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0CAN051502

May 12, 2015

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Annual Radiological Environmental Operating Report for 2014
Arkansas Nuclear One – Units 1 and 2
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6

REFERENCE: Entergy letter dated April 28, 2015, "Annual Radioactive Effluent Release Report for 2014" (0CAN041504)

Dear Sir or Madam:

In accordance with Arkansas Nuclear One (ANO), Unit 1 Technical Specification (TS) 5.6.2 and Unit 2 TS 6.6.2, the submittal of an annual radiological environmental operating report for the previous year is required by May 15 of each year. The subject ANO report for the calendar year 2014 is enclosed.

This report fulfills the reporting requirements of the TSs referenced above.

The radionuclides detected by the radiological environmental monitoring program during 2014 were significantly below the regulatory limits. The operation of the ANO station during 2014 had no harmful radiological effects nor resulted in any irreversible damage to the local environment.

Based on ANO's review, no environmental samples from the monitoring program equaled or exceeded the reporting levels for radioactivity concentration due to ANO effluents when averaged over any calendar quarter. A map of all sampling locations and a corresponding table providing the respective distances and directions from the reactor building is included in the Offsite Dose Calculation Manual (ODCM) submitted as part of the referenced Annual Radioactive Effluent Release Report.

This letter contains no new commitments.

If you have any questions or require additional information, please contact me.

Sincerely,

**ORIGINAL SIGNED BY STEPHENIE L. PYLE**

SLP/rwc

Enclosure: Annual Radiological Environmental Operating Report for 2014

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**Enclosure to**

**0CAN051502**

# Annual Radiological Environmental Operating Report for 2014

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## Summary

The Annual Radiological Environmental Operating Report (AREOR) presents data obtained through analyses of environmental samples collected for Arkansas Nuclear One's (ANO's) Radiological Environmental Monitoring Program (REMP) for the period January 1, 2014, through December 31, 2014. This report fulfills the requirements of ANO Unit 1 Technical Specification (TS) 5.6.2 and Unit 2 TS 6.6.2.

During 2014, as in previous years, ANO detected tritium attributable to plant operations at the discharge location (Station 8) where previously monitored liquid radioactive effluent from the plant is periodically discharged in accordance with the regulatory criteria established in the Offsite Dose Calculation Manual (ODCM). ANO personnel routinely monitor results from this area in order to note any trends. The review of results from this area indicates tritium levels in the surface water media continue to be below regulatory reporting limits and are consistent with concentrations that would typically be seen at this location as discussed in Section 2.3 of this AREOR.

Gross beta concentrations at the Station 14 (City of Russellville) indicator drinking water location continue to remain consistent with previous operational measurements and similar to the levels detected at the Station 57 (City of Danville) control drinking water location.

Radiological Environmental Monitoring Program

ANO established the REMP prior to the station becoming operational (1974) to provide data on background radiation and radioactivity normally present in the area. ANO has continued to monitor the environment by sampling air, water, sediment, fish and food products, as well as measuring radiation directly. ANO also samples milk if milk-producing animals are present commercially within five miles of the plant.

The REMP includes sampling indicator and control locations within an approximate 20-mile radius of the plant. The REMP utilizes indicator locations near the site to show any increases or buildup of radioactivity that might occur due to station operation, and control locations farther away from the site to indicate the presence of only naturally occurring radioactivity. ANO personnel compare indicator results with control and preoperational results to assess any impact ANO operation might have had on the surrounding environment.

In 2014, ANO personnel collected environmental samples for radiological analysis. Personnel compared results of indicator locations with control locations and previous studies and concluded that overall no significant relationship exists between ANO operation and effect on the plant environs. The review of 2014 data, in most cases, showed undetectable radiation levels in the environment and in all instances, no definable trends related to significant pathways associated with ANO.

Harmful Effects or Irreversible Damage

The REMP monitoring did not detect any harmful effects or evidence of irreversible damage in 2014. Therefore, no analysis or planned course of action to alleviate problems was necessary.

Reporting Levels

ANO's review indicates that no samples equaled or exceeded reporting levels for radioactivity concentration in environmental samples due to ANO effluents, as outlined in ODCM Table 2.5-2, when averaged over any calendar quarter. Therefore, 2014 results did not trigger any Radiological Monitoring Program special reports.

Radioactivity Not Attributable to ANO

The ANO REMP has detected radioactivity attributable to other sources. These include the 25th Chinese nuclear test explosion in 1980 and the radioactivity plume release due to reactor core degradation at the Chernobyl Nuclear Power Plant in 1986. Prior to 1981, the ANO REMP detected radioactivity resulting from nuclear weapons testing, with Cesium-137 continuing to be periodically detected. In 2011, ANO detected I-131 radioactivity attributed to the Fukushima Daiichi Nuclear Power Plant accident (March 11, 2011).

Comparison to Federal and State Programs

ANO personnel compared REMP data to state monitoring programs as results became available. Historically, the programs used for comparison have included the U.S. Nuclear Regulatory Commission (NRC) Thermoluminescent Dosimeter (TLD) Direct Radiation Monitoring Network and the Arkansas Department of Health (ADH).

The NRC TLD Network Program was discontinued in 1998. Historically these results have compared to those from the ANO REMP. ANO TLD results continue to remain similar to the historical average and continue to verify that plant operation is not affecting the ambient radiation levels in the environment.

The ADH and the ANO REMP entail similar radiological environmental monitoring program requirements. These programs include collecting air samples and splitting or sharing sample media such as water, sediment and fish. Both programs have obtained similar results over previous years.

Sample Deviations

- Milk

  The REMP did not include milk sampling within five miles of ANO in 2014 due to unavailability. The ODCM requires collection of milk samples, if available commercially within 5 miles of the plant. ANO personnel collected vegetation samples to monitor the ingestion pathway, as specified in the ODCM, because of milk unavailability.

- Lower Levels of Detection (LLDs) during this reporting period were within the acceptable limits required by Table 2.5-1 of the ODCM.

- Air Samples

  Listed below are air sampler deviations that occurred during 2014 due to electrical power outages and equipment failure. These deviations did not result in exceeding LLD values specified in the ODCM. As described in ODCM, B 2.5.1, Actions A.1 and A.2, deviations are permitted from the required sampling schedule due to malfunction of sampling equipment and other legitimate reasons.

| Station | Sampling Period | Comment |
|---|---|---|
| 56 | 02/11/2014 – 02/25/2014 | As documented on 02/26/2014, totalizer run time for the listed sampling period was 21 hours less than calculated run time. It could not be established if the lost time was due to a power outage or if the totalizer malfunctioned. The totalizer was verified to advance. (CR-ANO-C-2014-00497) |
| 56 | 03/25/2014 – 04/08/2014 | As documented on 04/08/2014, totalizer run time for the listed sampling period was less than expected and totalizer was not advancing. Totalizer was replaced. (CR-ANO-C-2014-00930) |
| 06 | 04/22/2014 – 05/06/2014 | As documented on 05/06/2014, power was lost on 4/24/14 during the listed sampling period. Reset the ground fault circuit interrupter (GFCI) and power was restored on 5/6/14. (CR-ANO-C-2014-01231) |
| 01 | 03/11/2014 – 03/25/2014 | As documented on 03/25/2014, the sample pump was not operating, thus no quantitative results were obtained for the listed sampling period. Pump was replaced. (CR-ANO-C-2014-00785) |
| 56 | 02/11/2014 – 02/25/2014 | As documented on 02/15/2014, Station #56 experienced a brief loss of power. Power was restored before the end of the work shift. (CR-ANO-C-2014-00369) |
| 56 | 03/11/2014 – 03/25/2014 | As documented on 03/12/2014, electrical power was lost to Station #56 on 3/12/2014. Estimated that power restoration would occur before the end of work shift. (CR-ANO-C-2014-00675) |

- Missed Samples

  First quarter environmental TLD Station #150 missing (CR-ANO-C-2014-00946)

  First quarter environmental TLD Station # 127 missing (CR-ANO-C-2014-00966).

  Second quarter environmental TLD Station # 4 missing (CR-ANO-C-2014-01890).

  Third quarter environmental TLD Station #150 missing (CR-ANO-C-2014-02353)

- Unavailable Results

  No results on air volume sampled for the period 3/11/14 – 3/25/14 at Station #1 are available due to pump failure.

Program Modifications

The following revisions were made to OP-1608.005, "Radiological Environmental Monitoring Program (REMP)" in 2014. Collectively, these changes were made through two revisions to the procedure, Revisions 40 and 41.

