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DTE Energy

April 30, 2013
NRC-13-0021

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington D C 20555-0001

Reference: Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

Subject: Annual Radioactive Effluent Release Report and
Radiological Environmental Operating Report

In accordance with Technical Specifications 5.6.2 and 5.6.3, DTE Electric Company (previously, The Detroit Edison Company) hereby submits the Annual Radioactive Effluent Release Report and the Radiological Environmental Operating Report for Fermi 2. Enclosure 1 provides the 2012 Annual Radioactive Effluent Release Report. Enclosure 2 provides the 2012 Annual Radiological Environmental Operating Report. Both reports cover the time period from January 1 through December 31, 2012.

Should you have any questions regarding these reports, please contact Mr. Richard LaBurn, Manager - Radiation Protection at (734) 586-4974.

Sincerely,

Enclosures

cc: NRC Project Manager
NRC Resident Office
Reactor Projects Chief, Branch 5, Region III
Regional Administrator, Region III
Supervisor, Electric Operators,
Michigan Public Service Commission

ENCLOSURE 1
To
NRC-13-0021

2012 Annual Radioactive Effluent Release Report

Total Pages - 45

Enrico Fermi Atomic Power Plant, Unit 2
NRC Docket No. 50-341
NRC License No. NPF-43

FERMI 2 NUCLEAR POWER PLANT

DETROIT EDISON COMPANY

OPERATING LICENSE NO. NPF - 43

Fermi 2 - 2012 Annual
Radioactive Effluent Release Report

for the period of
January 1, 2012 through December 31, 2012

Prepared by:

Fermi 2
Radiological Engineering

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Executive Summary

This report is published to provide information regarding radioactive effluent monitoring at the Fermi 2 Nuclear Power Plant. The 2012 Annual Radioactive Effluent Release Report covers the period from January 1, 2012 through December 31, 2012.

The Radioactive Effluent Release Report is produced annually, to document plant releases and offsite dose resulting from these releases. The data presented indicate that the operation of Fermi 2 results in offsite radiation exposures that are well below the applicable allowable levels set by the Nuclear Regulatory Commission (NRC) and the Environmental Protection Agency (EPA).

There were no releases of liquid radioactive effluents from Fermi 2 in 2012. Data on releases of radioactive isotopes in gaseous effluents, as well as regulatory limits and sampling methods for these releases, are contained in the body of the report and in Appendix A.

Regulatory limits for radioactive effluents pertain to allowable offsite doses rather than to quantities of radioactivity released. The highest potential single organ dose to a person living offsite due to iodines, particulates, tritium, and carbon-14 released from the plant was calculated to be 0.16 mrem, which is approximately 1% of the applicable limit found in 10 CFR Part 50, Appendix I.

During 2012, no direct radiation dose to members of the public beyond the site boundary was attributed to the operation of Fermi 2, based on analysis of readings of thermoluminescent dosimeters (TLD) placed at various locations near the Fermi site. The offsite dose due to effluents is a small fraction of the 40 CFR 190 limits. Therefore, the combined direct radiation and effluent dose due to Fermi 2 was in compliance with 40 CFR 190 in 2012.

Data on radioactivity contained in radwaste shipments from Fermi 2 to points offsite are contained in the body of the report and in Appendix A. The Offsite Dose Calculation Manual (ODCM) was not revised in 2012. Additional sections of the report address ODCM revisions, ODCM required monitors which were out of service for more than 30 days in 2012, major changes in radwaste processing, the contents of outside temporary tanks, abnormal releases, and errata to previous years' reports (see page 13).

Appendix B of this report describes the Fermi Integrated Ground Water Protection Program. This program was established as part of the site's commitment to conformance with an industry-wide ground water protection initiative. This appendix also contains the results of 2012 quarterly ground water sampling, from approximately 40 monitor wells around Fermi 2 (ground water sampling has been performed under this program since the fall of 2007). Some of these monitor wells, primarily to the east and south of Fermi 2, have yielded sporadic trace quantities of tritium that have been attributed to the recapture of tritium in precipitation from the plant's gaseous effluent. Appendix C of this report

provides data on tritium concentrations in rainwater samples collected onsite which represent this recapture phenomenon. Appendix D of this report contains the meteorological joint frequency distribution tables for 2012.

Introduction

During the normal operation of a nuclear power plant, most of the fission products are retained within the fuel and fuel cladding. However, small amounts of radioactive fission products and trace amounts of the component and structure surfaces that have been activated are present in the primary coolant water, as well as tritium and carbon-14. The five types of radioactive material released are noble gases, iodines, particulates, tritium, and carbon-14.

Noble Gases

Some of the fission products released in airborne effluents are radioactive isotopes of noble gases, such as xenon and krypton. These noble gases are released continuously at low levels while the reactor is operating. Noble gas releases to the environment are reduced by plant systems which delay release of these gases from the plant, which allows a portion of the noble gas activity to decay within plant systems prior to release.

Noble gases are biologically and chemically nonreactive. They do not concentrate in humans or other organisms. They contribute to human radiation dose by being an external source of radiation exposure to the body. They are readily dispersed in the atmosphere.

Iodines and Particulates

Fermi 2 is required to calculate offsite dose due to releases of iodine-131 and iodine-133, which are radioisotopes of iodine with half lives of 8 days and 1 day, respectively, and particulates with half-lives greater than 8 days in gaseous and liquid effluents, and tritium. The principal radioactive particulates released are fission products (e.g., yttrium-91m and barium-139) and activation products (e.g., cobalt-58 and cobalt-60). Annual releases of these radionuclides are well within industry norms. Factors such as their high chemical reactivity and solubility in water, combined with the high efficiency of gaseous and liquid processing and radwaste systems, minimize their discharge.

The main contribution of radioactive iodine to human radiation dose is to the thyroid gland, where the body concentrates iodine. This exposure results from inhalation or ingestion of these iodines. Radioactive cesiums and cobalts, when ingested or inhaled, contribute to radiation exposure of tissues such as the muscle, liver, and intestines. These iodines and particulates are also a source of external radiation exposure if deposited on the ground.

Tritium

Tritium, a radioactive isotope of hydrogen, is the predominant radionuclide in radioactive gaseous effluents. It is detected at Fermi 2 in ventilation exhaust samples.

Carbon-14

U.S. nuclear power plants are expected to report releases of carbon-14 (C-14). The releases reported are based on calculations involving the thermal power rating of the unit and 2012 monthly capacity factors. The Fermi 2 UFSAR estimates annual gaseous C-14 releases of 9.88 curies. The calculation performed for this report estimated a total 2012 C-14 release of 9.5 curies.

Plant Effluent Monitoring

Effluents are strictly monitored to ensure that radioactivity released to the environment is as low as reasonably achievable and does not exceed regulatory limits. Effluent control includes the operation of monitoring systems, in-plant and environmental sampling and analyses programs, quality assurance programs for effluent and environmental programs, and procedures covering all aspects of effluent and environmental monitoring.

The radioactive waste treatment systems at Fermi 2 are designed to collect, process, and/or delay the release of liquid and gaseous wastes that contain radioactivity. For example, the 2.0 and 2.2 minute holdup pipes delay the release of radioactive gases so that radioactive decay can occur prior to release. The offgas system provides additional delay for such gases.

Radioactivity monitoring systems are used to verify that all releases are below regulatory limits. These instruments provide a continuous indication of radioactivity present at the release points. Each instrument is equipped with alarms and indicators in the control room. The alarm setpoints are low enough to ensure that applicable limits will not be exceeded. In some cases, these alarms restrict the release. For example, several alarms cause building ventilation systems to be shut down and/or gaseous releases to be diverted to the standby gas treatment system.

All liquid and gaseous radioactive effluents are evaluated to identify the specific concentrations of radionuclides being released. Sampling and analysis provide a more sensitive and precise method of determining effluent composition than monitoring instruments.

A meteorological tower is located on the Fermi 2 site. It is linked to computers that record the meteorological data. These data are used in calculating dispersion and deposition factors, which are essentially dilution factors between plant release points and points offsite. Coupled with the effluent release data, these factors are used to calculate dose to the public.

Beyond the plant, devices maintained in conjunction with the Radiological Environmental Monitoring Program constantly sample the air in the surrounding environment. Also, frequent samples of other environmental media, such as water and vegetation, are collected to verify that the station radiological effluent program is being appropriately implemented without adverse impact to the surrounding environment.

Exposure Pathways to People

Radiological exposure pathways define the methods by which people may become exposed to radioactive material. The major pathways of concern are those that could cause the highest calculated radiation dose. These projected pathways are determined from the type and amount of radioactive material released, the environmental transport mechanism, and the use of the environment. The environmental transport mechanism includes consideration of physical factors, such as the hydrological and meteorological characteristics of the area.

An important factor in evaluating the exposure pathways is the use of the environment. This is evaluated in the annual Land Use Census. Many factors are considered, such as the locations of homes, gardens, and milk or meat animals in the area.

The release of radioactive gaseous effluents involves pathways such as external whole body exposure, deposition of radioactive material on plants, deposition on soil, inhalation and ingestion by animals raised for human consumption, and inhalation by humans. The release of radioactive material in liquid effluents involves pathways such as drinking water and fish consumption.

Although radionuclides can reach humans by many different pathways, some result in greater dose than others. The most significant pathway is the exposure pathway that will provide the greatest dose to a population, or to a specific individual. Identification of the most significant pathway depends on the radionuclides involved, the age and diet of the individual, and the location of the individual's residence. Doses delivered to the total body and to specific organs are calculated. The organ receiving the greatest dose is important in determining compliance with dose limits. The standard assumptions used in dose calculation result in conservative dose estimates.

Dose Assessment

Dose is energy deposited by radiation in an exposed individual. Whole body exposure to radiation involves the exposure of all organs. Most exposures due to external sources of radiation are of this type. Both non-radioactive and radioactive elements can enter the body through inhalation or ingestion. When they do, they are usually not distributed evenly. For example, iodine concentrates in the thyroid gland, cesium collects in muscle and liver tissue, and strontium collects in bone tissue.

The total dose to organs from a given radionuclide depends on the amount of radioactive material present in the organ and the amount of time that the radionuclide remains in the organ. Some radionuclides remain for very short times due to their rapid radioactive decay and/or elimination rate from the body, while other radionuclides may remain in the body for longer periods of time. The form of the radionuclide (soluble vs. insoluble) and the method of uptake also influence residence times in the body.

The maximum dose to the general public in the area surrounding Fermi 2 is calculated for periods of gaseous release and for each liquid release. The dose due to radioactive material released in gaseous effluents is calculated using factors such as the amount of radioactive material released, the concentration beyond the site boundary, the locations of exposure pathways (for example cow milk, goat milk, vegetable gardens and residences), and usage factors (inhalation and food consumption). The dose due to radioactive material released in liquid effluents is calculated using factors such as radionuclide concentrations, the total volume of liquid released, the total volume of dilution water, near field dilution, and usage factors (water and fish consumption). These calculations produce a conservative estimation of the dose.

Radioactive Effluent Monitoring Results

This section summarizes the results of effluent monitoring and offsite dose calculation for the year 2012. Calculated offsite doses are compared with Nuclear Regulatory Commission limits, and these limits are summarized in Appendix A. Appendix A also contains a detailed discussion of the methods used to determine quantities of radioactivity released in effluents, the types of solid radwaste shipped offsite, as well as tables of individual radionuclides released in effluents and shipped as solid radwaste. There were no routine releases of liquid radioactive effluents from Fermi 2 in 2012. There has not been a routine liquid radioactive discharge from Fermi 2 since 1994.

The data in the following gaseous effluent tables represent continuous and batch releases. In 2012, there were 17 recorded containment purges in which radioactivity was detected. The total time for these purges was 4005 minutes. Based on recorded start and stop times, the shortest of these purges lasted 105 minutes, the longest lasted 461 minutes, and the average purge length was 236 minutes. The amounts of radioactivity released in these purges were very small compared with the amounts released in continuous releases.

Table 1 - Fission and Activation Gases (Noble Gases) Summary

	Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**
Release (curies)	1.66E+00	8.36E-01	1.10E+00	1.23E+00
Average Release Rate for Period (µCi/sec)	2.11E-01	1.06E-01	1.38E-01	1.55E-01

Table 2 - Radioiodines Summary

	Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**
Total I-131 (curies)	4.13E-04	3.02E-04	1.92E-04	5.98E-05
Average Release Rate for Period (µCi/sec)	5.25E-05	3.84E-05	2.42E-05	7.52E-06

Table 3 - Particulates Summary

	Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**
Particulates with half lives > 8 days (curies)	1.23E-04	6.33E-04	1.94E-04	5.20E-05
Average Release Rate for Period (μCi/sec)	1.56E-05	8.05E-05	2.44E-05	6.54E-06
Gross Alpha Radioactivity	<5.3E-15* uCi/cc	<5.3E-15* uCi/cc	<5.3E-15* uCi/cc	<5.3E-15* uCi/cc

*In the above table, the "less than" value in units of microcuries per cubic centimeter (μCi/cc) is used when no radioactivity was detected and represents the lower limit of detection (LLD) value for a single sample.

Table 4 - Tritium (H-3) and Carbon-14 (C-14) Summary

	Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**
Total H-3 Release (curies)	7.53E+01	5.76E+01	4.40E+01	3.90E+01
Average H-3 Release Rate (μCi/sec)	9.58E+00	7.33E+00	5.53E+00	4.91E+00
Total C-14 Release (curies)	4.06E+00	2.28E+00	1.89E+00	1.22E+00
Average C-14 Release Rate (μCi/sec)	5.17E-01	2.90E-01	2.38E-01	1.53E-01

The offsite dose impact of the above releases was evaluated by calculating organ doses to the most highly exposed individual (an adult) living near the plant due to I-131, I-133, H-3, C-14 and particulates with half lives greater than 8 days. The most significant pathways of exposure to this individual have been determined to be inhalation, vegetation ingestion, and direct radiation from material deposited on the ground. The results of this calculation, which employs conservative assumptions, are shown in the following table:

Table 5

Organ	2012 Gaseous Effluent Dose to Receptor with Highest Single Organ Dose
Bone	1.57E-01 mrem
Liver	8.33E-02 mrem
Thyroid	9.58E-02 mrem
Kidney	8.33E-02 mrem
Lung	8.33E-02 mrem
GI-LLI	8.35E-02 mrem
Total body	8.34E-02 mrem

The highest single organ dose is 1.57E-01 mrem to the bone. This is 1.0% of the federal limit of 15 mrem specified in 10 CFR 50, Appendix I. (The Fermi 2 Offsite Dose Calculation Manual requires maximum receptor dose calculation for releases of I-131, I-133, H-3, and particulates with half lives greater than 8 days; for these isotopes, the thyroid is the highest dose organ. When C-14 is added, bone becomes the highest dose organ.)

In addition, gamma and beta air dose at the site boundary due to noble gases was calculated. In 2012, gamma air dose was 1.29E-03 mrad, 0.01% of the 10 mrad annual limit; beta air dose in 2012 was 5.20E-04 mrad, 0.003% of the 20 mrad annual limit.

Title 40, Part 190 of the Code of Federal Regulations requires that dose to an individual in the unrestricted area from the uranium fuel cycle, including direct radiation dose, be limited to 25 mrem/year to the total body and 75 mrem/year to the thyroid. During 2012, there was no direct radiation dose attributed to the operation of Fermi 2 beyond the site boundary, based on analysis of offsite TLD readings. Based on Table 5 above, the offsite dose due to effluents is 0.33% and 0.13% of 40 CFR 190 limits for the total body and thyroid, respectively. Therefore, Fermi 2 was in compliance with 40 CFR 190 in 2012.

Potential dose to visitors at Fermi 2 due to all radioactive effluents, including noble gases, was also calculated. The Offsite Dose Calculation Manual (ODCM) considers persons visiting the Fermi 2 Visitors Center (4 hours/year), and persons potentially ice fishing on Lake Erie near the plant (240 hours/year), to be visitors. Using ODCM assumptions about these categories of visitors, the maximum potential dose to a visitor to Fermi 2 in 2012 was 4.22E-03 mrem to the maximally exposed organ (thyroid) and 3.99E-03 mrem to the total body. These doses are below the annual maximum offsite doses due to gaseous effluents shown in Table 5, and are very small fractions of the 100 mrem/year limit for individual members of the public due to licensed operation of the plant provided in 10 CFR 20.1301.

Summary of Radioactive Waste Shipments

The radioactivity and volume of Fermi 2 solid waste shipped offsite is summarized in the following table:

Table 6 - Waste Shipped Offsite

Type of waste	Unit	12 month period	Est. total activity error, %
Spent resins, sludges, etc.	m^3 curies	1.38E+02 2.99E+02	± 25
Dry compressible waste, contaminated equipment, etc.	m^3 curies	1.23E+03 1.28E+00	± 25
Irradiated components, control rods, etc.	m^3 curies	0 0	N/A
Other	m^3 curies	0 0	N/A

Radioactive waste shipments from Fermi 2 in 2012 (to either disposal or to intermediate processors) are summarized in the following table:

Table 7 - Waste Shipments

Type of shipment/ solidification process	Number of shipments	Mode of transportation	Destination
Spent resin, sludges, etc.	22	Tractor trailer with cask	Energy Solutions, Clive, UT
Dry compressible waste, contaminated equipment, etc.	25	Tractor trailer, or tractor trailer with cask	Energy Solutions, Oak Ridge, TN

Additional Required Information

Appendices

Appendix A, Effluent and Radwaste Data, provides more detailed data on radiological effluents and radwaste shipments. Appendix B contains a description of the Fermi 2 Integrated Groundwater Protection Program, 2012 sampling data for this program, and a discussion of sampling results. Appendix C contains data on tritium concentrations in rainwater collected onsite and explains the significance of these data. Appendix D contains meteorological joint frequency distributions of wind speed and wind direction by atmospheric stability class, for all of 2012.

ODCM Revisions

The ODCM was not revised in 2012.

ODCM Monitors Out of Service

No ODCM monitors were out of service longer than 30 days in 2012.

Outside Temporary Tanks

In 2012 no outside temporary tank exceeded the 10 curie content limit for nuclides other than tritium and dissolved or entrained noble gases.

Major Changes to Radioactive Waste Systems

There were no major changes to radioactive waste systems in 2012.

Abnormal Radiological Releases

There were no abnormal radiological releases in 2012.

Errata/Corrections to Previous ARERRs

No errata for the ARERR for 2011 have been noted.

Appendix A

Effluent and Radwaste Data

Regulatory Limits for Radioactive Effluents

The Nuclear Regulatory Commission (NRC) limits on liquid and gaseous effluents are incorporated into the Fermi 2 Offsite Dose Calculation Manual. These limits prescribe the maximum doses and dose rates due to radioactive effluents resulting from normal operation of Fermi 2. These limits are described in the following sections.

A. Gaseous Effluents

I. Dose rate due to radioactivity released in gaseous effluents to areas at and beyond the site boundary shall be limited to the following:

a) Noble gases

Less than or equal to 500 mrem/year to the total body.
Less than or equal to 3000 mrem/year to the skin.

b) Iodine-131, iodine-133, tritium, and for all radionuclides in particulate form with half lives greater than 8 days

Less than or equal to 1500 mrem/year to any organ.

II. Air dose due to noble gases to areas at and beyond the site boundary shall be limited to the following:

a) Less than or equal to 5 mrad for gamma radiation
Less than or equal to 10 mrad for beta radiation
- During any calendar quarter

b) Less than or equal to 10 mrad for gamma radiation
Less than or equal to 20 mrad for beta radiation
- During any calendar year

III. Dose to a member of the public from iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half lives greater than 8 days in gaseous effluents released to areas at and beyond the site boundary shall be limited to the following:

a) Less than or equal to 7.5 mrem to any organ
- During any calendar quarter

b) Less than or equal to 15 mrem to any organ
- During any calendar year

Note: The calculated site boundary dose rates for Fermi 2 are based on identification of individual isotopes and on use of dose factors specific to each identified isotope or a highly conservative dose factor. Since individual isotopes are identified, average energy values are not used in these calculations, and therefore are not reported even though their use in these calculations is allowed by Regulatory Guide 1.21.

B. Liquid Effluents

I. The concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to ten times the concentrations specified in Title 10 of the Code of Federal Regulations (10 CFR) Part 20 (Standards for Protection Against Radiation), Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases, as required by the Fermi 2 Offsite Dose Calculation Manual. For dissolved or entrained noble gases, the concentration shall be limited to 2E-4 (.0002) microcuries/ml total activity. This limit is based on the Xe-135 air submersion dose limit converted to an equivalent concentration in water as discussed in the International Commission on Radiological Protection (ICRP) Publication 2.

II. The dose or dose commitment to a member of the public from radioactive materials in liquid effluents released to unrestricted areas shall be limited to the following:

a) Less than or equal to 1.5 mrem to the total body
Less than or equal to 5 mrem to any organ
- During any calendar quarter

b) Less than or equal to 3 mrem to the total body
Less than or equal to 10 mrem to any organ
- During any calendar year

As noted previously, Fermi 2 did not perform radioactive liquid releases in 2012.

Measurements and Approximations of Total Activity in Radioactive Effluents

As required by NRC Regulatory Guide 1.21, this section describes the methods used to measure the total radioactivity in effluent releases and to estimate the overall errors associated with these measurements. The effluent monitoring systems are described in Chapter 11.4 of the Fermi 2 Updated Final Safety Analysis Report (UFSAR).

A. Gaseous Effluents

I. Fission and Activation Gases

Samples are obtained from each of the six plant radiation monitors which continuously monitor the five ventilation exhaust points. The fission and activation gases are quantified by gamma spectroscopy analysis of periodic samples.

The summary values reported are the sums of all fission and activation gases quantified at all monitored release points.

II. Radioiodines

Samples are obtained from each of the six plant radiation monitors which continuously monitor the five ventilation exhaust points. The radioiodines are entrained on charcoal and then quantified by gamma spectroscopy analysis. For each sample, the duration of sampling and continuous flow rate through the charcoal are used in determining the concentration of radioiodines. From the flow rate of the ventilation system, a rate of release can be determined.

The summary values reported are the sums of all radioiodines quantified at all continuously monitored release points.

III. Particulates

Samples are obtained from each of the six plant effluent radiation monitors which continuously monitor the five ventilation exhaust points. The particulates are collected on a filter and then quantified by gamma spectroscopy analysis.

For each sample, the duration of sampling and the continuous flow rate through the filter are used in determining the concentration of particulates. From the flow rate of the ventilation system, a rate of release can be determined.

Quarterly, the filters from each ventilation release point are composited and then radiochemically separated and analyzed for strontium (Sr)-89/90.

The summary values reported are the sums of all particulates quantified at all monitored release points.

IV. Tritium

Samples are obtained from each of the six plant effluent radiation monitors which continuously monitor the five ventilation exhaust points. The sample is passed through a bottle containing water and the gaseous tritium is collected in this water. Portions of the collecting water are analyzed for tritium using liquid scintillation counting techniques. For each sample, the duration of sample and sample flow rate is used to determine the concentration. From the flow rate of the ventilation system, a release rate can be determined.

In addition to tritium releases from the five ventilation exhaust points, gaseous tritium releases from the Condensate Storage Tank and Condensate Return Tank have been calculated. These releases are due to evaporation of tritiated water in these tanks which is released through tank vents. However this is not a significant release point for tritium, contributing well less than 1% of total tritium releases. These releases were calculated to total 8.80E-03 curies in 2012; adding them to reported tritium releases from the ventilation release points does not change the reported release quantities, which are greater than 10 curies in each quarter and are expressed to three significant digits.

The summary values reported are the sums of all tritium quantified at all monitored release points.

V. Gross Alpha

The gaseous particulate filters from the six plant effluent radiation monitors are stored for one week to allow for decay of naturally occurring alpha emitters. These filters are then analyzed for gross alpha radioactivity by gas proportional counting, and any such radioactivity found is assumed to be plant related. The quantity of alpha emitters released can then be determined from sample flow rate, sample duration, and stack flow rate.

The summary values reported are the sums of all alpha emitters quantified at all monitored release points.

VI. Carbon-14

Carbon-14 releases are calculated using a method published by the Electric Power Research Institute in December 2010. Plant rated thermal power and monthly capacity factors were used in the calculation of quarterly releases.

B. Liquid Effluents

The liquid radwaste processing system and the liquid effluent monitoring system are described in the Fermi 2 UFSAR. Fermi 2 did not perform any releases of radioactive liquid effluents in 2012.

C. Statistical Measurement Uncertainties

The statistical uncertainty of the measurements in this section has been calculated and summarized in the following table:

Measurement Type	Sample Type	One Sigma Uncertainty
Fission and Activation Gases	Gaseous	30%
Radioiodines	Gaseous	17%
Particulates	Gaseous	16%
Tritium	Gaseous	25%
Gross Alpha	Gaseous	16%

Gaseous Releases by Individual Nuclide

Values in the following tables which are preceded by the "less than" symbol represent the lower limit of detection (LLD) in units of microcuries per cubic centimeter (μCi/cc) for individual samples, and indicate that the nuclide in question was not detected in gaseous effluent samples in the indicated quarter of 2012. For quantities of gross alpha radioactivity, tritium, and carbon-14 in gaseous effluents, see Tables 3 and 4 on page 10 of this report.

A. Particulate Radionuclides (Curies*)

Nuclide	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Mn-54	1.14E-05	4.76E-05	4.81E-06	<2.9E-13
Co-58	8.89E-06	1.17E-05	<1.0E-13	<1.0E-13
Co-60	2.82E-05	1.04E-04	4.80E-05	3.11E-06
Cr-51	2.14E-05	8.70E-05	<7.5E-14	<7.5E-14
Fe-59	<2.6E-13	1.39E-05	<2.6E-13	<2.6E-13
Zn-65	8.95E-06	1.70E-05	<9.8E-13	<9.8E-13
Tc-99m	<2.7E-13	<2.7E-13	<2.7E-13	1.01E-06
Ba-139	3.68E-02	9.30E-02	5.00E-02	4.93E-02
La-140	4.81E-05	1.36E-04	3.75E-05	5.41E-05
Ba-140	<6.1E-14	7.12E-05	1.42E-05	2.12E-05
Y-91m	2.91E-03	1.78E-02	6.18E-03	4.49E-03
Rb-89	<2.0E-10	<2.0E-10	2.24E-02	1.27E-02
Cs-138	1.13E-02	4.71E-02	1.58E-02	3.51E-02
Br-82	8.15E-06	<2.1E-13	<2.1E-13	<2.1E-13
Sr-91	<1.1E-12	1.23E-04	1.38E-04	1.29E-04
Sr-89	1.15E-05	1.96E-05	2.05E-05	1.11E-05
Sr-90	<9.7E-16	1.41E-06	7.75E-07	4.25E-07
Fe-55	3.23E-05	2.60E-04	1.06E-04	1.62E-05
Cs-134	<4.1E-14	<4.1E-14	<4.1E-14	<4.1E-14
Cs-137	<6.6E-14	<6.6E-14	<6.1E-14	<6.1E-14
Ce-141	<2.2E-14	<2.2E-14	<2.2E-14	<2.2E-14
Ce-143	<1.5E-13	<1.5E-13	<1.5E-13	<1.5E-13
Ce-144	<1.0E-13	<1.0E-13	<1.0E-13	<1.0E-13
Total	**5.12E-02**	**1.59E-01**	**9.47E-02**	**1.02E-01**

*Less than (<) values are in units of uCi/cc.

B. Noble Gases (Curies*)

Nuclide	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Ar-41	5.86E-01	3.20E-01	3.16E-01	1.82E-01
Kr-88	<1.5E-07	<1.5E-07	1.63E-01	<1.5E-07
Kr-85m	2.76E-02	<3.9E-08	1.61E-01	1.03E-01
Xe-129m	<5.0E-07	<5.0E-07	<5.0E-07	1.32E-01
Xe-133	<6.3E-08	<6.3E-08	1.37E-02	7.85E-02
Xe-135	4.93E-02	<2.9E-08	6.20E-03	3.13E-02
Xe-135m	4.87E-01	5.16E-01	2.27E-01	1.24E-01
Xe-138	5.09E-01	<2.1E-05	2.14E-01	5.77E-01
Total	**1.66E+00**	**8.36E-01**	**1.10E+00**	**1.23E+00**

C. Radioiodines (Curies*)

Nuclide	Quarter 1	Quarter 2	Quarter 3	Quarter 4
I-131	4.13E-04	3.02E-04	1.92E-04	5.98E-05
I-132	3.79E-03	1.39E-03	<8.3E-13	<8.3E-13
I-133	1.41E-03	1.48E-03	7.17E-04	4.25E-04
I-134	<1.5E-11	2.45E-03	<1.5E-11	<1.5E-11
I-135	2.76E-04	1.66E-03	<1.6E-12	<1.6E-12
Total	**5.98E-03**	**7.28E-03**	**9.09E-04**	**4.85E-04**

*Less than (<) values are in units of uCi/cc.

Shipments of Radwaste

Fermi 2 complies with the extensive federal regulations that govern radioactive waste shipments. Radioactive solid waste shipments from the Fermi 2 site consist of waste generated during water treatment, radioactive trash, irradiated components, etc. Shipment destinations are either a licensed burial site or intermediate processing facilities. Waste shipped to intermediate processing facilities is shipped directly from these facilities to a licensed burial site after processing. The following tables contain estimates of major nuclide composition, by class of waste, of Fermi 2 solid radwaste shipped offsite in 2012. The waste volumes shown in these tables are the volumes shipped, not the final volumes sent for burial after processing.

a. **Spent resins, sludges, etc.** All waste in this category in 2012 was Class A waste and consisted of spent resins. It was shipped in shielded transportation casks (1 Type B, and 21 General Design Bulk Packages), directly to the Clive, UT burial facility. This waste was dewatered prior to shipment. All quantities were determined by measurement.

Spent resins, sludges, etc, (Class A)

Isotope	mCi	Percent
Ag-110m	9.09E+01	3.04E-02
Ba-133	1.95E+01	6.52E-03
Ba-140	9.03E+00	3.02E-03
C-14	6.40E+03	2.14E+00
Ce-144	1.19E+01	3.98E-03
Co-57	1.70E+01	5.69E-03
Co-58	1.90E+03	6.36E-01
Co-60	5.70E+04	1.91E+01
Cr-51	1.49E+03	4.99E-01
Cs-137	5.09E+02	1.70E-01
Fe-55	1.81E+05	6.06E+01
Fe-59	1.90E+03	6.36E-01
H-3	2.39E+02	8.00E-02
Hf-181	1.71E+01	5.72E-03
I-129 (LLD)	6.33E+00	N/A
I-131	1.29E+01	4.32E-03
La-140	9.13E+00	3.06E-03
Mn-54	3.37E+04	1.13E+01
Nb-95	2.95E+01	9.87E-03
Ni-63	3.25E+03	1.09E+00
Pu-238	9.68E-03	3.24E-06
Sb-124	5.20E+01	1.74E-02
Sb-125	4.75E+00	1.59E-03
Sr-89	3.52E+02	1.18E-01
Sr-90	7.55E+01	2.53E-02
Tc-99	1.66E+01	5.56E-03
Zn-65	1.06E+04	3.55E+00
Zr-95	5.28E+01	1.77E-02
Total Activity	2.99E+05	1.00E+02
Volume Shipped cubic meters	1.38E+02	

b. **Dry compressible waste, contaminated equipment, etc.** Waste in this category in 2012 was shipped in strong tight containers (46 General Design Bulk Packages) of various sizes or within shielded transportation casks (3 General Design Bulk Packages), and was classified as Dry Active Waste (DAW). All DAW waste was shipped to an intermediate processor for processing, e.g. compaction or incineration. All quantities were determined by measurement.

Dry Active Waste (Class A)

Isotope	mCi	%
C-14 (LLD)	2.96E+01	N/A
Co-57	7.88E-02	6.16E-03
Co-58	8.58E-01	6.70E-02
Co-60	5.16E+02	4.03E+01
Cr-51	1.62E-06	1.27E-07
Cs-137	6.86E-01	5.36E-02
Fe-55	5.29E+02	4.13E+01
Fe-59	7.45E-01	5.82E-02
H-3	8.61E+01	6.73E+00
I-129 (LLD)	1.36E+01	N/A
Mn-54	1.23E+02	9.61E+00
Ni-63	1.16E+01	9.06E-01
Sb-124	2.40E-06	1.88E-07
Sb-125	6.06E-01	4.74E-02
Sr-89	5.55E-01	4.34E-02
Sr-90	4.16E-02	3.25E-03
Tc-99	1.77E-01	1.38E-02
Zn-65	1.03E+01	8.05E-01
Total Activity	1.28E+03	1.00E+02
Volume Shipped cubic meters	1.23E+03	

c. **Irradiated components, control rods, etc.:** No waste in this category

d. **Other, e.g. oil:** No waste in this category

Appendix B

Ground Water Protection Program Data and Analysis

EXECUTIVE SUMMARY

Fermi personnel conclude that the occasional positive tritium sample results in ground water from the shallow and deep monitor wells is not due to a leak from plant systems. Tritium in ground water in the shallow aquifer is the result of washout and recapture of tritium in precipitation that has passed through gaseous effluent from monitored plant systems. Low-level tritium activity was only detected in ground water from the bedrock aquifer in one sample and this result is deemed spurious because none of the adjacent shallow aquifer wells have elevated tritium levels nor is there a credible source for licensed material in the bedrock aquifer.

PROGRAM OVERVIEW

Quarterly sampling and gauging of the Fermi 2 Integrated Ground Water Protection Program (IGWPP) monitor wells continued uninterrupted in 2012.

Procedurally, each IGWPP specified monitor well is required to be sampled for tritium and plant-related gamma-emitting radioisotopes each quarter. Furthermore, once per year ground water from three monitor wells adjacent to the condensate storage tanks, or associated piping, is analyzed for hard-to-detect (HTD) radionuclides (Fe-55, Sr-89, and Sr-90).

Samples analyzed for gamma-emitting radionuclides, as well as HTDs, are counted to environmental lower limits of detection (LLD) for each given radioisotope of interest, with the exception of La-140 and Ba-140 (due to their extremely short half-lives). For tritium there is no required limit of detection, beyond what is prescribed for ground water samples taken as part of the site's Radiological Environmental Monitoring Program (REMP). The REMP Lower Limit of Detection (LLD) is set at 2,000 pCi/L which is $1/10^{th}$ of the EPA's drinking water limit of 20,000 pCi/L. Fermi 2's contract laboratory achieved LLDs for tritium of 500 pCi/L, or less, for all ground-water samples taken during 2012.

In 2012 Fermi personnel continued to take an additional sample split for tritium analysis. These samples were analyzed for the presence of tritium by the Fermi chemistry laboratory. This process ensures more accurate data for shipping the samples to the offsite contract laboratory and to facilitate immediate mitigating actions, if required.

RESULTS

Deep Wells (Table 8)
Tritium was not detected in samples of ground water from the Fermi 2 deep monitor wells, with the exception of a ground-water sample from monitor well EF2-07-009D (241 pCi/L).

Plant-related gamma-emitting radioisotopes were not detected in any samples collected from deep monitor wells in 2012.

Shallow Wells (Table 9)
Most shallow monitor wells have consistently yielded results indicating that tritium is not present at the detection limit. Of the 30 shallow monitor wells that are sampled quarterly (periodic sample events), only three samples from three wells produced results with tritium levels above the detection limit. The positive results were sporadic and variable with tritium activities all less than or equal to 479 pCi/L (less than 3% of the EPA drinking water limit for tritium).

Emergent Sample Events (Table 10)
In 2012 Fermi 2 performed several emergent sample events. Emergent sample events are performed in response to a leak of licensed material, in response to a spill, unusual analytical results in samples taken during the course of periodic sampling, or if station personnel are concerned over the integrity of a system, structure, or component containing licensed material.

All emergent sample events (E-2012-G-01 through E-2012-G-08) were performed in response to the discovery of indications of possible corrosion found on a spare condensate line associated with the Fermi 2 Condensate Return Tank (CRT). Analytical results from these emergent sample events indicate that the spare condensate line is intact (maximum tritium activity 875 pCi/L).

Plant-related gamma-emitting radioisotopes and hard-to-detect radioisotopes were not detected in any ground-water samples collected from shallow monitor wells in 2012.

DISCUSSION

Results of tritium analysis of ground water sampled in 2012 have shown that ground water from many of the site's wells have never yielded a positive result. In 2012, positive ground water results for tritium ranged from 203 – 875 pCi/L. These values are well within the range of historic values and lower than the range of values seen in 2011. Furthermore, since the Integrated Ground Water Protection Program was initiated in the Fall of 2007, plant-related gamma isotopes and hard-to-detect isotopes have never been identified in ground-water samples from any of the monitor wells.

If the tritium found in ground water from shallow wells were attributable to a leaking plant system then one would expect the levels to steadily increase over time, especially during the winter when there is, normally, less recharge from surface water. Instead the results from shallow monitor wells show periodic low-level hits for tritium in ground water with no trend. This pattern is consistent with what one would expect to see if the tritium were attributable to recapture in precipitation. Recapture of tritium emitted from nuclear power plant stacks in precipitation is well documented and these emissions are continuously monitored and reported annually by the utility as part of an approved effluents program. A tritium rain-water washout study performed at the Fermi site revealed that tritium is found in rain water collected at the site. Tritium activity in rain water samples, taken at the site over a period of two months, ranged from ca. 400 pCi/L to 5,750 pCi/L.

In 2012 tritium was found at very low levels in one deep monitor well. The positive result (241 pCi/L) was in the third-quarter ground water sample from monitor well EF2-07-009D, located at the eastern edge of the Fermi 2 Protected Area. This positive result is considered spurious because of the extremely low level reported (less than one-half the LLD) and there was only one positive sample from this monitor well. Furthermore, adjacent shallow monitor wells produced ground-water samples that were either negative for tritium, or, sporadically, of such low values that ground water from the surficial aquifer is not a credible source (see discussion below).

The deep monitor wells in the vicinity of Fermi 2 are screened 40-45 feet below ground surface in bedrock. An approximately 10-foot thick inorganic clay layer between surficial aquifer and the bedrock aquifer impedes flow to such a degree that the bedrock aquifer is saturated and under pressure to the point that static pressure in deep monitor wells rises to a level several feet above the top of the clay layer in deep monitor wells. Plant components, outside of buildings, that contain large quantities of tritiated water are either above ground in tanks or in piping running through aggregate at or above the water table. If these components were to generate a leak the contamination would be evident by the presence of high levels of activity in nearby shallow monitor wells screened in the surficial aquifer. Furthermore, buildings completed in bedrock (e.g. Reactor Building, Turbine Building, and Radwaste Building), that contain contaminated systems, are so far below the potentiometric surface that, should they leak, ground water would flow into the building and therefore the leak could not be a source of contamination under any probable circumstance (for an evaluation of this see Fermi 2 UFSAR, Chapter 2).

Under these conditions (hydrogeological and plant construction) it is highly improbable that the positive tritium values in ground water from deep monitor wells are indicative of plant-related tritium because there is no known pathway for plant-related tritium to contaminate the bedrock aquifer. Furthermore, to date, the levels of detectible tritium activity in the surficial aquifer, when it occurs, are far too low to be a plausible source of tritium in the bedrock aquifer. Additionally, natural radioisotopes commonly found in bedrock, such as Pb-210, produce low-energy betas in a similar energy range as tritium and may cause spurious results. The low-level of activity in ground water from deep monitor wells may also be attributable to chemiluminescence due to natural compounds that occur in the hard water from the bedrock (Bass Islands Group) dolomite.

In 2012 emergent sample events were performed to ensure that a spare condensate line from the CRT, that had indications of possible corrosion based on results from a non-destructive evaluation, has not begun to leak. This condensate line exits the CRT into the CRT valve galley where it is routed through a penetration in the concrete wall. The line is completed just outside of the valve galley and therefore risks spilling process water to the environment should the pipe fail. Although the line contains a valve, its condition is unknown so no credit is taken for the valve to be able to prevent the CRT from draining if the line would fail. An evaluation of this circumstance was performed and personnel concluded that if the line failed catastrophically, the CRT would drain and Operations would identify the leak; however, if the line started to leak at a low rate, that leak could only be identified by analyzing ground water from adjacent monitor wells for tritium. To ensure that such a condition did not go undetected, station personnel established an emergent sample routine to ensure the sentinel wells in the vicinity of the CST diked area are sampled monthly (credit was taken for the months when the monitor wells were sampled as part of the quarterly, periodic, sample program). **Based on the results of these samples, there is no indication of condensate leaking from the spare CRT line at this time.**

Data

Table 8: Deep Monitor Well Tritium Analysis Results for Year 2012 (Periodic [Quarterly] Sample Events).

MONITOR WELL	EVENT ID	QA TYPE	LAB ID	PARAMETER	PREFIX	VALUE	UNITS
EF2-07-001D	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.60E+02	PCI/L
EF2-07-001D	P-2012-G-Q2	NORMAL	GEL	H-3	<	3.73E+02	PCI/L
EF2-07-001D	P-2012-G-Q3	DUPLICATE	GEL	H-3	<	4.14E+02	PCI/L
EF2-07-001D	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.21E+02	PCI/L
EF2-07-001D	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.56E+02	PCI/L
EF2-07-003D	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.05E+02	PCI/L
EF2-07-003D	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.65E+02	PCI/L
EF2-07-003D	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.13E+02	PCI/L
EF2-07-003D	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.32E+02	PCI/L
EF2-07-004D	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.64E+02	PCI/L
EF2-07-004D	P-2012-G-Q2	NORMAL	GEL	H-3	<	3.93E+02	PCI/L
EF2-07-004D	P-2012-G-Q3	NORMAL	GEL	H-3	<	3.00E+02	PCI/L
EF2-07-004D	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.22E+02	PCI/L
EF2-07-006D	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.61E+02	PCI/L
EF2-07-006D	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.47E+02	PCI/L
EF2-07-006D	P-2012-G-Q3	Note 1					
EF2-07-006D	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.42E+02	PCI/L
EF2-07-008D	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.18E+02	PCI/L
EF2-07-008D	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.69E+02	PCI/L
EF2-07-008D	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.10E+02	PCI/L
EF2-07-008D	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.34E+02	PCI/L
EF2-07-009D	P-2012-G-Q1	DUPLICATE	GEL	H-3	<	4.07E+02	PCI/L
EF2-07-009D	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.03E+02	PCI/L
EF2-07-009D	P-2012-G-Q2	DUPLICATE	GEL	H-3	<	4.62E+02	PCI/L
EF2-07-009D	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.68E+02	PCI/L
EF2-07-009D	P-2012-G-Q3	NORMAL	GEL	H-3		2.41E+02	PCI/L
EF2-07-009D	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.30E+02	PCI/L
EF2-07-015D	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.04E+02	PCI/L
EF2-07-015D	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.79E+02	PCI/L
EF2-07-015D	P-2012-G-Q3	NORMAL	GEL	H-3	<	2.97E+02	PCI/L
EF2-07-015D	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.59E+02	PCI/L
EF2-07-020D	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.65E+02	PCI/L
EF2-07-020D	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.63E+02	PCI/L
EF2-07-020D	P-2012-G-Q2	DUPLICATE	GEL	H-3	<	3.94E+02	PCI/L
EF2-07-020D	P-2012-G-Q3	NORMAL	GEL	H-3	<	2.95E+02	PCI/L
EF2-07-020D	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.85E+02	PCI/L
EF2-07-029D	P-2012-G-Q1	DUPLICATE	GEL	H-3	<	4.11E+02	PCI/L
EF2-07-029D	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.02E+02	PCI/L
EF2-07-029D	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.66E+02	PCI/L
EF2-07-029D	P-2012-G-Q3	NORMAL	GEL	H-3	<	3.08E+02	PCI/L
EF2-07-029D	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.29E+02	PCI/L

Note 1: Monitor well could not be accessed because well was obstructed.

Table 9: Shallow Monitor Well Tritium Analysis Results for Year 2012 (Periodic [Quarterly] Sample Events).

MONITOR WELL	EVENT ID	QA TYPE	LAB ID	PARAMETER	PREFIX	VALUE	UNITS
392S	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.13E+02	PCI/L
392S	P-2012-G-Q2	DUPLICATE	GEL	H-3	<	4.84E+02	PCI/L
392S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.78E+02	PCI/L
392S	P-2012-G-Q3	NORMAL	GEL	H-3	<	2.16E+02	PCI/L
392S	P-2012-G-Q4	DUPLICATE	GEL	H-3	<	2.49E+02	PCI/L
392S	P-2012-G-Q4	NORMAL	GEL	H-3	<	2.51E+02	PCI/L
EF2-07-002S	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.15E+02	PCI/L
EF2-07-002S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.79E+02	PCI/L
EF2-07-002S	P-2012-G-Q3	NORMAL	GEL	H-3	<	3.01E+02	PCI/L
EF2-07-002S	P-2012-G-Q4	DUPLICATE	GEL	H-3	<	2.49E+02	PCI/L
EF2-07-002S	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.65E+02	PCI/L
EF2-07-003S	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.17E+02	PCI/L
EF2-07-003S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.65E+02	PCI/L
EF2-07-003S	P-2012-G-Q3	NORMAL	GEL	H-3	<	2.96E+02	PCI/L
EF2-07-003S	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.34E+02	PCI/L
EF2-07-005S	P-2012-G-Q1	NORMAL	GEL	H-3		3.92E+02	PCI/L
EF2-07-005S	P-2012-G-Q2	NORMAL	GEL	H-3	<	3.70E+02	PCI/L
EF2-07-005S	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.09E+02	PCI/L
EF2-07-005S	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.29E+02	PCI/L
EF2-07-007S	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.58E+02	PCI/L
EF2-07-007S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.66E+02	PCI/L
EF2-07-007S	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.15E+02	PCI/L
EF2-07-007S	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.59E+02	PCI/L
EF2-07-008S	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.12E+02	PCI/L
EF2-07-008S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.63E+02	PCI/L
EF2-07-008S	P-2012-G-Q3	NORMAL	GEL	H-3	<	3.05E+02	PCI/L
EF2-07-008S	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.30E+02	PCI/L
EF2-07-012S	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.72E+02	PCI/L
EF2-07-012S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.59E+02	PCI/L
EF2-07-012S	P-2012-G-Q3	NORMAL	GEL	H-3	<	2.99E+02	PCI/L
EF2-07-012S	P-2012-G-Q4	NORMAL	GEL	H-3	<	2.48E+02	PCI/L
EF2-07-013S	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.11E+02	PCI/L
EF2-07-013S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.47E+02	PCI/L
EF2-07-013S	P-2012-G-Q3	NORMAL	GEL	H-3	<	2.98E+02	PCI/L
EF2-07-013S	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.53E+02	PCI/L
EF2-07-014S	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.10E+02	PCI/L
EF2-07-014S	P-2012-G-Q2	NORMAL	GEL	H-3	<	3.90E+02	PCI/L
EF2-07-014S	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.18E+02	PCI/L
EF2-07-014S	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.22E+02	PCI/L
EF2-07-015S	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.02E+02	PCI/L
EF2-07-015S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.72E+02	PCI/L
EF2-07-015S	P-2012-G-Q3	NORMAL	GEL	H-3	<	3.01E+02	PCI/L
EF2-07-015S	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.63E+02	PCI/L
EF2-07-016S	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.17E+02	PCI/L
EF2-07-016S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.84E+02	PCI/L

EF2-07-016S	P-2012-G-Q3	NORMAL	GEL	H-3	<	3.05E+02	PCI/L
EF2-07-016S	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.68E+02	PCI/L
EF2-07-017S	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.62E+02	PCI/L
EF2-07-017S	P-2012-G-Q2	NORMAL	GEL	H-3	<	3.68E+02	PCI/L
EF2-07-017S	P-2012-G-Q3	NORMAL	GEL	H-3	<	3.01E+02	PCI/L
EF2-07-017S	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.36E+02	PCI/L
EF2-07-018S	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.72E+02	PCI/L
EF2-07-018S	P-2012-G-Q2	NORMAL	GEL	H-3	<	3.79E+02	PCI/L
EF2-07-018S	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.04E+02	PCI/L
EF2-07-018S	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.39E+02	PCI/L
EF2-07-019S	P-2012-G-Q1	DUPLICATE	GEL	H-3	<	3.60E+02	PCI/L
EF2-07-019S	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.65E+02	PCI/L
EF2-07-019S	P-2012-G-Q2	NORMAL	GEL	H-3	<	3.73E+02	PCI/L
EF2-07-019S	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.21E+02	PCI/L
EF2-07-019S	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.56E+02	PCI/L
EF2-07-020S	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.66E+02	PCI/L
EF2-07-020S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.67E+02	PCI/L
EF2-07-020S	P-2012-G-Q3	NORMAL	GEL	H-3	<	3.00E+02	PCI/L
EF2-07-020S	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.30E+02	PCI/L
EF2-07-021S	P-2012-G-Q1	NORMAL	GEL	H-3		3.76E+02	PCI/L
EF2-07-021S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.83E+02	PCI/L
EF2-07-021S	P-2012-G-Q3	Note 1					
EF2-07-021S	P-2012-G-Q4	Note 2					
EF2-07-022S	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.51E+02	PCI/L
EF2-07-022S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.66E+02	PCI/L
EF2-07-022S	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.17E+02	PCI/L
EF2-07-022S	P-2012-G-Q4	DUPLICATE	GEL	H-3	<	3.71E+02	PCI/L
EF2-07-022S	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.51E+02	PCI/L
EF2-07-023S	P-2012-G-Q1	NORMAL	GEL	H-3		4.79E+02	PCI/L
EF2-07-023S	P-2012-G-Q2	NORMAL	GEL	H-3	<	3.87E+02	PCI/L
EF2-07-023S	P-2012-G-Q3	NORMAL	GEL	H-3	<	2.12E+02	PCI/L
EF2-07-023S	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.23E+02	PCI/L
EF2-07-024S	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.13E+02	PCI/L
EF2-07-024S	P-2012-G-Q2	NORMAL	GEL	H-3	<	3.79E+02	PCI/L
EF2-07-024S	P-2012-G-Q3	NORMAL	GEL	H-3	<	2.99E+02	PCI/L
EF2-07-024S	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.55E+02	PCI/L
EF2-07-025S	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.11E+02	PCI/L
EF2-07-025S	P-2012-G-Q2	NORMAL	GEL	H-3	<	3.89E+02	PCI/L
EF2-07-025S	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.18E+02	PCI/L
EF2-07-025S	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.41E+02	PCI/L
EF2-07-026S	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.67E+02	PCI/L
EF2-07-026S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.53E+02	PCI/L
EF2-07-026S	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.18E+02	PCI/L
EF2-07-026S	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.48E+02	PCI/L
EF2-07-027S	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.67E+02	PCI/L
EF2-07-027S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.67E+02	PCI/L
EF2-07-027S	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.21E+02	PCI/L
EF2-07-027S	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.35E+02	PCI/L
EF2-07-028S	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.10E+02	PCI/L
EF2-07-028S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.74E+02	PCI/L

EF2-07-028S	P-2012-G-Q3	NORMAL	GEL	H-3	<	2.98E+02	PCI/L
EF2-07-028S	P-2012-G-Q4	NORMAL	GEL	H-3	<	2.49E+02	PCI/L
EF2-07-029S	P-2012-G-Q1	NORMAL	GEL	H-3	<	4.29E+02	PCI/L
EF2-07-029S	P-2012-G-Q2	NORMAL	GEL	H-3	<	4.56E+02	PCI/L
EF2-07-029S	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.12E+02	PCI/L
EF2-07-029S	P-2012-G-Q4	NORMAL	GEL	H-3	<	4.37E+02	PCI/L
EF2-07-031S	P-2012-G-Q1	Note 3					
EF2-07-031S	P-2012-G-Q2	NORMAL	GEL	H-3	<	3.76E+02	PCI/L
EF2-07-031S	P-2012-G-Q3	DUPLICATE	GEL	H-3	<	2.87E+02	PCI/L
EF2-07-031S	P-2012-G-Q3	NORMAL	GEL	H-3	<	2.94E+02	PCI/L
EF2-07-031S	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.68E+02	PCI/L
MW-9	P-2012-G-Q1	Note 2					
MW-9	P-2012-G-Q2	Note 2					
MW-9	P-2012-G-Q3	Note 2					
MW-9	P-2012-G-Q4	Note 2					
MW-10	P-2012-G-Q1	Note 2					
MW-10	P-2012-G-Q2	Note 2					
MW-10	P-2012-G-Q3	Note 2					
MW-10	P-2012-G-Q4	Note 2					
MW-11	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.64E+02	PCI/L
MW-11	P-2012-G-Q2	NORMAL	GEL	H-3	<	3.76E+02	PCI/L
MW-11	P-2012-G-Q3	DUPLICATE	GEL	H-3	<	4.10E+02	PCI/L
MW-11	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.28E+02	PCI/L
MW-11	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.57E+02	PCI/L
MW-18	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.57E+02	PCI/L
MW-18	P-2012-G-Q2	NORMAL	GEL	H-3	<	3.75E+02	PCI/L
MW-18	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.20E+02	PCI/L
MW-18	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.56E+02	PCI/L
MW-21	P-2012-G-Q1	NORMAL	GEL	H-3	<	3.55E+02	PCI/L
MW-21	P-2012-G-Q2	NORMAL	GEL	H-3	<	3.80E+02	PCI/L
MW-21	P-2012-G-Q3	DUPLICATE	GEL	H-3	<	4.13E+02	PCI/L
MW-21	P-2012-G-Q3	NORMAL	GEL	H-3	<	4.17E+02	PCI/L
MW-21	P-2012-G-Q4	NORMAL	GEL	H-3	<	3.63E+02	PCI/L

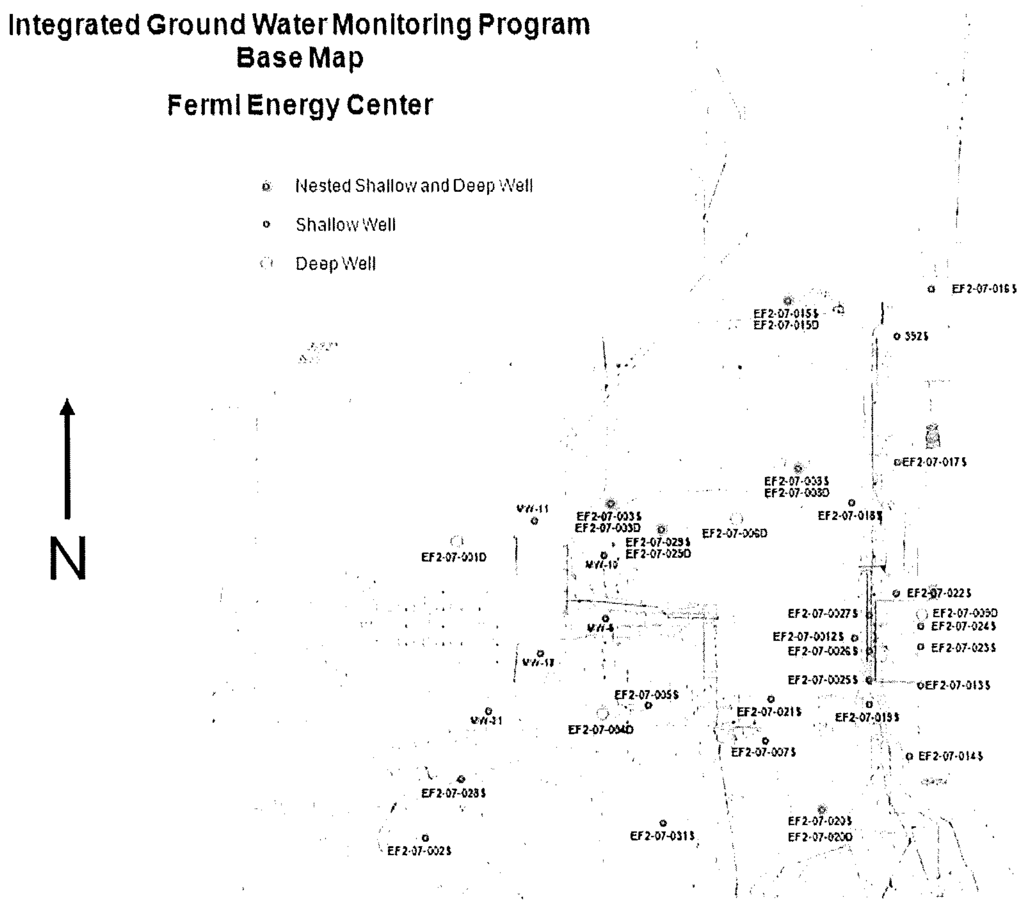
Note 1: Monitor well could not be accessed because it was in a construction area.
Note 2: Monitor well could not be accessed because it has been buried in gravel/soil due to recent construction.
Note 3: Monitor well could not be accessed because of flooding.

