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U.S. Nuclear Regulatory Commission
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MPS Lic/GJC	R0
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
2012 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

This letter transmits the Annual Radiological Environmental Operating Report for the Millstone Power Station, for the period January 2012 through December 2012. 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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FSME20
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Attachments: 1

Commitments made in this letter:

1. None.

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ATTACHMENT 1

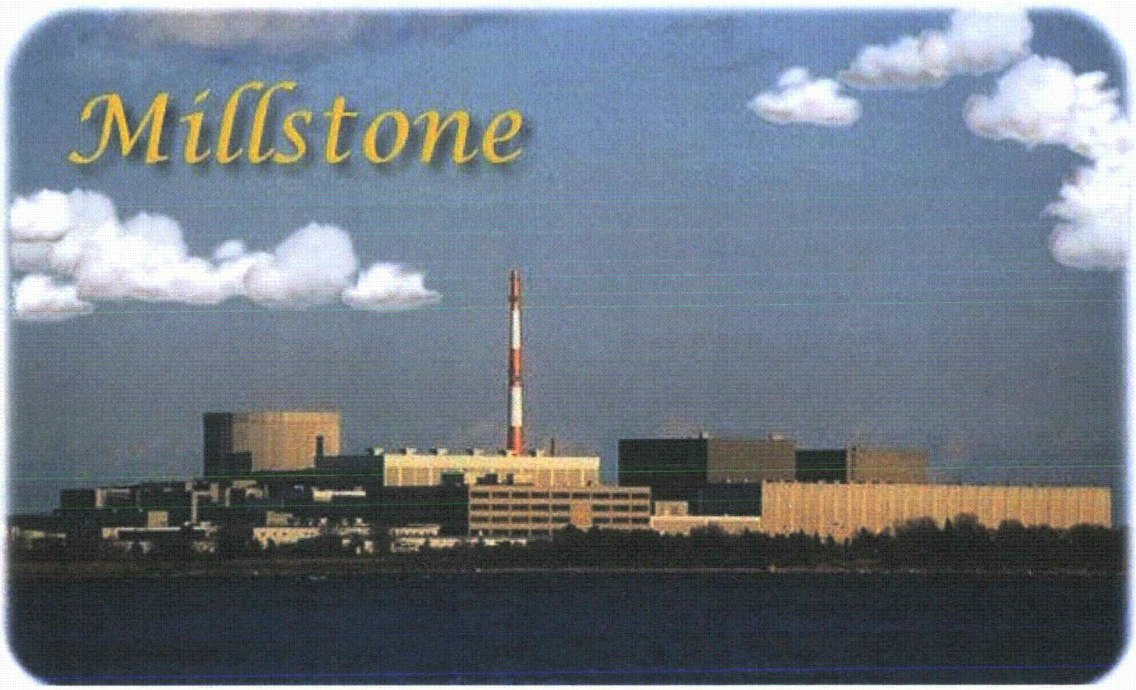
2012 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

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

Millstone Power Station

2012
Radiological Environmental Operating Report

January 1, 2012 – December 31, 2012



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

2012

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

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EXECUTIVE SUMMARY

INTRODUCTION

This report summarizes the results of the Radiological Environmental Monitoring Program (REMP) conducted in the vicinity of MPS during the period from January 1 to December 31, 2012. This document has been prepared in accordance with the requirements of the MPS Units 1, 2 and 3 (MPS1, 2 and 3) Technical Specifications.

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

SAMPLING AND ANALYSIS

The environmental sampling media collected in the vicinity of MPS and at distant locations included terrestrial samples in the form of air particulate filters, charcoal cartridges, soil, and cow milk, pasture grass, 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 2012, there were 1056 samples collected from the atmospheric, aquatic, and terrestrial environments. In addition, 174 exposure measurements were obtained using environmental thermoluminescent dosimeters (TLDs). A description of all discrepancies from the sample collection requirements in the Millstone Radiological Effluent Monitoring and Offsite Dose Calculation Manual (REMODCM) is presented in the Notes for the Data Tables of this report.

There were 1125 analyses performed on the environmental media samples. Teledyne Brown Engineering, Inc. of Knoxville, Tennessee performed the analyses as required by the MPS REMODCM.

LAND USE CENSUS

The annual land use census in the vicinity of MPS was conducted as required by the MPS REMODCM during 2012. Although broadleaf sampling may be used in lieu of a garden census, gardens were included in the 2012 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 in Appendix A. No new dairy animals within 10 miles of the MPS were located during the census. Monthly broad leaf sampling was also performed; it may be used in lieu of the garden census.

RADIOLOGICAL IMPACT TO THE ENVIRONMENT

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

There was no plant related activity detected in any of the terrestrial samples collected as part of the MPS REMP.

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. Radioactive iodine was found in three flora (seaweed) samples, one at the discharge point, one in Niantic Bay adjacent to the plant and one in Jordon Cove just east of the discharge point. Ag-110m was found in two oysters taken onstie from the Millstone Quarry. No radioactivity was found in edible seafood sampled beyond the discharge point.

Offsite ambient radiation measurements using environmental TLDs beyond the site boundary ranged between 53 and 103 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 2012, radiation doses to the general public as a result of MPS'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 MPS operations for 2012 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 2012 REMP for MPS resulted in the collection and analysis of over a thousand environmental samples and measurements. The data obtained were used to determine the impact of MPS'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 MPS's operation.

1. INTRODUCTION

This section provides an overview of the MPS 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 2012 performed by Dominion Nuclear Connecticut (DNC) for MPS 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 MPS's Technical Specifications (section 5.7.2 for MPS1, section 6.9.1.6 for MPS2 and Section 6.9.1.3 for MPS3), summarizes the results of measurements of radiation and radioactivity in the environment in the vicinity of the MPS and at distant locations during the period January 1 to December 31, 2012.

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 and goat 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 MPS operation and other natural and man-made sources. These results are reviewed by MPS'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 MPS.

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 substantially 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 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

MPS generates about 2100 megawatts of electricity at full power, which provides approximately one-third of the power consumed in the State of Connecticut. MPS2 and MPS3 are pressurized water reactors (MPS1, 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 MPS2 began in December 1975 and MPS3 in May 1986.

MPS was operational during most of 2012, with the exception of a refueling outage at MPS2 in October. The annual capacity factor for MPS2 was 82.1% and for MPS3 was 100.5%.

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 MPS 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.

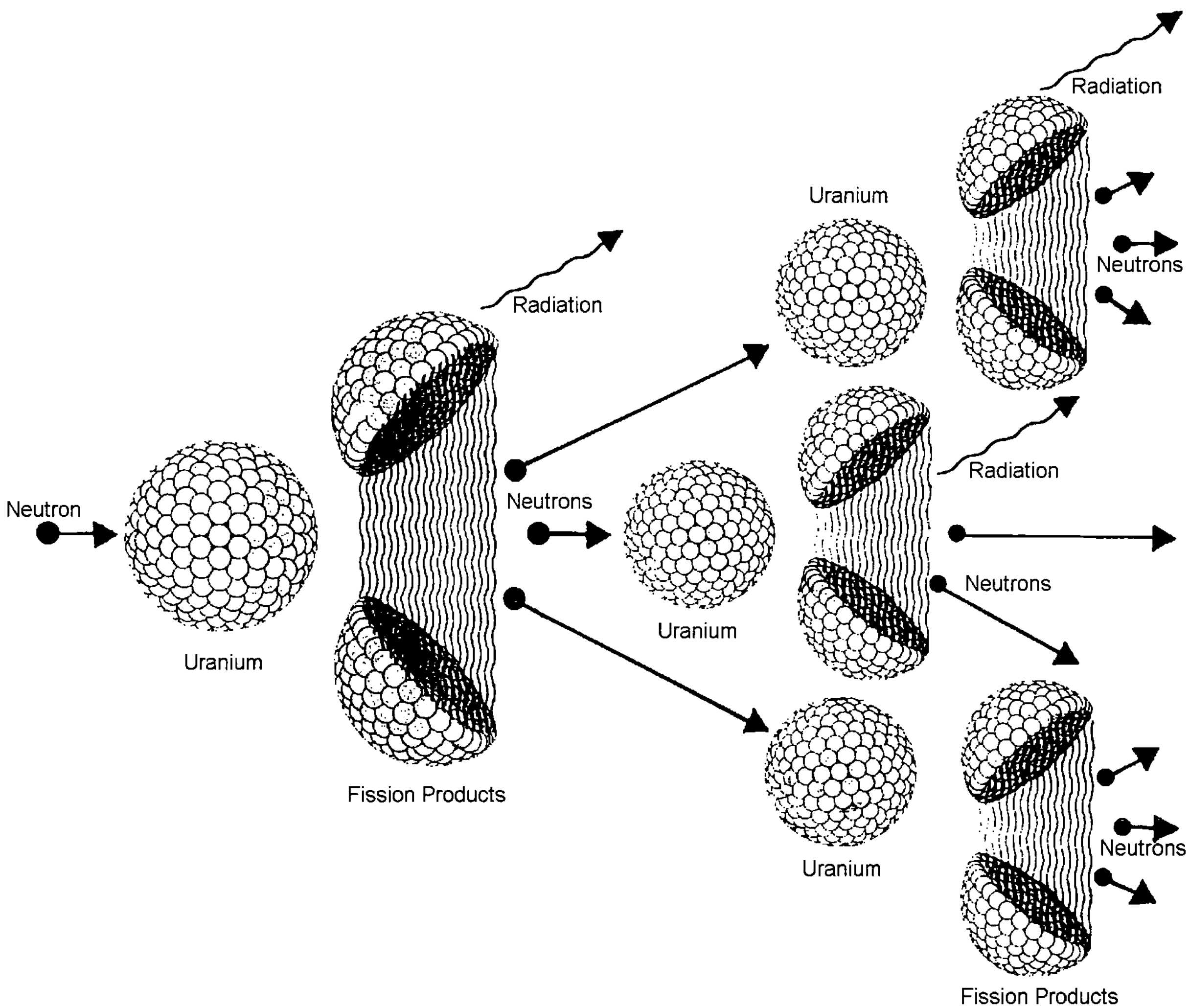


Figure 1.4-1
Radioactive Fission Product Formation

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).

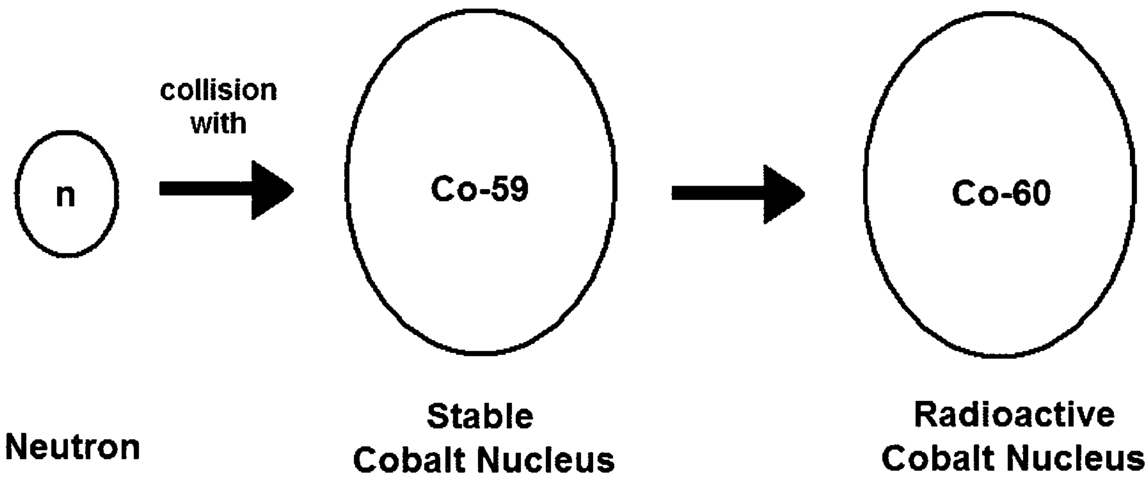


Figure 1.4-2
Radioactive Activation Product Formation

At MPS 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

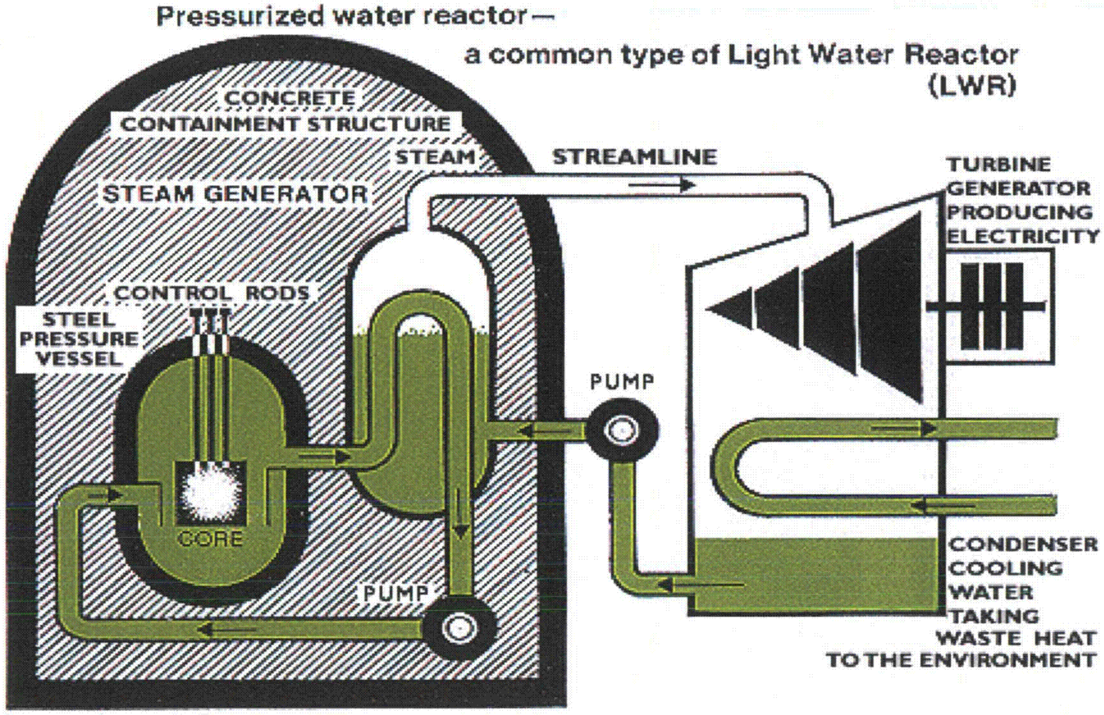


Figure 1.4-3

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 MPS'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 MPS 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 MPS3) 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 MPS2. Gaseous waste at MPS3 is purified through a process gas system, consisting of high-efficiency particulate air filters and charcoal adsorber beds. Gases from periodic venting of the MPS2 containment are released through a similar process system (Enclosure Building Filtration System) while gases from the MPS3 containment vacuum pumps are released without treatment. If necessary, MPS3 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 MPS2 are filtered by high-efficiency particulate filters while at MPS3 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 MPS3, for MPS2 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 MPS2). 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 MPS'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 MPS during each given 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. Section 5 of this report discusses the detailed dose calculations from the RERR and provides a comparison to REMP dose calculations. The liquid and gaseous effluents were well below the federal release limits and were a small percentage of the MPS 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, drinking water supplies, 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 MPS 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 MPS'S RADIATION EXPOSURE PATHWAYS

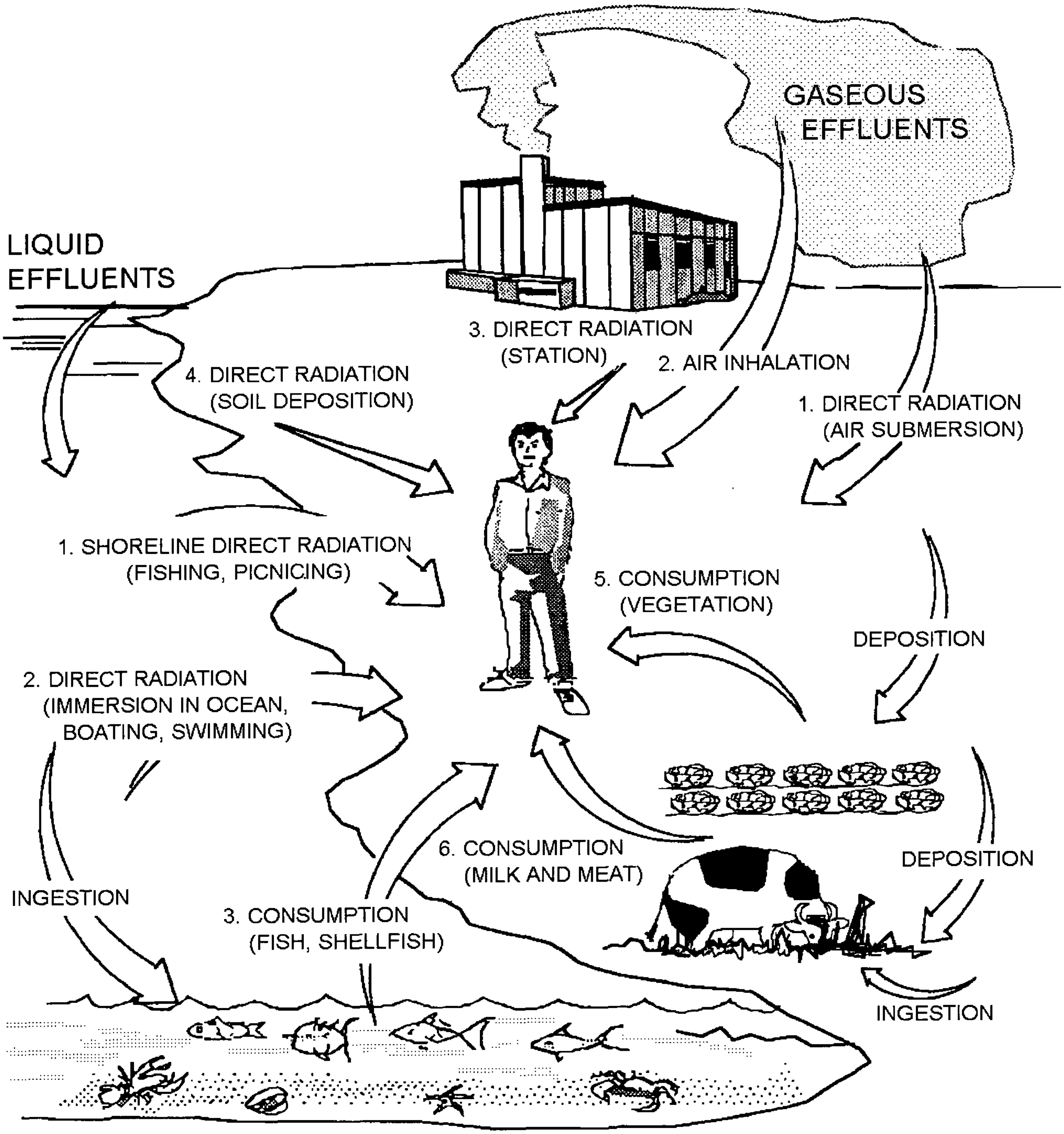


Figure 1.6
Radiation Exposure Pathways

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 soil;
- 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.

In addition, ambient (direct) radiation emitted from contained sources of radioactivity at MPS contributes to radiation exposure in the vicinity of the plant. For example, small amounts of ambient radiation result 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 very small amounts 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. When MPS-related radioactivity is detected in samples that represent a plausible exposure pathway, the resulting dose from such exposure is assessed (see Sections 4 and 5). However, the operation of MPS 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 documented and described in detail in the MPS'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 federal dose limits for the public. The two federal agencies that are charged with the responsibility of protecting the public from radiation and radioactivity are the NRC and the EPA.

The NRC, in 10 CFR 20.1301 (Reference 9) limits the levels of radiation to unrestricted areas resulting from the possession or use of radioactive materials such that they limit any individual to a dose of:

- less than or equal to 100 mrem per year to the total body.

In addition to this dose limit, the NRC has established design objectives for nuclear plant licensees. Conformance to these guidelines ensures that nuclear power reactor effluents are maintained as far below the legal limits as is reasonably achievable.

The NRC, in 10 CFR 50 Appendix I (Reference 10) establishes design objectives for the dose to a member of the general public from radioactive material in liquid effluents released to unrestricted areas to be limited to:

- 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 air dose due to release of noble gases in gaseous effluents is restricted to:

- less than or equal to 10 mrad per year for gamma radiation; and,
- less than or equal to 20 mrad per year for beta radiation.

The dose to a member of the general public from iodine-131, tritium, and all particulate radionuclides with half-lives greater than 8 days in gaseous effluents is limited to:

- less than or equal to 15 mrem per year to any organ.

The EPA, in 40 CFR 190.10 (Reference 11), sets forth the environmental standards for the uranium fuel cycle. During normal operation, the annual dose to any member of the public, at or beyond the site boundary, from the entire uranium fuel cycle shall be limited 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 summary of the 2012 radiological impact for MPS and comparison with the EPA dose limits and Appendix I guidelines is presented in Section 5 of this report.

The third stage of assessing releases to the environment is the REMP. The description and results of the REMP at MPS during 2012 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

Location Number*	Location Name	Direction & Distance From Release Point**	Sample Types
1-I	On-site - Old Millstone Rd.	0.6 Mi, NNW	TLD, Air Particulate, Iodine, Vegetation
2-I	On-site - Weather Shack	0.3 Mi, S	TLD, Air Particulate, Iodine
3-I	On-site - Bird Sanctuary	0.3 Mi, NE	TLD, Air Particulate, Iodine, Soil
4-I	On-site - Albacore Drive	1.0 Mi, N	TLD, Air Particulate, Iodine, Soil
5-I	MP3 Discharge	0.1 Mi, SSE	TLD
6-I	Quarry Discharge	0.3 Mi, SSE	TLD
7-I	Environmental Lab Dock	0.3 Mi, SE	TLD
8-I	Environmental Lab	0.3 Mi, SE	TLD
9-I	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-C	Fisher's Island, NY	8.0 Mi, ESE	TLD
13-X	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
18-X	Cow	10.4 Mi, NW	Milk
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	Nearest garden	Fruits & Vegetables
26-C	Beyond 10 Miles	Beyond 10 Miles	Fruits & Vegetables, Vegetation
27-I	Niantic	1.7 Mi, WNW	TLD, Air Particulate, Iodine
28-I	Two Tree Island	0.8 Mi, SSE	Mussels
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

*Key: **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.
*** Flounder and another type of fish, each required to be sampled at two separate locations.

Location Number*	Location Name	Direction & Distance From Release Point**	Sample Types
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	S12-MW-2	Onsite	Well Water
81-I	S2-MW-1	Onsite	Well Water
82-I	MW-GPI-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.

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 2012:

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	154[1]	18
Air Particulates	416	414[1]	0
Air Iodine	416	414[1]	0
Soil	3	3	0
Cow and Goat Milk	40	0[2]	18
Pasture Grass/Feed	Variable[3]	40	0
Fruit and Vegetables	0	0	10
Broad Leaf Vegetation	10	10	16
Well Water	12	12	20
Sea Water	16	16	0
Bottom Sediment	10	10	4
Aquatic Flora	0	0	20
Fish	16	10[4]	2
Mussels	8	3[4]	1
Oysters	16	16	2
Clams	8	8	0
Lobster	8	8	0
Total All Types	**1,135**	**1,118**	**111**

[1] See notes at end of Section 3 for details on loss of some TLDs and air samples.
[2] Pasture grass or feed sampled as necessary to substitute for unavailable milk.
[3] Depends upon availability of milk samples
[4] Due to sample unavailability, not all required fish and shellfish samples could be obtained

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. There were no non-routine measurements in 2012.