- Applied cosmetic changes throughout the procedure to improve place-keeping and clarity without changing the process or intent.
- Modified wording throughout OP-1608.005 to improve clarity and consistency. This includes removing the word "procedure" and replacing with "OP-". The modifications made do not change the process or intent of OP-1608.005.
- Added CR-ANO-C-2013-02585 in the References section. Added step to incorporate this condition report (CR) which requires chemists to ensure particulate filter is centered (off-center could allow flow to bypass the filter). A Note was also added above this step in reference to the CR.
- Numerous steps were identified as having more than one action per step. These steps were modified to indicate single actions in separate steps. The intent of this change was to facilitate place-keeping so that steps are not missed.
- Updated ODCM reference requirement to L.2.5.1 in applicable tables to most recent ODCM revision.
- Added reference to CR-ANO-C-2014-01380 to align air station numbering with the ODCM.
- Updated air samples header in Attachment 1 to OP-1608.005 to reflect the required amount of air stations from four to five. Previously, OP-1608.005 indicated that only four were required per ODCM L.2.5.1. With revision 025 of the ODCM, this is required to be five air stations. Though the requirement only stated that four stations were performed, there were five air stations already listed. The change provided consistent numbering throughout OP-1608.005 as well as the ODCM.

Attachments

Attachment 1 contains results of air, TLD, water, sediment, fish, and food product samples collected in 2014. TLDs were analyzed by a vendor (Environmental Dosimetry Company - EDC). All remaining samples were analyzed GEL Laboratories, LLC (GEL), except for the air samples covering December 30-31, 2014, which were analyzed by Teledyne Brown Engineering (TBE). TBE is the ANO vendor for 2015 samples; TBEs first air samples for 2015 also included the closing two days of 2014.

Attachment 2 contains GELs participation in the inter-laboratory comparison program during 2014. No documentation for TBEs participation is included in this report, but will be included in ANOs report for 2015 REMP activities.

Attachment 3 contains dose calculations performed for sediment using a generalized equation from Regulatory Guide 1.109, “Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I,” Revision 1.

# 1.0 Introduction

## 1.1 Radiological Environmental Monitoring Program

ANO established the REMP to ensure that plant operating controls properly function to minimize any associated radiation endangerment to human health or the environment. The REMP is designed for:

- Analyzing applicable pathways for anticipated types and quantities of radionuclides released into the environment.
- Considering the possibility of a buildup of long-lived radionuclides in the environment and identifying physical and biological accumulations that may contribute to human exposures.
- Considering the potential radiation exposure to plant and animal life in the environment surrounding ANO.
- Correlating levels of radiation and radioactivity in the environment with radioactive releases from station operation.

## 1.2 Pathways Monitored

The airborne, direct radiation, waterborne and ingestion pathways are monitored as required by the ODCM. A description of the ANO REMP used to monitor the exposure pathways is described in Table 1.1 and shown in Figures 1-1, 1-2 and 1-3.

Section 2.0 of this report provides a discussion of 2014 sampling results and Section 3.0 provides a summary of results for the monitored exposure pathways.

## 1.3 Land Use Census

ANO personnel conduct the land use census every 24 months as required by ODCM Surveillance (S) 2.5.2.1. The land use census was last conducted in 2013. This census serves to identify changes in land use within five miles of ANO that would require modifications to the REMP or ODCM. The most important concerns during this census are to determine location in each sector of the nearest:

1) Residence
2) Animal milked for human consumption
3) Garden of greater than 500 square feet producing fresh leafy (broadleaf) vegetables*

* ANO personnel did not perform a garden census since an ODCM Limitation (L) 2.5.2 Note allows the routine sampling of broadleaf vegetation in the highest D/Q sector near the site boundary in lieu of the garden census.

The method used by ANO personnel for conducting the land use census was as follows:

- ANO personnel conducted door-to-door (drive by) field surveys in order to locate the nearest resident in each meteorological sector.
- Consultation with local agricultural authorities was used to identify commercial milk providers within five-miles of the Unit 1 reactor building.
- As a result of these surveys, the following information was obtained in each meteorological sector:
    1) Nearest permanent residence
    2) Nearest milking animal
- ANO personnel identify locations on the map, measure distances to ANO (or use a GPS system) and record results.
- Locations, if any, are identified which yield a calculated dose or dose commitments greater than those currently calculated in the ODCM.
- ANO personnel compare results to previous census.

## TABLE 1.1

## RADIOLOGICAL ENVIRONMENT SAMPLING PROGRAM

| Exposure Pathway | Requirement | Sample Point Description, Distance and Direction | Sampling and Collection Frequency | Type and Frequency Of Analyses |
|---|---|---|---|---|
| Airborne | Radioiodine and Particulates<br><br>3 samples close to the Site Boundary, in (or near) different sectors with the highest calculated annual average ground level D/Q. | **Station 2 (243° - 0.5 miles)** - South of the sewage treatment plant.<br><br>**Station 56 (264° - 0.4 miles)** – West end of the sewage treatment plant.<br><br>**Station 1 (88° - 0.5 miles)** - Near the meteorology tower. | Continuous operation of sampler with sample collection as required by dust loading but at least once per 14 days. | Radioiodine Canister – Analyze at least once per 14 days for I-131.<br><br>Particulate Sampler – Analyze for gross beta radioactivity following filter change. |
| | Radioiodine and Particulates<br><br>1 sample from the vicinity of a community having the highest calculated annual average ground level D/Q. | **Station 6 (111° - 6.8 miles)** - Entergy local office in Russellville (305 South Knoxville Avenue). | | |
| | Radioiodine and Particulates<br><br>1 sample from a control location 15 - 30 km (10 - 20 miles) distance. | **Station 7 (210° - 19.0 miles)** – Entergy Supply Yard on Highway 10 in Danville. | | |
| Direct Radiation | Thermoluminescent dosimetry (TLDs)<br><br>16 inner ring stations with two or more dosimeters in each meteorological sector in the general area of the site boundary. | **Station 1 (88° - 0.5 miles)** - On a pole near the meteorology tower.<br><br>**Station 2 (243° - 0.5 miles)** - South of the sewage treatment plant.<br><br>**Station 3 (5° - 0.7 miles)** – West of ANO Gate #2 on Highway 333 (approximately 0.35 miles)<br><br>**Station 4 (181° - 0.5 miles)** – West of May Cemetery entrance on south side of the road. | Once per 92 days. | Gamma Dose – Once per 92 days. |

## TABLE 1.1 (continued)

## RADIOLOGICAL ENVIRONMENT SAMPLING PROGRAM

| Exposure Pathway | Requirement | Sample Point Description, Distance and Direction | Sampling and Collection Frequency | Type and Frequency Of Analyses |
|---|---|---|---|---|
| Direct Radiation | TLDs<br><br>16 inner ring stations with two or more dosimeters in each meteorological sector in the general area of the site boundary | **Station 56 (264° - 0.4 miles)** - West end of the sewage treatment plant.<br><br>**Station 108 (306° - 0.9 miles)** - South on Flatwood Road on a utility pole.<br><br>**Station 109 (291° - 0.6 miles)** - Utility pole across from the junction of Flatwood Road and Round Mountain Road.<br><br>**Station 110 (138° - 0.8 miles)** - Bunker Hill Lane on the first utility pole on the left.<br><br>**Station 145 (28° - 0.6 miles)** - Near west entrance to the RERTC on a utility pole.<br><br>**Station 146 (45° - 0.6 miles)** - South end of east parking lot at RERTC on a utility pole.<br><br>**Station 147 (61° - 0.6 miles)** - West side of Bunker Hill Road, approximately 100 yards from intersection with State Highway 333.<br><br>**Station 148 (122° - 0.6 miles)** - Intersection of Bunker Hill Road with Scott Lane on county road sign post. | Once per 92 days. | Gamma Dose – Once per 92 days. |

