). If exhaust from these areas reaches a predetermined level, the ventilation flow can be diverted by operator control to a particulate and charcoal filtration system.

Therefore, for both liquid and gaseous releases, radioactive effluent control systems exist to collect and purify the radioactive effluents in order to reduce releases to the environment to as low as is reasonably achievable. The effluents are always monitored, sampled and analyzed to make sure that radioactivity levels are below the release limits. If the release limits are being approached, isolation valves in some of the waste effluent lines will automatically shut to stop the release, or Control Room operators can implement procedures to ensure that federal regulatory limits are always met.

1.6 Radiological Impact on Humans

The final step in the effluent control process is the determination of the radiological dose impact to humans and comparison with the federal dose limits to the public. This step is performed in three stages. As mentioned previously, the purpose of continuous radiation monitoring and periodic sampling and analysis is to measure the quantities of radioactivity being released to determine compliance with the radioactivity release limits. This is the first stage for assessing releases to the environment.

The second stage is calculations of the dose impact to the general public from Millstone's radioactive effluents are performed. The purpose of these calculations is to periodically assess the doses to the general public resulting from radioactive effluents to ensure that these doses are being maintained as far below the federal dose limits as is reasonably achievable. This is the second stage for assessing releases to the environment.

The types and quantities of radioactive liquid and gaseous effluents released from Millstone during each year are reported to the NRC annually in the Radiological Effluent Release Report (RERR). Similar to this report, the RERR is submitted annually to the NRC. The liquid and gaseous effluents were well below the federal release limits and were a small percentage of the Millstone REMODCM effluent control limits.

The measurements of the physical and chemical nature of the effluents are used to determine how the radionuclides will interact with the environment and how they can result in radiation exposure to humans. The environmental interaction mechanisms depend upon factors such as the hydrological (water) and meteorological (atmospheric) characteristics in the area. Information on the water flow, wind speed, wind direction, and atmospheric mixing characteristics are used to estimate how radioactivity will distribute and disperse in the ocean and the atmosphere.

The most important type of information that is used to evaluate the radiological impact on humans is data on the use of the environment. Information on fish and shellfish consumption, boating usage, beach usage, locations of cows and goats, locations of residences, locations of gardens, and other usage information are utilized to estimate the amount of radiation and radioactivity received by the general public.

The radiation exposure pathway to humans is the path radioactivity takes from its release point at Millstone to its effect on man. The movement of radioactivity through the environment and its transport to humans is portrayed in Figure 1.6.

EXAMPLES OF Millstone's RADIATION EXPOSURE PATHWAYS

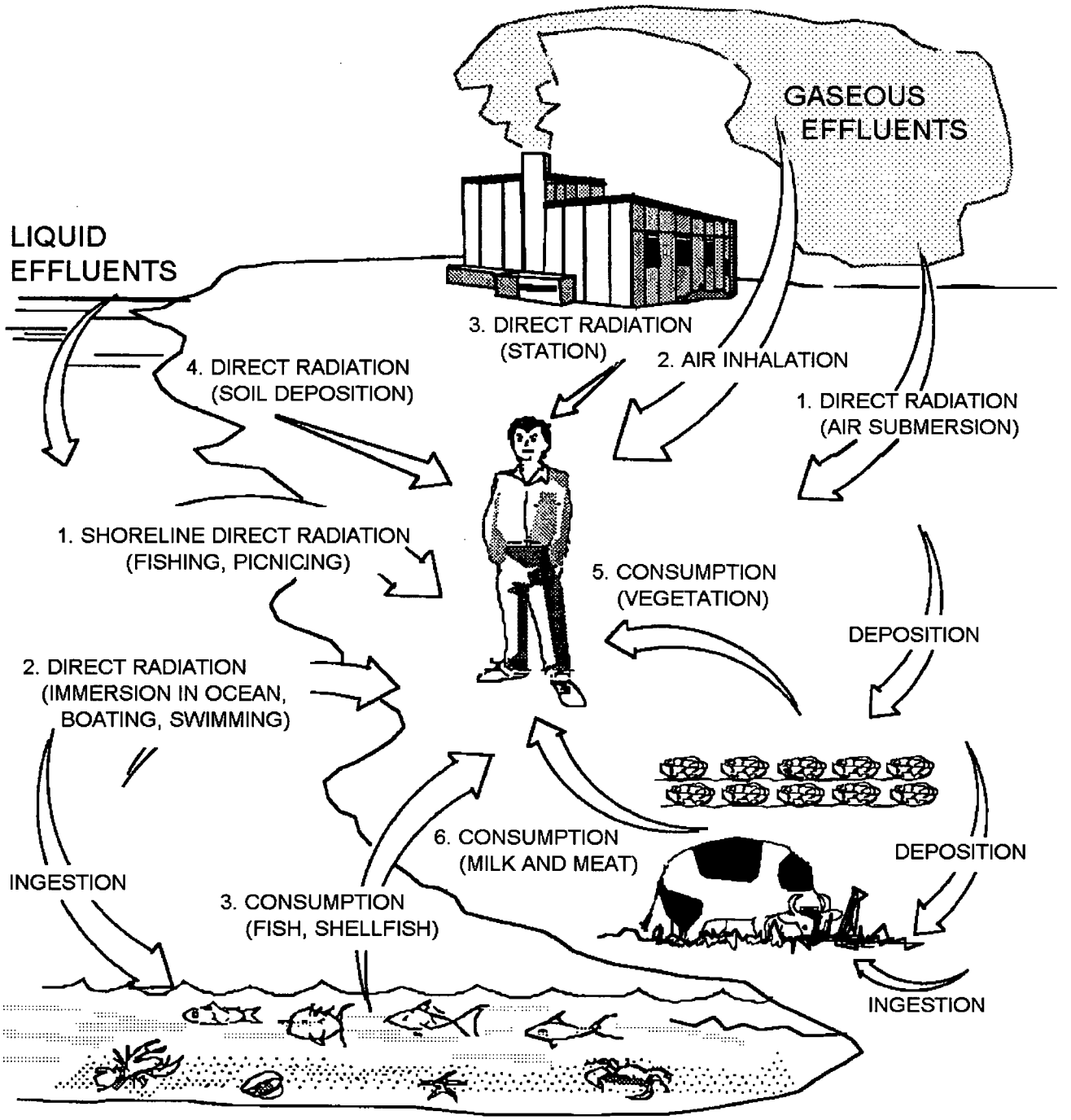


Figure 1.6
Radiation Exposure Pathways

There are three major pathways in which liquid effluents affect humans:

- external radiation from liquid effluents that deposit and accumulate on the shoreline;
- external radiation from immersion in ocean water containing radioactive liquids; and,
- internal radiation from consumption of fish and shellfish containing radioactivity absorbed from the liquid effluents.

There are six major ways in which gaseous effluents affect humans:

- external radiation from an airborne plume of radioactivity;
- internal radiation from inhalation of airborne radioactivity;
- external radiation from deposition of radioactive effluents on the ground;
- ambient (direct) radiation from contained sources at the power plant;
- internal radiation from consumption of vegetation containing radioactivity deposited on the vegetation from airborne deposition and absorbed from the soil due to ground deposition of radioactive effluents; and,
- internal radiation from consumption of milk and meat containing radioactivity deposited on forage that is eaten by cattle and other livestock.

Ambient (direct) radiation emitted from contained sources of radioactivity at Millstone comes from low-level radioactive waste being processed and stored at the site prior to shipping and disposal. Also, the operation of the Independent Spent Fuel Storage Installation (ISFSI) which began in 2005 results in a small amount of direct radiation at the site boundary.

The radiological dose impact on humans is based both on effluent analyses and modeling and on direct measurements of radiation and radioactivity in the environment. However, the operation of Millstone results in releases of only small amounts of radioactivity, and, as a result of dilution in the atmosphere and ocean, even the most sensitive radioactivity measurement and analysis techniques cannot usually detect these tiny amounts of radioactivity above that which is naturally present in the environment. Therefore, radiation doses are calculated using radioactive effluent release data and computerized dose calculations that are based on conservative NRC-recommended models that tend to result in over-estimates of the resulting dose. These computerized dose calculations are performed by DNC personnel. These computer codes use the guidelines and methodology set forth by the NRC in Regulatory Guide 1.109 (Reference 7). The dose calculations are specified in the Millstone's REMODCM (Reference 8), which has been reviewed by the NRC.

It should be emphasized that because of the conservative assumptions made in the computer code calculations, the maximum hypothetical dose to an individual is considerably higher than the dose that would actually be received by a real individual.

After dose calculations are performed, the results are compared to the dose limits for the public as specified in NRC's technical specifications for Millstone (References 9-11).

The technical specifications limits for the dose to a member of the general public from radioactive material in liquid effluents released to unrestricted areas are:

- less than or equal to 3 mrem per year to the total body; and,
- less than or equal to 10 mrem per year to any organ.

The technical specifications limits for dose due to release of radioactivity in gaseous effluents is restricted to:

- less than or equal to 10 mrad per year for gamma radiation from noble gases,
- less than or equal to 20 mrad per year for beta radiation from noble gases and
- less than or equal to 15 mrem per year to any organ from iodine-131, iodine-133, tritium, and all particulate radionuclides with half-lives greater than 8 days.

The technical specifications limits for total dose from all three Millstone units due to release of radioactivity in gaseous and liquid effluents and direct radiation is restricted to:

- less than or equal to 25 mrem per year to the total body;
- less than or equal to 75 mrem per year to the thyroid; and,
- less than or equal to 25 mrem per year to any other organ.

The third stage of assessing releases to the environment is the REMP. The description and results of the REMP at Millstone during 2013 is discussed in Sections 2 through 4 of this report.

2. PROGRAM DESCRIPTION

2.1 Sampling Schedule and Locations

The sample locations and the sample types and frequency of analysis are given in Tables 2-1 and 2-2 and Figures 2.1, 2.2 and 2.3. The program as described on Table 2-2 only lists the required samples as specified in the REMODCM. However, in order to identify the locations of the extra samples, all locations (both required and extra) are listed in Table 2-1 and shown on the figures.

Table 2-1 Environmental Monitoring Program Sampling Types and Locations

No.-Type*	Location Name	Distance, Direction From Release Point**	Sample Media
1-I	Onsite - Old Millstone Rd.	0.6 Mi, NNW	TLD, Air Particulate, Iodine, Vegetation
2-I	Onsite - Weather Shack	0.3 Mi, S	TLD, Air Particulate, Iodine
3-I	Onsite - Bird Sanctuary	0.3 Mi, NE	TLD, Air Particulate, Iodine, Soil
4-I	Onsite - Albacore Drive	1.0 Mi, N	TLD, Air Particulate, Iodine, Soil
5-I	Onsite - MP3 Discharge	0.1 Mi, SSE	TLD
6-I	Onsite - Quarry Discharge	0.3 Mi, SSE	TLD
7-I	Onsite - Environmental Lab Dock	0.3 Mi, SE	TLD
8-I	Onsite - Environmental Lab	0.3 Mi, SE	TLD
9-I	Onsite - Bay Point Beach	0.4 Mi, W	TLD
10-I	Pleasure Beach	1.2 Mi, E	TLD, Air Particulate, Iodine, Vegetation
11-I	New London Country Club	1.6 Mi, ENE	TLD, Air Particulate, Iodine
12-X	Fisher's Island, NY	8.0 Mi, ESE	TLD
13-C	Mystic, CT	11.5 Mi, ENE	TLD
14-C	Ledyard, CT	12.0 Mi, NE	TLD, Soil
15-C	Norwich, CT	14.0 Mi, N	TLD, Air Particulate, Iodine
16-C	Old Lyme, CT	8.8 Mi, W	TLD
17-I	Site Boundary	0.5 Mi, NE	Vegetation
22-X	Cow	10.5 Mi, WNW	Milk
21-I	Goat Location #1	2.0 Mi, N	Milk
24-C	Goat Location #3	29.0 Mi, NNW	Milk
25-I	Within 10 Miles	< 10 Miles	Vegetation
25-X	Within 10 Miles	< 10 Miles	Fruits and/or Vegetables***
26-C	Beyond 10 Miles	> 10 Miles	Vegetation
26-X	Beyond 10 Miles	> 10 Miles	Fruits and/or Vegetables***
27-I	Niantic	1.7 Mi, WNW	TLD, Air Particulate, Iodine
28-I	Two Tree Island	0.8 Mi, SSE	Mussels, Fish****
29-I	West Jordan Cove	0.4 Mi, NNE	Clams, Fish****
29-X	West Jordan Cove	0.4 Mi, NNE	Fucus
30-I	Niantic Shoals	1.5 Mi, NNW	Mussels
31-I	Niantic Shoals	1.8 Mi, NW	Bottom Sediment, Oysters
32-I	Vicinity of Discharge	< 0.1 Mi	Bottom Sediment, Oysters, Lobster, Fish****, Seawater
32-X	Vicinity of Discharge	< 0.1 Mi	Fucus
33-I	Seaside Point	1.8 Mi, ESE	Bottom Sediment
34-I	Thames River Yacht Club	4.0 Mi, ENE	Bottom Sediment
34-X	Thames River Yacht club	4.0 Mi, ENE	Oysters
35-I	Niantic Bay	0.3 Mi, WNW	Lobster, Fish****
35-X	Niantic Bay	0.3 Mi, WNW	Mussels, Fucus
36-X	Black Point	3.0 Mi, WSW	Fucus
37-C	Giant's Neck	3.5 Mi, WSW	Bottom Sediment, Oysters, Seawater
38-I	Waterford Shellfish Bed #1	1.0 Mi, NW	Clams
39-X	Jordan Cove Bar	0.8 Mi, NE	Bottom Sediment

* Types: **I** - Indicator **C** - Control **X** - Extra - sample not required by REMODCM
** The release points are the Site Stack for terrestrial locations and the quarry cut for aquatic locations.
*** A fruit or vegetable sample may count as a required vegetation sample.
**** Flounder and another type of fish, each required to be sampled at two separate locations.

No.-Type*	Location Name	Distance, Direction From Release Point**	Sample Media
41-I	Myrock Avenue	3.2 Mi, ENE	TLD
42-I	Billow Road	2.4 Mi, WSW	TLD
43-I	Black Point	2.6 Mi, SW	TLD
44-I	Onsite - Schoolhouse	0.1 Mi, NNE	TLD
45-I	Onsite - Access Road	0.5 Mi, NNW	TLD
46-I	Old Lyme - Hillcrest Ave.	4.6 Mi, WSW	TLD
47-I	East Lyme - W. Main St.	4.5 Mi, W	TLD
48-I	East Lyme - Corey Rd.	3.4 Mi, WNW	TLD
49-I	East Lyme - Society Rd.	3.6 Mi, NW	TLD
50-I	East Lyme - Manwaring Rd.	2.1 Mi, W	TLD
51-I	East Lyme - Smith Ave.	1.5 Mi, NW	TLD
52-I	Waterford - River Rd.	1.1 Mi, NNW	TLD
53-I	Waterford - Gardiners Wood Rd	1.4 Mi, NNE	TLD
55-I	Waterford - Magonk Point	1.8 Mi, ESE	TLD
56-I	New London - Mott Ave.	3.7 Mi, E	TLD
57-I	New London - Ocean Ave.	3.6 Mi, ENE	TLD
59-I	Waterford -Miner Ave.	3.4 Mi, NNE	TLD
60-I	Waterford - Parkway South	4.0 Mi, N	TLD
61-I	Waterford - Boston Post Rd.	4.3 Mi, NNW	TLD
62-I	East Lyme - Columbus Ave.	1.9 Mi, WNW	TLD
63-I	Waterford - Jordon Cove Rd.	0.8 Mi, NE	TLD
64-I	Waterford - Shore Rd.	1.1 Mi, ENE	TLD
65-I	Waterford - Bank St.	3.2 Mi, NE	TLD
66-X	NAP Parking Lot - Fit Center	0.4 Mi, NW	TLD
67-X	Golden Spur	4.7 Mi, NNW	Bottom Sediment
71-I	1-MW-XFMR-03	Onsite	Well Water
72-I	MW-GPI-1	Onsite	Well Water
73-X	Site Switchyard Fence	0.3 Mi, N	TLD
74-X	Ball Field Foul Pole	0.6 Mi, N	TLD
75-X	Waterford – Windward Way & Shotgun	0.5 Mi, NE	TLD
76-X	ISFSI-1	Up-gradient of ISFSI	Well Water
77-X	ISFSI-2A	Down-gradient of ISFSI	Well Water
78-X	ISFSI-3	Down-gradient of ISFSI	Well Water
79-I	M3-MW-1	Onsite	Well Water
80-I	MW-7C***	Onsite	Well Water
81-I	S2-MW-1	Onsite	Well Water
82-I	MW-6B	Onsite	Well Water
83-I	S3-MW-2***	Onsite	Well Water
88-I	DEEP Dock	Onsite	Oysters
90-X	Thames River	4 Mi, E	Fucus

* Key: **I** - Indicator **C** - Control **X** - Extra - sample not required by the REMODCM

** The release points are the Site Stack for terrestrial locations and the quarry cut for aquatic locations.

*** Well S3-MW-2 replaced Well MW-7C in 4th quarter of 2013.

Table 2-2 Required Sampling Frequency & Type of Analysis

	Exposure Pathway and/or Sample	No. of Locations	Sampling & Collection Frequency	Type of Analysis
1.	Gamma Dose - Environmental TLD	39[a]	Quarterly	Gamma Dose - Quarterly
2.	Airborne Particulate	8	Continuous sampler - weekly filter change	Gross Beta - Weekly Gamma Spectrum - Quarterly on composite (by location), and on individual sample if gross beta is greater than 10 times the mean of the weekly control station's gross beta results
3.	Airborne Iodine	8	Continuous sampler - weekly canister change	I-131 - Weekly
4.	Vegetation	5	One sample near middle and one near end of growing season	Gamma Isotopic on each sample
5.	Milk	2	Semimonthly when animals are on pasture; monthly at other times.	Gamma Isotopic and I-131 on each sample; Sr-89 and Sr-90 on quarterly composite
5a.	Pasture Grass	2	Sample as necessary to substitute for unavailable milk	Gamma Isotopic and I-131 on each sample
6.	Sea Water	2	Continuous sampler with a monthly collection at indicator location. Quarterly at control location - Composite of 6 weekly grab samples.	Gamma Isotopic and Tritium on each sample.
7.	Well Water	6	Semiannual	Gamma Isotopic and Tritium on each sample
8.	Bottom Sediment	5	Semiannual	Gamma Isotopic on each sample
9.	Soil	3	Annually	Gamma Isotopic on each sample
10.	Fin Fish - Flounder and one other type of edible fin fish	2	Quarterly	Gamma Isotopic on each sample
11.	Mussels (edible portion)	2	Quarterly	Gamma Isotopic on each sample
12.	Oysters (edible portion)	4	Quarterly	Gamma Isotopic on each sample
13.	Clams (edible portion)	2	Quarterly	Gamma Isotopic on each sample
14.	Lobster (edible portion)	2	Quarterly	Gamma Isotopic on each sample

(a) Two or more TLDs or TLD with two or more elements per location.

2.2 Samples Collected During Report Period

The following table summarizes the number of samples of each type collected and analyzed during 2013:

Sample Type	Number of Technical Specification Required Samples	Number of Technical Specification Required Samples Analyzed	Number of Extra Samples Analyzed
Gamma Exposure (Environmental TLD)	156	156	20
Air Particulates	416	416	0
Air Iodine	416	416	0
Soil	3	3	0
Cow and Goat Milk	36	0[1]	18
Pasture Grass/Feed	Variable[2]	10	14
Broad Leaf Vegetation, Fruit, Vegetables	10	10	6
Well Water	12	12	22
Sea Water	16	16	0
Bottom Sediment	10	10	4
Aquatic Flora	0	0	20
Fish	16	12[3]	0
Mussels	8	1[3]	0
Oysters	16	16	0
Clams	8	8	0
Lobster	8	8	0
Total All Types	**1,131**	**1,120**	90

[1] Pasture grass sampled as necessary to substitute for unavailable milk.
[2] Depends upon availability of milk samples. Pasture grass could not be collected during some parts of the year and feed was substituted.
[3] Due to sample unavailability, not all required fish and shellfish samples could be obtained

2.3 Required Samples Not Collected During the Report Period

During 2013 there were eleven required samples not collected. These included four fish samples of which two types are required to be collected at two locations quarterly (16 total) and seven mussel samples which are required to be collected at two locations quarterly (8 total). Repeated attempts were made to collect fish during the first quarter (January thru March) but were unsuccessful. Mussels were not available or the sample collected was too small for analyses at both required locations in all quarters of the year except for the second quarter (April thru June) at Niantic Shoals (Location #30).

Goat milk samples were not collected during 2013 because the goat owners at the two required locations were not milking their goats. No other milking goats could be located within ten miles of the plant. However, the REMODCM requires pasture grass as a substitute for goat milk when milk is not available. Pasture grass was collected at both locations during five months (April thru September) for a total of ten pasture grass samples. For the other months (January thru April and October thru December) feed was substituted for the required pasture grass.

Because of a loss of power there was an insufficient volume of air collected on the weekly air sample for November 26 at the onsite Weather Shack (Location #2). Therefore the LLD requirements for gross beta of 0.01 pCi/m^3 and for iodine of 0.07 pCi/m^3 could not be met for that one week.

3. RADIOCHEMICAL RESULTS

3.1 Summary Table

In accordance with the REMODCM, Section I.F.1, a summary table of the radiochemical results has been prepared and is presented on the following pages. The mean and range recorded are based only upon detectable measurements.

A more detailed analysis of the data is given in Section 4.0 where a discussion of the variations in the data explains many aspects that are not evident in the Summary Table because of the basic limitation of data summaries. The data summaries include the extra ("X") samples collected throughout the year. These samples are taken to enhance the monitoring program or replace samples from required locations when they are not available.

RADIOLOCIAL ENVIRONMENT MONITORING PROGRAM SUMMARY
MILLSTONE POWER STATION
Dockets 50-245, 50-336 & 50-423 2013

Medium or Pathway Sampled (Units)	Analysis Type	Total Number	LLD[1]	Indicator Locations	Location with Highest Mean			Control Locations
				Mean (Range)	Number	Distance Direction	Mean (Range)	Mean (Range)
Direct Radiation *TLD (uR/hr)*	**Gamma Dose**	176	NA	7.7 (4.6 - 11.5)	09	0.04 Mi. W	11.1 (10.4 - 11.5)	7.6 (5.6 - 9.4)
Air Iodine *(pCi/m^3)*	**I-131**	416	70	<LLD	NA	NA	<LLD	<LLD
Air Particulate *(pCi/m^3)*	**GR-B**	416	10	14.8 (4.5 - 43.8)	02	0.3 Mi. S	15.6 (7.2 - 43.8)	15.1 (6.1 - 29.3)
	GAMMA	32						
	Be-7		NA	110 (75 - 167)	15	14.0 Mi. N	120 (104 - 142)	120 (104 - 142)
	Other Gammas		Note 2	<LLD	NA	NA	<LLD	<LLD
Soil (pCi/g dry)	**GAMMA**	3						
	K-40		NA	17.7 (15.5 - 19.8)	03	0.03 Mi. NE	19.8	17.4
	Cs-137		0.18	0.36 (0.183 - 0.537)	04	1.0 Mi. N	0.537	0.101
	Other Gammas		Note 3	<LLD	NA	NA	<LLD	<LLD
Milk *(pCi/l)*	**Sr-89**	4	10	<LLD	NA	NA	<LLD	NA
	Sr-90	4	2	<LLD	NA	NA	<LLD	NA
	GAMMA	18						
	K-40		NA	1310 (1180 - 1485)	22	2.7 Mi. NE	1310 (1180 - 1485)	NA
	Other Gammas		Note 4	<LLD	NA	NA	<LLD	<LLD
Pasture Grass/Hay *(pCi/g wet)*	**GAMMA**	34						
	Be-7		NA	0.97 (0.15 - 1.60)	21	2.0 Mi. N	0.97 (0.15 - 1.60)	0.65 (0.20 - 1.19)
	K-40		NA	9.02 (3.41 - 17.62)	21	2.0 Mi. N	9.02 (3.41 - 17.62)	7.46 (3.33 - 14.36)
	Cs-137		0.08	<LLD	NA	NA	<LLD	<LLD
	Other Gammas		Note 5	<LLD	NA	NA	<LLD	<LLD

RADIOLOCIAL ENVIRONMENT MONITORING PROGRAM SUMMARY
MILLSTONE POWER STATION
Dockets 50-245, 50-336 & 50-423 2013

Medium or Pathway Sampled (Units)	Analysis Type	Total Number	LLD[1]	Indicator Locations	Location with Highest Mean			Control Locations
				Mean (Range)	Number	Distance Direction	Mean (Range)	Mean (Range)
Well Water *(pCi/l)*	**H-3**	34	2000	Note 6	MW-7C	NA	Note 6	NA
	GAMMA	34						
	Be-7		NA	<LLD	NA	NA	<LLD	NA
	K-40		NA	Note 7	NA	Onsite	Note 7	NA
	Other Gammas		Note 8	<LLD	NA	NA	<LLD	<LLD
Fruits & Vegetables *(pCi/g wet)*	**GAMMA**	6						
	K-40		NA	1.95 (0.604 - 4.32)	26	Beyond 10 miles	1.95 (0.604 - 4.32)	1.91 (0.604 - 4.32)
	Other Gammas		Note 9	<LLD	NA	NA	<LLD	<LLD
Broad Leaf Vegetation *(pCi/g wet)*	**GAMMA**	10						
	Be-7		NA	1.01 (0.594 - 1.38)	1	0.6 Mi NNW	1.19 (1.12 - 1.26)	1.32 (1.06 - 1.57)
	K-40		NA	3.61 (3.11 - 4.33)	17	0.5 Mi NE	3.72	3.98 (3.68 - 4.51)
	Cs-137		0.08	<LLD	NA	NA	<LLD	<LLD
	Other Gammas		Note 9	<LLD	NA	NA	<LLD	<LLD
Sea Water *(pCi/l)*	**H-3**	15	3000	597 (205 - 1080)	32	< 0.1 Mi	597 (205 - 1080)	<LLD
	GAMMA	15						
	K-40		NA	312 (243 - 365)	32	< 0.1 Mi	312 (243 - 365)	279 (253 - 311)
	Other Gammas		Note 8	<LLD	NA	NA	<LLD	<LLD
Bottom Sediment *(pCi/g dry)*	**GAMMA**	14						
	K-40		NA	17.4 (10.3 - 22.0)	67 Note 10	4.7 Mi. NNW	21.1 (20.9 - 21.3)	14.9
	Cs-137		0.18	0.182	67 Note 10	4.7 Mi. NNW	0.182	<LLD
	Other Gammas		Note 3	<LLD	NA	NA	<LLD	<LLD