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 2012

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**	174	NA	7.9 (6.1 - 11.8)	8	0.3 Mile SE	11.5 (11.1 - 11.8)	8.1 (6.0 - 10.0)
Air Iodine *(pCi/m³)*	**I-131**	414	0.07	<LLD	NA	NA	<LLD	<LLD
Air Particulate *(pCi/m³)*	**GR-B**	414	0.01	0.0148 (0.0036 - 0.0376)	15	14.0 Miles N	0.0155 (0.0045 - 0.0429)	0.0155 (0.0045 - 0.0429)
	GAMMA	32						
	Be-7		NA	0.115 (0.074 - 0.170)	15	14.0 Miles N	0.135 (0.100 - 0.175)	0.135 (0.100 - 0.175)
	Other Gammas		Note 2	<LLD	NA	NA	<LLD	<LLD
Soil *(pCi/g dry)*	**GAMMA**	3						
	Be-7		NA	<LLD	14	12.0 Miles NE	0.540	0.540
	K-40		NA	16.5 (14.7 - 18.4)	3	0.3 Mile NE	18.4	13.4
	Cs-137		0.18	0.431 (0.226 - 0.636)	14	12.0 Miles NE	1.466	1.466
	Other Gammas		Note 3	<LLD	NA	NA	<LLD	<LLD
Milk *(pCi/l)*	**Sr-89**	5	NA	<LLD	NA	NA	<LLD	NA
	Sr-90	5	NA	<LLD	NA	NA	<LLD	NA
	GAMMA	18						
	K-40		NA	1269 (1129 - 1424)	22	10.5 Miles WNW	1308 (1161 - 1424)	NA
	Other Gammas		Note 4	<LLD	NA	NA	<LLD	NA
Pasture Grass/Hay *(pCi/g wet)*	**GAMMA**	40						
	Be-7		NA	0.67 (0.00 - 2.61)	24	29.0 Miles NNW	1.13 (0.00 - 2.74)	1.13 (0.00 - 2.74)
	K-40		NA	7.86 (3.44 - 17.8)	21	2.0 Miles N	7.86 (3.44 - 17.8)	7.63 (4.57 - 17.7)
	Cs-137		0.08	Note 5	24	29.0 Miles NNW	Note 6	Note 6
	Other Gammas		Note 7	<LLD	NA	NA	<LLD	<LLD

RADIOLOCIAL ENVIRONMENT MONITORING PROGRAM SUMMARY
MILLSTONE POWER STATION
Dockets 50-245, 50-336 & 50-423 2012

Medium or Pathway Sampled (Units)	Analysis Type	Total Number	LLD'	Indicator Locations	Location with Highest Mean			Control Locations
				Mean (Range)	Number	Distance Direction	Mean (Range)	Mean (Range)
Fruits & Vegetables *(pCi/g wet)*	**GAMMA**	8						
	Be-7		NA	0.135 (0.000 - 0.290)	25	<10 Miles	0.135 (0.000 - 0.290)	0.201
	K-40		NA	2.77 (0.670 - 5.12)	26	>10 Miles	3.69 (0.975 - 7.65)	3.69 (0.975 - 7.65)
	Other Gammas		Note 10	<LLD	NA	NA	<LLD	<LLD
Broad Leaf Vegetation *(pCi/g wet)*	**GAMMA**	24						
	Be-7		NA	1.12 (0.479 - 1.85)	01	0.6 Mile NNW	1.4 (1.01 - 1.77)	1.33 (0.678 - 2.24)
	K-40		NA	3.59 (2.50 - 4.71)	10	1.2 Miles E	2.95 (3.04 - 4.71)	3.92 (3.10 - 4.78)
	Cs-137		0.08	Note 11	17	0.5 Mile NE	0.042	<LLD
	Other Gammas		Note 10	<LLD	NA	NA	<LLD	<LLD
Well Water *(pCi/l)*	**H-3**	32	2000	<LLD	NA	NA	<LLD	NA
	GAMMA	32						
	K-40		NA	Note 8	NA	Onsite	Note 8	NA
	Other Gammas		Note 9	<LLD	NA	NA	<LLD	<LLD
Sea Water *(pCi/l)*	**H-3**	15	3000	345 (0 - 1180)	32	< 0.1 Mile	345 (0 - 1180)	<LLD
	GAMMA	15						
	K-40		NA	259 (230 - 357)	32	< 0.1 Mile	259 (230 - 357	237 (215 - 260)
	Other Gammas		Note 9	<LLD	NA	NA	<LLD	<LLD
Bottom Sediment *(pCi/g dry)*	**GAMMA**	14						
	K-40		NA	17.1 (14.6 - 20.5)	67	4.7 Miles NNW	22.9 (22.5 - 23.3)	19.9 (16.5 - 23.3)
	Cs-137		0.18	Note 12	32	< 0.1 Mile	0.141 (1/2)	<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 2012

Medium or Pathway Sampled (Units)	Analysis Type	Total Number	LLD'	Indicator Locations Mean (Range)	Location with Highest Mean Number	Distance Direction	Mean (Range)	Control Locations Mean (Range)
Flora	**GAMMA**	20						
(pCi/g wet)	Be-7		NA	Note 13	29	0.4 Mile NNE	0.137 (0 - 0.265)	Note 14
	K-40		NA	7.07 (5.93 - 8.74)	32	< 0.1 Mile	7.97 (6.45 - 8.74)	6.54 (5.60 - 7.91)
	I-131		0.06	Note 15	90	4.0 Mile E	Note 15	<LLD
	Other Gammas		Note 16	<LLD	NA	NA	<LLD	NA
Fish - Flounder	**GAMMA**	6						
(pCi/g wet)	K-40		NA	4.6 (4.1 - 5.0)	32	< 0.1 Mile	4.9 (4.8 - 5.0)	NA
	Other Gammas		Note 17	<LLD	NA	NA	<LLD	NA
Fish - Other	**GAMMA**	6						
(pCi/g wet)	K-40		NA	4.4 (3.6 - 5.2)	29	0.4 Mile NNE	4.4	NA
	Other Gammas		Note 17	<LLD	NA	NA	<LLD	NA
Mussels	**GAMMA**	4						
(pCi/g wet)	K-40		NA	1.5 (0.9 - 2.3)	30	1.5 Miles NNW	1.5 (0.9 - 2.3)	NA
	Other Gammas		Note 17	<LLD	NA	NA	<LLD	NA
Oysters	**GAMMA**	18						
(pCi/g wet)	K-40		NA	2.0 (1.5 - 2.5)	31	1.8 Miles NW	2.2 (1.7/2.5)	1.6 (1.5 - 2.1)
	Ag-110M		NA	Note 18	32	< 0.1 Mile	Note 18	<LLD
	Other Gammas		Note 17	<LLD	NA	NA	<LLD	<LLD
Clams	**GAMMA**	8						
(pCi/g wet)	K-40		NA	2.1 (1.8 - 2.5)	29	0.4 Mile NNE	2.2 (1.9 - 2.5)	NA
	Other Gammas		Note 17	<LLD	NA	NA	<LLD	NA
Lobster	**GAMMA**	8						
(pCi/g wet)	K-40		NA	2.8 (2.1 - 3.3)	35	0.3 Mile WNW	3.1 (2.9 - 3.3)	NA
	Other Gammas		Note 17	<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 - Two samples of pasture grass/hay out of 20 had positive Cs-137 results, with 0.017 and 0.019 pCi/g.
6 - Three samples of pasture grass/hay out of 20 had positive Cs-137 results, with 0.035, 0.081 and 0.098 pCi/g.
7 - LLD for grass/hay other gamma is 0.15 pCi/g for Cs-134.
8 - One well water had positive K-40 of 43 pCi/l.
9 - 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.
10 - LLDs for fruits&vegetables and broadleaf vegetation other gamma are 0.06 pCi/M^3 for I-131, 0.05 pCi/M^3 for Cs-134 and 0.08 pCi/M3 for Cs-137.
11 - Three samples of broadleaf vegetation out of 18 had positive Cs-137 results, with 0.016, 0.032 and 0.042 pCi/g.
12 - Six samples of bottom sediment out of 14 had positive Cs-137 results with 0.085, 0.092, 0.146, 0.178, 0.187 and 0.265 pCi/g.
13 - One flora control out of 4 had positive Be-7 of 0.093 pCi/g.
14 - Two flora samples out of 12 had positive I-131 results with 0.024 and 0.037 pCi/g.
15 - Two flora samples out of 4 had positive I-131 results with 0.131 and 0.355 pCi/g.
16 - LLDs for other gamma are 0.05 pCi/M^3 for Cs-134 and 0.06 pCi/M^3 for Cs-137.
17 - LLDs for fish and shellfish other gamma 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.
18 - Two oyster samples out of nine had positive Ag-110m results with 0.084 and 0.335 pCi/g.

<u>Discussion of LLD</u>

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	8.6	0.3	10.4	0.4	7.4	0.3	8.2	0.3	9.8	0.3	8.2	0.3	7.1	0.4	11.6	0.3	8.9	0.3	11.1	0.3	6.8	0.3
2Q	7.7	0.6	10.0	0.6	7.3	0.4	7.7	0.4	9.7	0.6	7.5	0.4	6.1	0.4	11.1	0.6	8.6	0.5	9.8	0.6	6.4	0.4
3Q	8.7	0.3	10.5	0.5	7.9	0.3	8.6	0.3	10.6	0.3	8.6	0.4	6.4	0.4	11.8	0.5	9.9	0.4	10.8	0.4	7.4	0.3
4Q	8.5	0.3	10.4	0.4	7.6	0.3	7.8	0.4	9.5	0.4	9.4	0.4	See note A		11.6	0.4	10.2	0.4	10.5	0.4	7.1	0.3

PERIOD	12C	(+/-)	13C	(+/-)	14C	(+/-)	15C	(+/-)	16C	(+/-)	27	(+/-)	41	(+/-)	42	(+/-)	43	(+/-)	44	(+/-)	45	(+/-)
1Q	See note B		See note A		10.0	0.3	8.1	0.3	6.6	0.2	8.5	0.5	7.0	0.3	7.6	0.3	7.2	0.3	8.8	0.3	7.7	0.3
2Q	See note B		9.9	0.6	8.9	0.6	7.4	0.4	6.0	0.4	7.6	0.5	6.7	0.4	7.0	0.5	7.0	0.4	7.7	0.4	6.9	0.4
3Q	7.5	0.3	9.2	0.3	9.8	0.4	8.4	0.3	6.2	0.3	8.6	0.3	7.1	0.3	7.6	0.4	7.0	0.3	8.2	0.4	7.5	0.3
4Q	7.5	0.3	8.7	0.3	9.4	0.5	7.8	0.3	6.2	0.2	8.1	0.4	7.2	0.3	7.6	0.3	6.9	0.3	8.4	0.4	7.5	0.3

PERIOD	46	(+/-)	47	(+/-)	48	(+/-)	49	(+/-)	50	(+/-)	51	(+/-)	52	(+/-)	53	(+/-)	55	(+/-)	56	(+/-)	57	(+/-)
1Q	9.5	0.4	8.1	0.4	9.7	0.3	7.1	0.4	8.3	0.3	6.5	0.2	7.2	0.3	7.7	0.2	8.1	0.3	7.2	0.3	7.3	0.5
2Q	8.5	0.6	7.5	0.4	8.8	0.5	6.6	0.4	7.6	0.6	6.3	0.4	6.9	0.4	7.3	0.4	7.2	0.4	7.1	0.5	6.7	0.4
3Q	8.6	0.5	8.1	0.4	9.5	0.3	7.4	0.3	7.7	0.5	6.4	0.2	6.9	0.4	7.5	0.2	7.5	0.4	7.1	0.3	7.3	0.3
4Q	8.7	0.4	7.9	0.3	9.4	0.3	6.8	0.4	8.0	0.3	6.5	0.3	7.0	0.3	7.4	0.3	7.9	0.3	7.1	0.3	7.6	0.4

PERIOD	59	(+/-)	60	(+/-)	61	(+/-)	62	(+/-)	63	(+/-)	64	(+/-)	65	(+/-)	66	(+/-)	73	(+/-)	74	(+/-)	75	(+/-)
1Q	8.0	0.3	6.8	0.3	7.6	0.3	8.4	0.3	8.8	0.4	7.4	0.3	8.2	0.3	7.7	0.3	10.0	0.4	7.9	0.3	7.1	0.3
2Q	7.3	0.5	6.6	0.4	7.2	0.4	8.0	0.4	7.9	0.5	6.8	0.4	7.8	0.4	7.0	0.4	9.2	0.5	7.4	0.4	6.9	0.5
3Q	8.5	0.3	6.6	0.3	7.3	0.2	8.1	0.4	8.8	0.3	8.0	0.3	7.9	0.3	7.3	0.4	8.8	0.3	7.8	0.4	7.1	0.3
4Q	7.9	0.3	6.7	0.3	7.5	0.4	8.0	0.3	8.7	0.3	7.6	0.4	8.3	0.3	7.1	0.4	7.6	0.3	7.5	0.3	6.6	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

A - TLD was lost during a storm.

B - TLD was lost when the utility pole on which it was mounted was replaced.

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

LOCATIONS

PERIOD ENDING	01	(+/-)	02	(+/-)	03	(+/-)	04	(+/-)	10	(+/-)	11	(+/-)	27	(+/-)	15C	(+/-)
01/10/12	0.016	0.004	0.017	0.004	0.015	0.004	0.015	0.004	0.014	0.004	0.019	0.004	0.018	0.004	0.016	0.004
01/17/12	0.009	0.003	0.013	0.003	0.016	0.003	0.016	0.003	0.013	0.003	0.011	0.003	0.012	0.003	0.011	0.003
01/24/12	0.014	0.003	0.017	0.004	0.017	0.004	0.017	0.004	0.013	0.003	0.017	0.004	0.015	0.004	0.015	0.004
01/31/12	0.015	0.003	0.014	0.003	0.014	0.003	0.014	0.003	0.017	0.003	0.014	0.003	0.017	0.003	0.014	0.003
02/07/12	0.017	0.003	0.016	0.003	0.017	0.003	0.019	0.004	0.019	0.004	0.018	0.003	0.021	0.004	0.015	0.003
02/14/12	0.016	0.003	0.016	0.003	0.015	0.003	0.016	0.003	0.012	0.003	0.015	0.003	0.018	0.004	0.012	0.003
02/21/12	0.018	0.004	0.018	0.004	0.017	0.004	0.015	0.004	0.017	0.004	0.020	0.004	0.018	0.004	0.018	0.004
02/28/12	0.016	0.003	0.015	0.003	0.015	0.003	0.017	0.003	0.017	0.003	0.015	0.003	0.015	0.003	0.015	0.003
03/06/12	0.012	0.003	0.013	0.003	0.014	0.003	0.016	0.003	0.014	0.003	0.014	0.003	0.015	0.003	0.013	0.003
03/13/12	0.017	0.003	0.013	0.003	0.016	0.003	0.015	0.003	0.016	0.003	0.016	0.003	0.016	0.003	0.013	0.003
03/20/12	0.014	0.003	0.012	0.003	0.014	0.003	0.014	0.003	0.014	0.003	0.014	0.003	0.014	0.003	0.016	0.003
03/27/12	0.013	0.004	0.015	0.003	0.016	0.004	0.013	0.003	0.012	0.003	0.013	0.004	0.013	0.003	0.017	0.004
04/03/12	0.012	0.003	0.013	0.003	0.012	0.003	0.012	0.003	0.009	0.003	0.011	0.003	0.011	0.003	0.012	0.003
04/10/12	0.013	0.004	0.017	0.004	0.015	0.004	0.015	0.004	0.012	0.003	0.015	0.004	0.016	0.004	0.014	0.004
04/17/12	0.016	0.003	0.016	0.003	0.016	0.003	0.025	0.004	0.018	0.003	0.018	0.003	0.017	0.003	0.018	0.003
04/24/12	0.007	0.003	0.007	0.003	0.006	0.003	0.007	0.003	0.010	0.002	0.005	0.003	0.009	0.003	0.007	0.003
05/01/12	0.019	0.003	0.017	0.003	0.017	0.003	0.016	0.003	0.019	0.003	0.019	0.003	0.021	0.004	0.017	0.003
05/08/12	0.004	0.003	0.006	0.003	0.006	0.003	0.005	0.003	0.005	0.003	0.007	0.003	0.007	0.003	0.005	0.003
05/15/12	0.013	0.003	0.012	0.003	0.016	0.003	0.013	0.003	0.015	0.003	0.012	0.003	0.015	0.003	0.013	0.003
05/22/12	0.008	0.003	0.014	0.003	0.011	0.003	0.008	0.003	0.012	0.003	0.012	0.003	0.010	0.003	0.013	0.003
05/29/12	0.006	0.003	0.008	0.003	0.005	0.003	0.007	0.003	0.006	0.003	0.005	0.002	0.006	0.003	0.007	0.003
06/05/12	0.011	0.003	0.009	0.003	0.012	0.003	0.011	0.003	0.011	0.003	0.009	0.003	0.010	0.003	0.009	0.003
06/12/12	0.010	0.003	0.011	0.003	0.011	0.003	0.010	0.003	0.008	0.003	0.010	0.003	0.007	0.003	0.011	0.003
06/19/12	0.010	0.003	0.009	0.003	0.009	0.003	0.010	0.003	0.007	0.003	0.009	0.003	0.010	0.003	0.008	0.003
06/26/12	0.016	0.003	0.015	0.003	0.016	0.003	0.015	0.003	0.016	0.003	0.019	0.003	0.016	0.003	0.018	0.003
07/03/12	0.017	0.003	0.014	0.003	0.016	0.003	0.016	0.003	0.021	0.004	0.016	0.003	0.018	0.004	0.019	0.004

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

LOCATIONS

PERIOD ENDING	01	(+/-)	02	(+/-)	03	(+/-)	04	(+/-)	10	(+/-)	11	(+/-)	27	(+/-)	15C	(+/-)
07/10/12	0.015	0.004	0.015	0.004	0.016	0.004	0.015	0.004	0.016	0.004	0.019	0.004	0.016	0.004	0.020	0.004
07/17/12	0.016	0.003	0.017	0.003	0.016	0.003	0.020	0.004	0.020	0.004	0.019	0.003	0.017	0.004	0.016	0.003
07/24/12	0.015	0.004	0.014	0.004	0.018	0.004	0.014	0.004	0.013	0.004	0.012	0.003	0.013	0.004	0.016	0.004
07/31/12	0.015	0.003	0.013	0.003	0.015	0.003	0.015	0.003	0.014	0.003	0.014	0.003	0.013	0.003	0.014	0.003
08/07/12	0.014	0.003	0.016	0.003	0.015	0.003	0.014	0.003	0.016	0.003	0.017	0.003	0.016	0.003	0.016	0.003
08/14/12	0.014	0.003	0.010	0.003	0.015	0.003	0.013	0.003	0.015	0.003	0.016	0.003	0.012	0.003	0.015	0.003
08/21/12	0.015	0.003	0.016	0.003	0.018	0.003	0.017	0.003	0.014	0.003	0.016	0.003	0.016	0.004	0.021	0.004
08/28/12	0.018	0.003	0.024	0.004	0.020	0.004	0.021	0.004	0.018	0.003	0.021	0.003	0.020	0.003	0.023	0.004
09/04/12	0.016	0.004	0.017	0.004	0.015	0.004	0.020	0.004	0.019	0.004	0.017	0.004	0.020	0.004	0.018	0.004
09/11/12	0.015	0.003	0.015	0.003	0.013	0.003	0.016	0.003	0.014	0.003	0.014	0.003	0.015	0.003	0.015	0.003
09/18/12	0.013	0.004	0.014	0.003	0.015	0.004	0.013	0.004	0.014	0.004	0.013	0.003	0.014	0.003	0.017	0.004
09/25/12	0.012	0.003	0.011	0.003	0.014	0.003	0.012	0.003	0.011	0.003	0.012	0.003	0.008	0.003	0.012	0.003
10/02/12	0.015	0.004	0.014	0.003	0.014	0.003	0.015	0.003	0.014	0.003	0.015	0.003	0.015	0.003	0.016	0.004
10/09/12	0.020	0.004	0.020	0.004	0.019	0.004	0.020	0.004	0.017	0.004	0.021	0.004	0.020	0.004	0.022	0.004
10/16/12	0.013	0.003	0.010	0.003	0.010	0.003	0.013	0.003	0.013	0.003	0.013	0.003	0.012	0.003	0.013	0.003
10/23/12	0.016	0.003	0.015	0.003	0.016	0.003	0.017	0.003	0.015	0.003	0.016	0.003	0.015	0.003	0.016	0.004
10/28/12	0.011	0.004	0.016	0.004	0.018	0.004	0.010	0.004	0.017	0.004	0.016	0.004	0.023	0.005	0.017	0.004
11/06/12	0.007	0.002	0.007	0.001	0.009	0.002	0.013	0.009	0.007	0.002	0.007	0.002	0.005	0.001	0.006	0.001
11/13/12	0.015	0.003	0.017	0.003	0.017	0.003	See Note C		0.021	0.004	0.018	0.003	0.020	0.003	0.023	0.004
11/20/12	0.023	0.004	0.020	0.003	0.019	0.003	See Note C		0.021	0.004	0.018	0.003	0.020	0.003	0.022	0.004
11/27/12	0.019	0.004	0.023	0.004	0.023	0.004	0.026	0.004	0.026	0.004	0.022	0.004	0.024	0.004	0.025	0.004
12/04/12	0.027	0.004	0.029	0.004	0.028	0.004	0.031	0.004	0.038	0.005	0.025	0.004	0.037	0.004	0.043	0.005
12/11/12	0.014	0.003	0.011	0.003	0.013	0.003	0.012	0.003	0.016	0.004	0.014	0.003	0.014	0.003	0.016	0.004
12/18/12	0.015	0.003	0.016	0.003	0.013	0.003	0.015	0.003	0.017	0.003	0.015	0.003	0.016	0.003	0.018	0.004
12/26/12	0.013	0.003	0.013	0.003	0.010	0.003	0.012	0.003	0.017	0.003	0.013	0.003	0.010	0.003	0.009	0.003
01/02/13	0.014	0.003	0.014	0.003	0.014	0.003	0.011	0.003	0.014	0.003	0.024	0.004	0.017	0.003	0.014	0.004

C - Air Particulates and Iodines had loss of power at Location #4 during November due to a storm. Temporary power was used starting in late November and permanent power was restored later in the year.

TABLE 3
AIRBORNE IODINE
(pCi/m^3)

LOCATIONS

PERIOD ENDING	01		02		03		04		10		11		15C		27	
		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)		(+/-)
01/10/12	-0.002	0.024	-0.002	0.022	-0.002	0.024	-0.002	0.026	0.006	0.029	0.005	0.028	0.006	0.028	0.006	0.032
01/17/12	0.000	0.023	0.000	0.021	0.000	0.023	0.000	0.025	-0.011	0.022	-0.011	0.022	-0.010	0.022	-0.012	0.025
01/24/12	0.011	0.018	0.011	0.018	0.011	0.019	0.013	0.021	0.001	0.024	0.001	0.023	0.001	0.024	0.001	0.027
01/31/12	-0.017	0.024	-0.016	0.022	-0.017	0.024	-0.019	0.027	-0.010	0.031	-0.010	0.030	-0.010	0.031	-0.011	0.035
02/07/12	0.013	0.022	0.011	0.020	0.013	0.023	0.014	0.025	0.015	0.028	0.014	0.026	0.015	0.027	0.017	0.031
02/14/12	0.024	0.027	0.022	0.025	0.025	0.028	0.026	0.029	-0.013	0.033	-0.013	0.032	-0.014	0.034	-0.018	0.045
02/21/12	-0.002	0.036	-0.002	0.033	-0.002	0.037	-0.003	0.041	-0.013	0.031	-0.012	0.029	-0.013	0.030	-0.015	0.035
02/28/12	0.001	0.023	0.001	0.020	0.001	0.023	0.001	0.022	0.004	0.027	0.004	0.026	0.004	0.027	0.004	0.025
03/06/12	0.001	0.018	0.000	0.016	0.001	0.019	0.001	0.018	0.009	0.016	0.008	0.015	0.009	0.016	0.008	0.015
03/13/12	0.018	0.021	0.016	0.019	0.019	0.022	0.018	0.021	0.004	0.017	0.004	0.016	0.004	0.018	0.004	0.017
03/20/12	0.017	0.035	0.015	0.031	0.017	0.036	0.016	0.034	0.003	0.030	0.003	0.029	0.003	0.031	0.003	0.029
03/27/12	0.004	0.028	0.003	0.026	0.004	0.030	0.004	0.028	-0.009	0.034	-0.009	0.033	-0.009	0.034	-0.009	0.033
04/03/12	0.013	0.023	0.012	0.020	0.014	0.023	0.013	0.022	-0.023	0.029	-0.022	0.028	-0.024	0.030	-0.023	0.029
04/10/12	0.017	0.024	0.015	0.021	0.017	0.025	0.016	0.023	0.019	0.022	0.018	0.021	0.019	0.022	0.018	0.021
04/17/12	-0.011	0.035	-0.010	0.031	-0.012	0.036	-0.011	0.033	-0.015	0.028	-0.014	0.027	-0.015	0.028	-0.014	0.027
04/24/12	-0.008	0.031	-0.007	0.027	-0.008	0.033	-0.007	0.029	-0.001	0.032	-0.001	0.031	-0.001	0.033	-0.001	0.031
05/01/12	0.018	0.028	0.019	0.028	0.019	0.028	0.019	0.028	0.000	0.028	0.000	0.028	0.000	0.028	0.000	0.027
05/08/12	0.016	0.029	0.018	0.031	0.017	0.029	0.016	0.029	-0.009	0.032	-0.009	0.033	-0.010	0.033	-0.009	0.032
05/15/12	0.017	0.033	0.017	0.033	0.017	0.033	0.017	0.033	-0.016	0.021	-0.016	0.021	-0.017	0.022	-0.017	0.022
05/22/12	0.009	0.035	0.009	0.035	0.010	0.036	0.010	0.036	-0.024	0.031	-0.024	0.031	-0.026	0.033	-0.025	0.032
05/29/12	-0.013	0.031	-0.013	0.032	-0.013	0.032	-0.013	0.031	0.001	0.025	0.001	0.025	0.001	0.025	0.001	0.025
06/05/12	0.018	0.036	0.018	0.035	0.018	0.036	0.018	0.035	-0.011	0.039	-0.011	0.038	-0.012	0.040	-0.012	0.041
06/12/12	0.005	0.026	0.005	0.025	0.005	0.026	0.005	0.025	-0.016	0.023	-0.015	0.022	-0.017	0.024	-0.017	0.024
06/19/12	-0.010	0.031	-0.009	0.031	-0.010	0.031	-0.009	0.030	-0.008	0.027	-0.007	0.026	-0.008	0.027	-0.008	0.027
06/26/12	0.029	0.036	0.028	0.034	0.029	0.035	0.028	0.034	-0.013	0.043	-0.013	0.042	-0.011	0.042	-0.013	0.044
07/03/12	-0.006	0.028	-0.006	0.027	-0.006	0.028	-0.006	0.027	-0.030	0.036	-0.029	0.035	-0.032	0.038	-0.033	0.039

TABLE 3
AIRBORNE IODINE
(pCi/m^3)

LOCATIONS

PERIOD ENDING	01	(+/-)	02	(+/-)	03	(+/-)	04	(+/-)	10	(+/-)	11	(+/-)	15C	(+/-)	27	(+/-)
07/10/12	-0.028	0.044	-0.027	0.043	-0.027	0.043	-0.027	0.043	-0.054	0.037	-0.050	0.034	-0.054	0.037	-0.055	0.037
07/17/12	0.007	0.022	0.006	0.022	0.007	0.023	0.006	0.021	-0.023	0.027	-0.021	0.025	-0.023	0.027	-0.023	0.027
07/24/12	0.011	0.029	0.010	0.028	0.011	0.029	0.010	0.028	0.007	0.015	0.007	0.014	0.007	0.015	0.007	0.015
07/31/12	-0.025	0.036	-0.023	0.033	-0.024	0.035	-0.023	0.034	0.011	0.038	0.011	0.036	0.012	0.041	0.012	0.041
08/07/12	-0.008	0.016	-0.008	0.016	-0.009	0.018	-0.008	0.017	-0.004	0.019	-0.004	0.018	-0.005	0.019	-0.005	0.019
08/14/12	-0.004	0.035	-0.004	0.032	-0.004	0.035	-0.004	0.033	-0.003	0.034	-0.003	0.033	-0.003	0.035	-0.003	0.036
08/21/12	-0.007	0.026	-0.006	0.023	-0.007	0.026	-0.007	0.025	-0.019	0.018	-0.018	0.017	-0.020	0.019	-0.020	0.019
08/28/12	0.003	0.038	0.003	0.037	0.003	0.040	0.003	0.037	-0.013	0.017	-0.013	0.016	-0.014	0.017	-0.014	0.018
09/04/12	0.005	0.040	0.005	0.037	0.005	0.038	0.005	0.038	-0.021	0.033	-0.020	0.031	-0.022	0.034	-0.020	0.031
09/11/12	0.001	0.019	0.001	0.017	0.001	0.017	0.001	0.018	0.006	0.025	0.006	0.024	0.007	0.028	0.006	0.024
09/18/12	0.011	0.023	0.010	0.022	0.011	0.022	0.011	0.023	-0.015	0.021	-0.014	0.020	-0.016	0.022	-0.014	0.020
09/25/12	-0.013	0.025	-0.012	0.023	-0.012	0.024	-0.013	0.025	0.000	0.025	0.000	0.024	0.000	0.028	0.000	0.025
10/02/12	-0.003	0.037	-0.002	0.032	-0.002	0.034	-0.002	0.034	0.016	0.034	0.015	0.031	0.017	0.035	0.015	0.030
10/09/12	0.010	0.028	0.009	0.025	0.009	0.026	0.010	0.028	-0.008	0.036	-0.008	0.033	-0.009	0.039	-0.008	0.034
10/16/12	0.019	0.030	0.017	0.026	0.017	0.027	0.018	0.028	-0.004	0.026	-0.003	0.025	-0.004	0.029	-0.004	0.026
10/23/12	-0.010	0.031	-0.009	0.027	-0.009	0.029	-0.009	0.029	0.008	0.025	0.007	0.024	0.008	0.028	0.007	0.025
10/28/12	0.001	0.030	0.000	0.028	0.001	0.030	0.001	0.030	0.001	0.025	0.001	0.024	0.001	0.025	0.001	0.024
11/06/12	0.013	0.019	0.009	0.013	0.021	0.030	0.005	0.037	0.013	0.041	0.010	0.031	0.008	0.024	0.006	0.020
11/13/12	-0.003	0.028	-0.003	0.024	-0.003	0.025	See Note C		-0.003	0.027	0.005	0.017	0.005	0.019	0.005	0.017
11/20/12	0.018	0.040	0.015	0.034	0.016	0.036	See Note C		0.017	0.037	-0.012	0.025	-0.014	0.029	-0.012	0.025
11/27/12	-0.018	0.033	-0.015	0.028	-0.016	0.029	-0.017	0.030	0.012	0.022	0.011	0.021	0.013	0.024	0.011	0.021
12/04/12	0.000	0.022	0.000	0.019	0.000	0.019	0.000	0.021	-0.004	0.011	-0.004	0.010	-0.004	0.012	-0.004	0.011
12/11/12	-0.007	0.026	-0.006	0.022	-0.007	0.024	-0.007	0.025	-0.007	0.031	-0.006	0.028	-0.007	0.032	-0.006	0.028
12/18/12	0.004	0.038	0.004	0.038	0.004	0.035	0.009	0.043	-0.021	0.040	-0.021	0.040	-0.002	0.036	-0.022	0.042
12/26/12	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001
01/02/13	-0.024	0.023	-0.024	0.023	-0.022	0.022	-0.022	0.021	0.028	0.022	0.027	0.021	0.033	0.026	0.028	0.022

C - Air Particulates and Iodines had loss of power at Location #4 during November due to a storm. Temporary power was used starting in late November and permanent power was restored later in the year.