## TABLE 1.1 (continued)

## RADIOLOGICAL ENVIRONMENT SAMPLING PROGRAM

| Exposure Pathway | Requirement | Sample Point Description, Distance and Direction | Sampling and Collection Frequency | Type and Frequency Of Analyses |
|---|---|---|---|---|
| Direct Radiation | TLDs<br><br>16 inner ring stations with two or more dosimeters in each meteorological sector in the general area of the Site Boundary. | **Station 149 (156° - 0.5 miles)** – On a utility pole on the south side of May Road.<br><br>**Station 150 (205° - 0.6 miles)** – North side of May Road on a utility pole past the McCurley Place turn.<br><br>**Station 151 (225° - 0.4 miles)** – West side of sewage treatment plant near the lake on a metal post.<br><br>**Station 152 (338° - 0.8 miles)** – South side of State Highway 333 on a road sign post. | Once per 92 days. | Gamma Dose – Once per 92 days. |
| | TLDs<br><br>8 stations with two or more dosimeters in special interest areas such as population centers, nearby residences, schools, and in 1 - 2 areas to serve as control locations. | **Station 6 (111° - 6.8 miles)** - Entergy local office in Russellville (305 South Knoxville Avenue).<br><br>**Station 7 (210° - 19.0 miles)** – Entergy Supply Yard on Highway 10 in Danville.<br><br>**Station 111 (120° - 2.0 miles)** – Marina Road on a utility pole on the left just prior to curve.<br><br>**Station 116 (318° - 1.8 miles)** - Highway 333 and Highway 64 in London on a utility pole north of the railroad tracks. | | |

## TABLE 1.1 (continued)

## RADIOLOGICAL ENVIRONMENT SAMPLING PROGRAM

| Exposure Pathway | Requirement | Sample Point Description, Distance and Direction | Sampling and Collection Frequency | Type and Frequency Of Analyses |
|---|---|---|---|---|
| Direct Radiation | TLDs<br><br>8 stations with two or more dosimeters in special interest areas such as population centers, nearby residences, schools, and in 1 – 2 areas to serve as control locations. | **Station 125 (46° - 8.7 miles)** - College Street on a utility pole at the southeast corner of the red brick school building.<br><br>**Station 127 (100° - 5.2 miles)** - Arkansas Tech Campus on a utility pole across from Paine Hall.<br><br>**Station 137 (151° - 8.2 miles)** – On a speed limit sign on the right in front of the Morris R. Moore Arkansas National Guard Armory.<br><br>Station **153 (304° - 9.2 miles)** - Knoxville Elementary School near the school entrance gate on a utility pole. | Once per 92 days. | Gamma Dose – Once per 92 days. |
| Waterborne | Surface Water<br><br>1 indicator location (influenced by plant discharge)<br><br>1 control location (uninfluenced by plant discharge) | **Station 8 (166° - 0.2 miles)** - Plant discharge canal.<br><br>**Station 10 (95° - 0.5 miles)** – Plant intake canal. | Once per 92 days. | Gamma isotopic and tritium analyses once per 92 days. |
| | Drinking Water<br><br>1 indicator location (influenced by plant discharge)<br><br>1 control location (uninfluenced by plant discharge) | **Station 14 (70° - 5.1 miles)** - Russellville city water system from the Illinois Bayou.<br><br>**Station 57 (208° - 19.5 miles)** - Danville public water supply treatment on Fifth Street. | Once per 92 days. | I-131, gross beta, gamma isotopic and tritium analyses once per 92 days. |

## TABLE 1.1 (continued)

## RADIOLOGICAL ENVIRONMENT SAMPLING PROGRAM

| Exposure Pathway | Requirement | Sample Point Description, Distance and Direction | Sampling and Collection Frequency | Type and Frequency Of Analyses |
|---|---|---|---|---|
| Waterborne | Sediment<br><br>1 indicator location (influenced by plant discharge)<br><br>1 control location (uninfluenced by plant discharge) | **Station 8 (243° - 0.9 miles)** - Plant discharge canal.<br><br>**Station 16 (287° - 5.5 miles)** - Panther Bay on south side of Arkansas River across from mouth of Piney Creek. | Once per 365 days. | Gamma isotopic analysis once per 365 days. |
| Ingestion | Milk<br><br>1 indicator sample location within five-mile distance if commercially available.<br><br>1 control sample location at a distance of >five-miles when an indicator exists. | Currently, no available milking animals within 5 miles of ANO. | Once per 92 days. | Gamma isotopic and I-131 analyses once per 92 days. |
| | Fish<br><br>1 sample of commercially and/or recreationally important species in vicinity of plant discharge.<br><br>1 sample of same species in area not influenced by plant discharge. | **Station 8 (212° - 0.5 miles)** – Plant discharge canal.<br><br>**Station 16 (287° - 5.5 miles)** - Panther Bay on south side of Arkansas River across from mouth of Piney Creek. | Once per 365 days. | Gamma isotopic on edible portions once per 365 days. |
| | Food Products<br><br>1 sample of broadleaf (edible or non-edible) near the site boundary from one of the highest anticipated annual average ground level D/Q sectors, if milk sampling is not performed.<br><br>1 sample location of broadleaf vegetation (edible or non-edible) from a control location 15 – 30 km (10 – 20 miles) distant, if milk sampling is not performed. | **Station 13 (273° - 0.5 miles)** - West from ANO toward Gate 4 onto Flatwood Road.<br><br>**Station 55 (208° - 16.5 miles)** – Intersection of Highway 27 and 154. | Three per 365 days. | Gamma. isotopic and I-131 analyses three times per 365 days |

## TABLE 1.1 (continued)

## RADIOLOGICAL ENVIRONMENT SAMPLING PROGRAM

| Exposure Pathway | Requirement | Sample Point Description, Distance and Direction | Sampling and Collection Frequency | Type and Frequency Of Analyses |
|---|---|---|---|---|
| Ground water | 2 sample locations of Groundwater from a control location up gradient from the protected area | **Station 58 (GWM-1, 22° - 0.3 miles)** – North of Protected Area on Owner Control Area (OCA). West of Security North Check Point, east side of access road. | Once per 92 days | Control, Tritium, Gross Beta and Gamma Isotopic, once per 92 days. |
| | | **Station 62 (GWM-101, 34° - 0.5 miles)** – North of Protected Area on OCA. East of outside receiving building. | Once per 92 days | Control, Tritium, Gross Beta and Gamma Isotopic, once per 92 days. |
| | 2 sample locations of Groundwater from indicator locations down gradient from the protected area. | **Station 63 (GWM-103, 206° - 0.1 miles)** – South of Protected area on OCA. North-east of Stator Rewind Bldg. near wood line. | Once per 92 days | Indicator, Tritium, Gross Beta and Gamma Isotopic, once per 92 days. |
| | | **Station 64 (GWM-13, 112° - 0.1 miles)** – South of Oily Water Separator facility, northwest corner of U-2 Intake Structure. Inside Protected area. | Once per 92 days | Indicator, Tritium, Gross Beta and Gamma Isotopic, once per 92 days. |