RADIOLOCIAL ENVIRONMENT MONITORING PROGRAM SUMMARY
MILLSTONE POWER STATION
Dockets 50-245, 50-336 & 50-423 2013

Medium or Pathway Sampled (Units)	Analysis Type	Total Number	LLD[1]	Indicator Locations	Location with Highest Mean			Control Locations
				Mean (Range)	Number	Distance Direction	Mean (Range)	Mean (Range)
Aquatic Flora	**GAMMA**	20						
(pCi/g wet)	Be-7		NA	0.081 (0.015 - 0.204)	29 Note 12	0.4 Mi NNE	0.113 (0.032 - 0.204)	0.125 (0.083 - 0.225)
	K-40		NA	7.29 (4.93 - 10.54)	32 Note 12	< 0.1 Mi	8.96 (7.21 - 10.54)	6.25 (5.58 - 7.68)
	Co-58		NA	0.026	32 Note 12	< 0.1 Mi	0.026	<LLD
	Ag-110m		NA	0.019	32 Note 12	< 0.1 Mi	0.019	<LLD
	I-131		0.06	0.034	32 Note 12	< 0.1 Mi	0.034	<LLD
	Ac-228		NA	0.066 (0.038 - 0.107)	29 Note 12	0.4 Mi NNE	0.077	0.072 (0.041 - 0.137)
	Other Gammas		Note 9	<LLD	NA	NA	<LLD	<LLD
Fish - Flounder	**GAMMA**	6						
(pCi/g wet)	K-40		NA	4.58 (4.00 - 5.07)	35	0.3 Mi WNW	4.68 (4.16 - 5.07)	NA
	All Gammas		Note 13	<LLD	NA	NA	<LLD	NA
Fish - Other	**GAMMA**	6						
(pCi/g wet)	K-40		NA	4.33 (3.73 - 4.85)	32	<0.1 Mi	4.85	NA
	Other Gammas		Note 13	<LLD	NA	NA	<LLD	NA
Mussels	**GAMMA**	1						
(pCi/g wet)	K-40		NA	1.42	30	1.5 Mi NNW	1.42	NA
	Other Gammas		Note 13	<LLD	NA	NA	<LLD	NA
Oysters	**GAMMA**	16						
(pCi/g wet)	K-40		NA	2.09 (1.31 - 2.87)	32	<0.1 Mi	2.37 (2.04 - 2.87)	1.70
	AG-110M			0.032 (<LLD - 0.194)	32	<0.1 Mi	0.106 (0.012 - 0.194)	<LLD
	Other Gammas		Note 13	<LLD	NA	NA	<LLD	<LLD
Clams	**GAMMA**	8						
(pCi/g wet)	K-40		NA	2.26 (1.91 - 2.77)	38	1.0 Mi NW	2.25 (1.91 - 2.77)	NA
	Other Gammas		Note 13	<LLD	NA	NA	<LLD	NA
Lobster	**GAMMA**	8						
(pCi/g wet)	K-40		NA	3.20 (2.53 - 3.85)	32	<0.1 Mi	3.20 (2.53 - 3.85)	NA
	Other Gammas		Note 13	<LLD	NA	NA	<LLD	NA

NOTES FOR SUMMARY TABLE

1 - The required LLD. LLD is the smallest concentration of radioactivity that will be detected with 95% confidence that the activity is real. See detailed discussion below.
2 - LLDs for air particulate other gamma are 0.05 pCi/M^3 for Cs-134 and 0.06 pCi/M^3 for Cs-137.
3 - LLD for soil and sediment other gamma is 0.15 pCi/g for Cs-134.
4 - LLDs for milk other gamma are 1 pCi/l for I-131, 15 pCi/l for Cs-134, 18 pCi/l for Cs-137, 70 pCi/l for Ba-140 and 25 pCi/l for La-140.
5 - LLD for grass/hay other gamma is 0.15 pCi/g for Cs-134.
6 - One well water had positive H-3 of 1110 pCi/l.
7 - One well water had positive K-40 of 64 pCi/l.
8 - LLDs for water other gamma are 15 pCi/l for Mn-54, Co-58, Co-60, Nb-95, I-131, Cs-134 and La-140; 30 pCi/l for Fe-59, Zn-65 and Zr-95; 18 pCi/l for Cs-137 and 60 pCi/l for Ba-140.
9 - LLDs for fruits & vegetables, broadleaf vegetation and aquatic flora for other gamma are 0.06 pCi/M^3 for I-131, 0.06 pCi/M^3 for Cs-134 and 0.08 pCi/M3 for Cs-137.
10 – Location 67 is an extra, non-required sample.
11 – LLDs for other gamma are 0.15 pCi/g for Cs-134 and 0.18 pCi/g for Cs-137.
12 - All aquatic flora locations are extra, non-required samples with Locations 29, 32 and 35 treated as indicators and Location 36 as a control.
13 - LLDs for fish and shellfish for gammas are 0.13 pCi/g for Mn-54, Co-58, Co-60 and Cs-134; 0.26 pCi/g for Fe-59 and Zn-65; and 0.15 pCi/g for Cs-137.

Discussion of LLD

The LLD at a confidence level of 95% is the smallest concentration of radioactive material in a sample that will be detected with a 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system (which may include radiochemical separation):

$$LLD = \frac{4.66\ S_b}{E * V * 2.22 * Y * \exp(-\lambda \Delta t)}$$

LLD is the lower limit of detection as defined above (as pCi per unit mass or volume)

S_b is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute)

E is the counting efficiency (as counts per transformation)

V is the sample size (in units of mass or volume)

2.22 is the number of transformation per minute per picoCurie

Y is the fractional radiochemical yield (when applicable)

Δ is the radioactive decay constant for the particular radionuclide

λt is the elapsed time between sample collection (or end of the sample collection period) and time of counting

The LLD is defined as "a priori" (before the fact) limit representing the capability of a measurement system and not an "a posteriori" (after the fact) limit for a particular measurement.

Analyses was performed in such a manner that the stated LLDs were achieved under routine conditions. Occasionally background fluctuations, unavoidably small sample sizes, the presence of interfering nuclides, or other uncontrollable circumstances may have rendered these a priori LLDs unachievable. In such cases, the contributing factors are identified and described in this report. As shown in the equation above, for composite samples taken over a period of time, the LLD is decayed to the end of the sample period.

3.2 Data Tables

The data reported in this section are strictly counting statistics. The reported error is two times the standard deviation (2σ) of the net activity. Unless otherwise noted, the overall error (counting, sample size, chemistry, errors, etc.) is estimated to be 2 to 5 times that listed. Results are considered positive when the measured value exceeds 1.5 times the listed 2σ error (i.e., the measured value exceeds 3σ). Any errors listed as zero are the artifact that there were no background counts in the area of the peak for these nuclides.

Because of counting statistics, negative values, zeros and numbers below the Minimum Detectable Level (MDL) are statistically valid pieces of data. For the purposes of this report, in order to indicate any background biases, all the valid data are presented. This practice was recommended by Health and Safety Laboratory (HASL) ("Reporting of Analytical Results from HASL," letter by Leo B. Higginbotham), NUREG 0475 and NUREG/CR-4007 (Sept. 1984). In instances where zeros are listed after significant digits, this is an artifact of the computer data-handling program.

Data are given according to sample type as indicated below.

1. Gamma Exposure Rate
2. Air Particulates, Gross Beta Radioactivity
3. Air Particulates, Airborne I-131
4. Air Particulates, Gamma Spectra
5. Air Particulates, Strontium*
6. Soil
7. Milk - Cow
8. Milk - Goat
9. Pasture Grass/Hay/Feed
10. Well Water
11. Reservoir Water*
12. Fruits & Vegetables
13. Broad Leaf Vegetation
14. Seawater
15. Bottom Sediment
16. Aquatic Flora (Fucus)
17. Fin Fish
18. Mussels
19. Oysters
20. Clams
21. Scallops*
22. Lobster

* This type of sampling or analysis was not performed.

TABLE 1
QUARTERLY
GAMMA EXPOSURE RATE
(uR/hr)*

LOCATIONS

PERIOD	1		2		3		4		5		6		7		8		9		10		11	
		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)
1Q	7.7	0.4	9.2	0.4	7.3	0.4	7.3	0.4	9.1	0.4	8.7	0.4	5.2	0.3	10.7	0.6	11.1	0.6	10.3	0.4	6.6	0.4
2Q	8.5	0.4	10.4	0.4	7.6	0.2	7.9	0.3	9.8	0.5	9.4	0.3	5.3	0.4	11.2	0.5	11.5	0.5	10.0	0.3	7.5	0.4
3Q	8.3	0.4	9.7	0.4	7.4	0.4	7.8	0.4	9.6	0.6	8.6	0.4	4.7	0.2	11.1	0.6	11.4	0.6	10.1	0.6	7.1	0.3
4Q	7.4	0.4	9.1	0.6	7.4	0.4	7.3	0.4	9.0	0.4	8.6	0.4	4.6	0.2	10.9	0.4	10.4	0.6	9.0	0.4	6.9	0.3

PERIOD	12C		13C		14C		15C		16C		27		41		42		43		44		45	
		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)
1Q	6.9	0.5	8.3	0.4	8.9	0.4	7.4	0.3	5.9	0.3	8.0	0.4	6.7	0.4	7.0	0.3	6.4	0.3	7.7	0.5	7.5	0.5
2Q	7.2	0.2	8.7	0.4	9.4	0.3	8.4	0.3	6.1	0.3	8.7	0.3	7.2	0.2	7.5	0.3	7.2	0.3	8.9	0.3	7.5	0.5
3Q	8.2	0.4	8.9	0.4	8.9	0.4	7.5	0.4	6.3	0.3	8.0	0.4	6.6	0.4	7.1	0.3	6.6	0.3	8.0	0.4	7.2	0.3
4Q	6.7	0.3	7.8	0.4	8.5	0.4	7.0	0.3	5.6	0.3	7.8	0.4	6.5	0.3	7.1	0.3	6.7	0.4	7.0	0.3	6.7	0.3

PERIOD	46		47		48		49		50		51		52		53		55		56		57	
		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)
1Q	8.3	0.5	7.4	0.4	9.2	0.5	6.4	0.3	7.3	0.4	5.9	0.3	6.9	0.4	7.1	0.4	7.2	0.5	6.9	0.4	7.1	0.4
2Q	8.9	0.5	8.0	0.3	9.7	0.3	7.2	0.2	7.8	0.3	6.5	0.2	7.2	0.3	7.5	0.4	8.0	0.3	7.6	0.3	7.5	0.2
3Q	8.3	0.3	7.6	0.5	9.4	0.4	7.1	0.5	7.7	0.4	6.4	0.3	7.1	0.3	7.3	0.4	7.4	0.4	6.9	0.3	7.1	0.3
4Q	7.9	0.4	7.2	0.3	8.7	0.4	6.0	0.3	7.2	0.3	5.5	0.3	6.3	0.4	6.5	0.4	6.8	0.4	6.8	0.3	6.4	0.3

PERIOD	59		60		61		62		63		64		65		66		73		74		75	
		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)
1Q	7.2	0.4	6.1	0.4	6.9	0.3	7.5	0.4	8.3	0.4	6.8	0.4	7.5	0.4	6.5	0.3	7.5	0.4	7.1	0.4	6.4	0.3
2Q	8.1	0.4	7.0	0.3	7.5	0.2	8.0	0.2	8.7	0.3	7.7	0.2	8.4	0.4	7.2	0.3	8.0	0.3	7.7	0.3	7.1	0.3
3Q	7.8	0.3	6.9	0.6	7.3	0.3	7.8	0.4	8.0	0.5	7.1	0.4	7.7	0.3	6.8	0.3	7.6	0.5	7.7	0.3	6.7	0.3
4Q	7.4	0.4	6.1	0.4	6.6	0.3	7.1	0.3	7.8	0.4	6.7	0.3	7.0	0.3	6.8	0.4	7.6	0.3	7.0	0.3	6.5	0.3

* READINGS ARE THE AVERAGE OF MULTI CASO4TM PHOSPHOR ELEMENTS WITHIN ONE PANASONIC TLD BADGE
ERRORS ARE 1 SIGMA AND INCLUDE COUNTING, TRANSIT, READER AND FADE UNCERTAINTIES

TABLE 2
AIR PARTICULATES
GROSS BETA RADIOACTIVITY
(pCi/m^3)
LOCATIONS

PERIOD ENDING	01	(+/-)	02	(+/-)	03	(+/-)	04	(+/-)	10	(+/-)	11	(+/-)	27	(+/-)	15C	(+/-)
01/08/13	0.026	0.004	0.028	0.004	0.026	0.004	0.025	0.004	0.027	0.004	0.028	0.004	0.028	0.004	0.029	0.005
01/15/13	0.019	0.003	0.022	0.004	0.018	0.003	0.021	0.003	0.018	0.003	0.021	0.003	0.020	0.003	0.024	0.004
01/22/13	0.017	0.004	0.016	0.004	0.015	0.003	0.017	0.003	0.016	0.003	0.013	0.003	0.016	0.003	0.018	0.004
01/29/13	0.015	0.003	0.014	0.003	0.015	0.003	0.014	0.003	0.017	0.003	0.015	0.003	0.014	0.003	0.014	0.003
02/05/13	0.020	0.004	0.021	0.004	0.022	0.004	0.020	0.003	0.025	0.004	0.020	0.003	0.020	0.003	0.020	0.004
02/13/13	0.017	0.003	0.020	0.004	0.015	0.003	0.016	0.003	0.015	0.003	0.016	0.003	0.016	0.003	0.017	0.003
02/20/13	0.011	0.003	0.017	0.004	0.012	0.003	0.017	0.003	0.016	0.003	0.017	0.003	0.015	0.003	0.016	0.003
02/26/13	0.009	0.003	0.007	0.003	0.010	0.003	0.006	0.002	0.007	0.002	0.009	0.002	0.007	0.002	0.009	0.003
03/05/13	0.011	0.003	0.007	0.003	0.013	0.003	0.008	0.003	0.008	0.003	0.013	0.003	0.014	0.004	0.013	0.003
03/12/13	0.009	0.003	0.010	0.004	0.007	0.003	0.006	0.003	0.007	0.003	0.008	0.003	0.008	0.003	0.009	0.003
03/18/13	0.015	0.004	0.018	0.004	0.015	0.004	0.015	0.004	0.017	0.004	0.018	0.004	0.019	0.004	0.016	0.004
03/26/13	0.012	0.003	0.011	0.003	0.012	0.003	0.009	0.003	0.009	0.003	0.011	0.003	0.010	0.003	0.009	0.003
04/02/13	0.007	0.003	0.008	0.003	0.008	0.003	0.010	0.003	0.007	0.003	0.007	0.003	0.008	0.003	0.006	0.003
04/09/13	0.017	0.003	0.018	0.004	0.018	0.003	0.017	0.003	0.013	0.003	0.018	0.003	0.017	0.004	0.016	0.003
04/15/13	0.007	0.003	0.010	0.003	0.008	0.003	0.008	0.003	0.015	0.004	0.010	0.003	0.011	0.004	0.010	0.003
04/23/13	0.013	0.003	0.012	0.003	0.012	0.003	0.010	0.003	0.012	0.003	0.011	0.003	0.014	0.003	0.012	0.003
04/30/13	0.014	0.003	0.013	0.003	0.013	0.003	0.016	0.003	0.014	0.003	0.014	0.003	0.011	0.003	0.015	0.004
05/07/13	0.012	0.003	0.008	0.003	0.010	0.003	0.011	0.003	0.008	0.003	0.009	0.003	0.012	0.003	0.011	0.003
05/14/13	0.007	0.003	0.009	0.003	0.008	0.003	0.009	0.003	0.010	0.004	0.009	0.003	0.011	0.004	0.010	0.004
05/21/13	0.015	0.003	0.012	0.003	0.014	0.003	0.013	0.003	0.015	0.003	0.012	0.003	0.013	0.003	0.017	0.004
05/28/13	0.005	0.002	0.007	0.003	0.007	0.003	0.007	0.003	0.011	0.003	0.009	0.003	0.008	0.003	0.007	0.003
06/04/13	0.017	0.004	0.013	0.003	0.014	0.003	0.015	0.003	0.016	0.004	0.011	0.003	0.017	0.004	0.017	0.004
06/11/13	0.010	0.003	0.009	0.003	0.011	0.003	0.007	0.003	0.010	0.003	0.008	0.003	0.007	0.003	0.009	0.003
06/18/13	0.018	0.004	0.013	0.003	0.017	0.004	0.013	0.003	0.013	0.003	0.014	0.003	0.016	0.003	0.015	0.003
06/25/13	0.013	0.003	0.013	0.003	0.013	0.003	0.017	0.004	0.012	0.003	0.011	0.003	0.013	0.003	0.014	0.003
07/02/13	0.014	0.003	0.015	0.003	0.014	0.003	0.017	0.003	0.014	0.003	0.017	0.003	0.012	0.003	0.014	0.003

TABLE 2
AIR PARTICULATES
GROSS BETA RADIOACTIVITY
(pCi/m^3)

PERIOD ENDING	LOCATIONS 01		02		03		04		10		11		27		15C	
07/09/13	0.012	0.003	0.013	0.003	0.012	0.003	0.011	0.003	0.014	0.003	0.013	0.003	0.009	0.003	0.015	0.004
07/16/13	0.013	0.004	0.015	0.003	0.014	0.004	0.016	0.004	0.013	0.003	0.015	0.003	0.013	0.003	0.013	0.003
07/23/13	0.016	0.003	0.018	0.003	0.020	0.003	0.018	0.003	0.018	0.003	0.021	0.003	0.021	0.003	0.021	0.003
07/30/13	0.014	0.003	0.011	0.003	0.011	0.003	0.012	0.003	0.012	0.003	0.012	0.003	0.015	0.003	0.012	0.003
08/06/13	0.012	0.003	0.015	0.003	0.015	0.004	0.012	0.003	0.015	0.003	0.013	0.003	0.011	0.003	0.012	0.003
08/13/13	0.015	0.003	0.015	0.003	0.012	0.003	0.013	0.003	0.012	0.003	0.012	0.003	0.013	0.003	0.014	0.003
08/20/13	0.017	0.003	0.018	0.003	0.018	0.004	0.015	0.003	0.018	0.003	0.018	0.003	0.016	0.003	0.018	0.003
08/27/13	0.017	0.004	0.018	0.004	0.015	0.004	0.017	0.004	0.016	0.003	0.015	0.003	0.019	0.004	0.016	0.003
09/03/13	0.018	0.004	0.017	0.003	0.019	0.004	0.020	0.004	0.018	0.003	0.020	0.004	0.017	0.003	0.021	0.004
09/10/13	0.013	0.003	0.014	0.003	0.014	0.003	0.012	0.003	0.012	0.003	0.013	0.003	0.011	0.003	0.013	0.003
09/17/13	0.022	0.004	0.026	0.004	0.023	0.004	0.019	0.004	0.022	0.004	0.024	0.004	0.023	0.004	0.024	0.004
09/24/13	0.010	0.003	0.011	0.003	0.011	0.003	0.011	0.003	0.010	0.003	0.011	0.003	0.008	0.003	0.011	0.003
10/01/13	0.010	0.003	0.012	0.003	0.013	0.004	0.006	0.003	0.007	0.003	0.010	0.003	0.012	0.003	0.010	0.003
10/08/13	0.026	0.004	0.022	0.004	0.026	0.004	0.023	0.004	0.027	0.004	0.026	0.004	0.024	0.004	0.025	0.004
10/15/13	0.019	0.004	0.020	0.004	0.017	0.004	0.017	0.003	0.018	0.003	0.017	0.003	0.019	0.003	0.018	0.003
10/22/13	0.017	0.004	0.019	0.004	0.019	0.004	0.020	0.004	0.023	0.004	0.018	0.004	0.018	0.003	0.021	0.004
10/29/13	0.013	0.004	0.014	0.003	0.013	0.004	0.013	0.003	0.016	0.003	0.009	0.003	0.014	0.003	0.011	0.003
11/05/13	0.020	0.004	0.019	0.004	0.020	0.004	0.019	0.004	0.021	0.003	0.019	0.004	0.021	0.004	0.021	0.004
11/12/13	0.012	0.003	0.013	0.003	0.015	0.004	0.009	0.003	0.012	0.003	0.013	0.003	0.011	0.003	0.011	0.003
11/19/13	0.014	0.003	0.015	0.004	0.015	0.003	0.012	0.003	0.014	0.003	0.012	0.003	0.012	0.003	0.018	0.004
11/26/13	0.012	0.003	0.044	0.017	0.012	0.003	0.011	0.003	0.013	0.003	0.014	0.003	0.015	0.003	0.013	0.003
12/03/13	0.011	0.003	0.013	0.003	0.012	0.003	0.013	0.003	0.011	0.003	0.010	0.003	0.013	0.003	0.011	0.003
12/10/13	0.022	0.004	0.023	0.004	0.021	0.003	0.023	0.004	0.022	0.004	0.022	0.004	0.023	0.004	0.020	0.003
12/17/13	0.019	0.004	0.019	0.004	0.021	0.004	0.021	0.004	0.014	0.003	0.022	0.004	0.018	0.004	0.019	0.004
12/23/13	0.020	0.004	0.018	0.004	0.019	0.004	0.019	0.004	0.019	0.004	0.018	0.004	0.017	0.004	0.016	0.004
12/30/13	0.014	0.003	0.020	0.004	0.013	0.003	0.020	0.004	0.016	0.004	0.016	0.004	0.017	0.004	0.017	0.004

TABLE 3
AIRBORNE IODINE
(pCi/m^3)

PERIOD ENDING	LOCATIONS															
	01		02		03		04		10		11		27		15C	
		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)
01/08/13	0.013	0.040	0.014	0.041	0.012	0.037	0.012	0.036	0.005	0.033	0.005	0.033	0.005	0.034	0.006	0.040
01/15/13	-0.001	0.019	-0.001	0.019	-0.001	0.018	-0.001	0.017	-0.016	0.022	-0.016	0.021	-0.016	0.022	-0.019	0.026
01/22/13	0.021	0.022	0.021	0.021	0.020	0.020	0.019	0.020	-0.005	0.020	-0.005	0.019	-0.005	0.019	-0.006	0.023
01/29/13	-0.007	0.038	-0.007	0.038	-0.006	0.035	-0.006	0.035	-0.010	0.031	-0.010	0.030	-0.010	0.031	-0.012	0.037
02/05/13	0.005	0.037	0.005	0.039	0.005	0.035	0.005	0.034	0.007	0.032	0.006	0.030	0.006	0.031	0.008	0.037
02/13/13	-0.007	0.023	-0.010	0.030	-0.007	0.022	-0.007	0.021	0.019	0.029	0.016	0.025	0.019	0.029	0.020	0.031
02/20/13	-0.016	0.018	-0.017	0.018	-0.015	0.017	-0.015	0.016	-0.012	0.019	-0.011	0.017	-0.012	0.019	-0.012	0.019
02/26/13	-0.033	0.036	-0.035	0.039	-0.032	0.035	-0.031	0.034	-0.033	0.035	-0.030	0.032	-0.033	0.034	-0.033	0.035
03/05/13	0.007	0.023	0.007	0.024	0.007	0.021	0.006	0.021	-0.010	0.028	-0.009	0.025	-0.010	0.027	-0.010	0.028
03/12/13	0.025	0.029	0.027	0.031	0.024	0.027	0.023	0.027	0.021	0.029	0.019	0.027	0.021	0.029	0.021	0.029
03/18/13	0.001	0.036	0.001	0.037	0.001	0.034	0.001	0.033	-0.010	0.033	-0.009	0.030	-0.010	0.032	-0.010	0.033
03/26/13	-0.010	0.019	-0.011	0.020	-0.010	0.018	-0.010	0.017	-0.012	0.025	-0.011	0.023	-0.011	0.025	-0.012	0.026
04/02/13	-0.025	0.032	-0.027	0.035	-0.024	0.031	-0.023	0.030	-0.032	0.044	-0.030	0.040	-0.032	0.044	-0.033	0.044
04/09/13	0.005	0.036	0.005	0.039	0.004	0.034	0.004	0.034	-0.005	0.027	-0.005	0.026	-0.005	0.029	-0.005	0.029
04/15/13	0.014	0.021	0.013	0.019	0.014	0.020	0.014	0.020	0.007	0.018	0.007	0.017	0.008	0.019	0.007	0.019
04/23/13	-0.012	0.026	-0.011	0.023	-0.012	0.025	-0.012	0.025	-0.002	0.027	-0.002	0.025	-0.002	0.028	-0.002	0.028
04/30/13	0.006	0.022	0.005	0.020	0.005	0.022	0.005	0.021	0.015	0.017	0.014	0.016	0.015	0.018	0.015	0.017
05/07/13	0.020	0.036	0.018	0.032	0.019	0.035	0.019	0.034	-0.006	0.038	-0.005	0.035	-0.006	0.039	-0.006	0.039
05/14/13	-0.006	0.035	-0.005	0.031	-0.006	0.034	-0.005	0.032	0.000	0.018	0.000	0.016	0.000	0.019	0.000	0.019
05/21/13	-0.004	0.037	-0.004	0.034	-0.004	0.037	-0.004	0.033	-0.020	0.031	-0.018	0.028	-0.020	0.031	-0.020	0.031
05/28/13	-0.007	0.025	-0.006	0.022	-0.007	0.025	-0.007	0.023	0.014	0.035	0.013	0.031	0.015	0.036	0.015	0.036
06/04/13	0.028	0.036	0.026	0.033	0.028	0.036	0.026	0.034	0.009	0.035	0.008	0.031	0.009	0.035	0.009	0.036
06/11/13	0.004	0.042	0.004	0.039	0.004	0.042	0.004	0.039	0.016	0.034	0.014	0.031	0.017	0.035	0.016	0.035
06/18/13	0.009	0.019	0.008	0.017	0.009	0.019	0.009	0.018	-0.024	0.022	-0.021	0.020	-0.024	0.023	-0.025	0.023
06/25/13	-0.042	0.029	-0.038	0.026	-0.041	0.028	-0.038	0.026	-0.013	0.025	-0.014	0.028	-0.014	0.027	-0.014	0.026
07/02/13	-0.005	0.019	-0.005	0.018	-0.005	0.019	-0.005	0.018	-0.022	0.018	-0.024	0.020	-0.023	0.019	-0.022	0.019