Table 10: Monitor Well Tritium Analysis Results for Year 2012 (Emergent Sample Events)

MONITOR WELL	EVENT ID	QA TYPE	LAB ID	PARAMETER	PREFIX	VALUE	UNITS
EF2-07-013S	E-2012-G-01	NORMAL	FERMI	H-3		3.47E+02	PCI/L
EF2-07-022S	E-2012-G-01	NORMAL	FERMI	H-3		2.03E+02	PCI/L
EF2-07-023S	E-2012-G-01	NORMAL	FERMI	H-3		4.05E+02	PCI/L
EF2-07-024S	E-2012-G-01	NORMAL	FERMI	H-3		3.18E+02	PCI/L
EF2-07-025S	E-2012-G-01	NORMAL	FERMI	H-3		7.24E+02	PCI/L
EF2-07-026S	E-2012-G-01	NORMAL	FERMI	H-3	<	1.74E+02	PCI/L
EF2-07-027S	E-2012-G-01	NORMAL	FERMI	H-3		4.92E+02	PCI/L
EF2-07-013S	E-2012-G-02	NORMAL	FERMI	H-3		8.75E+02	PCI/L
EF2-07-022S	E-2012-G-02	NORMAL	FERMI	H-3		4.51E+02	PCI/L
EF2-07-023S	E-2012-G-02	NORMAL	FERMI	H-3		5.64E+02	PCI/L
EF2-07-024S	E-2012-G-02	NORMAL	FERMI	H-3		4.51E+02	PCI/L
EF2-07-025S	E-2012-G-02	NORMAL	FERMI	H-3		7.05E+02	PCI/L
EF2-07-026S	E-2012-G-02	NORMAL	FERMI	H-3		3.95E+02	PCI/L
EF2-07-027S	E-2012-G-02	NORMAL	FERMI	H-3		3.39E+02	PCI/L
EF2-07-013S	E-2012-G-03	NORMAL	FERMI	H-3		5.68E+02	PCI/L
EF2-07-022S	E-2012-G-03	NORMAL	FERMI	H-3	<	2.08E+02	PCI/L
EF2-07-023S	E-2012-G-03	NORMAL	FERMI	H-3		7.18E+02	PCI/L
EF2-07-024S	E-2012-G-03	NORMAL	FERMI	H-3		4.15E+02	PCI/L
EF2-07-025S	E-2012-G-03	NORMAL	FERMI	H-3		5.64E+02	PCI/L
EF2-07-026S	E-2012-G-03	NORMAL	FERMI	H-3		2.67E+02	PCI/L
EF2-07-027S	E-2012-G-03	NORMAL	FERMI	H-3	<	2.08E+02	PCI/L
EF2-07-013S	E-2012-G-04	NORMAL	FERMI	H-3		5.54E+02	PCI/L
EF2-07-022S	E-2012-G-04	NORMAL	FERMI	H-3		4.62E+02	PCI/L
EF2-07-023S	E-2012-G-04	NORMAL	FERMI	H-3		4.62E+02	PCI/L
EF2-07-024S	E-2012-G-04	NORMAL	FERMI	H-3		4.31E+02	PCI/L
EF2-07-025S	E-2012-G-04	NORMAL	FERMI	H-3		6.46E+02	PCI/L
EF2-07-026S	E-2012-G-04	NORMAL	FERMI	H-3		3.69E+02	PCI/L
EF2-07-027S	E-2012-G-04	NORMAL	FERMI	H-3		2.77E+02	PCI/L
EF2-07-013S	E-2012-G-05	NORMAL	FERMI	H-3		3.57E+02	PCI/L
EF2-07-022S	E-2012-G-05	NORMAL	FERMI	H-3		2.38E+02	PCI/L
EF2-07-023S	E-2012-G-05	NORMAL	FERMI	H-3		4.75E+02	PCI/L
EF2-07-024S	E-2012-G-05	NORMAL	FERMI	H-3		4.46E+02	PCI/L
EF2-07-025S	E-2012-G-05	NORMAL	FERMI	H-3		3.86E+02	PCI/L
EF2-07-026S	E-2012-G-05	NORMAL	FERMI	H-3		2.67E+02	PCI/L
EF2-07-027S	E-2012-G-05	NORMAL	FERMI	H-3	<	1.78E+02	PCI/L
EF2-07-013S	E-2012-G-06	NORMAL	FERMI	H-3	<	2.03E+02	PCI/L
EF2-07-022S	E-2012-G-06	NORMAL	FERMI	H-3	<	2.03E+02	PCI/L
EF2-07-023S	E-2012-G-06	NORMAL	FERMI	H-3	<	2.03E+02	PCI/L
EF2-07-024S	E-2012-G-06	NORMAL	FERMI	H-3	<	2.03E+02	PCI/L
EF2-07-025S	E-2012-G-06	NORMAL	FERMI	H-3	<	2.03E+02	PCI/L
EF2-07-026S	E-2012-G-06	NORMAL	FERMI	H-3	<	2.03E+02	PCI/L
EF2-07-027S	E-2012-G-06	NORMAL	FERMI	H-3	<	2.03E+02	PCI/L
EF2-07-013S	E-2012-G-07	NORMAL	FERMI	H-3		5.75E+02	PCI/L
EF2-07-022S	E-2012-G-07	NORMAL	FERMI	H-3		2.88E+02	PCI/L
EF2-07-023S	E-2012-G-07	NORMAL	FERMI	H-3		3.45E+02	PCI/L
EF2-07-024S	E-2012-G-07	NORMAL	FERMI	H-3		5.47E+02	PCI/L

EF2-07-025S	E-2012-G-07	NORMAL	FERMI	H-3	5.75E+02	PCI/L
EF2-07-026S	E-2012-G-07	NORMAL	FERMI	H-3	2.59E+02	PCI/L
EF2-07-027S	E-2012-G-07	NORMAL	FERMI	H-3	3.74E+02	PCI/L
EF2-07-013S	E-2012-G-08	NORMAL	FERMI	H-3	4.96E+02	PCI/L
EF2-07-022S	E-2012-G-08	NORMAL	FERMI	H-3	4.66E+02	PCI/L
EF2-07-023S	E-2012-G-08	NORMAL	FERMI	H-3	4.37E+02	PCI/L
EF2-07-024S	E-2012-G-08	NORMAL	FERMI	H-3	3.21E+02	PCI/L
EF2-07-025S	E-2012-G-08	NORMAL	FERMI	H-3	4.96E+02	PCI/L
EF2-07-026S	E-2012-G-08	NORMAL	FERMI	H-3	3.21E+02	PCI/L
EF2-07-027S	E-2012-G-08	NORMAL	FERMI	H-3	3.79E+02	PCI/L

Map of Current Monitor Well Locations



Appendix C

Rainwater Data and Analysis

Fermi 2 has documented the phenomenon of rainwater washout of gaseous effluents, in which tritium concentrations above background levels are routinely detected in rainwater samples collected at the site. These positive samples are most often observed in down-wind sectors from the plant. The largest gaseous tritium release point at the site is the Turbine Building ventilation exhaust vent. The Nuclear Regulatory Commission has also recognized this phenomenon of recapture of legally released gaseous effluents in NRC Regulatory Issue Summary 2008-03.

Fermi 2 continues to monitor this phenomenon through the collection of rainwater samples and storm-water outfall samples at least once per quarter. These samples are analyzed for tritium to a Lower Limit of Detection (LLD) of 500 pCi/L. The table and map at the end of this appendix show tritium results and collection locations for 2012 rainwater samples. The following general points may be made about these data:

1) Higher rainwater tritium levels were detected in down-wind sectors from the plant. This is to be expected based on the prevailing wind direction and proximity to the turbine building vent, as explained above. It is also consistent with the occasional detection of tritium in shallow groundwater wells, as mentioned in Appendix B.

2) Detection of tritium in rainwater samples is more frequent and at somewhat higher levels than in shallow groundwater wells. This is consistent with the dilution of rainwater tritium prior to its occurrence in groundwater wells.

3) Tritium levels seen at the storm-water outfall can be explained by runoff of relatively highly tritiated water from plant roofs (near plant vents).

4) Tritium levels in rainwater near the CST can be explained by periodic venting of tritiated water vapor from the CST and CRT (minor release points for tritium).

5) With the exception of one precipitation sample taken during the first quarter of 2012 (2,090 pCi/L), all rainwater and storm-water tritium concentrations were less than one tenth of the EPA drinking water limit (20,000 pCi/L). That is, the EPA considers water with tritium concentrations greater than 10 times the levels commonly detected in Fermi rainwater to be safe for drinking.

The Table 11 presents 2012 rainwater and storm-water tritium analyses. The designation "< CL" indicates that tritium in the sample was less than the "Critical Level" for that sample. The Critical Level is the net count rate that must be exceeded before the sample is said to have activity above background. Rainwater and storm-water samples are analyzed by Fermi 2 Chemistry personnel using a Liquid Scintillation Counter. Although the lab is requested to count these samples to an LLD of 500 pCi/L; the samples for two quarters (second and fourth quarter 2012) were counted to LLDs of 1,100 pCi/L (this is the nominal site LLD for Radiological Environmental Monitoring Program). The Critical Level (CL – a statistical limit for quantification of a positive sample) during those quarters (584 and 575 pCi/L, respectively) approached the requested LLDs and these results do not affect the interpretation. The CL for each sample is presented in the table.

Table 11: Rain Water and Storm Water Tritium Analysis Results for Year 2012

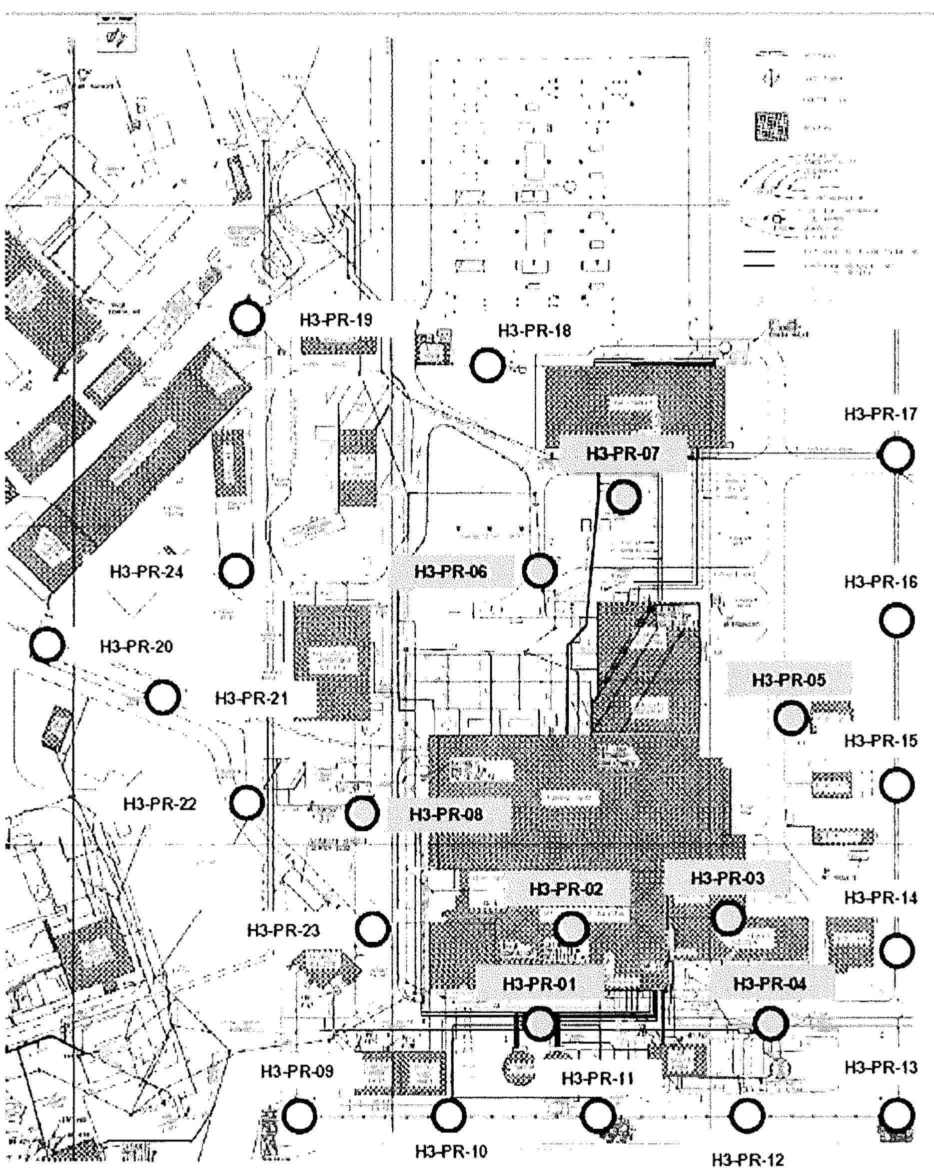
SAMPLE LOCATION	SAMPLE_ID	SAMPLE DATE	PREFIX	H3 RESULT (pCi/L)	CL (pCi/L)
OUTFALL 002	702060	10-Jan-12		6.08E+02	2.00E+02
OUTFALL 002	702068	7-Feb-12		3.67E+02	2.00E+02
H3-PR-01	702115	27-Mar-12		9.69E+02	2.00E+02
H3-PR-04	702116	27-Mar-12		2.86E+02	2.00E+02
H3-PR-05	702117	27-Mar-12		5.13E+02	2.00E+02
H3-PR-06	702118	27-Mar-12		7.12E+02	2.00E+02
H3-PR-07	702119	27-Mar-12		3.71E+02	2.00E+02
H3-PR-08	702120	27-Mar-12		8.55E+02	2.00E+02
H3-PR-14	702121	27-Mar-12		3.14E+02	2.00E+02
H3-PR-23	702122	27-Mar-12		9.97E+02	2.00E+02
H3-PR-24	702123	27-Mar-12		Note 1	2.00E+02
EAST OF TB VENT	702124	27-Mar-12		2.09E+03	2.00E+02
OUTFALL 002	702125	27-Mar-12		2.28E+02	2.00E+02
WEST OF H3-PR-09	702126	27-Mar-12		6.84E+02	2.00E+02
H3-PR-01	702144	18-Jun-12	<	CL	5.84E+02
H3-PR-04	702145	18-Jun-12	<	CL	5.84E+02
H3-PR-05	702146	18-Jun-12	<	CL	5.84E+02
H3-PR-06	702147	18-Jun-12	<	CL	5.84E+02
H3-PR-07	702148	18-Jun-12	<	CL	5.84E+02
H3-PR-08	702149	18-Jun-12	<	CL	5.84E+02
H3-PR-14	702150	18-Jun-12	<	CL	5.84E+02
H3-PR-23	702151	18-Jun-12	<	CL	5.84E+02
H3-PR-24	702152	18-Jun-12	<	CL	5.84E+02
OUTFALL 002	702153	18-Jun-12	<	CL	5.84E+02
H3-PR-09A	702154	18-Jun-12	<	CL	5.84E+02
H3-PR-01A	702155	18-Jun-12	<	CL	5.84E+02
H3-PR-01	702286	27-Aug-12		4.13E+02	1.77E+02
H3-PR-04	702287	27-Aug-12		2.95E+02	1.77E+02
H3-PR-05	702288	27-Aug-12	<	CL	1.77E+02
H3-PR-06	702289	27-Aug-12	<	CL	1.77E+02
H3-PR-07	702290	27-Aug-12	<	CL	1.77E+02
H3-PR-08	702291	27-Aug-12	<	CL	1.77E+02
H3-PR-14	702292	27-Aug-12	<	CL	1.77E+02
H3-PR-23	702293	27-Aug-12		1.77E+02	1.77E+02
H3-PR-24	702294	27-Aug-12		3.84E+02	1.77E+02
OUTFALL 002	702295	27-Aug-12		3.84E+02	1.77E+02
H3-PR-09A	702296	27-Aug-12		2.36E+02	1.77E+02
H3-PR-01A	702297	27-Aug-12		2.07E+02	1.77E+02
OUTFALL 002	702381	12-Nov-12	<	CL	5.75E+02
H3-PR-01	702382	12-Nov-12		5.75E+02	5.75E+02
H3-PR-04	702383	12-Nov-12	<	CL	5.75E+02
H3-PR-05	702384	12-Nov-12	<	CL	5.75E+02
H3-PR-06	702385	12-Nov-12	<	CL	5.75E+02
H3-PR-07	702386	12-Nov-12	<	CL	5.75E+02
H3-PR-08	702387	12-Nov-12	<	CL	5.75E+02
H3-PR-14	702388	12-Nov-12	<	CL	5.75E+02

H3-PR-23	702389	12-Nov-12	<	CL	5.75E+02
H3-PR-24	702390	12-Nov-12	<	CL	5.75E+02

Note 1: Less than minimum required sample quantity collected.

The map below shows the locations of the samples listed in the table on the preceding page:

RAIN WATER COLLECTION LOCATIONS



Appendix D

Meteorological Joint Frequency Distributions

Fermi 2 Joint Frequency Distribution Table - 2012
Stability Class - A

Wind Speed (mph)		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0 to	0.75	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
0.76to	2.5	0	1	7	4	3	0	1	3	2	2	3	7	5	7	2	4
2.51 to	4.5	10	9	8	12	21	21	23	18	18	18	18	25	18	34	20	14
4.51 to	6.5	31	7	27	29	33	65	80	44	51	73	26	38	28	34	44	21
6.51 to	8.5	11	16	32	28	25	73	121	51	60	77	35	37	14	32	23	11
8.51 to	11.5	11	16	10	13	27	61	55	42	15	52	24	7	9	40	16	14
11.51 to	14.5	12	4	3	0	0	10	5	1	2	6	19	3	1	18	18	6
14.51to	18.5	1	0	0	0	0	3	0	0	0	0	2	0	4	3	0	2
18.51to	23.5	2	0	0	0	0	0	0	0	0	1	4	0	0	0	0	4
	Totals:	**79**	**53**	**87**	**86**	**109**	**233**	**285**	**159**	**148**	**229**	**132**	**117**	**80**	**168**	**123**	**76**

Grand Total: **2164**

Fermi 2 Joint Frequency Distribution Table - 2012
Stability Class - B

Wind Speed (mph)		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0 to	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.76to	2.5	0	0	0	0	0	0	0	1	1	0	0	1	1	0	1	0
2.51to	4.5	2	3	0	2	3	0	4	1	2	3	2	6	7	4	4	2
4.51to	6.5	8	2	3	2	3	5	2	2	2	6	5	4	6	6	6	5
6.51to	8.5	8	3	1	2	1	6	2	3	3	8	11	2	0	6	1	4
8.51to	11.5	3	1	1	1	2	1	1	2	3	6	9	5	1	9	4	2
11.51to	14.5	2	0	0	1	2	0	1	0	0	1	2	2	0	1	1	1
14.51to	18.5	0	1	0	0	1	0	0	0	0	2	0	0	1	0	0	0
18.51to	23.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Totals:	**10**	**5**	**8**	**12**	**12**	**10**	**9**	**11**	**26**	**29**	**20**	**16**	**26**	**17**	**14**	**23**

Grand Total: **248**

Fermi 2 Joint Frequency Distribution Table - 2012
Stability Class - C

Wind Speed (mph)		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0 to	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.76to	2.5	0	1	0	2	2	1	0	1	1	0	1	0	1	0	0	0
2.51to	4.5	1	2	3	1	1	1	2	1	2	3	1	9	3	7	8	0
4.51to	6.5	4	3	5	4	0	4	1	3	3	4	4	8	4	3	5	2
6.51to	8.5	5	2	2	4	3	6	6	1	1	8	4	1	2	5	2	4
8.51to	11.5	1	4	6	1	0	2	4	0	1	4	7	3	1	9	6	4
11.51to	14.5	1	0	0	0	2	1	0	0	2	3	6	1	1	1	1	3
14.51to	18.5	0	1	0	0	0	0	0	0	0	1	3	2	1	0	0	2
18.51to	23.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Totals:	**12**	**13**	**16**	**12**	**8**	**15**	**13**	**6**	**10**	**23**	**26**	**24**	**13**	**25**	**22**	**15**

Grand Total: **253**

Fermi 2 Joint Frequency Distribution Table - 2012
Stability Class - D

Wind Speed (mph)		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0 to	0.75	1	0	0	0	1	0	0	0	0	1	0	4	1	1	0	1
0.76 to	2.5	7	7	5	2	3	4	2	1	8	2	5	11	15	25	11	11
2.51 to	4.5	25	28	30	10	14	14	22	13	13	15	22	54	62	43	45	25
4.51 to	6.5	32	35	73	41	42	50	27	22	31	51	49	82	50	53	33	43
6.51 to	8.5	40	23	63	70	44	44	27	14	23	37	59	46	53	48	30	35
8.51 to	11.5	37	22	20	42	28	31	22	7	19	67	95	34	23	34	38	26
11.51 to	14.5	10	7	8	5	14	10	1	13	5	29	28	9	11	7	17	8
14.51 to	18.5	10	6	5	1	19	1	1	1	0	10	13	5	2	2	8	14
18.51to	23.5	2	0	0	0	2	4	0	0	0	0	0	0	0	0	0	16
	Totals:	**164**	**128**	**204**	**171**	**167**	**158**	**102**	**71**	**99**	**212**	**271**	**245**	**217**	**213**	**182**	**179**

Grand Total: **2783**

Fermi 2 Joint Frequency Distribution Table - 2012
Stability Class - E

Wind Speed (mph)		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0 to	0.75	1	1	0	0	0	0	0	0	2	1	0	1	0	0	1	0
0.76 to	2.5	9	8	9	1	5	5	6	8	9	19	14	31	41	45	25	16
2.51 to	4.5	35	24	18	14	9	18	21	19	52	54	70	99	42	53	71	36
4.51 to	6.5	25	22	30	14	23	29	27	38	42	86	49	28	27	33	15	23
6.51 to	8.5	8	3	3	3	11	26	22	25	47	89	24	5	6	10	8	11
8.51 to	11.5	5	3	0	3	0	2	11	19	31	64	34	2	1	2	4	5
11.51to	14.5	4	0	0	0	1	0	4	4	6	37	7	1	0	0	2	0
14.51to	18.5	3	0	0	0	0	0	1	1	0	11	1	0	0	0	0	0
18.51to	23.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Totals:	**90**	**61**	**60**	**35**	**49**	**80**	**92**	**114**	**189**	**361**	**199**	**167**	**117**	**143**	**126**	**91**

Grand Total: **1974**

Fermi 2 Joint Frequency Distribution Table - 2012
Stability Class - F

Wind Speed (mph)		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0 to	0.75	1	0	1	1	1	0	0	1	0	2	2	0	3	1	0	0
0.76 to	2.5	11	8	2	4	5	4	0	10	14	19	18	36	36	49	24	10
2.51 to	4.5	29	1	2	2	8	13	12	19	18	44	31	23	9	34	33	24
4.51 to	6.5	4	0	0	1	5	22	6	14	17	14	6	0	0	1	1	5
6.51to	8.5	0	0	0	0	5	6	2	9	9	15	4	0	0	0	0	0
8.51to	11.5	0	1	0	0	2	2	3	10	13	14	0	0	0	0	0	0
11.51to	14.5	0	0	0	0	1	0	0	3	0	8	0	0	0	0	0	0
14.51to	18.5	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
18.51to	23.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Totals:	**45**	**10**	**5**	**8**	**27**	**47**	**23**	**67**	**71**	**116**	**61**	**59**	**48**	**85**	**58**	**39**

Grand Total: **769**

Fermi 2 Joint Frequency Distribution Table - 2012
Stability Class - G

Wind Speed (mph)		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0 to	0.75	0	1	2	0	0	0	0	0	0	0	0	0	1	1	0	1
0.76 to	2.5	5	7	5	2	2	4	8	7	2	7	7	18	27	82	36	20
2.51 to	4.5	15	0	1	1	5	15	6	2	11	10	6	4	3	37	15	36
4.51to	6.5	2	0	0	0	7	12	13	12	3	7	0	0	0	0	0	1
6.51to	8.5	0	0	0	0	0	13	1	8	2	3	0	0	0	0	0	0
8.51to	11.5	0	0	0	0	5	3	0	1	0	1	0	0	0	0	0	0
11.51to	14.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14.51to	18.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.51to	23.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Totals:	**22**	**8**	**8**	**3**	**19**	**47**	**28**	**30**	**18**	**28**	**13**	**22**	**31**	**120**	**51**	**58**
	Grand Total:	**506**															

END

ENCLOSURE 2
To
NRC-13-0021

2012 Annual Radiological Environmental Operating Report

Total Pages - 188

Enrico Fermi Atomic Power Plant, Unit 2
NRC Docket No. 50-341
NRC License No. NPF-43

FERMI 2 NUCLEAR POWER PLANT

DETROIT EDISON COMPANY

OPERATING LICENSE NO. NPF - 43

Fermi 2 - 2012 Annual
Radiological Environmental Operating Report

for the period of
January 1, 2012 through December 31, 2012

Prepared by:

Fermi 2
Radiological Engineering

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Executive Summary

This Annual Radiological Environmental Operating Report is a detailed report on the Radiological Environmental Monitoring Program (REMP) conducted at Detroit Edison's Fermi 2 nuclear power plant from January 1 through December 31, 2012.

Samples collected as part of the REMP program were analyzed by GEL Laboratories, LLC. Radioactivity measurements for these samples are reported in terms of sample concentration or less than the Lab's Minimum Detectable Activity (MDA). Standard units of measure for reporting radioactivity are the Curie (Ci) for the amount of activity, and the Roentgen (R) for the amount of radiation exposure in free air. The unit of radioactivity used in this report is the picocurie (pCi). A picocurie is one-one trillionth of a curie. The unit of direct radiation used in this report is milliroentgen (mR). A milliroentgen is one-one thousandth of a roentgen

The Radiological Environmental Monitoring Program is divided into four major parts. These four parts are direct radiation monitoring, atmospheric monitoring, terrestrial monitoring, and aquatic monitoring. The results of 2012 data showed that environmental radioactivity levels have not increased from background radioactivity levels detected prior to the operation of Fermi 2.

Direct radiation measurements were taken at 79 locations using thermoluminescent dosimeters (TLD). The average quarterly exposure was 15.0 mR/standard quarter for indicating locations. This average exposure is equivalent to the ambient radiation levels measured prior to the operation of Fermi 2.

Atmospheric monitoring results for 2012 showed only naturally occurring radioactivity and were consistent with levels measured prior to the operation of Fermi 2. No radioactivity attributable to activities at Fermi 2 was detected greater than the MDA in any atmospheric samples during 2012.

Terrestrial monitoring results for 2012 of milk, groundwater, and leafy garden vegetable samples, showed only naturally occurring radioactivity. The radioactivity levels detected were consistent with levels measured prior to the operation of Fermi 2. No radioactivity attributable to activities at Fermi 2 was detected greater than the MDA in any terrestrial samples during 2012.

Aquatic monitoring results for 2012 of drinking water, surface water, sediment, and fish, showed only naturally occurring radioactivity and radioactivity associated with fallout from past atmospheric nuclear weapons testing and were consistent with levels measured prior to the operation of Fermi 2. No radioactivity attributable to activities at Fermi 2 was detected above the MDA in any aquatic samples during 2012.

REMP sampling did not identify any radioactivity above the MDA attributable to the operation of Fermi 2.

Radiological Environmental Monitoring Program Results

Direct Radiation Monitoring

Radiation is a normal component of the environment resulting primarily from natural sources, such as cosmic radiation and naturally occurring radionuclides; and to a lesser extent, from manmade sources such as fallout from past nuclear weapons testing. The earth is constantly bombarded by cosmic radiation in the form of high energy gamma rays and particulates. The earth's crust also contains natural radioactive material, such as uranium and potassium-40, which contributes to the background radiation. Direct radiation monitoring primarily measures ionizing radiation from cosmic and terrestrial sources.

Thermoluminescent Dosimeters

Fermi 2 uses thermoluminescent dosimeters (TLDs) to measure direct gamma radiation in the environs of Fermi 2. The TLDs are thoroughly tested to comply with NRC Regulatory Guide 4.13 and American National Standards Institute's (ANSI) publication N545-1975, which assure accurate measurements under varying environmental conditions before being placed in the field.

Fermi 2 has 79 TLD locations within a fifteen mile radius of the plant. Of the 79 TLD locations, 26 are located on-site and are not used for comparison with the control locations. These 26 TLDs are affected by Hydrogen Water Chemistry's sky shine and are not representative of off-site dose. Indicator TLDs are located within a ten mile radius of the plant and control TLDs are located at a distance that is outside the potential influence of the plant. While in the field, TLDs are exposed to background radiation and, if measurable, gaseous effluents and direct radiation from Fermi 2. Environmental TLDs are exchanged and processed on a quarterly basis. TLD data are reported in terms of milliroentgen per standard quarter (mR/std qtr), with a standard quarter being 91 days.

In 2012, the average exposure for TLDs at all off-site indicator locations was 15.0 mR/std qtr and for all control locations was 14.0 mR/std qtr. These exposures are consistent with preoperational and past operational measurements as shown in Figure 1.

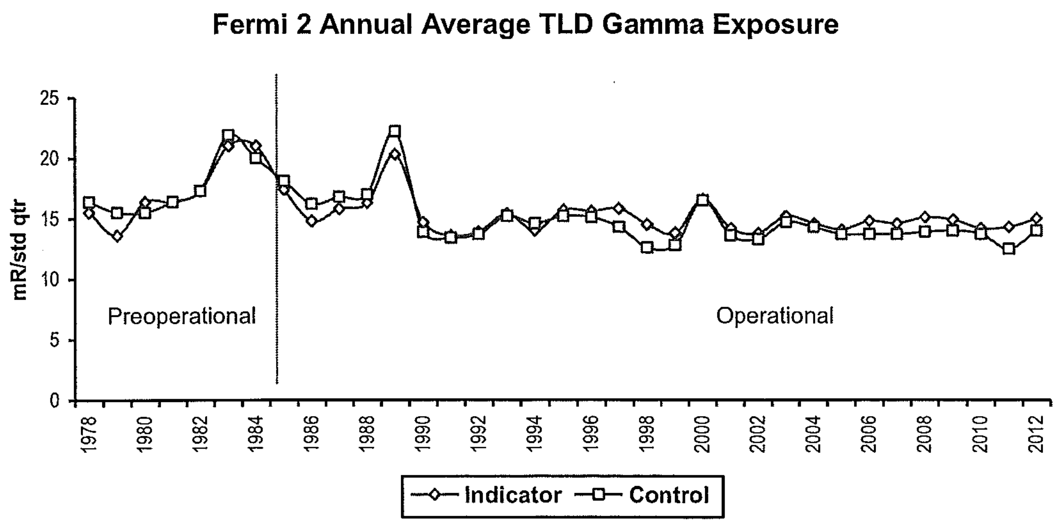


Figure 1 - Fermi 2 Annual Average TLD Gamma Exposure: The similarity between indicator and control results demonstrates that the operation of Fermi 2 has not caused any abnormal gamma exposure.

Atmospheric Monitoring

A potential exposure pathway to people is inhalation of airborne radioactive materials. Fermi 2 continuously samples the ambient air surrounding Fermi 2 for radioactivity. Air sampling began in 1979 during the preoperational program. At each sampling location, a mechanical air sampler is used to draw a continuous volume of air through two filters designed to collect particulates and radioiodines. Air samples are collected weekly and analyzed for gross beta radiation and iodine-131 gamma radiation. The particulate filters for each sampling location are combined on a quarterly basis to form a "composite sample" and are analyzed for gamma emitting radionuclides. There are four indicator sampling locations which were selected based on an evaluation of the predominant wind directions. A fifth sampling location is approximately fourteen miles west of the plant and is considered to be in a location unaffected by the operation of the plant. This is used as the control location.

Air Sampling

On October 16, 1980, the People's Republic of China conducted an atmospheric nuclear weapon test. The fallout from this test was detected in Fermi 2 preoperational environmental air samples in 1981 (see Figure 2). The average gross beta for 1981 was 1.60E-1 pCi/cubic meter for indicator samples and 2.40E-1 pCi/cubic meter for control samples which was a factor of ten times greater than background gross beta. Gamma spectroscopic analyses of the particulate filters indicated cesium-137, cerium-141, cerium-144, ruthenium-103, ruthenium-106, zirconium-95, niobium-95, manganese-54, and antimony-125 in the atmosphere as a result of this test. In 1986, as shown in Figure 2, there was a slight increase in gross beta activity and a 2.70E-1 pCi/cubic meter "spike" in the iodine-131 activity. These elevated levels in 1986 are attributed to the nuclear accident at Chernobyl on April 26, 1986. For all other years, the iodine-131 activity was below the lower limit of detection (LLD) of 7.0E-2 pCi/cubic meter.

On March 11, 2011, following the Tohoku earthquake and tsunami the Fukushima Daiichi Nuclear Power Plant in Japan, experienced a series of equipment failures, fuel-melt, and releases of radioactivity to the environment.

Within weeks of the accident, US nuclear power plant REMP programs and other monitoring stations detected the radioactivity from Japan mainly in the form of airborne iodine-131.

During the week of April 5, 2011, all five (5) of Fermi's air monitoring stations detected radioactivity greater than the MDA at an average airborne gross beta of 7.12E-2 pCi/cubic meter and 8.12E-2 pCi/cubic meter for iodine-131 due to the accident at Fukushima Daiichi Nuclear Power Plant.

During 2012, two hundred and sixty (260) particulate air filters and charcoal cartridges were collected and analyzed for gross beta activity and iodine-131 respectively. The average gross beta for indicator samples was 4.73E-2 pCi/cubic meter and 4.60E-2 pCi/cubic meter for control samples. None of the charcoal filters collected showed detectable levels of iodine-131greater than the MDA attributable to the operation of Fermi 2. The following table contains the annual average gross beta results of all five sample locations for 2012.

2012 Average Gross Beta Concentrations in Air Particulates (pCi/m^3)

Table 1

Station	Description (sector/distance)	Annual Average
API-1 (I)	Estral Beach (NE/1.4 mi.)	4.66E-2
API-2 (I)	Site Boundary (NNW/0.6 mi.)	4.45E-2
API-3 (I)	Site Boundary (NW/0.6 mi.)	4.79E-2
API-4 (C)	North Custer Rd. (W/14 mi.)	4.60E-2
API-5 (I)	Site Boundary (S/1.2 mi.)	5.04E-2

(I) = Indicator Station (C) = Control Station

Twenty (20) quarterly particulate filter composites were prepared and analyzed for gamma emitting radionuclides. Naturally occurring beryllium-7 was detected in both indicator and control samples and naturally occurring potassium-40 was detected in indicator samples.

In conclusion, the atmospheric monitoring data are consistent with preoperational and prior operational data and show no adverse long-term trends in the environment attributable to operation of Fermi 2 as illustrated in Figures 2 and 3.

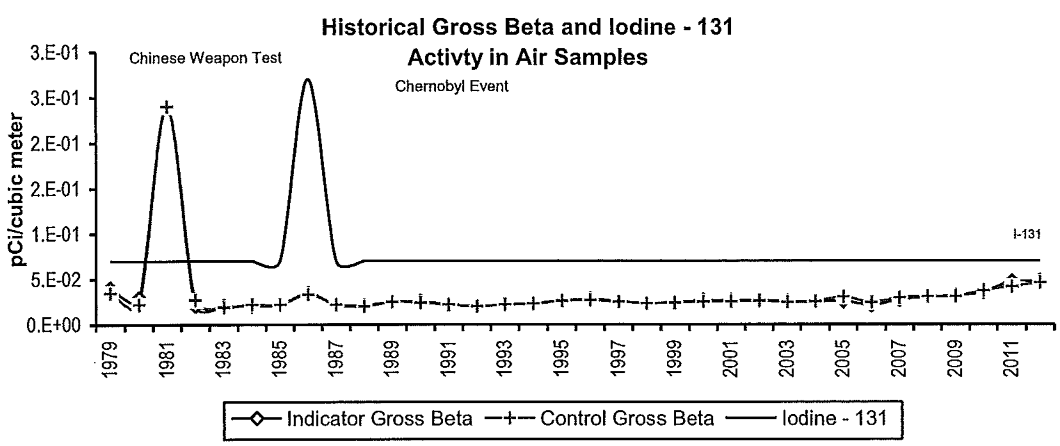


Figure 2 - Historical Gross Beta and Iodine-131 Activity in Air Samples; The similarity between indicator and control gross beta results demonstrates that the operation of Fermi 2 has had no adverse long-term trends in the environment. The lower limit of detection (LLD) for iodine-131 is 0.07 pCi/cubic meter.

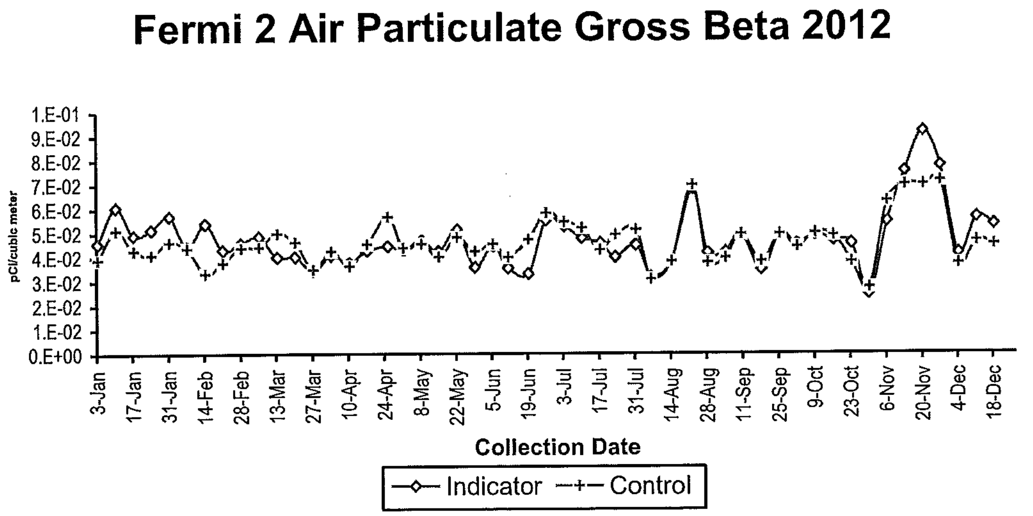


Figure 3 - Fermi 2 Air Particulate Gross Beta for 2012; the concentration of beta emitting radionuclides in airborne particulates samples was essentially identical at indicator and control locations. Gross beta activity varies throughout the year and is primarily an effect of seasonal precipitation.

Terrestrial Monitoring

Radionuclides released to the atmosphere may deposit on soil and vegetation, and therefore, may eventually be incorporated into the human food chain. To assess the impact of Fermi 2 operations to humans from the ingestion pathway, samples of milk, green leafy vegetables, and groundwater are collected and analyzed for radioactivity. The following sections discuss the type and frequency of terrestrial sampling, analyses performed, and a comparison of 2012 data to previous operational and preoperational data.

Milk Sampling

A major pathway in the human food chain is the consumption of milk from grazing animals (dairy cows or goats) due to biological concentration and the short turn around time in this pathway. Milk is collected from one indicator location and one control location semimonthly when animals are in the pasture, and monthly when the animals are on stored feed. The milk is analyzed for iodine-131, gamma emitting radionuclides, and strontium-89/90. At times when milk samples are not available, grass samples are collected at both the control milk sample location and the location where milk is not available. Grass samples are analyzed for iodine-131 and other gamma emitting radionuclides. During 2012, no grass samples were scheduled or collected for the REMP.

Milk sampling began in 1979 during the preoperational program. During this time period, milk samples were analyzed for iodine-131 and other gamma emitting radionuclides. Cesium-137 and naturally occurring potassium-40 were the only radionuclides detected in milk samples during the preoperational program. The cesium-137 concentration averaged 3.60E+0 pCi/liter and is due to past atmospheric nuclear weapons testing. In 1986, after the nuclear accident at Chernobyl, iodine-131 and cesium-137 were detected in both indicator and control milk samples. The average concentration was 3.70E+0 pCi/liter for iodine-131 and 6.60E+0 pCi/liter for cesium-137.

The analysis for strontium-89/90 began in 1988, and strontium-90 is routinely detected in both indicator and control milk samples because of past atmospheric nuclear weapons testing.

During 2012, thirty four (34) milk samples were collected and analyzed for iodine-131, gamma emitting radionuclides, and strontium-89/90. No iodine-131 or strontium-89/90 was detected greater than the MDA in any of the samples.

Naturally occurring potassium-40 and beryllium-7 were detected in both indicator and control samples.

In 1970, the concentration of strontium-90 in Monroe County milk was 6.00E+0 pCi/liter according to the Michigan Department of Health's "Milk Surveillance," Radiation Data and Reports, Vol. 11-15, 1970-1974. Figure 4 shows the calculated radiological decay curve for the 1970 concentration of strontium-90 and the average concentrations since 1988. This graph illustrates that the inventory of strontium-90 in the local environment is decreasing with time and closely follows the calculated decay curve. This supports the determination that the inventory of strontium-90 in the environment is due to fallout from past atmospheric nuclear weapons testing and not the operation of Fermi 2.

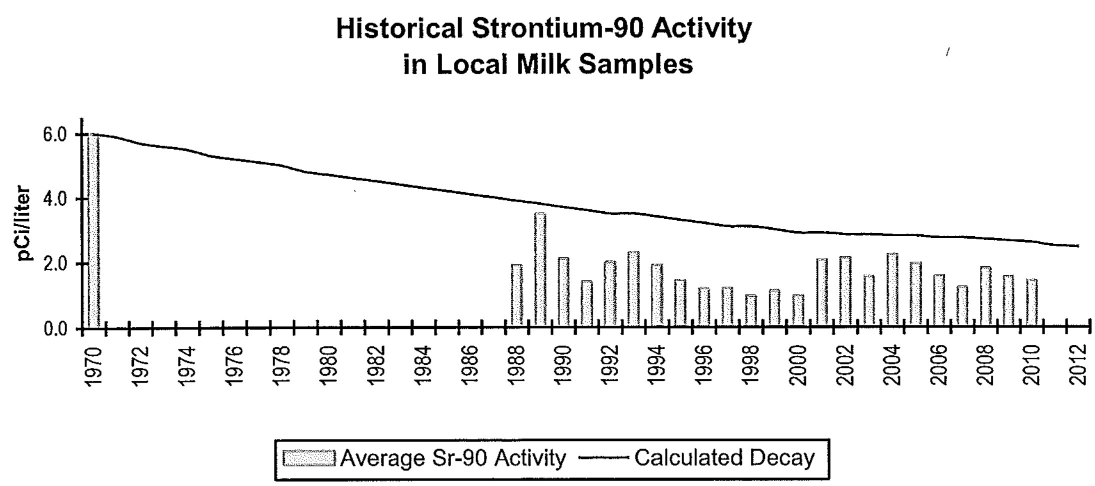


Figure 4 - Historical Strontium-90 Activity in Local Milk Samples; the concentration of strontium-90 in local milk samples is decreasing with time and is below the calculated decay curve. This supports the fact that strontium-90 in local milk is due to fallout from past atmospheric nuclear weapons testing and not the operation of Fermi 2.

Groundwater Sampling

In areas not served by municipal water systems, water supplies for domestic use are generally obtained from private wells. The network of private wells presently in use forms the source of water for domestic and livestock purposes in farms and homes west and north of the site. With the construction of new water plants and distribution systems, the water use trend in the area is from groundwater (local wells) to surface water (municipal water supply).

Groundwater is collected on a quarterly basis from four wells surrounding Fermi 2. The groundwater is analyzed for gamma emitting radionuclides and tritium. Sampling location GW-4, which is located approximately 0.6 miles west northwest, is designated as the control location because it is up-gradient and is least likely to be affected by the operation of the plant. The other three sampling locations are down-gradient from Fermi 2 and designated as indicator locations.

Groundwater sampling began in 1987, during the operational period of the REMP program. From 1987 to 1996, naturally occurring potassium-40, cesium-137, and tritium were detected in both indicator and control samples. The average concentration was 7.71E+0 pCi/liter for cesium-137 and 1.50E+2 pCi/liter for tritium. The presence of cesium-137 and tritium in groundwater samples is due to fallout from past atmospheric nuclear weapons testing leaching into the soil and becoming incorporated into the groundwater. From 1997 to 2008, only naturally occurring potassium-40 activity was detected in groundwater samples.

In 2012, sixteen (16) groundwater samples were collected and analyzed for gamma emitting radionuclides and tritium. During 2012, no samples detected any activity greater than the MDA.

Garden Sampling

Fermi 2 collects samples of broad leaf vegetables from indicator locations identified by the annual Land Use Census. Samples are also collected at a control location that is at a distance and direction which is considered to be unaffected by plant operations. Samples are collected once a month during the growing season (June through September) and are analyzed for iodine-131 and other gamma emitting radionuclides.

Vegetable sampling started in 1982. During the preoperational period from 1982 to 1985, only naturally occurring potassium-40 was detected in both indicator and control vegetable samples. During the operational period from 1985 to 1990 and 1994 to 1995, only naturally occurring potassium-40 was detected in both indicator and control vegetable samples. However, in 1991, 1992, and 1993, cesium-137 was detected in one indicator sample each year and had an average concentration of 1.2E+1 pCi/kilogram.

Cesium-137 may become incorporated into plants by either uptake from the soil or direct deposition on foliar surfaces. Since cesium-137 is normally not detected in gaseous effluent samples from Fermi 2, and there have been no recent atmospheric weapons testing or nuclear accidents, the incorporation of cesium-137 by direct deposition is highly unlikely. The most probable source of cesium-137 in vegetable samples is the uptake of previously deposited cesium-137, which has leached into the soil. This cesium activity is attributed to fallout from past atmospheric weapons testing and to the nuclear accident at Chernobyl.

During 2012, twelve (12) vegetable samples were collected and analyzed for iodine-131 and other gamma emitting radionuclides. No iodine-131 was detected greater than the MDA in vegetable samples during 2012. The only gamma emitting radionuclide detected were naturally occurring potassium-40 and beryllium-7 in both indicator and control samples.

Terrestrial monitoring results for 2012 of milk, groundwater and leafy garden vegetable samples, showed only naturally occurring radioactivity. The radioactivity levels detected were consistent with levels measured prior to the operation of Fermi 2 and no radioactivity attributable to activities at Fermi 2 was detected greater than the MDA in any terrestrial sample. In conclusion, the terrestrial monitoring data show no adverse trends in the terrestrial environment.

Aquatic Monitoring

Lake Erie, on which Fermi 2 borders, is used as a source for drinking water, as well as for recreational activities such as fishing, swimming, sunbathing, and boating. For this reason, Lake Erie and its tributaries are routinely monitored for radioactivity.

The aquatic monitoring portion of the REMP consists of sampling raw municipal drinking water, surface water, lake sediments, and fish for the presence of radioactivity. The following sections discuss the type and frequency of aquatic sampling, analyses performed, and a comparison of 2012 data to previous operational and preoperational data.

Drinking Water Sampling

Fermi 2 monitors drinking water at one control location and one indicator location using automatic samplers. The automatic samplers collect samples at time intervals that are very short (hourly) relative to the sample collection period (monthly) in order to assure that a representative sample is obtained. Indicator water samples are obtained at the Monroe water intake located approximately 1.1 miles south of the plant. Detroit municipal water is used for the control samples and is obtained at the Allen Park water intake located approximately 18.6 miles north of the plant. Drinking water samples are collected on a monthly basis and analyzed for gross beta, strontium-89/90, and gamma emitting radionuclides. The monthly samples for each location are combined on a quarterly basis and analyzed for tritium activity.

In late 1980, as shown in Figure 5, an atmospheric nuclear weapon test was conducted by the People's Republic of China. As a result of this test, the average gross beta for 1981 was 9.80E+0 pCi/liter for water samples. Figure 5 also shows that, except for the Chinese weapons testing, the historic drinking water sample data are below or slightly above the lower limit of detection (4.00E+0 pCi/liter) required by US Environmental Protection Agency (USEPA) National Interim Primary Drinking Water regulations. Even during the Chinese weapons testing, the drinking water samples did not exceed the USEPA maximum allowable criteria of 5.00E+1 pCi/liter gross beta. In 1980 and 1983, cesium-137 was detected in drinking water samples at levels ranging from 5.40E+0 pCi/liter to 1.90E+1 pCi/liter. Tritium was also detected during the preoperational program and had an average of 3.25E+2 pCi/liter. The presence of cesium-137 and detectable levels of tritium in these water samples is due to fallout from past atmospheric nuclear weapons testing and naturally occurring tritium.

From 1985 to 2011, the average annual gross beta activity for indicator samples was 3.86E+0 pCi/liter and 3.32E+0 pCi/liter for control samples. The analysis for strontium-89/90 began in 1988, and strontium-90 has in the past been detected in both indicator and control samples. The average strontium-90 activity for indicator samples was 7.25E-1 pCi/liter and 7.56E-1 pCi/liter for control samples during this time period. Tritium was also detected in both indicator and control drinking water samples during this time period. The average tritium activity for indicator samples was 2.52E+2 pCi/liter and 2.60E+2 pCi/liter for control samples. The presence of strontium-90 and detectable levels of tritium in these water samples is due to fallout from past atmospheric nuclear weapons testing and naturally occurring tritium.

In 2012, twenty-four (24) drinking water samples were collected and analyzed for gross beta, gamma emitting radionuclides, strontium-89/90, and tritium. Gross beta activity was detected in two indicator samples at an average of 4.80E+0 pCi/liter. Naturally occurring potassium-40 was detected in both indicator and samples. No strontium-89/90 activity was detected greater than the MDA in drinking water samples during 2012. Eight (8) quarterly composite drinking water samples were prepared and analyzed for tritium. No tritium activity was detected greater than the MDA in drinking water samples during 2012.

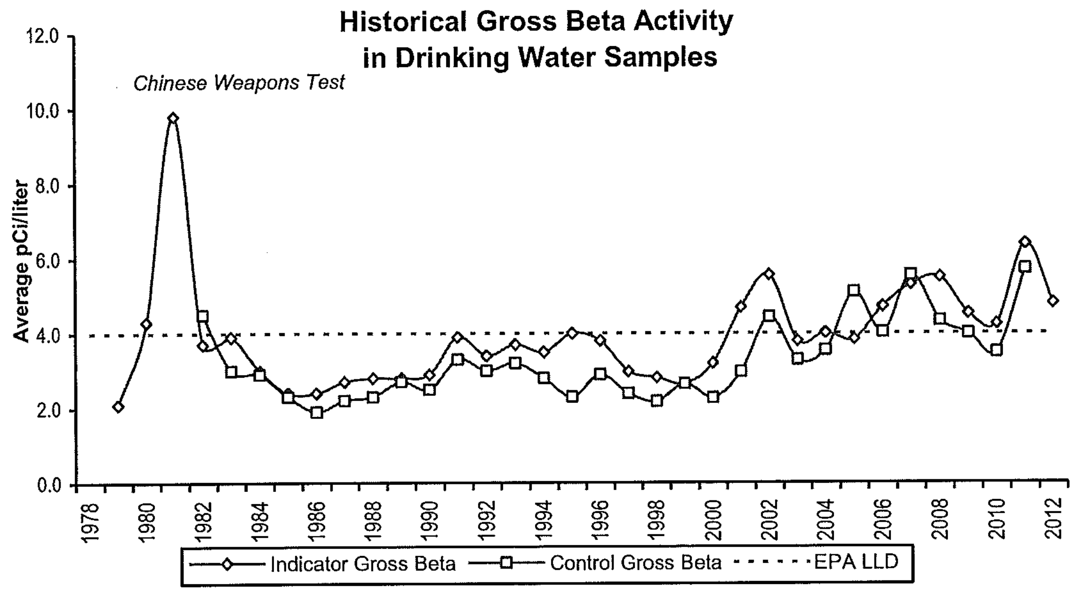


Figure 5 - Historical Gross Beta Activity in Drinking Water Samples. Since 1982, the annual concentrations of beta emitting radionuclides in drinking water samples collected from indicator locations have been consistent with those from control locations. This shows that Fermi 2 has had no measurable radiological impact on local drinking water.

Surface Water Sampling

Fermi 2 monitors surface water at two locations using automatic samplers. As with drinking water, surface water samples are collected at time intervals that are very short (hourly) relative to the sample collection period (monthly) in order to assure obtaining a representative sample. Indicator surface water samples are obtained at the Fermi 2 General Service Water building, located approximately 0.3 miles south southeast from Fermi 2. The control surface water samples are obtained from Trenton Channel Power Plant's cooling water intake on the Detroit River, which is approximately 11.7 miles north northeast of Fermi 2. Surface water samples are collected on a monthly basis and analyzed for strontium-89/90 and gamma emitting radionuclides. The monthly samples for each location are combined on a quarterly basis to form a quarterly composite sample and are analyzed for tritium.

Surface water sampling began in 1979, and the samples were analyzed for gamma emitting radionuclides and tritium. During this preoperational program, no gamma emitting radionuclides, except for naturally occurring potassium-40, were detected. Tritium was detected in both indicator and control samples during this time period and had an average concentration of 3.15E+2 pCi/liter. This tritium activity represents the background concentration due to naturally occurring tritium and tritium produced during past atmospheric nuclear weapons testing.

From 1985 to 2011, as part of the operational program, surface water samples were analyzed for gamma emitting radionuclides and tritium. The analysis for strontium-89/90 did not begin until 1988, and strontium-90 was detected in both indicator and control samples. The average strontium-90 concentration for this time period was 1.13E+0 pCi/liter. In 1990, two indicator samples showed detectable activity for cesium-137 at an average concentration of 1.20E+1 pCi/liter. The presence of cesium-137 and strontium-90 in these water samples is due to fallout from past atmospheric nuclear weapons testing. Tritium was detected in both indicator and control surface water samples during this time period at a concentration of 2.31E+2 pCi/liter. This tritium activity is consistent with background levels measured during the preoperational program.

In 2012, twenty-four (24) surface water samples were collected and analyzed for gamma emitting radionuclides and strontium-89/90. From these samples, eight (8) quarterly composite samples were prepared and analyzed for tritium. During 2012, one control sample detected naturally occurring potassium-40 no strontium-89/90 or tritium was detected greater than the MDA in surface water samples.

Sediment Sampling

Sediments often act as a sink (temporary or permanent) for radionuclides, but they may also become a source, as when they are resuspended during periods of increased turbulence or are dredged and deposited elsewhere. Sediment, in the vicinity of the liquid discharge point, represents the most likely site for accumulation of radionuclides in the aquatic environment, and with long-lived radionuclides, a gradual increase in radioactivity concentration would be expected over time if discharges occur. Sediment, therefore, provides a long-term indication of change that may appear in other sample media (i.e., water and fish samples).

Lake Erie shoreline and bottom sediments from five locations are collected on a semiannual basis (Spring and Fall) and are analyzed for gamma emitting radionuclides and strontium-89/90. There is one control location and four indicator locations. The control sample is collected near the Trenton Channel Power Plant's cooling water intake. The indicator samples are collected at Estral Beach, north of the Fermi 2 liquid discharge area, the shoreline at the end of Pointe Aux Peaux, and Indian Trails Community Beach.

During the preoperational program, there was not a control location, and indicator samples were analyzed for gamma emitting radionuclides. During the preoperational program, except for naturally occurring radionuclides, only cesium-137 was detected in sediment samples. For this time period, the average cesium-137 concentration was 3.27E+2 pCi/kilogram. The presence of cesium-137 in these sediment samples is due to fallout from past atmospheric nuclear weapons testing.

From 1985 to 2011, cesium-137, strontium-90, and naturally occurring radionuclides were detected in sediment samples. The average cesium-137 concentration was 1.20E+2 pCi/kilogram for all samples. The analysis for strontium-89/90 began in 1988, and strontium-90 has been routinely detected at similar concentrations in both indicator and control samples. The average strontium-90 activity for indicator samples was 1.80E+2 pCi/kilogram and 1.98E+2 pCi/kilogram for control samples. The presence of cesium-137 and strontium-90 in these sediment samples is due to fallout from past atmospheric nuclear weapons testing.

In 1990 and 1991, the Spring samples taken at the Fermi 2 liquid discharge line (Location S-2) showed activity for plant related radionuclides (manganese-54, cobalt-58, cobalt-60, and zinc-65) and was determined to be a result of liquid effluent from Fermi 2. The sample results were well below any regulatory reporting limits and were consistent with the activity released from the plant in liquid effluents as per the approved effluent program. The dose impact was negligible due to these effluents.