**FIGURE 1-1**

**SAMPLE COLLECTION SITES – NEAR FIELD**

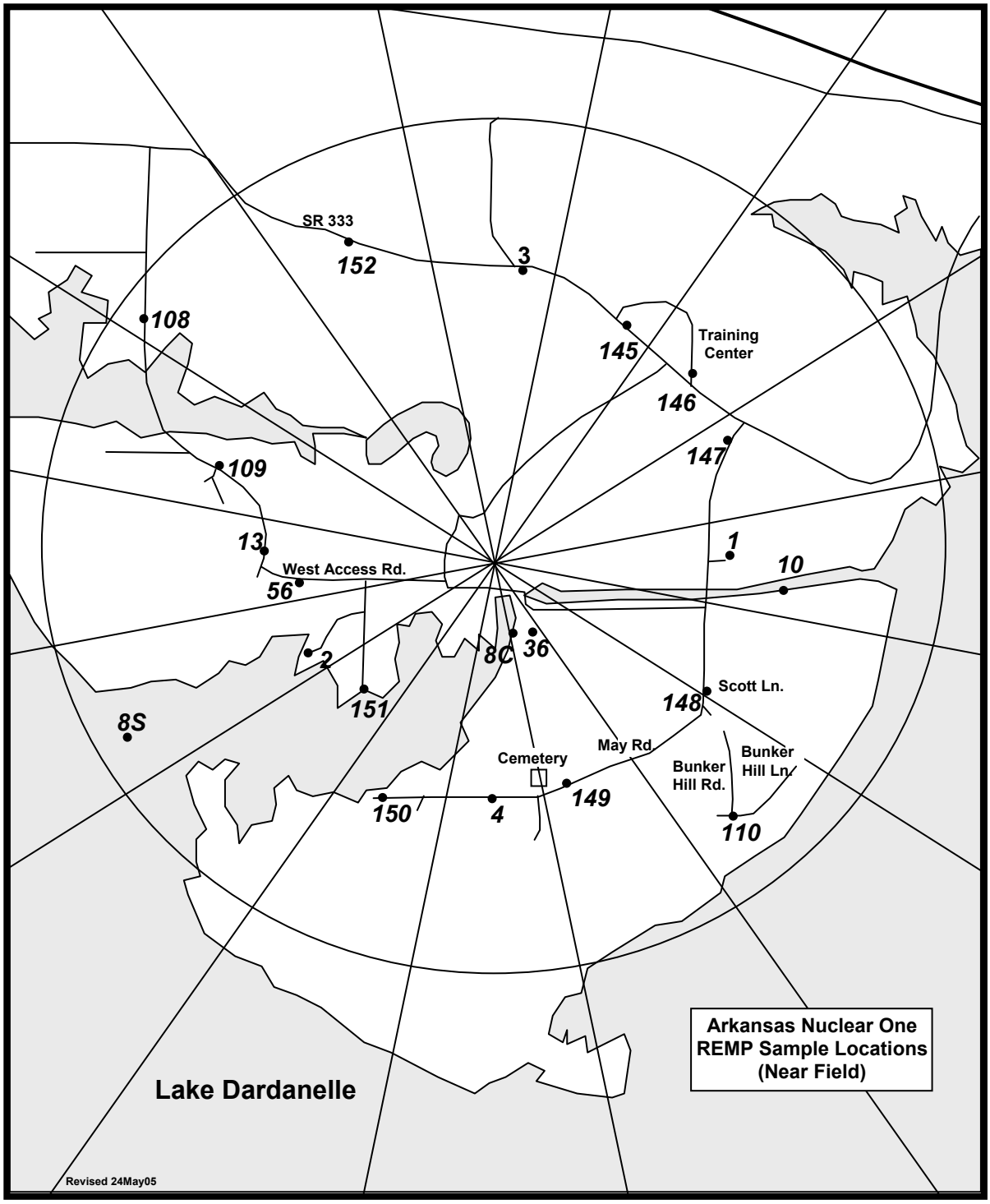


**FIGURE 1-2**

**SAMPLE COLLECTION SITES – FAR FIELD**

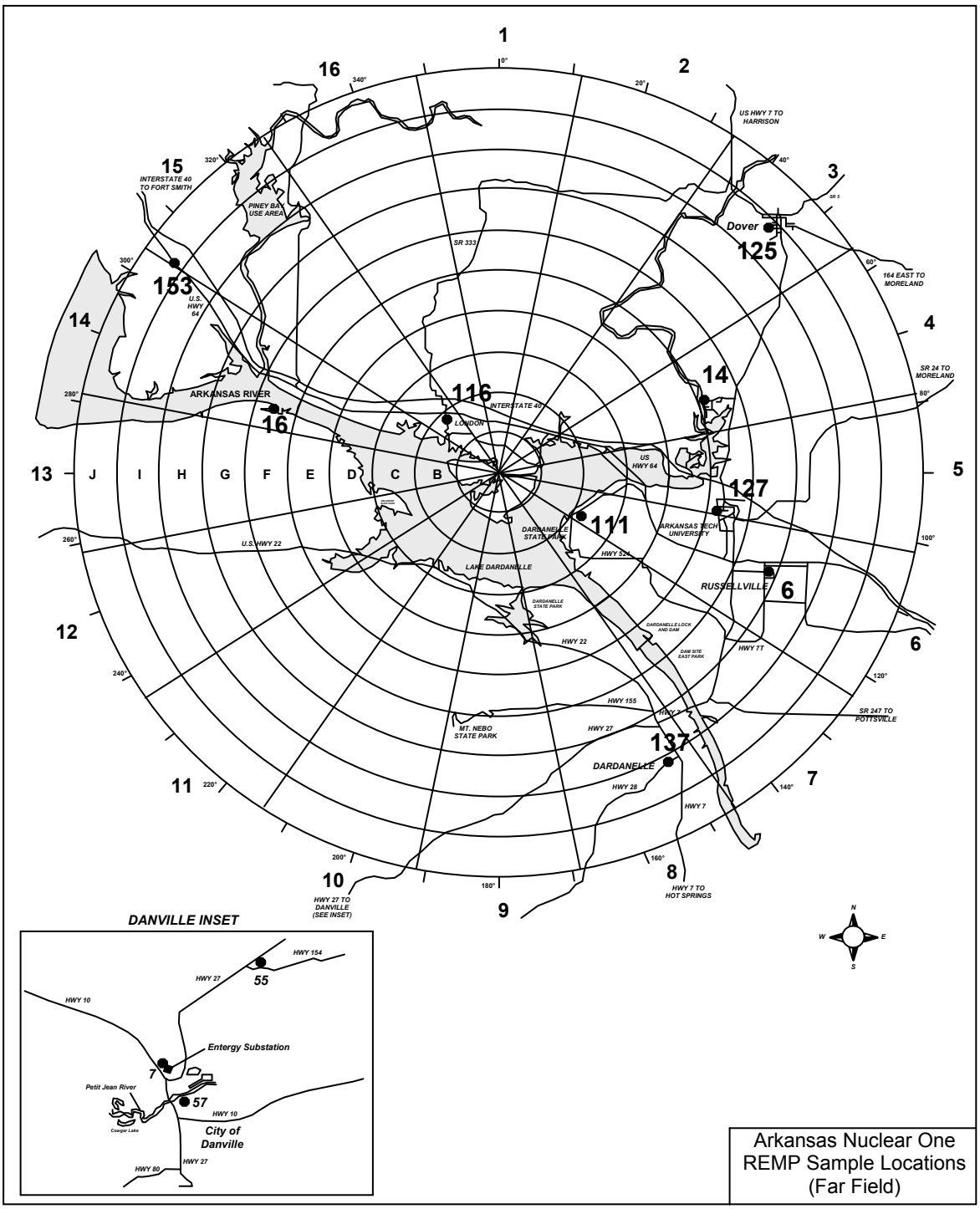
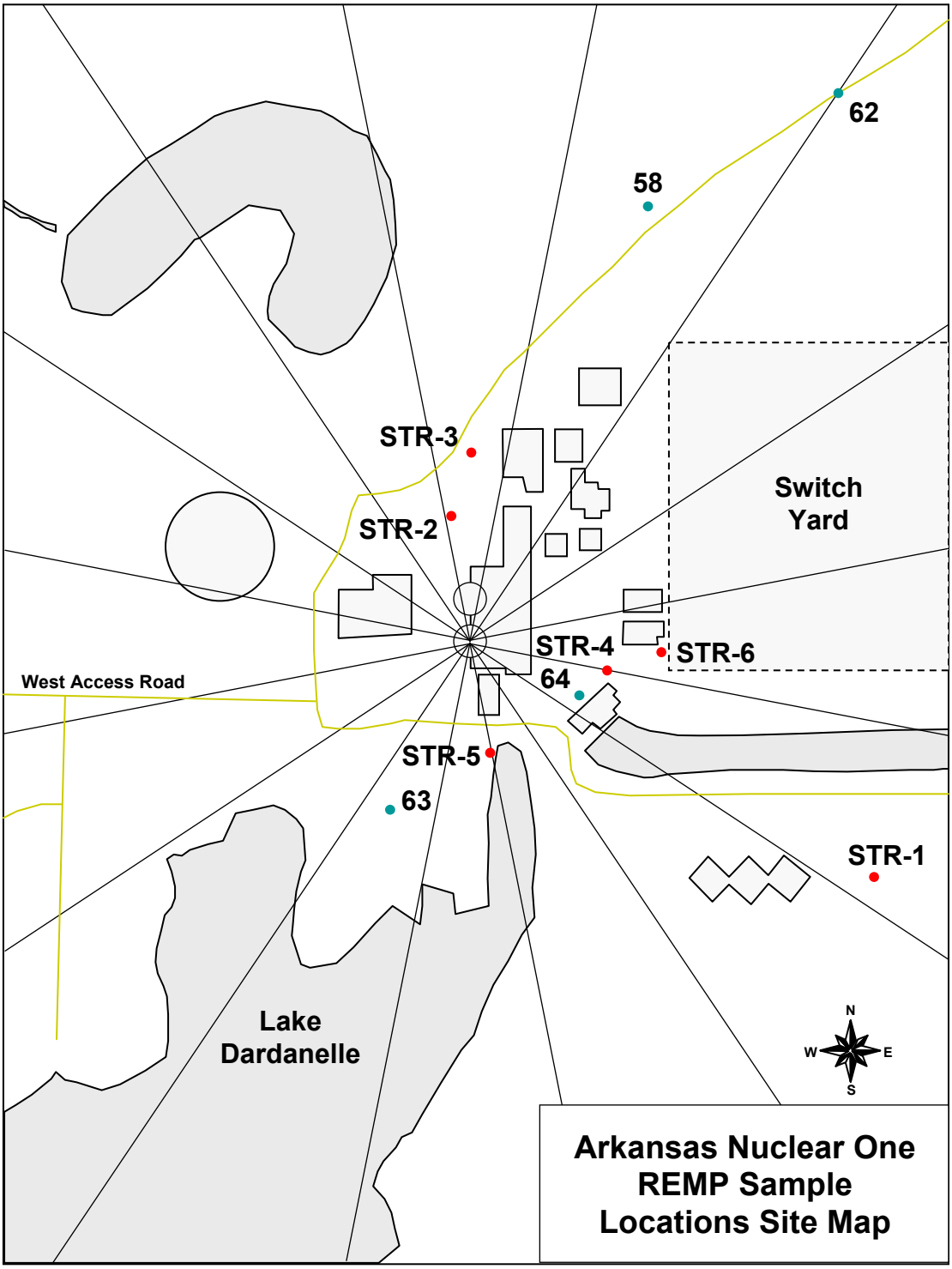