TABLE 3
AIRBORNE IODINE
(pCi/m^3)

PERIOD ENDING	LOCATIONS															
	01		02		03		04		10		11		27		15C	
07/09/13	-0.007	0.027	-0.007	0.025	-0.007	0.027	-0.007	0.025	-0.017	0.018	-0.020	0.021	-0.019	0.020	-0.022	0.023
07/16/13	0.011	0.031	0.010	0.029	0.011	0.031	0.010	0.029	-0.016	0.024	-0.017	0.027	-0.017	0.026	-0.016	0.025
07/23/13	-0.001	0.032	0.000	0.030	-0.001	0.032	0.000	0.029	0.014	0.030	0.016	0.034	0.015	0.032	0.014	0.031
07/30/13	0.003	0.028	0.002	0.026	0.003	0.028	0.002	0.025	-0.003	0.038	-0.003	0.042	-0.003	0.041	-0.003	0.040
08/06/13	0.026	0.033	0.024	0.030	0.026	0.033	0.023	0.029	-0.016	0.038	-0.017	0.043	-0.019	0.046	-0.016	0.039
08/13/13	-0.012	0.035	-0.011	0.033	-0.012	0.036	-0.011	0.032	0.021	0.025	0.023	0.027	0.022	0.026	0.020	0.024
08/20/13	-0.014	0.031	-0.013	0.030	-0.014	0.032	-0.013	0.028	0.007	0.024	0.007	0.026	0.007	0.026	0.007	0.025
08/27/13	-0.012	0.038	-0.011	0.034	-0.013	0.039	-0.012	0.035	-0.007	0.033	-0.008	0.036	-0.008	0.035	-0.008	0.034
09/03/13	-0.036	0.042	-0.035	0.040	-0.038	0.044	-0.034	0.040	0.020	0.037	0.023	0.041	0.022	0.040	0.021	0.039
09/10/13	-0.018	0.036	-0.027	0.038	-0.018	0.037	-0.026	0.037	-0.011	0.033	-0.012	0.035	-0.011	0.034	-0.011	0.032
09/17/13	-0.020	0.026	-0.020	0.026	-0.022	0.028	-0.019	0.024	-0.032	0.029	-0.034	0.031	-0.033	0.030	-0.032	0.029
09/24/13	0.022	0.034	0.020	0.030	0.022	0.034	0.020	0.030	0.011	0.033	0.012	0.036	0.011	0.033	0.011	0.032
10/01/13	-0.001	0.033	-0.001	0.032	-0.001	0.035	-0.001	0.031	-0.008	0.021	-0.009	0.023	-0.009	0.023	-0.008	0.022
10/08/13	-0.009	0.044	-0.009	0.041	-0.001	0.039	-0.008	0.040	-0.032	0.031	-0.036	0.034	-0.035	0.034	-0.034	0.033
10/15/13	-0.019	0.033	-0.018	0.031	-0.019	0.034	-0.017	0.030	0.010	0.028	0.011	0.031	0.011	0.030	0.011	0.029
10/22/13	-0.004	0.025	-0.004	0.025	-0.004	0.026	-0.004	0.023	0.000	0.022	0.000	0.024	0.000	0.024	0.000	0.023
10/29/13	-0.012	0.040	-0.011	0.036	-0.012	0.040	-0.011	0.036	-0.018	0.033	-0.019	0.036	-0.018	0.034	-0.018	0.033
11/05/13	-0.002	0.020	-0.002	0.020	-0.002	0.021	-0.002	0.018	0.009	0.020	0.010	0.022	0.010	0.021	0.009	0.020
11/12/13	0.006	0.033	0.005	0.027	0.006	0.034	0.005	0.030	-0.012	0.032	-0.013	0.035	-0.012	0.034	-0.012	0.032
11/19/13	-0.013	0.024	-0.016	0.029	-0.012	0.023	-0.014	0.026	-0.014	0.025	-0.015	0.027	-0.015	0.026	-0.014	0.026
11/26/13	-0.029	0.038	-0.178	0.233	-0.028	0.037	-0.032	0.042	0.038	0.030	0.041	0.034	0.040	0.032	0.039	0.031
12/03/13	-0.030	0.041	-0.034	0.045	-0.029	0.039	-0.034	0.045	-0.031	0.043	-0.034	0.047	-0.033	0.046	-0.032	0.044
12/10/13	-0.031	0.030	-0.035	0.033	-0.031	0.030	-0.035	0.033	-0.012	0.030	-0.013	0.032	-0.013	0.031	-0.012	0.030
12/17/13	-0.013	0.033	-0.014	0.036	-0.012	0.031	-0.013	0.035	0.000	0.032	0.000	0.035	0.000	0.033	0.000	0.033
12/23/13	0.000	0.011	0.000	0.012	0.000	0.011	0.000	0.012	-0.010	0.016	-0.010	0.017	-0.010	0.017	-0.010	0.016
12/30/13	-0.018	0.033	-0.020	0.037	-0.017	0.031	-0.019	0.035	-0.033	0.041	-0.035	0.044	-0.034	0.043	-0.034	0.043

TABLE 4
AIR PARTICULATES
(pCi/m^3)

GAMMA SPECTRA - QTR 1 (01/02/13 - 04/02/13)

LOCATION	Be-7	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)
1	0.1104	0.0337	0.0000	0.0015	-0.0015	0.0029	0.0009	0.0016	0.0047	0.0042	0.0008	0.0028	-0.0016	0.0060
2	0.1339	0.0453	0.0009	0.0019	-0.0008	0.0032	0.0012	0.0017	0.0036	0.0040	0.0018	0.0034	-0.0018	0.0059
3	0.0842	0.0437	-0.0010	0.0021	0.0021	0.0038	-0.0006	0.0025	-0.0018	0.0044	-0.0004	0.0037	0.0014	0.0050
4	0.0965	0.0350	-0.0010	0.0013	0.0006	0.0027	0.0005	0.0014	0.0014	0.0031	0.0008	0.0021	0.0022	0.0040
10	0.0860	0.0401	-0.0009	0.0019	0.0026	0.0030	0.0008	0.0016	0.0025	0.0040	-0.0001	0.0035	-0.0038	0.0062
11	0.0835	0.0426	-0.0015	0.0018	0.0000	0.0027	-0.0008	0.0015	0.0036	0.0038	-0.0007	0.0031	-0.0005	0.0057
27	0.0911	0.0278	-0.0003	0.0012	0.0004	0.0021	0.0000	0.0011	-0.0004	0.0023	0.0015	0.0023	-0.0032	0.0041
15C	0.1138	0.0392	0.0005	0.0011	0.0004	0.0017	0.0008	0.0010	0.0038	0.0034	0.0010	0.0020	0.0004	0.0034

LOCATION	Ru-103	(+/-)	Ru-106	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)
1	-0.0010	0.0040	0.0084	0.0094	0.0011	0.0014	0.0003	0.0012	-0.0008	0.2179	-0.0024	0.0058	0.0020	0.0059
2	0.0036	0.0044	-0.0087	0.0160	0.0029	0.0017	-0.0004	0.0017	-0.0142	0.2943	-0.0016	0.0081	0.0006	0.0086
3	-0.0011	0.0056	0.0069	0.0165	0.0004	0.0018	-0.0002	0.0018	-0.0509	0.3120	0.0041	0.0068	-0.0017	0.0065
4	0.0004	0.0035	0.0010	0.0135	0.0001	0.0012	0.0018	0.0012	-0.1062	0.2145	0.0001	0.0053	-0.0010	0.0058
10	0.0030	0.0054	-0.0171	0.0170	0.0021	0.0017	-0.0013	0.0013	-0.1775	0.2853	-0.0003	0.0086	0.0014	0.0093
11	-0.0019	0.0047	-0.0023	0.0164	0.0007	0.0022	0.0009	0.0016	0.0068	0.3042	0.0070	0.0080	0.0001	0.0082
27	-0.0014	0.0034	0.0066	0.0097	0.0013	0.0010	0.0004	0.0011	-0.0966	0.1983	0.0008	0.0058	-0.0019	0.0058
15C	-0.0013	0.0031	0.0020	0.0113	0.0012	0.0012	0.0001	0.0011	-0.0294	0.1839	-0.0045	0.0051	-0.0031	0.0052

GAMMA SPECTRA - QTR 2 (04/02/13 - 07/02/13)

LOCATION	Be-7	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)
1	0.1080	0.0390	0.0003	0.0010	-0.0004	0.0008	-0.0004	0.0008	-0.0003	0.0023	-0.0012	0.0027	0.0016	0.0022
2	0.1250	0.0400	0.0004	0.0010	-0.0003	0.0021	0.0000	0.0008	0.0004	0.0024	0.0007	0.0021	-0.0006	0.0037
3	0.1330	0.0410	0.0003	0.0005	0.0001	0.0012	0.0000	0.0000	-0.0020	0.0033	-0.0012	0.0027	-0.0020	0.0023
4	0.0890	0.0370	0.0006	0.0010	0.0007	0.0017	0.0002	0.0010	0.0016	0.0031	-0.0004	0.0033	-0.0006	0.0037
10	0.1660	0.0390	-0.0007	0.0007	0.0007	0.0014	-0.0003	0.0005	-0.0008	0.0018	-0.0002	0.0033	-0.0008	0.0029
11	0.1410	0.0420	0.0008	0.0012	0.0010	0.0015	0.0002	0.0010	-0.0026	0.0030	-0.0015	0.0040	0.0000	0.0024
27	0.1650	0.0410	0.0002	0.0011	0.0000	0.0013	-0.0006	0.0009	0.0005	0.0019	-0.0003	0.0031	0.0000	0.0028
15C	0.0790	0.0390	-0.0003	0.0013	0.0000	0.0000	0.0017	0.0017	-0.0005	0.0043	-0.0007	0.0014	-0.0013	0.0038

LOCATION	Ru-103	(+/-)	Ru-106	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)
1	0.0005	0.0021	0.0017	0.0075	-0.0003	0.0008	0.0002	0.0008	0.0090	0.0170	0.0021	0.0028	-0.0020	0.0031
2	0.0009	0.0023	0.0052	0.0095	0.0002	0.0007	0.0005	0.0008	-0.0110	0.0150	-0.0016	0.0032	0.0017	0.0040
3	-0.0005	0.0021	-0.0030	0.0120	0.0001	0.0006	-0.0010	0.0012	0.0080	0.0170	0.0005	0.0026	0.0031	0.0035
4	-0.0003	0.0024	-0.0020	0.0095	0.0005	0.0009	-0.0003	0.0010	-0.0180	0.0320	-0.0017	0.0028	-0.0001	0.0047
10	0.0018	0.0022	0.0004	0.0083	-0.0002	0.0006	-0.0007	0.0009	-0.0020	0.0430	0.0019	0.0027	-0.0003	0.0023
11	0.0001	0.0025	0.0038	0.0087	0.0001	0.0009	0.0003	0.0007	0.0000	0.0290	-0.0005	0.0030	-0.0011	0.0043
27	0.0000	0.0029	0.0010	0.0092	-0.0002	0.0007	0.0008	0.0009	0.0060	0.0110	0.0016	0.0036	-0.0014	0.0042
15C	-0.0005	0.0023	-0.0054	0.0098	-0.0001	0.0006	-0.0001	0.0013	-0.0200	0.0280	0.0006	0.0022	-0.0009	0.0030

TABLE 4
AIR PARTICULATES
(pCi/m³)

GAMMA SPECTRA - QTR 3 (07/02/13 - 10/01/13)

LOCATION	Be-7	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)
1	0.1150	0.0388	-0.0001	0.0010	-0.0010	0.0019	-0.0001	0.0011	0.0018	0.0030	0.0003	0.0024	-0.0003	0.0035
2	0.1270	0.0452	0.0002	0.0020	0.0016	0.0034	-0.0004	0.0018	0.0031	0.0048	-0.0017	0.0038	0.0007	0.0066
3	0.1150	0.0393	-0.0008	0.0014	-0.0016	0.0025	0.0004	0.0011	0.0007	0.0031	0.0002	0.0024	-0.0018	0.0043
4	0.1590	0.0451	-0.0012	0.0015	0.0012	0.0026	0.0000	0.0010	0.0012	0.0033	-0.0006	0.0031	-0.0001	0.0050
10	0.1590	0.0414	0.0002	0.0015	-0.0005	0.0029	-0.0010	0.0011	0.0017	0.0041	-0.0014	0.0025	0.0002	0.0049
11	0.1600	0.0364	-0.0004	0.0012	-0.0003	0.0022	0.0004	0.0012	0.0001	0.0024	0.0014	0.0028	0.0041	0.0043
27	0.0945	0.0296	-0.0001	0.0016	-0.0009	0.0034	-0.0001	0.0016	0.0005	0.0044	0.0008	0.0027	0.0005	0.0044
15C	0.1190	0.0384	-0.0003	0.0017	-0.0006	0.0030	0.0004	0.0013	0.0036	0.0043	-0.0007	0.0032	0.0025	0.0052

LOCATION	Ru-103	(+/-)	Ru-106	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)
1	-0.0021	0.0037	0.0076	0.0101	0.0011	0.0012	0.0004	0.0010	-0.0564	0.3240	0.0021	0.0055	0.0026	0.0050
2	0.0010	0.0052	-0.0279	0.0158	0.0023	0.0017	0.0004	0.0015	0.1110	0.4860	0.0027	0.0087	0.0029	0.0071
3	0.0039	0.0041	0.0015	0.0131	0.0012	0.0013	0.0004	0.0010	0.0774	0.4210	-0.0026	0.0068	0.0024	0.0057
4	0.0011	0.0046	-0.0036	0.0097	0.0019	0.0013	0.0005	0.0010	-0.2390	0.3910	0.0020	0.0072	0.0009	0.0056
10	0.0018	0.0046	-0.0023	0.0121	0.0016	0.0013	0.0006	0.0012	0.2670	0.4640	-0.0033	0.0069	0.0018	0.0063
11	-0.0006	0.0034	-0.0055	0.0118	-0.0008	0.0011	0.0012	0.0011	0.4410	0.3950	0.0008	0.0070	0.0019	0.0060
27	0.0027	0.0061	-0.0119	0.0157	0.0010	0.0018	-0.0002	0.0013	0.5830	0.4840	-0.0073	0.0090	-0.0002	0.0080
15C	-0.0008	0.0054	-0.0057	0.0147	0.0031	0.0016	0.0004	0.0015	-0.2780	0.4000	0.0020	0.0083	-0.0040	0.0061

GAMMA SPECTRA - QTR 4 (10/01/13 - 12/30/13)

LOCATION	Be-7	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)
1	0.0785	0.0264	0.0000	0.0010	-0.0008	0.0017	0.0000	0.0010	0.0002	0.0028	0.0018	0.0020	-0.0032	0.0036
2	0.1100	0.0359	-0.0002	0.0017	-0.0008	0.0025	0.0004	0.0012	-0.0016	0.0027	0.0010	0.0026	-0.0009	0.0046
3	0.1090	0.0280	0.0001	0.0008	-0.0006	0.0018	-0.0006	0.0012	-0.0013	0.0019	0.0006	0.0017	-0.0009	0.0028
4	0.0983	0.0324	-0.0003	0.0009	0.0006	0.0018	0.0005	0.0011	-0.0017	0.0025	0.0007	0.0020	0.0012	0.0038
10	0.1100	0.0305	-0.0009	0.0015	0.0000	0.0025	-0.0003	0.0015	0.0010	0.0040	-0.0020	0.0028	0.0019	0.0048
11	0.0957	0.0314	-0.0009	0.0012	-0.0007	0.0020	0.0006	0.0014	0.0033	0.0028	0.0013	0.0020	-0.0025	0.0038
27	0.0846	0.0452	0.0007	0.0016	-0.0010	0.0026	-0.0004	0.0011	0.0001	0.0038	-0.0013	0.0031	0.0017	0.0045
15C	0.0998	0.0252	-0.0003	0.0011	0.0006	0.0017	0.0005	0.0010	-0.0012	0.0023	0.0010	0.0015	-0.0025	0.0033

LOCATION	Ru-103	(+/-)	Ru-106	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)
1	-0.0009	0.0030	-0.0101	0.0088	0.0012	0.0012	-0.0003	0.0008	-0.0420	0.1350	-0.0003	0.0042	-0.0010	0.0048
2	0.0012	0.0038	0.0034	0.0131	0.0008	0.0012	0.0003	0.0014	-0.1020	0.2090	-0.0072	0.0056	-0.0041	0.0063
3	-0.0005	0.0022	0.0010	0.0061	-0.0006	0.0008	0.0005	0.0009	0.0282	0.1610	-0.0003	0.0039	0.0005	0.0041
4	-0.0008	0.0029	-0.0061	0.0083	-0.0005	0.0010	0.0002	0.0010	0.0248	0.1710	-0.0011	0.0050	0.0035	0.0051
10	0.0018	0.0039	-0.0042	0.0129	-0.0007	0.0013	-0.0001	0.0013	-0.0898	0.2380	-0.0022	0.0064	-0.0060	0.0067
11	-0.0016	0.0035	-0.0060	0.0097	0.0003	0.0013	0.0002	0.0010	-0.0184	0.1870	0.0022	0.0053	-0.0007	0.0057
27	0.0008	0.0040	0.0033	0.0115	0.0013	0.0013	-0.0007	0.0012	-0.1340	0.1890	0.0003	0.0057	0.0019	0.0066
15C	0.0002	0.0027	-0.0013	0.0098	0.0009	0.0011	-0.0002	0.0008	-0.0127	0.1420	-0.0010	0.0044	0.0005	0.0052

TABLE 5
AIR PARTICULATES
Strontium

Analyses for strontium in air particulate filters were not analyzed in 2013. See discussion in Section 4.5.

TABLE 6
SOIL
(pCi/g dry wt.)

LOCATION	COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
03	11/13/13	0.298	0.330	19.830	1.602	-0.201	0.322	-0.014	0.034	0.013	0.036	0.045	0.085
04	11/13/13	-0.066	0.321	15.500	1.356	-0.584	0.347	-0.019	0.040	-0.007	0.038	-0.001	0.076
14C	11/13/13	0.087	0.282	17.410	1.347	-0.008	0.276	0.025	0.034	0.014	0.032	-0.065	0.068

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
03	11/13/13	0.006	0.049	-0.057	0.106	0.009	0.040	0.004	0.063	-0.005	0.037	0.007	0.330
04	11/13/13	0.028	0.043	-0.025	0.101	0.026	0.039	0.002	0.063	-0.006	0.037	-0.068	0.314
14C	11/13/13	0.019	0.042	0.050	0.085	0.026	0.040	-0.001	0.061	0.006	0.032	0.246	0.285

LOCATION	COLLECTION DATE	Sb-125	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
03	11/13/13	0.016	0.098	0.012	0.036	0.183	0.077	0.048	0.058	0.049	0.245	1.174	0.319
04	11/13/13	0.030	0.096	-0.032	0.041	0.537	0.080	0.027	0.057	-0.198	0.222	0.257	0.335
14C	11/13/13	0.041	0.083	0.016	0.031	0.101	0.049	0.001	0.052	-0.025	0.196	1.356	0.273

TABLE 7
COW MILK
(pCi/l)

LOCATION	COLLECTION DATE	I-131	(+/-)	Sr-89	(+/-)	Sr-90	(+/-)	K-40	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)
22	01/24/13	-0.761	0.417					1180	123	1.3	3.4	0.4	3.4	-1.6	24.5	5.8	7.8
	02/21/13	-0.184	0.315					1220	152	-1.8	4.2	-4.5	3.7	11.9	17.2	-0.5	5.9
	03/13/13	0.436	0.483	1.1	5.1	1.0	0.9	1380	148	-1.6	3.9	3.9	4.6	0.8	19.5	-0.6	5.2
	04/24/13	-0.262	0.227					1356	135	-2.1	3.0	1.7	3.3	24.1	20.3	-3.1	5.7
	05/15/13	-0.217	0.387					1372	97.5	-3.7	2.5	1.0	2.7	-18.7	16.6	-0.9	5.2
	05/30/13	0.049	0.583					1360	148	-1.7	4.1	0.3	3.6	-0.8	16.9	3.8	5.5
	06/13/13	0.096	0.362					1418	133	-0.9	4.0	3.4	4.0	-2.5	16.8	-2.2	4.5
	06/19/13	0.238	0.397	3.3	5.4	-0.3	1.0	1255	163	-4.5	4.2	1.5	4.8	6.8	17.0	-3.7	4.4
	07/11/13	-0.017	0.262					1216	175	-1.6	5.0	2.0	4.6	-3.1	23.7	-2.4	6.5
	07/24/13	0.141	0.362					1203	121	0.0	3.0	-0.3	3.3	-13.5	26.3	-2.7	6.2
	08/07/13	-0.278	0.403					1212	125	0.9	3.8	-2.8	3.8	-9.4	19.4	-4.0	4.8
	08/21/13	0.104	0.360					1485	162	-3.4	3.7	1.2	3.8	13.8	20.0	2.1	5.6
	09/03/13	0.185	0.407					1356	166	0.8	5.9	-0.2	4.9	16.6	27.1	-0.2	6.3
	09/19/13	-0.076	0.300	3.6	5.1	0.5	0.4	1268	156	-0.8	4.0	-0.8	3.8	-4.7	17.1	0.8	5.3
	10/02/13	-0.042	0.421					1288	134	-1.0	3.3	0.4	3.5	5.0	21.3	-3.1	6.3
	10/22/13	0.033	0.373					1375	161	-0.8	4.4	1.3	3.7	7.9	24.1	-0.5	6.3
	11/20/13	-0.143	0.441					1348	128	0.9	3.7	0.0	3.5	4.2	23.4	0.5	5.3
	12/11/13	-0.248	0.363	0.8	7.4	0.5	0.8	1285	180	-4.3	5.2	-0.7	5.4	6.3	24.3	3.5	8.4

TABLE 8
GOAT MILK

Goat Milk samples were not available during 2013.
See discussions in Sections 2.3 and 4.5

TABLE 9
PASTURE GRASS / HAY
(pCi/g wet wt.)

Location 21

COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)	Co-60	(+/-)
01/24/13	0.016	0.092	17.6	0.6	-0.029	0.105	-0.004	0.011	-0.005	0.012	-0.007	0.030	-0.010	0.015
02/21/13	0.063	0.089	11.8	0.6	-0.030	0.091	0.005	0.011	0.006	0.011	0.030	0.027	-0.011	0.015
03/13/13	0.062	0.104	14.1	0.7	-0.033	0.104	0.000	0.013	0.008	0.013	-0.038	0.032	0.014	0.019
04/24/13	0.084	0.076	15.1	0.3	-0.001	0.069	0.003	0.006	0.001	0.007	0.002	0.017	0.001	0.008
05/16/13	0.148	0.057	5.2	0.2	-0.002	0.042	0.000	0.004	-0.001	0.004	-0.005	0.012	-0.004	0.005
05/30/13	0.510	0.165	5.0	0.5	-0.007	0.112	-0.008	0.012	-0.004	0.011	0.009	0.028	-0.005	0.016
06/13/13	0.910	0.166	6.4	0.5	-0.020	0.083	-0.008	0.011	-0.007	0.010	0.025	0.023	-0.007	0.013
06/19/13	0.921	0.222	3.4	0.5	0.006	0.127	-0.001	0.015	0.002	0.014	-0.007	0.032	0.007	0.017
07/11/13	0.638	0.277	9.7	0.9	-0.048	0.170	0.005	0.019	0.005	0.018	0.001	0.042	-0.018	0.026
07/24/13	1.150	0.208	4.9	0.4	-0.015	0.099	0.001	0.011	-0.007	0.011	0.005	0.021	0.003	0.015
08/07/13	0.406	0.088	8.3	0.3	-0.003	0.055	0.000	0.006	-0.005	0.006	0.007	0.017	0.005	0.008
08/21/13	1.369	0.288	10.6	0.8	0.103	0.160	0.005	0.017	0.011	0.016	-0.016	0.041	0.017	0.022
09/03/13	1.581	0.302	5.9	0.7	0.095	0.159	-0.002	0.020	-0.009	0.020	0.008	0.049	0.004	0.028
09/19/13	1.601	0.199	6.6	0.4	-0.086	0.098	-0.002	0.010	0.002	0.010	0.004	0.025	-0.008	0.012
10/02/13	0.817	0.167	8.4	0.5	0.006	0.115	-0.001	0.010	-0.003	0.011	0.011	0.028	0.007	0.014
10/22/13	1.248	0.104	7.0	0.2	-0.007	0.056	0.002	0.005	0.002	0.005	-0.001	0.013	-0.002	0.006
11/20/13	0.012	0.048	10.9	0.3	0.012	0.054	0.002	0.006	0.000	0.006	-0.002	0.017	-0.006	0.009
12/11/13	0.240	0.209	12.2	0.7	-0.131	0.151	0.006	0.016	-0.013	0.020	0.008	0.038	0.012	0.021

COLLECTION DATE	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
01/24/13	0.007	0.033	0.010	0.012	-0.001	0.020	0.001	0.012	-0.016	0.092	0.000	0.027	0.014	0.034
02/21/13	-0.053	0.028	0.008	0.012	-0.007	0.020	-0.001	0.011	-0.037	0.095	0.016	0.030	-0.015	0.016
03/13/13	-0.045	0.034	0.002	0.013	0.003	0.022	0.004	0.013	0.002	0.118	0.001	0.032	0.006	0.021
04/24/13	-0.033	0.018	0.007	0.007	0.011	0.012	0.004	0.007	0.037	0.054	0.001	0.016	-0.013	0.021
05/16/13	-0.010	0.011	0.003	0.004	0.003	0.008	-0.002	0.005	0.006	0.037	-0.002	0.010	-0.010	0.014
05/30/13	-0.032	0.033	0.002	0.013	0.025	0.023	-0.012	0.011	0.062	0.115	0.020	0.033	-0.017	0.022
06/13/13	-0.012	0.024	0.003	0.009	0.015	0.017	0.008	0.009	0.033	0.086	-0.018	0.025	-0.007	0.014
06/19/13	-0.004	0.028	-0.011	0.014	0.006	0.026	-0.004	0.015	-0.032	0.139	0.006	0.036	0.020	0.023
07/11/13	-0.016	0.044	-0.005	0.017	0.027	0.031	0.001	0.018	0.026	0.140	-0.008	0.049	-0.001	0.031
07/24/13	-0.039	0.030	0.010	0.011	0.009	0.019	0.001	0.011	0.064	0.088	-0.003	0.027	0.008	0.018
08/07/13	-0.023	0.017	0.007	0.006	0.005	0.011	0.003	0.006	0.023	0.052	0.001	0.014	0.014	0.018
08/21/13	-0.015	0.046	0.009	0.017	0.004	0.035	-0.013	0.017	0.021	0.154	0.010	0.044	-0.008	0.033
09/03/13	-0.040	0.065	0.025	0.019	0.004	0.035	0.000	0.019	0.030	0.164	0.018	0.050	0.013	0.030
09/19/13	-0.011	0.027	0.003	0.010	-0.002	0.017	-0.010	0.011	-0.055	0.085	0.003	0.025	0.005	0.025
10/02/13	0.006	0.028	0.001	0.011	0.008	0.022	0.000	0.013	-0.015	0.099	-0.005	0.029	-0.037	0.036
10/22/13	0.005	0.013	0.005	0.005	-0.005	0.009	-0.009	0.006	-0.005	0.043	-0.001	0.012	0.003	0.021
11/20/13	0.015	0.017	0.002	0.006	0.000	0.011	0.006	0.006	-0.040	0.048	-0.014	0.013	-0.003	0.019
12/11/13	0.040	0.045	0.013	0.021	0.015	0.032	-0.012	0.020	0.058	0.148	0.014	0.044	0.018	0.032

TABLE 9
PASTURE GRASS / HAY
(pCi/g wet wt.)