In 2012, ten (10) sediment samples were collected and analyzed for gamma emitting radionuclides and strontium 89/90. Cesium-137 was detected in two control samples with an average concentration of 9.22E+1 pCi/kilogram. The presence of cesium-137 in sediment samples is due to fallout from past atmospheric nuclear weapons testing. Naturally occurring radionuclide potassium-40 was also detected in both indicator and control sediment samples for this sampling period.

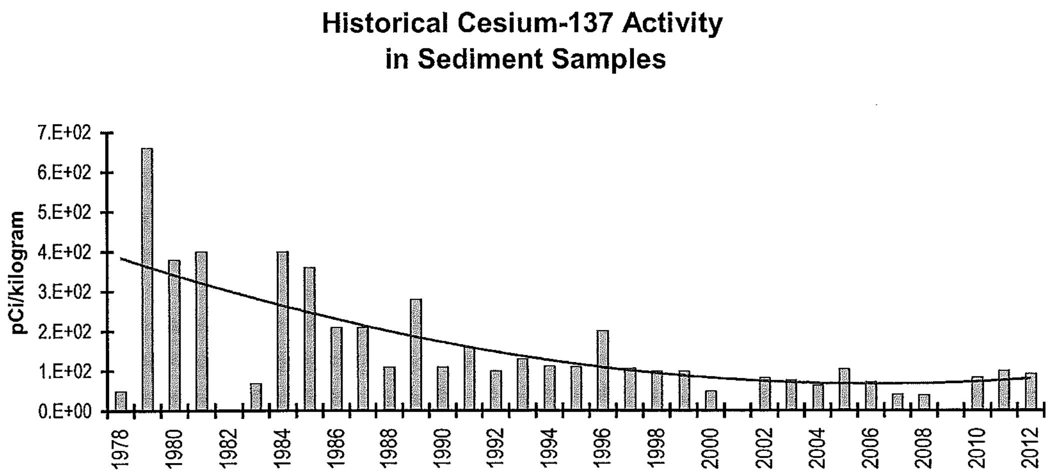


Figure 6 - Historical Cesium-137 Activity in Sediment Samples. As the calculated trend shows, the concentration of cesium-137 in Lake Erie sediments is decreasing with time. This supports the fact that cesium-137 in Lake Erie sediments is due to fallout from past atmospheric nuclear weapons testing and not the operation of Fermi 2.

Figure 6 shows the historical concentration of cesium-137 in sediment samples from 1978 to 2012. Using the data from these years, and the statistical method of least squares, an exponential curve can be calculated that represents the cesium-137 concentration in sediment. This curve has a negative slope which indicates the overall concentration of cesium-137 in the environment is decreasing with time. This supports the fact that the inventory of cesium-137 in the environment is due to fallout from past atmospheric nuclear weapons testing and not from the operation of Fermi 2.

Fish Sampling

Samples of fish are collected from Lake Erie at three locations on a semiannual basis. There are two control locations and one indicator location. The two control locations are offshore of Celeron Island and in Brest Bay. The indicator location is approximately 1200 feet offshore of the Fermi 2 liquid effluent discharge. Edible portions of the fish are analyzed for gamma emitting radionuclides and strontium-89/90.

During the preoperational program, fish samples were analyzed for gamma emitting radionuclides. Only cesium-137 and naturally occurring potassium-40 were detected during this time period. The average concentration of cesium-137 for indicator samples was 3.53E+1 pCi/kilogram and 4.20E+1 pCi/kilogram for control samples. The presence of cesium-137 in these fish samples is due to fallout from past atmospheric nuclear weapons testing.

From 1985 to 2011, cesium-137 and naturally occurring potassium-40 were detected in fish samples. The average cesium-137 concentration for indicator samples was 3.82E+1 pCi/kilogram and 3.92E+1 pCi/kilogram for control samples. The analysis for strontium-89/90 began in 1990, and strontium-90 was routinely detected at similar concentrations in both indicator and control samples. The average strontium-90 concentration for indicator samples was 3.84E+1 pCi/kilogram and 3.15E+1 pCi/kilogram for control samples. The presence of cesium-137 and strontium-90 in these fish samples is due to fallout from past atmospheric nuclear weapons testing.

In 2012, twenty-four (24) fish samples were collected and analyzed for gamma emitting radionuclides and strontium-89/90. Only naturally occurring potassium-40 was detected in both control and indicator fish samples for 2012.

Aquatic monitoring results for 2012 of water, sediment, and fish showed only naturally occurring radioactivity and radioactivity associated with fallout from past atmospheric nuclear weapons testing and were consistent with levels measured prior to the operation of Fermi 2. In conclusion, no radioactivity attributable to activities at Fermi 2 was detected greater than the MDA in any aquatic sample during 2012 and no adverse long-term trends are shown in the aquatic monitoring data.

Land Use Census

The Land Use Census is conducted in accordance with the Fermi 2 Offsite Dose Calculation Manual (ODCM), control 3.12.2, and satisfies the requirements of Section IV.B.3 of Appendix I to 10 CFR Part 50. This census identifies changes in the use of unrestricted areas to permit modifications to monitoring programs for evaluating doses to individuals from principal pathways of exposure. The pathways of concern are listed below:

- **Inhalation Pathway** - Internal exposure as a result of breathing radionuclides carried in the air.

- **Ground Exposure Pathway** - External exposure from radionuclides deposited on the ground.

- **Plume Exposure Pathway** - External exposure directly from a plume or cloud of radioactive material.

- **Vegetation Pathway** - Internal exposure as a result of eating vegetables which have absorbed deposited radioactive material or which have absorbed radionuclides through the soil.

- **Milk Pathway** - Internal exposure as a result of drinking milk which may contain radioactive material as a result of dairy animals grazing on a pasture contaminated by radionuclides.

- **Meat Pathway** - Internal exposure as a result of consuming meat which may contain radioactive material as a result of animals grazing on a pasture contaminated by radionuclides.

The Land Use Census is conducted during the growing season and is used to identify, within a radius of 5 miles, the location of the nearest residences, milk animals, meat animals, and gardens (greater than 50 square meters and containing broad leaf vegetation) in each of 16 meteorological sectors surrounding Fermi 2. Gardens greater than 50 square meters are the minimum size required to produce the quantity (26 kg/year) of leafy vegetables assumed in NRC Regulatory Guide 1.109 for consumption by a child. To determine this minimum garden size, the following assumptions were made: (1) 20% of the garden is used for growing broad leaf vegetation (i.e., lettuce and cabbage); and (2) a vegetation yield of 2 kg/square meter.

2012 Land Use Census Results

The Land Use Census is conducted in accordance with ODCM control 3.12.2 and satisfies the requirements of Section IV.B.3 of Appendix I to 10 CFR Part 50. This census identifies changes in the use of unrestricted areas to permit modifications to monitoring programs for evaluating doses to individuals from principal pathways of exposure. The annual Land Use Census is conducted during the growing season and is used to identify, within a radius of 5 miles, the location of the closest residences, milk animals, meat animals, and gardens in each of the 11 land based meteorological sectors surrounding Fermi 2.

The 2012 Land Use Census was performed during the month of August. The 2012 census data were obtained with the use of Global Positioning System (GPS) equipment. These data were compared to the 2011 data to determine any significant changes in the use of the land. The results of the census are tabulated in Tables 2 – 5 of this report.

No changes in the land use between 2011 and 2012 were found that would require changing the location of the "maximum exposed individual." There were no changes in any of the categories. All milk locations that were identified are pets and, any milk produced, is not use for human consumption. The "maximum exposed individual" is located in the West-North-West sector and at one time participated in the REMP program. In the past few years this location did not have a garden, but in past a garden has been planted at this location. With past surveys, this census identified new residential housing construction that shows a continuing trend of converting agricultural land to other uses in the area surrounding Fermi 2.

As stated above, there were no significant changes in the 2012 land use that would require changing the location of the "maximum exposed individual." For that reason, the location of "maximum exposed individual" remains the same and is described as follows:

Pathway	Sector	Azimuth (degrees)	Distance (miles)	Age Group	Maximum Organ
Ingestion (vegetation)	WNW	300.6	0.72	Adult	Thyroid/ Bone*

*-For the 10 CFR 50 Appendix I required calculation of dose due to I-131, I-133, H-3, and particulates with half-lives greater than 8 days, the thyroid is the maximum organ. However, if C-14 is added to this dose calculation, bone becomes the maximum organ.

2012 LAND USE CENSUS
Closest Residences

Table 2

Sector	Year	Azimuth (degrees)	Distance (miles)	Change (miles)
N	2011	8.9	1.11	
	2012	8.9	1.11	0.00
NE	2011	34.7	1.10	
	2012	34.7	1.10	0.00
NNE	2011	16.6	1.08	
	2012	16.6	1.08	0.00
NNW	2011	334.9	1.09	
	2012	334.9	1.09	0.00
NW	2011	309.7	1.07	
	2012	309.7	1.07	0.00
S	2011	169.6	1.03	
	2012	169.6	1.03	0.00
SSW	2011	200.1	1.12	
	2012	200.1	1.12	0.00
SW	2011	229.3	1.26	
	2012	229.3	1.26	0.00
W	2011	259.2	1.19	
	2012	259.2	1.19	0.00
WNW(a)	2011	302.3	0.72	
	2012	302.3	0.72	0.00
WSW	2011	236.3	1.39	
	2012	236.3	1.39	0.00

(a) = Location of "maximum exposed individual"

2012 LAND USE CENSUS

Closest Gardens

Table 3

Sector	Year	Azimuth (degrees)	Distance (miles)	Change (miles)
N	2011	0.1	1.61	
	2012	0.1	1.61	0.00
NE	2011	51.8	1.85	
	2012	51.8	1.85	0.00
NNE	2011	27.9	1.84	
	2012	27.9	1.84	0.00
NNW	2011	327.1	1.41	
	2012	327.1	1.41	0.00
NW	2011	315.5	1.51	
	2012	315.5	1.51	0.00
S	2011	170.0	1.01	
	2012	170.0	1.01	0.00
SSW	2011	192.4	1.44	
	2012	192.4	1.44	0.00
SW	2011	234.7	4.26	
	2012	234.7	4.26	0.00
W	2011	260.9	1.60	
	2012	260.9	1.60	0.00
WNW	2011	287.5	4.38	
	2012	287.5	4.38	0.00
WSW	2011	245.1	1.79	
	2012	245.1	1.79	0.00

2012 LAND USE CENSUS
Milk Locations

Table 4

Sector	Year	Azimuth (degrees)	Distance (miles)	Change (miles)	Type
N	2011	9.9	4.32		Goat
	2012	9.9	4.32	0.00	Goat
NE	2011	None identified	None identified		
	2012	None identified	None identified		
NNE	2011	None identified	None identified		
	2012	None identified	None identified		
NNW	2011	None identified	None identified		
	2012	None identified	None identified		
NW	2011	None identified	None identified		
	2012	None identified	None identified		
S	2011	None identified	None identified		
	2012	None identified	None identified		
SSW	2011	None identified	None identified		
	2012	None identified	None identified		
SW	2011	None identified	None identified		
	2012	None identified	None identified		
W	2011	None identified	None identified		
	2012	None identified	None identified		
WNW	2011	297.4	2.38		Goat
	2012	297.4	2.38	0.00	Goat
WSW	2011	None identified	None identified		
	2012	None identified	None identified		

2012 LAND USE CENSUS

Closest Meat Locations

Table 5

Sector	Year	Azimuth (degrees)	Distance (miles)	Change (miles)	Type
N	2011	None identified	None identified		
	2012	None identified	None identified		
NE	2011	None identified	None identified		
	2012	None identified	None identified		
NNE	2011	None identified	None identified		
	2012	None identified	None identified		
NNW	2011	338.2	4.36		Sheep
	2012	338.2	4.36	0.00	Sheep
NW	2011	321.4	3.02		Beef
	2012	321.4	3.02	0.00	Beef
S	2011	None identified	None identified		
	2012	None identified	None identified		
SSW	2011	None identified	None identified		
	2012	None identified	None identified		
SW	2011	None identified	None identified		
	2012	None identified	None identified		
W	2011	None identified	None identified		
	2012	None identified	None identified		
WNW	2011	287.5	1.65		Beef
	2012	287.5	1.65	0.00	Beef
WSW	2011	None identified	None identified		
	2012	None identified	None identified		

Appendix A

Sampling Locations

Direct Radiation Sample Locations

Table A-1

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx.)	Description	Collection Frequency	Type
T1	NE/38°	1.3 mi.	Estral Beach, Pole on Lakeshore 23 Poles S of Lakeview. (Special Area)	Q	I
T2	NNE/22°	1.2 mi.	Pole at termination of Brancheau St. (Special Area)	Q	I
T3	N/9°	1.1 mi.	Pole, NW corner of Swan Boat Club fence. (Special Area)	Q	I
T4	NNW/337°	0.6 mi.	Site boundary and Toll Rd. on Site fence by API #2.	Q	I
T5	NW/313°	0.6 mi.	Site boundary and Toll Rd. on Site fence by API #3.	Q	I
T6	WNW/294°	0.6 mi.	On Site fence at south end of N. Bullet Rd.	Q	I
T7	W/270°	14.0 mi.	Pole, at Michigan Gas substation on N. Custer Rd., 0.66 miles west of Doty Rd.	Q	C
T8	NW/305°	1.9 mi.	Pole on Post Rd. near NE corner of Dixie Hwy. and Post Rd.	Q	I
T9	NNW/334°	1.5 mi.	Pole, NW corner of Trombley and Swan View Rd.	Q	I
T10	N/6°	2.1 mi.	Pole, S side of Massarant- 2 poles W of Chinavare.	Q	I

I = Indicator *C = Control* *O = On-site* *Q = Quarterly*

Direct Radiation Sample Locations (Table A-1 continued)

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx.)	Description	Collection Frequency	Type
T11	NNE/23°	6.2 mi.	Pole, NE corner of Milliman and Jefferson.	Q	I
T12	NNE/29°	6.3 mi.	Pointe Mouille Game Area Field Office, Pole near tree, N area of parking lot.	Q	I
T13	N/356°	4.1 mi.	Labo and Dixie Hwy. Pole on SW corner with light.	Q	I
T14	NNW/337°	4.4 mi.	Labo and Brandon Pole on SE corner near RR.	Q	I
T15	NW/315°	3.9 mi.	Pole, behind building at the corner of Swan Creek and Mill St.	Q	I
T16	WNW/283°	4.9 mi.	Pole, SE corner of War and Post Rd.	Q	I
T17	W/271°	4.9 mi.	Pole, NE corner of Nadeau and Laprad near mobile home park.	Q	I
T18	WSW/247°	4.8 mi.	Pole, NE corner of Mentel and Hurd Rd.	Q	I
T19	SW/236°	5.2 mi.	Fermi siren pole on Waterworks Rd. NE corner of intersection - Sterling State Park Rd. Entrance Drive/Waterworks.	Q	I
T20	WSW/257°	2.7 mi.	Pole, S side of Williams Rd, 9 poles W of Dixie Hwy. (Special Area)	Q	I
T21	WSW/239°	2.7 mi.	Pole, N side of Pearl at Parkview Woodland Beach. (Special Area)	Q	I

I = Indicator *C = Control* *O = On-site* *Q = Quarterly*

Direct Radiation Sample Locations (Table A-1 continued)

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx.)	Description	Collection Frequency	Type
T22	S/172°	1.2 mi.	Pole, N side of Pointe Aux Peaux 2 poles W of Long - Site Boundary.	Q	I
T23	SSW/195°	1.1 mi.	Pole, S side of Pointe Aux Peaux 1 pole W of Huron next to Vent Pipe - Site Boundary.	Q	I
T24	SW/225°	1.2 mi.	Fermi Gate along Pointe Aux Peaux Rd. on fence wire W of gate Site Boundary.	Q	I
T25	WSW/252°	1.4 mi.	Pole, Toll Rd. - 12 poles S of Fermi Drive.	Q	I
T26	WSW/259°	1.1 mi.	Pole, Toll Rd. - 6 poles S of Fermi Drive.	Q	I
T27	SW/225°	6.8 mi.	Pole, NE corner of McMillan and East Front St. (Special Area)	Q	I
T28	SW/229°	10.6 mi.	Pole, N side of Mortar Creek between Hull and LaPlaisance.	Q	C
T29	WSW/237°	10.3 mi.	Pole, NE corner of S Dixie and Albain.	Q	C
T30	WSW/247°	7.8 mi.	E side S end of foot bridge, St. Mary's Park corner of Elm and Monroe St. (Special Area)	Q	I
T31	WSW/255°	9.6 mi.	1st pole W of entrance drive Milton "Pat" Munson Recreational Reserve on North Custer Rd.	Q	C

I = Indicator *C = Control* *O = On-site* *Q = Quarterly*

Direct Radiation Sample Locations (Table A-1 continued)

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx.)	Description	Collection Frequency	Type
T32	WNW/295°	10.3 mi.	Pole, corner of Stony Creek and Finzel Rd.	Q	I
T33	NW/317°	9.2 mi.	Pole, W side of Grafton Rd. 1 pole N of Ash and Grafton intersection.	Q	I
T34	NNW/338°	9.8 mi.	Pole, SW corner of Port Creek and Will-Carleton Rd.	Q	I
T35	N/359°	6.9 mi.	Pole, S Side of S Huron River Dr. across from Race St. (Special Area)	Q	I
T36	N/358°	9.1 mi.	Pole, NE corner of Gibraltar and Cahill Rd.	Q	I
T37	NNE/21°	9.8 mi.	Pole, S corner of Adams and Gibraltar across from Humbug Marina.	Q	I
T38	WNW/294°	1.7 mi.	Residence - 6594 N. Dixie Hwy.	Q	I
T39	S/176°	0.3 mi.	SE corner of Protected Area Fence (PAF).	Q	O
T40	S/170°	0.3 mi.	Midway along OBA - PAF.	Q	O
T41	SSE/161°	0.2 mi.	Midway between OBA and Shield Wall on PAF.	Q	O
T42	SSE/149°	0.2 mi.	Midway along Shield Wall on PAF.	Q	O
T43	SE/131°	0.1 mi.	Midway between Shield Wall and Aux Boilers on PAF.	Q	O
T44	ESE/109°	0.1 mi.	Opposite OSSF door on PAF.	Q	O

I = Indicator *C = Control* *O = On-site* *Q = Quarterly*

Direct Radiation Sample Locations (Table A-1 continued)

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx.)	Description	Collection Frequency	Type
T45	E/86°	0.1 mi.	NE Corner of PAF.	Q	O
T46	ENE/67°	0.2 mi.	NE side of barge slip on fence.	Q	O
T47	S/185°	0.1 mi.	South of Turbine Bldg. rollup door on PAF.	Q	O
T48	SW/235°	0.2 mi.	30 ft. from corner of AAP on PAF.	Q	O
T49	WSW/251°	1.1 mi.	Corner of Site Boundary fence north of NOC along Critical Path Rd.	Q	I
T50	W/270°	0.9 mi.	Site Boundary fence near main gate by the south Bullet Street sign.	Q	I
T51	N/3°	0.4 mi.	Site Boundary fence north of north Cooling Tower.	Q	O
T52	NNE/20°	0.4 mi.	Site Boundary fence at the corner of Arson and Tower.	Q	O
T53	NE/55°	0.2 mi.	Site Boundary fence east of South Cooling Tower.	Q	O
T54	S/189°	0.3 mi.	Pole next to Fermi 2 Visitors Center.	Q	O
T55	WSW/251°	3.3 mi.	Pole, north side of Nadeau Rd. across from Sodt Elementary School Marquee.	Q	I
T56	WSW/256°	2.9 mi.	Pole, entrance to Jefferson Middle School on Stony Creek Rd.	Q	I

I = Indicator *C = Control* *O = On-site* *Q = Quarterly*

Direct Radiation Sample Locations (Table A-1 continued)

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx.)	Description	Collection Frequency	Type
T57	W/260°	2.7 mi.	Pole, north side of Williams Rd. across from Jefferson High School entrance.	Q	I
T58	WSW/249°	4.9 mi.	Pole west of Hurd Elementary School Marquee.	Q	I
T59	NW/325°	2.6 mi.	Pole north of St. Charles Church entrance on Dixie Hwy.	Q	I
T60	NNW/341°	2.5 mi.	1st pole north of North Elementary School entrance on Dixie Hwy.	Q	I
T61	W/268°	10.1 mi.	Pole, SW corner of Stewart and Raisinville Rd.	Q	I
T62	SW/232°	9.7 mi.	Pole, NE corner of Albain and Hull Rd.	Q	I
T63	WSW/245°	9.6 mi.	Pole, NE corner of Dunbar and Telegraph Rd.	Q	I
T64	WNW/286°	0.2 mi.	West of switchgear yard on PAF.	Q	O
T65	NW/322°	0.1 mi.	PAF switchgear yard area NW of RHR complex.	Q	O
T66	NE/50°	0.1 mi.	Behind Bldg. 42 on PAF.	Q	O
T67	NNW/338°	0.2 mi.	Site Boundary fence West of South Cooling Tower.	Q	O
T68	WNW/303°	0.6 mi	Langton Rd. seven poles East of Leroux Rd.	Q	I
T69	NW/306°	0.8 mi	Langton Rd. five poles East of Leroux Rd.	Q	I
T70	NNW/333°	1.1 mi	Leroux Rd. last pole North of Fermi Dr.	Q	I
T71	WNW/300°	1.1 mi	Leroux Rd. six poles North of Fermi Dr.	Q	I

I = Indicator *C = Control* *O = On-site* *Q = Quarterly*

Direct Radiation Sample Locations (Table A-1 continued)

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx.)	Description	Collection Frequency	Type
ISFSI-1	WNW/302.3°	0.175 mi.	Center of west ISFSI fence.	Q	O
ISFSI-2	NW/310.2°	0.186 mi.	NW corner ISFSI fence.	Q	O
ISFSI-3	NW/313.2°	0.166 mi.	Center of north ISFSI fence.	Q	O
ISFSI-4	NW/315.6°	0.149 mi.	NE corner ISFSI fence.	Q	O
ISFSI-5	NW/305.4°	0.140 mi	Center of east ISFSI fence.	Q	O
ISFSI-6	WNW/294.1°	0.136 mi	SE corner ISFSI fence.	Q	O
ISFSI-7	WNW/293.0°	0.157 mi	Center of south ISFSI fence.	Q	O
ISFSI-8	WNW/293°	0.177 mi	SW corner ISFSI fence.	Q	O

I = Indicator *C = Control* *O = On-site* *Q = Quarterly*

Air Particulate and Air Iodine Sample Locations

Table A-2

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx.)	Description	Collection Frequency	Type
API-1	NE/39°	1.4 mi.	Estral Beach Pole on Lakeshore, 18 Poles S of Lakeview (Nearest Community with highest X/Q).	W	I
API-2	NNW/337°	0.6 mi.	Site Boundary and Toll Road, on Site Fence by T-4.	W	I
API-3	NW/313°	0.6 mi.	Site Boundary and Toll Road, on Site Fence by T-5.	W	I
API-4	W/270°	14.0 mi.	Pole, at Michigan Gas substation on N. Custer Rd., 0.66 miles west of Doty Rd.	W	C
API-5	S/188°	1.2 mi.	Pole, N corner of Pointe Aux Peaux and Dewey Rd.	W	I

I = Indicator *C = Control* *W = Weekly*

Milk Sample Locations

Table A-3

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx.)	Description	Collection Frequency	Type
M-2	NW/319°	5.4 mi.	Reaume Farm - 2705 E Labo.	M-SM	I
M-8	WNW/289°	9.9 mi.	Calder Dairy - 9334 Finzel Rd.	M-SM	C

I = Indicator *C = Control* *M = Monthly* *SM = Semimonthly*

Garden Sample Locations

Table A-4

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx.)	Description	Collection Frequency	Type
FP-1	NNE/21°	3.8 mi.	9501 Turnpike Highway.	M	I
FP-9	W/261°	10.9 mi.	4074 North Custer Road.	M	C

I = Indicator *C = Control* *M = Monthly (when available)*

Drinking Water Sample Locations

Table A-5

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx.)	Description	Collection Frequency	Type
DW-1	S/174°	1.1 mi.	Monroe Water Station N Side of Pointe Aux Peaux 1/2 Block W of Long Rd.	M	I
DW-2	N/8°	18.5 mi.	Detroit Water Station 14700 Moran Rd, Allen Park.	M	C

I = Indicator *C = Control* *M = Monthly*

Surface Water Sample Locations

Table A-6

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx.)	Description	Collection Frequency	Type
SW-2	NNE/20°	11.7 mi.	DECo's Trenton Channel Power Plant Intake Structure (Screenhouse #1).	M	C
SW-3	SSE/160°	0.2 mi.	DECO's Fermi 2 General Service Water Intake Structure.	M	I

I = Indicator *C = Control* *M = Monthly*

Groundwater Sample Locations

Table A-7

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx.)	Description	Collection Frequency	Type
GW-1	S/175°	0.4 mi.	Approx. 100 ft W of Lake Erie, EF-1 Parking lot near gas fired peakers.	Q	I
GW-2	SSW/208°	1.0 mi.	4 ft S of Pointe Aux Peaux (PAP) Rd. Fence 427 ft W of where PAP crosses over Stoney Point's Western Dike.	Q	I
GW-3	SW/226°	1.0 mi.	143 ft W of PAP Rd. Gate, 62 ft N of PAP Rd. Fence.	Q	I
GW-4	WNW/299°	0.6 mi.	42 ft S of Langton Rd, 8 ft E of Toll Rd. Fence.	Q	C

I = Indicator *C = Control* *Q = Quarterly*

Sediment Sample Locations

Table A-8

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx.)	Description	Collection Frequency	Type
S-1	SSE/165°	0.9 mi.	Pointe Aux Peaux, Shoreline to 500 ft offshore sighting directly to Land Base Water Tower.	SA	I
S-2	E/81°	0.2 mi.	Fermi 2 Discharge, approx. 200 ft offshore.	SA	I
S-3	NE/39°	1.1 mi.	Estral Beach, approx. 200 ft offshore, off North shoreline where Swan Creek and Lake Erie meet.	SA	I
S-4	WSW/241°	3.0 mi.	Indian Trails Community Beach.	SA	I
S-5	NNE/20°	11.7 mi.	DECo's Trenton Channel Power Plant intake area.	SA	C

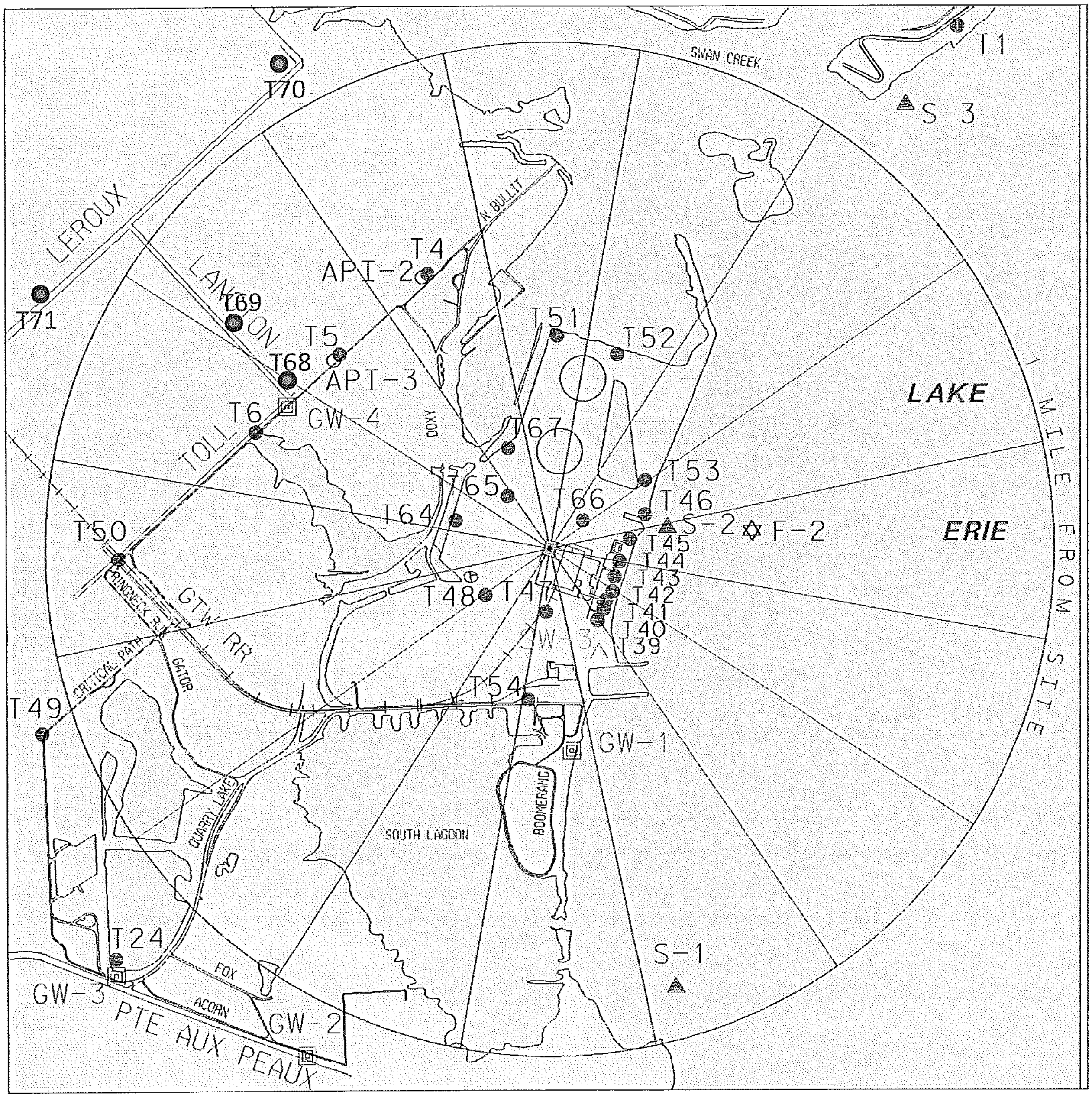
I = Indicator *C = Control* *SA = Semiannually*

Fish Sample Locations

Table A-9

Station Number	Meteorological Sector/Azimuth (Degrees)	Distance from Reactor (Approx.)	Description	Collection Frequency	Type
F-1	NNE/31°	9.5 mi.	Near Celeron Island.	SA	C
F-2	E/86°	0.4 mi.	Fermi 2 Discharge (approx. 1200 ft offshore).	SA	I
F-3	SW/227°	3.5 mi.	Brest Bay.	SA	C

I = Indicator *C = Control* *SA = Semiannually*



MAP - 1
SAMPLING LOCATIONS
BY STATION NUMBER
WITHIN 1 MILE

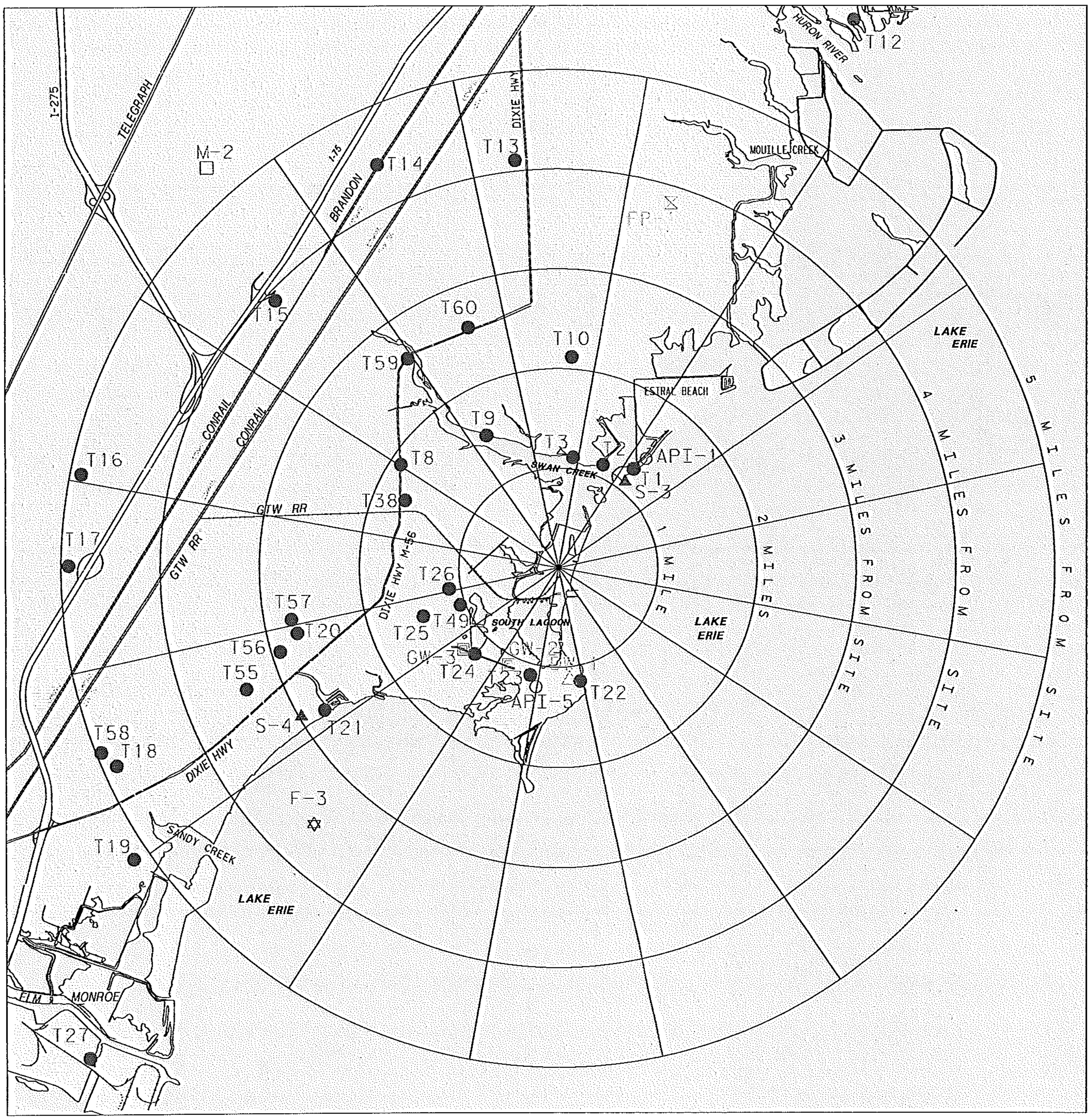
LEGEND

- T- DIRECT RADIATION
- API- AIR PARTICULATES/AIR IODINE
- S- SEDIMENTS
- DW/SW- DRINKING WATER/SURFACE WATER
- GW- GROUND WATER
- M- MILK
- FP- FOOD PRODUCTS
- F- FISH

N

0 0.5

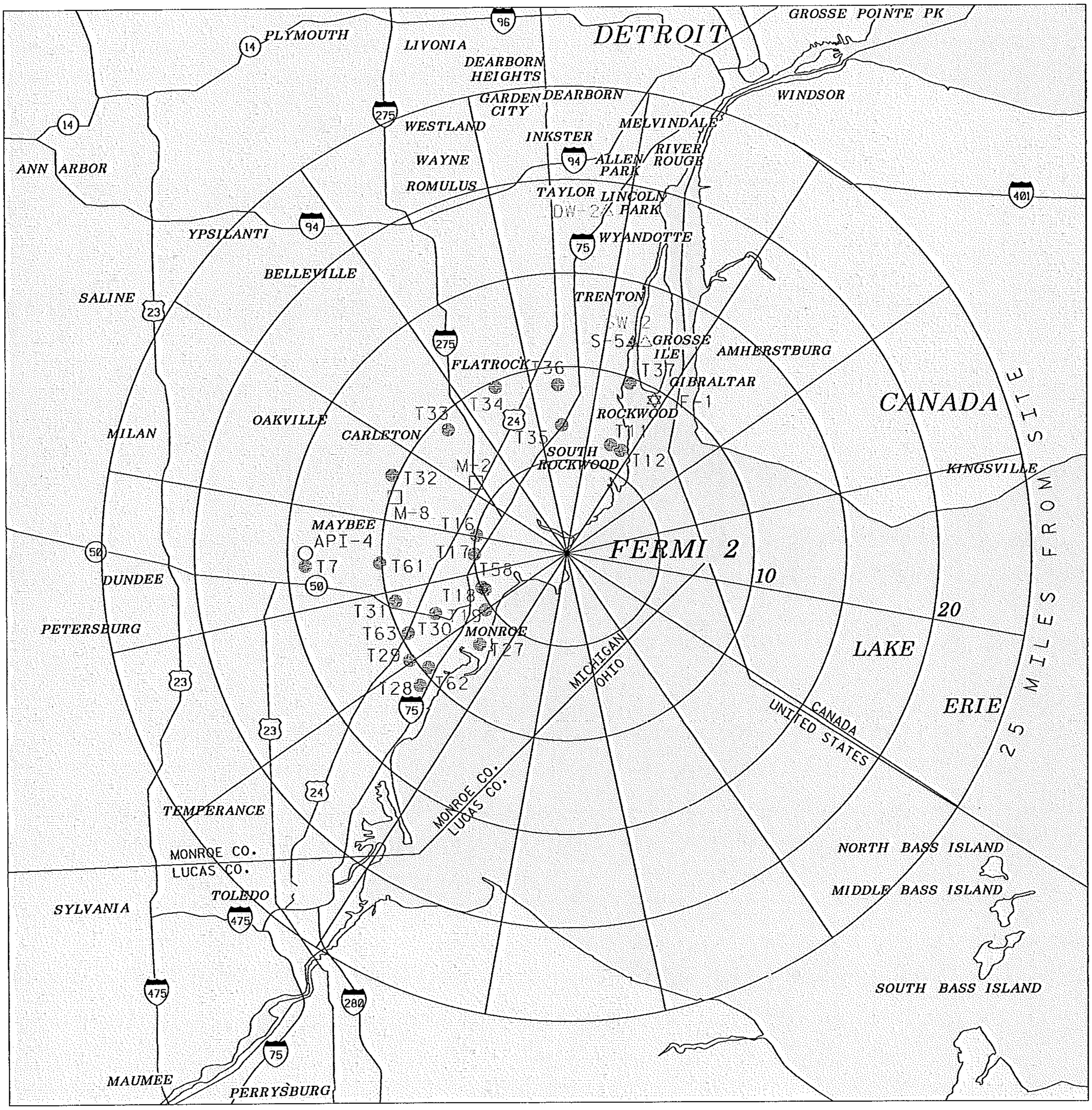
SCALE IN MILES



MAP - 2
SAMPLING LOCATIONS
BY STATION NUMBER
(1 To 5 MILES)

LEGEND

- T- DIRECT RADIATION
- API- AIR PARTICULATES/AIR IODINE
- S- SEDIMENTS
- DW/SW- DRINKING WATER/SURFACE WATER
- GW- GROUND WATER
- M- MILK
- FP- FOOD PRODUCTS
- F- FISH



MAP - 3
SAMPLING LOCATIONS
BY STATION NUMBER
(GREATER THAN 5 MILES)

LEGEND

- T- DIRECT RADIATION
- API- AIR PARTICULATES OR AIR IODINE
- S- SEDIMENTS
- DW/SW- DRINKING WATER/SURFACE WATER
- GW- GROUND WATER
- M- MILK
- FP- FOOD PRODUCTS
- F- FISH

N

5 0 5 10

SCALE IN MILES

Appendix B

Environmental Data Summary

Table B-1 Radiological Environmental Monitoring Program Summary

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 2012
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

Sample Type (Units)	Type and Number of Analysis	LLD (b)	Indicator Locations Mean and Range (d)	Location with Highest Annual Mean		Control Locations Mean and Range (d)	Number of Non-routine Results (f)
				Location (e)	Mean and Range (d)		
Direct Radiation *mR/std qtr* (a)	Gamma (TLD) 206	1.0	15.0 (190/190) 11.0 to 22.0	T-49 (Indicator)	20.1 (4/4) 19.2 to 21.9	14.0 (16/16) 11.8 to 16.8	None
Airborne Particulates *pCi/cu. m.*	Gross Beta 260	1.00E-2	4.73E-2 (208/208) 3.975E-3 to 1.13E-1	API-5 (Indicator)	5.04E-2 (52/52) 2.38E-2 to 9.71E-2	4.60E-2 (52/52) 2.73E-2 to 7.14E-2	None
	Gamma Spec. 20						
	Be-7	N/A	4.87E-2 (16/16) 1.13E-2 to 8.81E-2	API-1 (Indicator)	5.79E-2 (4/4) 4.11E-2 to 7.18E-2	4.27E-2 (4/4) 1.65E-2 to 8.81E-2	None
	K-40	N/A	1.35E-2 (6/16) 1.13E-2 to 1.48E-2	API-1 (Indicator)	1.48E-2 (1/4)	<MDA	None
	Mn-54	N/A	<MDA			<MDA	None
	Co-58	N/A	<MDA			<MDA	None
	Fe-59	N/A	<MDA			<MDA	None
	Co-60	N/A	<MDA			<MDA	None
	Zn-65	N/A	<MDA			<MDA	None
	Zr-95	N/A	<MDA			<MDA	None
	Nb-95	N/A	<MDA			<MDA	None
	Ru-103	N/A	<MDA			<MDA	None
	Ru-106	N/A	<MDA			<MDA	None
	Cs-134	5.00E-2	<MDA			<MDA	None
	Cs-137	6.00E-2	<MDA			<MDA	None
	Ba-140	N/A	<MDA			<MDA	None
	La-140	N/A	<MDA			<MDA	None
	Ce-141	N/A	<MDA			<MDA	None
	Ce-144	N/A	<MDA			<MDA	None
Airborne Iodine *pCi/cu. m.*	I-131 260	7.00E-2	<MDA			<MDA	None

Table B-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 2012
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

Sample Type (Units)	Type and Number of Analysis	LLD (b)	Indicator Locations Mean and Range (d)	Location with Highest Annual Mean		Control Locations Mean and Range (d)	Number of Non-routine Results (f)
				Location (e)	Mean and Range (d)		
Milk *pCi/l*	I-131 34	1.00E+0	<MDA			<MDA	None
	Sr-89 34	N/A	<MDA			<MDA	None
	Sr-90	N/A	<MDA				None
	Gamma Spec. 34						
	Be-7	N/A	<MDA			<MDA	None
	K-40	N/A	1.49E+3 (17/17) 1.36E+3 to 1.61E+3	M-2 (Indicator)	1.49E+3 (17/17) 1.36E+3 to 1.61E+3	1.45E+3 (17/17) 1.38E+3 to 1.54E+3	None
	Mn-54	N/A	<MDA			<MDA	None
	Co-58	N/A	<MDA			<MDA	None
	Fe-59	N/A	<MDA			<MDA	None
	Co-60	N/A	<MDA			<MDA	None
	Zn-65	N/A	<MDA			<MDA	None
	Zr-95	N/A	<MDA			<MDA	None
	Nb-95	N/A	<MDA			<MDA	None
	Ru-103	N/A	<MDA			<MDA	None
	Ru-106	N/A	<MDA			<MDA	None
	Cs-134	1.50E+1	<MDA			<MDA	None
	Cs-137	1.80E+1	<MDA			<MDA	None
	Ba-140	1.50E+1	<MDA			<MDA	None
	La-140	1.50E+1	<MDA			<MDA	None
	Ce-141	N/A	<MDA			<MDA	None
	Ce-144	N/A	<MDA			<MDA	None
Vegetation *pCi/kg wet*	I-131 12	6.00E+1	<MDA			<MDA	None
	Gamma Spec. 12						
	Be-7	N/A	1.64E+2 (6/6) 6.72E+1 to 2.59E+2	FP-9 (Control)	2.42E+2 (6/6) 7.26E+1 to 4.38E+2	2.42E+2 (6/6) 7.26E+1 to 4.38E+2	None
	K-40	N/A	3.74E+3 (6/6) 2.30E+3 to 5.14E+3	FP-9 (Control)	4.30E+3 (6/6) 3.32E+3 to 4.78E+3	4.30E+3 (6/6) 3.32E+3 to 4.78E+3	None

Table B-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 2012
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

Sample Type (Units)	Type and Number of Analysis	LLD (b)	Indicator Locations Mean and Range (d)	Location with Highest Annual Mean		Control Locations Mean and Range (d)	Number of Non-routine Results (f)
				Location (e)	Mean and Range(d)		
Vegetation (cont.) *pCi/kg wet*	Mn-54	N/A	<MDA			<MDA	None
	Co-58	N/A	<MDA			<MDA	None
	Fe-59	N/A	<MDA			<MDA	None
	Co-60	N/A	<MDA			<MDA	None
	Zn-65	N/A	<MDA			<MDA	None
	Zr-95	N/A	<MDA			<MDA	None
	Nb-95	N/A	<MDA			<MDA	None
	Ru-103	N/A	<MDA			<MDA	None
	Ru-106	N/A	<MDA			<MDA	None
	Cs-134	6.00E+1	<MDA			<MDA	None
	Cs-137	8.00E+1	<MDA			<MDA	None
	Ba-140	N/A	<MDA			<MDA	None
	La-140	N/A	<MDA			<MDA	None
	Ce-141	N/A	<MDA			<MDA	None
	Ce-144	N/A	<MDA			<MDA	None
Drinking Water *pCi/l*	Gross Beta 24	4.00E+0	4.80E+0 (2/12) 3.47E+0 to 6.12E+0	DW-1 (Indicator)	4.80E+0 (2/12) 3.47E+0 to 6.12E+0	<MDA	None
	Sr-89 24	N/A	<MDA			<MDA	None
	Sr-90	N/A	<MDA			<MDA	None
	Gamma Spec. 24						
	Be-7	N/A	<MDA			<MDA	None
	K-40	N/A	2.54E+1 (2/12) 2.46E+1 to 2.62E+1	DW-2 (Control)	3.66E+1 (1/12)	3.66E+1 (1/12)	None
	Cr-51	N/A	<MDA			<MDA	None
	Mn-54	1.50E+1	<MDA			<MDA	None
	Co-58	1.50E+1	<MDA			<MDA	None
	Fe-59	3.00E+1	<MDA			<MDA	None
	Co-60	1.50E+1	<MDA			<MDA	None
	Zn-65	3.00E+1	<MDA			<MDA	None
	Zr-95	1.50E+1	<MDA			<MDA	None
	Nb-95	1.50E+1	<MDA			<MDA	None

Table B-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 2012
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

Sample Type (Units)	Type and Number of Analysis	LLD (b)	Indicator Locations Mean and Range (d)	Location with Highest Annual Mean		Control Locations Mean and Range (d)	Number of Non-routine Results (f)
				Location (e)	Mean and Range (d)		
Drinking Water (cont.) *pCi/l*	Ru-103	N/A	<MDA			<MDA	None
	Ru-106	N/A	<MDA			<MDA	None
	Cs-134	1.50E+1	<MDA			<MDA	None
	Cs-137	1.80E+1	<MDA			<MDA	None
	Ba-140	1.50E+1	<MDA			<MDA	None
	La-140	1.50E+1	<MDA			<MDA	None
	Ce-141	N/A	<MDA			<MDA	None
	Ce-144	N/A	<MDA			<MDA	None
	H-3 8	2.00E+3	<MDA			<MDA	None
Surface Water *pCi/l*	Sr-89 24	N/A	<MDA			<MDA	None
	Sr-90	N/A	<MDA			<MDA	None
	Gamma Spec. 24						
	Be-7	N/A	<MDA			<MDA	None
	K-40	N/A	<MDA	SW-3(Control)	3.00E+1 (1/12)	3.00E+1 (1/12)	None
	Cr-51	N/A	<MDA			<MDA	None
	Mn-54	1.50E+1	<MDA			<MDA	None
	Co-58	1.50E+1	<MDA			<MDA	None
	Fe-59	3.00E+1	<MDA			<MDA	None
	Co-60	1.50E+1	<MDA			<MDA	None
	Zn-65	3.00E+1	<MDA			<MDA	None
	Zr-95	1.50E+1	<MDA			<MDA	None
	Nb-95	1.50E+1	<MDA			<MDA	None
	Ru-103	N/A	<MDA			<MDA	None
	Ru-106	N/A	<MDA			<MDA	None
	Cs-134	1.50E+1	<MDA			<MDA	None
	Cs-137	1.80E+1	<MDA			<MDA	None
	Ba-140	1.50E+1	<MDA			<MDA	None
	La-140	1.50E+1	<MDA			<MDA	None
	Ce-141	N/A	<MDA			<MDA	None

Table B-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 2012
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

Sample Type (Units)	Type and Number of Analysis		LLD (b)	Indicator Locations Mean and Range (d)	Location with Highest Annual Mean		Control Locations Mean and Range (d)	Number of Non-routine Results (f)
					Location (e)	Mean and Range (d)		
Surface Water (cont.) *pCi/l*	Ce-144		N/A	<MDA			<MDA	None
	H-3	8	2.00E+3	<MDA			<MDA	None
Groundwater *pCi/l*	Gamma Spec.	16						
	Be-7		N/A	<MDA			<MDA	None
	K-40		N/A	<MDA			<MDA	None
	Cr-51		N/A	<MDA			<MDA	None
	Mn-54		1.50E+1	<MDA			<MDA	None
	Co-58		1.50E+1	<MDA			<MDA	None
	Fe-59		3.00E+1	<MDA			<MDA	None
	Co-60		1.50E+1	<MDA			<MDA	None
	Zn-65		3.00E+1	<MDA			<MDA	None
	Zr-95		1.50E+1	<MDA			<MDA	None
	Nb-95		1.50E+1	<MDA			<MDA	None
	Ru-103		N/A	<MDA			<MDA	None
	Ru-106		N/A	<MDA			<MDA	None
	Cs-134		1.50E+1	<MDA			<MDA	None
	Cs-137		1.80E+1	<MDA			<MDA	None
	Ba-140		1.50E+1	<MDA			<MDA	None
	La-140		1.50E+1	<MDA			<MDA	None
	Ce-141		N/A	<MDA			<MDA	None
	Ce-144		N/A	<MDA			<MDA	None
	H-3	16	2.00E+3	<MDA			<MDA	None
Sediment *pCi/kg dry*	Sr-89	10	N/A	<MDA			<MDA	
	Sr-90		N/A	<MDA			<MDA	None
	Gamma Spec.	10						
	Be-7		N/A	<MDA				None
	K-40		N/A	1.23E+4 (8/8) 8.08E+3 to 1.74E+4	S-2 (Indicator)	1.73E+4 (2/2) 1.71E+4 to 1.74E+4	8.23E+3 (2/2) 7.08E+3 to 9.34E+3	None

Table B-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 2012
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

Sample Type (Units)	Type and Number of Analysis	LLD (b)	Indicator Locations Mean and Range (d)	Location with Highest Annual Mean		Control Locations Mean and Range (d)	Number of Non-routine Results (f)
				Location (e)	Mean and Range (d)		
Sediment (cont.) *pCi/kg dry*	Mn-54	N/A	<MDA			<MDA	None
	Co-58	N/A	<MDA			<MDA	None
	Fe-59	N/A	<MDA			<MDA	None
	Co-60	N/A	<MDA			<MDA	None
	Zn-65	N/A	<MDA			<MDA	None
	Zr-95	N/A	<MDA			<MDA	None
	Nb-95	N/A	<MDA			<MDA	None
	Ru-103	N/A	<MDA			<MDA	None
	Ru-106	N/A	<MDA			<MDA	None
	Cs-134	1.50E+2	<MDA			<MDA	None
	Cs-137	1.80E+2	<MDA	S-5 (Control)	9.22E+1 (2/2) 7.63E+1 to 1.08E+2	9.22E+1 (2/2) 7.63E+1 to 1.08E+2	None
	Ba-140	N/A	<MDA			<MDA	None
	La-140	N/A	<MDA			<MDA	None
	Ce-141	N/A	<MDA			<MDA	None
	Ce-144	N/A	<MDA			<MDA	None
Fish *pCi/kg wet*	Sr-89 24	N/A	<MDA			<MDA	None
	Sr-90	N/A	<MDA			<MDA	None
	Gamma Spec. 24						
	Be-7	N/A	<MDA			<MDA	None
	K-40	N/A	3.19E+3 (14/14) 2.81E+3 to 3.81E+3	F-2 (Indicator)	3.19E+3 (14/14) 2.81E+3 to 3.81E+3	2.92E+3 (25/25) 3.54E+3 to 3.90E+3	None
	Mn-54	1.30E+2	<MDA			<MDA	None
	Co-58	1.30E+2	<MDA			<MDA	None
	Fe-59	2.60E+2	<MDA			<MDA	None
	Co-60	1.30E+2	<MDA			<MDA	None
	Zn-65	2.60E+2	<MDA			<MDA	None

Table B-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2 Docket No.: 50-341 Reporting Period: January - December 2012
Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

Sample Type (Units)	Type and Number of Analysis	LLD (b)	Indicator Locations Mean and Range (d)	Location with Highest Annual Mean		Control Locations Mean and Range (d)	Number of Non-routine Results (f)
				Location (e)	Mean and Range (d)		
Fish (cont.)	Zr-95	N/A	<MDA			<MDA	None
pCi/kg wet	Nb-95	N/A	<MDA			<MDA	None
	Ru-103	N/A	<MDA			<MDA	None
	Ru-106	N/A	<MDA			<MDA	None
	Cs-134	1.30E+2	<MDA			<MDA	None
	Cs-137	1.50E+2	<MDA			<MDA	None
	Ba-140	N/A	<MDA			<MDA	None
	La-140	N/A	<MDA			<MDA	None
	Ce-141	N/A	<MDA			<MDA	None
	Ce-144	N/A	<MDA			<MDA	None

(a) Direct Radiation mean and range values are for off-site TLDs
(b) LLD = Fermi 2 ODCM LLD: nominal lower limit of detection based on 4.66 sigma error for background sample.
(c) <MDA = Less than the lab's minimum detectable activity which is less than the LLD.
(d) Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses (F).
(e)Locations are specified by Fermi 2 code and are described in Appendix A Sampling Locations.
(f) Non-routine results are those which are reportable according to Fermi 2 ODCM control 3.12.1.

Note: Other nuclides were considered in analysis results, but only those identifiable were reported in addition to ODCM listed nuclides.

Appendix C

Environmental Data Tables

FERMI 2
OFFSITE TLD ANALYSIS
(mR/Std Qtr)

STATION NUMBER	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER
T-1	12.15	13.55	14.65	12.83
T-2	11.53	13.62	13.53	13.14
T-3	10.99	11.85	13.36	13.14
T-4	13.24	14.89	15.86	14.79
T-5	13.45	15.58	16.61	15.23
T-6	14.22	15.35	17.89	(a)
T-7	14.31	15.38	16.77	15.99
T-8	14.77	16.40	16.80	16.08
T-9	12.88	14.42	14.71	14.63
T-10	13.95	15.63	16.66	14.79
T-11	12.63	14.23	15.09	13.78
T-12	11.73	12.89	14.15	13.07
T-13	14.78	16.00	16.91	15.70
T-14	14.69	15.75	17.79	16.57
T-15	12.15	13.73	14.46	13.06
T-16	16.39	18.26	18.90	17.52
T-17	12.32	13.66	14.44	12.80
T-18	12.92	13.59	14.77	14.05
T-19	14.29	15.97	16.77	16.68
T-20	14.93	16.75	17.41	16.30
T-21	12.70	13.49	14.66	13.61
T-22	13.59	15.15	15.65	14.28
T-23	12.39	13.91	15.71	13.68
T-24	(a)	13.15	14.03	13.09
T-25	15.84	(a)	17.91	17.66
T-26	15.86	17.28	18.98	17.97
T-27	11.69	12.65	12.57	12.15
T-28	12.85	13.20	14.11	12.69
T-29	11.75	12.85	13.66	12.76
T-30	13.88	13.41	(a)	(a)
T-31	13.20	14.54	14.83	14.46
T-32	13.99	15.69	16.22	15.71
T-33	12.23	13.35	14.41	12.73
T-34	12.82	14.25	15.31	14.32
T-35	13.06	14.11	15.41	13.43
T-36	12.84	13.91	14.77	14.60
T-37	13.41	15.84	15.08	14.80
T-38	14.36	16.30	17.53	16.09
T-49	19.17	19.75	21.99	19.33
T-50	14.90	15.31	18.51	15.70
T-55	14.52	15.58	16.97	16.11
T-56	13.49	14.61	15.93	14.89
T-57	16.41	17.37	19.60	18.01
T-58	12.16	13.53	15.22	13.24
T-59	13.25	(a)	14.20	13.82
T-60	13.66	15.70	16.50	15.01
T-61	14.49	15.87	16.97	16.10

(a) TLD missing, see Appendix D - Program Execution.