**FIGURE 1-3**

**SAMPLE COLLECTION SITES – SITE MAP**



## 2.0 Interpretation and Trends of Results

### 2.1 Air Particulate and Radioiodine Sample Results

The REMP has detected radioactivity in the airborne pathway attributable to other sources. These include the 25th Chinese nuclear test explosion in 1980, the radioactive plume release due to reactor core degradation at Chernobyl Nuclear Power Plant in 1986 and the Fukushima Daiichi Nuclear Power Plant accident (Mach 11, 2011).

As in past years, there were no other detections of I-131. Indicator gross beta air particulate results for 2014 were higher compared to results obtained from 2000-2012 of the operational REMP, but less than 2013 when the annual average was 0.043. Also, the 2014 annual average was less than the average for preoperational levels. Results are reported as annual average picocuries per cubic meter ($pCi/m^3$).

| Monitoring Period | Result |
|---|---|
| 2000 – 2012 (Minimum Value) | 0.020 |
| 2014 Value | 0.035 |
| 2000 – 2012 (Maximum Value) | 0.032 |
| Preoperational | 0.050 |

In the absence of plant-related gamma radionuclides, gross beta activity is attributed to naturally occurring radionuclides. Table 3.1, which includes gross beta concentrations and provides a comparison of the indicator and control means and ranges, emphasizes the consistent trends seen in this pathway to support the presence of naturally occurring activity. Therefore, it can be concluded that the airborne pathway continues to be unaffected by ANO operations.

### 2.2 Thermoluminescent Dosimetry (TLD) Sample Results

ANO reports measured dose as net exposure (field reading less transit reading) normalized to 92 days and relies on comparison of the indicator locations to the control as a measure of plant impact. ANO's comparison of the inner ring and special interest area TLD results to the control, as seen in Table 3.1, identified no noticeable trend that would indicate that the ambient radiation levels are being affected by plant operations. In addition, the inner ring value of 7.83 millirem (mrem) shown in Table 3.1 for 2014 is within the historical bounds of 2000 – 2013 annual average results, which have ranged from 6.6 to 8.9 mrem. Overall, ANO concluded that the ambient radiation levels are not being affected by plant operations.

### 2.3 Water Sample Results

Analytical results for 2014 drinking water and ground water samples were similar to those reported in previous years. Gamma radionuclides analytical results for 2014 surface water samples were similar to those reported in previous years. Tritium detection in ANO surface water indicator samples continues but at levels below those experienced in 2013 and below the ODCM-required LLD. These results are further explained below.

Surface water samples were collected and analyzed for gamma radionuclides and tritium. Gamma radionuclides were below detectable limits which is consistent with results seen in previous operational years. Tritium continues to be detected at the indicator location (Station 8) where previously monitored liquid radioactive effluent from the plant is periodically discharged in accordance with the regulatory criteria established in the ODCM and, for 2014, at levels considerably lower than the ODCM-required LLD of 3000 picocuries per liter. Furthermore, unlike the elevated tritium levels observed in 2013 attributable to particular plant events, no elevated levels attributable to particular events were observed in 2014. Results are reported as annual average picocuries per liter (pCi/l).

| Monitoring Period | Result |
|---|---|
| 2000 – 2013 (Minimum Value) | 277.1 |
| 2014 Value | 554.5 |
| 2000 – 2013 (Maximum Value) | 1003.5 |
| Preoperational | 200.0 |

ANO personnel have noted no definable increasing trends associated with the tritium levels at the discharge location. Levels detected during 2014 and previous operational years have been well below regulatory reporting limits. Therefore, the operation of ANO had no definable impact on this waterborne pathway during 2014 and levels of radionuclides remain similar to those obtained in previous operational years.

Drinking water samples were collected from two locations (indicator and control). Although ANO personnel utilize Station 14 (City of Russellville) as an indicator location due to the potential for the drinking water pathway to exist, the City of Russellville has not withdrawn water from Lake Dardanelle in the past several years.

Drinking water samples were analyzed for gross beta radionuclides, I-131, gamma radionuclides and tritium. Gamma radionuclides, gross beta radionuclides, I-131 and tritium concentrations were below the LLD limits at the indicator and control locations, which is consistent with 2013 and comparable to the 2000 – 2012 preoperational and operational years as shown below. Results from 2014 are summarized in Table 3.1. Results are reported as annual average pCi/l.

| Radionuclide | 2014 | 2013 | 2000 – 2012 | Preoperational |
|---|---|---|---|---|
| Gross Beta | <LLD | < LLD | 2.59 | 2.0 |
| Iodine-131 | <LLD | < LLD | < LLD | < LLD |
| Gamma | <LLD | < LLD | < LLD | < LLD |
| Tritium | <LLD | < LLD | < LLD | 200.0 |

ANO personnel have noted no definable trends associated with drinking water results at the indicator location. Therefore, the operation of ANO had no definable impact on this waterborne pathway during 2014 and levels of radionuclides remain similar to those obtained in previous operational years.

Groundwater samples were collected from four REMP locations (2 control, and 2 indicator locations). During 2011, ANO incorporated sixteen additional groundwater monitoring wells into the Groundwater Protection Initiative (GPI) site program. Sample data are compiled, organized and reviewed annually to:

- Analyze for increasing or decreasing trends at individual sample points, wells or groups of wells.
- Review the radionuclides detected to determine whether changes should be made to the analysis suites or sampling frequencies for each sampling location.
- Evaluate the locations of radionuclides in ground water to determine if changes should be made to the sampling locations.
- Review current investigation levels and determine if changes should be made.
- Determine if any change to the ODCM is required.
- Determine if a corrective actions/remediation is required.

Groundwater samples from the four REMP locations were analyzed for tritium and gamma radionuclides. Tritium and gamma concentrations were below the LLD limits at all four locations. Listed below is a comparison of 2014 indicator results to past operational years. Results are reported as annual average pCi/l. REMP Groundwater data are captured in Tables 8.1 and 8.2. Therefore, ANO operations had no significant impact on the environment or public by this waterborne pathway.

| Radionuclide | 2014 | 2006 – 2013 |
|---|---|---|
| Iodine-131 | < LLD | < LLD |
| Gamma | < LLD | < LLD |
| Tritium | < LLD | < LLD |

## 2.4 Sediment Sample Results

Sediment samples were collected from two locations in 2014 and analyzed for gamma radionuclides. Listed below is a comparison of 2014 indicator results to 2013 and the 2000 – 2012 operational years. Therefore, ANO operations had no significant impact on the environment or public by this waterborne pathway. Results are reported as pCi/kg.

| Monitoring Period | Result |
|---|---|
| 2000 – 2012 (Minimum Value) | 41.79 |
| 2013 Value | < LLD |
| 2014 Value | < LLD |
| 2000 – 2012 (Maximum Value) | 1170.0 |

Since reporting levels for radionuclides in sediment have not been established, an evaluation of potential dose to the public from this media was performed as shown in Attachment 3.

## 2.5 Milk Sample Results

Milk samples were not collected during 2014 due to the unavailability of indicator locations within five-miles of ANO.

## 2.6 Fish Sample Results

Fish samples were collected from two locations and analyzed for gamma radionuclides. In 2014, gamma radionuclides were below detectable limits which are consistent with the preoperational monitoring period and operational results since 1997. Therefore, based on these measurements, ANO operations had no significant radiological impact upon the environment or public by this ingestion pathway.

## 2.7 Food Product Sample Results

The REMP has detected radionuclides prior to 1990 that are attributable to other sources. These include the radioactive plume release due to reactor core degradation at Chernobyl Nuclear Power Plant in 1986 and atmospheric weapons testing.