Location 21

COLLECTION DATE	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
01/24/13	0.011	0.011	0.009	0.011	-0.049	0.076	-0.002	0.019	-0.009	0.020	-0.024	0.067	0.020	0.042
02/21/13	-0.002	0.012	0.009	0.011	-0.031	0.044	0.009	0.012	0.007	0.015	0.040	0.065	0.042	0.047
03/13/13	-0.007	0.013	0.008	0.011	0.030	0.060	-0.002	0.015	0.004	0.019	-0.017	0.076	-0.019	0.051
04/24/13	-0.002	0.007	0.017	0.007	0.018	0.047	-0.007	0.011	0.000	0.014	-0.046	0.042	0.013	0.032
05/16/13	-0.006	0.004	-0.001	0.004	0.000	0.030	0.000	0.008	-0.008	0.008	-0.014	0.025	0.038	0.025
05/30/13	0.004	0.013	-0.001	0.013	0.025	0.059	0.005	0.015	0.005	0.020	0.030	0.078	0.031	0.049
06/13/13	0.007	0.010	0.007	0.009	-0.015	0.039	-0.009	0.013	0.011	0.016	0.006	0.060	-0.003	0.042
06/19/13	-0.004	0.015	0.007	0.015	0.021	0.067	-0.003	0.021	-0.001	0.022	0.013	0.086	-0.019	0.057
07/11/14	-0.008	0.017	0.016	0.021	0.033	0.080	0.009	0.021	-0.017	0.028	-0.038	0.120	-0.029	0.071
07/24/13	0.003	0.009	0.014	0.012	0.014	0.052	-0.001	0.014	-0.002	0.017	-0.009	0.064	0.055	0.042
08/07/13	0.001	0.006	0.003	0.006	-0.005	0.041	-0.004	0.012	0.008	0.008	0.028	0.025	0.053	0.039
08/21/13	0.001	0.019	0.017	0.019	-0.082	0.082	0.009	0.017	0.013	0.027	0.054	0.108	0.025	0.067
09/03/13	-0.001	0.022	0.004	0.021	-0.022	0.093	-0.014	0.029	0.006	0.021	0.081	0.081	0.032	0.080
09/19/13	0.003	0.010	0.005	0.010	0.008	0.061	-0.009	0.016	0.001	0.016	0.025	0.055	-0.009	0.038
10/02/13	-0.021	0.011	0.015	0.011	0.010	0.081	0.002	0.021	0.019	0.023	-0.046	0.074	0.010	0.042
10/22/13	-0.006	0.005	0.003	0.005	-0.012	0.041	-0.001	0.011	-0.002	0.010	-0.012	0.032	0.006	0.030
11/20/13	-0.002	0.006	0.006	0.006	-0.022	0.043	0.003	0.012	-0.003	0.009	-0.017	0.028	0.007	0.033
12/11/13	0.065	0.020	0.004	0.016	0.012	0.087	-0.012	0.022	0.016	0.029	0.012	0.107	0.004	0.057

Note: Pasture grass is required as a substitute for milk when milk is not available. Grass was only available during the months of May thru September. During other months feed was substituted for pasture grass.

TABLE 9
PASTURE GRASS / HAY
(pCi/g wet wt.)

Location 24C

COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)	Co-60	(+/-)
01/24/13	0.075	0.119	14.4	0.6	0.088	0.131	0.003	0.013	0.000	0.015	-0.011	0.036	0.003	0.019
02/21/13	-0.093	0.125	10.1	0.8	-0.027	0.109	0.018	0.016	-0.007	0.016	-0.004	0.035	0.005	0.021
03/13/13	-0.011	0.101	11.1	0.6	0.071	0.101	0.001	0.013	0.001	0.013	-0.039	0.031	-0.005	0.019
04/24/13	-0.001	0.149	11.3	0.8	-0.049	0.151	-0.010	0.017	0.008	0.018	-0.004	0.047	-0.007	0.026
05/15/13	0.198	0.060	5.8	0.2	0.027	0.039	-0.001	0.003	0.001	0.004	0.004	0.010	-0.002	0.005
05/30/13	0.333	0.210	4.1	0.4	-0.054	0.096	0.001	0.010	-0.018	0.010	0.005	0.019	-0.004	0.012
06/13/13	0.501	0.148	3.3	0.3	-0.011	0.076	0.004	0.008	-0.001	0.010	-0.002	0.018	-0.004	0.012
06/19/13	0.523	0.228	3.4	0.5	-0.025	0.130	-0.003	0.015	0.001	0.014	0.001	0.031	0.015	0.018
07/11/13	0.810	0.231	3.7	0.6	0.068	0.134	0.007	0.014	-0.008	0.015	-0.017	0.037	-0.007	0.017
07/24/13	0.693	0.179	7.0	0.5	0.054	0.119	-0.003	0.011	0.008	0.011	0.014	0.025	0.003	0.014
08/07/13	1.188	0.081	6.2	0.2	-0.024	0.042	0.005	0.004	-0.001	0.004	0.005	0.012	0.005	0.006
08/21/13	0.624	0.208	5.8	0.6	0.068	0.115	-0.007	0.016	0.000	0.015	0.005	0.033	-0.001	0.019
09/03/13	1.141	0.214	5.1	0.5	-0.042	0.121	-0.003	0.013	-0.005	0.011	0.015	0.026	0.000	0.016
09/19/13	0.771	0.104	6.2	0.3	-0.048	0.062	-0.002	0.006	-0.003	0.007	0.010	0.016	0.003	0.009
10/02/13	0.546	0.213	6.7	0.5	0.067	0.107	-0.010	0.011	-0.013	0.012	0.005	0.030	0.006	0.015
10/22/13	0.631	0.057	5.6	0.2	-0.041	0.035	-0.002	0.003	0.002	0.003	0.015	0.010	-0.001	0.004
11/20/13	0.069	0.056	10.5	0.3	0.005	0.063	-0.001	0.006	0.002	0.007	0.004	0.016	0.003	0.008
12/11/13	-0.048	0.157	10.2	0.8	0.035	0.132	-0.012	0.017	-0.003	0.016	0.025	0.040	-0.011	0.022

	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
01/24/13	-0.053	0.038	0.004	0.015	0.001	0.026	-0.009	0.016	-0.072	0.122	0.017	0.032	-0.045	0.038
02/21/13	-0.004	0.039	-0.005	0.016	-0.008	0.028	-0.007	0.014	0.125	0.122	0.016	0.037	0.000	0.018
03/13/13	-0.005	0.032	-0.006	0.012	-0.005	0.021	0.004	0.012	0.087	0.105	-0.003	0.029	0.000	0.018
04/24/13	-0.056	0.049	0.007	0.020	-0.010	0.034	-0.004	0.018	0.197	0.151	-0.016	0.041	-0.019	0.035
05/15/13	-0.008	0.010	-0.003	0.004	-0.001	0.007	-0.003	0.004	0.004	0.030	-0.001	0.008	-0.012	0.013
05/30/13	-0.003	0.027	0.000	0.011	0.004	0.019	0.005	0.011	-0.048	0.084	-0.013	0.030	0.011	0.019
06/13/13	-0.011	0.020	0.011	0.009	-0.005	0.016	-0.002	0.008	0.002	0.074	-0.001	0.023	-0.010	0.013
06/19/13	-0.006	0.035	0.017	0.017	-0.014	0.025	0.003	0.016	0.056	0.132	-0.017	0.041	-0.006	0.027
07/11/13	-0.036	0.029	0.001	0.013	0.019	0.026	0.009	0.016	0.050	0.114	-0.005	0.041	0.021	0.027
07/24/13	-0.015	0.027	0.004	0.011	0.002	0.019	-0.003	0.013	0.036	0.094	0.014	0.033	-0.015	0.025
08/07/13	-0.009	0.011	0.001	0.005	0.007	0.007	-0.006	0.005	0.003	0.037	0.004	0.010	0.002	0.013
08/21/13	-0.007	0.038	-0.002	0.015	0.010	0.025	-0.011	0.014	0.066	0.125	-0.005	0.037	-0.008	0.024
09/03/13	0.012	0.033	0.005	0.013	-0.006	0.023	-0.004	0.011	-0.009	0.110	-0.013	0.033	0.010	0.019
09/19/13	0.006	0.017	0.005	0.007	0.000	0.012	0.001	0.007	0.029	0.057	0.001	0.016	0.006	0.018
10/02/13	-0.024	0.031	0.001	0.013	-0.012	0.021	-0.009	0.013	0.021	0.100	0.011	0.029	-0.022	0.037
10/22/13	-0.014	0.009	-0.001	0.004	0.000	0.006	-0.001	0.004	-0.024	0.027	0.004	0.008	0.006	0.014
11/20/13	0.001	0.016	0.011	0.007	-0.006	0.012	0.002	0.007	-0.034	0.053	0.005	0.015	-0.009	0.021
12/11/13	-0.031	0.048	0.014	0.016	0.004	0.026	0.002	0.016	-0.061	0.145	-0.017	0.044	0.022	0.032

TABLE 9
PASTURE GRASS / HAY
(pCi/g wet wt.)

Location 24C

COLLECTION DATE	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
01/24/13	-0.004	0.014	0.012	0.014	0.011	0.094	0.013	0.026	0.000	0.020	-0.022	0.064	0.006	0.055
02/21/13	-0.017	0.014	0.011	0.016	0.012	0.058	-0.011	0.020	0.001	0.015	-0.049	0.064	0.000	0.066
03/13/13	-0.003	0.012	-0.004	0.013	-0.003	0.055	0.001	0.015	0.006	0.017	-0.013	0.069	-0.012	0.051
04/24/13	-0.008	0.019	0.007	0.019	-0.054	0.106	0.013	0.029	-0.006	0.020	-0.041	0.067	-0.043	0.070
05/15/13	0.002	0.003	0.004	0.003	-0.020	0.025	-0.003	0.007	-0.001	0.007	-0.029	0.021	0.018	0.016
05/30/13	-0.003	0.011	-0.002	0.012	-0.009	0.050	-0.001	0.012	0.000	0.019	-0.019	0.074	-0.015	0.037
06/13/13	-0.008	0.009	-0.003	0.009	0.009	0.034	0.002	0.010	0.006	0.015	-0.009	0.059	0.039	0.035
06/19/13	0.011	0.018	-0.004	0.017	-0.006	0.072	-0.022	0.018	0.001	0.025	-0.048	0.092	-0.046	0.059
07/11/13	-0.003	0.014	-0.002	0.016	0.000	0.066	0.000	0.015	-0.019	0.027	0.037	0.099	0.039	0.060
07/24/13	0.008	0.012	0.003	0.012	0.029	0.062	-0.002	0.009	-0.004	0.024	-0.075	0.097	0.060	0.046
08/07/13	0.002	0.004	0.000	0.004	-0.026	0.030	-0.006	0.008	0.001	0.007	0.005	0.023	0.008	0.019
08/21/13	-0.009	0.016	0.004	0.015	0.030	0.065	-0.006	0.022	-0.005	0.018	-0.042	0.070	0.068	0.056
09/03/13	0.008	0.011	0.003	0.013	-0.018	0.056	0.007	0.018	-0.007	0.019	0.026	0.073	0.064	0.055
09/19/13	0.000	0.007	0.003	0.007	-0.023	0.041	0.003	0.010	-0.005	0.012	-0.026	0.042	0.009	0.044
10/02/13	-0.013	0.012	-0.002	0.011	0.023	0.080	-0.019	0.024	-0.001	0.017	-0.025	0.055	-0.008	0.045
10/22/13	-0.004	0.003	0.000	0.003	-0.017	0.028	-0.001	0.007	-0.006	0.006	-0.002	0.020	0.010	0.015
11/20/13	0.004	0.007	0.003	0.007	0.003	0.046	-0.003	0.012	-0.002	0.012	-0.007	0.034	0.010	0.032
12/11/13	0.002	0.018	0.004	0.017	-0.066	0.086	0.004	0.025	0.022	0.023	0.030	0.096	-0.011	0.071

Note: Pasture grass is required as a substitute for milk when milk is not available. Grass was only available during the months of May thru September. During other months feed was substituted for pasture grass.

TABLE 10
WELL WATER
(pCi/l)

LOCATION	COLLECTION DATE	H-3	(+/-)	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)	Co-60	(+/-)
71	03/27/13	26	495	5.6	22.3	16.1	48.9	-14.2	23.5	0.6	2.4	-0.7	2.7	1.9	4.6	-0.2	2.2
	06/10/13	479	1010	-13.7	33.8	12.3	64.6	22.5	39.2	0.2	4.5	1.1	4.0	8.1	9.5	-4.3	4.3
	09/24/13	-183	506	-1.4	26.3	20.4	37.9	8.0	34.3	1.1	2.8	1.2	2.9	2.0	6.9	-1.3	3.1
	12/14/13	213	537	6.4	9.1	5.4	17.4	-3.0	11.6	0.0	0.8	-0.7	0.9	-0.1	2.1	-0.4	0.8
72	03/26/13	135	505	-7.6	20.6	5.0	41.8	-5.6	22.3	-1.1	2.3	-1.3	2.6	2.9	5.3	-0.3	2.5
	06/10/13	-419	894	-17.0	37.3	-37.0	65.3	-59.2	39.0	-1.7	3.8	3.2	4.4	0.2	7.3	0.8	4.2
	09/24/13	78	528	-8.6	24.7	38.2	48.7	-5.1	32.1	-6.0	2.9	-2.1	3.1	2.0	6.1	-0.4	2.6
	12/13/13	87	530	3.1	11.8	-25.8	20.7	-13.3	15.2	-0.9	1.1	-0.3	1.2	1.3	2.9	0.3	1.1
76	03/20/13	-104	493	15.6	21.1	-14.7	33.3	2.2	22.1	1.7	2.3	-0.3	2.5	-3.4	4.8	-1.4	2.4
	06/06/13	143	524	-4.0	36.7	85.8	92.4	-18.7	44.5	-2.5	4.5	1.3	4.5	9.5	9.2	2.0	4.8
	09/19/13	-161	533	-0.5	23.8	29.5	65.9	-17.5	26.2	1.8	2.6	-0.4	2.8	2.8	6.0	-0.2	2.8
	12/11/13	236	523	-3.3	26.9	58.5	64.7	-14.3	29.8	2.0	2.8	0.8	3.0	3.6	6.9	-2.6	3.3
77	03/18/13	137	515	7.9	25.3	-10.8	38.9	-0.2	31.6	-1.9	2.7	-2.1	2.9	-3.6	5.1	0.8	2.6
	06/06/13	84	514	26.6	42.3	22.6	69.7	-3.8	44.7	-1.8	4.9	-4.9	4.6	-2.6	10.0	0.6	4.1
	09/19/13	-296	521	-21.8	28.5	14.0	61.0	-21.0	34.0	-2.9	3.2	-4.2	3.2	-3.2	6.0	-0.3	2.8
	12/11/13	-71	499	-41.8	32.2	-39.5	54.3	25.0	39.9	-0.2	4.0	-2.5	3.8	1.4	8.4	-1.1	3.5
78	03/18/13	104	511	29.4	22.1	16.2	36.8	-9.9	23.4	0.9	2.4	1.8	2.5	2.7	5.1	-0.4	2.6
	06/06/13	544	1270	4.3	31.8	-18.6	50.1	-15.4	31.5	-1.6	3.6	1.4	3.6	-2.3	8.7	-3.1	3.6
	09/17/13	211	574	7.5	20.2	50.1	52.7	-12.9	22.9	0.3	2.5	-1.3	2.5	1.6	5.6	-1.4	2.7
	12/12/13	-26	502	-9.4	31.5	26.6	57.1	13.5	37.3	0.0	3.5	-3.1	3.8	6.5	7.6	-0.6	3.6
79	03/27/2013	-185	475	4.0	18.2	64.2	44.3	17.7	22.0	-3.1	2.2	0.2	2.1	-1.4	4.4	-0.5	2.1
	06/10/2013	-353	903	-12.7	29.9	10.5	55.7	9.5	33.5	-2.1	3.3	0.5	3.7	-4.4	7.4	-0.5	3.6
	09/23/13	-78	515	-0.8	20.8	13.1	43.4	29.0	27.9	-0.1	2.3	1.9	2.6	1.5	5.5	-0.8	2.5
	12/13/13	-13	516	6.9	12.0	3.7	21.3	1.3	15.8	0.3	1.1	0.1	1.3	0.3	3.0	0.2	1.2
80	03/27/13	1110	612	-8.8	25.1	-27.3	36.2	-0.6	26.7	0.5	2.5	-4.3	3.1	-3.3	5.2	1.1	2.6
81	03/27/13	572	542	-13.4	19.3	31.4	37.4	-0.5	21.4	-0.8	2.2	-1.8	2.3	0.1	4.1	-0.9	2.2
	06/10/13	-255	918	18.8	38.7	14.4	66.7	-1.6	44.7	-2.1	3.9	-5.4	4.1	-1.0	7.5	-1.1	3.5
	09/25/13	241	479	-3.1	25.7	27.5	63.2	-1.0	29.5	-1.3	2.2	1.5	2.4	0.3	5.6	0.2	2.4
	12/14/13	689	872	7.5	13.5	-28.9	23.8	-7.5	16.3	0.1	1.3	-1.3	1.6	5.7	3.4	-1.1	1.3
82	03/27/13	238	515	23.0	27.9	34.2	50.6	10.6	32.4	-3.0	3.1	1.5	3.2	1.1	6.4	0.1	2.8
	06/10/13	453	975	-30.6	33.2	75.0	89.8	11.0	37.4	-0.6	3.8	-2.0	4.3	2.3	7.9	-2.2	3.7
	09/24/13	-110	508	18.4	26.5	24.4	55.0	36.9	33.6	0.2	2.8	1.1	3.1	8.5	6.3	-1.1	3.1
	12/14/13	524	560	0.1	11.7	-6.9	19.8	-6.7	14.9	-0.5	1.1	-1.1	1.2	-0.6	2.8	-0.8	1.2
83	12/14/13	352	548	12.8	11.9	15.4	24.7	-1.3	17.0	-1.0	1.1	0.7	1.2	-1.5	2.9	-0.7	1.1

TABLE 10
WELL WATER
(pCi/l)

LOCATION	COLLECTION DATE	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)
71	03/27/13	1.2	5.4	2.4	3.1	1.3	4.3	-1.8	2.8	-19.5	21.8	-4.5	7.3	0.2	3.8	-0.1	2.6
	06/10/13	-6.5	10.4	5.6	4.7	-2.3	7.0	-1.7	4.1	-2.2	30.8	-19.9	11.4	-3.6	8.2	-0.1	4.9
	09/24/13	-9.4	7.0	-0.1	3.0	4.9	5.5	-0.5	3.5	-14.5	26.1	-4.4	7.8	-7.6	9.2	-1.7	3.4
	12/14/13	-3.7	2.1	0.0	1.0	-0.1	1.6	0.3	1.4	0.8	7.5	0.4	2.3	-0.7	5.4	-5.7	0.9
72	03/26/13	-2.6	6.2	-0.5	2.7	-1.1	4.3	-1.7	2.5	11.2	23.1	2.7	6.7	2.7	3.8	0.9	2.6
	06/10/13	8.4	10.8	-0.1	4.9	-0.5	8.1	-1.5	4.5	-5.0	36.6	2.6	10.8	2.8	7.6	0.1	4.1
	09/24/13	-7.5	6.9	-0.9	3.0	-1.4	5.6	-2.0	3.5	-12.1	23.4	-0.6	7.9	0.8	9.1	-7.9	3.5
	12/13/13	-9.0	2.7	-0.4	1.3	0.5	2.2	-1.4	1.6	8.1	9.9	2.8	3.1	1.2	8.1	-4.9	1.3
76	03/20/13	-3.7	6.0	-0.2	2.6	-3.8	4.2	-0.9	2.5	13.8	20.5	0.4	6.9	-1.7	3.9	-1.2	2.7
	06/06/13	11.0	10.4	2.8	4.2	3.6	8.4	-0.6	4.4	22.5	38.8	-4.8	13.2	4.8	5.9	-3.9	5.4
	09/19/13	-2.7	7.1	-0.9	2.8	3.4	4.7	-0.5	3.0	7.6	23.3	-3.5	7.7	2.0	4.1	-1.1	2.9
	12/11/13	-20.8	8.9	2.5	3.4	-1.3	5.9	-1.2	3.5	-35.0	30.7	-3.2	8.5	-6.5	5.7	0.4	3.7
77	03/18/13	2.0	6.2	8.9	3.4	-3.5	5.2	0.6	3.2	3.1	25.1	-0.8	8.9	3.0	5.5	1.4	3.2
	06/06/13	7.3	12.5	12.6	5.7	5.2	7.3	0.9	4.7	-3.2	39.4	6.4	13.0	1.1	6.6	7.3	4.7
	09/19/13	0.8	7.2	7.8	4.0	1.2	5.5	-4.2	3.5	5.8	30.8	-2.8	9.8	-5.6	5.8	2.0	3.7
	12/11/13	6.9	8.1	6.1	4.8	2.8	7.3	-0.4	4.2	-24.4	36.0	2.9	11.1	-2.0	7.6	1.2	3.9
78	03/18/13	0.2	5.7	3.0	2.6	-0.6	4.2	-1.0	2.7	10.9	22.2	-3.7	7.0	3.5	4.3	2.8	3.1
	06/06/13	-7.4	10.0	1.4	4.1	-3.4	6.3	0.1	3.8	-1.4	29.2	4.1	10.6	3.8	4.7	-2.4	3.9
	09/17/13	5.0	5.5	1.4	2.8	-2.3	3.9	1.0	2.8	17.1	21.0	0.4	6.7	-0.3	4.8	-2.0	2.9
	12/12/13	5.7	8.9	5.0	4.1	4.2	6.0	5.7	4.0	-7.1	31.9	-2.2	10.6	-1.6	6.2	-3.9	4.7
79	03/27/13	3.5	4.9	0.6	2.2	1.7	3.8	-0.6	2.4	1.4	18.9	-2.0	6.2	-1.1	3.3	-0.1	2.4
	06/10/13	3.8	6.9	3.8	3.5	2.8	5.6	-1.2	3.5	-21.6	26.0	-0.4	9.4	-5.1	6.9	-1.1	3.4
	09/23/13	0.5	4.8	2.6	2.7	-1.6	4.6	-4.7	3.0	3.0	19.9	4.0	6.3	-2.7	8.1	-1.7	4.4
	12/13/13	-3.9	2.6	1.2	1.3	2.2	2.3	-2.0	1.6	2.2	10.4	-0.6	2.9	-1.9	7.7	-4.3	1.1
80	03/27/13	0.8	5.7	4.0	3.4	-1.8	4.7	0.4	2.9	-2.3	23.5	-5.2	8.1	-1.0	4.3	-1.4	3.0
81	03/27/13	2.3	5.1	1.6	2.4	0.0	3.8	-2.6	2.3	-18.7	17.3	1.9	6.5	0.6	3.6	0.0	2.2
	06/10/13	-0.3	9.1	4.0	4.3	4.2	7.4	3.4	4.7	-5.6	35.9	1.8	12.9	-1.3	10.0	-1.0	4.7
	09/25/13	-3.7	5.9	0.9	2.7	5.8	4.9	-2.5	3.1	9.5	22.4	4.0	7.6	-2.4	7.6	0.3	2.7
	12/14/13	-7.6	3.0	0.9	1.5	0.2	2.8	-0.9	1.8	-5.7	12.3	-1.7	3.5	4.5	8.2	-6.0	1.4
82	03/27/13	3.1	6.9	14.7	4.1	-0.3	5.4	-1.5	3.3	-9.4	26.5	-1.0	9.6	-0.1	5.2	1.0	3.3
	06/10/13	2.7	7.9	3.1	4.9	-0.9	6.9	-1.6	4.2	-0.1	34.3	-7.6	11.7	0.1	7.3	-0.1	4.0
	09/24/13	-1.8	6.5	6.2	3.6	1.8	5.4	-1.3	3.5	-9.0	25.1	-4.3	7.9	-5.4	8.6	0.6	3.2
	12/14/13	1.1	2.7	1.4	1.3	1.9	2.2	1.2	1.8	-3.7	10.3	1.1	3.1	-1.4	7.4	-1.1	1.3
83	12/14/13	0.1	2.7	0.1	1.3	0.2	2.3	-0.4	1.9	-7.5	10.4	-4.3	3.1	0.6	8.0	-1.7	1.3