FERMI 2
OFFSITE TLD ANALYSIS (CONT.)
(mR/Std Qtr)

STATION NUMBER	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER
T-62	15.10	15.83	16.53	15.59
T-63	11.98	13.06	13.31	13.25
T-68	15.76	18.61	19.18	19.66
T-69	15.37	16.80	19.15	17.66
T-70	14.57	15.22	17.20	15.58
T-71	15.12	16.48	18.06	17.49

ONSITE TLD ANALYSIS
(mR/Std Qtr)

STATION NUMBER	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER
T-39	16.53	15.10	14.22	12.66
T-40	15.22	15.38	14.07	12.83
T-41	22.20	20.51	17.02	13.90
T-42	20.25	24.88	17.16	15.24
T-43	24.01	24.07	19.86	15.37
T-44	21.51	20.03	16.52	14.48
T-45	16.29	14.60	12.98	11.54
T-46	14.28	14.66	12.87	12.50
T-47	25.28	21.80	19.92	16.00
T-48	19.28	18.43	16.01	14.19
T-51	10.36	10.37	12.16	10.93
T-52	12.01	12.21	13.31	12.52
T-53	14.15	13.82	14.80	13.03
T-54	13.69	12.54	13.49	11.83
T-64	12.64	12.96	13.30	11.94
T-65	14.01	14.21	14.16	12.10
T-66	30.56	25.04	20.30	16.97
T-67	13.27	13.75	14.81	13.65
ISFSI-1	13.39	13.17	13.03	12.19
ISFSI-2	12.60	13.50	13.21	11.94
ISFSI-3	13.68	13.28	14.30	12.09
ISFSI-4	13.32	13.99	13.86	11.72
ISFSI-5	13.48	14.22	13.68	12.69
ISFSI-6	12.55	13.86	12.33	11.39
ISFSI-7	13.53	13.62	12.96	11.36
ISFSI-8	13.77	15.10	13.14	11.79

FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

API-1 FIRST QUARTER

Date	Activity
3-Jan-12	5.56E-02
10-Jan-12	5.23E-02
17-Jan-12	6.05E-02
24-Jan-12	5.64E-02
31-Jan-12	5.88E-02
7-Feb-12	6.32E-02
14-Feb-12	4.29E-02
21-Feb-12	5.49E-02
28-Feb-12	4.78E-02
6-Mar-12	4.38E-02
13-Mar-12	5.58E-02
20-Mar-12	3.75E-02
27-Mar-12	3.70E-02

API-1 SECOND QUARTER

Date	Activity
3-Apr-12	3.68E-02
10-Apr-12	3.88E-02
17-Apr-12	3.48E-02
25-Apr-12	4.56E-02
1-May-12	4.89E-02
8-May-12	4.00E-02
15-May-12	4.54E-02
22-May-12	4.71E-02
29-May-12	5.79E-02
5-Jun-12	3.33E-02
11-Jun-12	5.28E-02
19-Jun-12	3.43E-02
26-Jun-12	3.97E-03

FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

API-1 THIRD QUARTER

Date	Activity
3-Jul-12	6.25E-02
10-Jul-12	5.99E-02
17-Jul-12	5.33E-02
23-Jul-12	4.23E-02
31-Jul-12	3.62E-02
6-Aug-12	4.99E-02
14-Aug-12	3.61E-02
22-Aug-12	3.39E-02
28-Aug-12	7.09E-02
4-Sep-12	4.57E-02
10-Sep-12	5.71E-02
18-Sep-12	4.41E-02
25-Sep-12	4.07E-02

API-1 FOURTH QUARTER

Date	Activity
2-Oct-12	4.20E-02
9-Oct-12	3.75E-02
16-Oct-12	3.69E-02
23-Oct-12	4.12E-02
30-Oct-12	3.94E-02
6-Nov-12	2.34E-02
13-Nov-12	4.29E-02
20-Nov-12	6.02E-02
27-Nov-12	7.57E-02
4-Dec-12	7.42E-02
11-Dec-12	3.82E-02
18-Dec-12	4.85E-02
26-Dec-12	4.65E-02

FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

API-2 FIRST QUARTER

Date	Activity
3-Jan-12	4.30E-02
10-Jan-12	3.49E-02
17-Jan-12	5.49E-02
24-Jan-12	4.63E-02
31-Jan-12	5.97E-02
7-Feb-12	5.59E-02
14-Feb-12	4.93E-02
21-Feb-12	5.23E-02
28-Feb-12	4.02E-02
6-Mar-12	4.03E-02
13-Mar-12	4.70E-02
20-Mar-12	3.82E-02
27-Mar-12	3.96E-02

API-2 SECOND QUARTER

Date	Activity
3-Apr-12	3.49E-02
10-Apr-12	3.93E-02
17-Apr-12	3.79E-02
25-Apr-12	3.86E-02
1-May-12	4.22E-02
8-May-12	4.20E-02
15-May-12	4.74E-02
22-May-12	3.49E-02
29-May-12	4.88E-02
5-Jun-12	3.71E-02
11-Jun-12	3.86E-02
19-Jun-12	4.06E-02
26-Jun-12	3.95E-02

FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

API-2 THIRD QUARTER

Date	Activity
3-Jul-12	4.53E-02
10-Jul-12	4.26E-02
17-Jul-12	4.52E-02
23-Jul-12	3.99E-02
31-Jul-12	4.28E-02
6-Aug-12	3.80E-02
14-Aug-12	2.93E-02
22-Aug-12	3.87E-02
28-Aug-12	6.28E-02
4-Sep-12	3.54E-02
10-Sep-12	3.42E-02
18-Sep-12	4.90E-02
25-Sep-12	2.39E-02

API-2 FOURTH QUARTER

Date	Activity
2-Oct-12	4.99E-02
9-Oct-12	3.75E-02
16-Oct-12	4.37E-02
23-Oct-12	4.07E-02
30-Oct-12	4.42E-02
6-Nov-12	2.23E-02
13-Nov-12	5.20E-02
20-Nov-12	7.31E-02
27-Nov-12	8.13E-02
4-Dec-12	7.44E-02
11-Dec-12	3.42E-02
18-Dec-12	5.68E-02
26-Dec-12	5.14E-02

FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

API-3 FIRST QUARTER

Date	Activity
3-Jan-12	4.55E-02
10-Jan-12	4.33E-02
17-Jan-12	6.54E-02
24-Jan-12	3.81E-02
31-Jan-12	4.82E-02
7-Feb-12	4.44E-02
14-Feb-12	3.78E-02
21-Feb-12	4.64E-02
28-Feb-12	4.01E-02
6-Mar-12	4.71E-02
13-Mar-12	4.27E-02
20-Mar-12	3.75E-02
27-Mar-12	4.06E-02

API-3 SECOND QUARTER

Date	Activity
3-Apr-12	3.28E-02
10-Apr-12	4.13E-02
17-Apr-12	3.78E-02
25-Apr-12	3.77E-02
1-May-12	3.89E-02
8-May-12	4.18E-02
15-May-12	4.39E-02
22-May-12	4.88E-02
29-May-12	4.61E-02
5-Jun-12	3.46E-02
11-Jun-12	3.96E-02
19-Jun-12	3.13E-02
26-Jun-12	4.12E-02

FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

API-3 THIRD QUARTER

Date	Activity
3-Jul-12	4.94E-02
10-Jul-12	5.40E-02
17-Jul-12	4.90E-02
23-Jul-12	4.61E-02
31-Jul-12	3.97E-02
6-Aug-12	4.21E-02
14-Aug-12	2.95E-02
22-Aug-12	4.26E-02
28-Aug-12	6.46E-02
4-Sep-12	4.71E-02
10-Sep-12	3.80E-02
18-Sep-12	4.83E-02
25-Sep-12	3.77E-02

API-3 FOURTH QUARTER

Date	Activity
2-Oct-12	6.11E-02
9-Oct-12	5.59E-02
16-Oct-12	5.74E-02
23-Oct-12	5.17E-02
30-Oct-12	4.67E-02
6-Nov-12	2.87E-02
13-Nov-12	6.35E-02
20-Nov-12	8.47E-02
27-Nov-12	1.13E-01
4-Dec-12	7.97E-02
11-Dec-12	4.51E-02
18-Dec-12	6.18E-02
26-Dec-12	5.99E-02

FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

API-4 FIRST QUARTER

Date	Activity
3-Jan-12	3.39E-02
10-Jan-12	3.91E-02
17-Jan-12	5.12E-02
24-Jan-12	4.28E-02
31-Jan-12	4.10E-02
7-Feb-12	4.63E-02
14-Feb-12	4.37E-02
21-Feb-12	3.33E-02
28-Feb-12	3.77E-02
6-Mar-12	4.39E-02
13-Mar-12	4.42E-02
20-Mar-12	4.98E-02
27-Mar-12	4.62E-02

API-4 SECOND QUARTER

Date	Activity
3-Apr-12	3.50E-02
10-Apr-12	4.24E-02
17-Apr-12	3.63E-02
25-Apr-12	4.53E-02
1-May-12	5.67E-02
8-May-12	4.39E-02
15-May-12	4.55E-02
22-May-12	4.01E-02
29-May-12	4.81E-02
5-Jun-12	4.24E-02
11-Jun-12	4.53E-02
19-Jun-12	4.00E-02
26-Jun-12	4.73E-02

FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

API-4 THIRD QUARTER

Date	Activity
3-Jul-12	5.82E-02
10-Jul-12	5.45E-02
17-Jul-12	5.21E-02
23-Jul-12	4.30E-02
31-Jul-12	4.93E-02
6-Aug-12	5.13E-02
14-Aug-12	3.09E-02
22-Aug-12	3.83E-02
28-Aug-12	6.98E-02
4-Sep-12	3.78E-02
10-Sep-12	3.96E-02
18-Sep-12	4.94E-02
25-Sep-12	3.82E-02

API-4 FOURTH QUARTER

Date	Activity
2-Oct-12	4.96E-02
9-Oct-12	4.42E-02
16-Oct-12	4.99E-02
23-Oct-12	4.89E-02
30-Oct-12	3.80E-02
6-Nov-12	2.73E-02
13-Nov-12	6.30E-02
20-Nov-12	6.98E-02
27-Nov-12	6.99E-02
4-Dec-12	7.14E-02
11-Dec-12	3.71E-02
18-Dec-12	4.65E-02
26-Dec-12	4.51E-02

FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

API-5 FIRST QUARTER

Date	Activity
3-Jan-12	4.17E-02
10-Jan-12	5.26E-02
17-Jan-12	6.22E-02
24-Jan-12	5.59E-02
31-Jan-12	3.93E-02
7-Feb-12	6.45E-02
14-Feb-12	4.69E-02
21-Feb-12	6.19E-02
28-Feb-12	4.34E-02
6-Mar-12	5.17E-02
13-Mar-12	4.88E-02
20-Mar-12	4.67E-02
27-Mar-12	4.32E-02

API-5 SECOND QUARTER

Date	Activity
3-Apr-12	3.38E-02
10-Apr-12	4.29E-02
17-Apr-12	4.03E-02
25-Apr-12	4.86E-02
1-May-12	4.79E-02
8-May-12	4.82E-02
15-May-12	5.10E-02
22-May-12	3.88E-02
29-May-12	5.25E-02
5-Jun-12	3.83E-02
11-Jun-12	4.72E-02
19-Jun-12	3.57E-02
26-Jun-12	4.76E-02

FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)

API-5 THIRD QUARTER

Date	Activity
3-Jul-12	6.30E-02
10-Jul-12	5.43E-02
17-Jul-12	4.37E-02
23-Jul-12	5.53E-02
31-Jul-12	4.12E-02
6-Aug-12	5.00E-02
14-Aug-12	3.24E-02
22-Aug-12	3.71E-02
28-Aug-12	7.35E-02
4-Sep-12	3.86E-02
10-Sep-12	3.93E-02
18-Sep-12	5.57E-02
25-Sep-12	3.69E-02

API-5 FOURTH QUARTER

Date	Activity
2-Oct-12	4.54E-02
9-Oct-12	5.02E-02
16-Oct-12	5.87E-02
23-Oct-12	5.40E-02
30-Oct-12	5.18E-02
6-Nov-12	2.38E-02
13-Nov-12	5.97E-02
20-Nov-12	8.30E-02
27-Nov-12	9.71E-02
4-Dec-12	8.18E-02
11-Dec-12	4.81E-02
18-Dec-12	5.77E-02
26-Dec-12	5.53E-02

FERMI 2
AIR IODINE – 131
(pCi/cubic meter)

API-1 FIRST QUARTER

Date	Activity	
3-Jan-12	<	1.68E-02
10-Jan-12	<	1.67E-02
17-Jan-12	<	3.50E-02
24-Jan-12	<	3.63E-02
31-Jan-12	<	2.74E-02
7-Feb-12	<	1.84E-02
14-Feb-12	<	2.00E-02
21-Feb-12	<	1.70E-02
28-Feb-12	<	1.88E-02
6-Mar-12	<	1.59E-02
13-Mar-12	<	2.28E-02
20-Mar-12	<	2.12E-02
27-Mar-12	<	4.37E-02

API-1 SECOND QUARTER

Date	Activity	
3-Apr-12	<	1.57E-02
10-Apr-12	<	9.96E-03
17-Apr-12	<	2.68E-02
25-Apr-12	<	1.59E-02
1-May-12	<	1.70E-02
8-May-12	<	2.91E-02
15-May-12	<	1.88E-02
22-May-12	<	2.81E-02
29-May-12	<	1.75E-02
5-Jun-12	<	3.60E-03
11-Jun-12	<	2.82E-02
19-Jun-12	<	3.11E-02
26-Jun-12	<	1.16E-02

FERMI 2
AIR IODINE – 131
(pCi/cubic meter)

API-1 THIRD QUARTER

Date	Activity	
3-Jul-12	<	2.17E-02
10-Jul-12	<	2.51E-02
17-Jul-12	<	3.14E-02
23-Jul-12	<	2.21E-02
31-Jul-12	<	1.11E-02
6-Aug-12	<	4.32E-02
14-Aug-12	<	4.49E-02
22-Aug-12	<	1.88E-02
28-Aug-12	<	3.77E-02
4-Sep-12	<	1.99E-02
10-Sep-12	<	1.37E-02
18-Sep-12	<	1.59E-02
25-Sep-12	<	2.33E-02

API-1 FOURTH QUARTER

Date	Activity	
2-Oct-12	<	2.37E-02
9-Oct-12	<	7.28E-03
16-Oct-12	<	1.10E-02
23-Oct-12	<	1.77E-02
30-Oct-12	<	2.00E-02
6-Nov-12	<	3.22E-02
13-Nov-12	<	1.71E-02
20-Nov-12	<	3.28E-02
27-Nov-12	<	4.05E-02
4-Dec-12	<	2.19E-02
11-Dec-12	<	1.98E-02
18-Dec-12	<	1.89E-02
26-Dec-12	<	1.24E-02

FERMI 2
AIR IODINE – 131
(pCi/cubic meter)

API-2 FIRST QUARTER

Date	Activity	
3-Jan-12	<	2.27E-02
10-Jan-12	<	3.46E-02
17-Jan-12	<	1.90E-02
24-Jan-12	<	5.96E-03
31-Jan-12	<	3.56E-02
7-Feb-12	<	3.13E-02
14-Feb-12	<	1.69E-02
21-Feb-12	<	2.08E-02
28-Feb-12	<	1.75E-02
6-Mar-12	<	1.63E-02
13-Mar-12	<	2.35E-02
20-Mar-12	<	1.53E-02
27-Mar-12	<	2.90E-02

API-2 SECOND QUARTER

Date	Activity	
3-Apr-12	<	1.60E-02
10-Apr-12	<	2.52E-02
17-Apr-12	<	2.35E-02
25-Apr-12	<	1.38E-02
1-May-12	<	2.66E-02
8-May-12	<	2.63E-02
15-May-12	<	1.92E-02
22-May-12	<	1.43E-02
29-May-12	<	1.41E-02
5-Jun-12	<	3.34E-03
11-Jun-12	<	3.45E-02
19-Jun-12	<	1.91E-02
26-Jun-12	<	2.08E-02

FERMI 2
AIR IODINE – 131
(pCi/cubic meter)

API-2 THIRD QUARTER

Date	Activity	
3-Jul-12	<	2.48E-02
10-Jul-12	<	5.32E-02
17-Jul-12	<	1.72E-02
23-Jul-12	<	2.34E-02
31-Jul-12	<	1.34E-02
6-Aug-12	<	4.56E-02
14-Aug-12	<	1.75E-02
22-Aug-12	<	2.36E-02
28-Aug-12	<	2.86E-02
4-Sep-12	<	1.36E-02
10-Sep-12	<	2.78E-02
18-Sep-12	<	1.83E-02
25-Sep-12	<	8.36E-03

API-2 FOURTH QUARTER

Date	Activity	
2-Oct-12	<	1.59E-02
9-Oct-12	<	7.02E-03
16-Oct-12	<	1.11E-02
23-Oct-12	<	2.55E-02
30-Oct-12	<	2.54E-02
6-Nov-12	<	2.12E-02
13-Nov-12	<	1.90E-02
20-Nov-12	<	2.36E-02
27-Nov-12	<	2.32E-02
4-Dec-12	<	2.37E-02
11-Dec-12	<	1.88E-02
18-Dec-12	<	1.73E-02
26-Dec-12	<	1.12E-02

FERMI 2
AIR IODINE - 131
(pCi/cubic meter)

API-3 FIRST QUARTER

Date	Activity	
3-Jan-12	<	2.74E-02
10-Jan-12	<	1.90E-02
17-Jan-12	<	2.14E-02
24-Jan-12	<	2.26E-02
31-Jan-12	<	2.40E-02
7-Feb-12	<	1.72E-02
14-Feb-12	<	2.57E-02
21-Feb-12	<	2.31E-02
28-Feb-12	<	1.48E-02
6-Mar-12	<	1.51E-02
13-Mar-12	<	1.96E-02
20-Mar-12	<	3.62E-02
27-Mar-12	<	4.14E-02

API-3 SECOND QUARTER

Date	Activity	
3-Apr-12	<	1.51E-02
10-Apr-12	<	1.37E-02
17-Apr-12	<	1.56E-02
25-Apr-12	<	1.38E-02
1-May-12	<	1.64E-02
8-May-12	<	1.52E-02
15-May-12	<	3.51E-02
22-May-12	<	1.96E-02
29-May-12	<	2.29E-02
5-Jun-12	<	4.34E-03
11-Jun-12	<	3.02E-02
19-Jun-12	<	1.76E-02
26-Jun-12	<	1.58E-02

FERMI 2
AIR IODINE - 131
(pCi/cubic meter)

API-3 THIRD QUARTER

Date		Activity
3-Jul-12	<	2.18E-02
10-Jul-12	<	3.19E-02
17-Jul-12	<	1.88E-02
23-Jul-12	<	1.71E-02
31-Jul-12	<	2.20E-02
6-Aug-12	<	4.40E-02
14-Aug-12	<	1.68E-02
22-Aug-12	<	1.99E-02
28-Aug-12	<	1.83E-02
4-Sep-12	<	9.68E-03
10-Sep-12	<	4.21E-02
18-Sep-12	<	2.05E-02
25-Sep-12	<	1.83E-02

API-3 FOURTH QUARTER

Date		Activity
2-Oct-12	<	2.50E-02
9-Oct-12	<	9.75E-03
16-Oct-12	<	1.45E-02
23-Oct-12	<	1.32E-02
30-Oct-12	<	2.90E-02
6-Nov-12	<	1.87E-02
13-Nov-12	<	1.79E-02
20-Nov-12	<	1.71E-02
27-Nov-12	<	2.03E-02
4-Dec-12	<	3.06E-02
11-Dec-12	<	1.71E-02
18-Dec-12	<	1.98E-02
26-Dec-12	<	1.42E-02

FERMI 2
AIR IODINE - 131
(pCi/cubic meter)

API-4 FIRST QUARTER

Date	Activity	
3-Jan-12	<	1.67E-02
10-Jan-12	<	1.53E-02
17-Jan-12	<	2.12E-02
24-Jan-12	<	1.76E-02
31-Jan-12	<	1.83E-02
7-Feb-12	<	2.63E-02
14-Feb-12	<	3.13E-02
21-Feb-12	<	1.36E-02
28-Feb-12	<	1.66E-02
6-Mar-12	<	1.39E-02
13-Mar-12	<	2.46E-02
20-Mar-12	<	3.15E-02
27-Mar-12	<	3.14E-02

API-4 SECOND QUARTER

Date	Activity	
3-Apr-12	<	2.60E-02
10-Apr-12	<	1.20E-02
17-Apr-12	<	2.15E-02
25-Apr-12	<	2.73E-02
1-May-12	<	2.32E-02
8-May-12	<	2.07E-02
15-May-12	<	2.56E-02
22-May-12	<	1.78E-02
29-May-12	<	2.04E-02
5-Jun-12	<	4.40E-03
11-Jun-12	<	2.51E-02
19-Jun-12	<	2.00E-02
26-Jun-12	<	1.33E-02

FERMI 2
AIR IODINE - 131
(pCi/cubic meter)

API-4 THIRD QUARTER

Date	Activity	
3-Jul-12	<	2.51E-02
10-Jul-12	<	3.04E-02
17-Jul-12	<	2.45E-02
23-Jul-12	<	3.06E-02
31-Jul-12	<	1.31E-02
6-Aug-12	<	3.49E-02
14-Aug-12	<	2.08E-02
22-Aug-12	<	2.22E-02
28-Aug-12	<	1.96E-02
4-Sep-12	<	1.59E-02
10-Sep-12	<	1.41E-02
18-Sep-12	<	1.34E-02
25-Sep-12	<	1.85E-02

API-4 FOURTH QUARTER

Date	Activity	
2-Oct-12	<	1.73E-02
9-Oct-12	<	1.45E-02
16-Oct-12	<	1.36E-02
23-Oct-12	<	2.56E-02
30-Oct-12	<	1.73E-02
6-Nov-12	<	2.06E-02
13-Nov-12	<	2.10E-02
20-Nov-12	<	2.08E-02
27-Nov-12	<	3.23E-02
4-Dec-12	<	2.37E-02
11-Dec-12	<	1.79E-02
18-Dec-12	<	1.86E-02
26-Dec-12	<	1.07E-02

FERMI 2
AIR IODINE – 131
(pCi/cubic meter)

API-5 FIRST QUARTER

Date	Activity	
3-Jan-12	<	2.16E-02
10-Jan-12	<	1.90E-02
17-Jan-12	<	3.11E-02
24-Jan-12	<	4.37E-02
31-Jan-12	<	1.64E-02
7-Feb-12	<	1.79E-02
14-Feb-12	<	1.84E-02
21-Feb-12	<	1.83E-02
28-Feb-12	<	3.56E-03
6-Mar-12	<	9.39E-03
13-Mar-12	<	2.17E-02
20-Mar-12	<	1.19E-02
27-Mar-12	<	3.39E-02

API-5 SECOND QUARTER

Date	Activity	
3-Apr-12	<	1.71E-02
10-Apr-12	<	1.51E-02
17-Apr-12	<	2.53E-02
25-Apr-12	<	4.08E-02
1-May-12	<	2.06E-02
8-May-12	<	2.53E-02
15-May-12	<	2.12E-02
22-May-12	<	1.88E-02
29-May-12	<	3.99E-02
5-Jun-12	<	3.61E-03
11-Jun-12	<	2.45E-02
19-Jun-12	<	1.64E-02
26-Jun-12	<	1.69E-02

FERMI 2
AIR IODINE – 131
(pCi/cubic meter)

API-5 THIRD QUARTER

Date	Activity	
3-Jul-12	<	4.17E-02
10-Jul-12	<	3.51E-02
17-Jul-12	<	2.18E-02
23-Jul-12	<	2.75E-02
31-Jul-12	<	1.42E-02
6-Aug-12	<	2.20E-02
14-Aug-12	<	1.97E-02
22-Aug-12	<	2.05E-02
28-Aug-12	<	2.47E-02
4-Sep-12	<	9.15E-03
10-Sep-12	<	1.84E-02
18-Sep-12	<	3.54E-02
25-Sep-12	<	2.33E-02

API-5 FOURTH QUARTER

Date	Activity	
2-Oct-12	<	2.13E-02
9-Oct-12	<	8.08E-03
16-Oct-12	<	8.51E-03
23-Oct-12	<	1.82E-02
30-Oct-12	<	1.99E-02
6-Nov-12	<	1.75E-02
13-Nov-12	<	1.64E-02
20-Nov-12	<	3.52E-02
27-Nov-12	<	2.45E-02
4-Dec-12	<	1.97E-02
11-Dec-12	<	4.09E-02
18-Dec-12	<	1.68E-02
26-Dec-12	<	1.32E-02

FERMI 2
AIR PARTICULATE QUARTERLY COMPOSITE ANALYSIS

API-1 (indicator)
(pCi/cubic meter)

Nuclide	First Quarter		Second Quarter	
Ba-140	<	3.12E-02	<	9.70E-03
Be-7		7.18E-02		4.70E-02
Ce-141	<	1.73E-03	<	2.03E-03
Ce-144	<	2.57E-03	<	2.08E-03
Co-58	<	8.48E-04	<	7.91E-04
Co-60	<	6.95E-04	<	5.84E-04
Cr-51	<	1.31E-02	<	1.85E-02
Cs-134	<	6.47E-04	<	4.96E-04
Cs-137	<	5.22E-04	<	4.68E-04
Fe-59	<	2.38E-03	<	2.88E-03
K-40		3.45E-03	<	1.14E-02
La-140	<	9.13E-03	<	9.70E-03
Mn-54	<	5.36E-04	<	5.70E-04
Nb-95	<	1.01E-03	<	9.60E-04
Ru-103	<	1.22E-03	<	1.31E-03
Ru-106	<	4.75E-03	<	3.94E-03
Zn-65	<	1.34E-03	<	1.31E-03
Zr-95	<	1.86E-03	<	1.46E-03

API-1 (indicator)
(pCi/cubic meter)

Nuclide	Third Quarter		Fourth Quarter	
Ba-140	<	3.12E-02	<	3.26E-02
Be-7		7.18E-02		4.11E-02
Ce-141	<	1.73E-03	<	1.89E-03
Ce-144	<	2.57E-03	<	2.88E-03
Co-58	<	8.48E-04	<	6.80E-04
Co-60	<	6.95E-04	<	6.13E-04
Cr-51	<	1.31E-02	<	1.40E-02
Cs-134	<	6.47E-04	<	5.54E-04
Cs-137	<	5.22E-04	<	5.48E-04
Fe-59	<	2.38E-03	<	2.74E-03
K-40		1.48E-02	<	5.12E-03
La-140	<	9.13E-03	<	1.55E-02
Mn-54	<	5.36E-04	<	6.50E-04
Nb-95	<	1.01E-03	<	1.10E-03
Ru-103	<	1.22E-03	<	1.14E-03
Ru-106	<	4.75E-03	<	4.85E-03
Zn-65	<	1.34E-03	<	1.30E-03
Zr-95	<	1.86E-03	<	1.82E-03

FERMI 2
AIR PARTICULATE QUARTERLY COMPOSITE ANALYSIS

API-2 (indicator)
(pCi/cubic meter)

Nuclide	First Quarter		Second Quarter	
Ba-140	<	1.23E-02	<	4.74E-02
Be-7		5.45E-02		7.29E-02
Ce-141	<	1.71E-03	<	3.66E-03
Ce-144	<	2.43E-03	<	3.66E-03
Co-58	<	9.43E-04	<	1.69E-03
Co-60	<	7.62E-04	<	7.58E-04
Cr-51	<	1.51E-02	<	2.98E-02
Cs-134	<	7.35E-04	<	8.28E-04
Cs-137	<	6.26E-04	<	3.90E-04
Fe-59	<	3.21E-03	<	3.05E-03
K-40		1.15E-02	<	1.69E-02
La-140	<	1.23E-02	<	4.74E-02
Mn-54	<	4.24E-04	<	7.73E-04
Nb-95	<	7.33E-04	<	1.49E-03
Ru-103	<	1.19E-03	<	2.34E-03
Ru-106	<	5.18E-03	<	5.20E-03
Zn-65	<	1.46E-03	<	1.68E-03
Zr-95	<	1.38E-03	<	2.72E-03

API-2 (indicator)
(pCi/cubic meter)

Nuclide	Third Quarter		Fourth Quarter	
Ba-140	<	2.90E-02	<	2.39E-02
Be-7		6.18E-02		4.91E-02
Ce-141	<	1.92E-03	<	1.60E-03
Ce-144	<	2.70E-03	<	2.37E-03
Co-58	<	8.58E-04	<	7.95E-04
Co-60	<	7.51E-04	<	7.15E-04
Cr-51	<	1.30E-02	<	1.18E-02
Cs-134	<	5.63E-04	<	6.67E-04
Cs-137	<	5.86E-04	<	5.55E-04
Fe-59	<	1.93E-03	<	2.39E-03
K-40		1.13E-02	<	6.26E-03
La-140	<	1.24E-02	<	1.08E-02
Mn-54	<	6.72E-04	<	4.76E-04
Nb-95	<	8.98E-04	<	9.70E-04
Ru-103	<	1.15E-03	<	1.02E-03
Ru-106	<	5.92E-03	<	4.28E-03
Zn-65	<	1.51E-03	<	1.42E-03
Zr-95	<	1.34E-03	<	1.68E-03

FERMI 2
AIR PARTICULATE QUARTERLY COMPOSITE ANALYSIS

API-3 (indicator)
(pCi/cubic meter)

Nuclide	First Quarter		Second Quarter	
Ba-140	<	3.01E-02	<	2.25E-02
Be-7		6.57E-02		8.36E-02
Ce-141	<	1.60E-03	<	3.25E-03
Ce-144	<	2.40E-03	<	3.46E-03
Co-58	<	8.32E-04	<	9.29E-04
Co-60	<	6.93E-04	<	9.65E-04
Cr-51	<	1.33E-02	<	2.65E-02
Cs-134	<	5.66E-04	<	8.49E-04
Cs-137	<	5.97E-04	<	6.26E-04
Fe-59	<	2.16E-03	<	1.97E-03
K-40		1.65E-02	<	6.67E-03
La-140	<	1.25E-02	<	2.25E-02
Mn-54	<	6.82E-04	<	8.22E-04
Nb-95	<	1.10E-03	<	1.59E-03
Ru-103	<	1.39E-03	<	2.24E-03
Ru-106	<	4.35E-03	<	6.32E-03
Zn-65	<	1.54E-03	<	1.90E-03
Zr-95	<	1.51E-03	<	1.97E-03

API-3 (indicator)
(pCi/cubic meter)

Nuclide	Third Quarter		Fourth Quarter	
Ba-140	<	3.01E-02	<	2.37E-02
Be-7		6.57E-02		5.87E-02
Ce-141	<	1.60E-03	<	1.60E-03
Ce-144	<	2.40E-03	<	2.71E-03
Co-58	<	8.32E-04	<	8.20E-04
Co-60	<	6.93E-04	<	6.26E-04
Cr-51	<	1.33E-02	<	1.41E-02
Cs-134	<	5.66E-04	<	5.18E-04
Cs-137	<	5.97E-04	<	5.81E-04
Fe-59	<	2.16E-03	<	2.07E-03
K-40		1.65E-02	<	7.01E-03
La-140	<	1.25E-02	<	1.10E-02
Mn-54	<	6.82E-04	<	4.95E-04
Nb-95	<	1.10E-03	<	7.95E-04
Ru-103	<	1.39E-03	<	1.03E-03
Ru-106	<	4.35E-03	<	4.60E-03
Zn-65	<	1.54E-03	<	1.54E-03
Zr-95	<	1.51E-03	<	1.54E-03

FERMI 2
AIR PARTICULATE QUARTERLY COMPOSITE ANALYSIS

API-4 (control)
(pCi/cubic meter)

Nuclide	First Quarter		Second Quarter	
Ba-140	<	1.55E-02	<	3.94E-02
Be-7		4.95E-02		8.81E-02
Ce-141	<	2.04E-03	<	4.18E-03
Ce-144	<	3.12E-03	<	4.61E-03
Co-58	<	8.89E-04	<	1.87E-03
Co-60	<	6.72E-04	<	9.59E-04
Cr-51	<	1.63E-02	<	3.62E-02
Cs-134	<	7.35E-04	<	1.23E-03
Cs-137	<	5.89E-04	<	1.04E-03
Fe-59	<	2.88E-03	<	5.50E-03
K-40	<	5.96E-03	<	1.79E-02
La-140	<	1.55E-02	<	3.94E-02
Mn-54	<	6.44E-04	<	9.18E-04
Nb-95	<	9.94E-04	<	2.03E-03
Ru-103	<	1.35E-03	<	2.64E-03
Ru-106	<	4.96E-03	<	9.22E-03
Zn-65	<	1.47E-03	<	1.59E-03
Zr-95	<	1.56E-03	<	3.03E-03

API-4 (control)
(pCi/cubic meter)

Nuclide	Third Quarter		Fourth Quarter	
Ba-140	<	3.15E-02	<	3.89E-02
Be-7		6.63E-02		3.85E-02
Ce-141	<	1.46E-03	<	1.83E-03
Ce-144	<	2.54E-03	<	3.15E-03
Co-58	<	9.77E-04	<	9.56E-04
Co-60	<	7.20E-04	<	7.84E-04
Cr-51	<	1.48E-02	<	1.80E-02
Cs-134	<	5.95E-04	<	8.43E-04
Cs-137	<	5.42E-04	<	6.87E-04
Fe-59	<	2.35E-03	<	1.93E-03
K-40	<	4.35E-03		1.69E-02
La-140	<	1.10E-02	<	9.34E-03
Mn-54	<	5.19E-04	<	7.70E-04
Nb-95	<	8.81E-04	<	1.06E-03
Ru-103	<	1.13E-03	<	1.42E-03
Ru-106	<	5.46E-03	<	6.64E-03
Zn-65	<	1.70E-03	<	1.74E-03
Zr-95	<	1.54E-03	<	1.96E-03

FERMI 2
AIR PARTICULATE QUARTERLY COMPOSITE ANALYSIS

API-5 (Indicator)
(pCi/cubic meter)

Nuclide	First Quarter		Second Quarter	
Ba-140	<	1.31E-02	<	5.87E-02
Be-7		5.95E-02		8.38E-02
Ce-141	<	1.85E-03	<	3.22E-03
Ce-144	<	2.92E-03	<	3.27E-03
Co-58	<	7.98E-04	<	2.08E-03
Co-60	<	6.41E-04	<	1.20E-03
Cr-51	<	1.53E-02	<	2.46E-02
Cs-134	<	6.83E-04	<	8.46E-04
Cs-137	<	5.83E-04	<	9.23E-04
Fe-59	<	2.83E-03	<	8.48E-03
K-40	<	1.17E-02	<	2.22E-02
La-140	<	1.31E-02	<	5.87E-02
Mn-54	<	5.64E-04	<	1.12E-03
Nb-95	<	9.24E-04	<	1.89E-03
Ru-103	<	1.18E-03	<	3.42E-03
Ru-106	<	5.15E-03	<	7.58E-03
Zn-65	<	1.46E-03	<	1.89E-03
Zr-95	<	1.75E-03	<	2.90E-03

API-5 (Indicator)
(pCi/cubic meter)

Nuclide	Third Quarter		Fourth Quarter	
Ba-140	<	3.57E-02	<	5.85E-02
Be-7		8.47E-02		7.65E-02
Ce-141	<	1.87E-03	<	2.76E-03
Ce-144	<	3.17E-03	<	4.23E-03
Co-58	<	8.44E-04	<	1.80E-03
Co-60	<	8.18E-04	<	1.03E-03
Cr-51	<	1.89E-02	<	2.47E-02
Cs-134	<	8.48E-04	<	1.37E-03
Cs-137	<	7.47E-04	<	1.20E-03
Fe-59	<	2.15E-03	<	4.06E-03
K-40	<	5.48E-03		1.16E-02
La-140	<	1.62E-02	<	1.87E-02
Mn-54	<	7.81E-04	<	1.11E-03
Nb-95	<	9.24E-04	<	1.64E-03
Ru-103	<	1.36E-03	<	2.27E-03
Ru-106	<	6.31E-03	<	9.61E-03
Zn-65	<	1.52E-03	<	2.63E-03
Zr-95	<	1.78E-03	<	3.17E-03

FERMI 2
MILK ANALYSIS

M-2 (Indicator)
(pCi/liter)

Nuclide	19-JAN	16-FEB	8-MAR
Ba-140	< 3.17E+00	< 3.35E+00	< 2.82E+00
Be-7	< 2.23E+01	< 2.14E+01	< 1.76E+01
Ce-141	< 4.03E+00	< 4.17E+00	< 3.62E+00
Ce-144	< 1.63E+01	< 1.64E+01	< 1.40E+01
Co-58	< 2.73E+00	< 2.49E+00	< 2.24E+00
Co-60	< 3.05E+00	< 2.92E+00	< 2.60E+00
Cs-134	< 3.26E+00	< 3.28E+00	< 2.77E+00
Cs-137	< 2.71E+00	< 2.81E+00	< 2.23E+00
Fe-59	< 5.74E+00	< 6.13E+00	< 5.03E+00
I-131	< 7.38E-01	< 6.33E-01	< 5.52E-01
K-40	1.45E+03	1.45E+03	1.51E+03
La-140	< 3.17E+00	< 3.35E+00	< 2.82E+00
Mn-54	< 2.74E+00	< 2.62E+00	< 2.08E+00
Nb-95	< 2.80E+00	< 2.83E+00	< 2.30E+00
Ru-103	< 2.56E+00	< 2.51E+00	< 2.10E+00
Ru-106	< 2.32E+01	< 2.20E+01	< 1.92E+01
Sr-89	< 3.06E+00	< 1.42E+00	< 1.69E+00
Sr-90	< 1.78E+00	< 1.70E+00	< 1.73E+00
Zn-65	< 6.08E+00	< 5.89E+00	< 5.33E+00
Zr-95	< 4.62E+00	< 4.14E+00	< 4.11E+00

Nuclide	12-APR	10-MAY	24-MAY
Ba-140	< 2.42E+00	< 1.88E+00	< 2.00E+00
Be-7	< 1.51E+01	< 1.59E+01	< 1.64E+01
Ce-141	< 3.15E+00	< 2.99E+00	< 3.17E+00
Ce-144	< 1.30E+01	< 1.29E+01	< 1.31E+01
Co-58	< 1.91E+00	< 1.95E+00	< 1.98E+00
Co-60	< 2.31E+00	< 2.45E+00	< 2.30E+00
Cs-134	< 2.71E+00	< 2.60E+00	< 2.51E+00
Cs-137	< 2.26E+00	< 2.08E+00	< 2.13E+00
Fe-59	< 4.64E+00	< 4.44E+00	< 4.15E+00
I-131	< 4.28E-01	< 7.58E-01	< 7.05E-01
K-40	1.41E+03	1.51E+03	1.53E+03
La-140	< 2.42E+00	< 1.88E+00	< 2.00E+00
Mn-54	< 2.00E+00	< 1.81E+00	< 2.00E+00
Nb-95	< 2.03E+00	< 2.10E+00	< 2.05E+00
Ru-103	< 1.91E+00	< 1.88E+00	< 1.98E+00
Ru-106	< 1.82E+01	< 1.70E+01	< 1.74E+01
Sr-89	< 1.52E+00	< 1.48E+00	< 1.55E+00
Sr-90	< 1.80E+00	< 1.31E+00	< 1.73E+00
Zn-65	< 5.29E+00	< 4.75E+00	< 4.89E+00
Zr-95	< 3.37E+00	< 3.53E+00	< 3.58E+00

FERMI 2
MILK ANALYSIS

M-2 (Indicator)
(pCi/liter)

Nuclide	7-JUN		21-JUN		12-JUL	
Ba-140	<	2.22E+00	<	2.37E+00	<	1.86E+00
Be-7	<	1.52E+01	<	1.51E+01	<	1.49E+01
Ce-141	<	2.98E+00	<	3.03E+00	<	3.20E+00
Ce-144	<	1.18E+01	<	1.18E+01	<	1.25E+01
Co-58	<	1.88E+00	<	1.97E+00	<	1.79E+00
Co-60	<	1.90E+00	<	2.26E+00	<	2.10E+00
Cs-134	<	2.20E+00	<	2.31E+00	<	2.09E+00
Cs-137	<	1.94E+00	<	2.03E+00	<	1.85E+00
Fe-59	<	4.22E+00	<	4.51E+00	<	4.08E+00
I-131	<	9.34E-01	<	5.95E-01	<	6.51E-01
K-40		1.51E+03		1.54E+03		1.48E+03
La-140	<	2.22E+00	<	2.37E+00	<	1.86E+00
Mn-54	<	1.84E+00	<	2.00E+00	<	1.75E+00
Nb-95	<	1.79E+00	<	1.99E+00	<	1.77E+00
Ru-103	<	1.67E+00	<	1.84E+00	<	1.71E+00
Ru-106	<	1.63E+01	<	1.66E+01	<	1.54E+01
Sr-89	<	2.30E+00	<	1.84E+00	<	2.20E+00
Sr-90	<	1.32E+00	<	1.83E+00	<	8.98E-01
Zn-65	<	4.54E+00	<	4.81E+00	<	4.30E+00
Zr-95	<	3.26E+00	<	3.29E+00	<	3.05E+00

Nuclide	26-JUL		9-AUG		23-AUG	
Ba-140	<	2.46E+00	<	2.98E+00	<	3.41E+00
Be-7	<	1.63E+01	<	1.66E+01	<	2.05E+01
Ce-141	<	3.42E+00	<	3.70E+00	<	4.23E+00
Ce-144	<	1.34E+01	<	1.29E+01	<	1.56E+01
Co-58	<	1.89E+00	<	1.80E+00	<	2.25E+00
Co-60	<	2.02E+00	<	2.09E+00	<	2.60E+00
Cs-134	<	2.60E+00	<	2.16E+00	<	2.90E+00
Cs-137	<	2.16E+00	<	1.79E+00	<	2.59E+00
Fe-59	<	4.30E+00	<	4.32E+00	<	5.87E+00
I-131	<	7.07E-01	<	6.28E-01	<	5.76E-01
K-40		1.59E+03		1.53E+03		1.45E+03
La-140	<	2.46E+00	<	2.98E+00	<	3.41E+00
Mn-54	<	2.06E+00	<	1.61E+00	<	2.47E+00
Nb-95	<	2.08E+00	<	1.98E+00	<	2.38E+00
Ru-103	<	2.01E+00	<	2.04E+00	<	2.49E+00
Ru-106	<	1.86E+01	<	1.61E+01	<	2.09E+01
Sr-89	<	1.50E+00	<	2.28E+00	<	1.61E+00
Sr-90	<	1.33E+00	<	1.46E+00	<	1.62E+00
Zn-65	<	4.77E+00	<	4.74E+00	<	5.87E+00
Zr-95	<	3.37E+00	<	3.40E+00	<	4.19E+00

FERMI 2
MILK ANALYSIS

M-2 (Indicator)
(pCi/liter)

Nuclide	6-SEP		20-SEP		11-OCT	
Ba-140	<	2.78E+00	<	3.42E+00	<	2.03E+00
Be-7	<	1.83E+01	<	2.26E+01	<	1.40E+01
Ce-141	<	3.39E+00	<	3.99E+00	<	2.82E+00
Ce-144	<	1.41E+01	<	1.51E+01	<	1.17E+01
Co-58	<	2.39E+00	<	2.57E+00	<	1.71E+00
Co-60	<	2.20E+00	<	3.02E+00	<	1.86E+00
Cs-134	<	2.62E+00	<	3.79E+00	<	2.17E+00
Cs-137	<	2.15E+00	<	3.10E+00	<	1.81E+00
Fe-59	<	5.04E+00	<	6.92E+00	<	3.91E+00
I-131	<	5.28E-01	<	5.87E-01	<	6.20E-01
K-40		1.41E+03		1.36E+03		1.52E+03
La-140	<	2.78E+00	<	3.42E+00	<	2.03E+00
Mn-54	<	2.23E+00	<	3.10E+00	<	1.77E+00
Nb-95	<	2.51E+00	<	2.77E+00	<	1.82E+00
Ru-103	<	2.00E+00	<	2.53E+00	<	1.64E+00
Ru-106	<	1.85E+01	<	2.33E+01	<	1.56E+01
Sr-89	<	1.66E+00	<	3.87E+00	<	3.49E+00
Sr-90	<	1.89E+00	<	1.77E+00	<	1.81E+00
Zn-65	<	5.44E+00	<	6.59E+00	<	4.49E+00
Zr-95	<	4.21E+00	<	4.59E+00	<	3.08E+00

Nuclide	15-NOV		13-DEC	
Ba-140	<	2.58E+00	<	2.53E+00
Be-7	<	1.84E+01	<	1.83E+01
Ce-141	<	3.96E+00	<	3.42E+00
Ce-144	<	1.55E+01	<	1.45E+01
Co-58	<	2.10E+00	<	2.29E+00
Co-60	<	2.69E+00	<	2.75E+00
Cs-134	<	2.42E+00	<	2.43E+00
Cs-137	<	2.44E+00	<	2.38E+00
Fe-59	<	5.05E+00	<	4.98E+00
I-131	<	4.43E-01	<	8.43E-01
K-40		1.61E+03		1.52E+03
La-140	<	2.58E+00	<	2.53E+00
Mn-54	<	2.22E+00	<	2.37E+00
Nb-95	<	2.21E+00	<	2.37E+00
Ru-103	<	2.14E+00	<	2.24E+00
Ru-106	<	2.04E+01	<	2.02E+01
Sr-89	<	1.33E+00	<	4.33E+00
Sr-90	<	1.74E+00	<	1.64E+00
Zn-65	<	5.75E+00	<	5.22E+00
Zr-95	<	4.21E+00	<	4.05E+00

FERMI 2
MILK ANALYSIS

M-8 (Control)
(pCi/liter)

Nuclide	19-JAN		16-FEB		8-MAR	
Ba-140	<	3.02E+00	<	2.93E+00	<	3.05E+00
Be-7	<	2.11E+01	<	1.83E+01	<	2.05E+01
Ce-141	<	4.36E+00	<	3.45E+00	<	4.31E+00
Ce-144	<	1.72E+01	<	1.41E+01	<	1.59E+01
Co-58	<	2.30E+00	<	2.24E+00	<	2.45E+00
Co-60	<	3.15E+00	<	2.77E+00	<	2.56E+00
Cs-134	<	3.34E+00	<	2.84E+00	<	2.99E+00
Cs-137	<	2.79E+00	<	2.77E+00	<	2.40E+00
Fe-59	<	5.91E+00	<	5.61E+00	<	5.76E+00
I-131	<	7.02E-01	<	5.34E-01	<	6.42E-01
K-40		1.47E+03		1.53E+03		1.45E+03
La-140	<	3.02E+00	<	2.93E+00	<	3.05E+00
Mn-54	<	2.72E+00	<	2.37E+00	<	2.32E+00
Nb-95	<	2.81E+00	<	2.22E+00	<	2.38E+00
Ru-103	<	2.48E+00	<	2.01E+00	<	2.44E+00
Ru-106	<	2.21E+01	<	2.07E+01	<	2.24E+01
Sr-89	<	2.98E+00	<	2.56E+00	<	1.60E+00
Sr-90	<	1.79E+00	<	1.66E+00	<	1.69E+00
Zn-65	<	6.64E+00	<	5.75E+00	<	6.11E+00
Zr-95	<	4.67E+00	<	4.09E+00	<	4.00E+00

Nuclide	12-APR		10-MAY		24-MAY	
Ba-140	<	2.66E+00	<	3.53E+00	<	2.11E+00
Be-7	<	2.00E+01	<	2.31E+01	<	1.75E+01
Ce-141	<	2.96E+00	<	3.83E+00	<	3.76E+00
Ce-144	<	1.25E+01	<	1.49E+01	<	1.59E+01
Co-58	<	2.44E+00	<	2.84E+00	<	1.91E+00
Co-60	<	2.88E+00	<	3.55E+00	<	2.25E+00
Cs-134	<	2.99E+00	<	3.39E+00	<	2.56E+00
Cs-137	<	2.88E+00	<	2.84E+00	<	2.26E+00
Fe-59	<	5.94E+00	<	6.60E+00	<	4.26E+00
I-131	<	4.64E-01	<	6.10E-01	<	5.64E-01
K-40		1.41E+03		1.44E+03		1.54E+03
La-140	<	2.66E+00	<	3.53E+00	<	2.11E+00
Mn-54	<	2.53E+00	<	2.96E+00	<	1.95E+00
Nb-95	<	2.57E+00	<	2.81E+00	<	2.05E+00
Ru-103	<	2.10E+00	<	2.77E+00	<	2.00E+00
Ru-106	<	2.00E+01	<	2.41E+01	<	1.95E+01
Sr-89	<	1.86E+00	<	1.22E+00	<	1.49E+00
Sr-90	<	1.84E+00	<	1.61E+00	<	1.75E+00
Zn-65	<	5.93E+00	<	7.23E+00	<	5.32E+00
Zr-95	<	4.36E+00	<	5.22E+00	<	3.55E+00

FERMI 2
MILK ANALYSIS

M-8 (Control)
(pCi/liter)

Nuclide	7-JUN	21-JUN	12-JUL
Ba-140	< 2.52E+00	< 2.73E+00	< 2.71E+00
Be-7	< 1.71E+01	< 1.72E+01	< 1.87E+01
Ce-141	< 3.56E+00	< 3.30E+00	< 3.93E+00
Ce-144	< 1.41E+01	< 1.32E+01	< 1.55E+01
Co-58	< 2.10E+00	< 2.09E+00	< 2.20E+00
Co-60	< 2.23E+00	< 2.13E+00	< 2.55E+00
Cs-134	< 2.50E+00	< 2.46E+00	< 2.74E+00
Cs-137	< 2.17E+00	< 2.13E+00	< 2.37E+00
Fe-59	< 4.53E+00	< 4.55E+00	< 5.15E+00
I-131	< 6.89E-01	< 7.52E-01	< 8.44E-01
K-40	1.45E+03	1.47E+03	1.40E+03
La-140	< 2.52E+00	< 2.73E+00	< 2.71E+00
Mn-54	< 2.05E+00	< 2.12E+00	< 2.32E+00
Nb-95	< 2.14E+00	< 2.09E+00	< 2.27E+00
Ru-103	< 1.98E+00	< 1.97E+00	< 2.29E+00
Ru-106	< 1.79E+01	< 1.90E+01	< 1.90E+01
Sr-89	< 1.75E+00	< 1.89E+00	< 2.39E+00
Sr-90	< 1.10E+00	< 1.93E+00	< 6.62E-01
Zn-65	< 4.97E+00	< 4.78E+00	< 5.60E+00
Zr-95	< 3.63E+00	< 3.56E+00	< 3.77E+00

Nuclide	26-JUL	9-AUG	23-AUG
Ba-140	< 3.10E+00	< 3.08E+00	< 3.59E+00
Be-7	< 1.90E+01	< 1.60E+01	< 1.71E+01
Ce-141	< 3.96E+00	< 3.45E+00	< 3.52E+00
Ce-144	< 1.58E+01	< 1.21E+01	< 1.29E+01
Co-58	< 2.36E+00	< 1.92E+00	< 2.10E+00
Co-60	< 2.68E+00	< 2.10E+00	< 2.41E+00
Cs-134	< 2.81E+00	< 2.12E+00	< 2.65E+00
Cs-137	< 2.38E+00	< 1.93E+00	< 2.10E+00
Fe-59	< 5.65E+00	< 4.40E+00	< 5.26E+00
I-131	< 6.10E-01	< 7.05E-01	< 6.16E-01
K-40	1.42E+03	1.42E+03	1.45E+03
La-140	< 3.10E+00	< 3.08E+00	< 3.59E+00
Mn-54	< 2.33E+00	< 1.79E+00	< 1.88E+00
Nb-95	< 2.27E+00	< 2.02E+00	< 2.08E+00
Ru-103	< 2.25E+00	< 1.92E+00	< 1.98E+00
Ru-106	< 1.99E+01	< 1.59E+01	< 1.88E+01
Sr-89	< 1.92E+00	< 2.94E+00	< 1.62E+00
Sr-90	< 1.82E+00	< 1.54E+00	< 1.57E+00
Zn-65	< 5.78E+00	< 4.29E+00	< 4.89E+00
Zr-95	< 3.97E+00	< 3.08E+00	< 3.96E+00

FERMI 2
MILK ANALYSIS

M-8 (Control)
(pCi/liter)

Nuclide	6-SEP		20-SEP		11-OCT	
Ba-140	<	3.23E+00	<	2.40E+00	<	2.44E+00
Be-7	<	1.86E+01	<	1.65E+01	<	1.83E+01
Ce-141	<	3.55E+00	<	3.45E+00	<	3.21E+00
Ce-144	<	1.41E+01	<	1.28E+01	<	1.29E+01
Co-58	<	2.43E+00	<	2.19E+00	<	2.24E+00
Co-60	<	2.50E+00	<	2.27E+00	<	3.02E+00
Cs-134	<	2.89E+00	<	2.44E+00	<	3.01E+00
Cs-137	<	2.48E+00	<	2.27E+00	<	2.58E+00
Fe-59	<	5.69E+00	<	5.12E+00	<	5.55E+00
I-131	<	5.86E-01	<	4.48E-01	<	6.86E-01
K-40		1.38E+03		1.42E+03		1.42E+03
La-140	<	3.23E+00	<	2.40E+00	<	2.44E+00
Mn-54	<	2.36E+00	<	2.00E+00	<	2.21E+00
Nb-95	<	2.54E+00	<	2.12E+00	<	2.44E+00
Ru-103	<	2.11E+00	<	1.92E+00	<	2.13E+00
Ru-106	<	1.95E+01	<	1.86E+01	<	1.85E+01
Sr-89	<	1.47E+00	<	2.56E+00	<	2.60E+00
Sr-90	<	1.71E+00	<	1.84E+00	<	1.80E+00
Zn-65	<	5.64E+00	<	5.25E+00	<	6.15E+00
Zr-95	<	4.19E+00	<	3.71E+00	<	4.10E+00

Nuclide	15-NOV		13-DEC	
Ba-140	<	2.91E+00	<	2.72E+00
Be-7	<	1.69E+01	<	1.71E+01
Ce-141	<	2.97E+00	<	3.52E+00
Ce-144	<	1.13E+01	<	1.34E+01
Co-58	<	2.47E+00	<	2.18E+00
Co-60	<	3.11E+00	<	2.52E+00
Cs-134	<	2.80E+00	<	2.42E+00
Cs-137	<	2.64E+00	<	2.15E+00
Fe-59	<	5.99E+00	<	5.51E+00
I-131	<	3.85E-01	<	9.48E-01
K-40		1.42E+03		1.53E+03
La-140	<	2.91E+00	<	2.72E+00
Mn-54	<	2.39E+00	<	1.94E+00
Nb-95	<	2.39E+00	<	2.13E+00
Ru-103	<	2.02E+00	<	2.04E+00
Ru-106	<	1.94E+01	<	1.81E+01
Sr-89	<	1.61E+00	<	3.43E+00
Sr-90	<	1.44E+00	<	1.71E+00
Zn-65	<	6.32E+00	<	5.29E+00
Zr-95	<	4.34E+00	<	3.78E+00

FERMI 2
VEGETABLE ANALYSIS

FP-1 (Indicator)
(pCi/kg wet)

Nuclide	26-JUL Broccoli	26-JUL Cabbage	26-JUL Collards
Ba-140	< 1.42E+01	< 1.13E+01	< 1.45E+01
Be-7	1.52E+02	6.72E+01	2.03E+02
Ce-141	1.32E+01	< 1.17E+01	< 9.73E+00
Ce-144	< 4.83E+01	< 4.14E+01	< 3.37E+01
Co-58	< 8.63E+00	< 8.11E+00	< 9.46E+00
Co-60	< 1.02E+01	< 9.98E+00	< 1.15E+01
Cs-134	< 1.08E+01	< 9.77E+00	< 1.11E+01
Cs-137	< 9.02E+00	< 8.53E+00	< 9.78E+00
Fe-59	< 1.98E+01	< 1.82E+01	< 2.17E+01
I-131	< 1.44E+01	< 1.26E+01	< 1.34E+01
K-40	3.79E+03	4.00E+03	4.51E+03
La-140	< 1.42E+01	< 1.13E+01	< 1.45E+01
Mn-54	< 9.11E+00	< 8.07E+00	< 9.70E+00
Nb-95	< 9.35E+00	< 8.24E+00	< 9.61E+00
Ru-103	< 8.46E+00	< 7.62E+00	< 8.31E+00
Ru-106	< 7.44E+01	< 7.20E+01	< 7.54E+01
Zn-65	< 1.98E+01	< 2.03E+01	< 2.22E+01
Zr-95	< 1.41E+01	< 1.29E+01	< 1.70E+01