In 2014, food product samples were collected when available from two locations and analyzed for Iodine-131 and gamma radionuclides. The 2014 levels remained undetectable, as has been the case in previous years. Therefore, based on these measurements, ANO operations had no significant radiological impact upon the environment or public by this ingestion pathway.

## 2.8 Interlaboratory Comparison Results

GEL Laboratories analyzed interlaboratory comparison samples to fulfill the requirements of ODCM Section 2.5.3. Attachment 2 contains these results.

## 2.9 Land Use Census Results

The latest land use census (performed in 2013) did not identify any new locations that yielded a calculated dose or dose commitment greater than those currently calculated (see Table 2.1).

Also, the land use census identified no milk-producing animals within a five-mile radius of the plant site. ANO personnel chose not to perform a garden census in 2013, which is allowed by ODCM Section L 2.5.2, in lieu of broadleaf vegetation sampling in the meteorological sector (Sector 13) with the highest D/Q.

**TABLE 2.1**

**2013 LAND USE CENSUS**

**Nearest Residence Within Five Miles**

| Direction | Sector | Distance (miles) |
|---|---|---|
| N | 1 | 0.9 |
| NNE | 2 | 1.3 |
| NE | 3 | 0.9 |
| ENE | 4 | 0.8 |
| E | 5 | 0.8 |
| ESE | 6 | 0.8 |
| SE | 7 | 0.8 |
| SSE | 8 | 0.8 |
| S | 9 | 0.8 |
| SSW | 10 | 0.7 |
| SW | 11 | 2.8 |
| WSW | 12 | 0.7 |
| W | 13 | 0.8 |
| WNW | 14 | 0.8 |
| NW | 15 | 1.0 |
| NNW | 16 | 0.9 |

## 3.0 Radiological Environmental Monitoring Program Summary

### 3.1 2014 Program Results Summary

Table 3.1 summarizes the 2014 REMP results.

**TABLE 3.1**

**RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY**

**Name of Facility:** ANO - Units 1 and 2 **Docket No:** 50-313 and 50-368.
**Location of Facility:** Pope County, Arkansas **Reporting Period:** January - December 2014

| Sample Type (Units) | Type / Number of Analyses[a] | LLD[b] | Indicator Locations Mean (°F)[c] [Range] | Location with Highest Annual Mean | | Control Locations Mean (°F)[c] [Range] | Number of Non-Routine Results[e] |
|---|---|---|---|---|---|---|---|
| | | | | Location[d] | Mean (°F)[c] [Range] | | |
| **Air Particulates (pCi/m$^3$)** | GB / 140 | 0.01 | 0.0355 (84 / 84) [0.015 – 0.072] | Station 2 (243°, 0.5 mi) | 0.0363 (28 / 28) [0.020 - 0.070] | 0.034 (56 / 56) [0.019 - 0.079] | 0 |
| **Airborne Iodine (pCi/ m$^3$)** | I-131 / 140 | 0.07 | < LLD | N/A | N/A | < LLD | 0 |
| **Inner Ring TLDs (mR/Qtr)** | Gamma / 61 | (f) | 7.83 (61 / 64) [4.9 – 10.1] | Station 56 (264°, 0.4 mi) | 9.2 (4 / 4) [8.1 – 9.7] | N/A | 0 |
| **Special Interest TLDs (mR/Qtr)** | Gamma / 27 | (f) | 6.91 (27 / 28) [4.3 – 9.0] | Station 137 (151°, 8.2 mi) | 8.3 (4 / 4) [7.7 – 9.0] | N/A | 0 |
| **Control TLD (mR/Qtr)** | Gamma / 4 | (f) | N/A | N/A | N/A | 6.1 (4 / 4) [5.6 – 6.6] | 0 |

**TABLE 3.1 (continued)**

**RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY**

| Sample Type (Units) | Type / Number of Analyses[a] | LLD[b] | Indicator Locations Mean (°F)[c] [Range] | Location with Highest Annual Mean | | Control Locations Mean (°F)[c] [Range] | Number of Non-Routine Results[e] |
|---|---|---|---|---|---|---|---|
| | | | | Location[d] | Mean (°F)[c] [Range] | | |
| **Surface Water (pCi/l)** | H-3 / 8 | 3000 | 555 (4* / 4) [344 – 745] | Station 8 (166°, 0.2 mi) | 555 (4* / 4) [344 – 745] | < LLD | 0 |
| | GS / 24 | | | | | | |
| | Mn-54 | 15 | < LLD | N/A | N/A | < LLD | 0 |
| | Fe-59 | 30 | < LLD | N/A | N/A | < LLD | 0 |
| | Co-58 | 15 | < LLD | N/A | N/A | < LLD | 0 |
| | Co-60 | 15 | < LLD | N/A | N/A | < LLD | 0 |
| | Zn-65 | 30 | < LLD | N/A | N/A | < LLD | 0 |
| | Zr-95 | 30 | < LLD | N/A | N/A | < LLD | 0 |
| | Nb-95 | 15 | < LLD | N/A | N/A | < LLD | 0 |
| | I-131 | 15 | < LLD | N/A | N/A | < LLD | 0 |
| | Cs-134 | 15 | < LLD | N/A | N/A | < LLD | 0 |
| | Cs-137 | 18 | < LLD | N/A | N/A | < LLD | 0 |
| | Ba-140 | 60 | < LLD | N/A | N/A | < LLD | 0 |
| | La-140 | 15 | < LLD | N/A | N/A | < LLD | 0 |

* Positive tritium results

**TABLE 3.1 (continued)**

**RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY**

| Sample Type (Units) | Type / Number of Analyses[a] | LLD[b] | Indicator Locations Mean (°F)[c] [Range] | Location with Highest Annual Mean | | Control Locations Mean (°F)[c] [Range] | Number of Non-Routine Results[e] |
|---|---|---|---|---|---|---|---|
| | | | | Location[d] | Mean (°F)[c] [Range] | | |
| **Drinking Water (pCi/1)** | GB / 8 | 4 | < LLD | N/A | N/A | < LLD | 0 |
| | I-131 / 8 | 1 | < LLD | N/A | N/A | < LLD | 0 |
| | H-3 / 8 | 2000 | < LLD | N/A | N/A | < LLD | 0 |
| | GS / 8 | | | | | | |
| | Mn-54 | 15 | < LLD | N/A | N/A | < LLD | 0 |
| | Fe-59 | 30 | < LLD | N/A | N/A | < LLD | 0 |
| | Co-58 | 15 | < LLD | N/A | N/A | < LLD | 0 |
| | Co-60 | 15 | < LLD | N/A | N/A | < LLD | 0 |
| | Zn-65 | 30 | < LLD | N/A | N/A | < LLD | 0 |
| | Zr-95 | 30 | < LLD | N/A | N/A | < LLD | 0 |
| | Nb-95 | 15 | < LLD | N/A | N/A | < LLD | 0 |
| | Cs-134 | 15 | < LLD | N/A | N/A | < LLD | 0 |
| | Cs-137 | 18 | < LLD | N/A | N/A | < LLD | 0 |
| | Ba-140 | 60 | < LLD | N/A | N/A | < LLD | 0 |
| | La-140 | 15 | < LLD | N/A | N/A | < LLD | 0 |
| **Bottom Sediment (pCi/kg)** | GS / 2 | | | | | | |
| | Cs-134 | 150 | < LLD | N/A | < LLD | < LLD | 0 |
| | Cs-137 | 180 | < LLD | N/A | < LLD | < LLD | 0 |

* Positive GB results.

**TABLE 3.1 (continued)**

**RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY**

| Sample Type (Units) | Type / Number of Analyses[a] | LLD[b] | Indicator Locations Mean (°F)[c] [Range] | Location with Highest Annual Mean | | Control Locations Mean (°F)[c] [Range] | Number of Non-Routine Results[e] |
|---|---|---|---|---|---|---|---|
| | | | | Location[d] | Mean (°F)[c] [Range] | | |
| **Fish (pCi/kg)** | GS / 2 | | | | | | |
| | Mn-54 | 130 | < LLD | N/A | N/A | < LLD | 0 |
| | Fe-59 | 260 | < LLD | N/A | N/A | < LLD | 0 |
| | Co-58 | 130 | < LLD | N/A | N/A | < LLD | 0 |
| | Co-60 | 130 | < LLD | N/A | N/A | < LLD | 0 |
| | Zn-65 | 260 | < LLD | N/A | N/A | < LLD | 0 |
| | Cs-134 | 130 | < LLD | N/A | N/A | < LLD | 0 |
| | Cs-137 | 150 | < LLD | N/A | N/A | < LLD | 0 |
| **Food Products (pCi/kg)** | I-131 / 6 | 60 | < LLD | N/A | N/A | N/A | 0 |
| | GS / 6 | | | | | | |
| | Cs-134 | 60 | < LLD | N/A | N/A | N/A | 0 |
| | Cs-137 | 80 | < LLD | N/A | N/A | N/A | 0 |

[a] GB = Gross beta; I-131 = Iodine-131; H-3 = Tritium; GS = Gamma scan.