TABLE 4

AIR PARTICULATES (pCi/m3)

GAMMA SPECTRA - QTR 1 (01/03/12 - 04/03/12)

LOCATION	Be-7	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)
01	0.154	0.042	0.0018	0.0014	0.0013	0.0023	0.0002	0.0014	-0.0007	0.0032	-0.0010	0.0023	0.0005	0.0048
02	0.119	0.034	0.0006	0.0009	0.0009	0.0020	-0.0002	0.0011	0.0010	0.0025	-0.0011	0.0021	0.0012	0.0026
03	0.109	0.038	-0.0002	0.0009	-0.0008	0.0017	-0.0002	0.0008	0.0009	0.0022	0.0010	0.0013	0.0011	0.0028
04	0.152	0.039	0.0005	0.0015	-0.0024	0.0029	0.0012	0.0017	0.0004	0.0033	0.0020	0.0030	-0.0020	0.0055
10	0.093	0.049	-0.0010	0.0020	-0.0001	0.0035	-0.0007	0.0022	0.0038	0.0052	0.0002	0.0040	0.0023	0.0075
11	0.170	0.041	0.0000	0.0016	0.0007	0.0027	-0.0001	0.0014	0.0032	0.0032	0.0004	0.0027	0.0021	0.0047
27	0.144	0.037	0.0006	0.0010	0.0015	0.0024	0.0008	0.0013	0.0006	0.0031	0.0011	0.0020	-0.0014	0.0036
15C	0.175	0.049	0.0008	0.0018	0.0002	0.0035	0.0009	0.0016	0.0006	0.0040	-0.0024	0.0037	-0.0013	0.0067

LOCATION	Ru-103	(+/-)	Ru-106	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)
01	-0.0009	0.0044	-0.0039	0.0111	0.0000	0.0010	-0.0003	0.0009	-0.1807	0.4277	-0.0008	0.0085	-0.0057	0.0070
02	-0.0006	0.0034	-0.0085	0.0101	-0.0003	0.0010	-0.0007	0.0008	0.3542	0.3459	-0.0028	0.0061	-0.0005	0.0054
03	-0.0006	0.0024	0.0000	0.0067	0.0000	0.0008	-0.0002	0.0006	0.0000	0.0000	-0.0025	0.0043	0.0007	0.0029
04	0.0001	0.0048	0.0043	0.0145	0.0007	0.0013	0.0010	0.0011	0.1154	0.4677	0.0008	0.0072	0.0042	0.0065
10	0.0003	0.0061	0.0040	0.0160	0.0015	0.0018	0.0008	0.0016	0.0496	0.5617	0.0034	0.0088	-0.0024	0.0063
11	-0.0035	0.0042	-0.0036	0.0139	-0.0004	0.0017	-0.0020	0.0014	-0.1067	0.4266	-0.0007	0.0078	-0.0044	0.0057
27	-0.0031	0.0041	-0.0030	0.0099	0.0006	0.0011	0.0001	0.0010	0.1460	0.3337	-0.0045	0.0065	-0.0003	0.0052
15C	-0.0018	0.0063	-0.0105	0.0153	0.0020	0.0018	0.0009	0.0015	0.0956	0.5693	-0.0077	0.0098	0.0004	0.0093

GAMMA SPECTRA - QTR 2 (04/03/12 - 07/03/12)

LOCATION	Be-7	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)
1	0.085	0.033	0.0004	0.0011	-0.0008	0.0017	0.0003	0.0012	0.0020	0.0029	0.0010	0.0018	-0.0025	0.0030
2	0.121	0.033	0.0004	0.0008	-0.0008	0.0020	0.0011	0.0013	0.0018	0.0029	0.0008	0.0028	-0.0014	0.0039
3	0.104	0.032	-0.0012	0.0013	-0.0007	0.0021	0.0002	0.0012	-0.0013	0.0027	0.0002	0.0018	-0.0011	0.0031
4	0.092	0.031	-0.0002	0.0012	0.0006	0.0018	0.0001	0.0009	0.0001	0.0023	0.0010	0.0018	-0.0007	0.0036
10	0.129	0.043	-0.0005	0.0019	-0.0022	0.0041	0.0009	0.0019	0.0052	0.0048	-0.0002	0.0037	0.0051	0.0069
11	0.117	0.040	0.0012	0.0015	-0.0008	0.0021	0.0007	0.0012	0.0003	0.0039	0.0002	0.0023	-0.0018	0.0039
27	0.114	0.029	0.0010	0.0013	0.0008	0.0017	0.0002	0.0012	-0.0001	0.0023	0.0013	0.0022	-0.0019	0.0032
15C	0.130	0.038	-0.0005	0.0018	-0.0016	0.0031	0.0002	0.0015	0.0025	0.0039	-0.0022	0.0032	-0.0023	0.0056

LOCATION	Ru-103	(+/-)	Ru-106	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)
1	-0.0018	0.0029	0.0047	0.0099	0.0000	0.0010	0.0010	0.0009	-0.0723	0.1425	0.0028	0.0043	-0.0038	0.0048
2	-0.0001	0.0031	-0.0035	0.0102	0.0009	0.0012	0.0004	0.0011	-0.0711	0.1758	0.0003	0.0051	0.0002	0.0055
3	-0.0021	0.0033	-0.0038	0.0109	0.0012	0.0012	0.0004	0.0010	0.0739	0.1969	-0.0015	0.0060	0.0041	0.0065
4	-0.0004	0.0028	-0.0009	0.0099	0.0004	0.0010	0.0004	0.0008	0.0421	0.1458	0.0038	0.0041	-0.0006	0.0044
10	-0.0012	0.0057	-0.0124	0.0184	0.0005	0.0019	-0.0002	0.0018	0.0009	0.2832	0.0047	0.0070	-0.0055	0.0071
11	0.0001	0.0038	0.0187	0.0122	0.0013	0.0013	-0.0006	0.0010	-0.0043	0.2211	-0.0064	0.0056	-0.0045	0.0058
27	0.0005	0.0030	-0.0059	0.0092	-0.0002	0.0010	0.0006	0.0009	0.0395	0.1676	-0.0006	0.0046	-0.0013	0.0049
15C	0.0025	0.0048	0.0107	0.0164	0.0010	0.0016	-0.0006	0.0014	0.0841	0.2636	-0.0007	0.0082	-0.0101	0.0087

TABLE 4
AIR PARTICULATES (pCi/m3)

GAMMA SPECTRA - QTR 3 (07/03/12 - 10/02/12)

LOCATION	Be-7	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)
1	0.146	0.051	0.0003	0.0018	0.0001	0.0034	-0.0002	0.0017	-0.0014	0.0039	-0.0011	0.0039	-0.0013	0.0069
2	0.124	0.044	0.0005	0.0021	0.0010	0.0043	0.0006	0.0019	0.0007	0.0048	-0.0018	0.0042	0.0016	0.0067
3	0.104	0.050	-0.0001	0.0014	-0.0005	0.0022	0.0008	0.0013	0.0029	0.0043	-0.0004	0.0030	0.0023	0.0052
4	0.118	0.040	-0.0003	0.0015	-0.0031	0.0028	0.0003	0.0014	0.0030	0.0040	0.0018	0.0034	0.0024	0.0047
10	0.115	0.061	0.0007	0.0018	0.0016	0.0040	0.0001	0.0014	-0.0018	0.0039	0.0034	0.0035	-0.0001	0.0064
11	0.145	0.034	0.0003	0.0010	0.0000	0.0022	-0.0008	0.0010	-0.0002	0.0025	-0.0006	0.0018	0.0003	0.0035
27	0.128	0.038	0.0002	0.0011	-0.0011	0.0033	-0.0009	0.0015	-0.0009	0.0034	0.0000	0.0027	0.0035	0.0043
15C	0.137	0.034	0.0000	0.0010	0.0000	0.0020	0.0004	0.0010	0.0010	0.0027	0.0008	0.0023	0.0028	0.0040

LOCATION	Ru-103	(+/-)	Ru-106	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)
1	-0.0038	0.0055	0.0057	0.0140	0.0017	0.0016	0.0005	0.0016	0.4542	0.6616	-0.0003	0.0086	-0.0018	0.0073
2	-0.0033	0.0064	-0.0096	0.0178	0.0005	0.0020	-0.0006	0.0017	-0.0635	0.5595	0.0034	0.0096	-0.0042	0.0071
3	0.0051	0.0057	-0.0063	0.0118	0.0027	0.0016	0.0003	0.0011	-0.8413	0.5738	-0.0091	0.0082	0.0039	0.0066
4	0.0042	0.0048	0.0032	0.0119	0.0004	0.0018	0.0002	0.0011	0.1072	0.4317	0.0046	0.0089	0.0007	0.0064
10	*-0.0014*	*0.0068*	*0.0034*	*0.0150*	*0.0017*	*0.0018*	*0.0014*	*0.0013*	*-0.0653*	*0.5860*	*0.0013*	*0.0110*	*-0.0064*	*0.0084*
11	-0.0030	0.0034	-0.0016	0.0084	-0.0004	0.0009	0.0000	0.0008	-0.0964	0.3197	0.0044	0.0063	-0.0001	0.0041
27	0.0004	0.0045	-0.0007	0.0108	0.0002	0.0018	0.0012	0.0011	-0.0780	0.4100	-0.0060	0.0080	0.0012	0.0063
15C	-0.0006	0.0038	-0.0030	0.0089	0.0013	0.0011	0.0006	0.0011	0.1086	0.3374	0.0025	0.0073	0.0019	0.0057

GAMMA SPECTRA - QTR 4 (10/02/12 - 01/13/13)

LOCATION	Be-7	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)
1	0.112	0.039	-0.0025	0.0018	-0.0039	0.0026	0.0006	0.0015	0.0033	0.0041	0.0002	0.0028	-0.0015	0.0047
2	0.074	0.029	0.0006	0.0020	0.0006	0.0028	-0.0004	0.0019	0.0007	0.0041	-0.0002	0.0033	0.0031	0.0057
3	0.091	0.040	-0.0002	0.0013	-0.0008	0.0023	-0.0005	0.0012	0.0059	0.0038	0.0003	0.0025	0.0016	0.0041
4	0.110	0.037	0.0007	0.0016	-0.0004	0.0031	-0.0006	0.0016	0.0029	0.0043	0.0026	0.0033	-0.0014	0.0056
10	0.085	0.027	0.0005	0.0011	0.0003	0.0016	0.0000	0.0008	0.0017	0.0025	0.0022	0.0018	0.0005	0.0033
11	0.079	0.028	-0.0005	0.0012	-0.0013	0.0022	0.0003	0.0012	0.0017	0.0026	0.0013	0.0022	-0.0027	0.0031
27	0.097	0.035	0.0002	0.0016	0.0000	0.0025	0.0001	0.0016	0.0011	0.0037	0.0021	0.0028	-0.0016	0.0052
15C	0.100	0.031	0.0005	0.0013	0.0008	0.0020	0.0001	0.0011	-0.0009	0.0028	-0.0007	0.0021	-0.0017	0.0040

LOCATION	Ru-103	(+/-)	Ru-106	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)
1	-0.0018	0.0044 <	-0.0111	0.0139	0.0009	0.0023	0.0013	0.0015	0.1077	0.2271	0.0033	0.0075	-0.0014	0.0077
2	0.0029	0.0050 <	-0.0017	0.0141	0.0015	0.0018	0.0007	0.0016	0.0698	0.2770	-0.0008	0.0058	0.0029	0.0061
3	0.0024	0.0037 <	0.0038	0.0118	0.0012	0.0017	-0.0005	0.0012	0.0332	0.1926	-0.0010	0.0051	0.0020	0.0059
4	0.0002	0.0047 <	0.0056	0.0171	0.0013	0.0017	0.0001	0.0014	0.0614	0.2099	-0.0016	0.0070	-0.0026	0.0077
10	0.0014	0.0030 <	0.0029	0.0096	0.0007	0.0013	0.0000	0.0009	0.0979	0.1404	-0.0014	0.0044	0.0036	0.0048
11	0.0014	0.0031 <	-0.0048	0.0100	0.0010	0.0011	0.0006	0.0012	-0.0940	0.1706	0.0031	0.0053	0.0044	0.0058
27	-0.0008	0.0039 <	-0.0087	0.0122	0.0025	0.0020	0.0000	0.0013	0.1775	0.2236	0.0040	0.0070	-0.0049	0.0075
15C	-0.0009	0.0032 <	-0.0017	0.0110	0.0013	0.0011	0.0002	0.0010	0.0199	0.1701	0.0001	0.0059	-0.0023	0.0065

TABLE 5
AIR PARTICULATES
Strontium

Analyses for strontium in air particulate filters were not analyzed in 2012. 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	11/15/2012	0.060	0.260	18.4	1.2	0.152	0.278	0.013	0.031	0.002	0.032	-0.050	0.067
04	11/15/2012	-0.061	0.305	14.7	1.2	-0.076	0.343	0.002	0.034	0.013	0.035	-0.047	0.068
14C	11/15/2012	0.540	0.311	13.4	1.1	-0.073	0.311	0.027	0.032	0.021	0.031	-0.044	0.067

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
03	11/15/2012	0.015	0.037	0.047	0.085	0.041	0.034	0.007	0.053	-0.008	0.030	-0.241	0.263
04	11/15/2012	0.013	0.034	-0.051	0.090	0.029	0.038	0.046	0.063	0.000	0.036	-0.017	0.292
14C	11/15/2012	0.004	0.039	-0.001	0.088	0.055	0.039	-0.002	0.057	-0.034	0.036	0.074	0.299

LOCATION	COLLECTION DATE	Sb-125	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
03	11/15/2012	0.005	0.077	-0.046	0.035	0.226	0.059	-0.005	0.043	0.066	0.153	0.170	0.277
04	11/15/2012	0.018	0.091	0.011	0.037	0.636	0.072	0.024	0.058	-0.050	0.218	1.151	0.254
14C	11/15/2012	0.039	0.089	-0.023	0.037	1.466	0.092	0.066	0.052	0.070	0.214	0.085	0.272

TABLE 7
COW MILK
(pCi/l)

LOCATION	COLLECTION DATE	Sr-89	(+/-)	Sr-90	(+/-)	K-40	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)
18	01/23/2012					1183	115	0.080	0.317	1.0	3.7	0.8	3.4	-11.0	15.0	-1.4	4.2
	02/22/2012					1129	94.7	-0.032	0.180	0.7	2.4	0.3	2.4	-3.6	8.9	0.0	2.9
	03/14/2012					1210	117	0.173	0.146	1.8	2.5	2.5	2.9	4.0	12.6	-0.4	3.3
	03/29/2012	-1.1	4.7	0.2	0.4	1300	109	0.159	0.176	-1.7	3.3	5.0	3.6	-0.6	12.7	-0.8	3.8
	04/11/2012					1319	156	-0.092	0.152	-0.5	4.0	2.4	4.5	3.1	19.2	-0.2	4.6
	04/25/2012					1299	109	0.176	0.208	0.9	2.6	2.1	2.7	-16.5	12.5	1.3	3.1
	05/09/2012					1301	146	0.167	0.328	0.6	4.6	1.0	4.0	-3.1	26.2	-1.8	6.7
	05/23/2012					1194	110	0.204	0.262	1.2	2.2	1.3	2.1	-4.5	12.3	-1.2	3.0
	06/06/2012					1217	117	-0.587	0.351	-0.7	2.5	0.1	2.8	2.3	12.1	0.0	2.6
	06/19/2012	2.3	2.8	0.8	0.7	1247	141	-0.390	0.428	-11.7	4.3	2.3	4.2	-10.7	18.5	-1.0	7.0
	07/10/2012	1.9	2.1	0.1	0.6	1285	121	-0.160	0.335	-2.6	3.1	-0.5	3.4	-7.3	15.7	2.1	4.8
22	08/22/2012					1295	143	-0.034	0.504	-4.6	4.0	-1.3	3.8	6.8	16.8	1.0	5.6
	09/05/2012					1161	153	0.028	0.349	-1.5	5.1	3.9	5.5	-12.8	22.2	1.7	4.9
	09/25/2012	0.83	1	-0.1	0.7	1424	116	-0.091	0.371	-2.3	3.5	2.7	3.1	-4.8	21.9	1.7	6.0
	10/09/2012					1227	166	-0.077	0.335	-5.1	4.4	2.8	4.2	11.2	27.1	-1.4	6.8
	10/23/2012					1368	154	-0.603	0.341	3.5	4.1	0.1	4.5	9.6	20.4	-4.1	5.9
	11/14/2012					1356	125	-0.543	0.350	-2.0	3.4	1.0	3.0	-6.1	23.1	1.0	6.2
	12/13/2012	2.25	1.97	0.31	0.47	1326	121	-0.404	0.287	-1.7	3.4	-2.3	3.6	-1.7	15.7	-4.3	4.5

TABLE 8
GOAT MILK
(pCi/l)

Goat Milk samples were not available during 2012. See discussion in Section 4.8

TABLE 9
PASTURE GRASS / HAY/FEED
(pCi/g wet wt.)
Location 21

COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)	Co-60	(+/-)
01/24/2012 *	0.121	0.095	17.75	0.47	-0.048	0.100	0.000	0.010	-0.016	0.010	-0.011	0.023	-0.003	0.013
02/22/2012 *	0.019	0.107	11.76	0.76	0.000	0.105	-0.008	0.014	0.003	0.015	0.003	0.036	-0.001	0.022
03/14/2012 *	0.048	0.077	10.27	0.50	0.069	0.085	-0.002	0.010	0.003	0.010	-0.004	0.025	0.007	0.013
03/28/2012	-0.051	0.090	10.67	0.61	0.024	0.106	0.003	0.011	0.010	0.012	0.005	0.033	0.013	0.016
04/11/2012	0.129	0.158	11.42	0.93	-0.008	0.165	-0.002	0.020	0.002	0.017	-0.020	0.046	0.015	0.028
04/26/2012	0.956	0.208	6.02	0.51	-0.025	0.110	-0.006	0.013	-0.006	0.013	-0.001	0.028	0.002	0.014
05/10/2012	0.715	0.173	5.35	0.51	0.015	0.112	-0.001	0.014	-0.008	0.014	0.000	0.030	0.020	0.018
05/23/2012	0.918	0.190	3.44	0.36	-0.025	0.101	0.001	0.010	-0.012	0.010	-0.003	0.023	-0.001	0.011
06/06/2012	0.448	0.147	4.45	0.35	-0.057	0.080	0.002	0.008	0.006	0.008	-0.003	0.020	-0.005	0.010
06/20/2012	0.494	0.228	5.96	0.63	0.003	0.156	-0.009	0.017	0.001	0.016	-0.033	0.035	0.013	0.019
07/11/2012	1.065	0.088	7.58	0.20	-0.002	0.052	0.003	0.004	-0.003	0.005	-0.001	0.012	0.006	0.006
07/24/2012	0.892	0.071	5.34	0.16	0.001	0.042	-0.001	0.004	0.001	0.004	-0.004	0.010	0.000	0.005
08/08/2012	0.460	0.139	4.29	0.33	-0.020	0.085	-0.005	0.008	0.003	0.008	0.014	0.018	-0.005	0.009
08/22/2012	1.033	0.172	5.72	0.40	-0.024	0.081	0.006	0.009	-0.001	0.009	0.011	0.020	0.004	0.011
09/06/2012	0.924	0.193	4.17	0.41	0.019	0.098	-0.008	0.010	-0.004	0.010	0.000	0.024	0.000	0.013
09/26/2012	1.354	0.076	5.33	0.15	0.010	0.050	-0.003	0.004	0.001	0.004	-0.006	0.010	-0.002	0.004
10/09/2012	1.446	0.236	5.04	0.52	0.060	0.123	-0.011	0.013	0.000	0.013	0.003	0.026	-0.002	0.014
10/23/2012	2.612	0.288	6.42	0.53	-0.053	0.107	-0.006	0.011	0.003	0.012	0.036	0.029	-0.008	0.016
11/14/2012 *	0.111	0.128	13.18	0.59	-0.089	0.142	0.001	0.013	0.001	0.015	-0.010	0.033	0.008	0.016
12/13/2012 *	-0.012	0.133	13.15	1.22	0.049	0.127	0.000	0.015	0.001	0.016	-0.022	0.034	-0.022	0.020

	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
01/24/2012 *	-0.061	0.025	0.011	0.010	0.014	0.018	-0.002	0.011	-0.017	0.091	-0.013	0.028	0.004	0.021
02/22/2012 *	-0.008	0.040	-0.003	0.014	-0.008	0.026	-0.002	0.013	-0.035	0.121	-0.017	0.037	-0.007	0.019
03/14/2012 *	0.021	0.026	0.005	0.010	-0.004	0.017	-0.003	0.009	-0.076	0.082	0.013	0.024	-0.003	0.016
03/28/2012	-0.037	0.033	0.000	0.012	-0.006	0.020	0.000	0.011	-0.002	0.099	-0.003	0.027	-0.007	0.020
04/11/2012	-0.040	0.051	-0.013	0.022	-0.024	0.036	-0.006	0.019	0.080	0.181	0.008	0.052	-0.009	0.030
04/26/2012	0.004	0.032	0.001	0.012	-0.001	0.023	0.002	0.013	0.003	0.115	0.001	0.034	0.009	0.018
05/10/2012	-0.021	0.032	0.009	0.014	-0.002	0.024	0.009	0.014	-0.053	0.119	0.020	0.030	0.009	0.028
05/23/2012	0.000	0.022	0.008	0.010	0.013	0.018	-0.005	0.011	-0.071	0.093	0.004	0.030	0.002	0.021
06/06/2012	-0.010	0.021	0.004	0.008	0.007	0.014	0.000	0.009	-0.017	0.074	-0.019	0.024	0.013	0.015
06/20/2012	-0.068	0.042	-0.003	0.017	0.015	0.030	0.003	0.017	-0.040	0.139	0.053	0.044	-0.006	0.029
07/11/2012	-0.025	0.011	0.005	0.005	0.006	0.009	0.001	0.005	-0.037	0.041	-0.001	0.012	0.003	0.015
07/24/2012	-0.010	0.009	-0.004	0.004	-0.002	0.007	-0.003	0.005	-0.018	0.035	0.002	0.010	-0.003	0.012
08/08/2012	0.006	0.021	0.005	0.009	-0.002	0.014	-0.002	0.008	-0.004	0.065	-0.004	0.022	-0.003	0.023
08/22/2012	-0.019	0.022	0.009	0.009	0.003	0.015	0.000	0.010	0.000	0.079	-0.017	0.024	0.001	0.016
09/06/2012	-0.058	0.030	0.002	0.011	-0.008	0.017	-0.001	0.010	0.030	0.091	0.015	0.030	-0.009	0.018
09/26/2012	-0.003	0.010	0.005	0.005	-0.004	0.007	-0.001	0.005	0.023	0.033	0.001	0.010	0.001	0.024
10/09/2012	-0.021	0.035	0.005	0.013	0.005	0.022	-0.003	0.014	-0.032	0.115	0.024	0.035	0.014	0.023
10/23/2012	-0.021	0.031	-0.004	0.012	0.018	0.021	-0.002	0.012	0.028	0.098	-0.006	0.033	0.000	0.019
11/14/2012 *	0.014	0.036	-0.006	0.017	0.006	0.025	0.019	0.016	0.025	0.125	0.022	0.037	0.020	0.047
12/13/2012 *	0.038	0.042	-0.005	0.016	-0.009	0.022	-0.007	0.017	0.027	0.120	0.036	0.038	-0.003	0.028

* Hay or feed

TABLE 9
PASTURE GRASS / HAY/FEED
(pCi/g wet wt.)
Location 21

COLLECTION DATE		Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
01/24/2012	*	-0.047	0.011	-0.009	0.010	0.008	0.055	0.002	0.012	-0.016	0.020	-0.095	0.070	0.045	0.044
02/22/2012	*	-0.025	0.015	0.009	0.016	0.039	0.059	-0.008	0.019	-0.006	0.020	-0.044	0.077	0.041	0.053
03/14/2012	*	-0.009	0.011	-0.001	0.010	0.028	0.043	-0.001	0.012	-0.005	0.015	0.049	0.057	0.012	0.065
03/28/2012		-0.010	0.013	0.012	0.012	0.007	0.051	0.017	0.016	-0.004	0.017	0.091	0.066	0.009	0.045
04/11/2012		0.007	0.020	0.009	0.020	0.023	0.080	-0.016	0.024	0.021	0.031	0.160	0.117	0.045	0.084
04/26/2012		0.007	0.013	-0.014	0.013	0.029	0.057	-0.006	0.015	0.015	0.021	-0.068	0.081	0.014	0.052
05/10/2012		0.002	0.013	0.000	0.013	0.071	0.069	-0.009	0.024	0.001	0.018	-0.049	0.061	-0.010	0.048
05/23/2012		-0.003	0.011	0.007	0.010	-0.011	0.053	-0.009	0.015	0.005	0.020	0.001	0.076	-0.013	0.044
06/06/2012		-0.019	0.010	0.001	0.008	0.028	0.040	0.003	0.012	-0.008	0.014	0.003	0.059	0.025	0.036
06/20/2012		-0.016	0.020	-0.003	0.018	-0.043	0.072	-0.006	0.022	-0.046	0.031	0.012	0.119	0.035	0.062
07/11/2012		-0.007	0.005	0.001	0.005	-0.002	0.032	-0.008	0.007	0.003	0.012	-0.027	0.039	0.014	0.049
07/24/2012		0.000	0.004	0.000	0.004	0.034	0.028	-0.002	0.007	-0.007	0.008	-0.001	0.025	0.018	0.019
08/08/2012		-0.009	0.009	0.002	0.008	-0.005	0.049	0.008	0.013	-0.006	0.015	0.024	0.052	-0.004	0.031
08/22/2012		-0.003	0.009	0.019	0.010	-0.003	0.044	0.000	0.011	0.013	0.014	-0.029	0.055	0.013	0.038
09/06/2012		0.002	0.012	0.011	0.010	-0.016	0.049	-0.007	0.014	0.001	0.017	-0.014	0.071	0.030	0.040
09/26/2012		-0.004	0.004	0.017	0.005	-0.018	0.038	0.011	0.010	-0.012	0.010	0.003	0.024	0.026	0.046
10/09/2012		-0.011	0.014	-0.017	0.014	-0.041	0.068	-0.004	0.019	-0.014	0.022	0.008	0.088	0.016	0.047
10/23/2012		-0.017	0.011	-0.003	0.013	0.025	0.057	0.007	0.017	0.012	0.018	-0.004	0.074	0.018	0.052
11/14/2012	*	0.008	0.015	-0.012	0.014	0.016	0.104	-0.037	0.029	-0.015	0.025	0.083	0.067	0.010	0.068
12/13/2012	*	0.003	0.015	0.002	0.016	0.071	0.069	-0.006	0.024	0.007	0.024	0.018	0.088	0.019	0.068