TABLE 10
WELL WATER
(pCi/l)

LOCATION	COLLECTION DATE	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ac-228	(+/-)
71	03/27/13	-2.5	2.8	-6.2	10.8	-1.5	3.7	4.6	9.5
	06/10/13	0.5	4.3	2.6	20.0	0.2	6.8	5.0	15.9
	09/24/13	0.1	2.8	6.5	19.9	2.8	6.6	-1.2	10.3
	12/14/13	0.1	0.8	-4.0	9.3	-0.4	3.1	0.7	4.4
72	03/26/13	-2.1	2.7	-2.5	11.4	-1.0	4.1	8.6	10.2
	06/10/13	1.5	4.3	12.8	20.7	0.0	6.9	1.3	16.8
	09/24/13	0.4	3.0	11.3	19.2	1.4	6.4	2.7	9.7
	12/13/13	-0.7	1.1	5.4	13.1	1.5	4.1	0.6	4.9
76	03/20/13	-1.5	2.7	2.4	10.6	0.8	4.2	2.3	9.0
	06/06/13	1.2	4.6	5.2	18.9	-2.7	6.7	7.8	18.6
	09/19/13	-0.5	2.6	-11.2	13.1	1.9	3.9	-2.0	10.3
	12/11/13	1.1	3.4	-0.5	16.5	-0.4	5.4	-4.3	13.3
77	03/18/13	-4.0	3.2	14.2	14.5	-0.2	3.5	-10.1	11.0
	06/06/13	-5.4	4.5	14.2	18.8	3.3	6.4	-2.8	15.7
	09/19/13	-2.9	3.4	-11.2	14.8	1.7	4.6	0.3	11.9
	12/11/13	-2.4	4.3	3.8	19.4	1.1	6.0	-8.6	14.2
78	03/18/13	1.2	2.6	0.1	12.0	-1.0	3.8	-3.5	9.3
	06/06/13	2.4	3.8	-3.7	12.2	-2.4	3.5	-0.6	12.1
	09/17/13	-2.6	2.7	1.5	13.4	-0.4	4.2	-2.7	10.4
	12/12/13	-1.3	3.9	-19.9	16.1	1.0	5.2	-8.3	13.7
79	03/27/13	-0.8	2.4	-2.8	9.3	1.3	3.0	-4.2	9.0
	06/10/13	-1.7	3.5	-3.6	17.8	-4.9	6.0	10.1	14.2
	09/23/13	1.7	2.5	8.7	17.8	5.3	5.9	-1.6	8.9
	12/13/13	0.7	1.2	8.5	13.0	-1.7	4.5	1.2	5.6
80	03/27/13	-0.5	2.9	-6.4	12.3	2.8	4.2	-7.8	9.4
81	03/27/13	-1.4	2.4	10.9	10.1	-0.6	3.3	-4.6	8.5
	06/10/13	-6.1	4.3	-14.5	21.2	-1.3	6.9	14.0	14.1
	09/25/13	-1.9	2.4	-19.4	16.4	-3.4	5.3	-5.4	9.6
	12/14/13	0.4	1.3	9.2	14.8	-1.4	4.7	0.3	7.5
82	03/27/13	-0.6	3.6	-8.5	13.7	-2.3	4.4	-7.6	12.0
	06/10/13	0.3	4.3	-0.2	20.4	5.0	7.3	16.5	18.1
	09/24/13	1.9	3.0	-15.4	19.8	0.2	6.9	27.5	20.1
	12/14/13	-0.4	1.1	0.3	12.8	-1.0	4.2	3.2	8.4
83	12/14/13	0.9	1.2	-9.0	12.8	0.0	4.0	-1.0	5.1

TABLE 11
RESERVOIR WATER
(pCi/ l)

Reservoir water was not sampled in 2013. See discussion in Section 4.11.

TABLE 12
FRUITS & VEGETABLES
(pCi/g wet wt.)

LOCATION 25

COLLECTION DATE	Type	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)	Co-60	(+/-)
07/29/13	Greens	0.076	0.034	4.315	0.168	-0.010	0.035	-0.002	0.003	0.001	0.004	0.006	0.009	-0.004	0.005
07/29/13	Blueberries	0.039	0.028	0.604	0.076	-0.007	0.026	0.000	0.003	-0.003	0.003	-0.001	0.005	0.000	0.003
10/29/13	Squash	-0.006	0.033	2.288	0.122	0.015	0.038	-0.001	0.004	-0.001	0.004	-0.001	0.009	0.002	0.004
10/29/13	Apples	0.000	0.028	0.604	0.098	-0.003	0.034	0.000	0.003	0.001	0.003	0.003	0.007	-0.003	0.003

COLLECTION DATE	Type	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
07/29/13	Greens	-0.013	0.009	0.001	0.004	0.000	0.007	-0.002	0.004	0.002	0.032	-0.004	0.009	0.002	0.010
07/29/13	Blueberries	-0.008	0.006	0.002	0.003	-0.002	0.004	0.000	0.003	0.010	0.024	-0.009	0.007	-0.004	0.006
10/29/13	Squash	0.006	0.009	0.001	0.004	0.010	0.006	-0.005	0.004	-0.015	0.030	0.003	0.009	0.003	0.013
10/29/13	Apples	-0.009	0.007	0.001	0.003	-0.001	0.006	0.000	0.004	0.022	0.027	0.002	0.008	-0.001	0.011

COLLECTION DATE	Type	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
07/29/13	Greens	-0.005	0.003	0.001	0.004	0.010	0.023	-0.004	0.006	0.001	0.006	-0.011	0.022	0.008	0.017
07/29/13	Blueberries	-0.009	0.003	0.000	0.003	0.009	0.014	0.000	0.004	0.004	0.005	-0.016	0.019	0.000	0.012
10/29/13	Squash	0.000	0.003	-0.001	0.003	-0.014	0.026	0.002	0.008	0.003	0.006	0.019	0.021	0.000	0.015
10/29/13	Apples	0.000	0.003	0.002	0.003	-0.011	0.023	-0.006	0.007	0.007	0.007	-0.014	0.024	-0.002	0.013

TABLE 12
FRUITS & VEGETABLES
(pCi/g wet wt.)

LOCATION 26C

COLLECTION DATE	Type	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)	Co-60	(+/-)
07/25/13	Greens	-0.014	0.020	3.675	0.150	-0.007	0.026	0.001	0.002	0.000	0.002	-0.003	0.006	0.003	0.003
07/25/13	Blueberries	0.047	0.024	0.812	0.078	0.015	0.028	-0.001	0.002	-0.001	0.003	0.005	0.006	-0.001	0.003
10/29/13	Squash	-0.001	0.036	2.258	0.147	-0.023	0.043	0.000	0.004	-0.001	0.005	0.004	0.011	-0.002	0.005
10/29/13	Apples	0.011	0.027	0.690	0.078	-0.023	0.032	0.001	0.003	-0.001	0.003	0.003	0.006	-0.001	0.003

COLLECTION DATE	Type	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
07/25/13	Greens	-0.007	0.005	0.000	0.002	0.002	0.004	-0.001	0.002	-0.008	0.019	0.004	0.006	0.004	0.006
07/25/13	Blueberries	0.004	0.006	0.004	0.003	-0.001	0.005	-0.001	0.003	-0.004	0.023	0.001	0.007	0.001	0.008
10/29/13	Squash	-0.004	0.011	-0.002	0.005	0.004	0.008	0.000	0.005	-0.022	0.035	0.003	0.011	-0.008	0.015
10/29/13	Apples	-0.002	0.006	0.005	0.004	-0.004	0.005	0.000	0.003	0.007	0.023	0.001	0.008	-0.007	0.011

COLLECTION DATE	Type	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
07/25/13	Greens	0.001	0.002	0.003	0.002	0.006	0.014	-0.003	0.005	0.000	0.004	0.000	0.014	0.002	0.023
07/25/13	Blueberries	0.000	0.003	0.000	0.003	-0.017	0.017	-0.002	0.005	-0.001	0.006	0.003	0.016	0.016	0.018
10/29/13	Squash	-0.003	0.004	-0.003	0.004	-0.009	0.032	-0.013	0.010	-0.001	0.007	-0.011	0.019	-0.004	0.019
10/29/13	Apples	-0.002	0.003	-0.001	0.003	0.001	0.021	-0.005	0.007	-0.002	0.006	0.009	0.018	0.011	0.012

TABLE 13
BROADLEAF VEGETATION
(pCi/g wet wt.)

LOCATION 1

COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)	Co-60	(+/-)
07/16/13	1.264	0.267	3.843	0.424	-0.017	0.126	0.003	0.012	-0.002	0.012	0.014	0.024	0.008	0.015
10/01/13	1.122	0.176	3.691	0.319	-0.042	0.093	0.009	0.008	-0.001	0.009	-0.001	0.022	0.002	0.011

COLLECTION DATE	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
07/16/13	-0.010	0.030	-0.001	0.012	-0.018	0.024	-0.010	0.014	0.010	0.116	0.020	0.031	-0.019	0.028
10/01/13	-0.041	0.022	0.002	0.010	0.006	0.016	0.002	0.011	0.023	0.075	-0.016	0.022	0.011	0.033

COLLECTION DATE	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
07/16/13	-0.005	0.015	0.003	0.014	0.054	0.062	0.008	0.019	-0.019	0.024	0.020	0.092	0.059	0.080
10/01/13	-0.005	0.010	0.005	0.009	-0.045	0.065	-0.008	0.016	-0.001	0.015	0.007	0.052	0.035	0.063

LOCATION 10

COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)	Co-60	(+/-)
07/16/13	0.594	0.241	3.245	0.447	0.191	0.123	0.013	0.013	0.007	0.012	-0.020	0.030	0.004	0.014
10/01/13	0.768	0.153	3.430	0.289	-0.001	0.090	0.004	0.008	0.006	0.009	0.005	0.021	0.006	0.009

COLLECTION DATE	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
07/16/13	-0.019	0.029	0.002	0.013	-0.013	0.021	0.000	0.014	-0.093	0.113	-0.002	0.031	0.010	0.028
10/01/13	-0.011	0.021	0.002	0.009	-0.002	0.016	0.004	0.010	-0.041	0.071	-0.005	0.023	0.002	0.031

COLLECTION DATE	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
07/16/13	-0.008	0.013	0.019	0.012	0.003	0.060	0.002	0.017	-0.008	0.023	0.051	0.087	0.032	0.056
10/01/13	-0.002	0.009	0.009	0.009	0.017	0.066	-0.008	0.015	0.003	0.017	0.034	0.054	0.070	0.055

TABLE 13
BROADLEAF VEGETATION
(pCi/g wet wt.)

LOCATION 17

COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)	Co-60	(+/-)
07/16/13	1.382	0.256	4.331	0.434	-0.054	0.142	0.002	0.013	0.002	0.013	0.036	0.029	-0.003	0.018
10/01/13	0.936	0.183	3.114	0.300	0.047	0.116	0.010	0.010	-0.008	0.011	-0.005	0.023	0.002	0.011

COLLECTION DATE	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
07/16/13	-0.026	0.031	-0.003	0.014	-0.001	0.026	-0.005	0.016	-0.010	0.120	-0.004	0.037	-0.018	0.030
10/01/13	-0.028	0.024	0.018	0.012	0.012	0.018	0.006	0.012	0.100	0.088	0.003	0.028	0.004	0.036

COLLECTION DATE	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
07/16/13	0.001	0.015	0.000	0.015	0.041	0.077	-0.006	0.023	-0.009	0.026	0.086	0.097	0.033	0.110
10/01/13	-0.001	0.011	0.008	0.010	0.008	0.074	-0.005	0.024	-0.012	0.021	-0.008	0.067	0.004	0.073

LOCATION 26C

COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)	Co-60	(+/-)
07/16/13	1.060	0.264	3.763	0.498	0.046	0.148	0.007	0.016	-0.007	0.015	0.037	0.034	-0.009	0.019
10/01/13	1.570	0.172	4.511	0.306	-0.014	0.093	0.001	0.008	0.006	0.009	0.002	0.019	0.002	0.009

COLLECTION DATE	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
07/16/13	-0.055	0.040	0.019	0.016	0.002	0.024	0.000	0.015	0.066	0.126	0.000	0.038	-0.020	0.032
10/01/13	0.010	0.020	-0.001	0.009	0.002	0.015	0.011	0.010	0.025	0.068	0.001	0.022	0.002	0.030

COLLECTION DATE	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
07/16/13	-0.001	0.017	-0.014	0.016	0.066	0.082	-0.001	0.021	-0.019	0.024	0.022	0.098	0.133	0.108
10/01/13	-0.003	0.009	0.005	0.009	0.051	0.063	0.005	0.018	0.001	0.018	-0.021	0.059	0.034	0.046

TABLE 14
SEA WATER
(pCi/l)

LOCATION 32

COLLECTION DATE	H-3	(+/-)	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
01/29/13	399	131	14.6	37.1	333	99	-16.6	39.4	2.32	4.99	3.29	4.97	-11.9	10.7
02/26/13	637	199	18.7	22.4	334	66	-17.3	24.1	-0.01	2.22	-3.02	2.55	-3.2	5.3
03/26/13	1080	257	8.2	25.0	303	73	-12.0	27.1	0.30	2.94	-0.85	2.83	3.3	6.3
04/30/13	1050	268	-11.0	30.7	357	90	-47.1	32.8	1.73	3.70	1.96	3.67	2.0	8.4
05/28/13	588	142	-1.5	27.3	306	78	8.6	29.0	1.14	3.05	2.59	3.26	1.9	5.8
06/25/13	263	177	7.2	19.3	243	56	5.4	24.9	-1.66	2.06	0.33	2.17	-2.3	4.9
07/30/13	287	169	17.2	30.7	365	76	0.7	32.5	-0.82	3.25	0.32	3.29	6.1	7.5
08/27/13	141	168	9.9	12.9	285	40	16.6	15.6	0.24	1.34	-0.67	1.47	2.5	3.3
09/24/13	101	158	-2.6	6.4	313	31	4.5	10.7	-0.09	0.63	-0.48	0.71	-0.3	2.0
10/29/13	205	121	2.7	29.6	291	72	-20.2	34.0	-2.18	3.57	1.68	3.84	0.7	7.3
11/26/13	286	174	11.9	12.2	329	35	5.6	15.3	-0.39	1.10	0.72	1.25	1.6	2.6
12/30/13	643	195	16.9	24.1	309	63	21.8	26.7	0.57	2.39	-1.57	2.63	1.1	5.6

DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)
01/29/13	3.37	5.14	4.69	10.30	-2.90	4.87	5.96	8.10	-0.80	5.28	-32.6	44.1	0.87	13.00
02/26/13	-1.60	2.37	-3.83	5.12	0.23	2.55	-1.02	4.05	1.92	2.74	-9.6	21.9	-5.61	6.83
03/26/13	0.21	2.82	-2.97	6.48	0.97	2.91	1.44	4.71	0.48	3.13	19.4	25.0	0.92	7.58
04/30/13	1.41	4.07	-10.46	10.90	0.81	3.69	-0.39	5.36	-2.33	4.17	1.0	35.9	3.77	9.95
05/28/13	2.44	3.16	-0.19	7.60	-2.10	3.69	4.07	5.74	-1.93	3.60	-7.8	27.5	-2.41	9.09
06/25/13	0.98	2.29	0.19	4.97	1.54	2.32	0.44	3.65	0.86	2.71	-2.0	19.1	-1.46	5.73
07/30/13	1.23	3.16	-2.97	7.55	2.07	3.27	2.60	5.52	0.16	3.81	5.9	30.3	0.01	9.28
08/27/13	-0.83	1.51	-3.37	3.05	0.82	1.51	-0.62	2.59	-2.15	1.76	7.0	11.6	2.71	3.62
09/24/13	-0.53	1.01	-0.49	1.50	0.53	0.78	0.58	1.34	0.28	0.89	0.8	5.8	1.11	1.68
10/29/13	1.07	3.70	-2.97	8.54	2.10	3.86	0.90	6.11	-0.32	4.03	-5.0	30.1	4.44	10.08
11/26/13	-0.72	1.15	0.73	2.63	0.67	1.35	-2.30	2.28	-1.28	1.62	-6.1	10.1	-1.51	3.24
12/30/13	-0.26	2.69	-4.50	5.55	2.52	2.78	1.83	4.67	-0.04	3.09	-2.9	22.2	-0.02	6.61

DATE	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ac-228	(+/-)
01/29/13	-9.08	8.89	-2.34	4.92	-5.13	5.19	-21.3	26.3	2.04	7.56	-5.3	16.8
02/26/13	0.99	4.72	-3.80	2.75	-0.95	2.68	9.0	12.3	-0.54	3.66	0.7	9.9
03/26/13	2.54	5.20	0.01	2.86	-2.04	2.94	-0.3	14.4	-3.17	4.06	14.3	16.7
04/30/13	4.84	6.51	-4.89	3.85	0.06	3.41	11.3	18.0	0.85	5.57	-0.7	13.0
05/28/13	-1.60	5.27	-0.86	3.27	1.89	3.26	2.6	14.3	0.28	4.29	-1.5	13.4
06/25/13	-1.94	6.46	0.63	2.35	-0.42	2.18	-1.0	14.7	0.85	4.21	0.3	8.7
07/30/13	3.88	6.88	-0.21	3.58	3.14	3.55	-11.2	18.4	-10.61	5.68	2.6	12.0
08/27/13	-2.57	5.19	-3.35	1.34	0.60	1.36	-0.7	10.1	-0.93	3.43	-7.4	5.8
09/24/13	4.58	7.43	0.10	0.59	0.09	0.66	9.9	9.2	-2.43	3.48	-2.4	3.9
10/29/13	-4.44	6.89	-1.10	4.11	2.09	3.99	-5.1	17.2	2.00	5.04	-2.6	12.9
11/26/13	4.72	6.53	-0.66	1.56	0.09	1.34	0.0	11.4	-4.04	3.38	-1.7	5.4
12/30/13	2.39	8.78	2.10	2.78	0.54	2.45	-15.2	20.0	-3.25	6.23	15.4	12.1

TABLE 14
SEA WATER
(pCi/l)

LOCATION 37C

COLLECTION DATE	H-3	(+/-)	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
02/05/13	-28	108	10.79	22.39	295.20	55.55	-20.94	27.54	-1.19	2.04	-1.69	2.39	-5.73	5.15
05/28/13	-28	108	-27.09	26.84	258.70	79.71	21.07	29.24	0.16	3.57	-1.61	3.33	3.77	6.86
09/03/13	102	157	-30.84	26.00	311.00	79.69	-2.19	29.76	-1.85	2.61	0.41	2.89	0.47	5.21
12/17/13	120	108	-2.04	22.23	252.90	76.71	-13.87	23.97	-1.14	2.22	-0.68	2.44	2.17	4.79

COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)
02/05/13	-2.03	2.77	-5.62	6.07	-0.20	2.73	0.40	4.26	-0.06	2.91	-3.11	21.94	5.41	6.65
05/28/13	1.07	3.52	6.90	6.60	0.69	3.85	-1.86	5.18	-0.09	3.14	-7.27	25.87	1.56	8.25
09/03/13	0.07	3.02	-10.05	7.02	1.09	3.07	1.60	5.51	0.14	3.51	-7.13	29.59	1.93	8.87
12/17/13	-0.59	2.33	1.68	5.13	-1.23	2.31	0.62	4.35	-0.32	2.73	-5.43	20.25	-2.24	5.39

COLLECTION DATE	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ac-228	(+/-)
02/05/13	-3.88	8.96	0.61	3.35	-0.61	2.52	-8.53	18.35	3.37	4.90	18.25	10.07
05/28/13	-0.79	4.72	0.20	2.97	-3.34	3.51	-3.43	13.20	4.41	4.57	1.13	12.98
09/03/13	-0.62	6.33	1.88	2.90	-0.12	3.27	-4.08	15.67	-1.13	4.80	-1.23	11.52
12/17/13	-1.09	8.80	0.49	1.79	-0.09	2.43	7.38	18.22	3.93	5.54	2.19	9.64

TABLE 15
BOTTOM SEDIMENT
(pCi/g dry wt.)

LOCATION	COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
31	02/05/13	0.293	0.319	17.38	1.39	0.153	0.362	0.014	0.038	-0.019	0.037	-0.014	0.078
31	01/06/14	0.029	0.265	17.70	1.25	0.076	0.344	0.005	0.026	-0.005	0.031	0.071	0.077
32	06/11/13	0.082	0.352	16.99	1.56	0.026	0.380	0.012	0.042	-0.051	0.037	0.003	0.092
32	08/20/13	-0.004	0.320	12.69	1.11	0.053	0.364	0.026	0.035	-0.026	0.037	-0.003	0.076
33	02/05/13	-0.115	0.240	10.28	0.84	-0.011	0.297	0.035	0.030	-0.023	0.029	-0.019	0.057
33	08/28/13	-0.069	0.228	22.04	1.22	-0.027	0.272	-0.020	0.023	-0.002	0.026	-0.059	0.078
34	01/09/13	-0.052	0.165	15.20	0.93	-0.108	0.196	0.023	0.018	-0.001	0.019	-0.001	0.055
34	08/28/13	0.297	0.321	16.26	1.23	-0.158	0.456	-0.026	0.030	0.001	0.035	-0.043	0.089
37	01/09/13	0.067	0.210	17.50	1.13	-0.180	0.276	-0.017	0.023	0.003	0.024	0.001	0.063
37	08/28/13	-0.015	0.255	14.90	1.00	-0.219	0.349	-0.001	0.028	-0.010	0.031	-0.113	0.076
39	06/11/13	0.128	0.296	18.50	1.45	0.109	0.330	-0.029	0.037	-0.007	0.035	-0.050	0.074
39	08/08/13	0.016	0.417	17.29	1.91	-0.107	0.440	-0.042	0.051	0.000	0.053	-0.023	0.109
67	02/05/13	0.073	0.308	21.26	1.61	-0.082	0.302	-0.032	0.036	-0.012	0.038	0.003	0.091
67	08/30/13	0.340	0.489	20.91	1.80	-0.377	0.582	0.029	0.047	-0.024	0.050	-0.104	0.129

TABLE 15
BOTTOM SEDIMENT
(pCi/g dry wt.)

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
31	02/05/13	0.023	0.042	-0.065	0.093	0.036	0.039	0.061	0.073	-0.028	0.038	0.017	0.361
31	01/06/14	-0.001	0.034	0.017	0.071	0.006	0.032	0.007	0.056	0.002	0.037	0.084	0.212
32	06/11/13	0.055	0.046	-0.264	0.120	-0.001	0.044	0.029	0.073	0.013	0.041	0.187	0.349
32	08/20/13	-0.001	0.038	-0.024	0.081	0.015	0.037	0.048	0.065	0.013	0.035	-0.155	0.263
33	02/05/13	-0.028	0.026	-0.029	0.069	0.052	0.037	0.047	0.053	0.016	0.030	-0.015	0.251
33	08/28/13	-0.005	0.035	-0.010	0.070	0.006	0.028	0.016	0.048	0.024	0.030	-0.008	0.178
34	01/09/13	-0.006	0.025	-0.097	0.050	-0.007	0.021	-0.024	0.035	-0.003	0.021	0.154	0.154
34	08/28/13	-0.020	0.037	-0.070	0.079	0.007	0.039	0.057	0.066	-0.016	0.041	-0.112	0.271
37	01/09/13	-0.011	0.031	-0.066	0.060	-0.001	0.023	0.017	0.041	-0.016	0.027	0.113	0.208
37	08/28/13	-0.011	0.034	-0.107	0.069	0.007	0.032	0.016	0.058	0.021	0.034	-0.168	0.225
39	06/11/13	0.063	0.042	0.003	0.087	0.021	0.037	0.080	0.065	-0.025	0.039	-0.185	0.296
39	08/08/13	-0.004	0.067	-0.192	0.136	0.051	0.054	0.079	0.086	-0.024	0.049	-0.086	0.427
67	02/05/13	0.012	0.056	-0.031	0.100	0.027	0.041	-0.025	0.067	0.012	0.037	-0.046	0.310
67	08/30/13	-0.012	0.052	-0.062	0.123	0.011	0.061	-0.036	0.102	-0.012	0.060	-0.059	0.415

TABLE 15
BOTTOM SEDIMENT
(pCi/g dry wt.)