[b] LLD = Required lower limit of detection based on ANO Units 1 and 2 ODCM Table 2.5-1.

[c] Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parenthesis (F).

[d] Locations are specified (1) by name and (2) degrees relative to reactor site.

[e] Non-routine results are those which exceed ten times the control station value. If no control station value is available, the result is considered non-routine if it exceeds ten times the preoperational value for the location.

[f] LLD is not defined in ANO Units 1 and 2 ODCM Table 2.5-1.

**ATTACHMENT 1**

**SUMMARY OF MONITORING RESULTS**

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**Table 1.1**

Sample Type: Air Particulate  Analysis: Gross Beta  Units: $pCi/m^3$

| Start Date | End Date | Station 1 (Indicator) | Station 2 (Indicator) | Station 56 (Indicator) | Station 6 (Control) | Station 7* (Control) |
|---|---|---|---|---|---|---|
| **Required LLD ➔** | | **0.01** | **0.01** | **0.01** | **0.01** | **0.01** |
| 12/31/2013 | 01/14/2014 | 0.032 | 0.034 | 0.037 | 0.033 | 0.042 |
| 01/14/2014 | 01/28/2014 | 0.027 | 0.022 | 0.027 | 0.022 | 0.026 |
| 01/28/2014 | 02/10/2014 | 0.036 | 0.034 | 0.034 | 0.030 | 0.032 |
| 02/10/2014 | 02/20/2014 | 0.046 | 0.037 | 0.041 | 0.032 | 0.039 |
| 02/20/2014 | 02/26/2014 | 0.025 | 0.020 | 0.030 | 0.023 | 0.026 |
| 02/26/2014 | 03/11/2014 | 0.055 | 0.046 | 0.050 | 0.051 | 0.049 |
| 03/11/2014 | 03/25/2014 | 0.015 | 0.029 | 0.042 | 0.031 | 0.032 |
| 03/25/2014 | 04/08/2014 | 0.031 | 0.032 | 0.031 | 0.030 | 0.029 |
| 04/08/2014 | 04/22/2014 | 0.072 | 0.070 | 0.056 | 0.062 | 0.079 |
| 04/22/2014 | 05/06/2014 | 0.024 | 0.031 | 0.028 | 0.033 | 0.027 |
| 05/06/2014 | 05/20/2014 | 0.030 | 0.029 | 0.028 | 0.028 | 0.028 |
| 05/20/2014 | 06/03/2014 | 0.024 | 0.027 | 0.026 | 0.023 | 0.026 |
| 06/03/2014 | 06/17/2014 | 0.025 | 0.023 | 0.024 | 0.020 | 0.023 |
| 06/17/2014 | 07/01/2014 | 0.028 | 0.031 | 0.032 | 0.028 | 0.028 |
| 07/01/2014 | 07/15/2014 | 0.031 | 0.031 | 0.028 | 0.028 | 0.026 |
| 07/15/2014 | 07/29/2014 | 0.032 | 0.034 | 0.030 | 0.025 | 0.032 |
| 07/29/2014 | 08/12/2014 | 0.041 | 0.040 | 0.034 | 0.039 | 0.038 |
| 08/12/2014 | 08/26/2014 | 0.034 | 0.034 | 0.033 | 0.030 | 0.032 |
| 08/26/2014 | 09/09/2014 | 0.027 | 0.033 | 0.028 | 0.031 | 0.028 |
| 09/09/2014 | 09/23/2014 | 0.034 | 0.039 | 0.033 | 0.033 | 0.036 |
| 09/23/2014 | 10/07/2014 | 0.042 | 0.041 | 0.037 | 0.039 | 0.041 |
| 10/07/2014 | 10/21/2014 | 0.043 | 0.038 | 0.036 | 0.036 | 0.037 |
| 10/21/2014 | 11/04/2014 | 0.047 | 0.048 | 0.045 | 0.046 | 0.047 |
| 11/04/2014 | 11/18/2014 | 0.036 | 0.039 | 0.037 | 0.032 | 0.031 |
| 11/18/2014 | 12/02/2014 | 0.044 | 0.047 | 0.032 | 0.035 | 0.034 |
| 12/02/2014 | 12/16/2014 | 0.054 | 0.067 | 0.054 | 0.047 | 0.044 |
| 12/16/2014 | 12/30/2014 | 0.038 | 0.035 | 0.034 | 0.033 | 0.029 |
| 12/30/2014 | 01/12/2015 | 0.024 | 0.026 | 0.023 | 0.021 | 0.019 |

* Station with highest annual mean.

**Table 1.2**

Sample Type: Radioiodine Cartridge Analysis: Iodine-131 Units: $pCi/m^3$

| Start Date | End Date | Station 1 (Indicator) | Station 2 (Indicator) | Station 56 (Indicator) | Station 6 (Control) | Station 7* (Control) |
|---|---|---|---|---|---|---|
| **Required LLD ➔** | | **0.07** | **0.07** | **0.07** | **0.07** | **0.07** |
| 12/31/2013 | 01/14/2014 | < 0.046 | < 0.018 | < 0.019 | < 0.024 | < 0.022 |
| 01/14/2014 | 01/28/2014 | < 0.014 | < 0.011 | < 0.027 | < 0.015 | < 0.018 |
| 01/28/2014 | 02/10/2014 | < 0.017 | < 0.022 | < 0.025 | < 0.025 | < 0.023 |
| 02/10/2014 | 02/20/2014 | < 0.031 | < 0.023 | < 0.049 | < 0.044 | < 0.032 |
| 02/20/2014 | 02/26/2014 | < 0.051 | < 0.015 | < 0.013 | < 0.016 | < 0.019 |
| 02/26/2014 | 03/11/2014 | <0.023 | <0.017 | <0.016 | <0.016 | <0.021 |
| 03/11/2014 | 03/25/2014 | < 0.008 | < 0.008 | < 0.015 | < 0.009 | < 0.009 |
| 03/25/2014 | 04/08/2014 | < 0.027 | < 0.016 | < 0.033 | < 0.029 | < 0.023 |
| 04/08/2014 | 04/22/2014 | < 0.023 | < 0.012 | < 0.016 | < 0.019 | < 0.013 |
| 04/22/2014 | 05/06/2014 | < 0.009 | < 0.010 | < 0.010 | < 0.062 | < 0.007 |
| 05/06/2014 | 05/20/2014 | < 0.019 | < 0.013 | < 0.020 | < 0.027 | < 0.016 |
| 05/20/2014 | 06/03/2014 | < 0.026 | < 0.033 | < 0.013 | < 0.028 | < 0.021 |
| 06/03/2014 | 06/17/2014 | < 0.015 | < 0.011 | < 0.024 | < 0.023 | < 0.012 |
| 06/17/2014 | 07/01/2014 | < 0.012 | < 0.010 | < 0.015 | < 0.014 | < 0.013 |
| 07/01/2014 | 07/15/2014 | < 0.038 | < 0.020 | < 0.021 | < 0.035 | < 0.029 |
| 07/15/2014 | 07/29/2014 | < 0.019 | < 0.026 | < 0.026 | < 0.018 | < 0.016 |
| 07/29/2014 | 08/12/2014 | < 0.021 | < 0.015 | < 0.022 | < 0.010 | < 0.013 |
| 08/12/2014 | 08/26/2014 | < 0.025 | < 0.030 | < 0.035 | < 0.033 | < 0.033 |
| 08/26/2014 | 09/09/2014 | < 0.029 | < 0.018 | < 0.021 | < 0.018 | < 0.026 |
| 09/09/2014 | 09/23/2014 | < 0.011 | < 0.011 | < 0.012 | < 0.009 | < 0.012 |
| 09/23/2014 | 10/07/2014 | < 0.018 | < 0.018 | < 0.019 | < 0.019 | < 0.027 |
| 10/07/2014 | 10/21/2014 | < 0.0120 | < 0.017 | < 0.034 | < 0.026 | < 0.026 |
| 10/21/2014 | 11/04/2014 | < 0.015 | < 0.020 | < 0.023 | < 0.017 | < 0.027 |
| 11/04/2014 | 11/18/2014 | < 0.018 | < 0.018 | < 0.029 | < 0.023 | < 0.027 |
| 11/18/2014 | 12/02/2014 | < 0.019 | < 0.021 | < 0.021 | < 0.019 | < 0.017 |
| 12/02/2014 | 12/16/2014 | < 0.017 | < 0.017 | < 0.024 | < 0.015 | < 0.011 |
| 12/16/2014 | 12/30/2014 | < 0.022 | < 0.021 | < 0.032 | < 0.018 | < 0.043 |
| 12/30/2014 | 01/12/2015 | < 0.019 | < 0.034 | < 0.034 | < 0.034 | < 0.034 |

* Station with highest annual mean.