* Hay or feed

TABLE 9
PASTURE GRASS / HAY/FEED
(pCi/g wet wt.)
Location 24

COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)	Co-60	(+/-)
01/23/2012 *	0.366	0.189	8.78	0.57	0.005	0.130	0.003	0.015	-0.001	0.015	-0.012	0.034	-0.009	0.017
02/22/2012 *	0.665	0.401	17.06	1.14	0.241	0.226	-0.004	0.025	0.002	0.026	0.020	0.057	-0.007	0.034
03/14/2012 *	0.240	0.184	17.65	0.86	0.068	0.195	-0.012	0.021	0.009	0.022	-0.009	0.048	-0.019	0.027
03/28/2012	0.010	0.119	8.51	0.66	-0.067	0.128	0.000	0.015	-0.004	0.017	0.019	0.037	-0.006	0.021
04/11/2012	1.471	0.226	6.18	0.54	-0.008	0.110	-0.014	0.014	-0.004	0.014	0.000	0.026	-0.005	0.017
04/25/2012	1.212	0.292	6.57	0.71	-0.058	0.160	0.002	0.020	-0.005	0.020	-0.013	0.045	-0.014	0.027
05/10/2012	1.155	0.257	5.06	0.47	0.012	0.118	0.004	0.013	0.000	0.011	-0.022	0.030	-0.010	0.014
05/23/2012	0.452	0.125	4.68	0.35	-0.022	0.065	0.004	0.007	0.004	0.006	-0.007	0.016	0.010	0.010
06/06/2012	0.706	0.256	4.69	0.66	0.111	0.189	-0.016	0.021	-0.014	0.024	0.018	0.045	-0.004	0.027
06/19/2012	0.717	0.340	4.57	0.86	0.123	0.217	0.007	0.025	0.000	0.026	0.059	0.066	0.022	0.029
07/10/2012	0.470	0.069	6.49	0.20	0.012	0.046	0.001	0.004	0.002	0.005	0.000	0.012	-0.002	0.006
07/23/2012	0.844	0.066	5.93	0.18	-0.003	0.044	0.002	0.004	-0.003	0.005	-0.001	0.011	0.006	0.005
08/08/2012	0.715	0.208	5.66	0.52	0.023	0.130	-0.003	0.014	0.008	0.014	0.024	0.032	0.000	0.017
08/22/2012	2.303	0.169	6.36	0.32	-0.009	0.071	-0.002	0.008	-0.004	0.008	-0.006	0.018	0.009	0.010
09/06/2012	2.398	0.141	5.83	0.27	0.014	0.046	0.003	0.005	0.000	0.005	0.009	0.011	-0.005	0.006
09/26/2012	1.123	0.076	5.54	0.14	-0.037	0.043	0.000	0.003	-0.005	0.004	-0.001	0.010	0.000	0.004
10/09/2012	1.979	0.231	5.52	0.50	0.078	0.100	-0.006	0.009	0.001	0.009	-0.004	0.028	0.007	0.014
10/23/2012	2.735	0.295	8.72	0.65	-0.016	0.122	-0.001	0.013	0.001	0.013	-0.025	0.030	-0.012	0.019
11/14/2012	2.417	0.252	7.72	0.48	-0.031	0.121	0.001	0.012	0.007	0.012	-0.002	0.031	0.014	0.014
12/13/2012 *	0.775	0.226	11.10	0.72	-0.112	0.170	-0.018	0.020	-0.005	0.021	0.057	0.045	-0.010	0.023

COLLECTION DATE	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
01/23/2012 *	-0.005	0.041	0.002	0.016	-0.004	0.026	0.003	0.016	0.034	0.137	0.001	0.038	0.003	0.029
02/22/2012 *	-0.053	0.062	0.003	0.024	0.022	0.046	-0.004	0.027	0.146	0.236	-0.031	0.070	-0.005	0.037
03/14/2012 *	-0.012	0.058	0.028	0.022	0.008	0.037	-0.019	0.022	-0.097	0.194	-0.003	0.059	-0.008	0.037
03/28/2012	-0.070	0.043	0.005	0.017	0.005	0.026	-0.005	0.015	-0.004	0.129	-0.006	0.039	0.009	0.025
04/11/2012	-0.038	0.033	-0.006	0.013	0.009	0.023	0.011	0.014	0.008	0.110	0.009	0.034	0.003	0.021
04/25/2012	-0.065	0.056	-0.002	0.021	0.001	0.038	-0.008	0.019	0.050	0.184	0.002	0.052	-0.011	0.031
05/10/2012	0.004	0.032	-0.003	0.012	-0.011	0.021	0.007	0.014	-0.037	0.096	-0.014	0.031	-0.003	0.028
05/23/2012	-0.002	0.019	0.002	0.007	-0.002	0.013	-0.002	0.008	0.021	0.056	0.001	0.018	0.006	0.014
06/06/2012	-0.039	0.055	0.004	0.021	0.003	0.038	-0.010	0.021	0.014	0.189	0.009	0.053	0.018	0.033
06/19/2012	-0.027	0.064	0.015	0.028	0.009	0.048	0.017	0.030	0.162	0.231	0.009	0.066	-0.017	0.048
07/10/2012	0.003	0.013	0.005	0.005	-0.008	0.009	-0.003	0.005	-0.010	0.038	-0.005	0.011	-0.004	0.015
07/23/2012	-0.028	0.011	0.000	0.004	-0.003	0.008	-0.003	0.005	-0.036	0.036	-0.008	0.011	0.004	0.014
08/08/2012	-0.018	0.038	-0.001	0.015	-0.007	0.028	-0.013	0.015	0.060	0.119	-0.033	0.032	0.019	0.037
08/22/2012	-0.032	0.020	0.002	0.009	0.001	0.015	0.005	0.008	-0.039	0.068	-0.012	0.022	-0.008	0.014
09/06/2012	-0.003	0.012	0.002	0.005	0.000	0.008	-0.004	0.005	-0.041	0.046	-0.003	0.014	0.002	0.008
09/26/2012	-0.001	0.009	-0.001	0.004	0.000	0.007	0.000	0.004	0.038	0.030	-0.003	0.009	-0.021	0.021
10/09/2012	-0.021	0.030	0.003	0.010	0.004	0.018	-0.009	0.010	0.077	0.082	-0.015	0.028	-0.008	0.021
10/23/2012	-0.017	0.035	0.009	0.013	0.020	0.022	0.008	0.014	-0.007	0.113	-0.002	0.037	-0.014	0.024
11/14/2012	0.041	0.029	-0.005	0.014	0.009	0.022	-0.004	0.013	-0.083	0.102	-0.027	0.029	-0.017	0.037
12/13/2012 *	-0.058	0.048	-0.001	0.020	-0.015	0.036	-0.005	0.021	0.115	0.182	0.037	0.052	-0.018	0.037

* Hay or feed

TABLE 9
PASTURE GRASS / HAY/FEED
(pCi/g wet wt.)
Location 24

COLLECTION DATE		Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
01/23/2012	*	0.005	0.017	0.081	0.023	0.003	0.079	0.039	0.025	-0.011	0.023	0.012	0.071	0.003	0.081
02/22/2012	*	0.014	0.026	0.098	0.031	0.068	0.104	0.011	0.024	-0.012	0.041	-0.020	0.179	0.019	0.109
03/14/2012	*	0.003	0.023	0.010	0.023	0.008	0.098	-0.020	0.026	-0.016	0.036	-0.104	0.133	0.018	0.148
03/28/2012		-0.008	0.016	-0.011	0.017	0.021	0.071	-0.018	0.020	-0.004	0.020	-0.008	0.078	0.000	0.062
04/11/2012		-0.011	0.015	-0.005	0.014	-0.011	0.059	-0.002	0.014	-0.006	0.020	0.000	0.080	0.055	0.055
04/25/2012		-0.009	0.023	0.007	0.023	0.049	0.092	0.011	0.025	0.001	0.024	0.021	0.089	-0.007	0.079
05/10/2012		0.006	0.013	0.001	0.012	-0.009	0.074	-0.019	0.019	0.014	0.021	-0.042	0.081	0.058	0.048
05/23/2012		-0.001	0.007	0.000	0.008	0.012	0.039	0.004	0.008	-0.005	0.012	-0.028	0.048	0.006	0.030
06/06/2012		0.005	0.023	0.013	0.020	0.023	0.099	-0.007	0.027	-0.001	0.028	-0.056	0.099	0.050	0.089
06/19/2012		-0.001	0.028	-0.002	0.025	-0.027	0.130	0.009	0.033	-0.014	0.032	0.004	0.119	0.050	0.104
07/10/2012		-0.003	0.005	0.004	0.005	0.005	0.031	0.005	0.009	-0.002	0.008	-0.010	0.025	0.042	0.030
07/23/2012		-0.003	0.005	-0.002	0.004	-0.008	0.031	-0.002	0.008	-0.004	0.009	0.019	0.028	0.030	0.033
08/08/2012		-0.001	0.014	0.007	0.015	-0.037	0.087	-0.014	0.029	-0.014	0.021	0.005	0.065	0.054	0.055
08/22/2012		0.005	0.008	0.002	0.008	0.014	0.038	0.001	0.010	0.006	0.013	0.006	0.049	0.042	0.041
09/06/2012		-0.001	0.005	0.003	0.005	0.008	0.021	-0.003	0.006	-0.013	0.010	-0.015	0.036	0.021	0.042
09/26/2012		-0.004	0.004	0.003	0.003	0.009	0.036	0.000	0.010	0.011	0.008	-0.002	0.023	0.004	0.015
10/09/2012		0.003	0.011	-0.002	0.011	0.004	0.054	-0.014	0.013	-0.004	0.016	-0.063	0.060	0.004	0.043
10/23/2012		-0.023	0.013	0.004	0.014	-0.021	0.059	-0.009	0.016	-0.009	0.023	0.018	0.093	0.033	0.057
11/14/2012		0.006	0.012	-0.001	0.012	-0.027	0.084	-0.007	0.022	-0.006	0.018	-0.002	0.064	0.088	0.086
12/13/2012	*	-0.046	0.021	0.035	0.021	0.098	0.097	-0.007	0.029	0.001	0.030	-0.096	0.112	0.029	0.088

* Hay or feed

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	03/07/2012	-196	437	-8.9	21.4	11.9	33.2	4.2	26.2	-1.3	2.3	-0.7	2.3	-0.2	5.2	1.4	2.4
	06/25/2012	202	462	1.9	20.6	38.5	38.4	2.9	23.5	0.5	2.0	-1.4	2.1	2.8	4.6	0.3	2.3
	09/28/2012	573	535	-1.2	11.0	-22.8	18.6	9.5	13.4	-1.1	1.1	1.5	1.2	1.8	2.8	1.1	1.1
	12/19/2012	624	509	2.0	18.4	12.2	32.1	18.2	26.2	-0.4	1.5	-0.7	1.7	2.0	3.7	0.9	1.6
72	03/08/2012	-410	431	-27.4	31.1	-26.4	45.0	-4.4	30.2	2.3	3.7	0.5	3.2	9.5	6.8	0.0	2.4
	06/25/2012	124	461	6.2	18.4	36.9	37.5	-8.6	24.2	1.0	1.8	-0.1	1.9	1.8	4.1	0.4	1.8
	09/28/2012	-57.3	482	15.5	13.0	35.0	33.3	-6.1	15.6	0.6	1.2	1.0	1.4	0.3	3.2	0.6	1.3
	12/19/2012	409	489	2.5	23.0	29.8	38.1	-1.9	29.7	0.4	2.4	-1.4	2.5	-0.7	5.2	1.1	2.5
76	03/06/2012	179	590	3.3	28.4	-11.3	50.2	-29.4	30.5	-1.1	2.9	-2.9	3.4	-0.4	5.9	0.0	3.0
	09/30/2012	108	496	-1.1	13.0	37.1	33.3	-2.5	17.2	-0.2	1.3	-1.0	1.4	1.1	2.9	1.2	1.3
	12/17/2012	493	474	-6.4	8.7	21.5	16.8	0.1	12.5	-0.3	0.8	0.2	1.0	1.7	2.0	0.3	0.8
	06/21/2012	184	287	-18.2	24.3	27.3	49.3	12.1	25.5	1.0	3.0	3.0	2.8	6.5	6.0	0.3	2.8
77	03/06/2012	291	595	-1.7	34.4	-37.3	48.9	3.6	36.4	-2.6	3.6	0.0	3.6	1.7	6.9	1.5	4.1
	09/30/2012	-108	477	-4.6	13.4	34.7	34.1	-6.0	15.8	-0.2	1.4	-0.4	1.4	2.9	3.4	0.1	1.3
	12/17/2012	416	461	7.4	10.5	23.2	17.0	2.4	15.0	-0.6	1.0	-0.8	1.1	1.8	2.4	0.4	0.9
	06/21/2012	125	290	-13.8	26.4	5.1	51.9	22.9	32.5	-2.2	3.0	-2.6	3.3	-1.1	6.3	1.4	3.1
78	03/06/2012	178	585	-1.4	29.6	38.1	55.6	2.4	35.2	-1.9	3.6	-0.9	3.2	2.3	7.4	-2.5	3.8
	09/30/2012	-191	471	8.2	11.3	11.2	27.5	-4.3	13.9	-0.8	1.1	0.1	1.2	1.9	2.7	-0.1	1.1
	12/17/2012	302	452	5.0	14.4	9.1	31.7	-4.0	18.2	-0.6	1.5	-0.6	1.7	3.8	3.8	0.3	1.5
	06/20/2012	256	303	1.5	28.9	29.2	53.1	15.4	29.1	-0.9	3.6	-0.1	3.3	5.6	7.0	1.2	3.4
79	03/07/2012	-326	443	3.3	22.8	39.9	73.3	-15.5	30.8	-0.1	2.3	1.2	2.9	-4.3	6.1	0.5	2.2
	06/25/2012	-25	448	9.2	24.9	37.3	54.7	2.3	29.9	1.1	2.7	0.9	3.1	1.6	6.4	-0.4	2.7
	09/28/2012	204	505	8.6	10.2	43.0	23.2	-3.7	13.1	0.4	1.1	-0.6	1.1	1.5	2.4	0.7	1.0
	12/19/2012	180	471	-6.0	32.0	9.3	59.9	-3.5	37.7	-0.6	3.0	-2.2	3.3	-2.2	7.2	1.8	3.1
80	03/07/2012	197	479	-7.9	27.3	29.9	42.5	-0.9	33.5	0.1	2.7	-1.5	2.9	0.1	5.8	-1.1	2.7
81	03/08/2012	-19.6	461	-39.5	40.1	1.0	80.4	43.7	38.5	3.4	4.6	-2.4	4.4	5.0	9.5	-4.1	4.5
	06/25/2012	-113	438	-16.1	20.1	30.6	46.7	5.7	24.5	0.6	1.9	-0.4	2.2	-1.2	4.5	-0.5	1.9
	09/28/2012	446	525	13.3	11.1	5.6	27.1	-4.8	14.2	-0.2	1.1	-0.5	1.2	1.8	2.7	0.8	1.1
	12/19/2012	318	487	-5.7	19.5	23.8	41.8	13.2	24.1	-0.1	1.9	-1.6	2.1	-0.7	3.9	-0.1	2.0
82	03/07/2012	82	459	27.6	30.9	13.5	50.1	10.4	31.8	-1.5	3.5	-3.1	3.7	1.4	6.9	-0.5	3.2
	06/25/2012	735	518	-3.3	27.3	83.8	73.3	27.0	31.1	-0.1	2.6	-0.7	2.4	-2.0	6.2	-1.7	2.4
	09/26/2012	720	547	9.7	10.9	25.3	25.8	3.5	13.1	0.0	1.0	-0.4	1.1	1.4	2.9	0.4	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	03/07/2012	0.6	4.7	0.4	2.8	2.6	4.5	-0.2	3.2	-3.0	21.4	0.7	6.4	3.3	6.2	1.1	2.5
	06/25/2012	2.4	4.1	-0.2	1.9	1.7	3.7	-0.9	2.5	-6.1	16.6	0.1	5.1	-2.8	7.8	0.0	2.1
	09/28/2012	-5.1	2.6	1.4	1.2	2.1	2.1	-0.7	1.5	4.4	9.6	-1.8	2.9	-0.3	5.7	-1.2	1.1
	12/19/2012	-1.3	4.0	1.6	1.9	-1.6	3.1	-1.1	2.5	3.7	15.5	-3.0	5.6	-1.5	8.3	-0.4	1.7
72	03/08/2012	-6.9	6.8	-0.5	3.2	-1.3	4.6	-1.5	3.7	11.4	26.8	-1.0	7.6	-5.8	7.2	0.9	3.2
	06/25/2012	-6.9	4.4	1.7	1.9	1.1	3.6	-1.7	2.4	0.3	18.0	1.4	5.2	4.5	8.3	-1.0	2.1
	09/28/2012	-5.0	3.0	1.0	1.4	1.9	2.5	-2.8	1.7	-9.5	11.6	-0.3	3.4	-4.1	6.9	-0.8	1.4
	12/19/2012	-8.1	5.3	0.8	2.6	1.9	4.4	-4.6	3.2	10.0	22.0	0.1	6.7	-3.4	9.1	-1.1	2.4
76	03/06/2012	-4.6	6.7	0.0	3.5	4.3	5.6	0.5	3.8	-8.6	26.4	-5.4	9.6	1.2	6.0	1.1	3.4
	09/30/2012	-6.5	2.9	1.8	1.5	0.1	2.5	-2.1	1.7	8.1	12.0	-0.1	3.5	-3.4	6.0	-0.2	1.4
	12/17/2012	1.5	1.9	0.6	1.0	-0.1	1.7	0.1	1.4	-3.9	7.2	0.5	2.3	3.4	6.8	0.3	0.9
	06/21/2012	-1.3	7.3	3.1	3.0	-1.0	5.0	0.0	3.1	0.9	25.5	4.5	8.2	-2.4	3.8	-0.1	3.3
77	03/06/2012	3.3	10.0	2.9	4.2	-0.4	6.5	-2.7	4.1	-7.4	30.6	0.0	11.1	-0.9	7.2	1.3	4.1
	09/30/2012	-1.9	3.2	0.8	1.5	1.7	2.7	-2.3	1.8	-1.0	11.4	-1.6	3.5	8.2	5.9	0.1	1.4
	12/17/2012	-0.7	2.3	0.8	1.1	0.0	2.0	-1.6	1.4	6.0	8.5	-0.5	2.7	0.2	8.0	-0.4	1.1
	06/21/2012	-1.7	8.2	7.9	4.0	0.9	5.1	-2.5	3.4	7.7	27.3	-2.9	9.9	1.5	4.9	1.0	4.8
78	03/06/2012	-5.3	7.8	2.8	3.3	-6.8	6.5	-0.2	3.6	-8.6	31.5	3.1	9.4	2.6	6.3	-0.1	3.8
	09/30/2012	-4.3	2.5	0.0	1.3	-1.3	2.3	-1.3	1.5	-8.3	10.7	1.3	3.2	-1.5	5.2	-1.3	1.4
	12/17/2012	-0.5	3.5	0.9	1.8	0.3	3.1	-1.4	2.0	4.2	12.5	2.5	3.5	-2.6	10.2	-0.4	1.5
	06/20/2012	-1.7	7.0	1.6	3.3	3.5	5.5	-3.2	3.6	10.1	28.2	3.5	9.6	1.9	5.0	0.2	3.4
79	03/07/2012	-1.0	5.5	-1.6	3.1	-1.1	4.8	-0.6	3.1	8.8	22.4	-5.6	7.6	5.0	7.9	-0.8	2.6
	06/25/2012	-2.4	5.8	-1.0	3.0	0.7	5.3	2.1	3.4	-0.5	24.4	-0.9	6.7	1.7	10.2	-0.8	2.8
	09/28/2012	1.4	2.2	0.4	1.2	0.5	2.0	0.1	1.4	-3.9	9.2	-0.2	2.8	-0.6	5.5	0.7	1.2
	12/19/2012	-14.2	7.9	3.0	3.5	5.9	6.6	1.9	4.1	-10.6	29.0	1.3	8.6	7.9	12.0	0.5	3.4
80	03/07/2012	-1.1	6.9	1.6	3.1	-0.4	5.2	-1.1	3.4	0.3	26.5	-3.5	8.4	-1.3	7.6	0.2	3.2
81	03/08/2012	-11.8	10.2	-2.2	5.0	-3.1	8.4	-1.9	4.9	22.2	36.9	-2.7	11.0	-0.2	9.3	1.3	4.4
	06/25/2012	1.2	4.1	2.1	2.4	-0.1	4.1	-1.9	2.7	4.2	18.5	-3.2	5.3	-1.9	8.2	-1.4	2.5
	09/28/2012	-2.9	2.5	1.4	1.2	-1.4	2.2	-0.5	1.5	-1.0	9.7	-0.3	2.9	-3.2	6.0	0.3	1.4
	12/19/2012	1.1	4.8	3.6	2.2	0.7	3.6	0.3	2.5	5.1	17.3	-2.0	5.6	-1.7	7.7	2.0	3.4
82	03/07/2012	0.6	5.5	0.7	3.8	-7.0	6.2	-0.8	3.8	-9.6	28.5	-4.7	9.0	3.6	8.1	2.8	2.6
	06/25/2012	-0.5	5.9	-2.5	2.9	-4.6	5.3	-0.9	3.6	-7.4	26.9	1.6	7.0	8.9	11.4	0.1	2.9
	09/26/2012	-5.4	2.5	0.3	1.2	-0.3	2.0	-0.7	1.5	9.3	9.1	0.9	2.7	-2.1	6.6	0.0	1.1

TabLE 10
WELL WATER
(pCi/l)

LOCATION	COLLECTION DATE	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ac-228	(+/-)
71	03/07/2012	-0.9	2.5	3.6	14.8	2.5	4.8	3.5	8.8
	06/25/2012	1.6	2.2	0.8	15.7	4.4	5.4	-1.2	7.6
	09/28/2012	-0.1	1.1	-2.0	10.1	-0.7	3.7	7.8	6.9
	12/19/2012	-0.8	1.7	-5.7	16.8	-1.8	3.9	0.4	6.3
72	03/08/2012	-2.2	3.3	-10.5	19.5	-16.1	7.5	-5.4	11.3
	06/25/2012	1.8	1.8	-13.9	15.5	-1.6	4.6	-2.1	7.3
	09/28/2012	2.0	1.3	7.6	13.0	4.2	4.3	-2.3	5.4
	12/19/2012	-2.0	2.3	-9.1	19.9	-0.5	5.9	-5.5	9.5
76	03/06/2012	-1.2	3.1	1.4	15.0	-6.3	5.6	-4.6	12.2
	09/30/2012	1.9	1.3	2.8	12.0	-3.7	3.7	-2.3	5.9
	12/17/2012	-0.6	0.8	5.1	9.9	-0.9	3.2	-0.2	4.0
	06/21/2012	0.0	3.2	2.2	12.5	2.2	4.3	7.1	11.9
77	03/06/2012	-2.0	4.0	-13.4	19.0	3.2	6.0	-5.0	13.9
	09/30/2012	-0.5	1.4	11.4	12.3	-2.1	3.8	-2.7	5.9
	12/17/2012	0.1	1.0	2.2	11.9	-0.2	3.7	-0.1	4.3
	06/21/2012	2.5	3.2	8.8	13.3	2.4	4.5	-1.0	11.9
78	03/06/2012	1.7	3.8	5.0	18.2	-2.0	5.1	-3.7	12.9
	09/30/2012	-1.1	1.2	0.9	10.5	-0.5	3.2	2.8	9.2
	12/17/2012	0.9	1.4	-5.2	16.5	0.6	6.0	-1.7	6.6
	06/20/2012	0.5	3.2	-3.2	14.1	1.1	4.8	7.2	12.6
79	03/07/2012	0.8	2.7	-4.5	18.3	0.9	5.4	1.0	11.7
	06/25/2012	-0.5	2.6	-18.7	21.0	-5.5	7.2	-0.9	10.5
	09/28/2012	0.2	1.1	5.5	10.3	0.5	3.0	3.0	5.3
	12/19/2012	-0.6	2.9	8.0	23.4	0.8	6.7	-2.3	12.5
80	03/07/2012	2.1	3.0	-4.6	18.7	-2.1	5.1	11.6	10.6
81	03/08/2012	-0.5	4.5	-7.5	25.4	0.6	6.7	14.3	15.0
	06/25/2012	-1.4	2.2	1.6	17.1	0.8	5.1	-0.4	7.8
	09/28/2012	1.4	1.1	2.6	10.9	0.5	3.5	2.3	4.8
	12/19/2012	-0.9	2.0	-9.2	15.4	-1.7	4.4	3.6	8.3
82	03/07/2012	1.3	3.4	5.8	19.3	-1.3	7.8	7.9	12.6
	06/25/2012	1.1	2.8	-15.1	24.1	-1.3	6.8	2.0	11.9
	09/26/2012	0.6	1.0	11.6	11.2	2.1	4.2	-5.5	4.5

TABLE 11
RESERVOIR WATER
(pCi/l)

Reservoir water was not sampled in 2012. 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	(+/-)
06/27/2012	Lettuce	0.290	0.080	3.811	0.193	-0.008	0.066	-0.002	0.005	0.000	0.006	-0.005	0.014	-0.002	0.007
06/28/2012	Raspberries	0.060	0.029	1.460	0.093	-0.040	0.034	0.000	0.003	-0.002	0.003	-0.002	0.007	0.000	0.003
09/26/2012	Greens	0.190	0.126	5.117	0.421	0.065	0.116	-0.011	0.012	-0.012	0.012	0.000	0.029	-0.009	0.013
10/03/2012	apples	-0.017	0.141	0.670	0.323	0.000	0.144	-0.017	0.019	0.007	0.019	0.001	0.037	0.004	0.017

COLLECTION DATE	TYPE	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
06/27/2012	Lettuce	-0.035	0.014	0.005	0.006	-0.005	0.010	-0.002	0.007	-0.009	0.049	-0.014	0.015	-0.003	0.023
06/28/2012	Raspberries	-0.011	0.006	0.004	0.003	0.004	0.005	0.003	0.004	0.006	0.026	0.003	0.008	-0.003	0.011
09/26/2012	Greens	0.018	0.029	0.013	0.012	0.017	0.021	-0.002	0.013	0.029	0.097	-0.012	0.031	-0.014	0.034
10/03/2012	apples	0.000	0.040	0.051	0.023	0.011	0.030	-0.007	0.017	0.134	0.150	-0.041	0.049	0.010	0.027