LOCATION	COLLECTION DATE	Ag-110M	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ac-228	(+/-)
31	02/05/13	-0.034	0.038	0.002	0.103	0.009	0.090	-0.015	0.042	0.015	0.042	2.663	0.337
31	01/06/14	-0.001	0.025	-0.050	0.067	0.109	0.187	-0.014	0.028	0.005	0.026	0.117	0.217
32	06/11/13	-0.030	0.041	-0.047	0.107	-0.042	0.090	-0.005	0.044	0.011	0.047	0.250	0.351
32	08/20/13	-0.021	0.032	0.015	0.083	-0.008	0.118	0.008	0.036	0.000	0.035	0.175	0.295
33	02/05/13	0.009	0.027	0.006	0.078	0.011	0.065	-0.007	0.030	-0.033	0.030	0.283	0.317
33	08/28/13	-0.036	0.021	-0.017	0.058	-0.071	0.180	0.006	0.020	0.020	0.022	0.287	0.161
34	01/09/13	-0.004	0.016	0.013	0.040	-0.009	0.086	-0.003	0.017	-0.008	0.018	0.127	0.077
34	08/28/13	-0.005	0.027	0.014	0.080	0.268	0.277	-0.014	0.034	-0.031	0.031	0.022	0.110
37	01/09/13	0.000	0.021	0.069	0.058	0.028	0.136	0.004	0.022	0.000	0.023	0.236	0.132
37	08/28/13	-0.001	0.024	-0.023	0.066	-0.063	0.210	0.011	0.028	0.013	0.026	0.180	0.107
39	06/11/13	-0.074	0.037	0.023	0.093	0.008	0.075	0.016	0.039	0.075	0.042	0.802	0.192
39	08/08/13	-0.058	0.050	-0.165	0.126	0.145	0.108	0.002	0.060	0.098	0.055	0.898	0.374
67	02/05/13	-0.011	0.038	0.014	0.086	0.061	0.074	-0.009	0.038	0.014	0.041	0.328	0.327
67	08/30/13	-0.031	0.054	-0.087	0.123	0.039	0.310	-0.024	0.051	0.182	0.074	0.144	0.456

TABLE 16
AQUATIC FLORA - FUCUS
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
29	02/05/13	0.1241	0.1010	6.0280	0.5044	-0.0593	0.0985	-0.0001	0.0120	-0.0011	0.0127	0.0041	0.0269
29	05/15/13	0.0855	0.0572	5.6540	0.2514	-0.0124	0.0623	-0.0028	0.0058	0.0012	0.0062	0.0041	0.0148
29	07/25/13	0.2038	0.1239	6.8790	0.3989	-0.0120	0.0415	0.0014	0.0046	-0.0005	0.0047	0.0009	0.0102
29	10/10/13	0.0316	0.0983	6.6890	0.5063	-0.0375	0.1090	0.0082	0.0109	0.0055	0.0122	0.0147	0.0290
32	01/10/13	0.1126	0.0588	10.5400	0.3503	0.0083	0.0674	0.0003	0.0062	0.0257	0.0125	-0.0143	0.0178
32	05/06/13	0.0418	0.0422	9.8600	0.2125	-0.0147	0.0480	0.0024	0.0046	0.0102	0.0050	0.0039	0.0108
32	07/25/13	0.1520	0.1008	8.2100	0.4195	0.0168	0.0433	-0.0014	0.0041	-0.0051	0.0049	0.0001	0.0103
32	10/10/13	0.0195	0.1025	7.2080	0.4898	0.0666	0.0923	-0.0002	0.0100	-0.0053	0.0127	-0.0240	0.0301
35	02/05/13	0.0150	0.0858	4.9300	0.4939	0.0027	0.0961	-0.0093	0.0117	-0.0045	0.0120	0.0140	0.0273
35	05/15/13	0.0684	0.0553	6.8680	0.2576	0.0163	0.0544	0.0000	0.0051	-0.0007	0.0054	0.0046	0.0144
35	07/25/13	0.0720	0.0460	6.9470	0.3726	-0.0103	0.0394	-0.0002	0.0049	0.0023	0.0043	-0.0012	0.0101
35	10/10/13	0.0399	0.0919	7.6100	0.5208	0.0008	0.0988	-0.0083	0.0096	-0.0027	0.0107	0.0043	0.0262
36	02/20/13	0.2248	0.0796	5.5840	0.3439	0.0127	0.0640	-0.0030	0.0085	0.0039	0.0080	-0.0131	0.0173
36	05/16/13	0.0833	0.0682	5.7920	0.2993	-0.0571	0.0691	-0.0036	0.0068	-0.0049	0.0075	0.0046	0.0186
36	08/28/13	0.1028	0.0967	5.9480	0.4732	-0.0759	0.0999	0.0056	0.0100	-0.0048	0.0099	0.0066	0.0226
36	11/13/13	0.0906	0.1056	7.6750	0.5651	0.0381	0.1051	0.0058	0.0119	0.0030	0.0136	0.0074	0.0327
90	01/09/13	0.0794	0.0875	5.4800	0.4230	0.0339	0.0816	0.0060	0.0100	-0.0027	0.0104	0.0008	0.0261
90	05/16/13	0.0684	0.0804	6.0920	0.2597	0.0039	0.0538	-0.0022	0.0062	-0.0031	0.0065	0.0125	0.0168
90	08/28/13	0.0921	0.1216	8.1010	0.6214	0.0586	0.1343	-0.0053	0.0116	-0.0068	0.0134	0.0085	0.0315
90	10/11/13	0.0847	0.0365	7.7130	0.1412	-0.0106	0.0426	0.0006	0.0030	-0.0037	0.0036	0.0075	0.0096

TABLE 16
AQUATIC FLORA - FUCUS
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
29	02/05/13	0.0047	0.0152	-0.0065	0.0277	0.0035	0.0113	-0.0048	0.0214	0.0004	0.0118	0.0372	0.1007
29	05/15/13	0.0037	0.0072	-0.0149	0.0141	-0.0016	0.0059	0.0089	0.0104	-0.0005	0.0066	0.0145	0.0495
29	07/25/13	-0.0025	0.0062	0.0044	0.0124	0.0008	0.0045	-0.0049	0.0079	0.0025	0.0051	0.0226	0.0483
29	10/10/13	0.0044	0.0143	-0.0224	0.0306	0.0074	0.0126	0.0147	0.0212	0.0060	0.0131	-0.0133	0.1001
32	01/10/13	-0.0019	0.0077	-0.0207	0.0146	-0.0089	0.0074	0.0041	0.0124	-0.0053	0.0076	0.0212	0.0518
32	05/06/13	-0.0020	0.0058	-0.0175	0.0113	0.0062	0.0050	-0.0057	0.0086	0.0021	0.0051	0.0009	0.0437
32	07/25/13	-0.0059	0.0067	-0.0176	0.0117	-0.0001	0.0051	0.0000	0.0087	0.0020	0.0045	0.0401	0.0385
32	10/10/13	-0.0102	0.0145	-0.0264	0.0287	0.0016	0.0117	-0.0073	0.0211	0.0046	0.0119	0.0165	0.0847
35	02/05/13	-0.0080	0.0154	-0.0098	0.0270	-0.0068	0.0111	-0.0139	0.0188	-0.0026	0.0112	0.0514	0.1008
35	05/15/13	-0.0063	0.0071	-0.0133	0.0140	0.0025	0.0056	0.0008	0.0101	-0.0005	0.0058	-0.0316	0.0445
35	07/25/13	0.0055	0.0061	-0.0046	0.0138	-0.0041	0.0047	0.0025	0.0086	-0.0035	0.0044	0.0091	0.0387
35	10/10/13	-0.0025	0.0146	-0.0426	0.0289	-0.0002	0.0109	0.0110	0.0207	0.0053	0.0117	0.0077	0.0862
36	02/20/13	-0.0074	0.0107	-0.0071	0.0196	-0.0030	0.0083	-0.0062	0.0149	-0.0032	0.0077	0.0189	0.0683
36	05/16/13	0.0037	0.0098	-0.0192	0.0194	0.0016	0.0075	0.0064	0.0131	0.0010	0.0080	-0.0529	0.0574
36	08/28/13	0.0081	0.0134	-0.0111	0.0245	0.0029	0.0096	0.0127	0.0174	0.0056	0.0114	-0.0071	0.0861
36	11/13/13	-0.0125	0.0176	-0.0317	0.0372	-0.0135	0.0144	0.0138	0.0244	-0.0014	0.0115	-0.0750	0.1071
90	01/09/13	-0.0175	0.0134	-0.0111	0.0233	0.0016	0.0097	-0.0063	0.0186	-0.0004	0.0102	-0.0005	0.0772
90	05/16/13	-0.0014	0.0083	-0.0115	0.0159	-0.0015	0.0065	-0.0030	0.0114	-0.0007	0.0064	-0.0068	0.0501
90	08/28/13	-0.0084	0.0170	-0.0409	0.0370	0.0056	0.0135	0.0104	0.0212	0.0051	0.0128	-0.0471	0.1080
90	10/11/13	0.0015	0.0039	0.0048	0.0090	0.0006	0.0036	0.0059	0.0063	-0.0055	0.0043	0.0107	0.0258

TABLE 16
AQUATIC FLORA - FUCUS
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Ag-110M	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ac-228	(+/-)
29	02/05/13	-0.0009	0.0099	-0.0038	0.0283	0.0054	0.0239	-0.0084	0.0121	-0.0010	0.0107	0.1073	0.0923
29	05/15/13	-0.0025	0.0053	0.0027	0.0150	0.0005	0.0200	-0.0018	0.0060	-0.0013	0.0059	0.0414	0.0386
29	07/25/13	-0.0014	0.0053	0.0047	0.0128	-0.0018	0.0083	-0.0016	0.0047	0.0016	0.0054	0.0639	0.0522
29	10/10/13	0.0033	0.0110	-0.0158	0.0283	0.0340	0.0307	-0.0165	0.0116	0.0053	0.0122	0.0958	0.0506
32	01/10/13	0.0102	0.0112	-0.0009	0.0133	0.0517	0.0393	-0.0001	0.0061	0.0010	0.0067	0.0999	0.0446
32	05/06/13	0.0190	0.0052	-0.0039	0.0127	0.0338	0.0123	0.0018	0.0050	0.0114	0.0059	0.0383	0.0383
32	07/25/13	0.0012	0.0044	0.0005	0.0137	0.0051	0.0095	-0.0039	0.0040	0.0019	0.0045	0.0503	0.0439
32	10/10/13	0.0128	0.0134	-0.0032	0.0248	-0.0087	0.0297	-0.0099	0.0102	0.0030	0.0113	0.0445	0.0617
35	02/05/13	-0.0013	0.0100	0.0105	0.0269	-0.0059	0.0228	-0.0034	0.0098	0.0102	0.0110	0.0884	0.0464
35	05/15/13	0.0019	0.0049	0.0011	0.0120	0.0092	0.0170	-0.0136	0.0051	-0.0030	0.0053	0.0561	0.0318
35	07/25/13	0.0031	0.0039	0.0005	0.0114	0.0160	0.0086	-0.0032	0.0042	-0.0010	0.0049	0.0453	0.0558
35	10/10/13	-0.0039	0.0094	-0.0139	0.0241	0.0080	0.0320	-0.0121	0.0104	0.0074	0.0097	0.0542	0.0465
36	02/20/13	-0.0013	0.0072	-0.0002	0.0194	0.0011	0.0123	-0.0078	0.0079	-0.0007	0.0075	0.0413	0.0583
36	05/16/13	0.0035	0.0063	0.0039	0.0175	0.0220	0.0222	0.0016	0.0074	-0.0053	0.0070	0.0576	0.0352
36	08/28/13	-0.0053	0.0091	-0.0097	0.0245	0.0001	0.0264	0.0042	0.0089	-0.0043	0.0100	0.0495	0.0422
36	11/13/13	-0.0010	0.0118	-0.0068	0.0291	-0.0040	0.0204	-0.0003	0.0129	-0.0055	0.0137	0.1374	0.0820
90	01/09/13	-0.0117	0.0098	0.0144	0.0240	-0.0120	0.0183	-0.0157	0.0098	0.0045	0.0108	0.1280	0.0552
90	05/16/13	-0.0030	0.0056	0.0043	0.0135	0.0149	0.0163	-0.0003	0.0060	0.0019	0.0060	0.1110	0.0373
90	08/28/13	-0.0015	0.0115	0.0037	0.0292	-0.0294	0.0341	-0.0061	0.0141	-0.0056	0.0132	0.0642	0.0548
90	10/11/13	-0.0028	0.0029	0.0011	0.0076	0.0507	0.0376	0.0000	0.0030	-0.0010	0.0034	0.0540	0.0241

TABLE 17A
FISH - FLOUNDER
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
29	06/04/13	0.002	0.153	4.627	0.546	0.052	0.169	-0.003	0.016	-0.015	0.018	0.035	0.040
29	07/16/13	-0.044	0.193	3.997	0.665	0.128	0.215	-0.011	0.023	0.000	0.021	0.034	0.038
29	10/08/13	0.036	0.117	4.805	0.312	-0.034	0.142	-0.004	0.012	-0.016	0.013	0.011	0.028
35	05/07/13	-0.025	0.111	4.827	0.379	0.065	0.119	0.005	0.012	0.003	0.013	0.011	0.026
35	07/16/13	0.119	0.202	5.070	0.749	0.080	0.240	0.029	0.026	-0.005	0.024	0.013	0.053
35	10/08/13	-0.004	0.084	4.161	0.331	-0.023	0.100	0.001	0.009	0.002	0.009	0.005	0.022

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
29	06/04/13	-0.002	0.019	-0.062	0.043	-0.006	0.018	0.005	0.033	-0.003	0.020	0.133	0.145
29	07/16/13	0.005	0.024	-0.020	0.051	0.004	0.023	-0.006	0.042	0.006	0.024	-0.039	0.206
29	10/08/13	0.014	0.012	0.047	0.032	0.009	0.013	-0.028	0.023	0.005	0.015	0.009	0.113
35	05/07/13	-0.002	0.013	-0.009	0.032	0.022	0.013	-0.003	0.022	0.001	0.013	0.017	0.115
35	07/16/13	0.007	0.027	-0.007	0.054	0.000	0.025	0.004	0.047	0.008	0.027	0.088	0.221
35	10/08/13	0.009	0.010	0.012	0.018	-0.005	0.010	0.006	0.017	-0.005	0.011	0.047	0.070

LOCATION	COLLECTION DATE	Ag-110M	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ac-228	(+/-)
29	06/04/13	-0.001	0.016	0.017	0.044	-0.007	0.051	-0.025	0.017	0.002	0.017	0.007	0.073
29	07/16/13	-0.001	0.021	0.020	0.058	-0.002	0.043	-0.004	0.026	0.002	0.023	0.011	0.088
29	10/08/13	0.006	0.012	0.017	0.033	0.012	0.047	0.031	0.013	0.000	0.013	0.053	0.044
35	05/07/13	-0.010	0.012	0.001	0.034	-0.010	0.027	-0.012	0.016	0.008	0.013	0.022	0.056
35	07/16/13	-0.005	0.024	0.025	0.064	-0.019	0.050	-0.001	0.029	0.010	0.025	-0.038	0.096
35	10/08/13	-0.002	0.008	-0.006	0.021	-0.022	0.046	0.006	0.008	0.003	0.008	0.030	0.063

TABLE 17B
FISH - OTHER
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
29	09/13/13	-0.007	0.208	4.12	0.741	-0.027	0.223	0.013	0.026	0.017	0.024	-0.009	0.058
29	10/02/13	0.058	0.097	4.62	0.303	0.059	0.118	-0.009	0.010	-0.002	0.010	0.020	0.024
32	04/16/13	0.013	0.130	4.85	0.519	-0.157	0.168	-0.007	0.015	-0.017	0.015	0.023	0.039
35	05/07/13	0.018	0.095	4.72	0.377	-0.040	0.096	0.008	0.011	-0.008	0.013	0.013	0.025
35	07/18/13	-0.061	0.136	3.97	0.497	0.057	0.161	0.000	0.013	-0.004	0.016	0.018	0.028
35	10/07/13	0.024	0.082	3.73	0.293	0.001	0.109	0.009	0.008	-0.008	0.009	0.000	0.018

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
29	09/13/13	0.003	0.029	-0.051	0.054	0.012	0.029	-0.013	0.046	-0.031	0.027	-0.179	0.218
29	10/02/13	0.004	0.011	-0.009	0.025	0.004	0.011	-0.010	0.019	0.000	0.012	0.084	0.094
32	04/16/13	-0.002	0.017	-0.018	0.038	0.021	0.017	0.009	0.029	0.001	0.018	-0.047	0.144
35	05/07/13	0.000	0.016	0.014	0.031	0.004	0.012	-0.003	0.021	-0.001	0.012	-0.024	0.099
35	07/18/13	0.014	0.014	0.007	0.028	-0.009	0.015	0.012	0.026	0.008	0.016	-0.026	0.116
35	10/07/13	0.006	0.009	-0.015	0.018	-0.003	0.009	0.005	0.015	0.001	0.011	0.013	0.074

LOCATION	COLLECTION DATE	Ag-110M	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ac-228	(+/-)
29	09/13/13	0.002	0.024	-0.049	0.065	-0.065	0.061	-0.016	0.027	0.010	0.025	0.037	0.096
29	10/02/13	-0.003	0.010	0.006	0.026	0.012	0.050	-0.005	0.012	-0.008	0.013	0.038	0.062
32	04/16/13	-0.008	0.015	0.056	0.039	0.031	0.050	0.005	0.017	0.005	0.015	0.092	0.097
35	05/07/13	-0.001	0.011	-0.012	0.029	-0.011	0.022	-0.009	0.013	-0.003	0.013	0.006	0.061
35	07/18/13	-0.010	0.013	0.003	0.039	-0.035	0.046	-0.007	0.014	0.021	0.014	-0.033	0.053
35	10/07/13	-0.006	0.008	-0.008	0.024	0.020	0.038	-0.002	0.009	0.006	0.009	-0.011	0.046

TABLE 18
MUSSELS
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
30	06/25/13	0.082	0.245	1.420	0.766	-0.090	0.247	0.009	0.029	0.018	0.031	-0.005	0.064

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
30	06/25/13	0.017	0.034	0.030	0.068	0.039	0.030	0.002	0.050	-0.026	0.030	0.107	0.283

LOCATION	COLLECTION DATE	Ag-110M	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ac-228	(+/-)
30	06/25/13	-0.030	0.028	0.047	0.074	0.016	0.054	0.009	0.034	0.011	0.030	-0.042	0.112

TABLE 19
OYSTERS
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
31	03/06/13	0.029	0.113	1.983	0.715	-0.046	0.121	0.014	0.013	0.006	0.014	-0.021	0.034
31	06/05/13	-0.046	0.187	2.523	0.514	-0.024	0.202	-0.006	0.022	0.002	0.021	-0.018	0.051
31	07/11/13	0.060	0.343	2.395	0.878	0.022	0.307	-0.010	0.034	-0.016	0.036	-0.082	0.090
31	12/11/13	0.066	0.240	2.118	0.726	0.007	0.281	-0.036	0.031	0.001	0.029	-0.020	0.047
32	02/20/13	0.167	0.169	2.870	0.473	-0.030	0.171	0.000	0.019	0.003	0.020	0.007	0.037
32	05/23/13	0.030	0.282	2.439	0.634	0.031	0.310	0.032	0.026	0.032	0.030	0.053	0.055
32	07/09/13	0.024	0.141	2.039	0.712	-0.024	0.186	0.000	0.016	0.006	0.012	0.001	0.030
32	12/11/13	-0.120	0.284	2.148	0.689	-0.006	0.307	0.023	0.031	-0.011	0.026	-0.044	0.068
37	02/22/13	0.061	0.128	1.799	0.423	-0.015	0.160	0.006	0.011	-0.004	0.013	-0.010	0.033
37	06/06/13	-0.235	0.382	1.618	0.770	-0.260	0.478	-0.023	0.033	0.006	0.035	-0.010	0.081
37	07/12/13	-0.027	0.208	1.851	0.554	0.121	0.201	0.005	0.024	-0.012	0.019	0.009	0.044
37	12/10/13	0.035	0.291	1.537	0.835	-0.153	0.346	-0.003	0.032	-0.030	0.033	-0.060	0.068
88	02/26/13	-0.022	0.133	1.313	0.500	-0.006	0.186	-0.007	0.014	-0.001	0.014	0.010	0.025
88	06/06/13	0.151	0.191	1.628	0.489	-0.047	0.204	-0.010	0.024	0.000	0.022	0.007	0.043
88	07/09/13	0.027	0.259	2.164	0.599	0.017	0.319	-0.002	0.027	-0.004	0.027	-0.054	0.055
88	12/10/13	-0.189	0.318	1.463	1.011	-0.160	0.383	0.021	0.040	-0.006	0.037	0.000	0.074

TABLE 19
OYSTERS
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
31	03/06/13	0.003	0.017	-0.005	0.027	-0.006	0.016	-0.011	0.021	0.006	0.014	-0.047	0.133
31	06/05/13	0.001	0.023	-0.045	0.051	-0.011	0.022	0.010	0.039	0.019	0.023	-0.066	0.198
31	07/11/13	0.023	0.042	-0.043	0.074	-0.006	0.042	0.026	0.073	-0.027	0.040	0.032	0.297
31	12/11/13	0.021	0.031	-0.009	0.069	-0.008	0.036	-0.020	0.056	-0.024	0.033	-0.133	0.263
32	02/20/13	-0.004	0.019	0.009	0.041	0.020	0.023	0.014	0.038	0.004	0.019	-0.022	0.176
32	05/23/13	-0.012	0.029	-0.053	0.062	0.015	0.031	0.018	0.056	0.006	0.033	-0.120	0.220
32	07/09/13	-0.012	0.017	0.021	0.031	0.008	0.016	0.016	0.027	-0.002	0.017	-0.103	0.122
32	12/11/13	0.011	0.033	0.045	0.090	-0.015	0.035	0.035	0.060	0.004	0.036	-0.101	0.285
37	02/22/13	-0.007	0.012	-0.001	0.023	-0.007	0.017	0.021	0.023	-0.003	0.012	0.031	0.102
37	06/06/13	-0.010	0.037	-0.078	0.077	0.022	0.040	0.004	0.071	0.030	0.047	-0.321	0.374
37	07/12/13	-0.001	0.025	-0.062	0.051	0.003	0.025	0.012	0.046	-0.026	0.023	0.054	0.179
37	12/10/13	0.006	0.030	-0.102	0.074	0.004	0.036	-0.004	0.063	0.009	0.037	0.007	0.275
88	02/26/13	0.000	0.017	0.005	0.028	0.001	0.015	0.001	0.029	-0.020	0.023	-0.035	0.109
88	06/06/13	-0.010	0.025	-0.038	0.054	0.027	0.025	0.010	0.041	0.004	0.024	0.025	0.203
88	07/09/13	0.007	0.026	-0.049	0.056	0.007	0.032	-0.035	0.049	-0.011	0.033	0.239	0.239
88	12/10/13	-0.011	0.039	-0.070	0.083	-0.010	0.040	-0.013	0.063	0.011	0.041	-0.146	0.344

TABLE 19
OYSTERS
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Ag-110M	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ac-228	(+/-)
31	03/06/13	-0.005	0.013	-0.033	0.035	-0.028	0.027	-0.003	0.014	-0.001	0.014	-0.040	0.063
31	06/05/13	-0.012	0.021	-0.007	0.055	0.023	0.056	-0.020	0.023	0.019	0.022	0.001	0.071
31	07/11/13	-0.002	0.031	0.015	0.082	-0.008	0.094	-0.019	0.032	-0.015	0.032	0.060	0.135
31	12/11/13	-0.010	0.031	0.034	0.081	0.021	0.061	-0.028	0.038	-0.005	0.033	-0.014	0.127
32	02/20/13	0.100	0.027	0.033	0.053	0.003	0.034	0.012	0.021	0.001	0.025	0.001	0.096
32	05/23/13	0.116	0.040	-0.007	0.077	0.080	0.096	-0.007	0.030	-0.011	0.035	-0.019	0.081
32	07/09/13	0.012	0.014	-0.012	0.036	0.062	0.044	0.002	0.015	0.011	0.014	-0.070	0.070
32	12/11/13	0.194	0.067	0.091	0.084	-0.018	0.062	0.001	0.034	0.001	0.039	0.068	0.101
37	02/22/13	0.001	0.012	-0.003	0.026	0.035	0.060	0.007	0.011	-0.005	0.013	-0.041	0.054
37	06/06/13	-0.004	0.035	0.002	0.108	-0.087	0.111	0.012	0.047	0.013	0.038	0.162	0.141
37	07/12/13	-0.007	0.022	-0.004	0.057	0.002	0.061	-0.027	0.022	-0.019	0.022	0.008	0.082
37	12/10/13	0.004	0.034	0.054	0.094	0.028	0.074	-0.003	0.037	0.028	0.039	-0.023	0.143
88	02/26/13	0.015	0.015	-0.015	0.042	-0.006	0.049	-0.010	0.019	-0.003	0.012	-0.010	0.063
88	06/06/13	0.013	0.024	-0.018	0.060	0.011	0.053	-0.007	0.022	-0.016	0.024	0.024	0.085
88	07/09/13	0.010	0.027	0.000	0.078	0.006	0.088	0.004	0.034	-0.024	0.028	0.059	0.108
88	12/10/13	-0.003	0.038	0.031	0.103	0.036	0.088	0.008	0.043	0.003	0.041	0.022	0.141

TABLE 20
CLAMS
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
29	02/19/13	-0.121	0.155	2.182	0.531	0.075	0.154	0.004	0.017	-0.016	0.019	-0.009	0.037
29	06/19/13	0.088	0.195	2.025	0.628	0.028	0.244	-0.020	0.020	-0.025	0.023	0.033	0.047
29	09/12/13	0.006	0.165	2.191	0.525	-0.026	0.201	-0.011	0.020	0.006	0.026	0.017	0.042
29	10/15/13	0.008	0.213	2.227	0.587	-0.024	0.274	-0.006	0.021	-0.012	0.024	0.015	0.052
38	03/26/13	0.021	0.171	2.735	0.669	-0.006	0.185	-0.004	0.022	-0.003	0.022	-0.001	0.041
38	06/20/13	0.136	0.264	2.066	0.568	-0.030	0.296	0.014	0.025	0.014	0.028	0.008	0.059
38	09/13/13	-0.011	0.274	2.771	0.793	0.261	0.351	-0.044	0.035	0.017	0.034	0.003	0.073
38	10/15/13	-0.062	0.207	1.911	0.535	0.131	0.295	-0.002	0.021	-0.008	0.020	0.017	0.049

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
29	02/19/13	-0.001	0.018	-0.079	0.037	-0.004	0.018	-0.009	0.029	0.014	0.018	0.079	0.161
29	06/19/13	0.014	0.023	0.009	0.051	0.010	0.027	-0.007	0.045	-0.011	0.022	-0.180	0.189
29	09/12/13	-0.006	0.026	-0.007	0.049	-0.001	0.019	0.003	0.042	-0.016	0.020	-0.020	0.163
29	10/15/13	0.002	0.022	-0.074	0.056	0.044	0.028	-0.019	0.038	-0.013	0.027	0.199	0.187
38	03/26/13	-0.012	0.022	-0.054	0.046	0.002	0.020	0.012	0.036	-0.004	0.021	0.057	0.178
38	06/20/13	-0.016	0.028	-0.039	0.067	0.000	0.032	0.001	0.052	0.012	0.037	0.168	0.235
38	09/13/13	0.011	0.031	-0.055	0.079	0.004	0.037	-0.059	0.057	-0.012	0.039	-0.140	0.300
38	10/15/13	-0.017	0.021	-0.005	0.042	0.002	0.022	0.009	0.041	0.005	0.025	0.055	0.173