Nuclide	30-AUG Broccoli	30-AUG Cabbage	30-JUL Collards
Ba-140	< 1.28E+01	< 7.96E+00	< 9.65E+00
Be-7	1.51E+02	1.51E+02	2.59E+02
Ce-141	< 1.16E+01	< 9.88E+00	< 9.22E+00
Ce-144	< 4.19E+01	< 3.61E+01	< 3.72E+01
Co-58	< 7.43E+00	< 6.30E+00	< 6.54E+00
Co-60	< 9.32E+00	< 7.24E+00	< 8.13E+00
Cs-134	< 9.61E+00	< 7.30E+00	< 8.29E+00
Cs-137	< 7.97E+00	< 5.94E+00	< 7.02E+00
Fe-59	< 1.84E+01	< 1.29E+01	< 1.43E+01
I-131	< 1.35E+01	< 9.71E+00	< 1.02E+01
K-40	5.14E+03	2.69E+03	2.30E+03
La-140	< 1.28E+01	< 7.96E+00	< 9.65E+00
Mn-54	< 7.54E+00	< 5.79E+00	< 6.55E+00
Nb-95	< 8.47E+00	< 6.34E+00	< 6.47E+00
Ru-103	< 7.55E+00	< 5.88E+00	< 5.83E+00
Ru-106	< 7.06E+01	< 5.27E+01	< 6.07E+01
Zn-65	< 1.92E+01	< 1.40E+01	< 1.58E+01
Zr-95	< 1.33E+01	< 1.06E+01	< 1.16E+01

FP-1 (Indicator)
(pCi/kg wet)

FERMI 2
VEGETABLE ANALYSIS

FP-9 (Control)
(pCi/kg wet)

Nuclide	26-JUL Broccoli	26-JUL Cabbage	26-JUL Collards
Ba-140	< 1.17E+01	< 1.05E+01	< 9.26E+00
Be-7	2.13E+02	< 7.26E+01	1.63E+02
Ce-141	< 1.23E+01	< 1.07E+01	< 1.04E+01
Ce-144	< 4.55E+01	< 3.89E+01	< 3.65E+01
Co-58	< 9.43E+00	< 8.19E+00	< 7.16E+00
Co-60	< 9.58E+00	< 7.73E+00	< 8.89E+00
Cs-134	< 1.12E+01	< 9.14E+00	< 8.36E+00
Cs-137	< 7.88E+00	< 8.06E+00	< 9.32E+00
Fe-59	< 1.89E+01	< 1.85E+01	< 1.71E+01
I-131	< 1.42E+01	< 1.26E+01	< 1.19E+01
K-40	4.78E+03	3.56E+03	4.58E+03
La-140	< 1.17E+01	< 1.05E+01	< 9.26E+00
Mn-54	< 8.97E+00	< 7.95E+00	< 7.10E+00
Nb-95	< 8.93E+00	< 8.27E+00	< 7.09E+00
Ru-103	< 8.45E+00	< 7.55E+00	< 6.40E+00
Ru-106	< 7.81E+01	< 6.74E+01	< 6.05E+01
Zn-65	< 1.89E+01	< 2.11E+01	< 1.90E+01
Zr-95	< 1.66E+01	< 1.46E+01	< 1.19E+01

FP-9 (Control)
(pCi/kg wet)

Nuclide	30-JUL Broccoli	30-JUL Cabbage	30-JUL Collards
Ba-140	< 1.60E+01	< 1.44E+01	< 9.78E+00
Be-7	2.58E+02	4.38E+02	3.06E+02
Ce-141	< 1.38E+01	< 1.32E+01	< 9.71E+00
Ce-144	< 5.23E+01	< 4.76E+01	< 3.48E+01
Co-58	< 1.03E+01	< 8.08E+00	< 6.74E+00
Co-60	< 1.01E+01	< 9.98E+00	< 8.43E+00
Cs-134	< 1.23E+01	< 1.02E+01	< 8.02E+00
Cs-137	< 1.05E+01	< 9.39E+00	< 7.01E+00
Fe-59	< 2.04E+01	< 2.03E+01	< 1.66E+01
I-131	< 1.76E+01	< 1.58E+01	< 1.07E+01
K-40	3.32E+03	4.77E+03	4.76E+03
La-140	< 1.60E+01	< 1.44E+01	< 9.78E+00
Mn-54	< 9.98E+00	< 8.87E+00	< 6.24E+00
Nb-95	< 1.08E+01	< 9.10E+00	< 6.72E+00
Ru-103	< 9.12E+00	< 8.42E+00	< 6.82E+00
Ru-106	< 8.95E+01	< 7.19E+01	< 5.50E+01
Zn-65	< 2.51E+01	< 2.25E+01	< 1.85E+01
Zr-95	< 1.84E+01	< 1.40E+01	< 1.29E+01

FERMI 2
DRINKING WATER ANALYSIS

DW-1 (Indicator)
(pCi/liter)

Nuclide	31-JAN	28-FEB	27-MAR
Ba-140	< 2.41E+00	< 2.76E+00	< 3.66E+00
Be-7	< 1.79E+01	< 1.64E+01	< 1.73E+01
Ce-141	< 3.85E+00	< 3.18E+00	< 3.72E+00
Ce-144	< 1.49E+01	< 1.30E+01	< 1.36E+01
Co-58	< 1.81E+00	< 1.78E+00	< 1.89E+00
Co-60	< 2.24E+00	< 1.91E+00	< 2.24E+00
Cr-51	< 1.78E+01	< 1.64E+01	< 1.93E+01
Cs-134	< 2.39E+00	< 2.41E+00	< 2.54E+00
Cs-137	< 1.92E+00	< 2.14E+00	< 1.98E+00
Fe-59	< 3.29E+00	< 3.80E+00	< 4.23E+00
GR-B	< 3.09E+00	< 3.08E+00	< 3.31E+00
K-40	< 2.89E+01	< 1.86E+01	< 2.64E+01
La-140	< 2.41E+00	< 2.76E+00	< 3.66E+00
Mn-54	< 1.82E+00	< 1.95E+00	< 1.96E+00
Nb-95	< 2.05E+00	< 1.97E+00	< 2.19E+00
Ru-103	< 2.14E+00	< 1.83E+00	< 2.18E+00
Ru-106	< 1.85E+01	< 1.60E+01	< 1.74E+01
Sr-89	< 2.05E+00	< 1.21E+00	< 1.42E+00
Sr-90	< 1.57E+00	< 1.69E+00	< 1.55E+00
Zn-65	< 3.89E+00	< 3.45E+00	< 4.05E+00
Zr-95	< 3.42E+00	< 3.53E+00	< 3.68E+00

Nuclide	25-APR	29-MAY	26-JUN
Ba-140	< 5.43E+00	< 1.89E+00	< 3.05E+00
Be-7	< 2.99E+01	< 1.21E+01	< 1.39E+01
Ce-141	< 6.29E+00	< 2.56E+00	< 2.54E+00
Ce-144	< 2.40E+01	< 1.04E+01	< 9.12E+00
Co-58	< 3.55E+00	< 1.42E+00	< 1.75E+00
Co-60	< 4.02E+00	< 1.64E+00	< 1.96E+00
Cr-51	< 3.37E+01	< 1.30E+01	< 1.49E+01
Cs-134	< 5.08E+00	< 1.79E+00	< 2.12E+00
Cs-137	< 4.24E+00	< 1.60E+00	< 1.86E+00
Fe-59	< 8.06E+00	< 2.84E+00	< 4.22E+00
GR-B	< 3.63E+00	< 3.14E+00	< 3.21E+00
K-40	< 5.44E+01	2.46E+01	2.62E+01
La-140	< 5.43E+00	< 1.89E+00	< 3.05E+00
Mn-54	< 3.41E+00	< 1.71E+00	< 1.71E+00
Nb-95	< 4.45E+00	< 1.55E+00	< 2.09E+00
Ru-103	< 3.79E+00	< 1.48E+00	< 1.78E+00
Ru-106	< 3.27E+01	< 1.39E+01	< 1.61E+01
Sr-89	< 1.82E+00	< 9.62E-01	< 1.78E+00
Sr-90	< 1.79E+00	< 1.01E+00	< 1.15E+00
Zn-65	< 6.62E+00	< 3.32E+00	< 3.73E+00
Zr-95	< 6.62E+00	< 2.61E+00	< 3.49E+00

FERMI 2
DRINKING WATER ANALYSIS

DW-1 (Indicator)
(pCi/liter)

Nuclide	31-JUL	28-AUG	25-SEP
Ba-140	<2.98E+00	<3.10E+00	<3.67E+00
Be-7	<1.57E+01	<1.45E+01	<2.66E+01
Ce-141	<3.39E+00	<2.97E+00	<4.99E+00
Ce-144	<1.42E+01	<1.15E+01	<2.16E+01
Co-58	<1.66E+00	<1.80E+00	<2.47E+00
Co-60	<1.98E+00	<2.13E+00	<3.63E+00
Cr-51	<1.63E+01	<1.62E+01	<2.75E+01
Cs-134	<2.07E+00	<2.13E+00	<3.54E+00
Cs-137	<2.00E+00	<1.87E+00	<3.04E+00
Fe-59	<3.33E+00	<3.82E+00	<5.47E+00
GR-B	6.12E+00	<2.22E+00	3.47E+00
K-40	<2.40E+01	<2.48E+01	<4.71E+01
La-140	<2.98E+00	<3.10E+00	<3.67E+00
Mn-54	<1.85E+00	<1.69E+00	<2.92E+00
Nb-95	<1.85E+00	<1.79E+00	<3.20E+00
Ru-103	<1.88E+00	<1.78E+00	<3.03E+00
Ru-106	<1.77E+01	<1.41E+01	<2.71E+01
Sr-89	<1.33E+00	<2.41E+00	<1.88E+00
Sr-90	<1.54E+00	<1.74E+00	<1.69E+00
Zn-65	<3.66E+00	<3.77E+00	<7.63E+00
Zr-95	<3.18E+00	<2.99E+00	<5.78E+00

Nuclide	30-OCT	27-NOV	26-DEC
Ba-140	<2.54E+00	<4.69E+00	<1.94E+00
Be-7	<1.35E+01	<2.12E+01	<1.05E+01
Ce-141	<2.81E+00	<3.65E+00	<2.27E+00
Ce-144	<1.11E+01	<1.41E+01	<8.79E+00
Co-58	<1.47E+00	<2.12E+00	<1.26E+00
Co-60	<1.68E+00	<2.94E+00	<1.30E+00
Cr-51	<1.41E+01	<2.17E+01	<1.21E+01
Cs-134	<1.81E+00	<2.79E+00	<1.45E+00
Cs-137	<2.20E+00	<2.38E+00	<1.34E+00
Fe-59	<3.00E+00	<5.11E+00	<2.42E+00
GR-B	<2.41E+00	<3.20E+00	<2.12E+00
K-40	<2.10E+01	<3.46E+01	<1.92E+01
La-140	<2.54E+00	<4.69E+00	<1.94E+00
Mn-54	<1.54E+00	<2.41E+00	<1.25E+00
Nb-95	<1.65E+00	<2.50E+00	<1.22E+00
Ru-103	<1.53E+00	<2.55E+00	<1.31E+00
Ru-106	<1.42E+01	<2.22E+01	<1.11E+01
Sr-89	<2.11E+00	<1.43E+00	<1.67E+00
Sr-90	<1.76E+00	<1.39E+00	<1.52E+00
Zn-65	<3.48E+00	<5.67E+00	<2.36E+00
Zr-95	<2.74E+00	<4.27E+00	<2.19E+00

FERMI 2
DRINKING WATER ANALYSIS

DW-2 (Control)
(pCi/liter)

Nuclide	25-JAN	22-FEB	27-MAR
Ba-140	< 1.95E+00	< 2.35E+00	< 2.66E+00
Be-7	< 1.46E+01	< 1.51E+01	< 1.39E+01
Ce-141	< 2.90E+00	< 3.29E+00	< 2.85E+00
Ce-144	< 1.16E+01	< 1.28E+01	< 1.14E+01
Co-58	< 1.58E+00	< 1.86E+00	< 1.54E+00
Co-60	< 1.82E+00	< 2.05E+00	< 1.78E+00
Cr-51	< 1.51E+01	< 1.76E+01	< 1.57E+01
Cs-134	< 1.96E+00	< 2.23E+00	< 2.05E+00
Cs-137	< 1.81E+00	< 1.95E+00	< 1.73E+00
Fe-59	< 2.90E+00	< 3.95E+00	< 3.53E+00
GR-B	< 3.84E+00	< 3.66E+00	< 3.55E+00
K-40	3.66E+01	< 2.96E+01	< 2.33E+01
La-140	< 1.95E+00	< 2.35E+00	< 2.66E+00
Mn-54	< 1.56E+00	< 1.81E+00	< 1.67E+00
Nb-95	< 1.66E+00	< 1.95E+00	< 1.89E+00
Ru-103	< 1.70E+00	< 1.71E+00	< 1.74E+00
Ru-106	< 1.59E+01	< 1.65E+01	< 1.40E+01
Sr-89	< 2.03E+00	< 2.34E+00	< 1.10E+00
Sr-90	< 1.67E+00	< 1.69E+00	< 1.50E+00
Zn-65	< 3.31E+00	< 3.85E+00	< 3.21E+00
Zr-95	< 2.99E+00	< 3.31E+00	< 2.94E+00

Nuclide	25-APR	29-MAY	26-JUN
Ba-140	< 4.76E+00	< 2.45E+00	< 2.21E+00
Be-7	< 2.81E+01	< 1.52E+01	< 1.14E+01
Ce-141	< 6.41E+00	< 3.34E+00	< 2.25E+00
Ce-144	< 2.37E+01	< 1.36E+01	< 8.71E+00
Co-58	< 3.24E+00	< 1.76E+00	< 1.25E+00
Co-60	< 3.48E+00	< 2.01E+00	< 1.31E+00
Cr-51	< 2.91E+01	< 1.75E+01	< 1.27E+01
Cs-134	< 3.50E+00	< 2.29E+00	< 1.56E+00
Cs-137	< 3.49E+00	< 1.99E+00	< 1.33E+00
Fe-59	< 6.51E+00	< 3.85E+00	< 2.64E+00
GR-B	< 3.83E+00	< 3.30E+00	< 3.60E+00
K-40	< 4.24E+01	< 2.05E+01	< 1.73E+01
La-140	< 4.76E+00	< 2.45E+00	< 2.21E+00
Mn-54	< 3.21E+00	< 1.73E+00	< 1.21E+00
Nb-95	< 3.54E+00	< 1.89E+00	< 1.31E+00
Ru-103	< 3.38E+00	< 1.78E+00	< 1.38E+00
Ru-106	< 2.86E+01	< 1.65E+01	< 1.15E+01
Sr-89	< 1.72E+00	< 8.77E-01	< 1.75E+00
Sr-90	< 1.52E+00	< 4.75E-01	< 8.72E-01
Zn-65	< 5.93E+00	< 3.52E+00	< 2.62E+00
Zr-95	< 5.62E+00	< 3.16E+00	< 2.13E+00

FERMI 2
DRINKING WATER ANALYSIS

DW-2 (Control)
(pCi/liter)

Nuclide	31-JUL	28-AUG	29-SEP
Ba-140	< 2.61E+00	< 3.05E+00	< 4.03E+00
Be-7	< 1.43E+01	< 1.46E+01	< 3.00E+01
Ce-141	< 2.79E+00	< 3.17E+00	< 6.37E+00
Ce-144	< 1.17E+01	< 1.19E+01	< 2.33E+01
Co-58	< 1.43E+00	< 1.57E+00	< 3.06E+00
Co-60	< 1.91E+00	< 1.79E+00	< 3.52E+00
Cr-51	< 1.50E+01	< 1.60E+01	< 2.83E+01
Cs-134	< 2.11E+00	< 2.08E+00	< 3.73E+00
Cs-137	< 1.76E+00	< 1.87E+00	< 3.57E+00
Fe-59	< 3.22E+00	< 3.52E+00	< 7.10E+00
GR-B	< 3.47E+00	< 2.05E+00	< 2.65E+00
K-40	< 1.68E+01	< 2.38E+01	< 4.80E+01
La-140	< 2.61E+00	< 3.05E+00	< 4.03E+00
Mn-54	< 1.69E+00	< 1.70E+00	< 3.02E+00
Nb-95	< 1.74E+00	< 1.72E+00	< 3.53E+00
Ru-103	< 1.65E+00	< 1.68E+00	< 3.49E+00
Ru-106	< 1.46E+01	< 1.66E+01	< 3.07E+01
Sr-89	< 1.28E+00	< 2.42E+00	< 2.18E+00
Sr-90	< 1.56E+00	< 1.68E+00	< 1.79E+00
Zn-65	< 3.52E+00	< 3.30E+00	< 7.01E+00
Zr-95	< 3.15E+00	< 3.06E+00	< 5.10E+00

Nuclide	30-OCT	27-NOV	26-DEC
Ba-140	< 2.37E+00	< 3.40E+00	< 2.20E+00
Be-7	< 1.37E+01	< 2.39E+01	< 1.23E+01
Ce-141	< 3.01E+00	< 5.21E+00	< 2.84E+00
Ce-144	< 1.19E+01	< 1.82E+01	< 1.06E+01
Co-58	< 1.53E+00	< 2.73E+00	< 1.42E+00
Co-60	< 1.62E+00	< 3.10E+00	< 1.56E+00
Cr-51	< 1.57E+01	< 2.66E+01	< 1.39E+01
Cs-134	< 1.83E+00	< 2.57E+00	< 1.59E+00
Cs-137	< 1.67E+00	< 2.87E+00	< 1.50E+00
Fe-59	< 3.09E+00	< 5.94E+00	< 2.61E+00
GR-B	< 2.25E+00	< 3.32E+00	< 2.09E+00
K-40	< 1.50E+01	< 3.86E+01	< 1.82E+01
La-140	< 2.37E+00	< 3.40E+00	< 2.20E+00
Mn-54	< 1.47E+00	< 2.43E+00	< 1.32E+00
Nb-95	< 1.61E+00	< 2.38E+00	< 1.53E+00
Ru-103	< 1.55E+00	< 2.90E+00	< 1.39E+00
Ru-106	< 1.44E+01	< 2.37E+01	< 1.28E+01
Sr-89	< 1.82E+00	< 1.88E+00	< 1.84E+00
Sr-90	< 1.71E+00	< 1.64E+00	< 1.56E+00
Zn-65	< 2.95E+00	< 5.69E+00	< 2.94E+00
Zr-95	< 2.71E+00	4.49E+00	< 2.31E+00

FERMI 2
SURFACE WATER ANALYSIS

SW-2 (Control)
(pCi/liter)

Nuclide	31-JAN	28-FEB	30-MAR
Ba-140	< 3.01E+00	< 3.08E+00	< 3.11E+00
Be-7	< 2.13E+01	< 1.88E+01	< 1.67E+01
Ce-141	< 4.49E+00	< 2.98E+00	< 3.76E+00
Ce-144	< 1.80E+01	< 1.18E+01	< 1.41E+01
Co-58	< 2.27E+00	< 2.32E+00	< 1.74E+00
Co-60	< 2.49E+00	< 2.48E+00	< 1.87E+00
Cr-51	< 2.23E+01	< 1.70E+01	< 1.82E+01
Cs-134	< 3.00E+00	< 2.98E+00	< 2.06E+00
Cs-137	< 2.64E+00	< 2.57E+00	< 1.90E+00
Fe-59	< 4.20E+00	< 5.35E+00	< 3.55E+00
K-40	< 2.92E+01	3.00E+01	< 2.34E+01
La-140	< 3.01E+00	< 3.08E+00	< 3.11E+00
Mn-54	< 2.29E+00	< 2.21E+00	< 1.68E+00
Nb-95	< 2.49E+00	< 2.28E+00	< 1.90E+00
Ru-103	< 2.53E+00	< 2.12E+00	< 1.94E+00
Ru-106	< 2.22E+01	< 1.93E+01	< 1.60E+01
Sr-89	< 2.25E+00	< 1.22E+00	< 1.90E+00
Sr-90	< 1.71E+00	< 1.64E+00	< 1.70E+00
Zn-65	< 4.97E+00	< 5.36E+00	< 3.23E+00
Zr-95	< 4.00E+00	< 4.17E+00	< 3.38E+00

Nuclide	25-APR	29-MAY	28-JUN
Ba-140	< 4.26E+00	< 2.96E+00	< 2.03E+00
Be-7	< 2.58E+01	< 1.64E+01	< 1.17E+01
Ce-141	< 5.28E+00	< 3.44E+00	< 2.40E+00
Ce-144	< 1.95E+01	< 1.43E+01	< 8.71E+00
Co-58	< 3.09E+00	< 1.94E+00	< 1.18E+00
Co-60	< 3.09E+00	< 1.94E+00	< 1.61E+00
Cr-51	< 3.04E+01	< 1.74E+01	< 1.30E+01
Cs-134	< 3.54E+00	< 2.56E+00	< 1.49E+00
Cs-137	< 3.82E+00	< 2.05E+00	< 1.42E+00
Fe-59	< 5.99E+00	< 3.76E+00	< 2.50E+00
K-40	< 4.24E+01	< 2.93E+01	< 1.94E+01
La-140	< 4.26E+00	< 2.96E+00	< 2.03E+00
Mn-54	< 2.47E+00	< 1.82E+00	< 1.17E+00
Nb-95	< 2.74E+00	< 1.96E+00	< 1.35E+00
Ru-103	< 3.33E+00	< 1.95E+00	< 1.37E+00
Ru-106	< 2.41E+01	< 1.88E+01	< 1.15E+01
Sr-89	< 1.12E+00	< 7.70E-01	< 1.78E+00
Sr-90	< 1.52E+00	< 9.75E-01	< 1.81E+00
Zn-65	< 6.72E+00	< 3.81E+00	< 2.64E+00
Zr-95	< 5.11E+00	< 3.10E+00	< 2.48E+00

FERMI 2
SURFACE WATER ANALYSIS

SW-2 (Control)
(pCi/liter)

Nuclide	31-JUL	28-AUG	25-SEP
Ba-140	<4.36E+00	<2.54E+00	<2.47E+00
Be-7	<1.86E+01	<1.68E+01	<1.29E+01
Ce-141	<3.83E+00	<3.52E+00	<2.77E+00
Ce-144	<1.40E+01	<1.35E+01	<1.06E+01
Co-58	<2.20E+00	<2.05E+00	<1.55E+00
Co-60	<2.47E+00	<1.94E+00	<1.66E+00
Cr-51	<2.10E+01	<1.82E+01	<1.41E+01
Cs-134	<2.41E+00	<2.31E+00	<1.82E+00
Cs-137	<2.12E+00	<2.10E+00	<1.76E+00
Fe-59	<4.11E+00	<3.51E+00	<3.08E+00
K-40	<2.71E+01	<2.44E+01	<2.17E+01
La-140	<4.36E+00	<2.54E+00	<2.47E+00
Mn-54	<1.84E+00	<2.03E+00	<1.45E+00
Nb-95	<1.97E+00	<1.99E+00	<1.53E+00
Ru-103	<2.41E+00	<2.04E+00	<1.51E+00
Ru-106	<2.04E+01	<1.71E+01	<1.35E+01
Sr-89	<1.42E+00	<2.20E+00	<1.51E+00
Sr-90	<1.49E+00	<1.90E+00	<1.72E+00
Zn-65	<4.30E+00	<3.50E+00	<3.21E+00
Zr-95	<3.75E+00	<3.48E+00	<2.86E+00

Nuclide	30-OCT	27-NOV	26-DEC
Ba-140	<3.76E+00	<6.43E+00	<2.68E+00
Be-7	<1.97E+01	<2.52E+01	<1.44E+01
Ce-141	<3.64E+00	<5.55E+00	<2.67E+00
Ce-144	<1.42E+01	<2.01E+01	<1.03E+01
Co-58	<1.91E+00	<2.88E+00	<1.42E+00
Co-60	<2.75E+00	<3.50E+00	<1.79E+00
Cr-51	<1.93E+01	<3.14E+01	<1.42E+01
Cs-134	<2.73E+00	<3.17E+00	<1.72E+00
Cs-137	<2.66E+00	<3.08E+00	<1.79E+00
Fe-59	<5.24E+00	<6.83E+00	<3.27E+00
K-40	<3.46E+01	<3.20E+01	<2.30E+01
La-140	<3.76E+00	<6.43E+00	<2.68E+00
Mn-54	<2.29E+00	<2.99E+00	<1.49E+00
Nb-95	<2.28E+00	<3.00E+00	<1.51E+00
Ru-103	<2.43E+00	<3.75E+00	<1.69E+00
Ru-106	<2.09E+01	<2.65E+01	<1.35E+01
Sr-89	<2.12E+00	<2.12E+00	<1.84E+00
Sr-90	<1.78E+00	<1.51E+00	<1.63E+00
Zn-65	<4.83E+00	<6.30E+00	<3.51E+00
Zr-95	<3.37E+00	<5.71E+00	<2.72E+00

FERMI 2
SURFACE WATER ANALYSIS

SW-3 (Indicator)
(pCi/liter)

Nuclide	31-JAN	28-FEB	29-MAR
Ba-140	< 2.91E+00	< 2.28E+00	< 2.13E+00
Be-7	< 1.71E+01	< 1.45E+01	< 1.32E+01
Ce-141	< 3.79E+00	< 2.97E+00	< 2.61E+00
Ce-144	< 1.57E+01	< 1.18E+01	< 1.06E+01
Co-58	< 1.95E+00	< 1.63E+00	< 1.50E+00
Co-60	< 2.26E+00	< 1.80E+00	< 1.66E+00
Cr-51	< 1.93E+01	< 1.51E+01	< 1.38E+01
Cs-134	< 2.52E+00	< 2.15E+00	< 1.98E+00
Cs-137	< 2.24E+00	< 1.89E+00	< 1.74E+00
Fe-59	< 4.75E+00	< 2.59E+00	< 3.19E+00
K-40	< 2.81E+01	< 2.43E+01	< 1.50E+01
La-140	< 2.91E+00	< 2.28E+00	< 2.13E+00
Mn-54	< 1.94E+00	< 1.54E+00	< 1.50E+00
Nb-95	< 2.17E+00	< 1.69E+00	< 1.56E+00
Ru-103	< 2.19E+00	< 1.71E+00	< 1.56E+00
Ru-106	< 1.90E+01	< 1.48E+01	< 1.38E+01
Sr-89	< 2.13E+00	< 1.33E+00	< 1.01E+00
Sr-90	< 1.66E+00	< 1.75E+00	< 1.45E+00
Zn-65	< 4.02E+00	< 3.29E+00	< 3.24E+00
Zr-95	< 3.23E+00	< 2.82E+00	< 2.97E+00

Nuclide	26-APR	29-MAY	26-JUN
Ba-140	< 4.35E+00	< 2.69E+00	< 2.43E+00
Be-7	< 2.21E+01	< 1.68E+01	< 1.34E+01
Ce-141	< 5.18E+00	< 2.65E+00	< 2.80E+00
Ce-144	< 2.27E+01	< 1.09E+01	< 9.95E+00
Co-58	< 2.47E+00	< 2.18E+00	< 1.49E+00
Co-60	< 2.80E+00	< 2.26E+00	< 1.53E+00
Cr-51	< 2.73E+01	< 1.54E+01	< 1.43E+01
Cs-134	< 4.09E+00	< 2.70E+00	< 1.72E+00
Cs-137	< 3.09E+00	< 2.37E+00	< 1.52E+00
Fe-59	< 6.24E+00	< 4.92E+00	< 2.88E+00
K-40	< 3.46E+01	< 2.91E+01	< 2.03E+01
La-140	< 4.35E+00	< 2.69E+00	< 2.43E+00
Mn-54	< 3.15E+00	< 2.16E+00	< 1.45E+00
Nb-95	< 2.55E+00	< 2.12E+00	< 1.55E+00
Ru-103	< 2.98E+00	< 1.92E+00	< 1.65E+00
Ru-106	< 2.61E+01	< 1.80E+01	< 1.37E+01
Sr-89	< 1.06E+00	< 1.03E+00	< 1.92E+00
Sr-90	< 1.49E+00	< 1.05E+00	< 1.45E+00
Zn-65	< 6.53E+00	< 4.24E+00	< 2.86E+00
Zr-95	< 4.84E+00	< 3.61E+00	< 2.63E+00

FERMI 2
SURFACE WATER ANALYSIS

SW-3 (Indicator)
(pCi/liter)

Nuclide	31-JUL		28-AUG		25-SEP	
Ba-140	<	4.37E+00	<	2.11E+00	<	2.52E+00
Be-7	<	2.01E+01	<	1.25E+01	<	1.38E+01
Ce-141	<	4.04E+00	<	2.67E+00	<	3.08E+00
Ce-144	<	1.45E+01	<	1.05E+01	<	1.14E+01
Co-58	<	2.29E+00	<	1.60E+00	<	1.55E+00
Co-60	<	2.31E+00	<	1.63E+00	<	1.62E+00
Cr-51	<	2.24E+01	<	1.35E+01	<	1.62E+01
Cs-134	<	2.91E+00	<	1.98E+00	<	2.00E+00
Cs-137	<	2.36E+00	<	1.75E+00	<	1.64E+00
Fe-59	<	4.54E+00	<	3.00E+00	<	3.04E+00
K-40	<	3.37E+01	<	2.02E+01	<	2.30E+01
La-140	<	4.37E+00	<	2.11E+00	<	2.52E+00
Mn-54	<	2.01E+00	<	1.52E+00	<	1.52E+00
Nb-95	<	2.37E+00	<	1.66E+00	<	1.64E+00
Ru-103	<	2.32E+00	<	1.66E+00	<	1.66E+00
Ru-106	<	1.94E+01	<	1.34E+01	<	1.48E+01
Sr-89	<	1.12E+00	<	1.57E+00	<	2.32E+00
Sr-90	<	1.79E+00	<	1.87E+00	<	1.70E+00
Zn-65	<	4.47E+00	<	3.42E+00	<	3.24E+00
Zr-95	<	3.86E+00	<	2.64E+00	<	2.73E+00

Nuclide	30-OCT		27-NOV		26-DEC	
Ba-140	<	3.08E+00	<	6.39E+00	<	2.26E+00
Be-7	<	1.50E+01	<	2.66E+01	<	1.24E+01
Ce-141	<	3.24E+00	<	4.77E+00	<	2.79E+00
Ce-144	<	1.18E+01	<	1.82E+01	<	1.05E+01
Co-58	<	1.81E+00	<	2.78E+00	<	1.30E+00
Co-60	<	1.79E+00	<	3.11E+00	<	1.75E+00
Cr-51	<	1.70E+01	<	2.63E+01	<	1.38E+01
Cs-134	<	1.86E+00	<	2.61E+00	<	1.67E+00
Cs-137	<	1.90E+00	<	2.89E+00	<	1.52E+00
Fe-59	<	3.50E+00	<	5.80E+00	<	3.09E+00
K-40	<	1.67E+01	<	4.37E+01	<	2.18E+01
La-140	<	3.08E+00	<	6.39E+00	<	2.26E+00
Mn-54	<	1.65E+00	<	2.38E+00	<	1.46E+00
Nb-95	<	1.90E+00	<	3.30E+00	<	1.60E+00
Ru-103	<	1.77E+00	<	3.09E+00	<	1.52E+00
Ru-106	<	1.66E+01	<	2.21E+01	<	1.39E+01
Sr-89	<	1.55E+00	<	2.15E+00	<	1.68E+00
Sr-90	<	1.74E+00	<	1.16E+00	<	1.77E+00
Zn-65	<	3.84E+00	<	4.54E+00	<	3.04E+00
Zr-95	<	3.24E+00	<	4.93E+00	<	2.69E+00

FERMI 2
DRINKING AND SURFACE WATER
QUARTERLY COMPOSITE SAMPLES

Tritium
(pCi/liter)

Station	First Quarter		Second Quarter	
DW-1	<	4.37E+02	<	1.84E+02
DW-2	<	4.34E+02	<	1.80E+02
SW-2	<	4.38E+02	<	1.80E+02
SW-3	<	4.27E+02	<	1.81E+02

Station	Third Quarter		Fourth Quarter	
DW-1	<	4.61E+02	<	3.82E+02
DW-2	<	4.37E+02	<	3.79E+02
SW-2	<	4.46E+02	<	3.79E+02
SW-3	<	4.27E+02	<	3.98E+02

FERMI 2
GROUNDWATER ANALYSIS

GW-1 (Indicator)
(pCi/liter)

Nuclide	First Quarter		Second Quarter	
Ba-140	<	3.03E+00	<	3.90E+00
Be-7	<	1.38E+01	<	1.58E+01
Ce-141	<	3.09E+00	<	3.53E+00
Ce-144	<	1.10E+01	<	1.11E+01
Co-58	<	1.75E+00	<	1.67E+00
Co-60	<	1.76E+00	<	1.92E+00
Cs-134	<	1.98E+00	<	1.91E+00
Cs-137	<	1.51E+00	<	1.92E+00
Fe-59	<	3.26E+00	<	3.70E+00
H-3	<	2.65E+02	<	3.91E+02
K-40	<	1.64E+01	<	2.47E+01
La-140	<	3.03E+00	<	3.90E+00
Mn-54	<	1.46E+00	<	1.70E+00
Nb-95	<	1.59E+00	<	1.86E+00
Ru-103	<	1.73E+00	<	1.92E+00
Ru-106	<	1.41E+01	<	1.49E+01
Zn-65	<	3.27E+00	<	3.07E+00
Zr-95	<	2.95E+00	<	3.29E+00

Nuclide	Third Quarter		Fourth Quarter	
Ba-140	<	1.12E+00	<	2.41E+00
Be-7	<	4.65E+00	<	1.21E+01
Ce-141	<	1.01E+00	<	2.70E+00
Ce-144	<	3.49E+00	<	1.07E+01
Co-58	<	5.39E-01	<	1.51E+00
Co-60	<	5.68E-01	<	1.59E+00
Cs-134	<	6.39E-01	<	1.61E+00
Cs-137	<	5.52E-01	<	2.10E+00
Fe-59	<	1.13E+00	<	3.07E+00
H-3	<	1.04E+02	<	3.29E+02
K-40	<	9.83E+00	<	2.50E+01
La-140	<	1.12E+00	<	2.41E+00
Mn-54	<	5.15E-01	<	1.41E+00
Nb-95	<	5.36E-01	<	1.55E+00
Ru-103	<	7.16E-01	<	1.42E+00
Ru-106	<	4.99E+00	<	1.39E+01
Zn-65	<	1.28E+00	<	3.12E+00
Zr-95	<	9.63E-01	<	2.55E+00

FERMI 2
GROUNDWATER ANALYSIS

GW-2 (Indicator)
(pCi/liter)

Nuclide	First Quarter		Second Quarter	
Ba-140	<	3.57E+00	<	1.89E+00
Be-7	<	1.92E+01	<	1.16E+01
Ce-141	<	4.51E+00	<	2.36E+00
Ce-144	<	1.65E+01	<	9.16E+00
Co-58	<	1.99E+00	<	1.22E+00
Co-60	<	2.17E+00	<	1.31E+00
Cs-134	<	2.71E+00	<	1.56E+00
Cs-137	<	2.29E+00	<	1.44E+00
Fe-59	<	4.42E+00	<	2.49E+00
H-3	<	4.42E+02	<	3.91E+02
K-40	<	2.70E+01	<	1.29E+01
La-140	<	3.57E+00	<	1.89E+00
Mn-54	<	2.19E+00	<	1.30E+00
Nb-95	<	2.47E+00	<	1.35E+00
Ru-103	<	2.33E+00	<	1.30E+00
Ru-106	<	2.07E+01	<	1.16E+01
Zn-65	<	4.22E+00	<	2.68E+00
Zr-95	<	3.52E+00	<	2.23E+00

Nuclide	Third Quarter		Fourth Quarter	
Ba-140	<	3.19E+00	<	1.82E+00
Be-7	<	1.68E+01	<	1.34E+01
Ce-141	<	3.57E+00	<	3.19E+00
Ce-144	<	1.39E+01	<	1.24E+01
Co-58	<	1.97E+00	<	1.55E+00
Co-60	<	2.17E+00	<	1.67E+00
Cs-134	<	2.46E+00	<	1.79E+00
Cs-137	<	2.02E+00	<	1.80E+00
Fe-59	<	4.09E+00	<	2.79E+00
H-3	<	4.32E+02	<	3.32E+02
K-40	<	2.13E+01	<	1.71E+01
La-140	<	3.19E+00	<	1.82E+00
Mn-54	<	1.77E+00	<	1.46E+00
Nb-95	<	1.79E+00	<	1.65E+00
Ru-103	<	2.02E+00	<	1.66E+00
Ru-106	<	1.82E+01	<	1.51E+01
Zn-65	<	4.71E+00	<	3.14E+00
Zr-95	<	3.51E+00	<	2.82E+00

FERMI 2
GROUNDWATER ANALYSIS

GW-3 (Indicator)
(pCi/liter)

Nuclide	First Quarter		Second Quarter	
Ba-140	<	3.08E+00	<	3.03E+00
Be-7	<	1.71E+01	<	1.73E+01
Ce-141	<	3.90E+00	<	2.91E+00
Ce-144	<	1.49E+01	<	1.09E+01
Co-58	<	1.97E+00	<	2.06E+00
Co-60	<	2.47E+00	<	2.35E+00
Cs-134	<	2.61E+00	<	2.66E+00
Cs-137	<	2.14E+00	<	2.20E+00
Fe-59	<	4.36E+00	<	4.48E+00
H-3	<	4.41E+02	<	4.47E+02
K-40	<	2.51E+01	<	2.15E+01
La-140	<	3.08E+00	<	3.03E+00
Mn-54	<	2.16E+00	<	2.08E+00
Nb-95	<	2.30E+00	<	2.23E+00
Ru-103	<	2.12E+00	<	1.78E+00
Ru-106	<	1.80E+01	<	1.86E+01
Zn-65	<	3.67E+00	<	4.68E+00
Zr-95	<	3.71E+00	<	3.90E+00

Nuclide	Third Quarter		Fourth Quarter	
Ba-140	<	3.12E+00	<	2.24E+00
Be-7	<	1.60E+01	<	1.39E+01
Ce-141	<	3.38E+00	<	2.98E+00
Ce-144	<	1.30E+01	<	1.22E+01
Co-58	<	1.70E+00	<	1.61E+00
Co-60	<	1.83E+00	<	2.13E+00
Cs-134	<	2.18E+00	<	1.72E+00
Cs-137	<	1.84E+00	<	1.71E+00
Fe-59	<	3.70E+00	<	2.96E+00
H-3	<	4.25E+02	<	3.49E+02
K-40	<	1.77E+01	<	1.65E+01
La-140	<	3.12E+00	<	2.24E+00
Mn-54	<	1.71E+00	<	1.41E+00
Nb-95	<	1.98E+00	<	1.98E+00
Ru-103	<	1.91E+00	<	1.62E+00
Ru-106	<	1.60E+01	<	1.46E+01
Zn-65	<	3.30E+00	<	3.37E+00
Zr-95	<	3.36E+00	<	2.77E+00

FERMI 2
GROUNDWATER ANALYSIS

GW-4 (Control)
(pCi/liter)

Nuclide	First Quarter	Second Quarter
Ba-140	< 3.26E+00	< 2.88E+00
Be-7	< 1.72E+01	< 1.88E+01
Ce-141	< 3.45E+00	< 3.68E+00
Ce-144	< 1.46E+01	< 1.47E+01
Co-58	< 1.91E+00	< 2.07E+00
Co-60	< 1.94E+00	< 2.18E+00
Cs-134	< 2.42E+00	< 2.53E+00
Cs-137	< 2.07E+00	< 2.28E+00
Fe-59	< 3.95E+00	< 3.92E+00
H-3	< 4.41E+02	< 4.34E+02
K-40	< 1.93E+01	< 2.49E+01
La-140	< 3.26E+00	< 2.88E+00
Mn-54	< 1.98E+00	< 2.18E+00
Nb-95	< 2.14E+00	< 2.24E+00
Ru-103	< 2.09E+00	< 2.10E+00
Ru-106	< 1.62E+01	< 1.82E+01
Zn-65	< 3.79E+00	< 3.91E+00
Zr-95	< 3.47E+00	< 3.68E+00

Nuclide	Third Quarter	Fourth Quarter
Ba-140	< 3.73E+00	< 2.52E+00
Be-7	< 1.87E+01	< 1.53E+01
Ce-141	< 3.41E+00	< 3.30E+00
Ce-144	< 1.27E+01	< 1.40E+01
Co-58	< 2.34E+00	< 1.75E+00
Co-60	< 2.52E+00	< 1.86E+00
Cs-134	< 3.16E+00	< 1.84E+00
Cs-137	< 2.53E+00	< 1.81E+00
Fe-59	< 5.45E+00	< 3.52E+00
H-3	< 4.27E+02	< 3.45E+02
K-40	< 3.32E+00	< 1.83E+01
La-140	< 3.22E+01	< 2.52E+00
Mn-54	< 3.73E+00	< 1.73E+00
Nb-95	< 2.53E+00	< 1.47E+00
Ru-103	< 2.57E+00	< 1.74E+00
Ru-106	< 2.46E+00	< 1.59E+01
Zn-65	< 2.07E+01	< 3.28E+00
Zr-95	< 5.02E+00	< 3.09E+00

FERMI 2
SEDIMENT ANALYSIS

S-1 (Indicator)
(pCi/kg dry)

Nuclide	20-JUN	10-OCT
Ba-140	< 2.44E+02	< 3.55E+02
Be-7	< 3.65E+02	< 3.86E+02
Ce-141	< 9.21E+01	< 7.07E+01
Ce-144	< 1.77E+02	< 1.89E+02
Co-58	< 3.94E+01	< 3.72E+01
Co-60	< 3.09E+01	< 2.99E+01
Cs-134	< 3.86E+01	< 4.33E+01
Cs-137	< 2.75E+01	< 3.69E+01
Fe-59	< 1.04E+02	< 1.00E+02
K-40	1.03E+04	9.70E+03
La-140	< 2.44E+02	< 1.29E+02
Mn-54	< 2.92E+01	< 3.85E+01
Nb-95	< 4.75E+01	< 5.12E+01
Ru-103	< 4.02E+01	< 4.28E+01
Ru-106	< 2.24E+02	< 2.81E+02
Sr-89	< 1.52E+02	< 1.22E+02
Sr-90	< 1.25E+02	< 9.39E+01
Zn-65	< 7.34E+01	< 8.43E+01
Zr-95	< 7.07E+01	< 5.88E+01

S-2 (Indicator)
(pCi/kg dry)

Nuclide	20-JUN	24-OCT
Ba-140	< 7.28E+02	< 3.36E+02
Be-7	< 7.13E+02	< 3.57E+02
Ce-141	< 1.66E+02	< 8.29E+01
Ce-144	< 2.99E+02	< 2.15E+02
Co-58	< 7.81E+01	< 4.05E+01
Co-60	< 6.06E+01	< 4.27E+01
Cs-134	< 8.65E+01	< 5.19E+01
Cs-137	< 6.05E+01	< 3.57E+01
Fe-59	< 2.14E+02	< 1.04E+02
K-40	1.71E+04	1.74E+04
La-140	< 7.28E+02	< 1.08E+02
Mn-54	< 6.89E+01	< 5.00E+01
Nb-95	< 1.01E+02	< 5.10E+01
Ru-103	< 9.01E+01	< 3.85E+01
Ru-106	< 4.30E+02	< 3.19E+02
Sr-89	< 2.03E+02	< 1.66E+02
Sr-90	< 1.50E+02	< 1.01E+02
Zn-65	< 1.59E+02	< 9.55E+01
Zr-95	< 1.49E+02	< 8.63E+01

FERMI 2
SEDIMENT ANALYSIS

S-3 (Indicator)
(pCi/kg dry)

Nuclide	14-MAY	24-OCT
Ba-140	<2.14E+03	<2.71E+02
Be-7	<5.64E+02	<2.72E+02
Ce-141	<1.67E+02	<4.76E+01
Ce-144	<1.70E+02	<1.45E+02
Co-58	<5.89E+01	<2.64E+01
Co-60	<3.59E+01	<3.76E+01
Cs-134	<3.34E+01	<3.14E+01
Cs-137	<2.97E+01	<3.33E+01
Fe-59	<2.02E+02	<9.21E+01
K-40	1.29E+04	1.19E+04
La-140	<2.14E+03	<7.68E+01
Mn-54	<3.07E+01	<2.58E+01
Nb-95	<5.78E+01	<2.84E+01
Ru-103	<8.46E+01	<2.79E+01
Ru-106	<2.58E+02	<2.19E+02
Sr-89	<2.01E+02	<1.26E+02
Sr-90	<1.24E+02	<1.23E+02
Zn-65	<7.85E+01	<7.79E+01
Zr-95	<9.80E+01	<5.99E+01

S-4 (Indicator)
(pCi/kg dry)

Nuclide	14-MAY	24-OCT
Ba-140	<1.16E+03	<1.44E+02
Be-7	<5.46E+02	<2.95E+02
Ce-141	<1.79E+02	<3.65E+01
Ce-144	<2.00E+02	<1.31E+02
Co-58	<5.79E+01	<3.64E+01
Co-60	<2.60E+01	<5.11E+01
Cs-134	<4.06E+01	<4.58E+01
Cs-137	<3.10E+01	<3.56E+01
Fe-59	<1.80E+02	<8.13E+01
K-40	8.08E+03	1.14E+04
La-140	<1.16E+03	<3.94E+01
Mn-54	<3.42E+01	<3.36E+01
Nb-95	<6.93E+01	<3.78E+01
Ru-103	<8.21E+01	<2.99E+01
Ru-106	<3.20E+02	<3.10E+02
Sr-89	<2.48E+02	<6.83E+01
Sr-90	<1.50E+02	<1.05E+02
Zn-65	<8.27E+01	<1.03E+02
Zr-95	<1.00E+02	<5.35E+01

FERMI 2
SEDIMENT ANALYSIS

S-5 (Control)
(pCi/kg dry)

Nuclide	14-MAY		24-OCT	
Ba-140	<	1.51E+03	<	4.30E+02
Be-7	<	5.70E+02	<	3.93E+02
Ce-141	<	1.79E+02	<	7.57E+01
Ce-144	<	1.62E+02	<	1.87E+02
Co-58	<	4.11E+01	<	4.03E+01
Co-60	<	3.37E+01	<	3.16E+01
Cs-134	<	3.80E+01	<	4.77E+01
Cs-137		7.63E+01		1.08E+02
Fe-59	<	1.56E+02	<	9.14E+01
K-40		9.38E+03		7.08E+03
La-140	<	1.51E+03	<	9.33E+01
Mn-54	<	2.94E+01	<	3.82E+01
Nb-95	<	6.14E+01	<	4.60E+01
Ru-103	<	8.36E+01	<	4.64E+01
Ru-106	<	2.52E+02	<	3.17E+02
Sr-89	<	2.46E+02	<	1.06E+02
Sr-90	<	1.41E+02	<	1.01E+02
Zn-65	<	7.93E+01	<	8.55E+01
Zr-95	<	1.04E+02	<	7.80E+01

FERMI 2
FISH ANALYSIS

F-1 (Control)
(pCi/kg wet)

Nuclide	11-MAY Catfish	11-MAY Carp	11-MAY Shad
Ba-140	< 1.18E+03	< 2.42E+02	< 1.01E+02
Be-7	< 2.55E+02	< 6.08E+01	< 8.18E+01
Ce-141	< 6.88E+01	< 1.94E+01	< 3.30E+01
Ce-144	< 6.00E+01	< 1.72E+01	< 1.79E+01
Co-58	< 2.52E+01	< 5.89E+00	< 2.14E+01
Co-60	< 1.33E+01	< 3.54E+00	< 1.69E+01
Cs-134	< 1.59E+01	< 3.41E+00	< 1.08E+02
Cs-137	< 1.16E+01	< 3.40E+00	< 3.20E+03
Fe-59	< 7.57E+01	< 2.21E+01	< 1.29E+03
K-40	2.60E+03	2.64E+03	1.83E+01
La-140	< 1.18E+03	< 2.42E+02	< 3.92E+01
Mn-54	< 1.37E+01	< 3.35E+00	< 5.69E+01
Nb-95	< 2.80E+01	< 6.40E+00	< 1.64E+02
Ru-103	< 4.36E+01	< 9.90E+00	< 2.03E+02
Ru-106	< 1.23E+02	< 2.89E+01	< 3.23E+01
Sr-89	< 1.43E+02	< 1.17E+02	< 4.22E+01
Sr-90	< 3.16E+01	< 3.33E+01	< 6.48E+01
Zn-65	< 3.33E+01	< 9.05E+00	< 1.01E+02
Zr-95	< 4.89E+01	< 1.12E+01	< 8.18E+01

Nuclide	11-MAY L. M. Bass	11-MAY Garfish	11-MAY Rock Bass
Ba-140	< 1.96E+03	< 1.26E+03	< 1.43E+03
Be-7	< 4.10E+02	< 2.10E+02	< 2.95E+02
Ce-141	< 1.30E+02	< 4.73E+01	< 9.85E+01
Ce-144	< 1.11E+02	< 4.01E+01	< 8.39E+01
Co-58	< 3.99E+01	< 2.30E+01	< 2.86E+01
Co-60	< 1.98E+01	< 1.47E+01	< 1.68E+01
Cs-134	< 2.36E+01	< 1.32E+01	< 1.62E+01
Cs-137	< 1.90E+01	< 1.21E+01	< 1.51E+01
Fe-59	< 1.22E+02	< 8.06E+01	< 9.26E+01
K-40	3.33E+03	2.54E+03	3.16E+03
La-140	< 1.96E+03	< 1.26E+03	< 1.43E+03
Mn-54	< 2.22E+01	< 1.19E+01	< 1.61E+01
Nb-95	< 4.44E+01	< 2.47E+01	< 3.38E+01
Ru-103	< 6.84E+01	< 3.81E+01	< 5.29E+01
Ru-106	< 1.88E+02	< 9.70E+01	< 1.56E+02
Sr-89	< 7.40E+01	< 1.07E+02	< 7.94E+01
Sr-90	< 3.72E+01	< 3.13E+01	< 4.46E+01
Zn-65	< 5.27E+01	< 3.47E+01	< 3.95E+01
Zr-95	< 7.33E+01	< 4.63E+01	< 5.30E+01

F-1 (Control)
(pCi/kg wet)

Nuclide	11-MAY White Bass		11-MAY White Perch		11-MAY Yellow Perch	
Ba-140	<	2.19E+01	<	1.44E+03	<	1.67E+03
Be-7	<	2.04E+01	<	3.24E+02	<	3.48E+02
Ce-141	<	6.39E+00	<	9.73E+01	<	1.02E+02
Ce-144	<	3.74E+00	<	8.47E+01	<	8.70E+01
Co-58	<	4.16E+00	<	3.00E+01	<	3.42E+01
Co-60	<	3.05E+00	<	1.94E+01	<	2.14E+01
Cs-134	<	2.47E+01	<	1.96E+01	<	2.26E+01
Cs-137	<	2.85E+03	<	1.91E+01	<	1.86E+01
Fe-59	<	2.54E+02	<	1.00E+02	<	1.21E+02
K-40		3.54E+00		3.48E+03		3.90E+03
La-140	<	7.34E+00	<	1.44E+03	<	1.67E+03
Mn-54	<	1.13E+01	<	1.69E+01	<	2.16E+01
Nb-95	<	2.99E+01	<	3.53E+01	<	3.99E+01
Ru-103	<	8.36E+01	<	5.31E+01	<	5.99E+01
Ru-106	<	6.24E+01	<	1.48E+02	<	1.78E+02
Sr-89	<	9.92E+00	<	8.83E+01	<	1.53E+02
Sr-90	<	1.21E+01	<	4.59E+01	<	5.49E+01
Zn-65	<	2.19E+01	<	4.27E+01	<	4.64E+01
Zr-95	<	2.04E+01	<	5.94E+01	<	7.38E+01

Nuclide	24-OCT Bullhead		24-OCT Catfish		24-OCT Shad	
Ba-140	<	2.74E+02	<	2.66E+01	<	4.07E+01
Be-7	<	2.59E+02	<	2.65E+01	<	3.92E+01
Ce-141	<	4.73E+01	<	5.40E+00	<	7.65E+00
Ce-144	<	1.27E+02	<	1.57E+01	<	2.12E+01
Co-58	<	3.41E+01	<	3.20E+00	<	4.51E+00
Co-60	<	3.43E+01	<	3.36E+00	<	4.58E+00
Cs-134	<	3.19E+01	<	3.03E+00	<	4.31E+00
Cs-137	<	2.88E+01	<	3.18E+00	<	4.37E+00
Fe-59	<	7.10E+01	<	8.57E+00	<	1.11E+01
K-40		2.99E+03		3.26E+03		2.67E+03
La-140	<	9.24E+01	<	7.56E+00	<	1.12E+01
Mn-54	<	2.86E+01	<	2.96E+00	<	3.85E+00
Nb-95	<	3.45E+01	<	3.44E+00	<	4.77E+00
Ru-103	<	3.42E+01	<	3.31E+00	<	5.09E+00
Ru-106	<	2.48E+02	<	2.45E+01	<	3.80E+01
Sr-89	<	1.18E+02	<	9.84E+01	<	1.02E+02
Sr-90	<	9.65E+01	<	1.02E+02	<	7.89E+01
Zn-65	<	6.73E+01	<	7.45E+00	<	9.30E+00
Zr-95	<	5.71E+01	<	6.10E+00	<	8.29E+00

F-1 (Control)
(pCi/kg wet)

Nuclide	24-OCT Rock Bass		24-OCT Walleye		24-OCT Yellow Perch	
Ba-140	<	2.76E+02	<	3.06E+01	<	1.45E+02
Be-7	<	2.74E+02	<	2.58E+01	<	1.41E+02
Ce-141	<	4.49E+01	<	5.62E+00	<	2.63E+01
Ce-144	<	1.22E+02	<	1.59E+01	<	7.68E+01
Co-58	<	3.05E+01	<	2.98E+00	<	1.78E+01
Co-60	<	3.65E+01	<	3.17E+00	<	1.93E+01
Cs-134	<	3.25E+01	<	3.13E+00	<	1.61E+01
Cs-137	<	3.13E+01	<	2.54E+00	<	1.52E+01
Fe-59	<	7.18E+01	<	8.65E+00	<	3.59E+01
K-40		2.84E+03		3.47E+03		3.71E+03
La-140	<	1.09E+02	<	8.82E+00	<	4.98E+01
Mn-54	<	2.97E+01	<	2.69E+00	<	1.47E+01
Nb-95	<	3.55E+01	<	3.28E+00	<	1.74E+01
Ru-103	<	3.35E+01	<	3.41E+00	<	1.95E+01
Ru-106	<	2.56E+02	<	2.42E+01	<	1.40E+02
Sr-89	<	1.14E+02	<	9.94E+01	<	7.75E+01
Sr-90	<	1.05E+02	<	7.48E+01	<	5.69E+01
Zn-65	<	6.71E+01	<	6.91E+00	<	3.86E+01
Zr-95	<	6.04E+01	<	5.89E+00	<	2.95E+01

FERMI 2
FISH ANALYSIS

F-2 (Indicator)
(pCi/kg wet)

Nuclide	20-JUN Drum	20-JUN Shad	20-JUN Garfish
Ba-140	< 1.79E+02	< 1.50E+02	< 3.83E+01
Be-7	< 2.22E+02	< 1.83E+02	< 4.21E+01
Ce-141	< 4.80E+01	< 3.82E+01	< 1.07E+01
Ce-144	< 8.69E+01	< 7.44E+01	< 1.88E+01
Co-58	< 2.42E+01	< 1.99E+01	< 4.82E+00
Co-60	< 2.47E+01	< 1.84E+01	< 4.21E+00
Cs-134	< 2.10E+01	< 1.83E+01	< 4.32E+00
Cs-137	< 1.71E+01	< 1.56E+01	< 3.48E+00
Fe-59	< 6.22E+01	< 5.37E+01	< 1.46E+01
K-40	2.90E+03	3.09E+03	2.81E+03
La-140	< 1.79E+02	< 1.50E+02	< 3.83E+01
Mn-54	< 1.90E+01	< 1.52E+01	< 3.54E+00
Nb-95	< 2.69E+01	< 2.10E+01	< 5.09E+00
Ru-103	< 2.94E+01	< 2.58E+01	< 6.08E+00
Ru-106	< 1.52E+02	< 1.46E+02	< 2.96E+01
Sr-89	< 4.20E+01	< 4.92E+01	< 5.90E+01
Sr-90	< 2.48E+01	< 4.29E+01	< 3.53E+01
Zn-65	< 4.15E+01	< 3.58E+01	< 9.24E+00
Zr-95	< 4.56E+01	< 3.82E+01	< 9.05E+00