COLLECTION DATE	TYPE	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
06/27/2012	Lettuce	-0.022	0.006	-0.001	0.006	-0.005	0.046	0.001	0.013	0.015	0.014	-0.012	0.039	0.009	0.023
06/28/2012	Raspberries	-0.013	0.003	0.001	0.003	-0.011	0.022	-0.006	0.006	0.011	0.007	-0.026	0.023	0.008	0.015
09/26/2012	Greens	0.000	0.012	-0.013	0.011	-0.007	0.075	0.000	0.020	-0.009	0.022	0.031	0.078	0.041	0.056
10/03/2012	apples	-0.010	0.021	0.001	0.020	-0.031	0.085	0.012	0.032	-0.005	0.022	-0.036	0.082	0.031	0.072

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	(+/-)
06/28/2012	Lettuce	0.201	0.065	4.861	0.197	-0.033	0.061	0.002	0.005	-0.007	0.005	-0.001	0.012	-0.003	0.006
06/28/2012	Raspberries	0.053	0.039	1.285	0.090	-0.001	0.026	0.000	0.002	0.001	0.002	0.000	0.006	-0.001	0.003
10/03/2012	greens	0.242	0.273	7.650	0.813	-0.008	0.180	-0.005	0.018	0.008	0.020	-0.017	0.044	0.013	0.025
10/03/2012	apples	-0.047	0.069	0.975	0.222	-0.041	0.082	-0.001	0.008	0.005	0.009	-0.001	0.021	0.002	0.009

COLLECTION DATE	TYPE	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
06/28/2012	Lettuce	-0.001	0.013	0.001	0.005	0.002	0.009	0.002	0.006	0.011	0.046	0.010	0.014	-0.007	0.020
06/28/2012	Raspberries	0.000	0.006	0.002	0.002	0.003	0.004	-0.001	0.003	-0.007	0.021	0.000	0.006	0.002	0.009
10/03/2012	greens	-0.002	0.054	0.019	0.025	0.014	0.037	-0.007	0.021	0.103	0.172	-0.024	0.051	-0.027	0.033
10/03/2012	apples	0.004	0.022	0.004	0.010	-0.001	0.017	-0.001	0.010	0.006	0.074	0.008	0.024	0.010	0.014

COLLECTION DATE	TYPE	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
06/28/2012	Lettuce	0.000	0.005	0.002	0.005	0.019	0.040	-0.008	0.011	-0.002	0.012	0.014	0.036	0.003	0.033
06/28/2012	Raspberries	-0.008	0.003	-0.001	0.002	0.003	0.018	0.006	0.006	0.006	0.004	0.000	0.015	0.001	0.010
10/03/2012	greens	-0.015	0.025	0.013	0.023	-0.023	0.094	-0.003	0.029	0.014	0.030	0.030	0.121	0.081	0.085
10/03/2012	apples	-0.001	0.009	0.003	0.010	0.022	0.041	-0.011	0.013	0.012	0.014	0.020	0.055	-0.008	0.033

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	(+/-)
05/15/2012	1.621	0.371	3.868	0.563	0.034	0.179	-0.008	0.015	0.008	0.017	0.023	0.042	0.002	0.018
06/19/2012	1.041	0.252	3.484	0.476	0.108	0.141	-0.005	0.012	-0.005	0.014	0.023	0.030	0.002	0.015
07/17/2012	1.013	0.222	3.553	0.441	0.019	0.109	0.005	0.010	0.002	0.010	-0.002	0.023	-0.002	0.013
08/14/2012	1.233	0.224	3.385	0.414	-0.069	0.132	0.005	0.012	0.000	0.013	0.001	0.027	0.001	0.017
09/11/2012	1.765	0.199	2.660	0.291	-0.050	0.102	0.005	0.009	0.000	0.009	0.005	0.020	0.002	0.010
10/16/2012	1.736	0.126	2.498	0.194	-0.018	0.062	0.003	0.006	-0.003	0.007	-0.002	0.013	0.003	0.007

COLLECTION DATE	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
05/15/2012	-0.020	0.036	0.008	0.019	0.005	0.033	-0.003	0.018	-0.032	0.145	0.008	0.041	0.032	
06/19/2012	-0.038	0.034	-0.003	0.015	0.006	0.025	0.002	0.015	-0.044	0.125	0.021	0.036	0.009	0.027
07/17/2012	-0.013	0.028	0.006	0.011	0.013	0.020	-0.007	0.011	0.015	0.092	0.003	0.029	0.005	0.024
08/14/2012	-0.042	0.030	0.010	0.013	-0.001	0.023	0.007	0.013	0.011	0.123	0.014	0.035	-0.002	0.023
09/11/2012	-0.015	0.020	0.004	0.010	-0.004	0.016	-0.001	0.010	-0.047	0.083	-0.014	0.028	0.002	0.021
10/16/2012	-0.063	0.015	0.011	0.006	0.002	0.011	-0.007	0.007	0.012	0.052	-0.005	0.016	0.007	0.013

COLLECTION DATE	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
05/15/2012	0.002	0.018	0.006	0.015	0.067	0.143	0.006	0.037	-0.008	0.029	0.056	0.101	0.094	0.075
06/19/2012	-0.002	0.016	0.009	0.015	-0.025	0.062	-0.001	0.018	-0.017	0.027	-0.036	0.106	0.045	0.069
07/17/2012	0.003	0.011	0.004	0.012	0.006	0.058	-0.001	0.013	-0.003	0.021	0.027	0.079	0.006	0.080
08/14/2012	-0.005	0.016	-0.004	0.015	0.007	0.068	0.000	0.017	-0.003	0.022	0.015	0.107	0.107	0.052
09/11/2012	-0.005	0.011	0.032	0.014	0.007	0.046	-0.002	0.012	0.003	0.019	0.009	0.067	0.072	0.058
10/16/2012	-0.004	0.007	0.016	0.009	0.024	0.032	0.004	0.011	0.015	0.011	0.012	0.040	0.014	0.028

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

LOCATION 10

COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)	Co-60	(+/-)
05/15/2012	1.023	0.251	4.184	0.463	0.031	0.129	0.003	0.012	-0.004	0.010	0.006	0.027	0.007	0.013
06/19/2012	0.656	0.199	4.143	0.461	-0.046	0.111	-0.005	0.012	-0.010	0.012	0.009	0.026	0.012	0.015
07/17/2012	0.479	0.167	3.755	0.436	-0.092	0.108	-0.002	0.013	-0.003	0.011	-0.007	0.024	0.005	0.012
08/14/2012	0.508	0.194	3.037	0.486	-0.025	0.129	0.001	0.016	0.010	0.016	-0.020	0.032	0.005	0.017
09/11/2012	0.489	0.154	3.846	0.334	-0.053	0.079	0.000	0.009	0.001	0.008	-0.003	0.019	-0.001	0.010
10/16/2012	0.927	0.098	4.705	0.211	-0.063	0.055	0.002	0.005	-0.004	0.006	-0.002	0.012	-0.007	0.007

COLLECTION DATE	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
05/15/2012	-0.008	0.022	0.005	0.011	-0.015	0.019	-0.004	0.014	0.004	0.089	0.001	0.029	0.032	
06/19/2012	0.004	0.027	0.002	0.012	0.017	0.022	-0.004	0.012	0.050	0.101	0.004	0.033	0.002	0.020
07/17/2012	-0.022	0.026	0.006	0.012	-0.010	0.021	0.008	0.012	0.039	0.107	-0.006	0.032	-0.013	0.025
08/14/2012	-0.034	0.034	0.005	0.017	0.027	0.029	0.000	0.015	0.115	0.148	0.020	0.038	0.022	0.026
09/11/2012	-0.008	0.022	-0.001	0.009	0.000	0.016	-0.006	0.009	-0.010	0.076	0.003	0.022	0.015	0.017
10/16/2012	0.003	0.014	0.003	0.006	0.005	0.010	0.001	0.006	0.002	0.050	-0.006	0.015	-0.010	0.012

COLLECTION DATE	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
05/15/2012	-0.005	0.010	0.014	0.012	0.020	0.090	-0.005	0.017	0.029	0.024	-0.046	0.078	0.014	0.053
06/19/2012	-0.012	0.013	0.006	0.014	-0.015	0.060	0.004	0.016	0.002	0.019	-0.010	0.077	0.075	0.057
07/17/2012	-0.011	0.012	0.013	0.012	-0.034	0.062	-0.016	0.018	-0.003	0.021	0.045	0.077	0.057	0.051
08/14/2012	-0.018	0.016	0.010	0.016	-0.033	0.081	0.004	0.024	-0.003	0.019	0.036	0.075	0.100	0.065
09/11/2012	-0.017	0.010	0.018	0.014	0.001	0.044	0.003	0.013	0.004	0.015	-0.024	0.052	0.068	0.042
10/16/2012	-0.001	0.006	0.011	0.006	0.013	0.031	-0.005	0.009	0.012	0.010	-0.011	0.038	0.047	0.043

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	(+/-)
05/15/2012	1.032	0.207	3.823	0.497	0.093	0.132	-0.001	0.011	-0.001	0.010	0.003	0.024	0.001	0.012
06/19/2012	0.647	0.271	3.226	0.642	0.037	0.152	0.013	0.018	-0.009	0.016	0.006	0.045	-0.009	0.022
07/17/2012	1.439	0.374	2.755	0.760	-0.008	0.250	-0.021	0.028	0.005	0.030	-0.018	0.069	-0.027	0.035
08/14/2012	1.093	0.274	4.185	0.507	-0.025	0.117	-0.003	0.014	-0.012	0.013	-0.008	0.026	0.002	0.015
09/11/2012	1.679	0.240	4.412	0.412	0.011	0.119	0.000	0.011	0.001	0.013	-0.026	0.025	0.007	0.014
10/16/2012	1.847	0.115	3.122	0.198	-0.001	0.053	0.011	0.005	0.000	0.005	-0.011	0.011	-0.006	0.006

COLLECTION DATE	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
05/15/2012	0.012	0.024	0.008	0.010	0.005	0.024	0.002	0.013	-0.064	0.095	-0.010	0.034	0.030	
06/19/2012	-0.024	0.040	0.005	0.020	-0.007	0.034	-0.007	0.018	0.090	0.179	-0.007	0.042	-0.024	0.030
07/17/2012	-0.078	0.060	0.009	0.031	-0.009	0.056	-0.008	0.027	0.010	0.265	0.005	0.069	-0.043	0.052
08/14/2012	-0.030	0.030	-0.004	0.013	-0.005	0.022	0.002	0.012	-0.043	0.122	0.001	0.034	-0.014	0.024
09/11/2012	-0.014	0.029	-0.006	0.012	-0.015	0.020	-0.003	0.013	0.043	0.099	-0.017	0.031	0.000	0.025
10/16/2012	0.004	0.012	-0.001	0.006	0.008	0.014	-0.001	0.006	-0.010	0.046	-0.001	0.015	-0.003	0.011

COLLECTION DATE	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
05/15/2012	-0.006	0.013	0.013	0.013	0.044	0.080	0.004	0.025	0.010	0.021	-0.064	0.070	0.039	0.051
06/19/2012	0.001	0.021	0.002	0.020	0.089	0.094	-0.020	0.028	0.017	0.022	-0.012	0.084	0.039	0.159
07/17/2012	0.015	0.030	0.011	0.029	-0.065	0.141	-0.001	0.043	-0.010	0.037	-0.016	0.137	0.183	0.131
08/14/2012	-0.001	0.015	-0.006	0.016	0.002	0.061	-0.004	0.014	-0.021	0.025	-0.010	0.092	0.080	0.110
09/11/2012	-0.024	0.011	0.042	0.018	-0.015	0.064	0.004	0.017	0.010	0.021	0.070	0.079	0.007	0.044
10/16/2012	0.004	0.006	0.004	0.006	0.006	0.027	-0.007	0.008	-0.006	0.010	-0.015	0.034	0.407	0.056

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

LOCATION 26C

COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)	Co-60	(+/-)
05/15/2012	0.678	0.209	3.760	0.443	0.170	0.126	-0.007	0.011	0.003	0.009	0.000	0.028	0.004	0.012
06/19/2012	1.155	0.218	4.781	0.486	0.087	0.121	0.003	0.013	-0.002	0.012	0.037	0.029	-0.009	0.015
07/17/2012	1.028	0.253	4.128	0.499	-0.032	0.140	-0.003	0.015	0.000	0.016	0.031	0.032	0.000	0.016
08/14/2012	0.787	0.211	4.035	0.445	0.031	0.120	0.001	0.012	-0.001	0.012	0.000	0.025	-0.004	0.014
09/11/2012	2.073	0.169	3.736	0.312	0.037	0.075	0.000	0.008	0.002	0.008	-0.005	0.019	-0.001	0.011
10/16/2012	2.243	0.108	3.104	0.168	0.017	0.050	0.002	0.005	-0.003	0.005	-0.002	0.010	-0.001	0.005

COLLECTION DATE	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)	I-131	(+/-)
05/15/2012	-0.013	0.024	-0.014	0.012	0.012	0.019	-0.002	0.011	0.005	0.084	-0.004	0.028	0.035	
06/19/2012	-0.009	0.030	-0.001	0.014	-0.017	0.024	0.003	0.014	-0.112	0.137	0.024	0.037	0.001	0.023
07/17/2012	-0.047	0.034	0.000	0.015	0.000	0.027	-0.016	0.015	-0.110	0.126	0.020	0.038	0.005	0.026
08/14/2012	-0.031	0.032	0.008	0.013	-0.010	0.020	-0.008	0.014	-0.043	0.125	-0.009	0.035	-0.006	0.022
09/11/2012	-0.018	0.024	0.001	0.008	-0.001	0.013	0.001	0.008	0.015	0.070	0.018	0.022	0.010	0.017
10/16/2012	0.003	0.012	0.001	0.005	-0.001	0.009	-0.005	0.006	-0.029	0.043	-0.003	0.014	-0.004	0.011

COLLECTION DATE	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ce-141	(+/-)	Ce-144	(+/-)	Ac-228	(+/-)
05/15/2012	0.003	0.011	0.017	0.012	-0.004	0.076	-0.022	0.024	0.018	0.022	-0.006	0.070	0.032	0.042
06/19/2012	-0.029	0.016	-0.005	0.015	0.035	0.069	0.012	0.017	0.014	0.024	-0.027	0.085	0.019	0.094
07/17/2012	-0.024	0.016	-0.009	0.016	-0.007	0.070	0.012	0.016	-0.016	0.024	-0.055	0.082	-0.015	0.057
08/14/2012	-0.013	0.015	0.009	0.013	0.070	0.063	-0.014	0.018	-0.006	0.023	-0.031	0.086	0.058	0.084
09/11/2012	-0.005	0.009	-0.001	0.008	-0.006	0.042	0.009	0.012	-0.006	0.014	-0.022	0.051	0.037	0.051
10/16/2012	-0.003	0.005	0.006	0.005	0.024	0.028	-0.010	0.007	0.006	0.010	-0.032	0.034	0.064	0.044

TABLE 14
SEA WATER
(pCi/l)

LOCATION 32

COLLECTION DATE	H-3	(+/-)	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
01/31/2012	248	115	20.2	20.0	241	56	-14.02	24.60	1.37	2.33	-0.762	2.33	0.498	5.05
02/28/2012	314	116	-10.43	21.33	268	62	-0.82	23.64	-0.52	2.30	0.37	2.55	-0.53	5.18
03/27/2012	180	115	-4.93	38.02	261	92	24.25	39.21	3.04	3.88	0.20	4.06	1.84	8.75
04/24/2012	0	117	14.31	24.83	249	89	-9.93	29.49	-1.83	3.01	-1.99	2.96	2.51	5.33
05/29/2012	732	159	-19.14	24.58	284	63	10.06	27.68	-1.31	2.48	-0.44	2.72	-1.86	5.55
06/26/2012	0	112	0.86	13.45	268	39	-18.10	16.53	-0.23	1.40	-1.21	1.53	3.42	3.44
07/31/2012	0	117	16.98	35.46	230	89	24.20	42.37	1.36	3.94	2.09	3.97	10.94	8.82
08/28/2012	1180	176	-2.89	19.89	291	59	16.95	24.34	1.05	2.20	0.60	2.15	-0.84	4.69
09/25/2012	452	194	-4.80	11.05	323	34	-7.03	13.38	-0.80	1.12	0.03	1.22	2.88	2.65
10/28/2012	563	222	6.95	12.76	357	40	-5.08	16.89	-0.22	1.21	0.32	1.43	-0.88	3.08
11/27/2012	0	114	23.89	43.38	288	138	-39.27	47.14	3.95	4.95	-1.98	6.11	2.30	11.00
12/26/2012	373	143	-11.69	31.10	28	68	14.75	37.78	1.40	3.40	-3.38	3.83	4.52	8.20

DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)
01/31/2012	1.86	2.54	1.02	6.12	0.81	2.27	2.44	3.97	0.36	2.76	19.5	22.9	-0.072	6.24
02/28/2012	-0.23	2.41	2.06	5.73	1.15	2.46	-0.91	4.57	-0.04	2.52	-15.08	22.18	-4.34	6.38
03/27/2012	0.56	4.14	-12.03	9.29	1.19	4.00	6.57	8.77	2.59	4.67	9.26	34.60	0.43	11.12
04/24/2012	-1.01	3.04	0.37	8.22	1.21	3.01	-0.79	5.24	0.95	3.18	11.76	25.65	-1.36	9.00
05/29/2012	0.23	2.90	-7.20	6.67	0.19	2.67	2.60	4.58	2.15	3.12	10.56	24.55	-4.89	7.38
06/26/2012	0.75	1.76	-0.97	3.48	-0.71	1.52	1.53	2.73	-1.56	1.77	-5.06	12.22	1.14	3.40
07/31/2012	1.28	3.77	-0.23	9.06	2.86	4.09	-0.26	7.67	1.64	4.35	12.74	37.43	12.60	11.08
08/28/2012	-0.01	2.34	-2.56	4.71	2.82	2.32	-1.52	3.93	0.25	2.30	-5.71	20.87	-5.24	6.37
09/25/2012	0.62	1.33	-0.17	2.80	0.62	1.27	2.01	2.08	-0.34	1.39	3.42	10.48	1.87	3.02
10/28/2012	0.24	1.37	-6.50	2.93	0.80	1.50	0.50	2.49	-1.43	1.67	-9.39	11.32	-0.23	3.69
11/27/2012	1.41	5.08	-4.66	11.12	-4.13	5.08	1.79	8.44	-0.16	5.11	20.84	49.28	-1.80	13.03
12/26/2012	0.39	3.19	3.17	8.32	0.77	3.89	0.66	6.84	-1.45	4.38	-6.24	32.04	-10.17	11.66

DATE	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ac-228	(+/-)
01/31/2012	4.93	5.79	-1.53	2.82	-2.13	2.62	-3.01	13.6	-4.23	4.40	-4.45	9.74
02/28/2012	1.20	4.28	-1.68	2.84	2.63	2.74	1.10	11.88	-2.84	3.43	3.74	11.13
03/27/2012	2.85	7.47	-5.53	4.32	-2.21	4.50	0.60	22.82	0.84	6.61	9.71	18.66
04/24/2012	1.40	5.83	-1.32	3.27	-2.40	3.21	2.47	14.76	1.15	5.06	2.40	12.92
05/29/2012	-3.67	9.06	0.72	2.55	-0.31	2.81	8.88	20.11	0.66	5.06	-1.39	10.09
06/26/2012	2.29	6.82	-5.33	1.39	-0.43	1.35	-8.60	12.35	0.79	4.68	0.18	7.80
07/31/2012	0.16	8.63	0.14	3.99	0.81	4.05	11.38	22.41	4.86	6.55	-13.50	14.88
08/28/2012	-3.28	4.24	0.15	2.59	-0.34	2.40	0.09	11.21	3.00	3.18	2.06	8.49
09/25/2012	-3.92	4.26	1.87	1.20	-1.52	1.19	-2.41	8.64	0.92	2.81	0.56	5.10
10/28/2012	-2.70	6.20	-0.11	1.36	0.46	1.26	1.76	11.52	-3.39	3.66	1.00	5.38
11/27/2012	4.23	9.82	-2.89	4.24	-1.56	5.31	8.08	25.92	-6.15	9.05	12.01	19.27
12/26/2012	4.14	7.96	-0.31	3.88	-3.19	3.55	-13.30	20.10	-4.86	6.78	25.67	15.83

TABLE 14
SEA WATER
(pCi/l)

LOCATION 37C

COLLECTION DATE	H-3	(+/-)	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
03/20/2012	-86	109	1.15	30.25	215	76	-23.17	29.57	2.57	3.07	0.76	3.87	1.20	7.76
06/12/2012	-19	113	-11.64	34.27	260	94	0.58	35.61	3.33	3.17	-0.52	3.56	-5.16	7.31
08/14/2012	-36	103	29.13	34.52	250	108	16.14	38.86	0.82	3.85	1.04	4.56	-0.93	8.94
11/13/2012	47	107	-19.80	30.50	221	84	-6.89	31.16	2.51	3.00	-2.44	3.56	0.24	6.41

236.6

DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)	Sb-125	(+/-)
03/20/2012	1.02	3.64	-10.16	8.36	1.27	3.58	-3.55	5.90	-2.64	3.84	-0.21	31.16	4.60	8.95
06/12/2012	-1.18	3.50	-6.98	8.10	-1.01	3.74	-3.29	6.73	-2.74	4.15	22.77	34.94	1.16	9.25
08/14/2012	0.28	4.39	-5.26	9.67	0.12	4.34	1.02	6.90	-3.04	4.68	9.20	36.84	8.28	11.21
11/13/2012	2.06	3.08	-1.55	7.00	6.74	3.90	-2.03	5.90	-1.29	3.60	-2.61	29.39	-0.61	9.77

DATE	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ba-140	(+/-)	La-140	(+/-)	Ac-228	(+/-)
03/20/2012	2.09	6.27	-1.59	4.05	0.19	3.70	9.80	16.46	1.26	6.19	13.92	13.28
06/12/2012	0.96	5.92	2.20	3.62	0.71	3.65	-4.52	17.60	-2.60	4.68	-3.49	13.10
08/14/2012	11.72	10.66	-2.97	4.50	1.94	4.03	-20.64	26.50	4.41	8.16	-15.52	14.46
11/13/2012	0.29	6.23	-0.42	3.31	-1.69	3.47	7.33	17.13	3.31	4.93	1.03	13.16

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

LOCATION	COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
31	02/21/2012	-0.014	0.154	20.43	0.94	0.108	0.160	0.023	0.020	-0.011	0.019	-0.038	0.043
31	10/22/2012	0.014	0.301	15.39	1.16	0.308	0.327	-0.021	0.033	0.019	0.034	0.027	0.072
32	06/28/2012	0.342	0.369	14.93	1.45	-0.245	0.517	0.022	0.039	0.005	0.044	-0.059	0.099
32	10/17/2012	0.102	0.366	18.32	1.50	0.018	0.415	-0.026	0.040	0.004	0.043	0.026	0.094
33	02/22/2012	-0.061	0.140	17.22	0.90	0.016	0.140	0.001	0.019	0.007	0.019	0.022	0.043
33	10/24/2012	0.051	0.264	14.62	1.08	-0.135	0.253	0.019	0.029	-0.004	0.032	0.001	0.065
34	02/21/2012	0.130	0.162	14.80	0.80	-0.114	0.169	0.015	0.018	-0.004	0.019	0.003	0.041
34	10/24/2012	0.147	0.212	16.84	1.25	-0.156	0.224	-0.023	0.024	-0.023	0.025	-0.020	0.060
39	06/29/2012	0.081	0.341	20.53	1.54	-0.088	0.426	0.037	0.035	-0.004	0.039	0.040	0.096
39	10/17/2012	0.015	0.251	16.98	1.25	0.110	0.314	0.009	0.032	-0.034	0.031	0.050	0.073
37	02/22/2012	0.010	0.129	17.11	0.95	0.104	0.150	0.006	0.018	-0.006	0.017	-0.020	0.042
37	10/22/2012	0.001	0.265	16.49	1.29	-0.102	0.268	-0.017	0.034	-0.009	0.031	-0.035	0.072
67	02/22/2012	0.129	0.223	22.52	1.15	0.150	0.250	0.004	0.028	0.007	0.026	0.011	0.060
67	11/30/2012	0.078	0.161	23.33	0.91	0.093	0.170	0.014	0.019	-0.006	0.019	-0.023	0.044

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

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
31	02/21/2012	0.006	0.023	-0.025	0.051	-0.022	0.019	-0.026	0.033	-0.001	0.018	-0.053	0.162
31	10/22/2012	-0.036	0.036	-0.088	0.083	-0.013	0.035	0.005	0.059	-0.008	0.039	-0.016	0.320
32	06/28/2012	0.001	0.045	0.021	0.093	0.016	0.049	-0.010	0.082	0.007	0.049	-0.217	0.354
32	10/17/2012	0.008	0.049	-0.011	0.098	0.005	0.042	0.005	0.077	-0.041	0.044	0.135	0.350
33	02/22/2012	0.015	0.025	0.002	0.054	0.013	0.021	0.030	0.031	0.006	0.017	-0.001	0.148
33	10/24/2012	-0.022	0.040	-0.026	0.087	0.019	0.033	-0.002	0.053	-0.010	0.030	-0.008	0.258
34	02/21/2012	-0.011	0.024	-0.001	0.050	0.015	0.019	0.017	0.031	-0.011	0.019	-0.061	0.167
34	10/24/2012	0.021	0.033	-0.029	0.070	0.002	0.030	-0.027	0.049	-0.016	0.028	-0.119	0.231
37	02/22/2012	0.003	0.024	-0.008	0.052	0.007	0.018	0.033	0.030	-0.002	0.016	-0.023	0.146
37	10/22/2012	-0.061	0.043	-0.144	0.085	0.009	0.037	0.078	0.061	-0.018	0.033	-0.124	0.296
39	06/29/2012	0.022	0.047	-0.159	0.106	0.090	0.044	0.021	0.067	0.002	0.041	0.236	0.313
39	10/17/2012	0.024	0.035	0.036	0.074	0.015	0.036	0.002	0.056	0.006	0.034	0.128	0.265
67	02/22/2012	-0.017	0.037	-0.025	0.075	0.031	0.028	0.000	0.046	0.007	0.028	0.027	0.233
67	11/30/2012	-0.014	0.026	0.010	0.052	0.026	0.021	0.020	0.034	-0.001	0.020	-0.036	0.151