LOCATION	COLLECTION DATE	Ag-110M	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ac-228	(+/-)
29	02/19/13	0.000	0.016	-0.004	0.047	-0.018	0.033	0.002	0.020	-0.010	0.018	-0.006	0.070
29	06/19/13	-0.004	0.021	0.008	0.051	0.003	0.118	-0.044	0.021	-0.007	0.022	0.050	0.082
29	09/12/13	0.006	0.021	-0.011	0.051	0.014	0.057	-0.004	0.024	-0.008	0.022	0.019	0.083
29	10/15/13	0.010	0.016	-0.020	0.052	0.057	0.175	-0.066	0.024	-0.020	0.018	-0.021	0.080
38	03/26/13	-0.020	0.019	-0.030	0.046	0.002	0.034	0.018	0.021	0.014	0.021	-0.025	0.082
38	06/20/13	-0.014	0.025	0.011	0.077	-0.062	0.141	-0.005	0.032	-0.002	0.028	0.033	0.103
38	09/13/13	-0.013	0.030	-0.012	0.094	-0.045	0.084	0.014	0.038	-0.010	0.031	0.013	0.127
38	10/15/13	0.001	0.019	-0.014	0.053	0.044	0.191	-0.036	0.022	0.007	0.018	0.004	0.069

TABLE 21

SCALLOPS

Scallops were not sampled in 2013. See discussion in Section 4.21

TABLE 22
LOBSTERS
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
32	03/21/13	0.006	0.234	2.533	0.573	-0.009	0.275	0.020	0.028	-0.026	0.030	-0.015	0.058
32	05/09/13	0.370	0.447	3.140	1.012	0.156	0.528	0.006	0.040	0.003	0.049	-0.050	0.115
32	07/18/13	0.102	0.147	3.849	0.749	0.018	0.151	-0.004	0.015	0.001	0.017	-0.035	0.035
32	10/14/13	0.162	0.247	3.290	0.614	0.069	0.356	0.011	0.023	-0.009	0.030	-0.014	0.070
35	03/11/13	0.054	0.456	3.253	1.062	0.036	0.475	0.030	0.041	0.007	0.043	-0.013	0.109
35	05/07/13	-0.011	0.058	2.869	0.260	-0.036	0.064	-0.001	0.007	-0.009	0.007	0.004	0.013
35	07/18/13	-0.038	0.130	3.722	0.709	-0.048	0.176	-0.006	0.013	-0.010	0.013	-0.005	0.031
35	10/14/13	-0.140	0.269	2.952	0.788	0.180	0.362	-0.006	0.024	-0.014	0.033	0.007	0.069

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
32	03/21/13	0.013	0.028	-0.035	0.066	0.029	0.030	0.008	0.049	-0.006	0.030	-0.250	0.247
32	05/09/13	0.033	0.045	-0.120	0.115	0.035	0.055	0.069	0.085	-0.002	0.057	-0.100	0.370
32	07/18/13	-0.015	0.018	0.017	0.035	-0.018	0.018	-0.009	0.023	-0.001	0.020	0.031	0.142
32	10/14/13	0.008	0.032	-0.091	0.065	-0.009	0.031	-0.029	0.048	0.028	0.033	-0.014	0.219
35	03/11/13	-0.012	0.045	-0.033	0.090	0.026	0.044	0.044	0.072	-0.010	0.049	0.262	0.391
35	05/07/13	0.001	0.007	-0.008	0.016	-0.002	0.008	-0.004	0.012	-0.004	0.007	0.046	0.065
35	07/18/13	-0.005	0.019	0.013	0.042	-0.014	0.018	0.032	0.029	0.016	0.018	-0.091	0.114
35	10/14/13	0.011	0.029	-0.056	0.064	-0.022	0.032	-0.037	0.055	0.008	0.035	0.093	0.247

LOCATION	COLLECTION DATE	Ag-110M	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ac-228	(+/-)
32	03/21/13	0.001	0.025	-0.052	0.073	0.021	0.073	-0.051	0.030	-0.008	0.027	0.033	0.109
32	05/09/13	0.013	0.047	0.060	0.114	-0.217	0.269	-0.001	0.049	0.039	0.045	0.038	0.205
32	07/18/13	-0.001	0.014	-0.024	0.041	-0.026	0.051	-0.002	0.015	-0.003	0.014	-0.003	0.076
32	10/14/13	-0.008	0.025	0.002	0.062	0.263	0.256	-0.004	0.028	0.015	0.026	-0.011	0.095
35	03/11/13	-0.008	0.039	0.039	0.121	0.033	0.164	0.016	0.048	0.034	0.039	0.052	0.150
35	05/07/13	0.003	0.006	0.005	0.018	-0.003	0.014	-0.005	0.008	0.002	0.007	0.018	0.061
35	07/18/13	0.009	0.014	0.011	0.036	-0.017	0.051	-0.010	0.014	-0.003	0.014	-0.032	0.079
35	10/14/13	0.005	0.027	-0.002	0.064	-0.192	0.247	0.025	0.028	0.004	0.029	-0.048	0.105

4. DISCUSSION OF RESULTS

This section summarizes the results of the analyses on the REMP samples. DNC has carefully examined the data throughout the year and has presented in this section all cases where station related radioactivity could be detected. The results are compared with previous environmental surveillance data.

Few impacts of the station operation on the environment were observed. Sub-sections contain a description of each particular media or potential exposure pathway. Naturally occurring nuclides such as Be-7, K-40, and Th-232 (and its daughters Th-228 and Ac-228) were detected in numerous samples. Be-7, which is produced by cosmic processes, was observed predominantly in airborne and vegetation samples. Th-232 and daughter results were variable and are generally at levels higher than plant related radionuclides.

Cs-137 and Sr-90 from atmospheric nuclear weapons testing in the 1960's have been observed in the past. During 2013 Cs-137 from weapons was detected in several samples while Sr-90 was not detected.

4.1 Gamma Exposure Rate (Table 1)

Gamma exposure rate is determined from the integrated exposure measured over a calendar quarter using TLDs. Prior to 1990, Victoreen CaF_2(Mn) glass bulb dosimeters were used for these measurements. In 1990, these were replaced by Harshaw CaF_2(Mn) chips. In 2000, the CaF_2(Mn) TLDs, were replaced with the $CaSO_4$(Tm) Panasonic model UD-804 ASx TLDs. Readings are recorded as uR/hr. The unit uR stands for 'micro (u)-roentgen' with a 'micro' being one-millionth of a roentgen. A roentgen is the quantity of radiation equal to 87.6 ergs of energy per gram of air.

The dosimeters are strategically placed at a number of on-site locations, as well as at inner and outer off-site locations. Starting in 2001, the collection of TLDs was changed from monthly to quarterly and additional measurement locations were incorporated into the REMP requirements listed in the REMODCM (Reference 8). Three more locations were added in mid-2003 to prepare for monitoring the potential effect from the ISFSI. Two Dry Cask Containers were loaded in the first quarter 2005. Three containers were loaded in mid 2006, three in October 2007, three in April 2009, and three in October 2010. None were loaded in 2008 or from 2011 to 2013. The exposure rate measurements at two of the three additional TLD locations remain basically unchanged from the background measurements performed prior to any cask loading (six quarter background average mid 2003 – 2004: 9.1 uR/hour at Location 73, 7.4 uR/hour at Location 74 and 6.7 uR/hour at Location 75). At Location 73 the readings in 2013 were lower.

Table 1 lists the exposure rate measurements for all 44 monitored locations. Trends similar to those of past years are apparent. These measurements demonstrate the general variations in background radiation between the various onsite and offsite locations and include gamma exposure from all sources of radioactivity. For example, the Weather Shack (Location 2), Millstone Unit 3 Discharge (Location 5), Environmental Laboratory (Location 8), Bay Point Beach (Location 9), Pleasure Beach (Location 10), Corey Road (Location 48), and Site Switchyard Fence (Location 73) experience higher exposure rates due to their proximity to granite beds and stonewalls. In addition, the Mystic (Location 13C) and Ledyard (Location 14C) control locations experience relatively higher background exposure rate than the other control locations at Fisher's Island, Norwich and Old Lyme (Locations 12C, 15C and 16C). The only appreciable effect seen in the recent TLD data is that attributable to the variation in the background radiation that is consistent with previous years. Figure 4.1-1 shows a historical trend of TLD exposure rate measurements, comparing an annual average of all indicator TLDs, an annual average of all control TLDs, and the annual average of the two most critical indicator locations which are used to represent the two closest site boundary residences in the North-northwest and Northeast directions. Examination of the average measurements since 1990, shows interesting site changes and site characteristics. For example, the averages of all indicator locations for the period when Millstone Unit 1 was still in operation (through 1995) exhibit the effects of N-16 BWR turbine building skyshine to immediate areas onsite. As discussed in previous annual reports, the effects of skyshine at onsite monitoring stations were increased exposure rates as high as 6 uR/hr at certain onsite locations. The elevated exposure rates from skyshine decreased rapidly with distance to levels indistinguishable from normal background measurements at even the nearest offsite monitoring stations. Also apparent in Figure 4.1-1 is a change of the type of TLD dosimeter in the year 2000. The difference in response between the two types of TLD dosimeters is apparent, with the new type reading 15% to 20% lower. This lower response is consistent for all locations, including both indicator and control locations.

Figure 4.1-1 also relates the difference in critical indicator locations 1 and 3 and the annual average of all indicator TLDs to the annual average of the control TLDs collected and measured during coincident periods throughout the year. As discussed earlier, the exposure measurements of many indicator locations onsite (and two of the control locations) are influenced by natural background exposure differences caused by the many granite out-croppings typical of the local area. Figure 4.1-1 shows the annual average at indicator Location 1 is slightly higher in gamma exposure rate than the average control gamma exposure rate. An opposite trend is shown for Location 3. These differences are the result of the differences in granite at these locations. Location 3 was moved in the second quarter 2009 to minimize the effect of tree covering for the air sampler also located at this location. The 2009 to 2013 data for Location 3 shows an increase likely attributable to the being closer to granite at the new location.

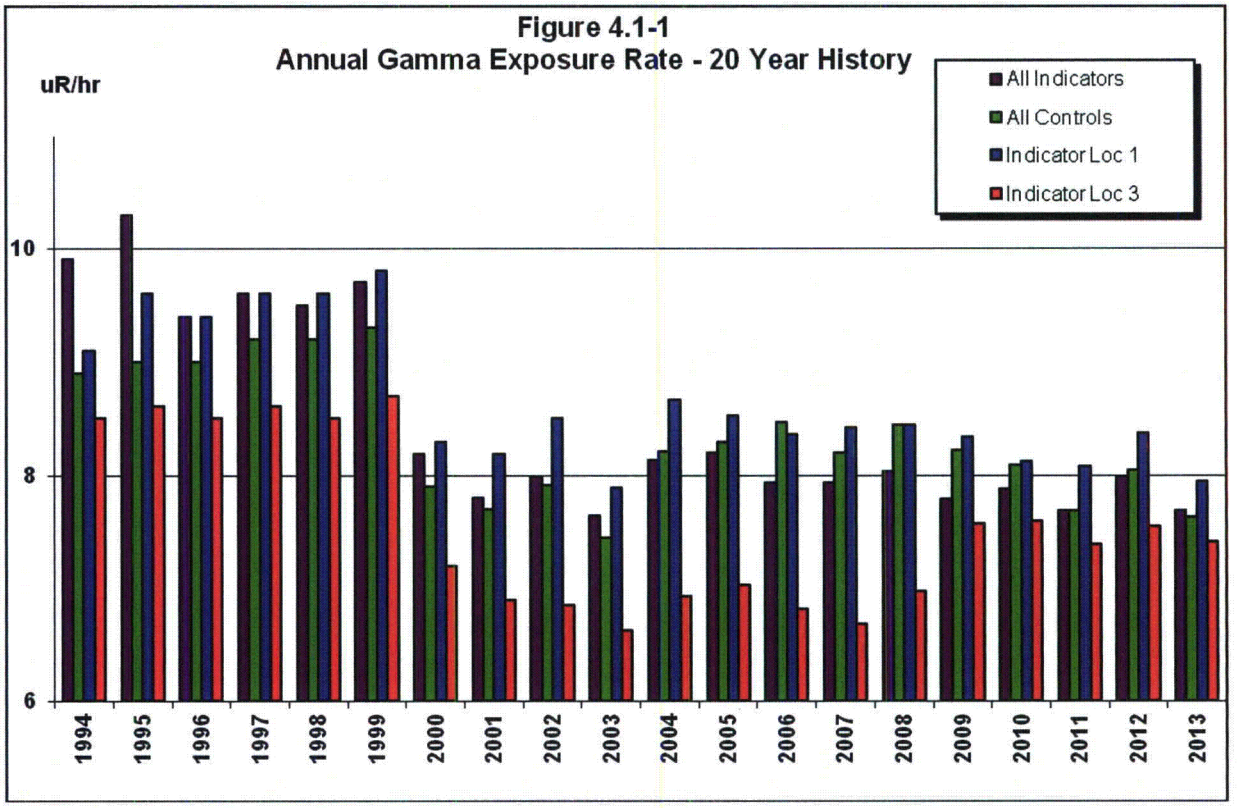
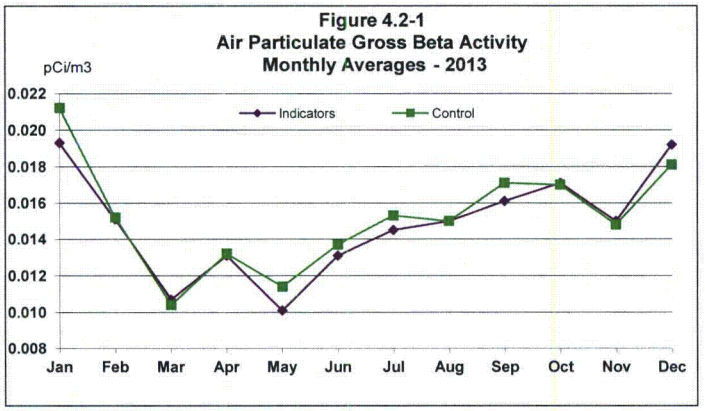
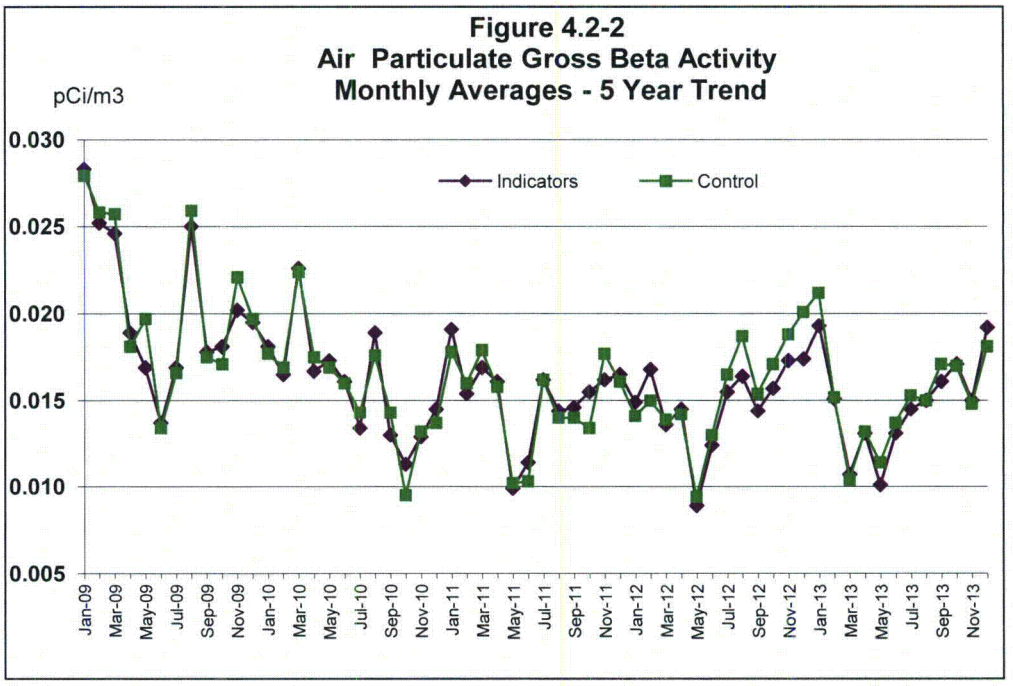


Figure 4.1-1
Annual Gamma Exposure Rate - 20 Year History
uR/hr
All Indicators
All Controls
Indicator Loc 1
Indicator Loc 3
10
8
6
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

4.2 Air Particulate Gross Beta Radioactivity (Table 2)

Air is continuously sampled at seven inner ring (0 to 2 miles) locations and one control location (14 miles N) by passing it through glass fiber particulate filters. These samples are collected weekly and analyzed for gross beta radioactivity. Results are shown on Figure 4.2-1 and Table 2. Because of a loss of power the weekly sample for November 26 at Location #2 was not sufficient to meet the LLD requirement of 0.01 pCi/m^3. Gross beta activity remained at levels similar to that seen over the last decade. Inner and control monitoring locations continue to show no significant variation in measured activities (see Figure 4.2-2). This indicates that any station contribution is not measurable.





4.3 Airborne Iodine (Table 3)

Charcoal cartridges are included at all of the air particulate monitoring stations for the collection of atmospheric iodine. These cartridges are analyzed on a weekly basis for I-131. No detectable levels of I-131 were seen in the 2013 charcoal samples. Because of a loss of power the weekly sample for November 26 at Location #2 was not sufficient to meet the LLD requirement of 0.07 pCi/m^3.

4.4 Air Particulate Gamma (Table 4)

The air particulate samples that are utilized for the weekly gross beta analyses are composited quarterly and analyzed for gamma emitting isotopes. The results, as shown in Table 4, indicate the presence of naturally occurring Be-7, which is produced by cosmic radiation. No other positive results are seen. These analyses indicate the lack of station effects.

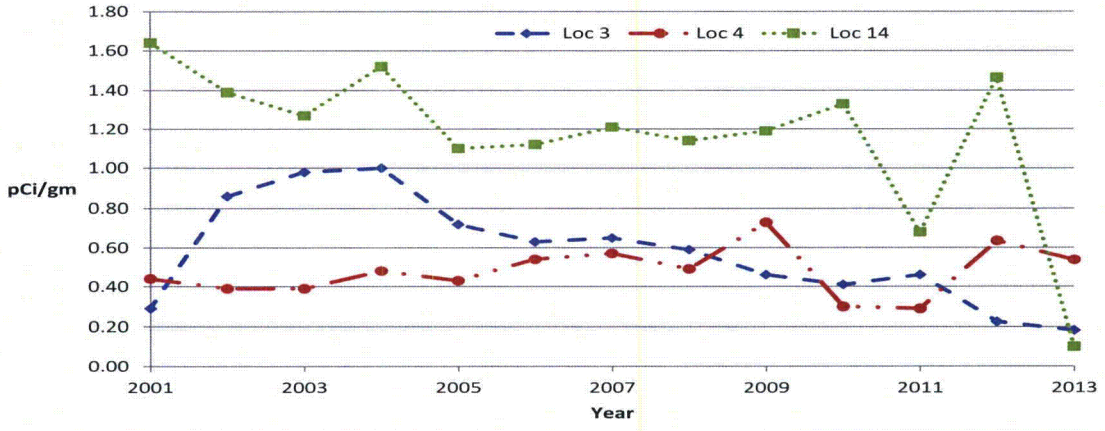
4.4 Air Particulate Strontium (Table 5)

Prior to 1989 Table 5 was used for listing the data for measurements of Sr-89 and Sr-90 in quarterly composite air particulate filters. The historical data indicated the lack of any detectable station related activity. Since these analyses are not listed in NUREG-1301 (Reference 15), these measurements were discontinued. In the event of widespread station related contamination or other unusual events, these measurements could be made. Historically, when world events created conditions that caused detectable measurements of these nuclides, there was no difference noted between indicator and control locations. This further confirms that any of the detectable levels for these nuclides were not plant related.

4.5 Soil (Table 6)

This media is collected annually from one control and two indicator locations. Millstone has collected and analyzed soil since 2001. Prior to 2001, soil had not been sampled for over fifteen years because station related detectable activity had not been detected. Similarly, since 2001, no station detectable activity has been seen in these samples. Naturally occurring K-40 and Ac-228 is detected in soil. Also detected is Cs-137 from nuclear weapons testing. The results of these samples, allows for the determination of baseline activity levels in soil. This is particularly important for Cs-137, since significant levels from past weapons testing fallout remain in the soil. Figure 4.6-1 shows the trend of Cs-137 in soil samples. Except for Location 4, the trend appears to be declining with time. Baseline levels should be useful in the future, when site characterization and decommissioning of the station become the focus during preparations for license termination.

Figure 4.6-1
Cs-137 in Soil



4.6 Cow Milk (Table 7)

Typically, the most sensitive indicator of fission product existence in the terrestrial environment is the radiological analysis of milk samples. Milk is a widely consumed food, therefore it is usually one of the most critical exposure pathways. Since 1996 all dairy (cow) farms close enough to Millstone to be considered an indicator location (i.e. within 10 miles) have ceased operation. One cow milk location, about ten and half miles from the plant, was sampled as an extra (i.e.; not required) sample and results are shown in Table 7. Naturally occurring K-40 is the only positive result seen in cow milk.

Each year the Land Use Census is used to identify locations of milk animals that should be included in the monitoring program. It is performed annually and is maintained by observations, door-to-door surveys and consulting with local agriculture authorities. The 2013 census is listed in Appendix A. If a new dairy farm is identified close enough to Millstone to be considered an indicator location, the collection of cow milk at that location would be added.

4.7 Goat Milk (Table 8)

When available, these samples are collected twice per month during grazing season and once per month during the rest of the year. Because goat milk was not available in 2013, no samples were collected.

4.8 Pasture Grass/Hay/Feed (Table 9)

Per REMODCM requirements, pasture grass is collected as a substitute when goat milk is not available. Although not required by the REMODCM, hay or feed is substituted when pasture grass is not available. During the winter months and early spring, insufficient growth often prohibits sampling of pasture grass. No station effects are noted in these samples. Cosmic produced Be-7 was observed in the samples of pasture grass which were taken during the warmer months. Naturally occurring K-40 was present in all samples being approximately two times higher in hay and feed compared to pasture grass samples. Cs-137 from nuclear weapons testing was seen in one sample.

4.10 Well Water (Table 10)

Except for Well Location #80, there were no station related activity detected in the samples collected as part of the REMP. For Well Location #80 a positive H-3 result was found. This well is located in the Unit 3 protected area. There is an ongoing investigation on the source of groundwater tritium in this area. Additional samples from this well, and other wells, were obtained as part of the Groundwater Protection Program (GWPP). Results from the GWPP are reported in the Millstone annual "Radioactive Effluent Release Report" for 2013.

4.11 Reservoir Water (Table 11)

Reservoir water samples are special samples not required by the REMP. Previous data has shown the lack of detectable station activity in this media. This fact and the extremely unlikely possibility of observing routine station effluents in this media have resulted in discontinuing these samples. In the event of widespread station related contamination, these samples may be collected.

4.12 Fruits and Vegetables (Table 12)

Consistent with past years, this media did not show any station effects. Naturally occurring Be-7 was detected in some samples and K-40 in all samples.

4.13 Broad Leaf Vegetation (Table 13)

Consistent with past years, this media did not show any station effects. All samples had detectable levels of cosmic produced Be-7 and naturally occurring K-40 at levels consistent with previous years. Occasionally these samples indicate positive levels of Cs-137. This can be attributed to fallout from weapons testing which has been widespread in terrestrial samples for many years.

4.14 Seawater (Table 14)

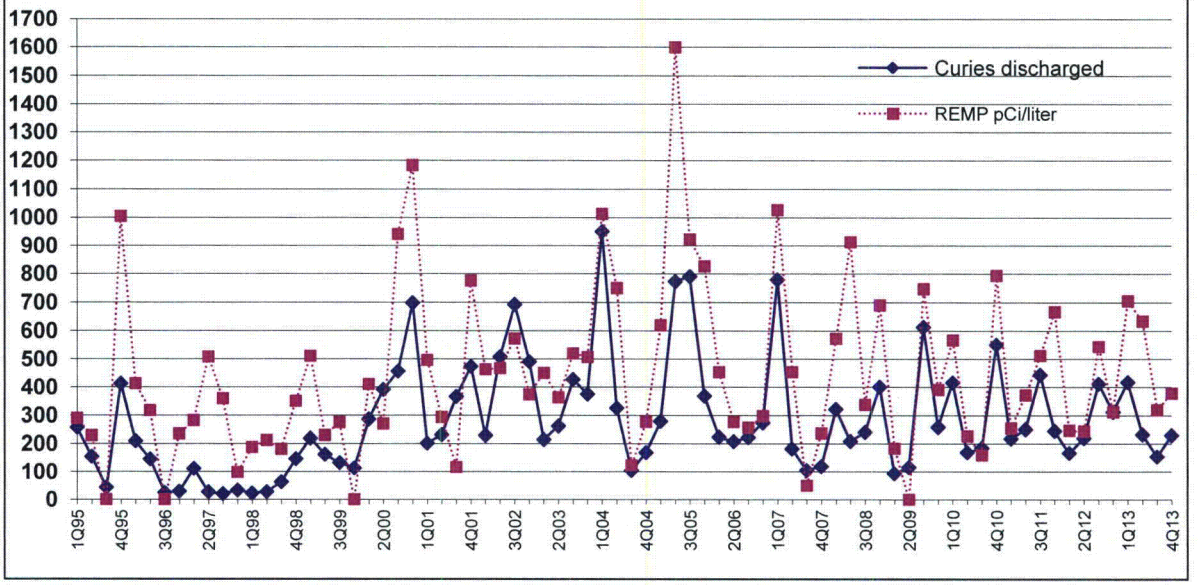
The guidance in Reference 15 specifies one sample upstream (control – beyond significant influence of the discharge) and one sample downstream (indicator – beyond but near the mixing zone) for surface water samples. Historically the downstream sample for Millstone has been located in the vicinity of discharge (location 32 – see Reference 8) which is prior to the mixing zone. This location was chosen since it was readily accessible and not affected by cold weather conditions. Operation of an automatic sampler at the indicator location is necessary for providing a representative sample. Any dose consequences can be assessed by use of the appropriate dilution factors. It's not as necessary to have a continuous sampler at the control location due to the historical relative consistency noted in seawater background activity near the Millstone._

A technician collects an aliquot from the automatic sampler at Location 32 on a weekly frequency. These samples are composited for monthly analyses. For the Control Location, Giant's Neck (Location 37C), six weekly grab samples are obtained for quarterly compositing.