Nuclide	20-JUN Pike	20-JUN White Sucker	20-JUN White Bass
Ba-140	< 3.13E+01	< 9.39E+01	< 1.56E+02
Be-7	< 3.59E+01	< 1.15E+02	< 1.78E+02
Ce-141	< 9.16E+00	< 2.69E+01	< 3.87E+01
Ce-144	< 1.72E+01	< 5.00E+01	< 7.21E+01
Co-58	< 4.09E+00	< 1.21E+01	< 1.70E+01
Co-60	< 4.06E+00	< 9.28E+00	< 1.57E+01
Cs-134	< 3.62E+00	< 1.07E+01	< 1.59E+01
Cs-137	< 3.01E+00	< 9.10E+00	< 1.31E+01
Fe-59	< 1.35E+01	< 3.11E+01	< 5.03E+01
K-40	3.32E+03	3.32E+03	2.81E+03
La-140	< 3.13E+01	< 9.39E+01	< 1.56E+02
Mn-54	< 3.22E+00	< 9.20E+00	< 1.51E+01
Nb-95	< 4.49E+00	< 1.41E+01	< 1.90E+01
Ru-103	< 5.31E+00	< 1.65E+01	< 2.44E+01
Ru-106	< 2.74E+01	< 8.24E+01	< 1.28E+02
Sr-89	< 4.59E+01	< 5.43E+01	< 6.02E+01
Sr-90	< 4.70E+01	< 4.49E+01	< 3.23E+01
Zn-65	< 8.83E+00	< 2.14E+01	< 3.25E+01
Zr-95	< 7.59E+00	< 2.38E+01	< 3.61E+01

FERMI 2
FISH ANALYSIS

F-2 (Indicator)
(pCi/kg wet)

Nuclide	20-JUN White Perch		20-JUN Walleye		25-OCT Catfish	
Ba-140	<	1.28E+02	<	1.03E+02	<	1.66E+02
Be-7	<	1.42E+02	<	1.60E+02	<	1.57E+02
Ce-141	<	2.73E+01	<	3.74E+01	<	2.85E+01
Ce-144	<	5.08E+01	<	7.04E+01	<	7.40E+01
Co-58	<	1.50E+01	<	1.78E+01	<	1.92E+01
Co-60	<	1.23E+01	<	1.21E+01	<	1.67E+01
Cs-134	<	1.48E+01	<	1.66E+01	<	1.83E+01
Cs-137	<	1.27E+01	<	1.20E+01	<	1.69E+01
Fe-59	<	4.49E+01	<	4.21E+01	<	4.20E+01
K-40		3.14E+03		3.79E+03		3.17E+03
La-140	<	1.28E+02	<	1.03E+02	<	4.84E+01
Mn-54	<	1.25E+01	<	1.39E+01	<	1.68E+01
Nb-95	<	1.73E+01	<	1.80E+01	<	2.07E+01
Ru-103	<	2.07E+01	<	2.31E+01	<	2.09E+01
Ru-106	<	1.12E+02	<	1.18E+02	<	1.51E+02
Sr-89	<	6.11E+01	<	5.22E+01	<	1.30E+02
Sr-90	<	4.79E+01	<	4.40E+01	<	5.03E+01
Zn-65	<	2.86E+01	<	2.78E+01	<	3.60E+01
Zr-95	<	3.05E+01	<	3.13E+01	<	3.44E+01

Nuclide	25-OCT Pike		25-OCT Silver Bass		25-OCT Sucker	
Ba-140	<	6.29E+01	<	2.53E+01	<	1.09E+02
Be-7	<	6.79E+01	<	2.62E+01	<	1.04E+02
Ce-141	<	1.27E+01	<	4.90E+00	<	1.85E+01
Ce-144	<	3.71E+01	<	1.51E+01	<	5.03E+01
Co-58	<	7.34E+00	<	3.10E+00	<	1.20E+01
Co-60	<	6.49E+00	<	2.91E+00	<	1.18E+01
Cs-134	<	7.89E+00	<	3.30E+00	<	1.23E+01
Cs-137	<	6.67E+00	<	2.66E+00	<	1.20E+01
Fe-59	<	1.86E+01	<	8.37E+00	<	2.73E+01
K-40		2.81E+03		3.00E+03		3.42E+03
La-140	<	2.08E+01	<	7.65E+00	<	3.90E+01
Mn-54	<	7.14E+00	<	2.96E+00	<	1.14E+01
Nb-95	<	7.95E+00	<	3.37E+00	<	1.39E+01
Ru-103	<	8.72E+00	<	3.46E+00	<	1.32E+01
Ru-106	<	6.36E+01	<	2.43E+01	<	9.90E+01
Sr-89	<	9.35E+01	<	7.58E+01	<	9.79E+01
Sr-90	<	5.91E+01	<	6.01E+01	<	6.82E+01
Zn-65	<	1.59E+01	<	7.31E+00	<	2.60E+01
Zr-95	<	1.39E+01	<	5.42E+00	<	2.15E+01

F-2 (Indicator)
(pCi/kg wet)

Nuclide		25-OCT White Perch		25-OCT Walleye
Ba-140	<	3.75E+01	<	3.04E+01
Be-7	<	4.00E+01	<	2.79E+01
Ce-141	<	8.32E+00	<	6.16E+00
Ce-144	<	2.40E+01	<	1.75E+01
Co-58	<	4.81E+00	<	3.63E+00
Co-60	<	5.11E+00	<	3.70E+00
Cs-134	<	4.77E+00	<	3.39E+00
Cs-137	<	4.32E+00	<	3.34E+00
Fe-59	<	1.28E+01	<	1.03E+01
K-40		3.22E+03		3.81E+03
La-140	<	1.26E+01	<	8.17E+00
Mn-54	<	4.39E+00	<	3.35E+00
Nb-95	<	4.89E+00	<	3.78E+00
Ru-103	<	4.98E+00	<	3.84E+00
Ru-106	<	3.78E+01	<	2.86E+01
Sr-89	<	8.72E+01	<	1.09E+02
Sr-90	<	6.98E+01	<	9.37E+01
Zn-65	<	1.07E+01	<	8.25E+00
Zr-95	<	8.67E+00	<	6.81E+00

FERMI 2
FISH ANALYSIS

F-3 (Control)
(pCi/kg wet)

Nuclide	22-JUN Red Sucker	22-JUN Drum	22-JUN Long Sucker
Ba-140	< 9.35E+02	< 7.60E+02	< 4.31E+02
Be-7	< 3.03E+02	< 2.69E+02	< 1.76E+02
Ce-141	< 8.95E+01	< 8.18E+01	< 5.03E+01
Ce-144	< 9.63E+01	< 8.68E+01	< 5.60E+01
Co-58	< 2.88E+01	< 2.56E+01	< 1.72E+01
Co-60	< 1.87E+01	< 1.76E+01	< 1.04E+01
Cs-134	< 2.01E+01	< 1.91E+01	< 1.20E+01
Cs-137	< 1.67E+01	< 1.54E+01	< 1.30E+01
Fe-59	< 9.16E+01	< 7.68E+01	< 5.42E+01
K-40	3.20E+03	2.88E+03	3.36E+03
La-140	< 9.35E+02	< 7.60E+02	< 4.31E+02
Mn-54	< 1.88E+01	< 1.59E+01	< 1.04E+01
Nb-95	< 3.39E+01	< 2.98E+01	< 1.97E+01
Ru-103	< 4.86E+01	< 4.45E+01	< 2.90E+01
Ru-106	< 1.59E+02	< 1.33E+02	< 9.45E+01
Sr-89	< 1.11E+02	< 7.16E+01	< 4.78E+01
Sr-90	< 4.53E+01	< 4.27E+01	< 3.06E+01
Zn-65	< 4.74E+01	< 3.66E+01	< 2.41E+01
Zr-95	< 5.63E+01	< 5.38E+01	< 3.28E+01

Nuclide	22-JUN Quillback	22-JUN White Bass	22-JUN White Perch
Ba-140	< 1.44E+03	< 1.64E+02	< 3.83E+02
Be-7	< 4.76E+02	< 6.68E+01	< 1.55E+02
Ce-141	< 1.11E+02	< 2.12E+01	< 4.29E+01
Ce-144	< 1.24E+02	< 2.32E+01	< 4.58E+01
Co-58	< 4.41E+01	< 6.47E+00	< 1.38E+01
Co-60	< 2.94E+01	< 4.04E+00	< 8.89E+00
Cs-134	< 3.38E+01	< 4.50E+00	< 8.92E+00
Cs-137	< 2.59E+01	< 3.40E+00	< 8.76E+00
Fe-59	< 1.59E+02	< 2.32E+01	< 3.90E+01
K-40	3.88E+03	3.24E+03	2.77E+03
La-140	< 1.44E+03	< 1.64E+02	< 3.83E+02
Mn-54	< 2.81E+01	< 4.13E+00	< 8.64E+00
Nb-95	< 5.17E+01	< 6.52E+00	< 1.50E+01
Ru-103	< 7.15E+01	< 1.03E+01	< 2.18E+01
Ru-106	< 2.51E+02	< 3.32E+01	< 7.80E+01
Sr-89	< 9.36E+01	< 6.48E+01	< 8.19E+01
Sr-90	< 2.51E+01	< 4.12E+01	< 2.62E+01
Zn-65	< 6.43E+01	< 1.12E+01	< 1.95E+01
Zr-95	< 9.85E+01	< 1.21E+01	< 2.83E+01

FERMI 2
FISH ANALYSIS

F-3 (Control)
(pCi/kg wet)

Nuclide	22-JUN White Sucker	22-JUN Walleye	6 NOV Walleye
Ba-140	< 9.45E+02	< 5.98E+02	< 4.14E+01
Be-7	< 3.24E+02	< 1.49E+02	< 6.84E+01
Ce-141	< 8.90E+01	< 3.07E+01	< 1.23E+01
Ce-144	< 9.61E+01	< 3.29E+01	< 4.12E+01
Co-58	< 2.86E+01	< 1.61E+01	< 7.58E+00
Co-60	< 1.84E+01	< 1.23E+01	< 8.96E+00
Cs-134	< 2.07E+01	< 1.15E+01	< 8.10E+00
Cs-137	< 1.68E+01	< 9.12E+00	< 8.47E+00
Fe-59	< 9.36E+01	< 5.76E+01	< 1.73E+01
K-40	3.83E+03	2.93E+03	3.27E+03
La-140	< 9.45E+02	< 5.98E+02	< 1.35E+01
Mn-54	< 1.93E+01	< 9.81E+00	< 7.62E+00
Nb-95	< 3.74E+01	< 1.78E+01	< 7.94E+00
Ru-103	< 4.76E+01	< 2.52E+01	< 7.55E+00
Ru-106	< 1.61E+02	< 7.89E+01	< 6.81E+01
Sr-89	< 6.73E+01	< 7.68E+01	< 1.42E+02
Sr-90	< 5.26E+01	< 2.41E+01	< 5.66E+01
Zn-65	< 4.53E+01	< 3.06E+01	< 1.81E+01
Zr-95	< 5.35E+01	< 3.30E+01	< 1.31E+01

Nuclide	6 NOV Yellow Perch
Ba-140	< 1.19E+02
Be-7	< 1.76E+02
Ce-141	< 2.05E+01
Ce-144	< 7.27E+01
Co-58	< 2.70E+01
Co-60	< 3.90E+01
Cs-134	< 2.84E+01
Cs-137	< 2.70E+01
Fe-59	< 6.52E+01
K-40	3.14E+03
La-140	< 6.09E+01
Mn-54	< 2.57E+01
Nb-95	< 2.65E+01
Ru-103	< 2.22E+01
Ru-106	< 2.07E+02
Sr-89	< 8.79E+01
Sr-90	< 6.68E+01
Zn-65	< 7.43E+01
Zr-95	< 4.40E+01

Appendix D

Environmental Program Exceptions

Environmental Program Exceptions

On occasions, samples cannot be collected. This can be due to a variety of events, such as equipment malfunction, loss of electrical power, severe weather conditions, or vandalism. In 2012, missed samples were a result of missing field TLDs. The following sections list all missed samples, changes and corrective actions taken during 2012. These missed samples did not have a significant impact on the execution of the REMP.

Direct Radiation Monitoring

All TLDs are placed in the field in inconspicuous locations to minimize the loss of TLDs due to vandalism. During 2012, three hundred sixteen (316) TLDs were placed in the field for the REMP program and all but four (4) TLDs were collected and processed.

- During the first quarter collection T-24, was found missing and was replaced with the next quarter's TLDs.
- During the second quarter collection T-25was found missing and was replaced with the next quarter's TLDs.
- During the third quarter collection T-30was found missing and was replaced with the next quarter's TLDs.
- During the fourth quarter collection T-30was found missing and was replaced with the next quarter's TLDs.

Atmospheric Monitoring

During 2012, two hundred sixty (260) air samples were placed in the field and all were collected and processed. There were no changes to the Atmospheric Monitoring program during 2012.

Terrestrial Monitoring - None

Milk Sampling - None

Garden Sampling - None

Groundwater Sampling - None

Aquatic Monitoring - None

Drinking Water Sampling - None

Surface Water Sampling - None

Sediment Sampling - None

Fish Sampling - None

Program Changes - None

Appendix E

Interlaboratory Comparison Data
GEL Laboratories'
Quality Assurance Programs
and the
Annual Quality Assurance Status Report
Environmental Dosimetry Company

Interlaboratory Comparison Program for 2012

In an interlaboratory comparison program, participant laboratories receive from a commerce source, environmental samples of known activity concentration for analysis. After the samples have been analyzed by the laboratory, the manufacturer of the sample reports the known activity concentration of the samples to the laboratory. The laboratory compares its results to the reported concentrations to determine any significant deviations, investigates such deviations if found, and initiates corrective action if necessary. Participation in this program provides assurance that the contract laboratory is capable of meeting accepted criteria for radioactivity analysis. The following is GEL Laboratories' participation in an interlaboratory comparison program and the Annual Quality Assurance Status Report for the Environmental Dosimetry Company.

GEL | Laboratories LLC

2012 ANNUAL QUALITY ASSURANCE REPORT

FOR THE

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM (REMP)

GEL LABORATORIES, LLC
P.O. Box 30712, Charleston, SC 29417
843.556.8171

2012 ANNUAL QUALITY ASSURANCE REPORT

FOR THE

RADIOLOGICAL ENVIRONMENTAL

MONITORING PROGRAM (REMP)

Approved By: [signature] February 28, 2013

Robert L. Pullano — Date

Director, Quality Systems

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2012 ANNUAL QUALITY ASSURANCE REPORT FOR THE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM (REMP)

1. Introduction

GEL Laboratories, LLC (GEL) is a privately owned environmental laboratory dedicated to providing personalized client services of the highest quality. GEL was established as an analytical testing laboratory in 1981. Now a full service lab, our analytical divisions use state of the art equipment and methods to provide a comprehensive array of organic, inorganic, and radiochemical analyses to meet the needs of our clients.

At GEL, quality is emphasized at every level of personnel throughout the company. Management's ongoing commitment to good professional practice and to the quality of our testing services to our customers is demonstrated by their dedication of personnel and resources to develop, implement, assess, and improve our technical and management operations.

The purpose of GEL's quality assurance program is to establish policies, procedures, and processes to meet or exceed the expectations of our clients. To achieve this, all personnel that support these services to our clients are introduced to the program and policies during their initial orientation, and annually thereafter during company-wide training sessions.

GEL's primary goals are to ensure that all measurement data generated are scientifically and legally defensible, of known and acceptable quality per the data quality objectives (DQOs), and thoroughly documented to provide sound support for environmental decisions. In addition, GEL continues to ensure compliance with all contractual requirements, environmental standards, and regulations established by local, state and federal authorities.

GEL administers the QA program in accordance with the Quality Assurance Plan, GL-QS-B-001. Our Quality Systems include all quality assurance (QA) policies and quality control (QC) procedures necessary to plan, implement, and assess the work we perform. GEL's QA Program establishes a quality management system (QMS) that governs all of the activities of our organization.

This report entails the quality assurance program for the proficiency testing and environmental monitoring aspects of GEL for 2012. GEL's QA Program is designed to monitor the quality of analytical processing associated with environmental, radiobioassay, effluent (10 CFR Part 50), and waste (10 CFR Part 61) sample analysis.

This report covers the category of Radiological Environmental Monitoring Program (REMP) and includes:

- Intra-laboratory QC results analyzed during 2012.
- Inter-laboratory QC results analyzed during 2012 where known values were available.

2. Quality Assurance Programs for Inter-laboratory, Intra-laboratory and Third Party Cross-Check

In addition to internal and client audits, our laboratory participates in annual performance evaluation studies conducted by independent providers. We routinely participate in the following types of performance audits:

- Proficiency testing and other inter-laboratory comparisons
- Performance requirements necessary to retain Certifications
- Evaluation of recoveries of certified reference and in-house secondary reference materials using statistical process control data.
- Evaluation of relative percent difference between measurements through SPC data.

We also participate in a number of proficiency testing programs for federal and state agencies and as required by contracts. It is our policy that no proficiency evaluation samples be analyzed in any special manner. Our annual performance evaluation participation generally includes a combination of studies that support the following:

- US Environmental Protection Agency Discharge Monitoring Report, Quality Assurance Program (DMR-QA). Annual national program sponsored by EPA for laboratories engaged in the analysis of samples associated with the NPDES monitoring program. Participation is mandatory for all holders of NPDES permits. The permit holder must analyze for all of the parameters listed on the discharge permit. Parameters include general chemistry, metals, BOD/COD, oil and grease, ammonia, nitrates, etc.

- Department of Energy Mixed Analyte Performance Evaluation Program (MAPEP). A semiannual program developed by DOE in support of DOE contractors performing waste analyses. Participation is required for all laboratories that perform environmental analytical measurements in support of environmental management activities. This program includes radioactive isotopes in water, soil, vegetation and air filters.

- ERA's MRAD-Multimedia Radiochemistry Proficiency test program. This program is for labs seeking certification for radionuclides in wastewater and solid waste. The program is conducted in strict compliance with USEPA National Standards for Water Proficiency study.

- ERA's InterLaB RadCheM Proficiency Testing Program for radiological analyses. This program completes the process of replacing the USEPA EMSL-LV Nuclear Radiation Assessment Division program discontinued in 1998. Laboratories seeking certification for radionuclide analysis in drinking water also use the study. This program is conducted in strict compliance with the USEPA National Standards for Water Proficiency Testing Studies. This program encompasses Uranium by EPA method 200.8 (for drinking water certification in Florida/Primary NELAP), gamma emitters, Gross Alpha/Beta, Iodine-131, naturally occurring radioactive isotopes, Strontium-89/90, and Tritium.

- ERA's Water Pollution (WP) biannual program for waste methodologies includes parameters for both organic and inorganic analytes.
- ERA's Water Supply (WS) biannual program for drinking water methodologies includes parameters for organic and inorganic analytes.
- Environmental Cross-Check Program administered by Eckert & Ziegler Analytics, Inc. This program encompasses radionuclides in water, soil, milk, naturally occurring radioactive isotopes in soil and air filters.

GEL procures single-blind performance evaluation samples from Eckert & Ziegler Analytics to verify the analysis of sample matrices processed at GEL. Samples are received on a quarterly basis. GEL's Third-Party Cross-Check Program provides environmental matrices encountered in a typical nuclear utility REMP. The Third-Party Cross-Check Program is intended to meet or exceed the inter-laboratory comparison program requirements discussed in NRC Regulatory Guide 4.15, revision 1. Once performance evaluation samples have been prepared in accordance with the instructions provided by the PT provider, samples are managed and analyzed in the same manner as environmental samples from GEL's clients.

3. Quality Assurance Program for Internal and External Audits

During each annual reporting period, at least one internal assessment of each area of the laboratory is conducted in accordance with the pre-established schedule from Standard Operating Procedure for the Conduct of Quality Audits, GL-QS-E-001. The annual internal audit plan is reviewed for adequacy and includes the scheduled frequency and scope of quality control actions necessary to GEL's QA program. Internal audits are conducted at least annually in accordance with a schedule approved by the Quality Systems Director. Supplier audits are contingent upon the categorization of the supplier, and may or may not be conducted prior to the use of a supplier or subcontractor. Type I suppliers and subcontractors, regardless of how they were initially qualified, are re-evaluated at least once every three years.

In addition, prospective customers audit GEL during pre-contract audits. GEL hosts several external audits each year for both our clients and other programs. These programs include environmental monitoring, waste characterization, and radiobioassay. The following list of programs may audit GEL at least annually or up to every three years depending on the program.

- NELAC, National Environmental Laboratory Accreditation Program
- DOECAP, U.S. Department of Energy Consolidated Audit Program
- DOELAP, U.S. Department of Energy Laboratory Accreditation Program
- DOE QSAS, U.S. Department of Energy, Quality Systems for Analytical Services
- ISO/IEC 17025
- A2LA, American Association for Laboratory Accreditation
- DOD ELAP, US Department of Defense Environmental Accreditation Program
- NUPIC, Nuclear Procurement Issues Committee
- South Carolina Department of Heath and Environmental Control (SC DHEC)

The annual radiochemistry laboratory internal audit (12-RAD-001) was conducted in March 2012. Two (2) findings, three (3) observations, and three (3) recommendations resulted from this assessment. In May, 2012, each finding was closed and appropriate laboratory staff addressed each observation and recommendation.

The Nuclear Procurement Issues Committee (NUPIC) follow up verification audit was conducted on October 16, 2012 through October 17, 2012. This Duke Energy/NUPIC QA audit was performed to verify that the six audit findings identified in the 2011 NUPIC audit had been successfully implemented.

The audit confirmed that the actions taken to the six findings have been adequately addressed by GEL. The Audit Report # 22837-A for Supplier Number 5644 has been posted on the NUPIC website.

4. Performance Evaluation Acceptance Criteria for Environmental Sample Analysis

GEL utilized an acceptance protocol based upon two performance models. For those inter-laboratory programs that already have established performance criteria for bias (i.e., MAPEP, and ERA/ELAP), GEL will utilize the criteria for the specific program. For intra-laboratory or third party quality control programs that do not have a specific acceptance criteria (i.e. the Eckert-Ziegler Analytics Environmental Cross-check Program), results will be evaluated in accordance with GEL's internal acceptance criteria.

5. Performance Evaluation Samples

Performance Evaluation (PE) results and internal quality control sample results are evaluated in accordance with GEL acceptance criteria. The first criterion concerns bias, which is defined as the deviation of any one result from the known value. The second criterion concerns precision, which deals with the ability of the measurement to be replicated by comparison of an individual result with the mean of all results for a given sample set.

At GEL, we also evaluate our analytical performance on a regular basis through statistical process control (SPC) acceptance criteria. Where feasible, this criterion is applied to both measures of precision and accuracy and is specific to sample matrix. We establish environmental process control limits at least annually.

For Radiochemistry analysis, quality control evaluation is based on static limits rather than those that are statistically derived. Our current process control limits are maintained in GEL's AlphaLIMS. We also measure precision with matrix duplicates and/or matrix spike duplicates. The upper and lower control limits (UCL and LCL respectively) for precision are plus or minus three times the standard deviation from the mean of a series of relative percent differences. The static precision criteria for radiochemical analyses are 0 - 20%, for activity levels exceeding the contract required detection limit (CRDL).

6. Quality Control Program for Environmental Sample Analysis

GEL's internal QA Program is designed to include QC functions such as instrumentation calibration checks (to insure proper instrument response), blank samples, instrumentation backgrounds, duplicates, as well as overall staff qualification analyses and statistical process controls. Both quality control and qualification analyses samples are used to be as similar as the matrix type of those samples submitted for analysis by the various laboratory clients. These performance test samples (or performance evaluation samples) are either actual sample submitted in duplicate in order to evaluate the precision of laboratory measurements, or fortified blank samples, which have been given a known quantity of a radioisotope that is in the interest to GEL's clients.

Accuracy (or Bias) is measured through laboratory control samples and/or matrix spikes, as well as surrogates and internal standards. The UCLs and LCLs for accuracy are plus or minus three times the standard deviation from the mean of a series of recoveries. The static limit for radiochemical analyses is 75 - 125%. Specific instructions for out-of-control situations are provided in the applicable analytical SOP.

GEL's Laboratory Control Standard (LCS) is an aliquot of reagent water or other blank matrix to which known quantities of the method analytes are added in the laboratory. The LCS is analyzed exactly like a sample, and its purpose is to determine whether the methodology is in control, and whether the laboratory is capable of making accurate and precise measurements. Some methods may refer to these samples as Laboratory Fortified Blanks (LFB). The requirement for recovery is between 75 and 125% for radiological analyses excluding drinking water matrix.

$$\text{Bias (\%)} = \frac{\text{(observed concentration)}}{\text{(known concentration)}} * 100\ \%$$

Precision is a data quality indicator of the agreement between measurements of the same property, obtained under similar conditions, and how well they conform to themselves. Precision is usually expressed as standard deviation, variance or range in either absolute or relative (percentage) terms.

GEL's laboratory duplicate (DUP or LCSD) is an aliquot of a sample taken from the same container and processed in the same manner under identical laboratory conditions. The aliquot is analyzed independently from the parent sample and the results are compared to measure precision and accuracy.

If a sample duplicate is analyzed, it will be reported as Relative Percent Difference (RPD). The RPD must be 20 percent or less, if both samples are greater than 5 times the MDC. If both results are less than 5 times MDC, then the RPD must be equal to or less than 100%. If one result is above the MDC and the other is below the MDC, then the RPD can be calculated using the MDC for the result of the one below the MDC. The RPD must be 100% or less. In the situation where both results are above the MDC but one result is greater than 5 times the MDC and the other is less than 5 times the MDC, the RPD must be less than or equal to 20%. If both results are below MDC, then the limits on % RPD are not applicable.

$$\text{Difference (\%)} = \frac{\text{(high duplicate result – low duplicate result)}}{\text{(average of results)}} * 100\ \%$$

7. Summary of Data Results

During 2012, forty-three (43) radioisotopes associated with seven (7) matrix types were analyzed under GEL's Performance Evaluation program in participation with ERA, MAPEP, and Eckert & Ziegler Analytics. Matrix types were representative of client analyses performed during 2012. Of the four hundred forty-four (444) total results reported, 98% (433 of 444) were found to be acceptable. The list below contains the type of matrix evaluated by GEL.

- Air Filter
- Cartridge
- Water
- Milk
- Soil
- Liquid
- Vegetation

Graphs are provided in Figures 1-9 of this report to allow for the evaluation of trends or biases. These graphs include radioisotopes Cobalt-60, Cesium-137, Tritium, Strontium-90, Gross Alpha, Gross Beta, Iodine-131, Americium-241, and Plutonium-238.

8. Summary of Participation in the Eckert & Ziegler Analytics Environmental Cross-Check Program

Eckert & Ziegler Analytics provided samples for nintety-two (92) individual environmental analyses. The accuracy of each result reported to Eckert & Ziegler Analytics, Inc. is measured by the ratio of GEL's result to the known value. All results fell within GEL's acceptance criteria (100%). .

9. Summary of Participation in the MAPEP Monitoring Program

MAPEP Series 25, 26 and 27 were analyzed by the laboratory. Of the one hundred twenty-nine (129) analyses, 94% (121 out of 129) of all results fell within the PT provider's acceptance criteria. Eight analytical failures occurred: Cobalt-57 in soil, Uranium-234/235 in filter, Strontium-90 in vegetation, Uranium 234/235 in vegetation, Strontium-90 in soil, Uranium-234/235 in filter, Uranium-238 in filter and Gross Alpha in Filter.

For the corrective actions associated with MAPEP Series 26 and 27, refer to CARR120711-694, CARR120711-698, CARR121127-742, CARR121127-743, and CARR121127-744 please see Table 8.

10. Summary of Participation in the ERA MRaD PT Program

The ERA MRad program provided samples (MRAD-16 and MRAD-17) for one hundred seventy-nine individual environmental analyses. All results (100%) fell within the PT provider's acceptance criteria.

11. Summary of Participation in the ERA PT Program

The ERA program provided samples (RAD-88, RAD-89, RAD-90 and RAD-91) for forty-four (44) individual environmental analyses. Of the 44 analyses, 93% (41 out of 44) of all results fell within the PT provider's acceptance criteria. Three analytical failures occurred: Barium-133 in water, Zinc-65 in soil, and I-131 in water.

For the corrective actions associated with RAD-88, and RAD-90, refer to corrective actions CARR120306-667 and CARR120831-715 (Table 8).

12. Corrective Action Request and Report (CARR)

There are two categories of corrective action at GEL. One is corrective action implemented at the analytical and data review level in accordance with the analytical SOP. The other is formal corrective action documented by the Quality Systems Team in accordance with GL-QS-E-002. A formal corrective action is initiated when a nonconformance reoccurs or is so significant that permanent elimination or prevention of the problem is required. Formal corrective action investigations include root cause analysis.

GEL includes quality requirements in most analytical standard operating procedures to ensure that data are reported only if the quality control criteria are met or the quality control measures that did not meet the acceptance criteria are documented. A formal corrective action is implemented according to GL-QS-E-002 for Conducting Corrective/Preventive Action and Identifying Opportunities for Improvement. Recording and documentation is performed following guidelines stated in GL-QS-E-012 for Client NCR Database Operation.

Any employee at GEL can identify and report a nonconformance and request that corrective action be taken. Any GEL employee can participate on a corrective action team as requested by the QS team or Group Leaders. The steps for conducting corrective action are detailed in GL-QS-E-002. In the event that correctness or validity of the laboratory's test results in doubt, the laboratory will take corrective action. If investigations show that the results have been impacted, affected clients will be informed of the issue in writing within five (5) calendar days of the discovery.

Table 8 provides the status of CARRs for radiological performance testing during 2012. **It has been determined that causes of the failures did not impact any data reported to our clients.**

13. References

1. GEL Quality Assurance Plan, GL-QS-B-001
2. GEL Standard Operating Procedure for the Conduct of Quality Audits, GL-QS-E-001
3. GEL Standard Operating Procedure for Conducting Corrective/Preventive Action and Identifying Opportunities for Improvement, GL-QS-E-002
4. GEL Standard Operating Procedure for AlphaLIMS Documentation of Nonconformance Reporting and Dispositioning and Control of Nonconforming Items, GL-QS-E-004
5. GEL Standard Operating Procedure for Handling Proficiency Evaluation Samples, GL-QS-E-013
6. GEL Standard Operating Procedure for Quality Assurance Measurement Calculations and Processes, GL-QS-E-014
7. 40 CFR Part 136 Guidelines Establishing Test Procedures for the Analysis of Pollutants
8. ISO/IEC 17025-2005, General Requirements for the Competence of Testing and Calibration Laboratories
9. ANSI/ASQC E4-1994, Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs, American National Standard
10. 2003 NELAC Standard, National Environmental Laboratory Accreditation Program
11. MARLAP, Multi-Agency Radiological Laboratory Analytical Protocols
12. 10 CFR Part 21, Reporting of Defects and Noncompliance
13. 10 CFR Part 50 Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants
14. 10 CFR Part 61, Licensing Requirements for Land Disposal and Radioactive Waste
15. NRC REG Guide 4.15 and NRC REG Guide 4.8

TABLE 1

2012 RADIOLOGICAL PROFICIENCY TESTING RESULTS AND ACCEPTANCE CRITERIA

PT Provider	Quarter / Year	Analytical Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Barium-133	58.2	57.1	47.3-63.0	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Cesium-134	63.5	64	52.0-70.4	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Cesium-137	89.5	91.2	82.1-103	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Cobalt-60	49.5	48.9	44.0-56.4	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Zinc-65	75	71.8	64.2-86.7	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Gross Alpha	31.0	35.7	18.4-45.9	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Gross Beta	27.3	28.8	18.3-36.6	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Gross Alpha	29.8	35.7	18.4-45.9	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Radium-226	8.89	8.73	6.55-10.2	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Radium-228	5.9	5.78	3.53-7.60	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Uranium (Nat)	31.6	32.5	26.2-36.3	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	ug/L	Uranium (Nat) mass	49.9	47.5	38.3-53.1	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Radium-226	8.80	8.73	6.55-10.2	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Radium-228	4.8	5.78	3.53-7.60	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Uranium (Nat)	27.6	32.5	26.2-36.3	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	ug/L	Uranium (Nat) mass	41.2	47.5	38.3-53.1	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Tritium	16200	19200	16800-21100	Not Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Strontium-89	38.4	42.5	32.7-49.6	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Strontium-90	23.5	24.2	17.4-28.3	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Strontium-89	42.2	42.5	32.7-49.6	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Strontium-90	24.2	24.2	17.4-28.3	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Iodine-131	28.4	25.7	21.3-30.3	Acceptable
ERA	1st/2012	03/06/12	RAD - 88	Water	pCi/L	Iodine-131	28.4	25.7	21.3-30.3	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Cartridge	pCi	Iodine-131	9.52E+01	8.92E+01	1.07	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Strontium-89	8.78E+01	8.96E+01	0.98	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Strontium-90	1.51E+01	1.48E+01	1.02	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Iodine-131	9.36E+01	9.02E+01	1.04	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Chromium-51	5.53E+02	5.66E+02	0.98	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Cesium-134	1.59E+02	1.71E+02	0.93	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Cesium-137	2.27E+02	2.10E+02	1.08	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Cobalt-58	2.18E+02	2.21E+02	0.99	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Manganese-54	2.52E+02	2.41E+02	1.05	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Iron-59	1.90E+02	1.83E+02	1.04	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Zinc-65	3.19E+02	2.91E+02	1.09	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Cobalt-60	2.82E+02	2.70E+02	1.04	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Cesium-141	1.00E+01	Not spiked	None	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Iodine-131	8.44E+01	8.87E+01	0.95	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Chromium-51	5.32E+02	5.66E+02	0.94	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Cesium-134	1.56E+02	1.71E+02	0.91	Acceptable

EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Cesium-137	2.06E+02	2.10E+02	0.98	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Cobalt-58	2.02E+02	2.21E+02	0.92	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Manganese-54	2.50E+02	2.41E+02	1.04	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Iron-59	1.81E+02	1.83E+02	0.99	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Zinc-65	2.95E+02	2.91E+02	1.01	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Cobalt-60	2.58E+02	2.70E+02	0.96	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Cesium-141	-9.60E+01	Not spiked	None	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Iodine-131	1.01E+02	9.38E-01	1.08	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Cerium-141	2.64E+00	2.60E+00	1.01	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Chromium-51	3.34E+02	3.09E+02	1.08	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Cesium-134	9.90E-01	1.13E+02	0.94	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Cesium-137	1.26E+02	1.13E+02	1.12	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Cobalt-58	9.55E-01	9.34E-01	1.02	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Manganese-54	1.49E+02	1.38E+02	1.08	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Iron-59	1.40E+02	1.19E+02	1.18	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Zinc-65	2.58E+02	2.35E+02	1.1	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Cobalt-60	2.14E+02	1.97E+02	1.09	Acceptable
EZA	1st/2012	03/15/12	E10041	Milk	pCi/L	Strontium-89	7.94E-01	7.99E-01	0.99	Acceptable
EZA	1st/2012	03/15/12	E10041	Milk	pCi/L	Strontium-90	1.12E+01	1.14E+01	0.98	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Iodine-131	1.02E+02	1.54E+02	1.10	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Cerium-141	2.64E+02	2.60E+02	1.01	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Chromium-51	4.46E+02	4.36E+02	1.02	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Cesium-134	1.31E+02	1.49E+02	0.88	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Cesium-137	1.62E+02	1.59E+02	1.02	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Cobalt-58	1.28E+02	1.32E+02	0.97	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Manganese-54	1.99E+02	1.95E+02	1.02	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Iron-59	1.96E+02	1.68E+02	1.17	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Zinc-65	3.50E+02	3.33E+02	1.05	Acceptable
EZA	1st/2012	03/15/12	E10040	Milk	pCi/L	Cobalt-60	2.90E+02	2.79E+02	1.04	Acceptable
EZA	1st/2012	03/15/12	E7465-278	Cartridge	pCi	Iodine-131	8.93E+01	9.42E+01	0.95	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Actinium-228	1330	1570	110-2180	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Americium-241	900	938	549-1220	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Bismuth-212	1540	1550	413-2280	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Bismuth-214	1100	1100	665-1590	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Cesium-134	2380	2180	1420-2620	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Cesium-137	10700	8770	6720-11300	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Cobalt-60	4060	3500	2370-4820	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Lead-212	1380	1510	992-2110	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Lead-214	1350	1110	647-1650	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Manganese-54	<37.2	<1000	0-1000	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Plutonium-238	842	984.00	592-1360	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Plutonium-239	793	879.00	575-1210	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Potassium-40	10400	11600	8470-15600	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Strontium-90	7370	8800	3360-13900	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Thorium-234	2360	2000	632-3760	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Zinc-65	4540	3650	2910-4850	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Strontium-90	7370	8800	3360-13900	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Uranium-234	2250	1960	1200-2510	Acceptable

ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Uranium-238	1620	2000	1240-2540	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Uranium-Total	4220	4030	2190-5320	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Soil	ug/kg	Uranium-Total(mass)	5070	5880	3240-7400	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	pCi/kg	Americium-241	4270	4540	2780-6040	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	pCi/kg	Curium-244	829	812	400 - 1260	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	pCi/kg	Plutonium-238	2300	2570	1400-3220	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	pCi/kg	Plutonium-239	2480	2570	1580-3540	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	pCi/kg	Uranium-234	3310	3610	2370-4640	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	pCi/kg	Uranium-238	3540	3580	2390-4550	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	pCi/kg	Uranium-Total	7025	7350	4980-9150	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	ug/kg	Uranium-Total(mass)	10600	10700	7170-13600	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	pCi/kg	Americium-241	4270	4540	2780-6040	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	pCi/kg	Cesium-134	2840	2920	1880-3790	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	pCi/kg	Cesium-137	1330	1340	972-1860	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	pCi/kg	Cobalt-60	2380	2210	1520-3090	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	pCi/kg	Manganese-54	<68.8	<300	0.00-300	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	pCi/kg	Potassium-40	33700	28600	20700-40100	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	pCi/kg	Zinc-65	2570	2310	1670-3240	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Veg	pCi/kg	Strontium-90	7000	8520	4860-11300	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Americium-241	72.4	68.8	42.4-93.1	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Plutonium-238	57.3	63.2	43.3-83.1	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Plutonium-239	58.8	63	45.6-82.4	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Uranium-234	42.5	47.5	29.4-71.6	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Uranium-238	44.5	47.4	30.4-65.1	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Uranium-Total	89.4	96.7	53.5-147	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	ug/Filter	Uranium-Total(mass)	134	141	90.2-198	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Americium-241	72.4	68.8	42.4-93.1	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Cesium-134	260	279	182 - 345	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Cesium-137	1210	1130	849-1480	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Cobalt-60	942	880	681-1100	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Manganese-54	<7.68	<50.0	0-50.0	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Zinc-65	1040	897	642-1240	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Strontium-90	87	89.6	43.8-134	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Iron-55	776	739	229-1440	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	ug/Filter	Uranium-Total(mass)	147	141	90.2-198	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Gross Alpha	93.9	77.8	26.1-121	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Gross Beta	57.3	52.5	33.2-76.5	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Uranium-234	92.6	105	78.9-135	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Uranium-238	94.9	104	79.3-128	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Uranium-Total	192.6	214	157-277	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	ug/L	Uranium-Total(mass)	285	312	249-377	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Americium-241	132	135	91.0-181	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Plutonium-238	127	135	99.9-168	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Plutonium-239	107	112	86.9-141	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Cesium-134	580	609	447-700	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Cesium-137	1290	1250	1060-1500	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Cobalt-60	910	875	760-1020	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Manganese-54	<5.0	<100	0.00-100	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Zinc-65	822	749	624-945	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Strontium-90	970	989	644-1310	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Iron-55	987	863	514-1170	Acceptable

ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Gross Alpha	95.9	103	36.6-160	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Gross Beta	50	43.7	25.0-64.7	Acceptable
ERA	2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Tritium	8740	9150	6130-13000	Acceptable
ERA	2nd/2012	05/24/12	RAD-89	Water	pCi/L	Tritium	1700	15800	13800-17400	Acceptable
MAPEP	2nd/2012	05/03/12	MAPEP-11-GrF24	Filter	Bq/sample	Gross Alpha	0.000	0.000	False Pos. Test	Acceptable
MAPEP	2nd/2012	05/03/12	MAPEP-11-GrF24	Filter	Bq/sample	Gross Beta	0.000	0.000	False Pos. Test	Acceptable
EZA	2nd/2012	06/14/12	E10175	Cartridge	pCi	Iodine-131	9.67E+01	9.72E+01	0.99	Acceptable
EZA	2nd/2012	06/14/12	E10176	Milk	pCi/L	Strontium-89	1.11E+02	9.98E+01	1.11	Acceptable
EZA	2nd/2012	06/14/12	E10176	Milk	pCi/L	Strontium-90	1.06E+02	1.27E+01	0.83	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Iodine-131	9.94E+01	9.97E+01	1.00	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Cerium-141	8.62E+01	8.22E+01	1.05	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Chromium-51	3.76E+02	4.02E+02	0.94	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Cesium-134	1.63E+02	1.74E+02	0.93	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Cesium-137	2.08E+02	2.12E+02	0.98	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Cobalt-58	8.94E+01	9.23E+01	0.97	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Manganese-54	1.27E+02	1.32E+02	0.96	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Iron-59	1.46E+02	1.28E+02	1.14	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Zinc-65	2.22E+02	1.99E+02	1.11	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Cobalt-60	3.52E+02	3.55E+02	0.99	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Iodine-131	9.94E+01	9.94E+01	1.00	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Cerium-141	1.31E+02	1.12E+02	1.17	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Chromium-51	5.51E+02	5.48E+02	1.01	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Cesium-134	2.22E+02	2.38E+02	0.93	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Cesium-137	2.91E+02	2.89E+02	1.01	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Cobalt-58	1.35E+02	1.26E+02	1.07	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Manganese-54	1.83E+02	1.80E+02	1.02	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Iron-59	2.00E+02	1.74E+02	1.15	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Zinc-65	2.94E+02	2.72E+02	1.08	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Cobalt-60	5.04E+02	4.84E+02	1.04	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Americium-241	152	159	111-207	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Cesium-134	754	828	580-1076	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Cesium-137	0	0	False Pos Test	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Cobalt-57	1430.0	1179	825-1533	Warning
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Cobalt-60	0.97	1.56	Sens. Eval.	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Iron-55	1456	1370	959-1781	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Manganese-54	596	558	391-725	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Nickel-63	888.0	862	603-1121	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Plutonium-238	127.0	136	95-177	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Plutonium-239/240	61.13	65.8	46.1-85.5	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Potassium-40	1495	1491	1044-1938	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Strontium-90	391.7	392	274-510	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Technetium-99	345.3	374	262-486	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Americium-241	1.5067	1.630	1.14-2.12	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Cesium-134	0.09	0.0	False Pos Test	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Cesium-137	41.2	39.9	27.9-51.9	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-	Water	Bq/L	Cobalt-57	34.45	32.9	23.0-42.8	Acceptable

			MaW26							
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Cobalt-60	23.90	23.7	16.60-30.84	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Hydrogen-3	481.7	437	306-568	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Iron-55	88.10	81.9	57.3-106.5	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Manganese-54	33.3	31.8	22.3-41.3	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Nickel-63	59.6	60.0	42.0-78.0	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Plutonium-238	0.555	0.629	0.110-0.818	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Plutonium-239/240	1.230	1.340	0.94-1.74	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Potassium-40	156.5	142	99-185	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Strontium-90	0.01	0.00	False Pos Test	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Technetium-99	26.3	27.90	19.5-36.3	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Uranium-234/233	0.381	0.39	0.270-0.510	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Uranium-238	2.537	2.76	1.93-3.59	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Zinc-65	-0.220	0.00	False Pos Test	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-GrW26	Water	Bq/L	Gross Alpha	2.043	2.140	0.64-3.64	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-GrW26	Water	Bq/L	Gross Beta	6.820	6.36	3.18-9.54	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	ug/sample	Uranium-235	0.200	0.019	0.0131-0.243	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	ug/sample	Uranium-238	9.5	10.0	7.0-13.0	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	ug/sample	Uranium-Total	9.98	10.0	7.0-13.0	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	ug/sample	Americium-241	0.660	0.073	0.051-0.095	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Cesium-134	2.29	2.38	1.67-3.09	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Cesium-137	1.910	1.79	1.25-2.33	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Cobalt-57	0.008	0.00	False Pos Test	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Cobalt-60	2.235	2.18	1.527-2.837	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Manganese-54	3.440	3.24	2.27-4.21	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Plutonium-238	0.004	0.002	Sens. Eval.	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Plutonium-239/240	0.088	0.0970	0.068-0.126	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Strontium-90	0.012	0.00	False Pos Test	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Uranium-234/233	0.010	0.0188	0.0132-0.0244	Not Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Uranium-238	0.111	0.124	0.087-0.161	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Zinc-65	3.460	2.99	2.09-3.89	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Gross Alpha	0.780	1.200	0.4-2.0	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Gross Beta	2.59	2.40	1.2-3.6	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Americium-241	0.005	0.00	False Pos Test	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdV26	Vegetation	Bq/sample	Cesium-134	7.655	8.43	5.90-10.96	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdV26	Vegetation	Bq/sample	Cesium-137	-0.025	0.00	False Pos Test	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdV26	Vegetation	Bq/sample	Cobalt-57	11.950	12.00	8.4-15.6	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdV26	Vegetation	Bq/sample	Cobalt-60	6.255	6.05	4.24-7.87	Acceptable

MAPEP	3rd/2012	07/26/12	MAPEP-12-RdV26	Vegetation	Bq/sample	Manganese-54	0.029	0.00	False Pos Test	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdV26	Vegetation	Bq/sample	Plutonium-238	0.194	0.219	0.153-0.285	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdV26	Vegetation	Bq/sample	Plutonium-239/240	0.1226	0.152	0.106-0.198	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdV26	Vegetation	Bq/sample	Strontium-90	1.613	2.11	1.48-2.74	Warning
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdV26	Vegetation	Bq/sample	Uranium-234/233	0.030	0.411	0.0288-0.0534	Warning
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdV26	Vegetation	Bq/sample	Uranium-238	0.224	0.278	0.195-0.361	Acceptable
MAPEP	3rd/2012	07/26/12	MAPEP-12-RdV26	Vegetation	Bq/sample	Zinc-65	9.720	8.90	6.23-11.57	Acceptable
EZA	3rd/2012	11/06/12	E10281	Cartridge	pCi	Iodine-131	1.02E+02	9.64E+01	1.06	Acceptable
EZA	3rd/2012	11/06/12	E10283	Milk	pCi/L	Strontium-89	9.87E+01	9.96E+01	0.99	Acceptable
EZA	3rd/2012	11/06/12	E10283	Milk	pCi/L	Strontium-90	1.44E+01	1.60E+01	0.9	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Iodine-131	9.69E+01	9.96E+01	0.97	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Cerium-141	1.61E+02	1.64E+02	0.98	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Chromium-51	2.92E+02	2.48E+02	1.18	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Cesium-134	9.85E+01	1.08E+02	0.91	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Cesium-137	1.76E+02	1.74E+02	1.01	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Cobalt-58	9.72E+01	1.00E+02	0.97	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Manganese-54	1.98E+02	1.96E+02	1.01	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Iron-59	1.62E+02	1.52E+02	1.07	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Zinc-65	2.08E+02	1.92E+02	1.08	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Cobalt-60	1.59E+02	1.52E+02	1.05	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Iodine-131	1.10E+02	9.99E+01	1.1	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Cerium-141	2.49E+02	2.51E+02	0.99	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Chromium-51	3.75E+02	3.80E+02	0.99	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Cesium-134	1.51E+02	1.66E+02	0.91	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Cesium-137	2.72E+02	2.67E+02	1.02	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Cobalt-58	1.56E+02	1.54E+02	1.01	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Manganese-54	3.16E+02	3.00E+02	1.05	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Iron-59	2.65E+02	2.33E+02	1.14	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Zinc-65	3.20E+02	2.95E+02	1.09	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Cobalt-60	2.42E+02	2.33E+02	1.04	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Americium-241	106.67	111	78-144	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Cesium-134	839.5	939	657-1221	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Cesium-137	1230.0	1150	805-1495	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Cobalt-57	1605	1316	921-1711	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Cobalt-60	551.5	531	372-690	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Iron-55	459.3	508	356-660	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Manganese-54	1015	920	644-1196	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Plutonium-238	104.6	106	74.1-137.5	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Plutonium-239/240	132.33	134	94-174	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Potassium-40	723	632	442-822	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Strontium-90	476.7	508	356-660	Warning
MAPEP	4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Technetium-99	385.3	469	328-610	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Uranium-234/233	51.6	60	42.2-78.4	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Uranium-238	238.33	263	184-342	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-	Soil	Bq/kg	Zinc-65	721.5	606	424-788	Acceptable

			MaS27							
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Americium-241	0.9407	1.06	0.74-1.38	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Cesium-134	20.6	23.2	16.2-30.2	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Cesium-137	17.05	16.7	11.7-21.7	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Cobalt-57	29.45	29.3	20.5-38.1	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Cobalt-60	0.03	0.0	False Positive	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Hydrogen-3	334	334	234-434	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Manganese-54	18.4	17.8	12.5-23.1	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Nickel-63	66.2	66.3	46.4-86.2	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Plutonium-238	0.0088	0.0	Sensitivity Eval.	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Plutonium-239/240	1.44	1.61	1.13-2.09	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Potassium-40	140.5	134	94-174	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Strontium-90	11.13	12.2	8.5-15.9	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Technetium-99	4.5	4.58	3.21-5.95	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Uranium-234/233	0.414	0.451	0.316-0.586	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Uranium-238	2.96	3.33	2.33-4.33	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Zinc-65	28.15	25.9	18.1-33.7	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-GrW27	Water	Bq/L	Gross Alpha	1.737	1.79	0.54-3.04	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-GrW27	Water	Bq/L	Gross Beta	8.893	9.1	4.6-13.7	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-XaW27	Water	Bq/L	Iodine-129	6.229	6.82	4.77-8.87	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdF27	Filter	ug/sample	Uranium-235	0.0154	0.0148	0.0104-0.0192	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdF27	Filter	ug/sample	Uranium-238	7.77	8	5.6-10.4	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdF27	Filter	ug/sample	Uranium-Total	7.785	8.1	5.7-10.5	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdF27	Filter	ug/sample	Americium-241	0.0716	0.078	0.0546-0.1014	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdF27	Filter	ug/sample	Cesium-134	2.795	2.74	1.92-3.56	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdF27	Filter	ug/sample	Cesium-137	-0.016	0	False Positive	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdF27	Filter	ug/sample	Cobalt-57	2.265	1.91	1.34-2.48	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdF27	Filter	ug/sample	Cobalt-60	1.865	1.728	1.210-2.246	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdF27	Filter	ug/sample	Manganese-54	2.465	2.36	1.65-3.07	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdF27	Filter	ug/sample	Plutonium-238	0.061	0.0625	0.0438-0.0813	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdF27	Filter	ug/sample	Plutonium-239/240	-0.002	0.00081	Sensitivity Eval.	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdF27	Filter	ug/sample	Strontium-90	0.914	1.03	0.72-1.34	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdF27	Filter	ug/sample	Uranium-234/233	0.009	0.0141	0.0099-0.0183	Not Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdF27	Filter	ug/sample	Uranium-238	0.087	0.1	0.070-0.130	Not Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdF27	Filter	ug/sample	Zinc-65	-0.154	0	False Positive	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-GrF27	Filter	Bq/sample	Gross Alpha	0.2253	0.97	0.29-1.65	Not Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-GrF27	Filter	Bq/sample	Gross Beta	1.93	1.92	0.96-2.88	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdV27	Vegetation	Bq/sample	Americium-241	0.142	0.163	0.114-0.212	Acceptable

MAPEP	4th/2012	11/26/12	MAPEP-12-RdV27	Vegetation	Bq/sample	Cesium-134	6.355	6.51	4.56-8.46	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdV27	Vegetation	Bq/sample	Cesium-137	4.575	4.38	3.07-5.69	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdV27	Vegetation	Bq/sample	Cobalt-57	6.04	5.66	3.96-7.36	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdV27	Vegetation	Bq/sample	Cobalt-60	5.44	5.12	3.58-6.66	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdV27	Vegetation	Bq/sample	Manganese-54	3.565	3.27	2.29-4.25	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdV27	Vegetation	Bq/sample	Plutonium-238	0.176	0.187	0.131-0.243	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdV27	Vegetation	Bq/sample	Plutonium-239/240	0.12	0.123	0.086-0.160	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdV27	Vegetation	Bq/sample	Strontium-90	0.0018	0	False Positive	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdV27	Vegetation	Bq/sample	Uranium-234/233	0.024	0.0257	0.0180-0.0334	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdV27	Vegetation	Bq/sample	Uranium-238	0.143	0.158	0.111-0.205	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdV27	Vegetation	Bq/sample	Uranium-Total	11.1	12.7	8.9-16.5	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-12-RdV27	Vegetation	Bq/sample	Zinc-65	-0.04	0	False Positive	Acceptable
MAPEP	4th/2012	11/26/12	MAPEP-11-XaW25	Water	Bq/sample	Iodine-129	8.723	9.5	6.7 - 12.4	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-234	4310	4310	2830-5540	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-238	4330	4280	2860-5440	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-Total	4849	5190	2960 - 7010	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	ug/kg	Uranium-Total (mass)	8860	8790	5960-10900	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-234	3720	3400	2080-4360	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-238	3350	3420	2120-4340	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-Total	7232	6970	3780-9200	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	ug/kg	Uranium-Total (mass)	10400	10200	5620-12800	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Actinium-228	1400	1240	795-1720	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Americium-241	847	728	426-946	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Bismuth-212	1300	1240	330-1820	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Bismuth-214	1310	1290	777-1860	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Cesium-134	2210	1980	1290-2380	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Cesium-137	4140	3470	2660-4460	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Cobalt-60	5270	4310	2910-5930	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Lead-212	1250	1240	812-1730	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Lead-214	1580	1290	753-1920	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Manganese-54	< 35	< 1000	0.00 - 1000	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Plutonium-238	1250	981	590-1350	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Plutonium-239	1110	871	569-1200	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Potassium-40	11000	12300	8980-16500	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Thorium-234	5120	3420	1080-6430	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Zinc-65	3770	2880	2290-3830	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Strontium-90	6670	6860	2620-10800	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-234	2640	2530	1600 - 3140	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-238	2450	2560	1560 - 3250	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-Total	5200	5190	2960 - 7010	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	ug/kg	Uranium-Total (mass)	7286	7570	4160 - 9520	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	ug/kg	Uranium-Total (mass)	7430	7570	4160 - 9520	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Americium-241	3040	2980	1700 - 4090	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Curium-244	697	642	316 - 1000	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Plutonium-238	3000	2880	1560 - 4220	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Plutonium-239	2910	2980	1850 - 4060	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-234	2580	2420	1660 - 3210	Acceptable

ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-238	2660	2400	1690 - 3030	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-Total	5356	4920	3330 - 6120	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	ug/kg	Uranium-Total (mass)	7970	7180	4810 - 9120	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Cesium-134	1480	1380	790 - 1910	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Cesium-137	1570	1270	932 - 1760	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Cobalt-60	1800	1500	1010 - 2160	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Manganese-54	< 44.0	< 300	0.00 - 300	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Potassium-40	32100	28800	20700 - 40800	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Zinc-65	3470	2770	2000 - 3790	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Strontium-90	6320	5440	3040 - 7220	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Americium-241	3780	3540	2160-4710	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Curium-244	1910	1850	906-2880	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Plutonium-238	2360	2250	1340-3080	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Plutonium-239	2270	2170	1330-2990	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Uranium-234	4310	4310	2830-5540	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Uranium-238	4330	4280	2860-5440	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Uranium-Total	8860	8790	5960-10900	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	ug/kg	Uranium-Total (mass)	13000	12800	8580-16200	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	ug/kg	Uranium-Total (mass)	11900	12800	8580-16200	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Cesium-134	2240	2350	1510-3050	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Cesium-137	2190	2070	1500-2880	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Cobalt-60	2360	2030	1400-2840	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Manganese-54	< 38.6	< 300	0.00 - 300	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Potassium-40	36000	29600	21400-41500	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Zinc-65	2500	1970	1420-2760	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Strontium-90	9040	10000	5700-13300	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Americium-241	64.7	67.1	41.4-90.8	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Plutonium-238	50.3	55	37.7-72.3	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Plutonium-239	53.8	56.8	41.1-74.2	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Uranium-234	49.1	55.2	34.2-83.2	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Uranium-238	55	54.7	35.3-75.6	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Uranium-Total	106.6	112	62.0-170	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	ug/Filter	Uranium-Total (mass)	165	164	105-231	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Cesium-134	393	429	273-532	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Cesium-137	810	793	596-1040	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Cobalt-60	532	521	403-651	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Manganese-54	< 3.97	< 50.0	0.00 - 50.0	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Zinc-65	765	692	496-955	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Strontium-90	167	166	81.1-249	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Uranium-Total (mass)	152	164	105-231	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Uranium-Total (mass)	160	164	105-231	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Gross Alpha	110	87	30.3 - 87.8	Acceptable
ERA	4th /2012	12/12/12	MRAD-17	Filter	pCi/Filter	Gross Beta	71.2	62.7	39.6-91.4	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-234	155	159	119-205	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-238	161	158	120-194	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-Total	323.6	324	238-419	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	ug/L	Uranium-Total (mass)	482	473	337-572	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Americium-241	96.3	91.8	61.8-123	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Plutonium-238	98	97.7	72.3-122	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Plutonium-239	82.5	85.8	66.6-108	Acceptable

ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-234	155	159	119-205	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-238	161	158	120-194	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-Total	312.6	324	238-419	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	ug/L	Uranium-Total (mass)	482	473	377-572	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Cesium-134	786	876	643-1010	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Cesium-137	2050	2040	1730-2440	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Cobalt-60	1270	1260	1090-1470	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Manganese-54	< 7.27	< 100	0.00 - 100	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Zinc-65	950	879	733-1110	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Strontium-90	577	681	444-900	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-234	158	159	119-205	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-238	162	158	120-194	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-Total	327.7	324	238-419	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-Total (mass)	485	473	337-572	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-234	156	159	119-205	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-238	162	158	120-194	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-Total	318	324	238-419	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-Total (mass)	482	473	337-572	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-Total (mass)	463	473	337-572	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Iron-55	673	548	327-743	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Gross Alpha	62.1	76.9	27.3-119	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Gross Beta	57.4	62.6	35.8-92.7	Acceptable
ERA	4th/2012	12/12/12	MRAD-17	Water	pCi/L	Tritium	17900	18700	12500-26700	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Barium-133	72.7	65.0	54.1-71.5	Not Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Cesium-134	87.5	92.5	76.0-102	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Cesium-137	219	216	194-239	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Cobalt-50	55.6	51.3	46.2-59.0	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Zinc-65	108	98.9	89.0-118	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Gross Alpha	38.8	48.2	25.1-60.8	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Gross Beta	34.4	36.8	24.2-44.4	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Gross Alpha	40.9	48.2	25.1-60.6	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Radium-226	14.4	12.6	9.40-14.5	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Radium-226	14.6	12.6	9.40-14.5	Not Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Radium-228	4.3	5.01	2.99-6.72	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Uranium (Nat)	49.4	49.7	40.3-55.2	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	ug/L	Uranium (Nat) mass	73.4	72.5	58.8-80.6	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Tritium	7290	6790	5860-7470	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Strontium-89	55	47.9	37.5-55.2	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Strontium-90	27.1	28.7	20.9-33.4	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Strontium-89	48.3	47.9	37.5-55.2	Acceptable
ERA	3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Strontium-90	28.9	28.7	20.9-33.4	Acceptable
ERA	3rd/2012	8/31/2012	RAD-91	Water	pCi/L	Barium-133	84.9	84.8	71.3-93.3	Acceptable
ERA	3rd/2012	8/31/2012	RAD-91	Water	pCi/L	Radium-226	12.8	15	11.2-17.2	Acceptable

TABLE 2

2012 ECKERT & ZIEGLER ANALYTICS PERFORMANCE EVALUATION RESULTS

PT Provider	Quarter / Year	Report Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
EZA	1st/2012	02/08/12	E8197-278	Cartridge	pCi	Iodine-131	9.52E+01	8.92E+01	1.07	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Strontium-89	8.78E+01	8.96E+01	0.98	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Strontium-90	1.51E+01	1.48E+01	1.02	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Iodine-131	9.36E+01	9.02E+01	1.04	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Chromium-51	5.53E+02	5.66E+02	0.98	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Cesium-134	1.59E+02	1.71E+02	0.93	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Cesium-137	2.27E+02	2.10E+02	1.08	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Cobalt-58	2.18E+02	2.21E+02	0.99	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Manganese-54	2.52E+02	2.41E+02	1.05	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Iron-59	1.90E+02	1.83E+02	1.04	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Zinc-65	3.19E+02	2.91E+02	1.09	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Cobalt-60	2.82E+02	2.70E+02	1.04	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Milk	pCi/L	Cesium-141	1.00E+01	Not spiked	None	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Iodine-131	8.44E+01	8.87E+01	0.95	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Chromium-51	5.32E+02	5.66E+02	0.94	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Cesium-134	1.56E+02	1.71E+02	0.91	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Cesium-137	2.06E+02	2.10E+02	0.98	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Cobalt-58	2.02E+02	2.21E+02	0.92	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Manganese-54	2.50E+02	2.41E+02	1.04	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Iron-59	1.81E+02	1.83E+02	0.99	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Zinc-65	2.95E+02	2.91E+02	1.01	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Cobalt-60	2.58E+02	2.70E+02	0.96	Acceptable
EZA	1st/2012	02/08/12	E8197-278	Water	pCi/L	Cesium-141	-9.60E+01	Not spiked	None	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Iodine-131	1.01E+02	9.38E-01	1.08	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Cerium-141	2.64E+00	2.60E+00	1.01	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Chromium-51	3.34E+02	3.09E+02	1.08	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Cesium-134	9.90E-01	1.13E+02	0.94	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Cesium-137	1.26E+02	1.13E+02	1.12	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Cobalt-58	9.55E-01	9.34E-01	1.02	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Manganese-54	1.49E+02	1.38E+02	1.08	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Iron-59	1.40E+02	1.19E+02	1.18	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Zinc-65	2.58E+02	2.35E+02	1.1	Acceptable
EZA	1st/2012	03/15/12	E10043	Water	pCi/L	Cobalt-60	2.14E+02	1.97E+02	1.09	Acceptable
EZA	1st/2012	03/15/12	E10041	Milk	pCi/L	Strontium-89	7.94E-01	7.99E-01	0.99	Acceptable
EZA	1st/2012	03/15/12	E10041	Milk	pCi/L	Strontium-90	1.12E+01	1.14E+01	0.98	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Iodine-131	1.02E+02	1.54E+02	1.10	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Cerium-141	2.64E+02	2.60E+02	1.01	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Chromium-51	4.46E+02	4.36E+02	1.02	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Cesium-134	1.31E+02	1.49E+02	0.88	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Cesium-137	1.62E+02	1.59E+02	1.02	Acceptable

EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Cobalt-58	1.28E+02	1.32E+02	0.97	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Manganese-54	1.99E+02	1.95E+02	1.02	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Iron-59	1.96E+02	1.68E+02	1.17	Acceptable
EZA	1st/2012	03/15/12	E10042	Milk	pCi/L	Zinc-65	3.50E+02	3.33E+02	1.05	Acceptable
EZA	1st/2012	03/15/12	E10040	Milk	pCi/L	Cobalt-60	2.90E+02	2.79E+02	1.04	Acceptable
EZA	1st/2012	03/15/12	E7465-278	Cartridge	pCi	Iodine-131	8.93E+01	9.42E+01	0.95	Acceptable
EZA	2nd/2012	06/14/12	E10175	Cartridge	pCi	Iodine-131	9.67E+01	9.72E+01	0.99	Acceptable
EZA	2nd/2012	06/14/12	E10176	Milk	pCi/L	Strontium-89	1.11E+02	9.98E+01	1.11	Acceptable
EZA	2nd/2012	06/14/12	E10176	Milk	pCi/L	Strontium-90	1.06E+02	1.27E+01	0.83	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Iodine-131	9.94E+01	9.97E+01	1.00	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Cerium-141	8.62E+01	8.22E+01	1.05	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Chromium-51	3.76E+02	4.02E+02	0.94	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Cesium-134	1.63E+02	1.74E+02	0.93	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Cesium-137	2.08E+02	2.12E+02	0.98	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Cobalt-58	8.94E+01	9.23E+01	0.97	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Manganese-54	1.27E+02	1.32E+02	0.96	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Iron-59	1.46E+02	1.28E+02	1.14	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Zinc-65	2.22E+02	1.99E+02	1.11	Acceptable
EZA	2nd/2012	06/14/12	E10177	Milk	pCi/L	Cobalt-60	3.52E+02	3.55E+02	0.99	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Iodine-131	9.94E+01	9.94E+01	1.00	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Cerium-141	1.31E+02	1.12E+02	1.17	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Chromium-51	5.51E+02	5.48E+02	1.01	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Cesium-134	2.22E+02	2.38E+02	0.93	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Cesium-137	2.91E+02	2.89E+02	1.01	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Cobalt-58	1.35E+02	1.26E+02	1.07	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Manganese-54	1.83E+02	1.80E+02	1.02	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Iron-59	2.00E+02	1.74E+02	1.15	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Zinc-65	2.94E+02	2.72E+02	1.08	Acceptable
EZA	2nd/2012	06/14/12	E10178	Water	pCi/L	Cobalt-60	5.04E+02	4.84E+02	1.04	Acceptable
EZA	3rd/2012	11/06/12	E10281	Cartridge	pCi	Iodine-131	1.02E+02	9.64E+01	1.06	Acceptable
EZA	3rd/2012	11/06/12	E10283	Milk	pCi/L	Strontium-89	9.87E+01	9.96E+01	0.99	Acceptable
EZA	3rd/2012	11/06/12	E10283	Milk	pCi/L	Strontium-90	1.44E+01	1.60E+01	0.9	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Iodine-131	9.69E+01	9.96E+01	0.97	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Cerium-141	1.61E+02	1.64E+02	0.98	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Chromium-51	2.92E+02	2.48E+02	1.18	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Cesium-134	9.85E+01	1.08E+02	0.91	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Cesium-137	1.76E+02	1.74E+02	1.01	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Cobalt-58	9.72E+01	1.00E+02	0.97	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Manganese-54	1.98E+02	1.96E+02	1.01	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Iron-59	1.62E+02	1.52E+02	1.07	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Zinc-65	2.08E+02	1.92E+02	1.08	Acceptable
EZA	3rd/2012	11/06/12	E10284	Milk	pCi/L	Cobalt-60	1.59E+02	1.52E+02	1.05	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Iodine-131	1.10E+02	9.99E+01	1.1	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Cerium-141	2.49E+02	2.51E+02	0.99	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Chromium-51	3.75E+02	3.80E+02	0.99	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Cesium-134	1.51E+02	1.66E+02	0.91	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Cesium-137	2.72E+02	2.67E+02	1.02	Acceptable

EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Cobalt-58	1.56E+02	1.54E+02	1.01	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Manganese-54	3.16E+02	3.00E+02	1.05	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Iron-59	2.65E+02	2.33E+02	1.14	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Zinc-65	3.20E+02	2.95E+02	1.09	Acceptable
EZA	3rd/2012	11/06/12	E10285	Water	pCi/L	Cobalt-60	2.42E+02	2.33E+02	1.04	Acceptable

TABLE 3

2012 DEPARTMENT OF ENERGY MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP) RESULTS

Quarter / Year	Analytical Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
2nd/2012	05/03/12	MAPEP-11-GrF24	Filter	Bq/sample	Gross Alpha	0.000	0.000	False Pos. Test	Acceptable
2nd/2012	05/03/12	MAPEP-11-GrF24	Filter	Bq/sample	Gross Beta	0.000	0.000	False Pos. Test	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Americium-241	152	159	111-207	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Cesium-134	754	828	580-1076	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Cesium-137	0	0	False Pos Test	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Cobalt-57	1430.0	1179	825-1533	Warning
3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Cobalt-60	0.97	1.56	Sens. Eval.	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Iron-55	1456	1370	959-1781	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Manganese-54	596	558	391-725	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Nickel-63	888.0	862	603-1121	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Plutonium-238	127.0	136	95-177	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Plutonium-239/240	61.13	65.8	46.1-85.5	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Potassium-40	1495	1491	1044-1938	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Strontium-90	391.7	392	274-510	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaS26	Soil	mg/kg	Technetium-99	345.3	374	262-486	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Americium-241	1.5067	1.630	1.14-2.12	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Cesium-134	0.09	0.0	False Pos Test	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Cesium-137	41.2	39.9	27.9-51.9	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Cobalt-57	34.45	32.9	23.0-42.8	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Cobalt-60	23.90	23.7	16.60-30.84	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Hydrogen-3	481.7	437	306-568	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Iron-55	88.10	81.9	57.3-106.5	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Manganese-54	33.3	31.8	22.3-41.3	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Nickel-63	59.6	60.0	42.0-78.0	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Plutonium-238	0.555	0.629	0.110-0.818	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Plutonium-239/240	1.230	1.340	0.94-1.74	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Potassium-40	156.5	142	99-185	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Strontium-90	0.01	0.00	False Pos Test	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Technetium-99	26.3	27.90	19.5-36.3	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Uranium-234/233	0.381	0.39	0.270-0.510	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Uranium-238	2.537	2.76	1.93-3.59	Acceptable
3rd/2012	07/26/12	MAPEP-12-MaW26	Water	Bq/L	Zinc-65	-0.220	0.00	False Pos Test	Acceptable
3rd/2012	07/26/12	MAPEP-12-GrW26	Water	Bq/L	Gross Alpha	2.043	2.140	0.64-3.64	Acceptable
3rd/2012	07/26/12	MAPEP-12-GrW26	Water	Bq/L	Gross Beta	6.820	6.36	3.18-9.54	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	ug/sample	Uranium-235	0.200	0.019	0.0131-0.243	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	ug/sample	Uranium-238	9.5	10.0	7.0-13.0	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	ug/sample	Uranium-Total	9.98	10.0	7.0-13.0	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	ug/sample	Americium-241	0.066	0.073	0.051-0.095	Acceptable

3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Cesium-134	2.29	2.38	1.67-3.09	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Cesium-137	1.910	1.79	1.25-2.33	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Cobalt-57	0.008	0.00	False Pos Test	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Cobalt-60	2.235	2.18	1.527-2.837	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Manganese-54	3.440	3.24	2.27-4.21	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Plutonium-238	0.004	0.002	Sens. Eval.	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Plutonium-239/240	0.088	0.0970	0.068-0.126	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Strontium-90	0.012	0.00	False Pos Test	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Uranium-234/233	0.010	0.0188	0.0132-0.0244	Not Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Uranium-238	0.111	0.124	0.087-0.161	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Zinc-65	3.460	2.99	2.09-3.89	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Gross Alpha	0.780	1.200	0.4-2.0	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Gross Beta	2.59	2.40	1.2-3.6	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdF26	Filter	Bq/sample	Americium-241	0.005	0.00	False Pos Test	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdV26	Veg.	Bq/sample	Cesium-134	7.655	8.43	5.90-10.96	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdV26	Veg.	Bq/sample	Cesium-137	-0.025	0.00	False Pos Test	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdV26	Veg.	Bq/sample	Cobalt-57	11.950	12.00	8.4-15.6	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdV26	Veg.	Bq/sample	Cobalt-60	6.255	6.05	4.24-7.87	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdV26	Veg.	Bq/sample	Manganese-54	0.029	0.00	False Pos Test	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdV26	Veg.	Bq/sample	Plutonium-238	0.194	0.219	0.153-0.285	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdV26	Veg.	Bq/sample	Plutonium-239/240	0.1226	0.152	0.106-0.198	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdV26	Veg.	Bq/sample	Strontium-90	1.613	2.11	1.48-2.74	Warning
3rd/2012	07/26/12	MAPEP-12-RdV26	Veg.	Bq/sample	Uranium-234/233	0.030	0.411	0.0288-0.0534	Warning
3rd/2012	07/26/12	MAPEP-12-RdV26	Veg.	Bq/sample	Uranium-238	0.224	0.278	0.195-0.361	Acceptable
3rd/2012	07/26/12	MAPEP-12-RdV26	Veg.	Bq/sample	Zinc-65	9.720	8.90	6.23-11.57	Acceptable
4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Americium-241	106.67	111	78-144	Acceptable
4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Cesium-134	839.5	939	657-1221	Acceptable
4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Cesium-137	1230.0	1150	805-1495	Acceptable
4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Cobalt-57	1605	1316	921-1711	Acceptable
4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Cobalt-60	551.5	531	372-690	Acceptable
4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Iron-55	459.3	508	356-660	Acceptable
4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Manganese-54	1015	920	644-1196	Acceptable
4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Plutonium-238	104.6	106	74.1-137.5	Acceptable
4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Plutonium-239/240	132.33	134	94-174	Acceptable
4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Potassium-40	723	632	442-822	Acceptable
4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Strontium-90	476.7	508	356-660	Warning
4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Technetium-99	385.3	469	328-610	Acceptable
4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Uranium-234/233	51.6	60	42.2-78.4	Acceptable
4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Uranium-238	238.33	263	184-342	Acceptable
4th/2012	11/26/12	MAPEP-12-MaS27	Soil	Bq/kg	Zinc-65	721.5	606	424-788	Acceptable
4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Americium-241	0.9407	1.06	0.74-1.38	Acceptable
4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Cesium-134	20.6	23.2	16.2-30.2	Acceptable
4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Cesium-137	17.05	16.7	11.7-21.7	Acceptable
4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Cobalt-57	29.45	29.3	20.5-38.1	Acceptable
4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Cobalt-60	0.03	0.0	False Positive	Acceptable

4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Hydrogen-3	334	334	234-434	Acceptable
4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Manganese-54	18.4	17.8	12.5-23.1	Acceptable
4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Nickel-63	66.2	66.3	46.4-86.2	Acceptable
4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Plutonium-238	0.0088	0.0	Sensitivity Eval.	Acceptable
4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Plutonium-239/240	1.44	1.61	1.13-2.09	Acceptable
4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Potassium-40	140.5	134	94-174	Acceptable
4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Strontium-90	11.13	12.2	8.5-15.9	Acceptable
4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Technetium-99	4.5	4.58	3.21-5.95	Acceptable
4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Uranium-234/233	0.414	0.451	0.316-0.586	Acceptable
4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Uranium-238	2.96	3.33	2.33-4.33	Acceptable
4th/2012	11/26/12	MAPEP-12-MaW27	Water	Bq/L	Zinc-65	28.15	25.9	18.1-33.7	Acceptable
4th/2012	11/26/12	MAPEP-12-GrW27	Water	Bq/L	Gross Alpha	1.737	1.79	0.54-3.04	Acceptable
4th/2012	11/26/12	MAPEP-12-GrW27	Water	Bq/L	Gross Beta	8.893	9.1	4.6-13.7	Acceptable
4th/2012	11/26/12	MAPEP-12-XaW27	Water	Bq/L	Iodine-129	6.229	6.82	4.77-8.87	Acceptable
4th/2012	11/26/12	MAPEP-12-RdF27	Filter	uq/sample	Uranium-235	0.0154	0.0148	0.0104-0.0192	Acceptable
4th/2012	11/26/12	MAPEP-12-RdF27	Filter	uq/sample	Uranium-238	7.77	8	5.6-10.4	Acceptable
4th/2012	11/26/12	MAPEP-12-RdF27	Filter	uq/sample	Uranium-Total	7.785	8.1	5.7-10.5	Acceptable
4th/2012	11/26/12	MAPEP-12-RdF27	Filter	uq/sample	Americium-241	0.0716	0.078	0.0546-0.1014	Acceptable
4th/2012	11/26/12	MAPEP-12-RdF27	Filter	uq/sample	Cesium-134	2.795	2.74	1.92-3.56	Acceptable
4th/2012	11/26/12	MAPEP-12-RdF27	Filter	uq/sample	Cesium-137	-0.016	0	False Positive	Acceptable
4th/2012	11/26/12	MAPEP-12-RdF27	Filter	uq/sample	Cobalt-57	2.265	1.91	1.34-2.48	Acceptable
4th/2012	11/26/12	MAPEP-12-RdF27	Filter	uq/sample	Cobalt-60	1.865	1.728	1.210-2.246	Acceptable
4th/2012	11/26/12	MAPEP-12-RdF27	Filter	uq/sample	Manganese-54	2.465	2.36	1.65-3.07	Acceptable
4th/2012	11/26/12	MAPEP-12-RdF27	Filter	uq/sample	Plutonium-238	0.061	0.0625	0.0438-0.0813	Acceptable
4th/2012	11/26/12	MAPEP-12-RdF27	Filter	uq/sample	Plutonium-239/240	-0.002	0.00081	Sensitivity Eval.	Acceptable
4th/2012	11/26/12	MAPEP-12-RdF27	Filter	uq/sample	Strontium-90	0.914	1.03	0.72-1.34	Acceptable
4th/2012	11/26/12	MAPEP-12-RdF27	Filter	uq/sample	Uranium-234/233	0.009	0.0141	0.0099-0.0183	Not Acceptable
4th/2012	11/26/12	MAPEP-12-RdF27	Filter	uq/sample	Uranium-238	0.087	0.1	0.070-0.130	Not Acceptable
4th/2012	11/26/12	MAPEP-12-RdF27	Filter	uq/sample	Zinc-65	-0.154	0	False Positive	Acceptable
4th/2012	11/26/12	MAPEP-12-GrF27	Filter	Bq/sample	Gross Alpha	0.2253	0.97	0.29-1.65	Not Acceptable
4th/2012	11/26/12	MAPEP-12-GrF27	Filter	Bq/sample	Gross Beta	1.93	1.92	0.96-2.88	Acceptable
4th/2012	11/26/12	MAPEP-12-RdV27	Veg	Bq/sample	Americium-241	0.142	0.163	0.114-0.212	Acceptable
4th/2012	11/26/12	MAPEP-12-RdV27	Veg	Bq/sample	Cesium-134	6.355	6.51	4.56-8.46	Acceptable
4th/2012	11/26/12	MAPEP-12-RdV27	Veg	Bq/sample	Cesium-137	4.575	4.38	3.07-5.69	Acceptable
4th/2012	11/26/12	MAPEP-12-RdV27	Veg	Bq/sample	Cobalt-57	6.04	5.66	3.96-7.36	Acceptable
4th/2012	11/26/12	MAPEP-12-RdV27	Veg	Bq/sample	Cobalt-60	5.44	5.12	3.58-6.66	Acceptable
4th/2012	11/26/12	MAPEP-12-RdV27	Veg	Bq/sample	Manganese-54	3.565	3.27	2.29-4.25	Acceptable
4th/2012	11/26/12	MAPEP-12-RdV27	Veg	Bq/sample	Plutonium-238	0.176	0.187	0.131-0.243	Acceptable
4th/2012	11/26/12	MAPEP-12-RdV27	Veg	Bq/sample	Plutonium-239/240	0.12	0.123	0.086-0.160	Acceptable
4th/2012	11/26/12	MAPEP-12-RdV27	Veg	Bq/sample	Strontium-90	0.0018	0	False Positive	Acceptable
4th/2012	11/26/12	MAPEP-12-RdV27	Veg	Bq/sample	Uranium-234/233	0.024	0.0257	0.0180-0.0334	Acceptable
4th/2012	11/26/12	MAPEP-12-RdV27	Veg	Bq/sample	Uranium-238	0.143	0.158	0.111-0.205	Acceptable
4th/2012	11/26/12	MAPEP-12-RdV27	Veg	Bq/sample	Uranium-Total	11.1	12.7	8.9-16.5	Acceptable
4th/2012	11/26/12	MAPEP-12-RdV27	Veg	Bq/sample	Zinc-65	-0.04	0	False Positive	Acceptable

4th/2012	11/26/12	MAPEP-11-XaW25	Water	Bq/sample	Iodine-129	8.723	9.5	6.7 - 12.4	Acceptable

TABLE 4

2012 ERA PROGRAM PERFORMANCE EVALUATION RESULTS

Quarter / Year	Analytical Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Barium-133	58.2	57.1	47.3-63.0	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Cesium-134	63.5	64	52.0-70.4	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Cesium-137	89.5	91.2	82.1-103	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Cobalt-60	49.5	48.9	44.0-56.4	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Zinc-65	75	71.8	64.2-86.7	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Gross Alpha	31.0	35.7	18.4-45.9	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Gross Beta	27.3	28.8	18.3-36.6	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Gross Alpha	29.8	35.7	18.4-45.9	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Radium-226	8.89	8.73	6.55-10.2	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Radium-228	5.9	5.78	3.53-7.60	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Uranium (Nat)	31.6	32.5	26.2-36.3	Acceptable
1st/2012	03/06/12	RAD - 88	Water	ug/L	Uranium (Nat) mass	49.9	47.5	38.3-53.1	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Radium-226	8.80	8.73	6.55-10.2	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Radium-228	4.8	5.78	3.53-7.60	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Uranium (Nat)	27.6	32.5	26.2-36.3	Acceptable
1st/2012	03/06/12	RAD - 88	Water	ug/L	Uranium (Nat) mass	41.2	47.5	38.3-53.1	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Tritium	16200	19200	16800-21100	Not Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Strontium-89	38.4	42.5	32.7-49.6	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Strontium-90	23.5	24.2	17.4-28.3	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Strontium-89	42.2	42.5	32.7-49.6	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Strontium-90	24.2	24.2	17.4-28.3	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Iodine-131	28.4	25.7	21.3-30.3	Acceptable
1st/2012	03/06/12	RAD - 88	Water	pCi/L	Iodine-131	28.4	25.7	21.3-30.3	Acceptable
2nd/2012	05/24/12	RAD-89	Water	pCi/L	Tritium	1700	15800	13800-17400	Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Barium-133	72.7	65.0	54.1-71.5	Not Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Cesium-134	87.5	92.5	76.0-102	Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Cesium-137	219	216	194-239	Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Cobalt-50	55.6	51.3	46.2-59.0	Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Zinc-65	108	98.9	89.0-118	Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Gross Alpha	38.8	48.2	25.1-60.8	Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Gross Beta	34.4	36.8	24.2-44.4	Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Gross Alpha	40.9	48.2	25.1-60.6	Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Radium-226	14.4	12.6	9.40-14.5	Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Radium-226	14.6	12.6	9.40-14.5	Not Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Radium-228	4.3	5.01	2.99-6.72	Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Uranium (Nat)	49.4	49.7	40.3-55.2	Acceptable
3rd/2012	8/31/2012	RAD-90	Water	ug/L	Uranium (Nat) mass	73.4	72.5	58.8-80.6	Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Tritium	7290	6790	5860-7470	Acceptable

3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Strontium-89	55	47.9	37.5-55.2	Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Strontium-90	27.1	28.7	20.9-33.4	Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Strontium-89	48.3	47.9	37.5-55.2	Acceptable
3rd/2012	8/31/2012	RAD-90	Water	pCi/L	Strontium-90	28.9	28.7	20.9-33.4	Acceptable
3rd/2012	8/31/2012	RAD-91	Water	pCi/L	Barium-133	84.9	84.8	71.3-93.3	Acceptable
3rd/2012	8/31/2012	RAD-91	Water	pCi/L	Radium-226	12.8	15	11.2-17.2	Acceptable

TABLE 5

2012 ERA PROGRAM (MRAD) PERFORMANCE EVALUATION RESULTS

Quarter / Year	Analytical Date	Sample Number	Sample Media	Unit	Analyte / Nuclide	GEL Value	Known value	Acceptance Range/ Ratio	Evaluation
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Actinium-228	1330	1570	110-2180	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Americium-241	900	938	549-1220	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Bismuth-212	1540	1550	413-2280	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Bismuth-214	1100	1100	665-1590	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Cesium-134	2380	2180	1420-2620	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Cesium-137	10700	8770	6720-11300	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Cobalt-60	4060	3500	2370-4820	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Lead-212	1380	1510	992-2110	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Lead-214	1350	1110	647-1650	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Manganese-54	<37.2	<1000	0-1000	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Plutonium-238	842	984.00	592-1360	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Plutonium-239	793	879.00	575-1210	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Potassium-40	10400	11600	8470-15600	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Strontium-90	7370	8800	3360-13900	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Thorium-234	2360	2000	632-3760	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Zinc-65	4540	3650	2910-4850	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Strontium-90	7370	8800	3360-13900	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Uranium-234	2250	1960	1200-2510	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Uranium-238	1620	2000	1240-2540	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	pCi/kg	Uranium-Total	4220	4030	2190-5320	Acceptable
2nd/2012	05/18/12	MRAD-16	Soil	ug/kg	Uranium-Total(mass)	5070	5880	3240-7400	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	pCi/kg	Americium-241	4270	4540	2780-6040	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	pCi/kg	Curium-244	829	812	400 - 1260	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	pCi/kg	Plutonium-238	2300	2570	1400-3220	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	pCi/kg	Plutonium-239	2480	2570	1580-3540	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	pCi/kg	Uranium-234	3310	3610	2370-4640	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	pCi/kg	Uranium-238	3540	3580	2390-4550	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	pCi/kg	Uranium-Total	7025	7350	4980-9150	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	ug/kg	Uranium-Total(mass)	10600	10700	7170-13600	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	pCi/kg	Americium-241	4270	4540	2780-6040	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	pCi/kg	Cesium-134	2840	2920	1880-3790	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	pCi/kg	Cesium-137	1330	1340	972-1860	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	pCi/kg	Cobalt-60	2380	2210	1520-3090	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	pCi/kg	Manganese-54	<68.8	<300	0.00-300	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	pCi/kg	Potassium-40	33700	28600	20700-40100	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	pCi/kg	Zinc-65	2570	2310	1670-3240	Acceptable
2nd/2012	05/18/12	MRAD-16	Vegetation	pCi/kg	Strontium-90	7000	8520	4860-11300	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Americium-241	72.4	68.8	42.4-93.1	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Plutonium-238	57.3	63.2	43.3-83.1	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Plutonium-239	58.8	63	45.6-82.4	Acceptable

2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Uranium-234	42.5	47.5	29.4-71.6	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Uranium-238	44.5	47.4	30.4-65.1	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Uranium-Total	89.4	96.7	53.5-147	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	ug/Filter	Uranium-Total(mass)	134	141	90.2-198	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Americium-241	72.4	68.8	42.4-93.1	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Cesium-134	260	279	182 - 345	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Cesium-137	1210	1130	849-1480	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Cobalt-60	942	880	681-1100	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Manganese-54	<7.68	<50.0	0-50.0	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Zinc-65	1040	897	642-1240	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Strontium-90	87	89.6	43.8-134	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Iron-55	776	739	229-1440	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	ug/Filter	Uranium-Total(mass)	147	141	90.2-198	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Gross Alpha	93.9	77.8	26.1-121	Acceptable
2nd/2012	05/18/12	MRAD-16	Filter	pCi/Filter	Gross Beta	57.3	52.5	33.2-76.5	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Uranium-234	92.6	105	78.9-135	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Uranium-238	94.9	104	79.3-128	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Uranium-Total	192.6	214	157-277	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	ug/L	Uranium-Total(mass)	285	312	249-377	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Americium-241	132	135	91.0-181	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Plutonium-238	127	135	99.9-168	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Plutonium-239	107	112	86.9-141	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Cesium-134	580	609	447-700	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Cesium-137	1290	1250	1060-1500	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Cobalt-60	910	875	760-1020	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Manganese-54	<5.0	<100	0.00-100	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Zinc-65	822	749	624-945	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Strontium-90	970	989	644-1310	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Iron-55	987	863	514-1170	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Gross Alpha	95.9	103	36.6-160	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Gross Beta	50	43.7	25.0-64.7	Acceptable
2nd/2012	05/18/12	MRAD-16	Water	pCi/L	Tritium	8740	9150	6130-13000	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-234	4310	4310	2830-5540	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-238	4330	4280	2860-5440	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-Total	4849	5190	2960 - 7010	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	ug/kg	Uranium-Total (mass)	8860	8790	5960-10900	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-234	3720	3400	2080-4360	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-238	3350	3420	2120-4340	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-Total	7232	6970	3780-9200	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	ug/kg	Uranium-Total (mass)	10400	10200	5620-12800	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Actinium-228	1400	1240	795-1720	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Americium-241	847	728	426-946	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Bismuth-212	1300	1240	330-1820	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Bismuth-214	1310	1290	777-1860	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Cesium-134	2210	1980	1290-2380	Acceptable

4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Cesium-137	4140	3470	2660-4460	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Cobalt-60	5270	4310	2910-5930	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Lead-212	1250	1240	812-1730	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Lead-214	1580	1290	753-1920	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Manganese-54	< 35	< 1000	0.00 - 1000	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Plutonium-238	1250	981	590-1350	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Plutonium-239	1110	871	569-1200	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Potassium-40	11000	12300	8980-16500	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Thorium-234	5120	3420	1080-6430	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Zinc-65	3770	2880	2290-3830	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Strontium-90	6670	6860	2620-10800	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-234	2640	2530	1600 - 3140	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-238	2450	2560	1560 - 3250	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-Total	5200	5190	2960 - 7010	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	ug/kg	Uranium-Total (mass)	7286	7570	4160 - 9520	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	ug/kg	Uranium-Total (mass)	7430	7570	4160 - 9520	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Americium-241	3040	2980	1700 - 4090	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Curium-244	697	642	316 - 1000	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Plutonium-238	3000	2880	1560 - 4220	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Plutonium-239	2910	2980	1850 - 4060	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-234	2580	2420	1660 - 3210	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-238	2660	2400	1690 - 3030	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Uranium-Total	5356	4920	3330 - 6120	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	ug/kg	Uranium-Total (mass)	7970	7180	4810 - 9120	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Cesium-134	1480	1380	790 - 1910	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Cesium-137	1570	1270	932 - 1760	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Cobalt-60	1800	1500	1010 - 2160	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Manganese-54	< 44.0	< 300	0.00 - 300	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Potassium-40	32100	28800	20700 - 40800	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Zinc-65	3470	2770	2000 - 3790	Acceptable
4th/2012	12/12/12	MRAD-17	Soil	pCi/kg	Strontium-90	6320	5440	3040 - 7220	Acceptable
4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Americium-241	3780	3540	2160-4710	Acceptable
4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Curium-244	1910	1850	906-2880	Acceptable
4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Plutonium-238	2360	2250	1340-3080	Acceptable
4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Plutonium-239	2270	2170	1330-2990	Acceptable
4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Uranium-234	4310	4310	2830-5540	Acceptable
4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Uranium-238	4330	4280	2860-5440	Acceptable
4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Uranium-Total	8860	8790	5960-10900	Acceptable
4th/2012	12/12/12	MRAD-17	Vegetation	ug/kg	Uranium-Total (mass)	13000	12800	8580-16200	Acceptable
4th/2012	12/12/12	MRAD-17	Vegetation	ug/kg	Uranium-Total (mass)	11900	12800	8580-16200	Acceptable
4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Cesium-134	2240	2350	1510-3050	Acceptable
4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Cesium-137	2190	2070	1500-2880	Acceptable
4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Cobalt-60	2360	2030	1400-2840	Acceptable
4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Manganese-54	< 38.6	< 300	0.00 - 300	Acceptable

4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Potassium-40	36000	29600	21400-41500	Acceptable
4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Zinc-65	2500	1970	1420-2760	Acceptable
4th/2012	12/12/12	MRAD-17	Vegetation	pCi/kg	Strontium-90	9040	10000	5700-13300	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Americium-241	64.7	67.1	41.4-90.8	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Plutonium-238	50.3	55	37.7-72.3	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Plutonium-239	53.8	56.8	41.1-74.2	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Uranium-234	49.1	55.2	34.2-83.2	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Uranium-238	55	54.7	35.3-75.6	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Uranium-Total	106.6	112	62.0-170	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	ug/Filter	Uranium-Total (mass)	165	164	105-231	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Cesium-134	393	429	273-532	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Cesium-137	810	793	596-1040	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Cobalt-60	532	521	403-651	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Manganese-54	< 3.97	< 50.0	0.00 - 50.0	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Zinc-65	765	692	496-955	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Strontium-90	167	166	81.1-249	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Uranium-Total (mass)	152	164	105-231	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Uranium-Total (mass)	160	164	105-231	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Gross Alpha	110	87	30.3 - 87.8	Acceptable
4th/2012	12/12/12	MRAD-17	Filter	pCi/Filter	Gross Beta	71.2	62.7	39.6-91.4	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-234	155	159	119-205	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-238	161	158	120-194	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-Total	323.6	324	238-419	Acceptable
4th/2012	12/12/12	MRAD-17	Water	ug/L	Uranium-Total (mass)	482	473	337-572	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Americium-241	96.3	91.8	61.8-123	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Plutonium-238	98	97.7	72.3-122	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Plutonium-239	82.5	85.8	66.6-108	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-234	155	159	119-205	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-238	161	158	120-194	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-Total	312.6	324	238-419	Acceptable
4th/2012	12/12/12	MRAD-17	Water	ug/L	Uranium-Total (mass)	482	473	377-572	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Cesium-134	786	876	643-1010	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Cesium-137	2050	2040	1730-2440	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Cobalt-60	1270	1260	1090-1470	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Manganese-54	< 7.27	< 100	0.00 - 100	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Zinc-65	950	879	733-1110	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Strontium-90	577	681	444-900	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-234	158	159	119-205	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-238	162	158	120-194	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-Total	327.7	324	238-419	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-Total (mass)	485	473	337-572	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-234	156	159	119-205	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-238	162	158	120-194	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-Total	318	324	238-419	Acceptable

4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-Total (mass)	482	473	337-572	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Uranium-Total (mass)	463	473	337-572	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Iron-55	673	548	327-743	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Gross Alpha	62.1	76.9	27.3-119	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Gross Beta	57.4	62.6	35.8-92.7	Acceptable
4th/2012	12/12/12	MRAD-17	Water	pCi/L	Tritium	17900	18700	12500-26700	Acceptable

FIGURE 1

COBALT-60 PERFORMANCE EVALUATION RESULTS AND % BIAS

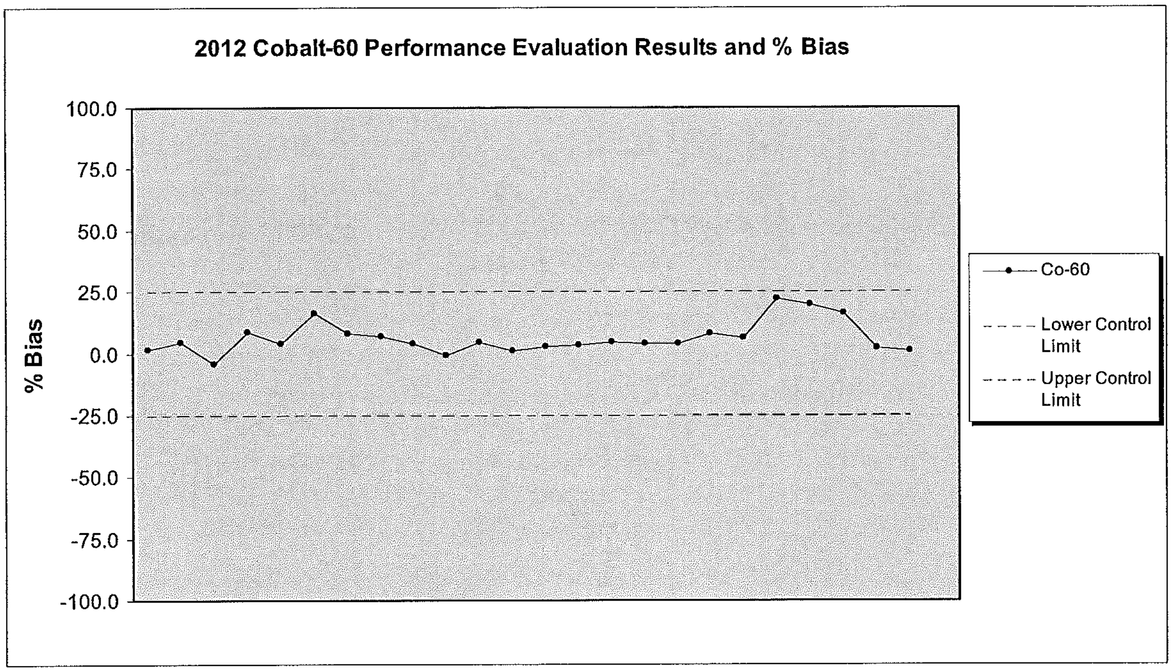

FIGURE 2

CESIUM-137 PERFORMANCE EVALUATION RESULTS AND % BIAS

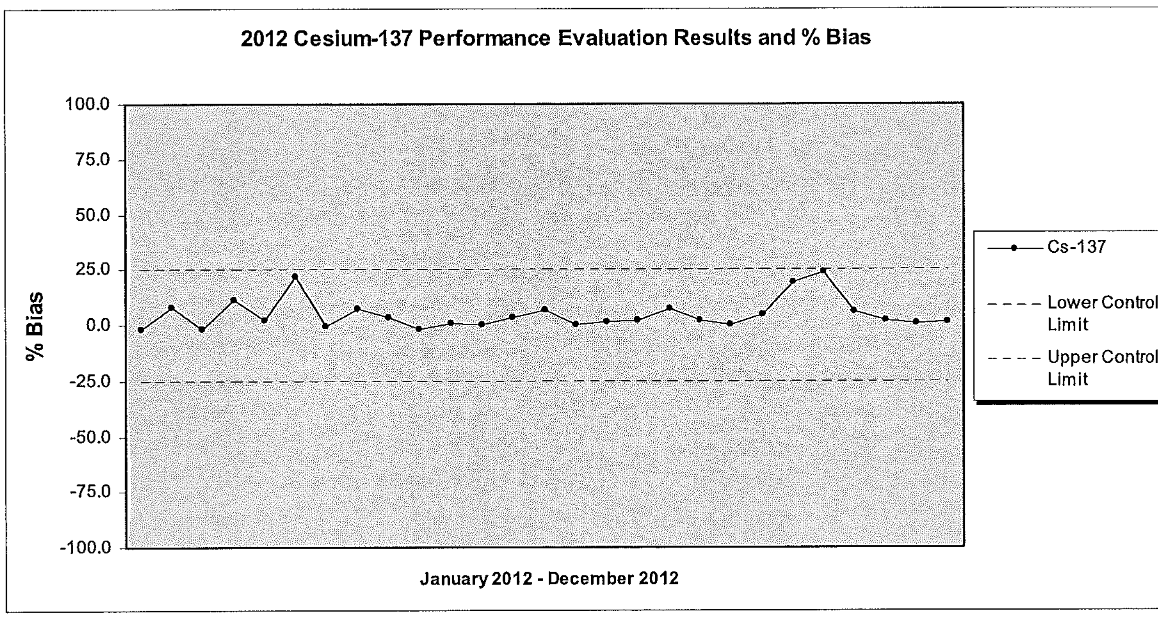

FIGURE 3

TRITIUM PERFORMANCE EVALUATION RESULTS AND % BIAS

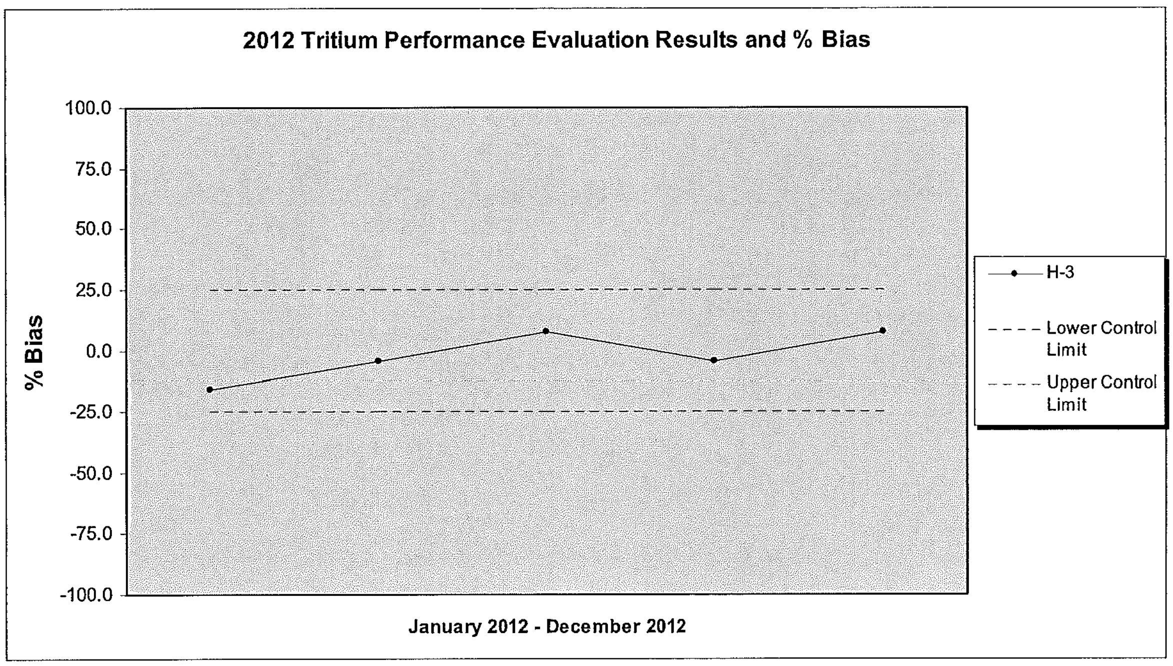

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FIGURE 4

STRONTIUM-90 PERFORMANCE EVALUATION RESULTS AND % BIAS

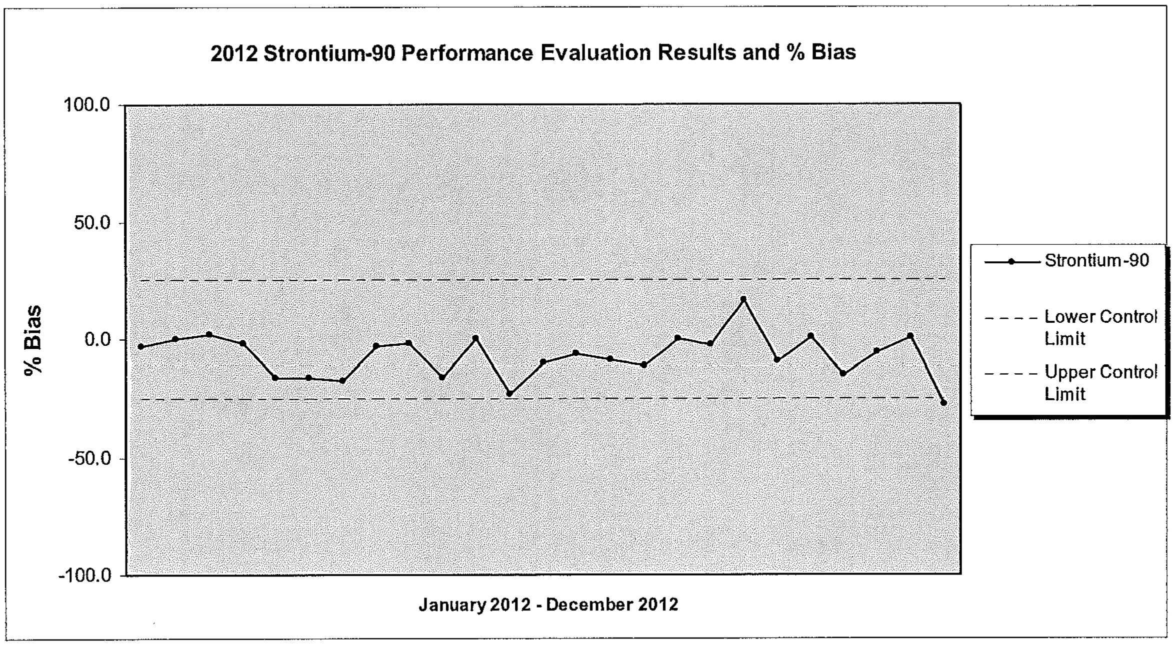

FIGURE 5

GROSS ALPHA PERFORMANCE EVALUATION RESULTS AND % BIAS

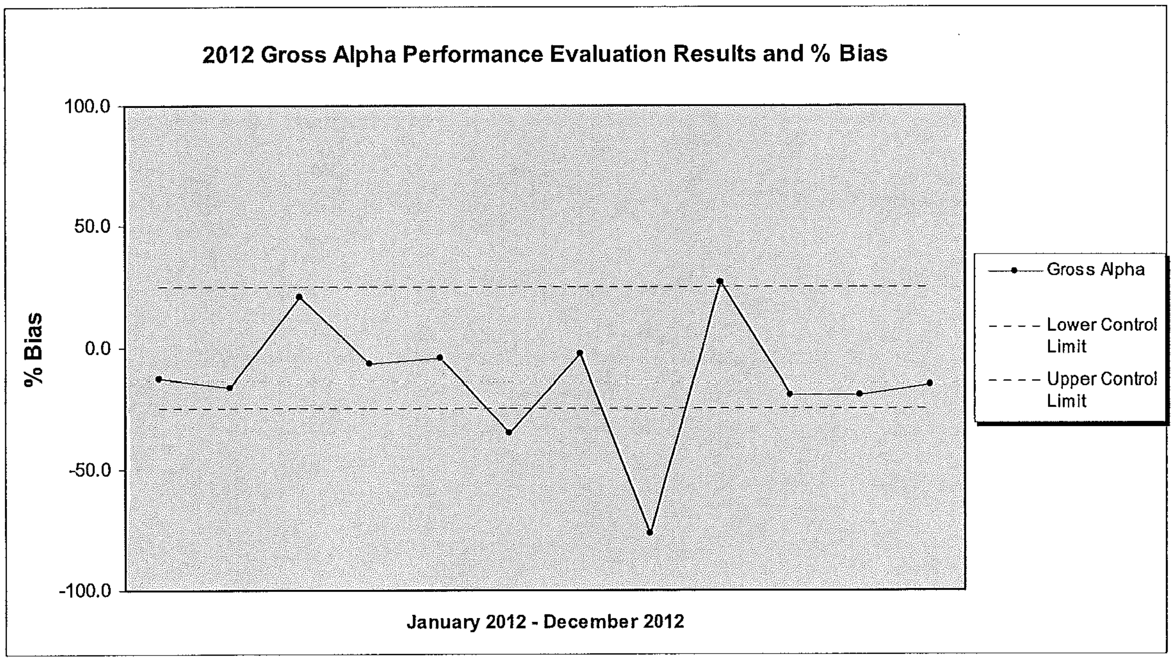

FIGURE 6

GROSS BETA PERFORMANCE EVALUATION RESULTS AND % BIAS

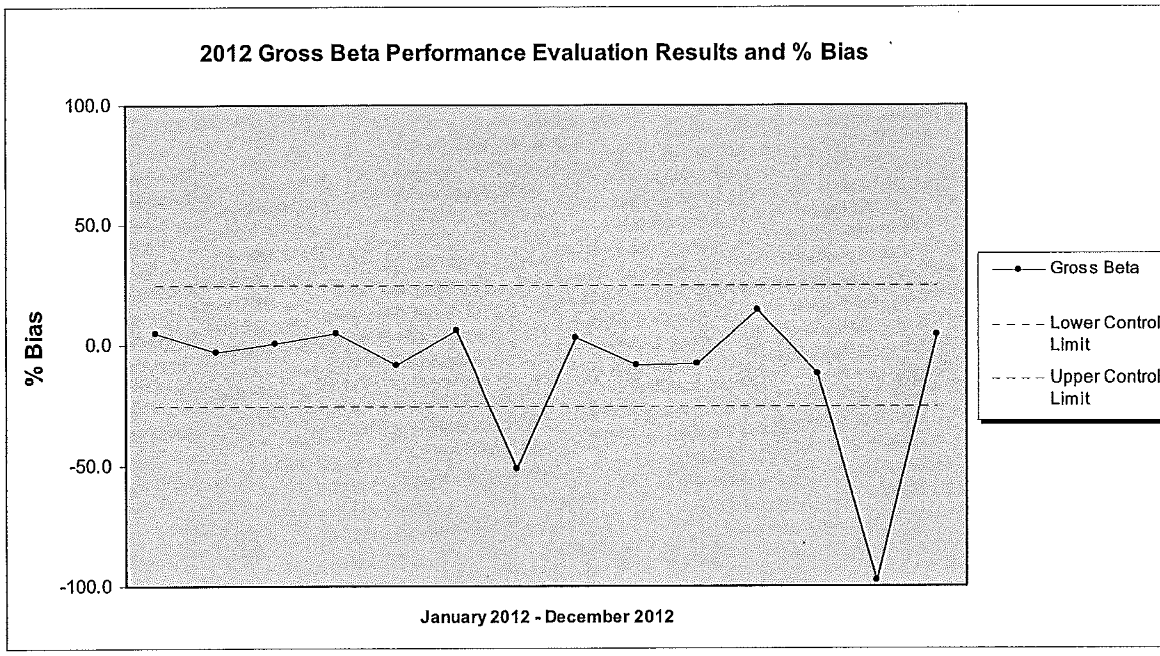

FIGURE 7

IODINE-131 PERFORMANCE EVALUATION RESULTS AND % BIAS

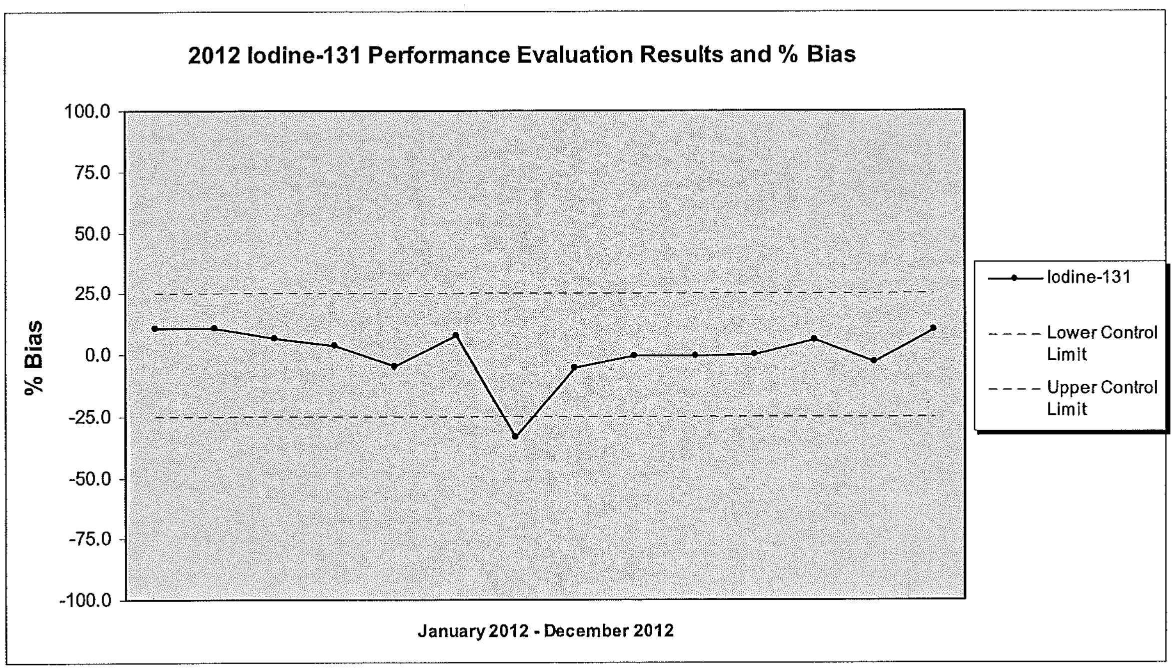

FIGURE 8

AMERICIUM-241 PERFORMANCE EVALUATION RESULTS AND % BIAS

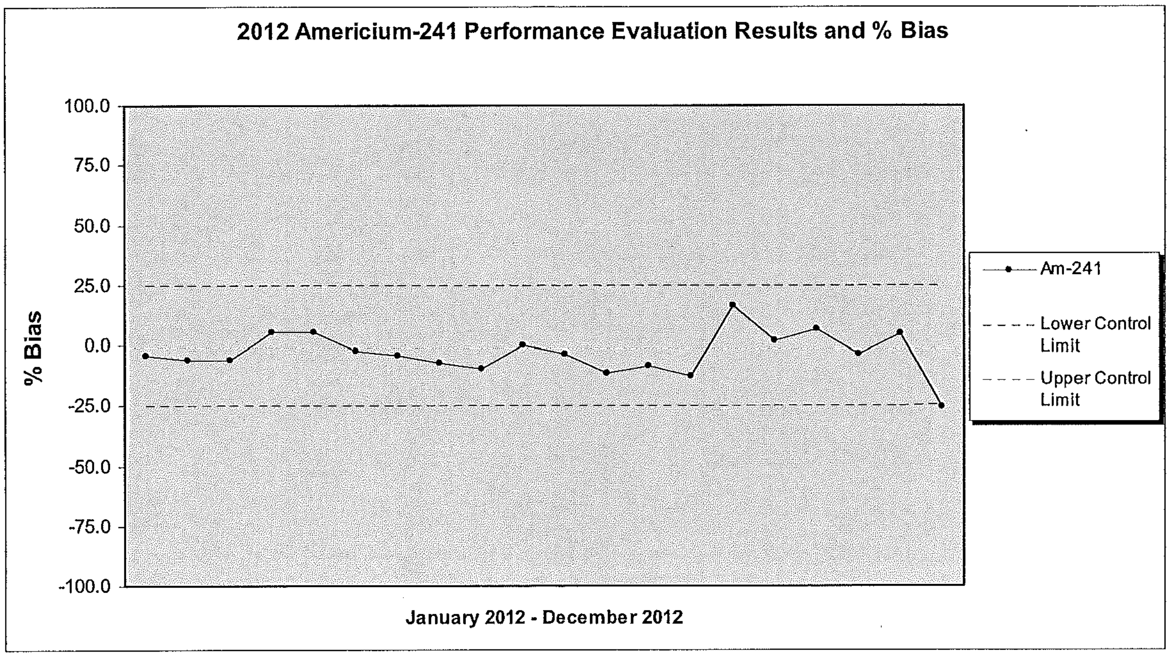

FIGURE 9

PLUTONIUM-238 PERFORMANCE EVALUATION RESULTS AND % BIAS

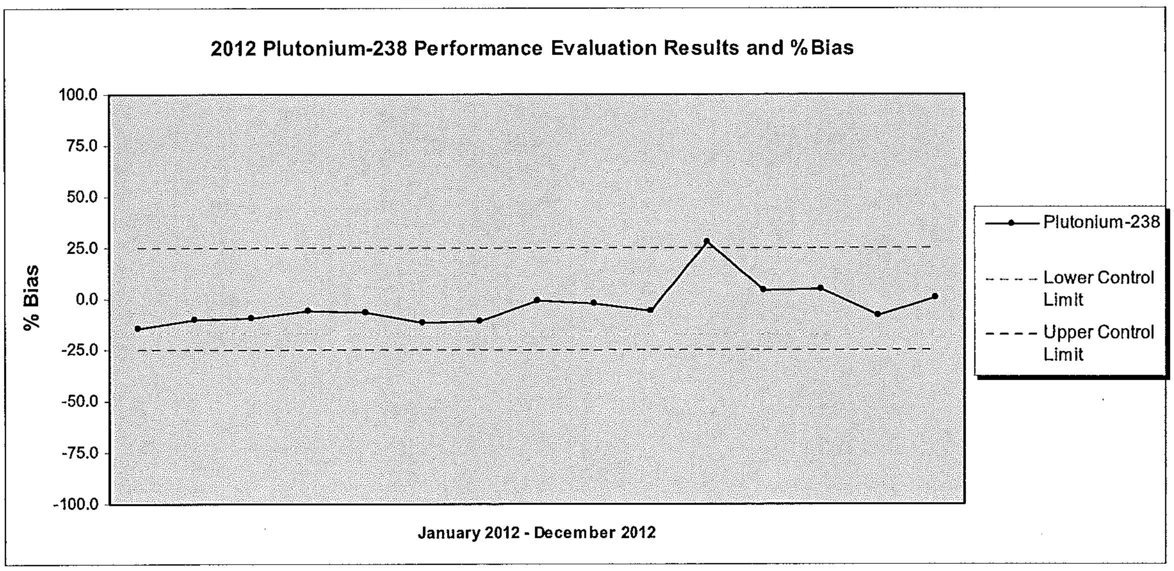

TABLE 6

REMP INTRA-LABORATORY DATA SUMMARY: BIAS AND PRECISION BY MATRIX

2012	Bias Criteria (+ / - 25%		Precision Criteria (Note 1)	
	WITHIN CRITERIA	OUTSIDE CRITERIA	WITHIN CRITERIA	OUTSIDE CRITERIA
MILK				
Gas Flow Sr 2nd count	42	0	43	0
Gas Flow Total Strontium	29	0	29	0
Gamma Spec Liquid RAD A-013 with Ba, La	74	0	147	0
SOLID				
Gamma Spec Solid RAD A-013	21	0	31	0
LSC Nickel 63	9	0	9	0
Gas Flow Sr 2nd count	5	0	5	0
Gas Flow Strontium 90	3	0	3	0
Gas Flow Total Strontium	11	0	11	0
Gamma Spec Solid RAD A-013 with Ba, La	8	0	13	0
Gamma Spec Solid RAD A-013 with Iodine	5	0	6	0
FILTER				
Gamma Spec Filter RAD A-013	8	0	8	0
Gas Flow Sr 2nd Count	5	0	5	0
Alpha Spec Am241Curium	5	0	5	0
Gas Flow Total Strontium	5	0	5	0
Gross A & B	528	0	543	0
Gas Flow Sr-90	1	0	1	0
Gamma Spec Filter	51	0	52	0
LIQUID				
Alpha Spec Uranium	15	0	18	0
Tritium	331	0	333	0
LSC Iron-55	67	0	65	0
LSC Nickel 63	65	2	65	0
Gamma Spec Liquid RAD A-013	33	0	33	0
Gamma Iodine-131	34	0	36	0
Alpha Spec Plutonium	18	0	18	0
Gas Flow Sr 2nd count	41	0	41	0
Alpha Spec Am241 Curium	23	0	23	0
Gas Flow Total Strontium	153	0	153	0
Gross Alpha Non Vol Beta	106	0	110	0
Gamma Spec Liquid RAD A-013 with Ba, La	102	0	192	0
Gamma Spec Liquid RAD A-013 with Iodine	54	0	98	0
TISSUE				
Gamma Spec Solid RAD A-013	47	0	48	0
LSC Nickel 63	7	0	7	0
Gas Flow Sr 2nd count	21	0	21	0
Gas Flow Total Strontium	26	0	26	0

Gamma Spec Solid RAD A-013 with Ba, La	9	0	9	0
Gamma Spec Solid RAD A-013 with Iodine	24	0	24	0
VEGETATION				
Gamma Spec Solid RAD A-013	6	0	6	0
Gas Flow Sr 2nd count	13	0	13	0
Gamma Spec Solid RAD A-013 with Iodine	87	0	90	0
AIR CHARCOAL				
Gamma Iodine 131 RAD A-013	549	0	552	0
DRINKING WATER				
Alpha Spec Uranium	2	0	2	0
Tritium	42	0	42	0
LSC Iron-55	18	0	20	0
LSC Nickel 63	18	0	20	0
Gamma Iodine-131	32	0	34	0
Alpha Spec Thorium	2	0	2	0
Gas Flow Sr 2nd count	17	0	17	0
Gas Flow Total Strontium	21	0	21	0
Gross Alpha Non Vol Beta	94	0	93	0
Gamma Spec Liquid RAD A-013 with Ba, La	53	0	93	0
Gamma Spec Liquid RAD A-013 with Iodine	1	0	1	0
Total	**2941**		**3242**	

Note 1: The RPD must be 20 percent or less, if both samples are greater than 5 times the MDC. If both results are less than 5 times MDC, then the RPD must be equal to or less than 100%. If one result is above the MDC and the other is below the MDC, then the RPD can be calculated using the MDC for the result of the one below the MDC. The RPD must be 100% or less. In the situation where both results are above the MDC but one result is greater than 5 times the MDC and the other is less than 5 times the MDC, the RPD must be less than or equal to 20%. If both results are below MDC, then the limits on % RPD are not applicable. All not applicable results are revised to 0.