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

LOCATION	COLLECTION DATE	Ag-110M	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ac-228	(+/-)
31	02/21/2012	-0.019	0.018	0.009	0.045	0.013	0.029	-0.003	0.020	0.023	0.021	0.942	0.158
31	10/22/2012	0.027	0.034	0.051	0.099	-0.051	0.072	0.018	0.037	-0.003	0.037	1.239	0.257
32	06/28/2012	-0.031	0.038	-0.067	0.102	0.015	0.219	0.008	0.040	0.040	0.042	0.139	0.344
32	10/17/2012	-0.003	0.040	0.021	0.098	-0.031	0.118	0.002	0.044	0.141	0.066	0.874	0.306
33	02/22/2012	-0.018	0.017	0.009	0.044	-0.028	0.025	0.001	0.018	0.021	0.019	0.251	0.106
33	10/24/2012	-0.028	0.030	-0.026	0.081	0.015	0.051	-0.012	0.033	0.019	0.032	0.134	0.246
34	02/21/2012	-0.005	0.018	-0.015	0.049	-0.009	0.031	-0.007	0.020	0.001	0.020	0.007	0.131
34	10/24/2012	-0.025	0.022	0.034	0.067	-0.005	0.043	-0.012	0.028	0.000	0.026	0.065	0.239
37	02/22/2012	-0.002	0.017	0.002	0.042	-0.001	0.025	0.004	0.017	0.001	0.019	0.077	0.149
37	10/22/2012	0.034	0.031	-0.025	0.077	0.029	0.059	0.008	0.031	-0.024	0.034	0.258	0.371
39	06/29/2012	-0.050	0.036	0.008	0.081	0.031	0.166	0.013	0.035	0.016	0.039	0.643	0.207
39	10/17/2012	-0.015	0.032	-0.035	0.074	-0.055	0.092	0.015	0.031	0.005	0.035	1.040	0.201
67	02/22/2012	-0.030	0.027	-0.057	0.071	-0.016	0.041	0.009	0.028	0.038	0.028	0.117	0.204
67	11/30/2012	-0.023	0.018	-0.008	0.046	-0.030	0.048	0.000	0.020	0.018	0.020	0.054	0.161

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	03/14/2012	0.0718	0.0593	6.7880	0.3514	0.0198	0.0591	0.0037	0.0066	0.0030	0.0072	0.0160	0.0174
29	06/06/2012	0.1269	0.1088	6.6340	0.5444	0.0275	0.1069	-0.0036	0.0115	0.0062	0.0132	-0.0025	0.0304
29	09/07/2012	0.0854	0.0281	6.2230	0.1111	-0.0055	0.0264	0.0015	0.0022	0.0004	0.0025	-0.0029	0.0061
29	12/19/2012	0.2648	0.0408	7.0060	0.1415	-0.0042	0.0304	-0.0003	0.0027	-0.0005	0.0030	0.0022	0.0084
32	02/21/2012	-0.0075	0.1202	8.7370	0.6743	0.0214	0.1208	-0.0002	0.0157	0.0052	0.0154	0.0213	0.0342
32	05/24/2012	0.1870	0.0978	6.4480	0.6397	-0.0370	0.1023	0.0027	0.0118	0.0075	0.0130	0.0152	0.0285
32	07/26/2012	0.0916	0.0466	8.1220	0.2040	-0.0182	0.0389	0.0015	0.0040	0.0050	0.0043	-0.0031	0.0108
32	10/24/2012	0.1776	0.0942	8.5820	0.5395	0.0225	0.0903	-0.0004	0.0118	-0.0041	0.0113	-0.0210	0.0266
35	02/21/2012	0.1084	0.0912	5.9730	0.5331	0.0032	0.0855	0.0014	0.0110	-0.0016	0.0134	-0.0008	0.0267
35	06/21/2012	0.1200	0.0707	6.7820	0.2061	0.0214	0.0557	0.0036	0.0044	-0.0045	0.0050	-0.0030	0.0130
35	08/21/2012	0.1463	0.0668	5.9300	0.2324	0.0006	0.0432	-0.0002	0.0051	0.0004	0.0048	-0.0057	0.0111
35	11/29/2012	0.0663	0.0448	7.5570	0.1891	0.0240	0.0384	0.0022	0.0035	-0.0019	0.0036	0.0038	0.0085
36	03/14/2012	0.1326	0.1047	5.7980	0.3667	-0.0257	0.0735	0.0050	0.0078	-0.0037	0.0076	-0.0010	0.0180
36	05/24/2012	0.0490	0.1086	6.2550	0.5924	-0.0473	0.1159	-0.0058	0.0116	0.0017	0.0104	0.0136	0.0277
36	08/22/2012	0.1048	0.0865	6.1320	0.3278	0.0004	0.0726	-0.0033	0.0068	0.0023	0.0070	0.0129	0.0160
36	11/29/2012	0.0934	0.0508	6.2520	0.2147	-0.0122	0.0560	-0.0038	0.0053	-0.0060	0.0056	-0.0052	0.0120
90	02/21/2012	0.2004	0.1143	5.6030	0.3771	0.0248	0.0764	0.0038	0.0085	0.0020	0.0083	-0.0002	0.0209
90	05/23/2012	0.1306	0.1128	6.2710	0.3505	0.0736	0.0892	0.0044	0.0075	-0.0024	0.0079	0.0087	0.0211
90	08/21/2012	0.1470	0.0967	6.3690	0.3356	-0.0185	0.0670	-0.0014	0.0082	0.0016	0.0081	-0.0097	0.0201
90	10/24/2012	0.3268	0.1831	7.9100	0.6060	0.0539	0.1067	-0.0078	0.0144	-0.0013	0.0148	0.0064	0.0341

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	03/14/2012	-0.0018	0.0099	-0.0109	0.0177	0.0011	0.0067	0.0030	0.0125	-0.0012	0.0068	-0.0216	0.0615
29	06/06/2012	0.0036	0.0159	-0.0310	0.0339	-0.0045	0.0142	0.0047	0.0226	0.0061	0.0131	-0.0090	0.1110
29	09/07/2012	0.0030	0.0030	-0.0016	0.0065	0.0016	0.0025	0.0015	0.0043	0.0018	0.0031	-0.0015	0.0190
29	12/19/2012	-0.0002	0.0044	-0.0105	0.0075	0.0006	0.0031	0.0027	0.0054	-0.0005	0.0033	-0.0103	0.0243
32	02/21/2012	0.0080	0.0201	-0.0484	0.0384	-0.0163	0.0157	-0.0134	0.0294	-0.0010	0.0149	-0.0304	0.1399
32	05/24/2012	-0.0178	0.0156	-0.0207	0.0326	-0.0068	0.0117	-0.0077	0.0221	0.0012	0.0115	0.0870	0.0937
32	07/26/2012	0.0004	0.0057	-0.0218	0.0113	0.0039	0.0044	-0.0032	0.0079	-0.0032	0.0042	0.0147	0.0355
32	10/24/2012	0.0131	0.0154	-0.0062	0.0294	0.0074	0.0111	0.0031	0.0197	-0.0008	0.0101	-0.0297	0.0993
35	02/21/2012	0.0002	0.0147	-0.0074	0.0325	-0.0016	0.0125	-0.0083	0.0210	-0.0041	0.0113	-0.0146	0.1095
35	06/21/2012	0.0042	0.0059	-0.0087	0.0117	0.0002	0.0050	0.0025	0.0090	-0.0019	0.0057	0.0097	0.0398
35	08/21/2012	0.0032	0.0064	-0.0163	0.0120	-0.0007	0.0050	0.0035	0.0084	-0.0013	0.0048	0.0002	0.0397
35	11/29/2012	-0.0009	0.0043	0.0050	0.0095	0.0004	0.0038	0.0010	0.0067	0.0006	0.0040	0.0118	0.0313
36	03/14/2012	0.0060	0.0099	-0.0232	0.0182	0.0038	0.0074	0.0002	0.0130	-0.0028	0.0076	0.0058	0.0647
36	05/24/2012	-0.0022	0.0136	-0.0117	0.0258	0.0054	0.0097	0.0031	0.0177	-0.0022	0.0132	0.0736	0.1123
36	08/22/2012	0.0013	0.0080	-0.0140	0.0175	0.0038	0.0073	0.0061	0.0117	-0.0019	0.0075	0.0401	0.0603
36	11/29/2012	0.0025	0.0059	-0.0002	0.0136	0.0057	0.0058	0.0009	0.0097	0.0009	0.0060	-0.0121	0.0465
90	02/21/2012	0.0002	0.0104	-0.0326	0.0224	0.0070	0.0084	0.0165	0.0142	-0.0016	0.0087	0.0248	0.0741
90	05/23/2012	0.0058	0.0095	-0.0094	0.0189	0.0064	0.0083	0.0039	0.0145	-0.0041	0.0095	0.0742	0.0733
90	08/21/2012	-0.0058	0.0112	0.0158	0.0231	0.0078	0.0084	-0.0051	0.0143	-0.0024	0.0082	-0.0079	0.0652
90	10/24/2012	-0.0153	0.0184	-0.0317	0.0365	-0.0058	0.0147	-0.0122	0.0253	-0.0026	0.0139	0.0416	0.1230

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	03/14/2012	0.0017	0.0066	-0.0098	0.0174	0.0367	0.0155	-0.0119	0.0082	0.0040	0.0067	0.0696	0.0464
29	06/06/2012	-0.0023	0.0109	-0.0002	0.0305	0.0041	0.0234	0.0029	0.0136	-0.0130	0.0125	0.0313	0.0737
29	09/07/2012	0.0005	0.0021	0.0019	0.0055	0.0014	0.0100	-0.0005	0.0024	0.0000	0.0023	0.0383	0.0169
29	12/19/2012	0.0017	0.0025	0.0029	0.0065	0.0185	0.0156	-0.0029	0.0028	-0.0005	0.0028	0.0589	0.0194
32	02/21/2012	0.0080	0.0142	0.0042	0.0377	0.0164	0.0225	-0.0008	0.0161	-0.0018	0.0161	0.0417	0.0594
32	05/24/2012	0.0099	0.0119	-0.0153	0.0268	0.0039	0.0344	-0.0017	0.0109	-0.0103	0.0141	0.0525	0.0525
32	07/26/2012	-0.0032	0.0039	-0.0082	0.0098	0.0238	0.0151	-0.0009	0.0045	0.0013	0.0042	0.0476	0.0245
32	10/24/2012	-0.0038	0.0118	0.0068	0.0280	0.0162	0.0174	0.0019	0.0119	-0.0031	0.0131	0.0730	0.0832
35	02/21/2012	-0.0058	0.0107	0.0002	0.0283	0.0112	0.0173	-0.0004	0.0129	0.0033	0.0119	0.0344	0.0563
35	06/21/2012	0.0012	0.0043	-0.0011	0.0112	0.0329	0.0281	-0.0147	0.0046	-0.0021	0.0046	0.0188	0.0307
35	08/21/2012	-0.0018	0.0043	-0.0015	0.0121	0.0258	0.0138	-0.0011	0.0050	0.0028	0.0047	0.0109	0.0363
35	11/29/2012	0.0017	0.0034	0.0020	0.0094	0.0056	0.0108	0.0007	0.0036	-0.0023	0.0038	0.0780	0.0341
36	03/14/2012	0.0039	0.0071	0.0125	0.0211	0.0053	0.0136	0.0002	0.0079	-0.0029	0.0077	0.0473	0.0322
36	05/24/2012	0.0047	0.0097	-0.0047	0.0296	-0.0024	0.0346	-0.0059	0.0100	-0.0039	0.0105	0.0863	0.0912
36	08/22/2012	-0.0018	0.0067	0.0059	0.0199	0.0009	0.0147	-0.0008	0.0073	0.0061	0.0072	0.0146	0.0508
36	11/29/2012	0.0022	0.0049	0.0103	0.0140	0.0082	0.0157	-0.0031	0.0058	-0.0023	0.0053	0.0981	0.0342
90	02/21/2012	-0.0041	0.0076	0.0136	0.0231	0.0311	0.0220	-0.0190	0.0090	0.0001	0.0083	0.0444	0.0402
90	05/23/2012	0.0041	0.0066	-0.0003	0.0213	0.0157	0.0263	-0.0030	0.0088	-0.0005	0.0079	0.0737	0.0471
90	08/21/2012	-0.0022	0.0069	0.0053	0.0197	0.3548	0.0313	0.0021	0.0078	0.0002	0.0075	0.0591	0.0446
90	10/24/2012	-0.0098	0.0133	0.0085	0.0319	0.1313	0.0390	-0.0088	0.0138	0.0077	0.0142	0.0695	0.0975

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

LOCATION	COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
29	07/17/2012	0.030	0.078	4.71	0.30	-0.035	0.098	-0.001	0.008	-0.003	0.009	-0.002	0.021
32	05/25/2012	-0.007	0.079	5.01	0.28	0.106	0.099	-0.003	0.008	-0.008	0.009	0.014	0.020
32	10/24/2012	0.032	0.214	4.81	0.85	-0.024	0.221	0.005	0.021	-0.008	0.025	0.023	0.047
35	08/13/2012	0.013	0.158	4.35	0.58	0.135	0.159	-0.009	0.019	0.006	0.018	-0.015	0.040
35	10/09/2012	-0.044	0.203	4.72	0.65	-0.055	0.212	-0.007	0.022	-0.017	0.022	0.001	0.051
35	10/24/2012	0.000	0.226	4.13	0.90	0.015	0.245	-0.021	0.024	-0.023	0.025	-0.003	0.048

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
29	07/17/2012	0.000	0.009	0.015	0.021	-0.010	0.009	-0.004	0.016	0.003	0.010	0.032	0.074
32	05/25/2012	-0.001	0.009	0.012	0.022	0.018	0.010	0.008	0.017	0.002	0.010	-0.007	0.075
32	10/24/2012	-0.014	0.029	0.000	0.065	0.010	0.026	0.004	0.040	-0.022	0.026	0.009	0.247
35	08/13/2012	0.005	0.022	0.020	0.045	0.009	0.019	0.016	0.031	0.003	0.018	-0.089	0.149
35	10/09/2012	0.004	0.024	-0.099	0.057	0.019	0.023	0.000	0.040	0.001	0.024	0.034	0.209
35	10/24/2012	0.005	0.027	0.019	0.056	-0.015	0.033	0.005	0.050	-0.004	0.030	-0.039	0.266

LOCATION	COLLECTION DATE	Ag-110M	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ac-228	(+/-)
29	07/17/2012	0.001	0.008	-0.006	0.020	0.003	0.050	0.003	0.009	0.000	0.009	0.002	0.042
32	05/25/2012	-0.009	0.008	0.001	0.021	-0.003	0.044	0.004	0.010	0.002	0.009	0.033	0.045
32	10/24/2012	-0.002	0.021	0.008	0.063	-0.006	0.039	0.003	0.025	0.019	0.023	-0.074	0.100
35	08/13/2012	0.002	0.018	-0.046	0.050	-0.008	0.032	0.000	0.021	0.014	0.020	-0.032	0.069
35	10/09/2012	0.009	0.021	0.026	0.062	0.028	0.045	-0.004	0.028	-0.006	0.023	-0.055	0.095
35	10/24/2012	-0.002	0.024	-0.022	0.075	0.004	0.046	0.021	0.027	-0.004	0.031	0.017	0.100

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

LOCATION	COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
29	10/09/2012	0.035	0.173	4.40	0.58	-0.058	0.182	-0.005	0.018	0.002	0.019	-0.034	0.040
32	04/19/2012	0.056	0.101	3.58	0.33	-0.011	0.123	0.001	0.011	0.000	0.012	-0.004	0.026
32	10/24/2012	0.123	0.243	5.17	0.93	0.137	0.248	0.021	0.024	-0.012	0.028	0.027	0.046
35	04/24/2012	0.070	0.108	3.74	0.46	0.073	0.117	0.005	0.011	-0.006	0.011	0.001	0.022
35	05/07/2012	0.014	0.109	4.83	0.37	-0.082	0.115	-0.006	0.013	0.004	0.014	0.007	0.025
35	07/27/2012	-0.016	0.086	4.42	0.32	-0.084	0.104	-0.005	0.010	-0.006	0.011	0.002	0.022

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
29	10/09/2012	0.007	0.021	-0.040	0.050	0.009	0.022	-0.004	0.033	-0.003	0.019	0.011	0.177
32	04/19/2012	0.009	0.012	0.010	0.025	0.010	0.012	0.002	0.020	0.002	0.013	0.003	0.100
32	10/24/2012	0.007	0.023	0.000	0.053	0.004	0.024	0.026	0.048	-0.028	0.028	0.039	0.235
35	04/24/2012	0.001	0.011	-0.010	0.023	0.006	0.012	-0.008	0.020	-0.014	0.013	-0.135	0.103
35	05/07/2012	-0.005	0.013	0.016	0.028	0.015	0.013	0.016	0.022	0.001	0.014	-0.069	0.110
35	07/27/2012	0.006	0.014	0.004	0.024	0.005	0.011	0.011	0.018	-0.006	0.011	-0.062	0.087

LOCATION	COLLECTION DATE	Ag-110M	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ac-228	(+/-)
29	10/09/2012	0.014	0.017	0.027	0.052	0.003	0.040	-0.003	0.023	0.005	0.020	-0.050	0.074
32	04/19/2012	-0.004	0.010	0.014	0.029	-0.028	0.037	-0.014	0.013	0.000	0.012	-0.004	0.052
32	10/24/2012	0.021	0.023	-0.024	0.072	-0.033	0.045	-0.014	0.029	0.010	0.026	-0.030	0.109
35	04/24/2012	-0.006	0.011	0.007	0.031	-0.018	0.024	0.002	0.012	0.000	0.015	0.045	0.057
35	05/07/2012	0.011	0.012	0.004	0.034	-0.023	0.026	-0.009	0.014	-0.002	0.014	0.016	0.086
35	07/27/2012	0.000	0.009	0.002	0.024	0.024	0.038	-0.004	0.011	0.002	0.010	0.012	0.072

TABLE 18
MUSSELS
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
30	03/08/2012	0.132	0.086	2.264	0.192	-0.010	0.078	-0.003	0.007	0.000	0.007	0.010	0.015
30	05/16/2012	0.597	0.289	1.421	0.469	-0.064	0.206	0.000	0.021	0.002	0.021	0.021	0.038
30	08/29/2012	0.118	0.161	0.942	0.415	0.021	0.174	-0.011	0.018	-0.001	0.018	0.002	0.037
35	06/21/2012	-0.312	0.532	1.520	0.914	0.017	0.716	0.037	0.045	0.021	0.058	-0.061	0.115

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
30	03/08/2012	0.000	0.007	-0.009	0.017	-0.003	0.010	0.015	0.013	0.002	0.008	-0.027	0.066
30	05/16/2012	-0.007	0.018	-0.043	0.047	0.000	0.020	-0.002	0.036	0.021	0.022	-0.094	0.182
30	08/29/2012	0.004	0.017	-0.028	0.040	-0.007	0.019	0.004	0.034	0.022	0.019	-0.084	0.181
35	06/21/2012	0.028	0.050	-0.098	0.116	0.059	0.065	0.042	0.107	-0.009	0.072	-0.130	0.407

LOCATION	COLLECTION DATE	Ag-110M	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ac-228	(+/-)
30	03/08/2012	0.001	0.007	0.009	0.019	0.002	0.022	-0.006	0.008	0.001	0.007	0.028	0.039
30	05/16/2012	0.006	0.018	0.014	0.053	0.018	0.052	-0.053	0.024	-0.004	0.020	0.033	0.074
30	08/29/2012	0.008	0.017	-0.019	0.049	0.005	0.034	-0.006	0.022	0.001	0.019	0.072	0.153
35	06/21/2012	0.011	0.046	-0.037	0.143	0.041	0.411	-0.037	0.055	-0.030	0.049	-0.135	0.185

TABLE 19
OYSTERS
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
31	03/28/2012	-0.086	0.229	2.16	0.68	-0.083	0.216	-0.008	0.027	0.001	0.023	-0.011	0.050
31	06/28/2012	0.067	0.091	2.37	0.25	0.051	0.115	-0.002	0.009	-0.007	0.012	0.014	0.020
31	09/26/2012	0.001	0.155	1.67	0.54	-0.009	0.170	0.013	0.018	0.002	0.020	-0.036	0.040
31	12/03/2012	0.023	0.077	2.47	0.25	-0.047	0.083	0.005	0.009	0.000	0.009	-0.001	0.018
32	02/21/2012	0.032	0.135	2.08	0.39	-0.093	0.135	0.005	0.014	0.008	0.013	0.035	0.031
32	06/28/2012	0.006	0.091	1.75	0.22	0.056	0.112	-0.005	0.009	-0.004	0.010	0.014	0.019
32	09/29/2012	0.065	0.186	1.63	0.40	-0.069	0.192	0.003	0.015	-0.010	0.020	0.024	0.040
32	12/12/2012	0.047	0.224	1.86	0.43	0.016	0.248	-0.003	0.023	0.002	0.022	0.009	0.043
34	01/17/2012	-0.001	0.083	1.89	0.26	0.017	0.099	-0.003	0.009	-0.002	0.010	-0.018	0.020
36	06/28/2012	0.008	0.065	1.51	0.20	-0.052	0.082	0.005	0.007	-0.001	0.008	-0.009	0.017
37C	01/20/2012	0.022	0.053	1.52	0.16	0.003	0.060	0.006	0.006	-0.004	0.006	0.003	0.012
37C	03/30/2012	0.053	0.165	1.48	0.34	-0.094	0.191	0.011	0.015	-0.007	0.019	-0.023	0.035
37C	06/28/2012	-0.002	0.049	1.47	0.17	-0.017	0.053	0.000	0.005	0.006	0.006	-0.008	0.012
37C	09/28/2012	-0.088	0.215	1.52	0.53	0.135	0.228	-0.012	0.023	-0.022	0.024	-0.018	0.050
37C	12/05/2012	0.033	0.089	2.11	0.28	0.052	0.101	-0.001	0.010	-0.014	0.010	-0.023	0.021
88	03/28/2012	-0.126	0.292	2.11	0.81	-0.143	0.271	-0.011	0.030	-0.007	0.031	-0.018	0.059
88	09/26/2012	0.008	0.160	2.05	0.39	0.054	0.171	-0.007	0.016	0.013	0.018	-0.021	0.039
88	12/05/2012	0.021	0.033	2.15	0.21	0.022	0.035	0.002	0.003	-0.003	0.004	-0.005	0.008

TABLE 19
OYSTERS
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
31	03/28/2012	-0.016	0.023	-0.016	0.056	0.009	0.026	-0.005	0.046	-0.009	0.025	-0.145	0.221
31	06/28/2012	0.007	0.009	-0.048	0.021	0.002	0.011	-0.013	0.019	0.009	0.012	0.061	0.087
31	09/26/2012	0.007	0.023	-0.066	0.044	-0.013	0.019	0.009	0.036	0.003	0.020	-0.085	0.161
31	12/03/2012	0.010	0.010	0.004	0.021	0.007	0.009	0.008	0.016	-0.005	0.009	0.014	0.081
32	02/21/2012	0.003	0.016	-0.026	0.034	-0.005	0.014	-0.001	0.026	0.000	0.015	-0.014	0.118
32	06/28/2012	-0.001	0.008	0.013	0.021	0.033	0.011	0.001	0.018	-0.013	0.012	0.008	0.083
32	09/29/2012	0.000	0.018	-0.056	0.044	-0.007	0.019	0.011	0.029	0.012	0.022	-0.053	0.163
32	12/12/2012	-0.011	0.023	-0.030	0.050	0.121	0.031	-0.015	0.049	-0.007	0.028	0.051	0.240
34	01/17/2012	0.014	0.009	0.020	0.021	0.011	0.010	0.001	0.017	-0.006	0.010	-0.018	0.081
36	06/28/2012	-0.002	0.007	-0.005	0.016	0.008	0.008	0.007	0.013	0.001	0.008	-0.003	0.062
37	01/20/2012	-0.004	0.006	-0.005	0.014	0.007	0.006	-0.008	0.010	-0.001	0.007	0.021	0.050
37	03/30/2012	0.006	0.014	-0.008	0.037	-0.011	0.021	-0.007	0.030	-0.006	0.021	0.001	0.157
37	06/28/2012	0.003	0.007	-0.004	0.014	0.003	0.006	-0.003	0.010	-0.002	0.006	0.037	0.044
37	09/28/2012	0.002	0.022	-0.069	0.053	0.021	0.022	0.021	0.039	0.008	0.027	-0.022	0.216
37	12/05/2012	0.000	0.011	-0.006	0.025	0.017	0.012	0.001	0.018	-0.001	0.011	-0.021	0.093
88	03/28/2012	0.037	0.031	0.023	0.068	-0.016	0.030	0.045	0.057	0.026	0.033	-0.002	0.288
88	09/26/2012	0.015	0.018	-0.022	0.039	-0.006	0.019	-0.039	0.030	-0.018	0.019	0.000	0.145
88	12/05/2012	0.000	0.004	0.003	0.008	-0.004	0.004	-0.001	0.006	0.001	0.004	-0.008	0.036

TABLE 19
OYSTERS
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Ag-110M	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ac-228	(+/-)
31	03/28/2012	-0.002	0.025	-0.016	0.068	0.002	0.039	-0.012	0.028	-0.004	0.027	0.006	0.094
31	06/28/2012	-0.008	0.009	0.001	0.025	-0.001	0.043	-0.010	0.012	-0.001	0.010	-0.047	0.041
31	09/26/2012	0.009	0.017	0.050	0.044	-0.005	0.061	0.002	0.019	-0.010	0.019	-0.005	0.070
31	12/03/2012	0.002	0.008	0.007	0.023	-0.006	0.018	-0.004	0.010	-0.003	0.009	-0.012	0.037
32	02/21/2012	0.012	0.015	0.017	0.042	-0.003	0.025	0.005	0.016	-0.012	0.016	0.002	0.104
32	06/28/2012	0.084	0.011	-0.005	0.025	-0.003	0.043	-0.011	0.010	0.005	0.012	0.002	0.052
32	09/29/2012	-0.008	0.017	0.045	0.051	-0.038	0.047	-0.006	0.021	0.004	0.018	-0.035	0.073
32	12/12/2012	0.335	0.033	-0.090	0.072	0.040	0.055	-0.017	0.030	0.031	0.030	-0.055	0.088
34	01/17/2012	-0.002	0.009	0.005	0.023	-0.012	0.031	-0.007	0.010	0.009	0.010	0.021	0.098
36	06/28/2012	-0.006	0.007	0.002	0.018	-0.007	0.031	0.002	0.007	0.001	0.007	0.003	0.029
37	01/20/2012	0.006	0.005	-0.020	0.016	-0.011	0.016	0.005	0.006	-0.004	0.006	-0.015	0.027
37	03/30/2012	-0.003	0.017	-0.028	0.049	0.007	0.053	0.004	0.017	0.003	0.018	0.090	0.112
37	06/28/2012	-0.002	0.005	-0.010	0.013	-0.002	0.021	-0.002	0.006	0.006	0.006	0.015	0.034
37	09/28/2012	0.002	0.021	-0.019	0.057	-0.068	0.064	-0.030	0.026	0.004	0.022	0.116	0.111
37	12/05/2012	-0.013	0.010	0.006	0.029	-0.005	0.020	-0.006	0.012	-0.018	0.013	0.012	0.060
88	03/28/2012	0.016	0.029	-0.034	0.087	-0.018	0.052	-0.004	0.036	-0.024	0.030	0.083	0.124
88	09/26/2012	0.002	0.014	-0.037	0.043	-0.003	0.052	-0.005	0.018	-0.003	0.016	-0.026	0.070
88	12/05/2012	0.005	0.004	0.002	0.010	0.003	0.006	-0.001	0.004	0.002	0.005	-0.021	0.022

TABLE 20
CLAMS
(pCi/g wet wt.)