Naturally occurring K-40 was the only detectable gamma activity seen in these samples and naturally occurring Ac-228 was seen in one sample. Measured plant related levels of H-3 in seawater from the immediate vicinity of discharge (location 32) were observed in most samples. Tritium releases are typically higher near outages due to the need for increased liquid processing during these times. The higher H-3 levels in March and April are related to the Millstone Unit 3 refueling outage. As mentioned above, these samples are taken directly from liquid effluent flow prior to dilution into the Long Island Sound. Dilution studies performed for this discharge have determined that a dilution factor of 3 is appropriate to estimate concentrations immediately outside the quarry within a near-field area.

Tritium builds up in the reactor coolant during each fuel cycle. It is generated during plant operation from fission and neutron reactions. Between 1992 and 2002, H-3 was not typically detected. However, due to the enhanced detection sensitivity, H-3 levels are now often detected at the indicator location. Figure 4.14-1 shows an eighteen-year trend of H-3 releases in the Millstone liquid effluents versus the measured environmental concentrations from the vicinity of discharge location.

Figure 4.14-1
H-3 Curies Released versus Seawater Concentration
18 Year Trend



4.15 Bottom Sediment (Table 15)

There was no plant related radioactivity detected in bottom sediment samples in 2013. Naturally occurring K-40 is seen in all samples and naturally occurring Ac-228 in some samples. Cs-137 from nuclear weapons testing is seen in samples from Locations #39 and #67. These locations are at areas where inland streams deposit sediment and can be correlated to soil sample results for Cs-137. Several results are greater than their 2σ error but all are less than the MDC. Bottom sediment is not a significant dose pathway to man, especially at areas not typically used by the public.

4.16 Aquatic Flora (Table 16)

Although sampling of this media is not required, it provides useful information since it a very sensitive indicator of radioactivity in the environment. Naturally occurring Be-7 and Ac-228 appear in some samples and K-40 in all samples. Low levels of man-made radioactivity (e.g., Mn-54, Co-58, Co-60, Zn-65, I-131 and Ag-110m) have been detected in the past. Some results are greater than their 2σ error but less than the MDC.

Seaweed has a significant bioaccumulation factor for iodine which makes it an extremely sensitive indicator of iodine in the environment. Other radionuclides can be accumulated in seaweed. Three positive, plant-related I-131 measurements were noted in 2013, one on January 10 and one on May 6, both at Location #32 which is Vicinity of Discharge, and one on July 25 at Location #35 which is in Niantic Bay adjacent to the plant. The measurements are consistent with I-131 seen in liquid effluents with the two at Location #32 related to the Unit 3 outage. Positive results were also seen for Co-58, Ag-110m and Cs-137 on May 6 and for Co-58 on January 10 all at Location #32. These results are related to the Unit 3 outage. A positive I-131 result was also seen at background location #90 on October 11. This location is downstream of the waste water processing plant on the Thames River in New London. In the past I-131 at this location was determined to be from medical waste being

processed. The positive result seen on July 25 in Niantic Bay (Location #35) may be from this same source. Release of radioactivity in liquid effluents were well below regulatory limits and environment concentrations are comparable to some prior years at the same locations.

4.17 Fish (Tables 17A and 17B)

The activity in Flounder (Table 17A) and Other Fish (Table 17B) is the same as that seen in the past. No activity was observed except for the naturally occurring K-40. Plant-related activity was detected in flounder – Nb-95 in flounder on May 7 at Location #35 and Sb-125 in other fish on April 16 at Location #32. Several other results are greater than their 2σ error but less than the MDC. Release of radioactivity in liquid effluents were well below regulatory limits and environment concentrations are comparable to some prior years at the same locations.

4.18 Mussels (Table 18)

Similar to the last several years, this sampling media showed no activity except for the naturally occurring K-40. Result for Nb-95 was greater than the 2σ error but less than the MDC. Mussels were not available at Two Three Island (Location #28) and were only available at Niantic Shoals (Location #30) for one quarter during 2013.

4.19 Oysters (Table 19)

All locations utilize oysters stocked in trays. The stocked trays are kept at sampling areas and represent conditions in those areas. Due to safety concerns Location #32 was moved about eight years ago to a more accessible area in the middle of the quarry. Although it is labeled as vicinity of the discharge, it was previously located at the end of the quarry.

Naturally occurring K-40 is seen in all samples. Millstone related Ag-110m was detected in three of four samples from Location #32. This has been an historical occurrence (see discussion below). Several other results are greater than their 2σ error but less than the MDC.

For several previous years, high levels of Zn-65 were observed in oysters. This was caused by their high capacity for accumulating zinc. Studies have shown that oysters can accumulate as much as 50 times or more the amount of zinc compared to most other seafood. A remarkable correlation existed between the Zn-65 concentration measured in the native quarry oysters and the amount of Zn-65 discharged into the environment. However, since the permanent shutdown of Millstone Unit 1 in 1996, the amount of Zn-65 in liquid effluents has decreased significantly. Starting in 2001, no Zn-65 has been detected in either the liquid effluents or in oysters. Figure 4.19-1, shows a historical trend that existed between Zn-65 releases and measured concentrations in quarry oysters. The decreasing trend in effluent radioactive releases is apparent in both the curies released and the measured concentrations in oysters.

Figure 4.19-2 shows the trend of Ag-110m concentration in quarry oysters compared to the liquid effluents discharged. Similar to Zn-65, the correlation between Ag-110m discharged and the Ag-110m concentration measured in the native quarry oysters is apparent. Per regulatory guidance (Reference 7), the bioaccumulation factors for both Zn and Ag were adjusted based upon several years of historical data to account for the higher measured uptakes.

The location of the quarry is onsite and not available for public use. No Millstone activity was observed at locations beyond the Millstone discharge area. Therefore, the actual concentration of the nuclides in oysters available for public consumption is much less than the levels found inside the quarry. The near-field dilution factor for liquid discharges from the Millstone Quarry discharge is a factor of 3.

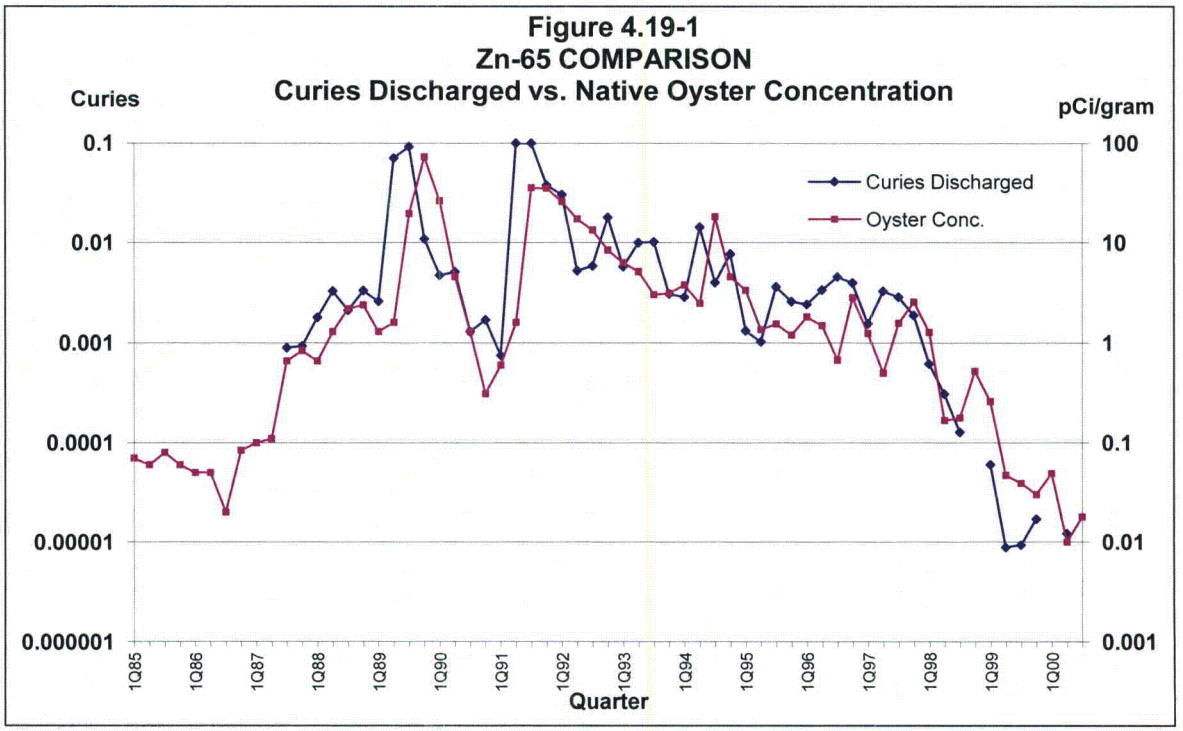


Figure 4.19-1
Zn-65 COMPARISON
Curies Discharged vs. Native Oyster Concentration
Curies
pCi/gram
0.1
0.01
0.001
0.0001
0.00001
0.000001
100
10
1
0.1
0.01
0.001
Curies Discharged
Oyster Conc.
1Q85
1Q86
1Q87
1Q88
1Q89
1Q90
1Q91
1Q92
1Q93
1Q94
1Q95
1Q96
1Q97
1Q98
1Q99
1Q00
Quarter

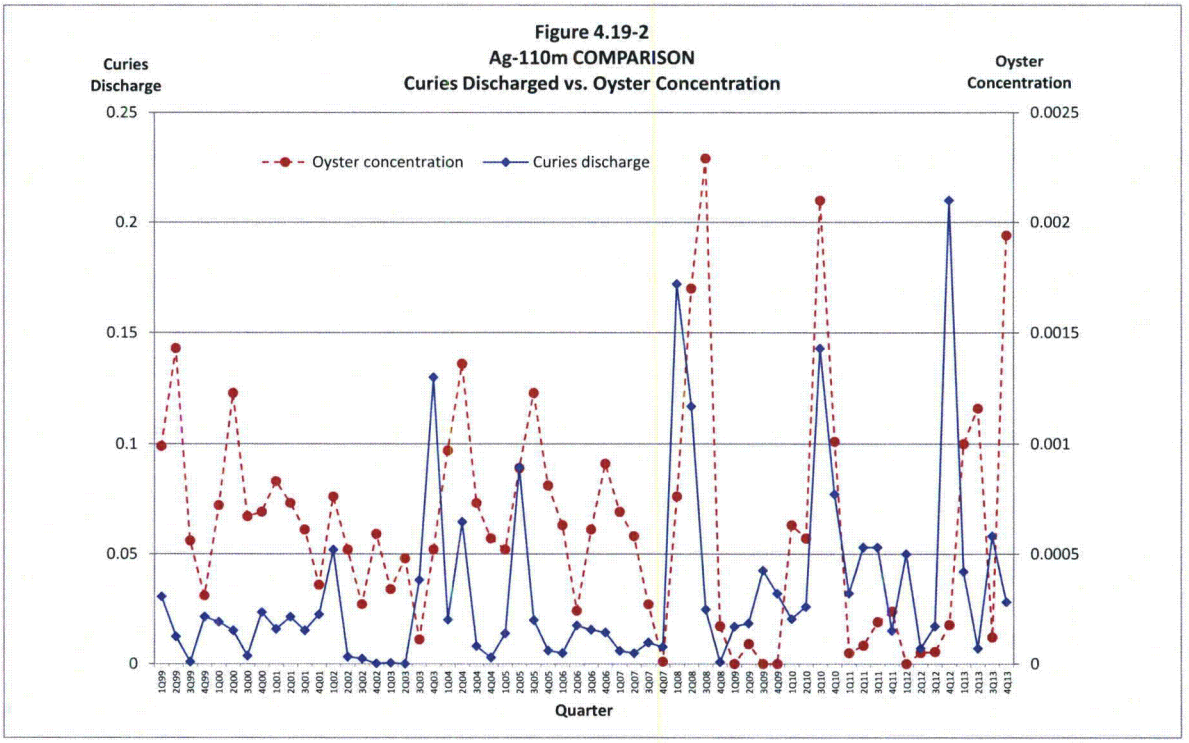


Figure 4.19-2
Ag-110m COMPARISON
Curies Discharged vs. Oyster Concentration
Curies Discharge
Oyster Concentration
0.25
0.2
0.15
0.1
0.05
0
0.0025
0.002
0.0015
0.001
0.0005
0
Oyster concentration
Curies discharge
Quarter

4.20 Clams (Table 20)

Occasionally this media indicates the presence of station related radioactivity. In 2013 no activity was observed except for the naturally occurring K-40. Several results were greater than their 2σ error but less than the MDC.

4.21 Scallops (Table 21)

No scallop samples have been available for several years.

4.22 Lobsters (Table 22)

No activity was observed except for the naturally occurring K-40. Several results were greater than their 2σ error but less than the MDC.

5. COMPARISON TO EFFLUENT DOSE CALCULATION

The REMODCM requires that a dose assessment of the measured environmental results be compared to calculated effluent results to confirm the relative accuracy or conservatism of effluent dose calculations.

There are very few plant related results with which to make this comparison. For 2013 the only plant related results were in seaweed, fish and oysters. Because seaweed is not a food source the comparison could not be made using this media. The dose from activity observed in fish and oysters was estimated and compared to effluent dose calculations. The table below gives the values used for this dose assessment and the results.

Nuclide	Sample type	Highest concentration (pCi/gm)	Consumption* (gm/year)	Dose Conversion Factor* (mRem/gm)	Whole Body Dose (mRem)
Nb-95	Fish	0.022	2.1E4	1.86E-9	8.6E-7
Sb-125	Fish	0.056	2.1E4	4.26E-7	5.0E-4
Ag-110m	Oyster	0.2	5E3	8.79E-8	8.79E-5

* Values are from Regulatory Guide 1.109.

The total whole body dose is 5.9E-4 mRem. Effluent liquid whole body dose calculated for Millstone in 2013 is 1.45E-3 mRem (Reference 19). This confirms that the effluent dose calculation is not substantially underestimating the dose as required in 10 CFR Part 50, Appendix I.

6. REFERENCES

1) United States of America, Code of Federal Regulations, Title 10, Part 50, Appendix A Criteria 64.
2) Donald T. Oakley, "Natural Radiation Exposure in the United States." U. S. Environmental Protection Agency, ORP/SID 72-1, June 1972.
3) National Council on Radiation Protection and Measurements, Report No. 160, "Ionizing Radiation Exposures of the Population of the United States," March 2009.
4) National Council on Radiation Protection and Measurements, Report No. 94, "Exposure of the Population of the United States and Canada from Natural Background Radiation," December 1987.
5) United States Nuclear Regulatory Commission, Regulatory Guide 8.29, "Instructions Concerning Risks from Occupational Radiation Exposure," Revision 0, July 1981.
6) United States of America, Code of Federal Regulations, Title 10, Part 20.1302.
7) United States Nuclear Regulatory Commission, Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision 1, October 1977.
8) Millstone Power Station Radiological Effluent Monitoring and Offsite Dose Calculation Manual, Revision 027-00, March 13, 2013.
9) Millstone Unit 1 Defueled Technical Specifications, Section 5.6.4, "Radioactive Effluents Control Program."
10) Millstone Unit 2 Technical Specifications, Section 6.20, "Radioactive Effluents Control Program."
11) Millstone Unit 3 Technical Specifications, Section 6.15, "Radioactive Effluents Control Program."
12) United States Nuclear Regulatory Commission, Regulatory Guide 4.1, "Program for Monitoring Radioactivity in the Environs of Nuclear Power Plants," Rev. 1, April 1975.
13) ICN/TracerLab, "Millstone Nuclear Power Station Pre-operational Environmental Radiation Survey Program, Quarterly Reports," April 1967 to June 1970.
14) International Commission of Radiological Protection, Publication No. 43, "Principles of Monitoring for the Radiation Protection of the Population," May 1984.
15) United States Nuclear Regulatory Commission, NUREG-1301, "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors," April 1991.
16) United States Nuclear Regulatory Commission, Branch Technical Position, "An Acceptable Radiological Environmental Monitoring Program," Rev. 1, November 1979.
17) Reassessment of Millstone Power Station's Environmental Monitoring Data, Connecticut Department of Environmental Protection, Division of Radiation, March 2006.
18) Nuclear Regulatory Commission Regulatory Guide 4.1, Radiological Environmental Monitoring for Nuclear Power Plants, Revision 2, June 2009.
19) Millstone Power Station 2013 Radioactive Effluents Release Report.

APPENDIX A

LAND USE CENSUS FOR 2013

The annual land use census in the vicinity of Millstone was conducted as required by the Millstone REMODCM. Typically the cow milk locations are identified by a review of the annual registration information obtained from the State of Connecticut Department of Agriculture. Gardens are located by a drive-by during the harvest season. Although broadleaf sampling was performed and may be used in lieu of a garden census, gardens were included in the 2013 census. Only vegetable gardens having an area of more than 500 square feet need to be identified. Due to the difficulty of measuring individual gardens, the nearest garden within each directional sector identified by a drive-by survey is listed. Garden distances are based on nearest resident assuming that a resident may plant a new garden. Goat locations are more difficult to determine, but best efforts are made to consult goat association records, contact previous owners or perform drive-bys, if necessary.

Results of the land use census are given in Tables A-1 through A-3. No new dairy animals within 10 miles of the Millstone were located during the census. Twelve of 29 cow locations within 20 miles of miles of Millstone on the 2012 list are not on the 2013 list. The closest cow location at 10.0 miles stopped selling milk in August of 2012.

The dose modeling incorporates the distances listed in Tables A-1, A-2 and A-3.

TABLE A-1

Active Dairy Cows Within 20 Miles of Millstone Point - 2013

Direction	Distance		Location
	miles	meters	
N	18.0	29,000	Bozrah
N	18.5	29,800	North Franklin
N	19.4	31,200	North Franklin
N	19.6	31,500	North Franklin
NNE	15.0	24,100	Preston
NNE	16.2	26,100	Preston
NNE	16.3	26,200	Norwich
NE	14.4	23,200	North Stonington
NE	19.2	30,900	North Stonington
NE	19.2	30,900	North Stonington
ENE	17.9	28,800	North Stonington
WNW	10.5	16,900	Lyme
NNW	19.5	31,400	Lebanon
NNW	19.6	31,500	Lebanon

TABLE A-2

Dairy Goats Within 20 Miles of Millstone Point - 2013

Direction	Distance		Location
	miles	meters	
N	2.1	3,350	Waterford (REMP Location #21)
N	11.1	17,900	Oakdale
N	17.3	27,800	Lebanon
N	18.4	29,600	Bozrah
N	18.5	29,800	North Franklin
NNE	17.4	28,000	Preston
NNE	18.3	29,500	Preston
NE	2.8	4,510	Waterford
ENE	11.5	19,000	Stonington (Mystic)
ENE	12.8	20,600	Stonington
ENE	17.9	28,800	North Stonington
WNW	9.5	15,300	Lyme
WNW	14.6	23,500	Hadlyme
WNW	17.6	28,300	Haddam
NW	16.9	27,200	East Haddam
NNW	12.2	19,600	Salem
NNW	18.1	29,100	Colchester
NNW	19.5	31,400	Lebanon
NNW	28.6	46,000	Hebron (REMP Location #24)

TABLE A-3

2013 Resident and Garden Survey

Downwind Direction	Closest Distance For: Resident		Garden	
	miles	meters	miles	meters
N	0.97	1561	0.97	1561
NNE	0.53	853	0.53	853
NE	0.46	740	0.46	740
ENE	0.97	1561	0.97	1561
E	0.91	1464	0.91	1464
ESE	1.1	1770	1.1	1770
SE	N/A	N/A	N/A	N/A
SSE	N/A	N/A	N/A	N/A
S	N/A	N/A	N/A	N/A
SSW	N/A	N/A	N/A	N/A
SW	2.3	3701	2.3	3701
WSW	2.0	3218	2.0	3218
W	1.8	2896	1.8	2896
WNW	1.5	2414	1.6	2574
NW	1.3	2092	1.3	2092
NNW	0.51	821	0.51	821

APPENDIX B

SUMMARY OF INTERLABORATORY COMPARISONS

INTRODUCTION

This appendix summarizes the Intercomparison Program of the Teledyne Brown Engineering (TBE) Laboratory as required by technical specifications for each Millstone unit. Teledyne uses QA/QC samples provided by Eckert & Ziegler Analytics, by the Environmental Resource Associates (ERA) Proficiency Test (PT) Program and by the Department of Energy (DOE) Mixed Analyte Performance Evaluation Program (MAPEP) to monitor the quality of analytical processing associated with the REMP. The suite of samples are comparable with the pre-1996 US EPA Interlaboratory Cross-Check Program in terms of sample number, matrices, and nuclides. It includes:

- milk for gamma (9 nuclides) analyses once per quarter
- milk for low level Iodine-131 analyses once per quarter
- milk for Sr-89 and Sr-90 analyses once per quarter
- water for gamma (9 nuclides) once per quarter
- water for low level Iodine-131 analyses twice per year
- water for tritium analyses once per quarter
- water for Sr-90 analyses once per quarter
- water for gamma Sr-89 analyses twice per year
- air filter for gamma (9 nuclides) analyses once per quarter
- air filter for gross beta analysis twice per year
- charcoal filter for I-131 once per quarter
- air filter for Sr-90 analyses twice per year
- soil for gamma (10 nuclides) analyses twice per year
- vegetation for gamma (6 nuclides) analyses twice per year
- vegetation for Sr-90 analyses twice per year

Intercomparison program results are evaluated using the laboratory's internal bias acceptance criterion. Teledyne Brown's acceptance criterion is defined as within 20% of the known value. Sample results which are less or greater than 20% of the known value but within 30% is acceptable with warning. Samples results outside 30% of the known value are not acceptable. All sample analyses which are not acceptable are investigated. Teledyne Brown Engineering Intercomparison Program results are included on pages B-3 through B-6 for 2013.

RESULTS

For the TBE laboratory, 178 out of 185 analyses performed met the specified acceptance criteria. Seven analyses (Sr-89 and Sr-90 in milk, Co 57, Zn-65 and Sr-90 in soil, Cs-134 in air particulate and Sr-90 in vegetation) did not meet the specified acceptance criteria or internal QA requirements for the following reason:

1) Teledyne Brown Engineering's Analytics September 2013 Sr-89 in milk result of 63.9 pCi/L was lower than the known value of 96.0 pCi/L. The failure was a result of analyst error and was specific to the Analytics sample. Client samples for the associated time period were evaluated and no client samples were affected by this failure. Teledyne Brown Engineering's Analytics September 2013 Sr-90 in milk result of 8.88 pCi/L was lower than the known value of 13.2 pCi/L. The failure was a result of analyst error and was specific to the Analytics sample. Client samples for the associated time period were evaluated and no client samples were affected by this failure.

2) Teledyne Brown Engineering's MAPEP September 2013 Co-57 and Zn-65 in soil were evaluated as failing the false positive test. While MAPEP evaluated the results as failures, the gamma software listed the results as non identified nuclides. The two nuclides would never have been reported as detected nuclides to a client. MAPEP does not allow laboratories to put in qualifiers for the submitted data nor "less than" results. MAPEP evaluates results based on the relationship between the activity and the uncertainty. MAPEP spiked the soil sample with an extremely large concentration of Eu-152, which was identified by the gamma software as an interfering nuclide, resulting in forced activity results that were evaluated by MAPEP as detected Co-57 and Zn-65. No client samples were affected by these failures.
3) Teledyne Brown Engineering's MAPEP September 2013 Cs-134 in air particulate activity of -0.570 Bq/sample was evaluated as a failed false positive test, based on MAPEP's evaluation of the result as a significant negative value at 3 standard deviations. A negative number would never have been reported as a detected nuclide to a client, therefore no client samples were affected by this failure.
4) Teledyne Brown Engineering's MAPEP September 2013 Sr-90 in vegetation result was investigated due to two low warnings in a row. It appears the September sample was double spike with carrier, resulting in a low activity. With a recovery of around 50% lower, the Sr-90 result would have fallen within the acceptance range. No client samples were affected by this issue.

APPENDIX C

Erratum

Erratum – Correction to Millstone 2012 Annual Radiological Environmental Operating Report

During 2013 the analyses vendor discovered that a wrong value had been applied in the algorithm to calculate Lower Limit of Detection (LLD) resulting in incorrect LLDs on some sample results. Correct LLDs were recalculated and the sample results were revised on April 26, 2013. Copies of the revised results were received by the vendor on May 8, 2013. The values reported in Millstone's 2013 report includ the corrected values. Some of the incorrect LLDs were reported in Millstone's 2012 report and they are corrected with this erratum.

For analyses performed in 2012 with incorrectly calculated LLDs, eight corrected values did not meet the (LLD) for I-131 as required by Table I.E-4 of the REMODCM. The samples included five well water, two sea water and one vegetation. Each sample with date of sample, required LLD and the revised LLD are shown in the table below.

Sample			LLD	
Identification	Date	Results*	Required*	Corrected reported value*
Well M3-MW-1	12/19/12	7.9	15	20.3
Well M3-MW-1	6/25/12	1.7	15	16.3
Well MW-GPI-2	6/25/12	8.9	15	20.0
Well S2-MW-1	3/8/12	-0.2	15	15.5
Well MW-GPI-9	3/8/12	1.4	15	17.5
Seawater Giant's Neck	7/10-8/14/12	11.72	15	19.1
Seawater Vic of Discharge	10/28-11/27/12	4.23	15	16.8
Vegetation Site Boundary	7/17/12	-0.043	0.06	0.0805

* Units are pCi/l for water and pCi/gm for vegetation.

In all cases the corrected LLDs which exceeded the required LLDs were no more than 36% higher than the required LLDs. All samples results were less than the reportability levels of 20 pCi/l for water and 0.1 pCi/gm for vegetation.