TABLE 7

ALL RADIOLOGICAL INTRA-LABORATORY DATA SUMMARY:
BIAS AND PRECISION BY MATRIX

2012	Bias Criteria (+ / - 25%)		Precision Criteria (Note 1)	
	WITHIN CRITERIA	OUTSIDE CRITERIA	WITHIN CRITERIA	OUTSIDE CRITERIA
MILK				
Gamma Spec Liquid RAD A-013	8	0	8	0
Gamma Iodine-129	0	0	1	0
Gamma Iodine-131	44	0	154	0
Gas Flow Sr 2nd count	51	0	48	0
Gas Flow Strontium 90	7	0	7	0
Gas Flow Total Strontium	29	0	29	0
Gross Alpha Non Vol Beta	1	0	1	0
Gamma Spec Liquid RAD A-013 with Ba, La	74	0	147	0
Gamma Spec Liquid RAD A-013 with Iodine	6	0	5	0
SOLID				
Gas Flow Radium 228	16	0	20	0
Tritium	368	0	402	0
Carbon-14	274	0	358	0
LSC Iron-55	203	0	215	0
Alpha Spec Polonium Solid	90	0	148	0
Gamma Nickel 59 RAD A-022	184	0	240	0
LSC Chlorine-36 in Solids	13	0	24	0
Gamma Spec Ra226 RAD A-013	142	0	178	0
Gamma Spec Solid RAD A-013	815	0	1181	1
LSC Nickel 63	263	0	312	0
LSC Plutonium	268	0	285	2
Technetium-99	429	0	458	0
Gamma Spec Liquid RAD A-013	5	0	5	0
ICP-MS Technetium-99 in Soil	95	0	92	0
LSC Selenium 79	4	0	4	0
Total Activity,	10	0	11	0
Tritium	4	0	4	0
Alpha Spec Am243	42	0	74	0
Gamma Iodine-129	215	0	228	0
Gas Flow Lead 210	41	0	38	0
Total Uranium KPA	7	0	10	0
Alpha Spec Uranium	451	0	614	0
LSC Promethium 147	26	0	37	0
LSC, Rapid Strontium 89 and 90	116	0	129	0
Alpha Spec Polonium	2	0	2	0
Alpha Spec Thorium	257	0	392	0

ICP-MS Uranium-233, 234 in Solid	11	0	8	0
LSC Sulfur 35	2	0	2	0
Alpha Spec Plutonium	309	0	448	3
ICP-MS Technetium-99 Prep in Soil	88	0	85	0
Alpha Spec Neptunium	293	0	321	1
Alpha Spec Plutonium	157	0	206	0
Alpha Spec Radium 226	12	0	15	1
Gamma Spec Solid with Ra226, Ra228	7	0	13	0
Gas Flow Sr 2nd count	15	0	17	0
Gas Flow Strontium 90	239	0	312	0
Gas Flow Total Radium	2	0	2	0
Lucas Cell Radium 226	43	0	55	0
Total Activity Screen	8	0	48	0
Alpha Spec Am241 Curium	402	0	536	0
LSC Phosphorus-32	3	0	3	0
Gas Flow Total Strontium	88	0	90	0
Gross Alpha Non Vol Beta	2	0	2	0
ICP-MS Uranium-233, 234 Prep in Solid	13	0	8	0
ICP-MS Uranium-235, 236, 238 in Solid	15	0	12	0
Gamma Spec Solid RAD A-013 with Ba, La	8	0	13	0
Gamma Spec Solid RAD A-013 with Iodine	5	0	6	0
Organically Bound Tritium	7	0	16	0
GFC Chlorine-36 in Solids	3	0	2	0
Gamma Spec Solid RAD A-013 (pCi/Sample)	3	0	8	0
Technetium-99	0	0	1	0
Tritium	4	0	4	0
Alpha Spec Am241 (pCi/Sample)	0	0	1	0
ICP-MS Uranium-234, 235, 236, 238 in Solid	290	0	281	0
ICP-MS Uranium-235, 236, 238 Prep in Solid	11	0	7	0
Carbon-14	2	0	2	0
Gross Alpha/Beta	299	0	456	1
Alpha Spec Neptunium	0	0	1	0
Gross Alpha/Beta (Americium Calibration) Solid	1	0	1	0
ICP-MS Uranium-234, 235, 236, 238 Prep in Solid	139	0	147	0
Lucas Cell Radium 226 by DOE HASL 300 Ra-04 Solid	1	0	2	0
FILTER				
Alpha Spec Uranium	11	0	20	0
Alpha Spec Polonium	5	0	15	0
Gamma I-131, filter	5	0	5	0
LSC Plutonium Filter	133	0	158	0

Tritium	123	0	181	0
Carbon-14	88	0	151	0
Nickel-63	0	0	6	0
LSC Iron-55	136	0	154	0
Gamma Nickel 59 RAD A-022	132	0	151	0
Gamma Iodine 131 RAD A-013	4	0	4	0
Gamma Spec Solid RAD A-013	1	0	1	0
LSC Nickel 63	136	0	181	0
LSC Plutonium	1	0	1	0
Technetium-99	90	0	136	0
Gamma Spec Filter RAD A-013	217	0	288	0
LSC Chlorine-36 in Filters	0	0	1	0
Alphaspec Np Filter per Liter	32	0	40	0
Alphaspec Pu Filter per Liter	22	0	32	0
Gamma Iodine-125	11	0	0	0
Gamma Iodine-129	110	0	128	0
Gross Alpha/Beta	0	0	76	0
Alpha Spec Am243	16	0	30	0
Gas Flow Lead 210	0	0	3	0
LSC Plutonium Filter per Liter	36	0	42	0
Total Uranium KPA	7	0	10	0
Alpha Spec Uranium	61	0	79	0
LSC Promethium 147	1	0	6	0
LSC, Rapid Strontium 89 and 90	128	0	170	0
Alpha Spec Thorium	35	0	48	0
Alpha Spec Plutonium	85	0	106	0
Alpha Spec Neptunium	108	0	135	0
Alpha Spec Plutonium	134	0	181	0
Alpha Spec Polonium,(Filter/Liter)	0	0	17	0
Gas Flow Sr 2nd Count	86	0	92	0
Gas Flow Strontium 90	50	0	61	0
Lucas Cell Radium-226	0	0	1	0
Alpha Spec Am241Curium	157	0	189	0
Gas Flow Total Strontium	6	0	12	0
Total Activity in Filter,	2	0	7	0
Alphaspec Am241 Curium Filter per Liter	36	0	43	0
Tritium	127	0	127	0
GFC Chlorine-36 in Filters	1	0	2	0
Gamma Spec Filter RAD A-013 Direct Count	3	0	3	0
Carbon-14	52	0	60	0
Direct Count-Gross Alpha/Beta	67	0	0	0
Gross Alpha/Beta	73	0	93	0
ICP-MS Uranium-234, 235, 236, 238 in Filter	4	0	10	0
Alpha Spec U	28	0	66	0
Gross A & B	649	0	603	0

Gross Alpha/Beta	1	0	1	0
LSC Iron-55	44	0	55	0
Technetium-99	32	0	38	0
Gas Flow Sr-90	36	0	41	0
LSC Nickel 63	40	0	47	0
Gas Flow Pb-210	24	0	45	0
Gas Flow Ra-228	27	0	36	0
Gamma Iodine 129	50	0	51	0
ICP-MS Uranium-234, 235, 236, 238 Prep in Filter	2	0	6	0
Gamma Spec Filter	172	0	215	0
Lucas Cell Ra-226	30	0	43	0
Alpha Spec Thorium	37	0	52	0
LIQUID				
Alpha Spec Uranium	523	0	802	0
Alpha Spec Polonium	2	0	6	0
Electrolytic Tritium	21	0	35	0
Tritium	1377	0	1465	0
Carbon-14	263	0	300	0
Chlorine-36 in Liquids	1	0	3	0
Iodine-131	10	0	18	6
LSC Iron-55	298	0	363	0
Gamma Nickel 59 RAD A-022	26	0	41	0
Gamma Iodine 131 RAD A-013	3	0	4	0
LSC Nickel 63	359	0	402	0
LSC Plutonium	83	0	102	2
LSC Radon 222	9	0	31	0
Technetium-99	364	0	458	0
Gamma Spec Liquid RAD A-013	879	0	941	0
Total Activity,	4	0	4	0
Alpha Spec Am243	10	0	16	0
Gamma Iodine-129	103	0	160	0
Gamma Iodine-131	34	0	36	0
ICP-MS Technetium-99 in Water	4	0	28	0
ICP-MS Uranium-238 in Liquid	0	0	43	0
Gas Flow Lead 210	102	0	101	0
Total Uranium KPA	96	0	249	0
LSC Promethium 147	3	0	11	0
LSC, Rapid Strontium 89 and 90	15	0	18	0
Alpha Spec Polonium	1	0	1	0
Alpha Spec Thorium	257	0	384	0
Gas Flow Radium 228	286	0	333	0
Gas Flow Radium 228	12	0	12	0
Alpha Spec Plutonium	319	0	407	0
ICP-MS Uranium-238 Prep in Liquid	0	0	41	0
Alpha Spec Neptunium	118	0	160	0
Alpha Spec Plutonium	60	0	77	0
Alpha Spec Radium 226	0	0	14	0

Gas Flow Sr 2nd count	337	0	359	0
Gas Flow Strontium 90	482	0	517	0
Gas Flow Strontium 90	1	0	1	0
Gas Flow Strontium 90	2	0	3	0
Gas Flow Total Radium	83	0	112	0
ICP-MS Technetium-99 Prep in Water	4	0	28	0
ICP-MS Uranium-233, 234 in Liquid	4	0	5	0
Lucas Cell Radium 226	335	0	406	0
Lucas Cell Radium-226	15	0	15	0
Total Activity Screen	0	0	2	0
Chlorine-36 in Liquids	8	0	14	0
Alpha Spec Am241 Curium	327	0	426	0
Gas Flow Total Strontium	240	0	253	0
Gross Alpha Non Vol Beta	1289	0	1521	6
Lucas Cell Radium 226 by Method Ra-04	2	0	0	0
ICP-MS Uranium-233, 234 Prep in Liquid	4	0	5	0
Tritium in Drinking Water by EPA 906.0	16	0	17	0
Gamma Spec Liquid RAD A-013 with Ba, La	104	0	194	0
Gamma Spec Liquid RAD A-013 with Iodine	165	0	230	0
Gas Flow Strontium 89 & 90	7	0	3	0
ICP-MS Uranium-235, 236, 238 in Liquid	8	0	8	0
Gas Flow Total Alpha Radium	2	0	2	0
Gross Alpha Co-precipitation	14	0	13	0
ICP-MS Uranium-235, 236, 238 Prep in Liquid	4	0	5	0
ICP-MS Uranium-234, 235, 236, 238 in Liquid	52	0	146	0
Gross Alpha Beta (Americium Calibration) Liquid	21	0	24	0
ICP-MS Uranium-234, 235, 236, 238 Prep in Liquid	23	0	68	0
TISSUE				
Tritium	5	0	6	0
LSC Iron-55	7	0	7	0
Gamma Spec Solid RAD A-013	100	0	105	0
LSC Nickel 63	7	0	7	0
Tritium	2	0	2	0
Alpha Spec Uranium	7	0	8	0
Alpha Spec Plutonium	10	0	11	0
Gas Flow Sr 2nd count	21	0	21	0
Gas Flow Strontium 90	26	0	33	0
Lucas Cell Radium 226	2	0	2	0
Alpha Spec Am241 Curium	3	0	3	0
Gas Flow Total Strontium	26	0	26	0

Gamma Spec Solid RAD A-013 with Ba, La	9	0	9	0
Gamma Spec Solid RAD A-013 with Iodine	24	0	24	0
Organically Bound Tritium	1	0	1	0
Gross Alpha/Beta	4	0	5	0
VEGETATION				
Carbon-14	6	0	6	0
Gamma Nickel 59 RAD A-022	4	0	4	0
Gamma Spec Solid RAD A-013	25	0	30	0
LSC Nickel 63	4	0	4	0
LSC Plutonium	5	0	4	0
Technetium-99	7	0	7	0
Tritium	16	0	16	0
Gamma Iodine-129	4	0	3	0
Gas Flow Lead 210	4	0	4	0
Total Uranium KPA	2	0	2	0
Alpha Spec Uranium	25	0	27	0
Alpha Spec Thorium	7	0	8	0
Alpha Spec Plutonium	12	0	9	0
Alpha Spec Neptunium	1	0	1	0
Alpha Spec Plutonium	1	0	1	0
Gas Flow Sr 2nd count	13	0	13	0
Gas Flow Strontium 90	16	0	14	0
Gas Flow Total Radium	0	0	1	0
Alpha Spec Am241 Curium	9	0	6	0
Gamma Spec Solid RAD A-013 with Iodine	87	0	90	0
Gamma Spec Solid RAD A-013 (pCi/Sample)	2	0	2	0
Alpha Spec Am241 (pCi/Sample)	4	0	2	0
ICP-MS Uranium-234, 235, 236, 238 in Solid	6	0	3	0
Alpha Spec Uranium	2	1	2	0
Gross Alpha/Beta	7	2	9	0
Alpha Spec Plutonium	2	2	2	0
Gas Flow Strontium 90	4	0	2	0
ICP-MS Uranium-234, 235, 236, 238 Prep in Solid	4	0	2	0
AIR CHARCOAL				
Gamma I-131, filter	4	0	4	0
Gamma Iodine 131 RAD A-013	549	0	552	0
Carbon-14	8	0	6	0
DRINKING WATER				
Alpha Spec Uranium	7	0	8	0
Tritium	44	0	44	0
Iodine-131	0	0	18	6
LSC Iron-55	18	0	20	0
LSC Nickel 63	22	0	24	0

LSC Radon 222	78	1	99	0
Gamma Spec Liquid RAD A-013	16	0	46	0
Gamma Iodine-129	2	0	7	0
Gamma Iodine-131	32	0	34	0
Total Uranium KPA	19	0	38	0
Alpha Spec Thorium	2	0	2	0
Gas Flow Radium 228	174	0	143	0
Gas Flow Sr 2nd count	17	0	17	0
Gas Flow Strontium 90	18	0	18	0
LSC Calcuim 45	4	0	4	0
Lucas Cell Radium-226	158	0	169	0
Gas Flow Total Strontium	21	0	21	0
Gross Alpha Non Vol Beta	393	0	327	0
LSC Phosphorus-32	5	0	25	0
Tritium in Drinking Water by EPA 906.0	35	0	35	0
Gamma Spec Liquid RAD A-013 with Ba, La	53	0	93	0
Gamma Spec Liquid RAD A-013 with Iodine	2	0	2	0
Gas Flow Strontium 89 & 90	19	0	12	0
Gas Flow Total Alpha Radium	4	0	4	0
Gross Alpha Co-precipitation	109	0	107	0
Alpha/Beta (Americium Calibration) Drinking Water	13	0	14	0
ECLS-R-GA NJ 48 Hr Rapid Gross Alpha	9	0	9	0
Total	**22305**		**27436**	

Note 1: The RPD must be 20 percent or less, if both samples are greater than 5 times the MDC. If both results are less than 5 times MDC, then the RPD must be equal to or less than 100%. If one result is above the MDC and the other is below the MDC, then the RPD can be calculated using the MDC for the result of the one below the MDC. The RPD must be 100% or less. In the situation where both results are above the MDC but one result is greater than 5 times the MDC and the other is less than 5 times the MDC, the RPD must be less than or equal to 20%. If both results are below MDC, then the limits on % RPD are not applicable. All not applicable results are revised to 0.

TABLE 8

2012 CORRECTIVE ACTION REPORT SUMMARY

CORRECTIVE ACTION ID# & PE FAILURE	DISPOSITION
CARR120306-667 ISO Documentation of PT Failures in RAD-88 Study – Tritium in Water	The low bias associated with the tritium result for RAD-88 initiated an investigation of the liquid scintillation detector used for the original reported result after the original vials were recounted on a different detector and met acceptance criteria. The tritium efficiency for the detector was reviewed and a slight low bias was observed. A service call was initiated. Tritium and carbon-14 efficiencies were calculated on all liquid scintillation detectors to ensure that service was not required. No other deficiencies were noted. The data reported using this detector was also reviewed and were deemed acceptable as originally reported In the future, the efficiency of each detector will be monitored monthly in order to rapidly identify any change that may require service. **A second PT was successfully analyzed for this matrix.**
CARR120831-715 ISO Documentation of PT Failures in RAD-90 Study - Barium-133 and Radium-226	**Barium-133** All data were reviewed and it appears that the cause of the high bias was due to the calibration standard. The reported result was counted on a detector that omitted the Hg-203 nuclide from the efficiency calibration due to its short half-life and an inability to accumulate 10,000 counts in a reasonable amount of time. The duplicate sample in the batch counted on a detector that had the Hg-203 point included in its efficiency calibration and generated a result of 64.83 pCi/L. This result compares well with the assigned value of 65 pCi/L. **Radium-226** After a review of the data, an apparent reason for this discrepancy could not be determined. Multiple steps were taken to prove that this high bias was an isolated occurrence and that our overall process is within control.

	Two sample duplicates were also prepared and counted along with the reported result. Both results fell well within the acceptance range **Actions to Prevent Potential Occurrence or Recurrence:** **Barium-133** In the future additional points will be included in the efficiency curve to better estimate the efficiencies across the entire energy spectrum. **Radium-226** The laboratory must assume an unidentified random error caused the high bias because all quality control criteria were met for the batch. The lab will continue to monitor the recoveries of this radionuclide to ensure that there are no issues.

CARR120711-694 and 698 For Failures of MAPEP 26 Study for Uranium 234/233 in Filters and Vegitation	**MAPEP-12-RdF26** **Uranium-234/233** After a thorough review of the data, the root cause of the low bias on the reported values was due to a high counting uncertainty. The counting uncertainty achieved for the U-233/4 results was approximately 100% of the reported results. Since the Relative Error Ratio between the result and the true value was 1.72, this indicates that the measured result is within the uncertainty of the measurement. **Update January 2013** Originally, it was suspected that the failure of the low bias on the reported values was due to a high counting uncertainty. The counting uncertainty achieved for the U-233/4 results was approximately 100% of the reported results. However, after the receipt of a similar failure in MAPEP 27 and a conversation with Mr. David Sill of the RESL Laboratory, it is certain that the aliquot used to analyze the sample was insufficient to detect the Uranium-234/233 spiked onto the filter (which is directly related to the high counting uncertainty). **MAPEP-12-RdV26** **Uranium-234/233** After a thorough review of the data, the root cause of the low bias on the reported values was due to a high counting uncertainty. The counting uncertainty achieved for the U-233/4 results was approximately 60% of the reported results. Since the Relative Error Ratio between the result and the true value was 1.14, this indicates that the measured result is within the uncertainty of the measurement. **Permanent Corrective/Preventive Actions or Improvements**: Since guidance on acceptable uncertainties or Action Levels are not provided, to avoid potential warnings and failures due to high counting uncertainty in the future, our internal review process has been adjusted. If the result has measurable activity but a low count rate, the count time will be extended and the sample re-analyzed with a larger aliquot to achieve better counting statistics.

CARR121127-742 MAPEP 27 Unacceptable and Warning – Selinium, Gross Alpha	**Root Cause Analysis of MAPEP-12-MaS27 Selenium** After a review of the data, a definitive reason for this discrepancy could not be determined. However, it is suspected that something occurred during the digestion of the batch to produce the lower recovery. The following steps were taken to ensure that this was an isolated occurrence and that our overall process is within control. **Actions Taken: MAPEP-12-MaS27 Selenium** The laboratory must assume an unidentified random error caused the lower result. However, closer attention must be paid to the matrix QC failures. In the future, the samples should be re-extracted to confirm results prior to reporting. **MAPEP-12-GrF27 Gross Alpha** Prior to counting, this filter was taken through the opening and labeling procedures specified in CARR120118-659. It is not suspected that previous Gross Alpha MAPEP issues contributed to this failure. While reviewing results from previous studies, a low bias was observed. It was suspected that this bias was due to a difference in instrument efficiency due to the filter media. To investigate further, a previous MAPEP filter containing activity was counted and used to establish an efficiency. When applied to the counts of MAPEP 27, the result were acceptable but the low bias was still observed. Source standards were then created using blank filter media from previous MAPEP studies. The blank filters were spiked with Th-230 and counted to determine an average efficiency. When this efficiency was applied to the MAPEP 27 count, the result fell well within the acceptance range. Using the blank filter to create an instrument efficiency is part of the study instructions as an option. This efficiency is much more accurate than what was used and will be used for future MAPEP studies. **Actions taken : MAPEP-12-GrF27 Gross Alpha** Since using the blank filter to create an instrument efficiency is part of the study instructions, it will be used for future MAPEP studies. GEL found that this efficiency is much more accurate than the one previously used.

CARR 121127-743 MAPEP 27 Study Unacceptable and Warning ratings for U234/233 in Filter	**MAPEP-12-RdF27** **Uranium-234/233** Upon notification of the failures, the data were reviewed again for accuracy. Investigations on quality control checks and trending were preformed to ensure that the low bias was isolated to the MAPEP sample procedure and not indicative of a systematic failure. Also, an additional MAPEP-12-RdF27 filter was obtained and prepared per standard protocol. Based on the recommendations from Mr. David Sill of the RESL laboratory, the entire filter was used for analysis. The U-233/234 and U-238 results for this analysis were 98% of the known values. The cause of the failure was the limited sample amount used to prepare the initial sample. Multiple aliquots had been removed from the digested filter for other analyses, the RESL Laboratory had had prepared this sample as a single analysis. **Action Taken: MAPEP-12-RdF26 and MAPEP-12-RdF27 Uranium-234/233** Since guidance on acceptable uncertainties or Action Levels are not provided, to avoid potential warnings and failures due to high counting uncertainty in the future, our internal review process has been adjusted. If the result has measurable activity but a low count rate, the count time will be extended and/or the sample re-analyzed using a larger sample aliquot to achieve better counting statistics. Although the MAPEP instructions are written such that the laboratory should have confidence in using smaller aliquots and still attain sufficiently low counting uncertainties, it is now our understanding that the design of the MAPEP filter program requires the analysis of a complete filter aliquot for each parameter analyzed. GEL will procure from MAPEP a filter for each parameter, analyze the entire filter for each parameter, and no longer perform batch duplicates for filter analysis of MAPEP samples.
CARR121109-744 MAPEP 27 Study for biased high trends of Cobalt-57	**MAPEP-12-MaS26** & **MAPEP-12-MaS27** **Co-57** GEL received warnings for Co-57 results in the soil matrix in the past two testing rounds of the MAPEP. While Co-57 received warning flags all other gamma emitting isotopes in the soil matrix had acceptable results. Due to a potential trend, a corrective action was opened. After receiving the results from MAPEP-27 and a second biased high result for Co-57, a thorough review of our process

	was conducted. This review indicated an issue associated with the calibration correction factors (absorption factors or density corrections) applied to results due to differing densities between the sample and the calibration standard. A potential 20% positive bias for Co-57 (122 keV) was observed. **Note:** This bias was within the acceptable uncertainty of the method (+/- 25%) for duplicate results. Results for Am-241(59.5 keV) were also reviewed to ensure that biases were not observed. **Action Taken: MAPEP-12-MaS26 & MAPEP-12-MaS27 Co-57** The reported results compared very well to the reference values for both MAPEP-26 and MAPEP-27 (~97% and 101%, respectively). Since absorption factors (or density corrections) are only applied to our 100 ml aluminum can geometry for soils, no other matrices were impacted. **A review of the annual analytical data for this isotope indicated that the reported data to clients were not impacted by this bias.**

ENVIRONMENTAL DOSIMETRY COMPANY

ANNUAL QUALITY ASSURANCE STATUS REPORT

January - December 2012

Prepared By:	[signature]	Date:	3/13/13
Approved By:	[signature]	Date:	3/13/13

Environmental Dosimetry Company
10 Ashton Lane
Sterling, MA 01564

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EXECUTIVE SUMMARY

Routine quality control (QC) testing was performed for dosimeters issued by the Environmental Dosimetry Company (EDC) .

During this annual period, 100% (72/72) of the individual dosimeters, evaluated against the EDC internal performance acceptance criteria (high-energy photons only), met the criterion for accuracy and 100% (72/72) met the criterion for precision (Table 1). In addition, 100% (12/12) of the dosimeter sets evaluated against the internal tolerance limits met EDC acceptance criteria (Table 2) and 100% (6/6) of independent testing passed the performance criteria (Table 3). Trending graphs, which evaluate performance statistic for high-energy photon irradiations and co-located stations are given in Appendix A.

Two assessments were performed in 2012, one internal and one external. All findings were closed out in September of 2012.

I. INTRODUCTION

The TLD systems at the Environmental Dosimetry Company (EDC) are calibrated and operated to ensure consistent and accurate evaluation of TLDs. The quality of the dosimetric results reported to EDC clients is ensured by in-house performance testing and independent performance testing by EDC clients, and both internal and client directed program assessments.

The purpose of the dosimetry quality assurance program is to provide performance documentation of the routine processing of EDC dosimeters. Performance testing provides a statistical measure of the bias and precision of dosimetry processing against a reliable standard, which in turn points out any trends or performance changes. Two programs are used:

A. QC Program

Dosimetry quality control tests are performed on EDC Panasonic 814 Environmental dosimeters. These tests include: (1) the in-house testing program coordinated by the EDC QA Officer and (2) independent test perform by EDC clients. In-house test are performed using six pairs of 814 dosimeters, a pair is reported as an individual result and six pairs are reported as the mean result. Results of these tests are described in this report.

Excluded from this report are instrumentation checks. Although instrumentation checks represent an important aspect of the quality assurance program, they are not included as process checks in this report. Instrumentation checks represent between 5-10% of the TLDs processed.

B. QA Program

An internal assessment of dosimetry activities is conducted annually by the Quality Assurance Officer (Reference 4). The purpose of the assessment is to review procedures, results, materials or components to identify opportunities to improve or enhance processes and/or services.

II. PERFORMANCE EVALUATION CRITERIA

1. Acceptance Criteria for Internal Evaluations

(a) Bias

For each dosimeter tested, the measure of bias is the percent deviation of the reported result relative to the delivered exposure. The percent deviation relative to the delivered exposure is calculated as follows:

$$\frac{(H_i' - H_i)}{H_i}100$$

where:

H_i' = the corresponding reported exposure for the i^{th} dosimeter (i.e., the reported exposure)

H_i = the exposure delivered to the i^{th} irradiated dosimeter (i.e., the delivered exposure)

(b) Mean Bias

For each group of test dosimeters, the mean bias is the average percent deviation of the reported result relative to the delivered exposure. The mean percent deviation relative to the delivered exposure is calculated as follows:

$$\sum\left(\frac{(H_i' - H_i)}{H_i}\right)100\left(\frac{1}{n}\right)$$

where:

H_i' = the corresponding reported exposure for the i^{th} dosimeter (i.e., the reported exposure)

H_i = the exposure delivered to the i^{th} irradiated test dosimeter (i.e., the delivered exposure)

n = the number of dosimeters in the test group

(c) Precision

For a group of test dosimeters irradiated to a given exposure, the measure of precision is the percent deviation of individual results relative to the mean reported exposure. At least two values are required for the determination of precision. The measure of precision for the i^{th} dosimeter is:

$$\left(\frac{(H_i' - \overline{H})}{\overline{H}}\right)100$$

where:

H_i' = the reported exposure for the i^{th} dosimeter (i.e., the reported exposure)

$\overline{H}$ = the mean reported exposure; i.e., $\overline{H} = \sum H_i'\left(\frac{1}{n}\right)$

n = the number of dosimeters in the test group

(d) EDC Internal Tolerance Limits

All evaluation criteria are taken from the "EDC Quality System Manual," (Reference 2). These criteria are only applied to individual test dosimeters irradiated with high-energy photons (Cs-137) and are as follows for Panasonic Environmental dosimeters: ± 15% for bias and ± 12.8% for precision.

2. QC Investigation Criteria and Result Reporting

EDC Quality System Manual (Reference 2) specifies when an investigation is required due to a QC analysis that has failed the EDC bias criteria. The criteria are as follows:

(a) No investigation is necessary when an individual QC result falls outside the QC performance criteria for accuracy.

(b) Investigations are initiated when the mean of a QC processing batch is outside the performance criterion for bias.

3. Reporting of Environmental Dosimetry Results to EDC Customers

(a) All results are to be reported in a timely fashion.

(b) If the QA Officer determines that an investigation is required for a process, the results shall be issued as normal. If the QC results, prompting the investigation, have a mean bias from the known of greater than ±20%, the results shall be issued with a note indicating that they may be updated in the future, pending resolution of a QA issue.

(c) Environmental dosimetry results do not require updating if the investigation has shown that the mean bias between the original results and the corrected results, based on applicable correction factors from the investigation, does not exceed ±20%.

III. DATA SUMMARY FOR ISSUANCE PERIOD JANUARY-DECEMBER 2012

A. General Discussion

Results of performance tests conducted are summarized and discussed in the following sections. Summaries of the performance tests for the reporting period are given in Tables 1 through 3 and Figures 1 through 4.

Table 1 provides a summary of individual dosimeter results evaluated against the EDC internal acceptance criteria for high-energy photons only. During this period, 100% (72/72) of the individual dosimeters, evaluated against these criteria met the tolerance limits for accuracy and 100% (72/72) met the criterion for precision. A graphical interpretation is provided in Figures 1 and 2.

Table 2 provides the Bias + Standard deviation results for each group (N=6) of dosimeters evaluated against the internal tolerance criteria. Overall,100% (12/12) of the dosimeter sets evaluated against the internal tolerance performance criteria met these criteria. A graphical interpretation is provided in Figures 3

Table 3 presents the independent blind spike results for dosimeters processed during this annual period. All results passed the performance acceptance criterion. Figure 4 is a graphical interpretation of Seabrook Station blind co-located station results.

B. Result Trending

One of the main benefits of performing quality control tests on a routine basis is to identify trends or performance changes. The results of the Panasonic environmental dosimeter performance tests are presented in Appendix A. The results are evaluated against each of the performance criteria listed in Section II, namely: individual dosimeter accuracy, individual dosimeter precision, and mean bias.

All of the results presented in Appendix A are plotted sequentially by processing date.

IV. STATUS OF EDC CONDITION REPORTS (CR)

During this annual period, one EDC Condition Report was issued. CR 1-2012 was issued to document the findings from the DTE Energy Audit 12-006.

V. STATUS OF AUDITS/ASSESSMENTS

1. Internal

EDC Internal Quality Assurance Assessment was conducted during the fourth quarter 2012. There were not any findings as a result of this assessment.

2. External

The DTE Energy Audit 12-006 was conducted on June 5, 2012. Two findings were issued as a result of this audit. The EDC responded to these findings and they were closed on September 6, 2012

VI. PROCEDURES AND MANUALS REVISED DURING JANUARY - DECEMBER 2012

Manual 1 was revised on August 1, 2012.

Procedure 700 was revised on August 31,2012

Procedure 750 was revised on February 15,2012

VII. CONCLUSION AND RECOMMENDATIONS

The quality control evaluations continue to indicate the dosimetry processing programs at the EDC satisfy the criteria specified in the Quality System Manual. The EDC demonstrated the ability to meet all applicable acceptance criteria.

VIII. REFERENCES

1. EDC Quality Control and Audit Assessment Schedule, 2012.
2. EDC Manual 1, Quality System Manual, Rev. 3, August 1, 2012.

TABLE 1

PERCENTAGE OF INDIVIDUAL DOSIMETERS THAT PASSED EDC INTERNAL CRITERIA JANUARY – DECEMBER 2012[(1), (2)]

Dosimeter Type	Number Tested	% Passed Bias Criteria	% Passed Precision Criteria
Panasonic Environmental	72	100	100

[(1)]This table summarizes results of tests conducted by EDC.
[(2)]Environmental dosimeter results are free in air.

TABLE 2

MEAN DOSIMETER ANALYSES (N=6) JANUARY – DECEMBER 2012[(1), (2)]

Process Date	Mean Bias %	Standard Deviation %	Tolerance Limit +/-15%
4/18/2012	7.7	1.7	Pass
4/21/2012	11.6	1.4	Pass
5/1/2012	1.1	1.4	Pass
6/5/2012	-0.5	1.3	Pass
7/19/2012	2.3	1.6	Pass
7/23/2012	-4.0	0.8	Pass
11/1/2012	2.5	2.2	Pass
11/4/2012	1.5	0.9	Pass
11/26/2012	-2.3	2.6	Pass
1/23/2013	-3.2	1.1	Pass
1/28/2013	4.4	1.3	Pass
2/2/2013	-0.1	1.2	Pass

[(1)]This table summarizes results of tests conducted by EDC for TLDs issued in 2012.
[(2)]Environmental dosimeter results are free in air.

TABLE 3
SUMMARY OF INDEPENDENT DOSIMETER TESTING JANUARY – DECEMBER 2012[(1), (2)]

Issuance Period	Client	Mean Bias %	Standard Deviation %	Pass / Fail
1st Qtr.2012	Millstone	-10.4	2.6	Pass
2nd Qtr.2012	Millstone	-4.7	1.6	Pass
2nd Qtr.2012	Seabrook	-0.8	1.5	Pass
3rd Qtr. 2012	Millstone	-13.9	2.6	Pass
4th Qtr.2012	Millstone	4.3	1.5	Pass
4th Qtr.2012	Seabrook	-5.2	1.3	Pass

[(1)]Performance criteria are +/- 30%.
[(2)]Blind spike irradiations using Cs-137

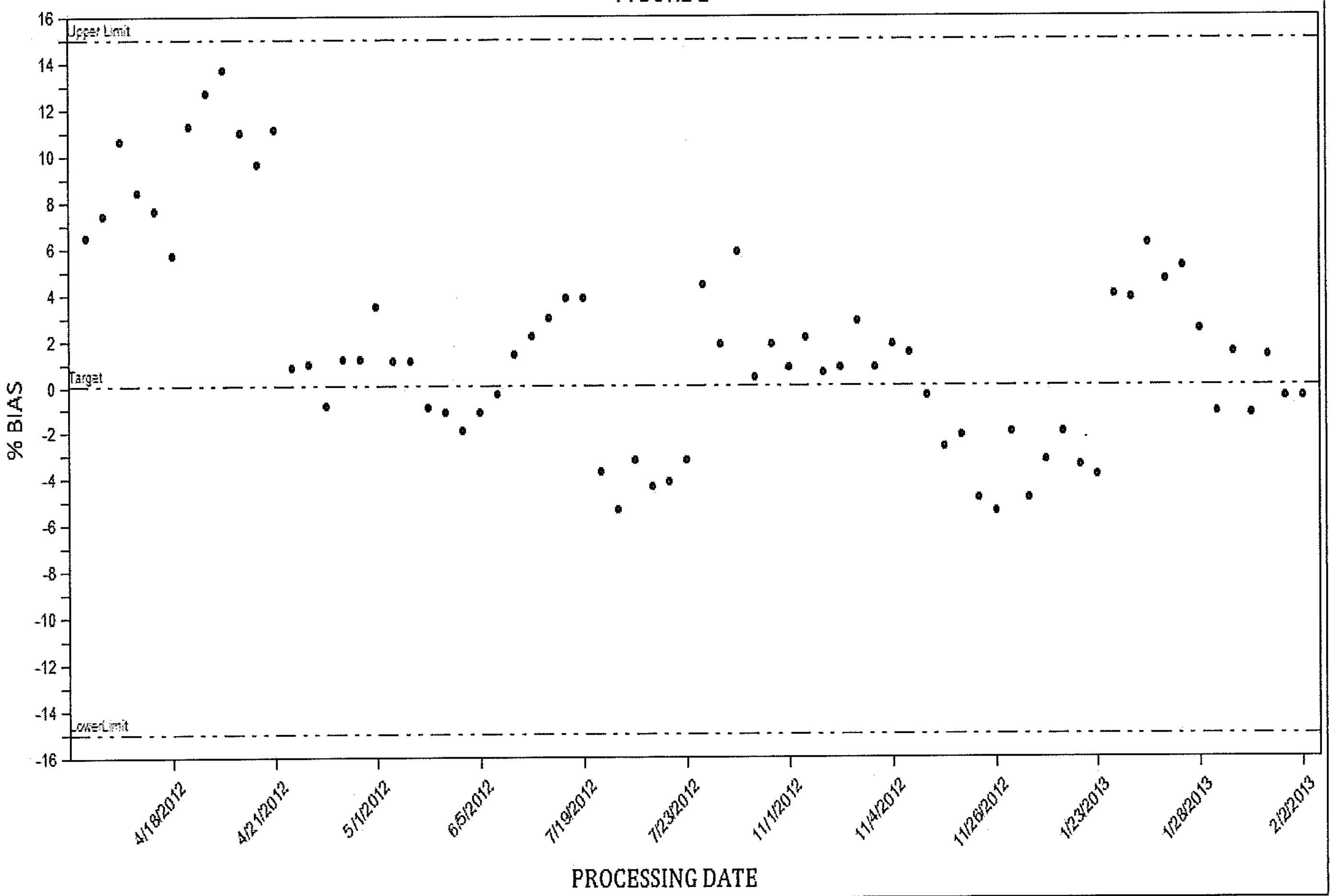
APPENDIX A

DOSIMETRY QUALITY CONTROL TRENDING GRAPHS

ISSUE PERIOD JANAURY - DECEMBER 2012

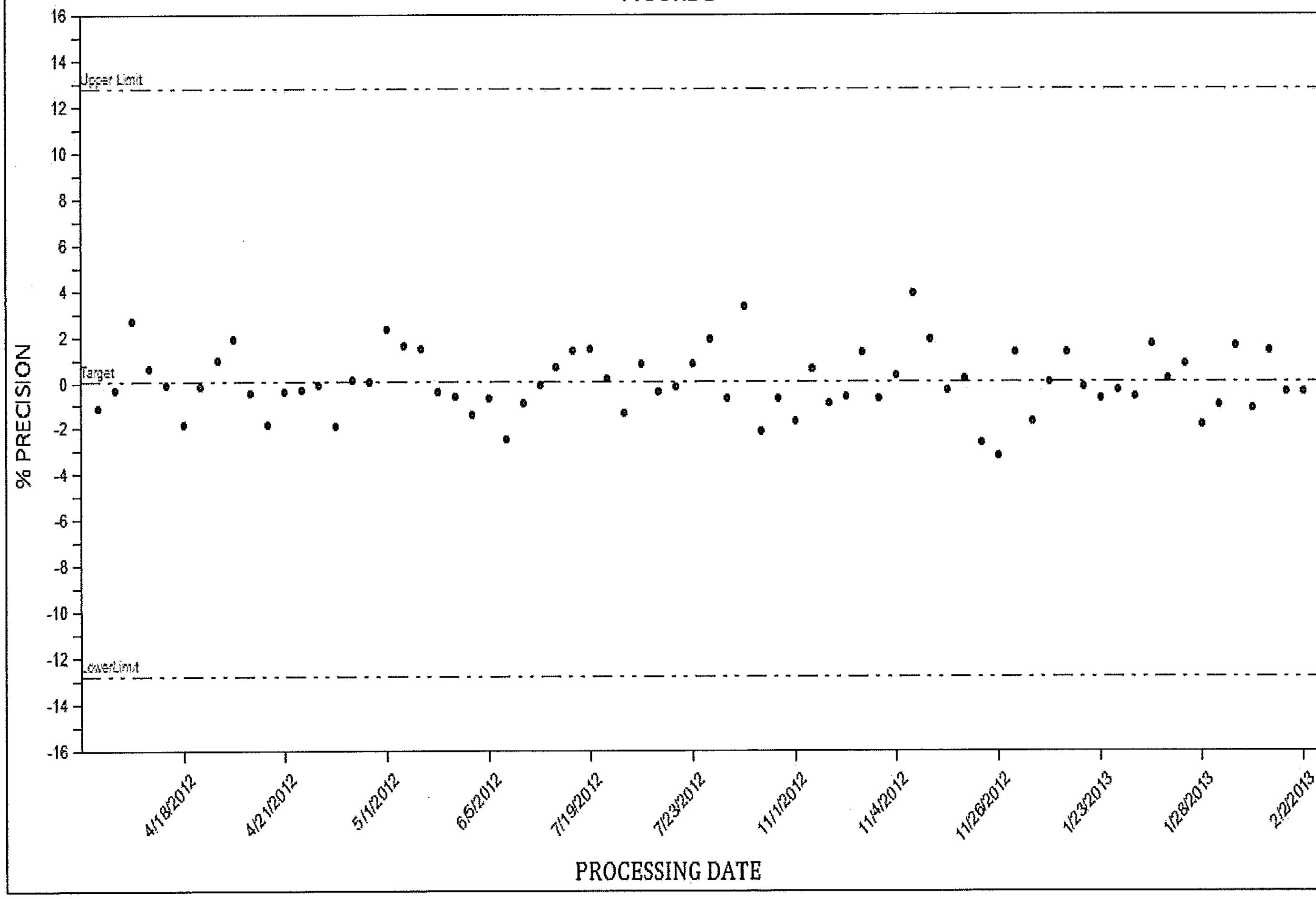
INDIVIDUAL ACCURACY ENVIRONMENTAL

FIGURE 1

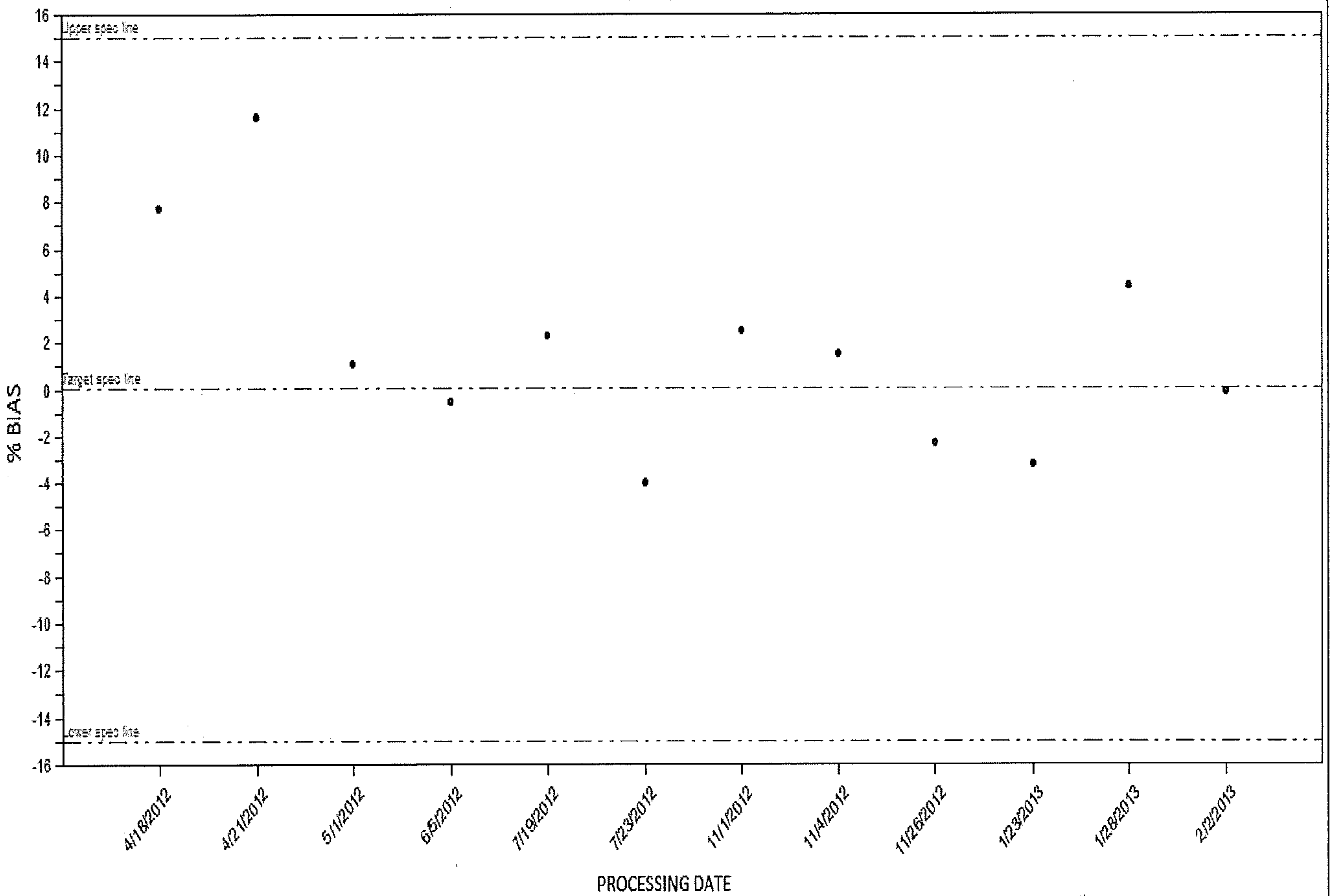


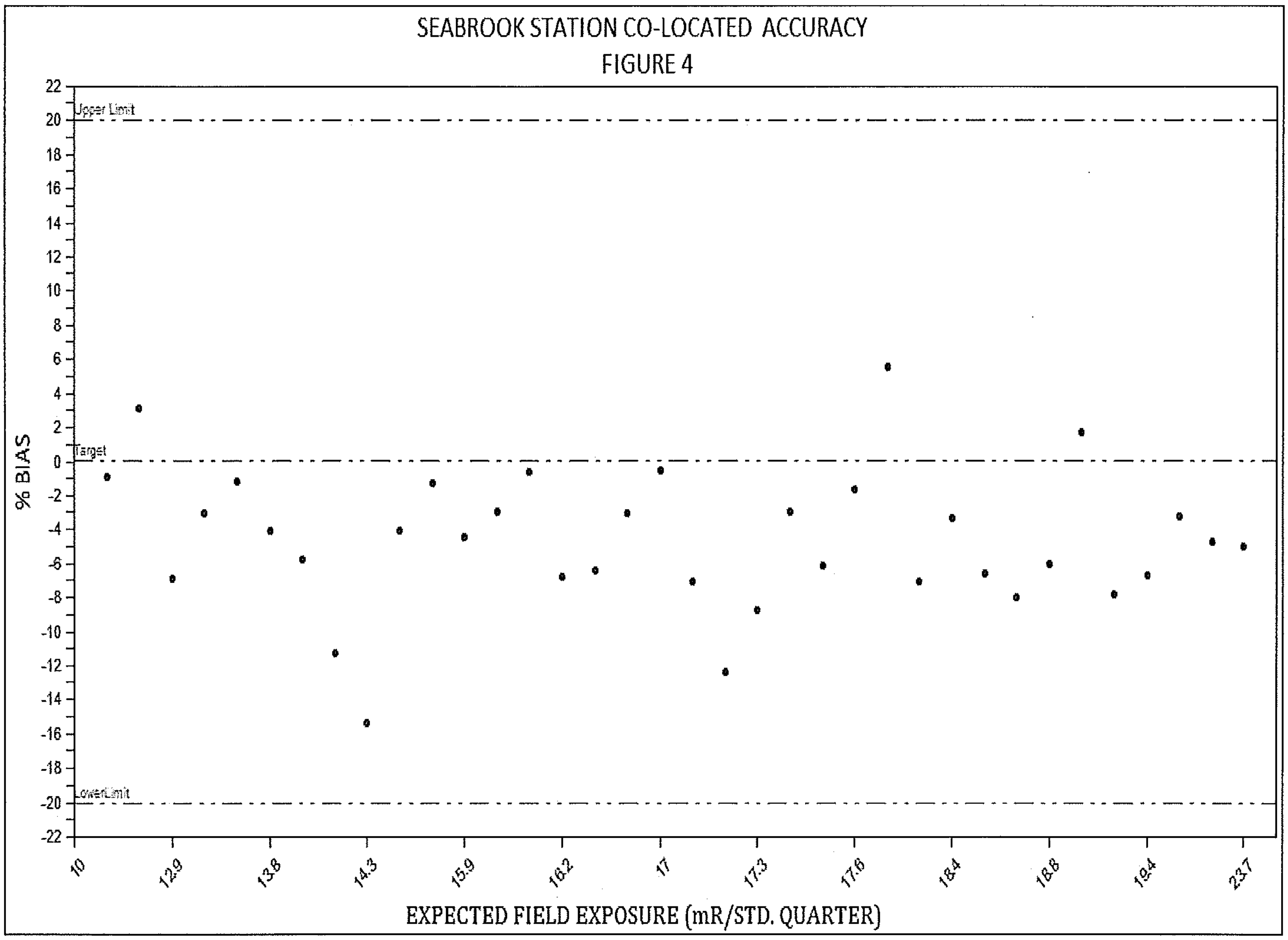
INDIVIDUAL PRECISION ENVIRONMENTAL

FIGURE 2



MEAN ACCURACY ENVIRONMENTAL
FIGURE 3




SEABROOK STATION CO-LOCATED ACCURACY
FIGURE 4
% BIAS
Upper Limit
Target
Lower Limit
22
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
10
12.9
13.8
14.3
15.9
16.2
17
17.3
17.6
18.4
18.8
19.4
23.7
EXPECTED FIELD EXPOSURE (mR/STD. QUARTER)