LOCATION	COLLECTION DATE	Be-7	(+/-)	K-40	(+/-)	Cr-51	(+/-)	Mn-54	(+/-)	Co-58	(+/-)	Fe-59	(+/-)
29	03/14/2012	0.067	0.052	2.39	0.19	0.028	0.057	-0.005	0.006	-0.003	0.006	0.013	0.012
29	06/06/2012	0.030	0.135	1.93	0.51	0.028	0.180	0.006	0.018	0.008	0.016	0.026	0.034
29	07/24/2012	0.036	0.083	1.95	0.26	-0.014	0.092	0.001	0.009	0.003	0.010	0.001	0.019
29	11/30/2012	0.049	0.080	2.52	0.31	0.027	0.093	0.004	0.010	-0.005	0.010	-0.004	0.020
38	03/30/2012	-0.031	0.178	2.23	0.63	0.042	0.225	-0.018	0.019	0.003	0.021	-0.014	0.041
38	06/08/2012	0.182	0.179	1.85	0.47	-0.074	0.196	0.004	0.019	0.006	0.017	-0.035	0.042
38	09/27/2012	0.071	0.171	2.22	0.50	0.045	0.200	-0.011	0.019	-0.008	0.021	0.007	0.042
38	12/20/2012	0.001	0.089	2.10	0.29	-0.064	0.115	0.001	0.009	0.000	0.010	-0.002	0.021

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
29	03/14/2012	0.004	0.006	0.009	0.014	-0.002	0.006	0.009	0.011	-0.003	0.006	-0.001	0.055
29	06/06/2012	-0.001	0.020	-0.046	0.042	0.016	0.017	-0.012	0.033	0.003	0.018	-0.071	0.167
29	07/24/2012	0.002	0.009	-0.018	0.023	0.001	0.010	-0.014	0.018	0.010	0.010	0.049	0.082
29	11/30/2012	-0.003	0.010	0.005	0.024	0.016	0.012	0.006	0.018	0.003	0.010	0.053	0.086
38	03/30/2012	0.014	0.020	-0.006	0.048	-0.002	0.022	0.009	0.034	0.006	0.022	-0.083	0.168
38	06/08/2012	0.000	0.022	-0.051	0.037	0.006	0.020	0.014	0.034	-0.009	0.022	-0.105	0.189
38	09/27/2012	-0.002	0.017	0.013	0.045	0.015	0.022	-0.012	0.038	-0.002	0.022	0.094	0.172
38	12/20/2012	0.003	0.009	0.013	0.021	0.004	0.011	0.006	0.018	0.007	0.012	-0.059	0.080

LOCATION	COLLECTION DATE	Ag-110M	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ac-228	(+/-)
29	03/14/2012	-0.001	0.006	-0.001	0.016	0.005	0.010	-0.002	0.007	0.001	0.006	-0.013	0.028
29	06/06/2012	0.000	0.017	-0.009	0.043	0.018	0.036	0.015	0.021	-0.003	0.019	0.007	0.065
29	07/24/2012	0.000	0.009	-0.017	0.024	0.025	0.028	-0.001	0.010	0.008	0.010	-0.007	0.040
29	11/30/2012	-0.003	0.009	-0.011	0.027	-0.021	0.025	0.004	0.010	0.004	0.010	0.002	0.046
38	03/30/2012	-0.001	0.016	0.033	0.055	0.016	0.060	0.004	0.022	0.000	0.020	0.020	0.085
38	06/08/2012	-0.010	0.019	-0.003	0.052	0.005	0.058	-0.006	0.023	0.010	0.020	-0.039	0.071
38	09/27/2012	0.003	0.019	-0.032	0.048	0.052	0.057	-0.012	0.024	0.007	0.020	0.037	0.074
38	12/20/2012	-0.001	0.009	-0.012	0.024	0.049	0.054	0.003	0.011	0.010	0.009	0.044	0.058

TABLE 21

SCALLOPS

Scallops were not sampled in 2012. 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	03/30/2012	-0.064	0.168	2.056	0.641	-0.032	0.193	-0.012	0.016	-0.003	0.015	0.017	0.036
32	05/07/2012	-0.015	0.065	2.796	0.237	-0.009	0.074	0.005	0.008	-0.006	0.009	-0.001	0.016
32	08/13/2012	0.083	0.181	2.586	0.618	-0.022	0.204	0.006	0.020	0.000	0.021	0.010	0.041
32	10/26/2012	0.049	0.199	2.646	0.586	-0.043	0.214	0.004	0.021	0.002	0.023	0.009	0.047
35	03/30/2012	-0.072	0.165	3.314	0.516	-0.086	0.182	-0.003	0.016	0.004	0.017	-0.026	0.040
35	05/07/2012	0.009	0.077	2.854	0.243	-0.060	0.084	-0.003	0.009	0.003	0.009	-0.014	0.017
35	08/13/2012	0.095	0.177	2.870	0.553	0.001	0.205	-0.007	0.020	-0.009	0.022	0.010	0.040
35	10/26/2012	0.049	0.118	3.330	0.375	0.056	0.136	-0.003	0.013	-0.010	0.014	-0.010	0.031

LOCATION	COLLECTION DATE	Co-60	(+/-)	Zn-65	(+/-)	Nb-95	(+/-)	Zr-95	(+/-)	Ru-103	(+/-)	Ru-106	(+/-)
32	03/30/2012	0.008	0.019	0.022	0.045	0.005	0.022	-0.015	0.030	0.001	0.023	0.058	0.164
32	05/07/2012	-0.003	0.008	0.010	0.019	0.013	0.009	0.000	0.013	0.003	0.008	-0.005	0.071
32	08/13/2012	0.013	0.022	-0.039	0.051	0.004	0.021	-0.018	0.036	-0.003	0.023	0.108	0.211
32	10/26/2012	0.003	0.023	-0.054	0.047	0.031	0.021	0.015	0.038	-0.018	0.024	-0.153	0.192
35	03/30/2012	-0.001	0.019	-0.069	0.041	0.006	0.020	-0.022	0.032	-0.013	0.021	-0.068	0.176
35	05/07/2012	-0.001	0.009	-0.008	0.021	0.003	0.010	0.001	0.016	-0.006	0.010	0.119	0.082
35	08/13/2012	-0.002	0.022	0.010	0.052	0.041	0.023	-0.010	0.037	-0.013	0.022	0.209	0.198
35	10/26/2012	-0.003	0.016	-0.038	0.032	0.009	0.014	0.029	0.025	-0.003	0.015	0.086	0.122

LOCATION	COLLECTION DATE	Ag-110M	(+/-)	Sb-125	(+/-)	I-131	(+/-)	Cs-134	(+/-)	Cs-137	(+/-)	Ac-228	(+/-)
32	03/30/2012	0.017	0.016	0.032	0.050	-0.030	0.064	0.000	0.018	0.001	0.020	0.125	0.088
32	05/07/2012	-0.005	0.007	-0.003	0.021	0.017	0.017	-0.006	0.009	-0.002	0.008	-0.013	0.034
32	08/13/2012	-0.014	0.022	0.007	0.060	-0.020	0.041	-0.015	0.024	0.004	0.025	-0.003	0.086
32	10/26/2012	0.009	0.019	0.002	0.058	-0.023	0.057	-0.073	0.026	-0.008	0.021	-0.060	0.096
35	03/30/2012	-0.001	0.016	-0.012	0.045	0.025	0.054	-0.014	0.023	0.007	0.017	-0.031	0.062
35	05/07/2012	0.001	0.008	0.013	0.023	-0.010	0.018	0.003	0.010	-0.007	0.009	0.008	0.039
35	08/13/2012	0.012	0.019	-0.027	0.052	-0.009	0.040	-0.013	0.026	-0.015	0.023	-0.032	0.086
35	10/26/2012	0.004	0.012	0.004	0.037	-0.004	0.035	-0.019	0.017	0.000	0.013	-0.014	0.059

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 were observed at levels similar to those of past years. The levels of Cs-137 and Sr-90 detected were the result of atmospheric nuclear weapons testing in the 1960's.

Some REMP samples during 2012 identified detectable concentrations of isotopes that could be credibly attributed to the trans-Pacific transport of airborne releases from Fukushima, Japan following the March 11, 2012 Tohoku earthquake.

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.

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 in 2012. The exposure rate measurements at 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 73X, 7.4 uR/hour at location 74X and 6.7 uR/hour at location 75X). 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.

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 on-site and off-site locations and include gamma exposure from all sources of radioactivity. For example, the Weather Shack (location 02), MPS3 Discharge (location 05), Environmental Laboratory (location 08), Bay Point Beach (location 09), 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 average of all indicator locations for the period when MPS1 was still in operation (through 1995) exhibit the effects of N-16 BWR turbine building sky-shine to immediate areas onsite. As discussed in previous annual reports, the effects of sky-shine at onsite monitoring stations were increased exposure rates as high as 6 Ur/hr at certain onsite locations. The elevated exposure rates from sky-shine 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 2012 data for location 3 shows an increase likely attributable to the being closer to granite at the new location.

Although not measurable, any resulting site boundary doses are bounded by dose rates from the radwaste storage areas and are discussed in Section 5.

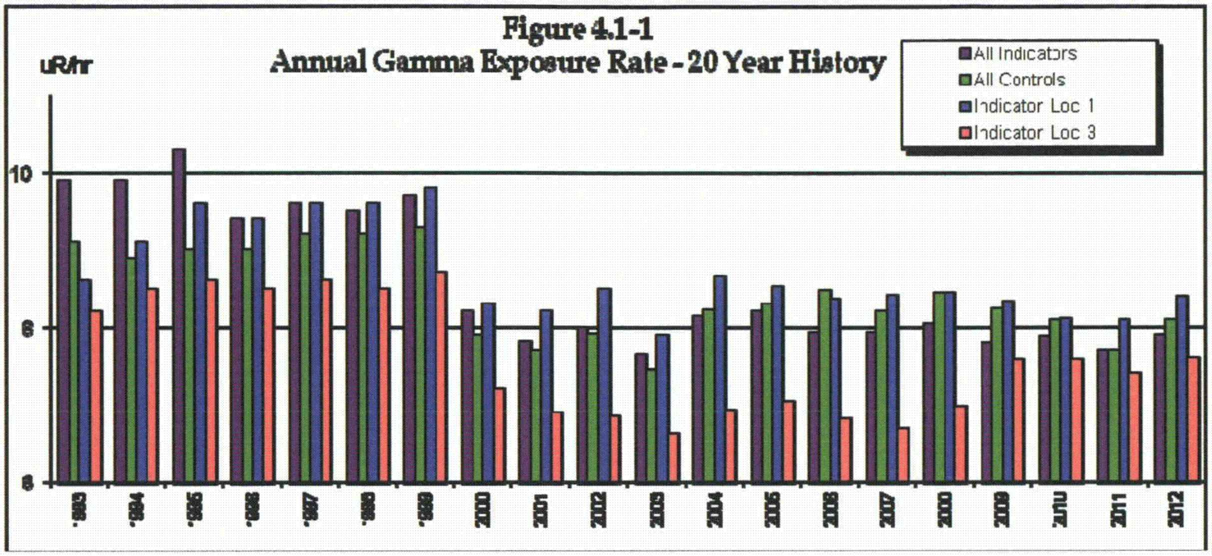


Figure 4.1-1
Annual Gamma Exposure Rate - 20 Year History

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. 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.

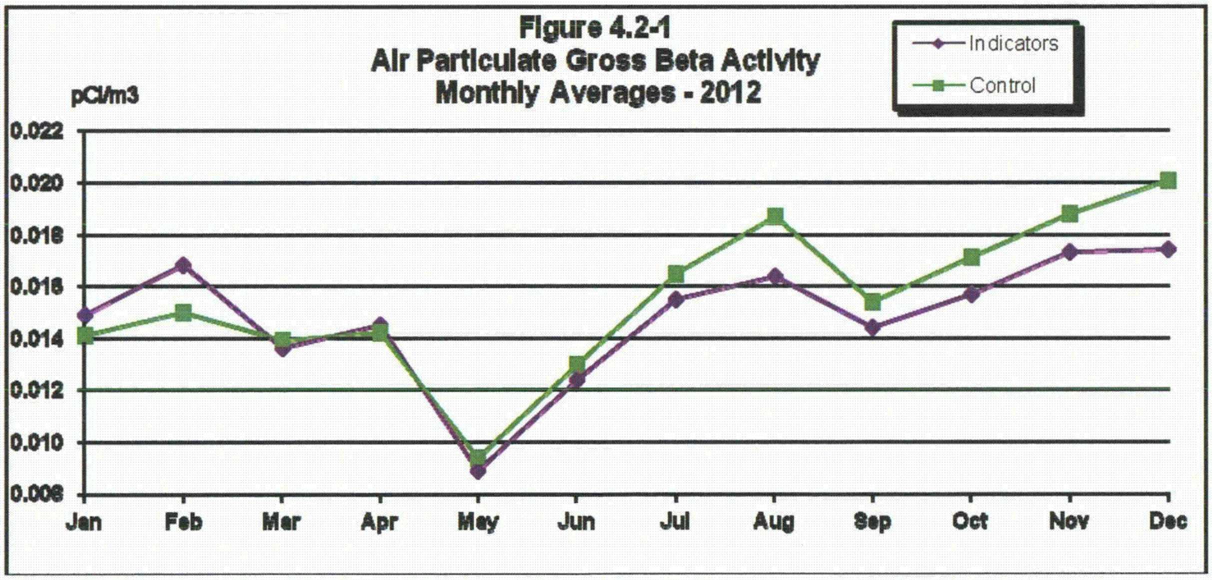


Figure 4.2-1
Air Particulate Gross Beta Activity
Monthly Averages - 2012

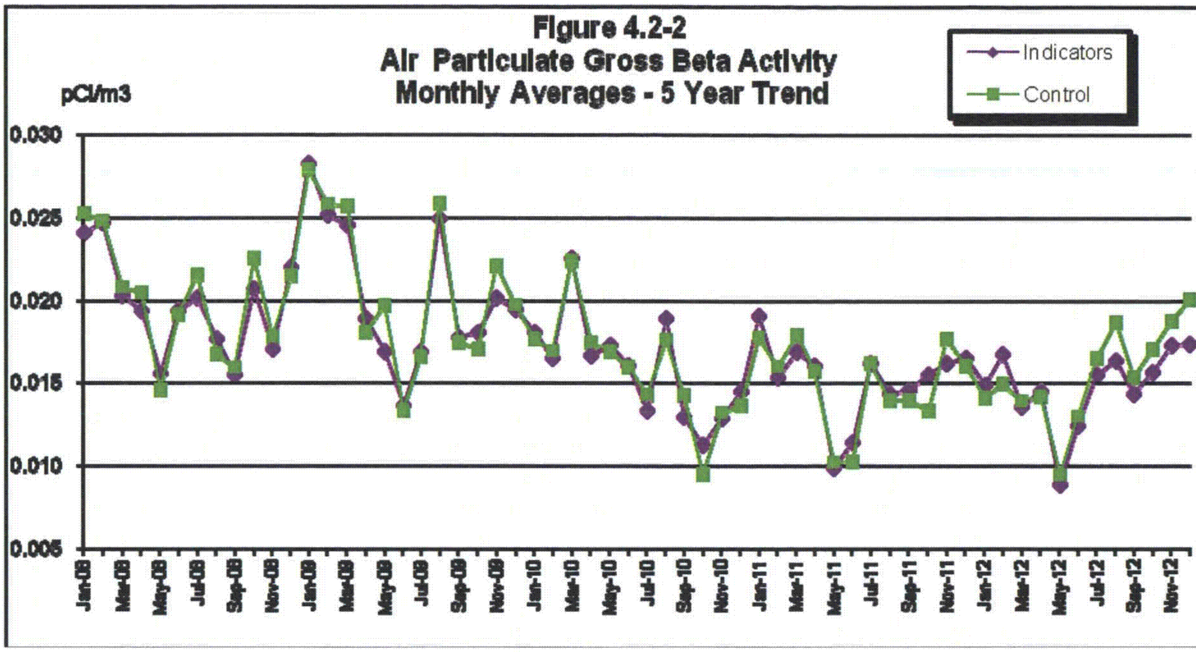


Figure 4.2-2
Air Particulate Gross Beta Activity
Monthly Averages - 5 Year Trend

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 2012 charcoal samples.

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.

4.5 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.

4.6 Soil (Table 6)

MPS resumed collection of soil as a required media type in 2001. Prior to 2001, it had not been sampled for over fifteen years. These samples were discontinued due to the fact that, previous sample results never indicated any station related detectable activity. Similarly, since 2001, no station detectable activity has been seen in these samples. 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. Baseline levels should be useful in the future, when site characterization and decommissioning of the station become the focus during preparations for License termination. This media is collected annually from one control and two indicator locations.

4.7 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 MPS to be considered an indicator location (i.e. within 10 miles) have ceased operation. Two cow milk locations about ten and half miles from the plant were sampled as extra (i.e.; not required) samples and results are shown in Table 7. Location 18 ceased milking of cows in July and was replaced by Location 22.

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 2012 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.

4.8 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 2012, no samples were collected.

4.9 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. These samples may also be taken to further investigate the levels of radioactivity in milk. No station effects are noted in these samples. Cosmic produced Be-7 was observed in the majority of the samples. Naturally occurring K-40 was approximately two times higher in hay and feed compared to pasture grass samples.

4.10 Well Water (Table 10)
There were no incidents of any station related activity detected in the samples collected as part of the REMP. Other onsite wells were sampled. Those results are reported in the Millstone annual "Radioactive Effluent Release Report" for 2012.

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.

This media can be an early and sensitive indicator of releases from the station for both unplanned releases and normal operations. Therefore, to enhance program-monitoring effectiveness, samples of broadleaf vegetation are collected monthly during the growing season, May - October, even though requirements are to collect this media twice a year.

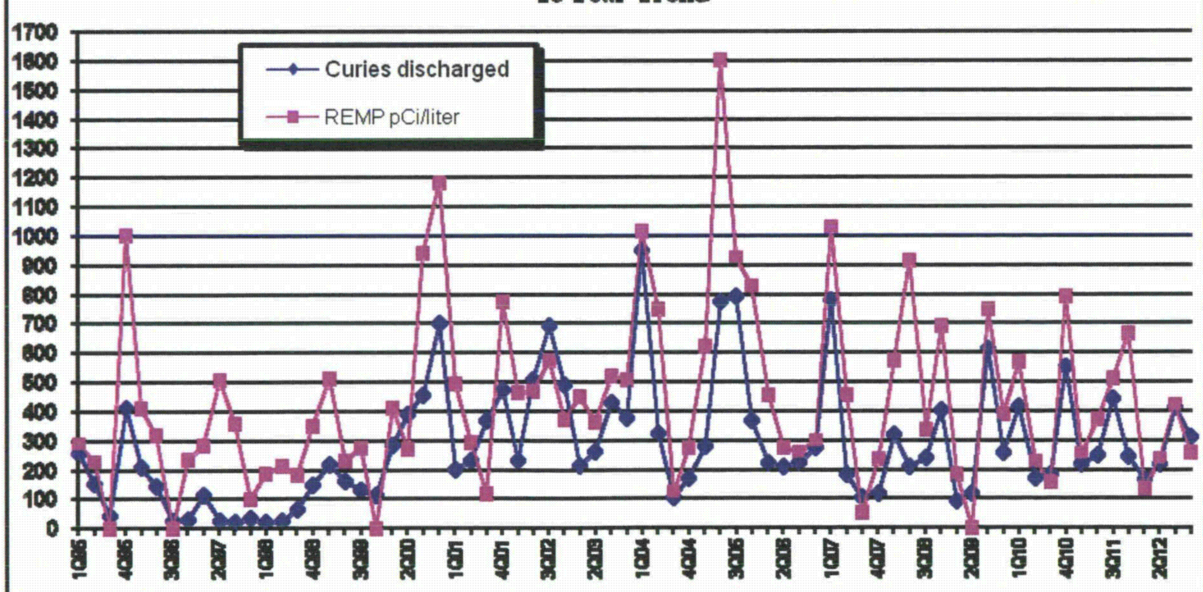
4.14 Seawater (Table 14)
The guidance in Reference 15 specifies one sample upstream (control – beyond significant influence of the discharge) and one sample downstream (indicator – beyond but near the mixing zone) for surface water samples. Historically the downstream sample for MPS has been located 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. Although samples obtained at this location actually monitor the undiluted discharge activity, it provides for an excellent check on the radioactive effluent monitoring program. 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 MPS.

A technician collects an aliquot from the automatic sampler at Location 32 on a weekly frequency. These samples are composited for monthly analyses. In September 1999, MPS increased the required analysis frequency for this composite sample to monthly to increase monitoring effectiveness. For the Control Location, Giant's Neck (Location 37C), six weekly grab samples are obtained for quarterly compositing. In 2003, the LLD for H-3 (tritium) at the indicator location (32) was lowered by approximately a factor of four to further enhance monitoring effectiveness. This lower LLD was continued through 2012.

Naturally occurring K-40 was the only detectable gamma activity seen in most of these samples and naturally occurring Ac-228 was seen in one sample. Results for Fe-59 and Sb-125 on July 31, for Mn-54 on June 12, for I-131 on Aug. 14 and for Nb-95 on Nov. 13, although greater than the 2σ error, were less than their MDC. Measured plant related levels of H-3 in seawater from the immediate vicinity of discharge (location 32) were observed in most samples. MPS2 in October had a refueling outage. Tritium releases are typically higher near these outages due to the need for increased liquid processing during these times. 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 MPS 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 2012. Naturally occurring K-40 is seen in all samples Some 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. Examinations of other aquatic media, including seafood, sampled from near these locations (discussions that follow) do not show any detectable Co-60 or Cs-137.

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. Since 2000, levels have decreased to undetectable for all nuclides except for I-131. 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. Three positive, plant-related I-131 measurements were noted in 2012, one on July 26 at Location #32 which is Vicinity of Discharge, one on March 14 at Location #29 which is in Jordon Cove just downstream of discharge and one on August 21 at Location #35 which is Niantic Bay adjacent to the plant. The measurements are consistent with I-131 seen in liquid effluents reported for the first three quarters of 2012. Positive I-131 results were also seen at background location #90 on August 21 and October 24. 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 August 21 in Niantic Bay (Location #35) my be from this same source. Release of I-131 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)

4.17.1 Flounder (Table 17A)

The activity in Flounder is the same as that seen for the past decade. No activity was observed except for the naturally occurring K-40. Nb-95 calculated activity was greater than the calculated MDC for the sample on May 25 at Location #32. But further analysis of the gamma spectrum determined that the peak was not from actual radioactivity. Several other results are greater than their 2σ error but less than the MDC.

4.17.2 Fish - Other (Table 17B)

The activity in other fish is the same as that seen for the past decade. No activity was observed in this media except for naturally occurring K-40. One result (Nb-95 on May 7 at Location #29) was greater than its 2σ error but less than the MDC.

4.18 Mussels (Table 18)

Similar to the last several years, this sampling media showed no activity except for the naturally occurring Be-7 and K-40. Several other results are greater than their 2σ error but less than the MDC. Mussels were not available at the required sampling location of Two Three Island (#28). They were replaced by samples taken from Niantic Bay.

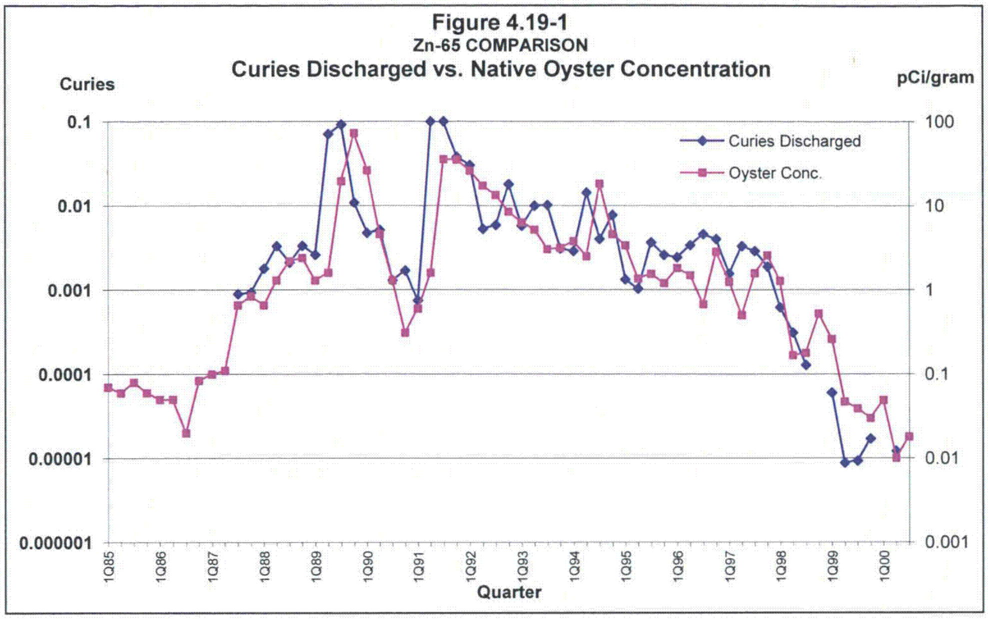
4.19 Oysters (Table 19)
All locations utilize oysters stocked in trays. The stocked trays are kept at sampling areas and represent conditions in those areas. Due to safety concerns Location #32 was moved about six years ago to a more accessible area in the middle of the quarry. Although it is labeled as vicinity of the discharge, it was previously located at the end of the quarry.

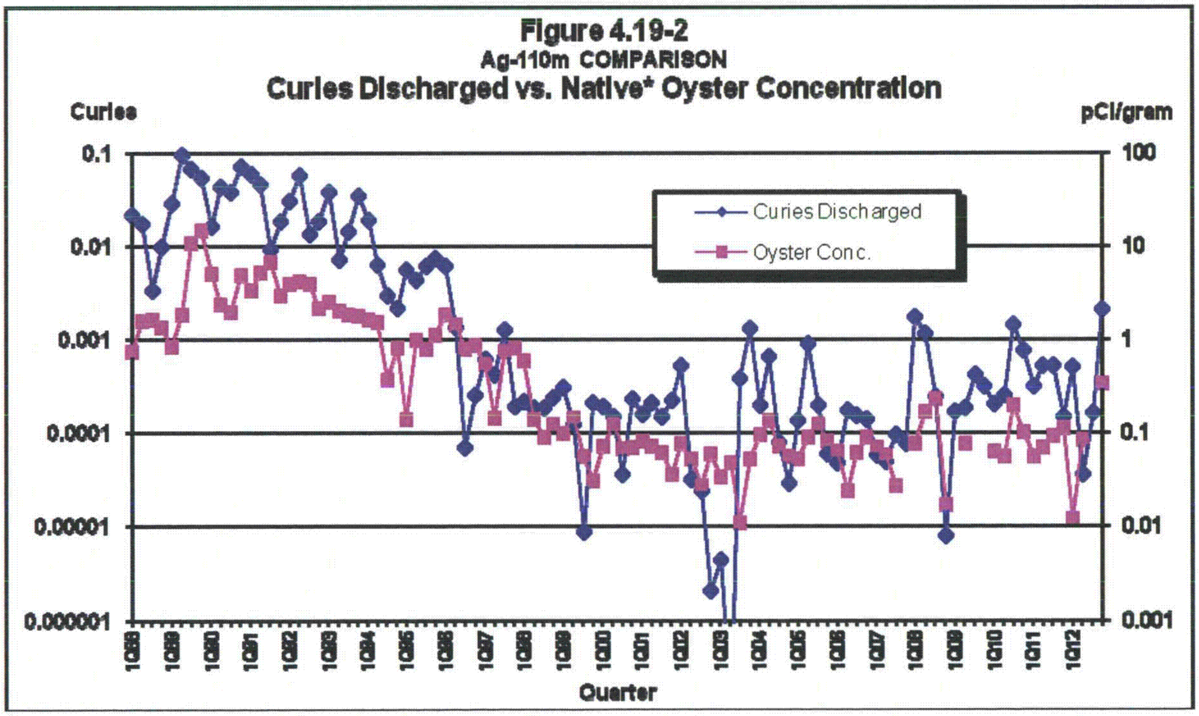
MPS related Ag-110m was detected in two samples (June 28 and December 12) from Location #32. This has been an historical occurrence (see discussion below). Nb-95 calculated activity was greater than the calculated MDC for the same samples, but further analyses of the gamma spectrums determined that the peaks were not from actual radioactivity.

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 MPS1 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. These adjustments have typically shown good agreement between the two methods, with method 1 usually being conservative. Due to significant effluent reductions over the last several years, the low resulting doses (less than 0.01 mrem) make this comparison difficult and subject to significant error. Trending of these comparisons is routinely performed and adjustments are made, if appropriate.

The location of the quarry is on-site and not available for public use. No MPS activity was observed at locations beyond the MPS 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.





* Native oysters until 3Q 2007; because of diver safety issues oysters are only sampled now in the Quarry stocked in trays similar to what has historically been performed at all the other locations.

4.20 Clams (Table 20)

Occasionally this media indicates the presence of station related radioactivity. No activity was observed except for the naturally occurring K-40. Some results are greater than their 2σ error but all are 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. Some results are greater than their 2σ error but all are less than the MDC.

5. DISCUSSION

The evaluation of the effects of MPS operation on the environment requires the careful consideration of many factors. Those factors depend upon the media being affected. They include MPS release rates, effluent dispersion, occurrence of nuclear weapons tests, seasonal variability of fallout, local environment, and location variability of fallout. Additional factors affecting the uptake of radionuclides in milk include soil conditions (mineral content, pH, etc.), quality of fertilization, quality of land management (e.g., irrigation), pasturing habits of animals, and type of pasturage. Any of these factors could cause significant variations in the measured radioactivity. A failure to consider these factors could cause erroneous conclusions.

Consider, for example, the problem of deciphering the effect of MPS releases on the radioactivity measured in milk samples. Some of these fission products, such as I-131 and Sr-89 are relatively short-lived. Therefore they can result from MPS effluents, nuclear weapons tests or nuclear incidents (e.g. Chernobyl, Fukushima). Sr-89's lifetime is longer than I-131's, therefore it will remain around for much longer periods of time. The even longer-lived fission products, Sr-90 and Cs-137, cause more of a concern. These isotopes are still remaining from the weapons testing era of the 1960's. This results in measurable amounts of Sr-90 and Cs-137 appearing in past milk samples. Distinguishing between this "background" of fallout activity and MPS effects is of prime interest for a REMP.

In reviewing the historical Sr-90 and Cs-137 measured in cow and goat milk in the areas around MPS, a casual observer could notice that in some cases the levels of these isotopes are higher at farms closer to the MPS than at those further away from the MPS. The MPS's effluents might at first appear to be responsible. However, the investigation of the following facts proves this conclusion wrong.

(1) Nuclear power stations measure many fission products, including Sr-90 and Cs-137 in their releases. Based on these measurements and proven models developed by the NRC, concentrations in the environment can be calculated. These calculations show that insufficient quantities of Sr-90 and Cs-137 have been released from the plants to yield the measured concentrations in milk.
(2) Over the many years of MPS operation, Sr-89 has often been released in comparable quantity to Sr-90. Since they are chemically similar, comparable levels should have been detected in milk if the Sr-90 was MPS related. No MPS related Sr-89 has ever been detected in milk samples.
(3) Similar to Sr-89, Cs-134 can be used as an indication of MPS related Cs-137. Although not as conclusive as Sr-89, the lack of any measurable Cs-134 in any of the milk samples suggests that the Cs-137 is not MPS related. This is further confirmed by the evaluation of the air particulate data. The only occurrences of detectable Cs-134 in milk resulted from the Chernobyl incident.
(4) Dairy milk sampling in Connecticut began in the 1960's, several years prior to MPS operation. The highest levels of weapons fallout related Sr-90 and Cs-137 (see Figures 6-1 and 6-2), were measured in the years prior to MPS operation. Samples taken in the immediate areas have always shown higher levels of weapons related fallout than samples taken from the Central Connecticut Region (CT Pooled Milk). Radioactivity levels of fallout related Sr-90 and Cs-137 have decreased significantly since the 1964 Nuclear Test Ban Treaty due to decay.

(5) Local variability of Sr-90 and Cs-137 in milk is common throughout the United States. Due to the variability in soil conditions, pasturing methods, rainfall, etc., it is the rule rather than the exception. Therefore, it is not surprising that certain farms have higher levels of radioactivity than other farms. In fact, in the past there are some cases where the farms further from the MPS have higher Sr-90 and Cs-137 values than the farms that are closer to the MPS.
(6) In the past when a goat farm operated near MPS (2.0 Mi - ENE), the highest levels of Sr-90 and Cs-137 were typically indicated. This same farm also experienced the highest levels of short-lived activity from the 1976 and 1977 Chinese Tests and the 1986 Chernobyl accident. This indicates that for some unknown reason this farm had the ability for higher reconcentration. Special studies performed at this and other farms failed to find any link to the MPS.

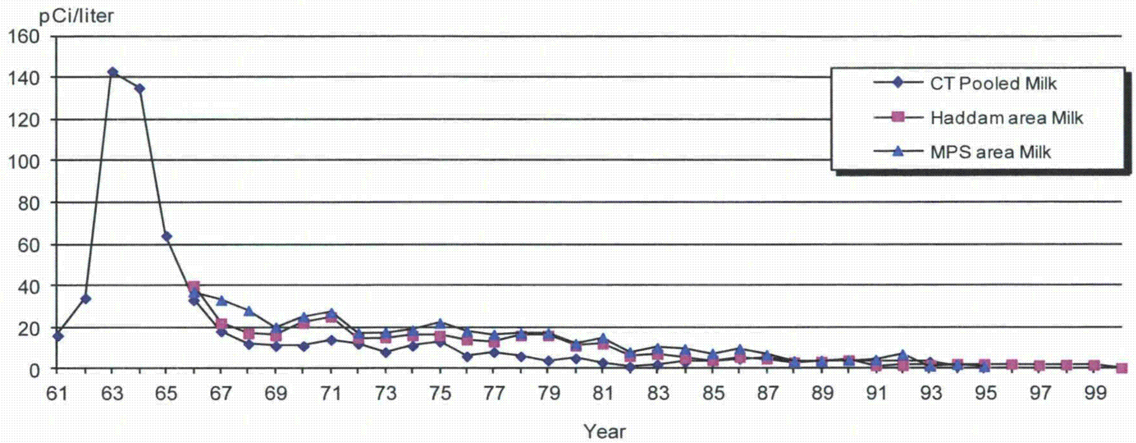
Based on these facts, the observation that the MPS effluents are responsible is evidently false. The cause must be one or more of the other variables.

Dominion has carefully examined the data throughout the years and has presented in this report all cases where MPS related radioactivity could be detected. An analysis of the potential exposure to the maximum individual from any MPS related activity has been performed and shows that in all cases the exposure is insignificant.

The Connecticut Department of Energy and Environmental Protection (DEEP) performs an independent check on certain environmental program analyses. The results of their analyses are comparable to the results from this program's analyses. These comparisons can be used as a cross-reference to verify measured MPS activity. DEEP performed a comprehensive review of all the historical MPS data in 2006 (Reference 17). It concluded that "the collective sampling in and around Millstone Power Station show expected levels of residual fallout from weapons testing and the Chernobyl event and are unrelated to the operation of the Millstone Power Station."

Figure 4-1 Strontium-90 in Milk

Figure 4-2 Cesium-137 in Milk



Dairy milk is no longer available within ten miles of MPS, Haddam Neck no longer collects milk, and CT Pooled milk has not been collected by the State of CT since 1994. Graphs provided to show historical trends.

CY Start-up occurred:	July 24, 1967	MPS2 Start-up occurred:	December, 1975
MPS1 Start-up occurred:	October 26, 1970	MPS3 Start-up occurred:	January 23, 1986

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, 2012.
9) United States of America, Code of Federal Regulations, Title 10, Part 20.1301.
10) United States of America, Code of Federal Regulations, Title 10, Part 50, Appendix I.
11) United States of America, Code of Federal Regulations, Title 40, Part 190.
12) United States Nuclear Regulatory Commission, Regulatory Guide 4.1, "Program for Monitoring Radioactivity in the Environs of Nuclear Power Plants," Revision 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," Revision 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.

APPENDIX A

LAND USE CENSUS FOR 2012

INTRODUCTION

The annual land use census in the vicinity of MPS was conducted as required by the MPS 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 2012 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. Goat locations are more difficult to determine, but best efforts are made to consult goat association records, contact previous owners and or drive-bys, if necessary.

RESULTS

Tables A-1 through A-3 indicate information from the latest land use census. No new dairy animals within 10 miles of the MPS were located during the census. Several changes were identified, these include:

- Thirteen cow dairy locations were removed from the previous year census.
- One new cow dairy location was added.
- One goat location, Indicator Location #22, was removed from the previous year census.
- Nine new goat locations were added.
- Garden distances are now based on nearest resident assuming that a resident may plant a new garden.

Based on these changes a cow sampling location was changed and there was loss of one goat location. The cow location at 10.4 miles NW from last year's census was lost and sampling at cow location 10.5 miles WNW was begun in middle of 2012.

Based on these changes the goat location at 2.8 miles NE from last year's census was lost. A goat location which is actively milking could not be found to replace that location. Two locations remain in the sample schedule, Location #21 at 2.1 miles N is the indicator and Location #24 is the control (background). Neither one of these locations were actively milking during 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 - 2012

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	19.1	30,700	Preston*
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

* New location for this year
**Began sampling on Aug. 22, 2012

Note: None of these cow farms are required to be sampled since all farms are greater than ten miles from plant (NUREG 1301, Reference 15, uses a cutoff distance of 5 miles). The closest milk farm at 10.5 miles is sampled as an extra sample.

TABLE A-2

Dairy Goats* Within 20 Miles** of Millstone Point - 2012

Direction	Distance miles	Distance meters	Location
N	2.1	3,350	Waterford (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***
ENE	11.8	19,000	Stonington
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 (Location 24)

* Some goat locations are not actively milking, including the present indicator locations (#21 at 2.1 miles N).

** Plus one control location at 28.6 miles

*** New location

TABLE A-3

2012 Resident and Garden Survey

Closest Distance For:

Downwind Direction	Resident		Garden	
	miles	meters	miles	meters
N	1.1	1,750	1.1	1,750
NNE	0.59	942	0.59	942
NE	0.54	864	0.54	864
ENE	1.1	1,720	1.1	1,720
E	1.0	1,620	1.0	1,620
ESE	1.2	1,860	1.2	1,860
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	3,670	2.3	3,670
WSW	2.0	3,230	2.0	3,230
W	1.8	2,940	1.8	2,940
WNW	1.6	2,610	1.6	2,810
NW	1.5	2,360	1.5	2,360
NNW	0.65	1,050	0.65	1,050

N/A - not applicable (over water sectors)

APPENDIX B

SUMMARY OF INTERLABORATORY COMPARISONS

INTRODUCTION

This appendix covers the Intercomparison Program of the Teledyne Brown Engineering Laboratory as required by technical specifications for each MPS 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

RESULTS

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 2012.

A total of 180 analysis results were obtained by Teledyne Brown Engineering with 173 within acceptable criteria, a 96% success rate. Results of investigations are noted at the end of the following tables.

ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
March 2012	E10066	Milk	Sr-89	pCi/L	101	94.8	1.07	A
			Sr-90	pCi/L	11.7	13.5	0.87	A
	E10067	Milk	I-131	pCi/L	87.5	92.5	0.95	A
			Ce-141	pCi/L	247	260	0.95	A
			Cr-51	pCi/L	435	436	1.00	A
			Cs-134	pCi/L	133	149	0.89	A
			Cs-137	pCi/L	156	159	0.98	A
			Co-58	pCi/L	127	132	0.96	A
			Mn-54	pCi/L	190	195	0.97	A
			Fe-59	pCi/L	179	168	1.07	A
			Zn-65	pCi/L	327	333	0.98	A
			Co-60	pCi/L	274	279	0.98	A
	E10069	AP	Ce-141	pCi	167	164	1.02	A
			Cr-51	pCi	310	276	1.12	A
			Cs-134	pCi	107	94.5	1.13	A
			Cs-137	pCi	109	101	1.08	A
			Co-58	pCi	87.6	83.5	1.05	A
			Mn-54	pCi	133	123	1.08	A
			Fe-59	pCi	113	106	1.07	A
			Zn-65	pCi	226	210	1.08	A
			Co-60	pCi	185	176	1.05	A
	E10068	Charcoal	I-131	pCi	92.8	94.2	0.99	A
	E10070	Water	Fe-55	pCi/L	1800	1570	1.15	A
June 2012	E10198	Milk	Sr-89	pCi/L	86.1	99.8	0.86	A
			Sr-90	pCi/L	9.2	12.7	0.72	W
	E10199	Milk	I-131	pCi/L	88.9	99.7	0.89	A
			Ce-141	pCi/L	72.8	82.2	0.89	A
			Cr-51	pCi/L	394	402	0.98	A
			Cs-134	pCi/L	159	174	0.91	A
			Cs-137	pCi/L	206	212	0.97	A
			Co-58	pCi/L	89.5	92.3	0.97	A
			Mn-54	pCi/L	129	132	0.98	A
			Fe-59	pCi/L	129	128	1.01	A
			Zn-65	pCi/L	193	199	0.97	A
			Co-60	pCi/L	342	355	0.96	A
	E10201	AP	Ce-141	pCi	73.2	75.1	0.97	A
			Cr-51	pCi	367	366	1.00	A
			Cs-134	pCi	165	159	1.04	A
			Cs-137	pCi	205	193	1.06	A
			Co-58	pCi	84.7	84.2	1.01	A
			Mn-54	pCi	118	121	0.98	A
			Fe-59	pCi	125	117	1.07	A
			Zn-65	pCi	181	182	0.99	A
			Co-60	pCi	338	324	1.04	A
	E10200	Charcoal	I-131	pCi	101	96.6	1.05	A

(a) Teledyne Brown Engineering reported result.

(b) The Analytics known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

(c) Ratio of Teledyne Brown Engineering to Analytics results.

(d) Analytics evaluation based on TBE internal QC limits: A= Acceptable. Reported result falls within ratio limits of 0.80-1.20. W-Acceptable with warning. Reported result falls within 0.70-0.80 or 1.20-1.30. N = Not Acceptable. Reported result falls outside the ratio limits of < 0.70 and > 1.30.

ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
June 2012	E10202	Water	Fe-55	pCi/L	1890	1580	1.20	A
September 2012	E10296	Milk	Sr-89	pCi/L	106	99.6	1.06	A
			Sr-90	pCi/L	13.6	16.0	0.85	A
	E10297	Milk	I-131	pCi/L	89.8	99.6	0.90	A
			Ce-141	pCi/L	160	164	0.98	A
			Cr-51	pCi/L	230	248	0.93	A
			Cs-134	pCi/L	101	108	0.94	A
			Cs-137	pCi/L	174	174	1.00	A
			Co-58	pCi/L	97.2	100	0.97	A
			Mn-54	pCi/L	188	196	0.96	A
			Fe-59	pCi/L	159	152	1.05	A
			Zn-65	pCi/L	195	192	1.02	A
			Co-60	pCi/L	155	152	1.02	A
	E10299	AP	Ce-141	pCi	145	135	1.07	A
			Cr-51	pCi	219	205	1.07	A
			Cs-134	pCi	94.1	89.4	1.05	A
			Cs-137	pCi	140	144	0.97	A
			Co-58	pCi	88.3	83.0	1.06	A
			Mn-54	pCi	173	162	1.07	A
			Fe-59	pCi	136	125	1.09	A
			Zn-65	pCi	165	159	1.04	A
			Co-60	pCi	133	125	1.06	A
	E10298	Charcoal	I-131	pCi	95.5	97.2	0.98	A
	E10300	Water	Fe-55	pCi/L	1630	1900	0.86	A
December 2012	E10334	Milk	Sr-89	pCi/L	101	96.6	1.05	A
			Sr-90	pCi/L	11.3	13.8	0.82	A
	E10335	Milk	I-131	pCi/L	93.1	90.0	1.03	A
			Ce-141	pCi/L	52.5	51.0	1.03	A
			Cr-51	pCi/L	373	348	1.07	A
			Cs-134	pCi/L	157	165	0.95	A
			Cs-137	pCi/L	113	117	0.97	A
			Co-58	pCi/L	94.1	98.5	0.96	A
			Mn-54	pCi/L	116	116	1.00	A
			Fe-59	pCi/L	124	116	1.07	A
			Zn-65	pCi/L	190	186	1.02	A
			Co-60	pCi/L	172	170	1.01	A
	E10337A	AP	Ce-141	pCi	51.8	49.6	1.04	A
			Cr-51	pCi	372	338	1.10	A
			Cs-134	pCi	165	161	1.02	A
			Cs-137	pCi	113	114	0.99	A
			Co-58	pCi	96.5	95.8	1.01	A
			Mn-54	pCi	118	112	1.05	A
			Fe-59	pCi	105	112	0.94	A
			Zn-65	pCi	166	181	0.92	A
			Co-60	pCi	179	165	1.08	A
December 2012	E10336	Charcoal	I-131	pCi	73.1	72.7	1.01	A
	E10333	Water	Fe-55	pCi/L	1550	1750	0.89	A

(a) Teledyne Brown Engineering reported result.

(b) The Analytics known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

(c) Ratio of Teledyne Brown Engineering to Analytics results.

(d) Analytics evaluation based on TBE internal QC limits: A= Acceptable. Reported result falls within ratio limits of 0.80-1.20. W-Acceptable with warning. Reported result falls within 0.70-0.80 or 1.20-1.30. N = Not Acceptable. Reported result falls outside the ratio limits of < 0.70 and > 1.30.

DOE's MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
March 2012	12-MaW26	Water	Cs-134	Bq/L	-0.0045		(1)	A
			Cs-137	Bq/L	37.5	39.9	27.9 - 51.9	A
			Co-57	Bq/L	30.8	32.9	23.0 - 42.8	A
			Co-60	Bq/L	22.4	23.72	16.60 - 30.84	A
			H-3	Bq/L	456	437	306 - 568	A
			Mn-54	Bq/L	31.0	31.8	22.3 - 41.3	A
			K-40	Bq/L	144	142	99 - 185	A
			Sr-90	Bq/L	-0.0084		(1)	A
			Zn-65	Bq/L	-0.369		(1)	A
	12-GrW26	Water	Gr-A	Bq/L	2.06	2.14	0.64 - 3.64	A
			Gr-B	Bq/L	7.48	6.36	3.18 - 9.54	A
	12-MaS26	Soil	Cs-134	Bq/kg	831	828	580 - 1076	A
			Cs-137	Bq/kg	0.145		(1)	A
			Co-57	Bq/kg	1270	1179	825 - 1533	A
			Co-60	Bq/kg	7.61	1.56	(2)	N (3)
			Mn-54	Bq/kg	634	558	391 - 725	A
			K-40	Bq/kg	1690	1491	1044 - 1938	A
			Sr-90	Bq/kg	328	392	274 - 540	A
			Zn-65	Bq/kg	753	642	449 - 835	A
	12-RdF26	AP	Cs-134	Bq/sample	2.31	2.38	1.67 - 3.09	A
			Cs-137	Bq/sample	2.15	1.79	1.25 - 2.33	W
			Co-57	Bq/sample	-0.0701		(1)	A
			Co-60	Bq/sample	2.62	2.182	1.527 - 2.837	W
			Mn-54	Bq/sample	4.13	3.24	2.27 - 4.21	W
			Sr-90	Bq/sample	0.0185		(1)	A
			Zn-65	Bq/sample	4.19	2.99	2.09 - 3.89	N (3)
	12-GrF26	AP	Gr-A	Bq/sample	0.365	1.2	0.4 - 2.0	A
			Gr-B	Bq/sample	2.31	2.4	1.2 - 3.6	A
	12-RdV26	Vegetation	Cs-134	Bq/sample	8.72	8.43	5.90 - 10.96	A
			Cs-137	Bq/sample	0.0424		(1)	A
			Co-57	Bq/sample	15.5	12.0	8.4 - 15.6	W
			Co-60	Bq/sample	6.80	6.05	4.24 - 7.87	A
			Mn-54	Bq/sample	0.0057		(1)	A
			Sr-90	Bq/sample	2.24	2.11	1.48 - 2.74	A
			Zn-65	Bq/sample	10.5	8.90	6.23 - 11.57	A
September 2012	12-MaW27	Water	Cs-134	Bq/L	21.4	23.2	16.2 - 30.2	A
			Cs-137	Bq/L	17.0	16.7	11.7 - 21.7	A
			Co-57	Bq/L	28.7	29.3	20.5 - 38.1	A
			Co-60	Bq/L	0.179		(1)	A
			H-3	Bq/L	387	334	234 - 434	A
			Mn-54	Bq/L	18.1	17.8	12.5 - 23.1	A
			K-40	Bq/L	139	134	94 - 174	A
			Sr-90	Bq/L	19.6	12.2	8.5 - 15.9	N (4)
			Zn-65	Bq/L	27.2	25.9	18.1 - 33.7	A
	12-GrW27	Water	Gr-A	Bq/L	0.966	1.79	0.54 - 3.04	A
			Gr-B	Bq/L	10.0	9.1	4.6 - 13.7	A

(1) False positive test.
(2) Sensitivity evaluation
(3) No cause was found for the failed high soil Co-60 sensitivity test or the high Zn-65 in AP, which TBE considers an anomaly. NCR 12-08
(4) Sr-90 in water high due to incorrect aliquot entered in LIMS. 12-11
(a) Teledyne Brown Engineering reported result.
(b) The MAPEP known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.
(c) DOE/MAPEP evaluation: A=acceptable, W=acceptable with warning, N=not acceptable.

DOE's MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
September 2012	12-MaS27	Soil	Cs-134	Bq/kg	880	939	657 - 1221	A
			Cs-137	Bq/kg	1220	1150	805 - 1495	A
			Co-57	Bq/kg	1330	1316	921 - 1711	A
			Co-60	Bq/kg	552	531	372 - 690	A
			Mn-54	Bq/kg	1000	920	644 - 1196	A
			K-40	Bq/kg	674	632	442 - 822	A
			Sr-90	Bq/kg	528	508	356 - 660	A
			Zn-65	Bq/kg	665	606	424 - 788	A
	12-RdF27	AP	Cs-134	Bq/sample	2.760	2.74	1.92 - 3.56	A
			Cs-137	Bq/sample	0.0415		(1)	A
			Co-57	Bq/sample	2.00	191.00	1.34 - 2.48	A
			Co-60	Bq/sample	1.78	1.728	1.210 - 2.246	A
			Mn-54	Bq/sample	2.40	2.36	1.65 - 3.07	A
			Sr-90	Bq/sample	0.931	1.03	0.72 - 1.34	A
			Zn-65	Bq/sample	-0.688		(1)	A
	12-GrF27	AP	Gr-A	Bq/sample	0.434	0.97	0.29 - 1.65	A
			Gr-B	Bq/sample	1.927	1.92	0.96 - 2.88	A
	12-RdV27	Vegetation	Cs-134	Bq/sample	6.28	6.51	4.56 - 8.46	A
			Cs-137	Bq/sample	4.62	4.38	3.07 - 5.69	A
			Co-57	Bq/sample	6.51	5.66	3.96 - 7.36	A
			Co-60	Bq/sample	5.32	5.12	3.58 - 6.66	A
			Mn-54	Bq/sample	3.59	3.27	2.29 - 4.25	A
			Sr-90	Bq/sample	0.0012		(1)	A
			Zn-65	Bq/sample	-0.046		(1)	A

(1) False positive test.

(a) Teledyne Brown Engineering reported result.

(b) The MAPEP known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

(c) DOE/MAPEP evaluation: A=acceptable, W=acceptable with warning, N=not acceptable.

ERA ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Limits	Evaluation (c)
May 2012	RAD-89	Water	Sr-89	pCi/L	63.4	58.5	46.9 - 66.3	A
			Sr-90	pCi/L	33.5	37.4	27.4 - 43.1	A
			Ba-133	pCi/L	89.2	82.3	69.1 - 90.5	A
			Cs-134	pCi/L	66.5	74.2	60.6 - 81.6	A
			Cs-137	pCi/L	152	155	140 - 172	A
			Co-60	pCi/L	73.3	72.9	65.6 - 82.6	A
			Zn-65	pCi/L	109	105	94.5 - 125	A
			Gr-A	pCi/L	82.4	62.9	33.0 - 78.0	N (1)
			Gr-B	pCi/L	43.6	44.2	29.6 - 51.5	A
			I-131	pCi/L	25.9	27.1	22.5 - 31.9	A
			H-3	pCi/L	15433	15800	13800 - 17400	A
	MRAD-16	Filter	Gr-A	pCi/filter	39.5	77.8	26.1 - 121	A
November, 2012	RAD-91	Water	Sr-89	pCi/L	46.5	39.1	29.7 - 46.1	N (2)
			Sr-90	pCi/L	16.6	20.1	14.4 - 23.8	A
			Ba-133	pCi/L	85.2	84.8	71.3 - 93.3	A
			Cs-134	pCi/L	76.9	76.6	62.6 - 84.3	A
			Cs-137	pCi/L	177	183	165 - 203	A
			Co-60	pCi/L	77.4	78.3	70.5 - 88.5	A
			Zn-65	pCi/L	209	204	184 - 240	A
			Gr-A	pCi/L	50.6	58.6	30.6 - 72.9	A
			Gr-B	pCi/L	59.3	39.2	26.0 - 46.7	N (2)
			I-131	pCi/L	22.9	24.8	20.6 - 29.4	A
			H-3	pCi/L	5020	4890	4190 - 5380	A
	MRAD-17	Filter	Gr-A	pCi/filter	59.6	87.5	29.3 - 136	A

(1) Detector G1 is slightly biased high for Th-230 based measurements used only for ERA Gross Alpha samples. NCR 12-05

(2) The Sr-89 found to known ratio was 1.19, which TBE considers acceptable. It appears the aliquot was entered incorrectly for the Gross Beta NCR 12-13

(a) Teledyne Brown Engineering reported result.

(b) The ERA known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

(c) ERA evaluation: A=acceptable. Reported result falls within the Warning Limits. NA=not acceptable. Reported result falls outside of the Control Limits. CE=check for Error. Reported result falls within the Control Limits and outside of the Warning Limit.