**Table 2.1**

Sample Type: Thermoluminescent Dosimeters Analysis: Gamma Dose Units: mrem/Qtr

| Inner Ring (Indicators) | | | | | |
|---|---|---|---|---|---|
| **Station** | **1st Qtr '14 (mrem)** | **2nd Qtr '14 (mrem)** | **3rd Qtr '14 (mrem)** | **4th Qtr '14 (mrem)** | **Annual Mean '14 (mrem)** |
| 1 | 8.1 | 7.4 | 8.9 | 9.0 | **8.4** |
| 2 | 7.2 | 7.9 | 8.2 | 8.5 | **8.0** |
| 3 | 5.8 | 4.9 | 5.0 | 6.6 | **5.6** |
| 4 | 7.6 | LOST | 7.2 | 8.9 | **7.9** |
| ***56** | **9.3** | **9.7** | **8.1** | **9.6** | **9.2** |
| 108 | 8.1 | 7.6 | 7.1 | 9.8 | **8.2** |
| 109 | 8.2 | 8.3 | 7.7 | 9.7 | **8.5** |
| 110 | 7.4 | 8.2 | 8.3 | 9.2 | **8.3** |
| 145 | 8.2 | 7.9 | 7.5 | 8.7 | **8.1** |
| 146 | 7.8 | 7.9 | 7.4 | 8.7 | **8.0** |
| 147 | 7.1 | 6.0 | 6.2 | 7.6 | **6.7** |
| 148 | 7.7 | 7.1 | 7.6 | 9.0 | **7.9** |
| 149 | 7.2 | 8.1 | 7.8 | 8.1 | **7.8** |
| 150 | LOST | 8.2 | LOST | 9.8 | **9.0** |
| 151 | 7.7 | 7.8 | 7.9 | 10.1 | **8.4** |
| 152 | 6.8 | 5.9 | 5.2 | 7.3 | **6.3** |

* Station with highest annual mean.

**Table 2.2**

Sample Type: Thermoluminescent Dosimeters Analysis: Gamma Dose Units: mrem/Qtr

| Special Interest Areas - (Population Centers & Schools) | | | | | |
|---|---|---|---|---|---|
| **Station** | **1st Qtr '14 (mrem)** | **2nd Qtr '14 (mrem)** | **3rd Qtr '14 (mrem)** | **4th Qtr '14 (mrem)** | **Annual Mean '14 (mrem)** |
| 6 | 7.2 | 6.6 | 6.4 | 8.0 | **7.1** |
| 111 | 5.7 | 5.6 | 5.3 | 6.2 | **5.7** |
| 116 | 8.2 | 7.6 | 7.2 | 8.3 | **7.8** |
| 125 | 4.9 | 4.3 | 4.5 | 5.2 | **4.7** |
| 127 | LOST | 7.0 | 7.0 | 8.3 | **7.4** |
| ***137** | 7.9 | 7.7 | 8.4 | 9.0 | **8.3** |
| 153 | 7.3 | 7.5 | 6.5 | 8.9 | **7.6** |

* Stations with highest annual mean.

| Special Interest Areas – (Control) | | | | | |
|---|---|---|---|---|---|
| **Station** | **1st Qtr '14 (mrem)** | **2nd Qtr '14 (mrem)** | **3rd Qtr '14 (mrem)** | **4th Qtr '14 (mrem)** | **Annual Mean '14 (mrem)** |
| 7 | 6.4 | 5.6 | 5.7 | 6.6 | **6.1** |

**Table 3.1**

Sample Type: Surface Water  Analysis: Gamma Isotopic  Units: pCi/l

| Location | Start Date | End Date | Mn-54 | Co-58 | Fe-59 | Co-60 | Zn-65 | Nb-95 | Zr-95 | I-131 | Cs-134 | Cs-137 | Ba-140 | La-140 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Required LLD → | 15 | 15 | 30 | 15 | 30 | 15 | 30 | 15 | 15 | 18 | 60 | 15 |
| Station 8 (Indicator) | 12/31/2013 | 01/31/2014 | <2.90 | <2.20 | <5.18 | <3.25 | <5.81 | <2.74 | <4.80 | <4.80 | <3.09 | <2.49 | <4.33 | <4.33 |
| Station 10 (Control) | 12/31/2013 | 01/31/2014 | <2.63 | <3.22 | <5.46 | <2.27 | <4.94 | <3.04 | <4.38 | <5.10 | <3.03 | <3.75 | <3.99 | <3.99 |
| Station 8 (Indicator) | 01/31/2014 | 02/29/2014 | <2.17 | <2.02 | <4.50 | <2.60 | <4.73 | <2.15 | <4.05 | <3.50 | <2.37 | <2.39 | <3.38 | <3.38 |
| Station 10 (Control) | 01/31/2014 | 02/29/2014 | <3.19 | <3.89 | <7.78 | <2.92 | <7.71 | <4.52 | <6.31 | <7.78 | <4.38 | <3.92 | <5.51 | <5.51 |
| Station 8 (Indicator) | 02/28/2014 | 03/31/2014 | <4.76 | <4.25 | <8.28 | <5.54 | <10.20 | <4.20 | <9.26 | <5.89 | <5.37 | <4.79 | <6.31 | <6.31 |
| Station 10 (Control) | 02/28/2014 | 03/31/2014 | <4.19 | <3.41 | <7.34 | <4.26 | <8.01 | <4.31 | <8.17 | <5.55 | <3.93 | <4.74 | <4.52 | <4.52 |
| Station 8 (Indicator) | 03/31/2014 | 04/30/2014 | <3.66 | <3.61 | <7.88 | <5.29 | <5.70 | <3.91 | <7.05 | <5.96 | <4.37 | <4.77 | <6.73 | <6.73 |
| Station 10 (Control) | 03/31/2014 | 04/30/2014 | <4.87 | <4.42 | <10.00 | <5.42 | <8.54 | <4.89 | <10.90 | <7.65 | <4.70 | <4.65 | <10.60 | <10.60 |
| Station 8 (Indicator) | 04/30/2014 | 05/31/2014 | <3.78 | <5.74 | <11.20 | <5.37 | <10.40 | <4.71 | <9.57 | <8.53 | <5.64 | <5.00 | <7.25 | <7.25 |
| Station 10 (Control) | 04/30/2014 | 05/31/2014 | <3.90 | <3.62 | <8.91 | <4.95 | <8.69 | <5.03 | <6.67 | <9.09 | <3.90 | <3.87 | <7.60 | <7.60 |
| Station 8 (Indicator) | 05/31/2014 | 06/30/2014 | <1.98 | <2.04 | <3.71 | <1.67 | <4.21 | <2.02 | <3.34 | <3.75 | <2.07 | <2.57 | <4.01 | <4.01 |
| Station 10 (Control) | 05/31/2014 | 06/30/2014 | <1.67 | <1.85 | <4.41 | <2.06 | <3.87 | <2.13 | <3.22 | <4.00 | <2.05 | <1.99 | <3.13 | <3.13 |
| Station 8 (Indicator) | 06/30/2014 | 07/31/2014 | <3.62 | <2.93 | <6.73 | <2.99 | <6.35 | <3.16 | <5.33 | <5.44 | <3.44 | <3.53 | <5.40 | <5.40 |
| Station 10 (Control) | 06/30/2014 | 07/31/2014 | <2.94 | <3.09 | <6.01 | <3.42 | <7.13 | <3.54 | <5.72 | <5.08 | <3.90 | <3.36 | <5.68 | <5.68 |
| Station 8 (Indicator) | 07/31/2014 | 08/31/2014 | <1.90 | <1.86 | <3.70 | <1.90 | <3.77 | <1.99 | <3.25 | <2.89 | <1.90 | <1.91 | <2.75 | <2.75 |
| Station 10 (Control) | 07/31/2014 | 08/31/2014 | <1.95 | <1.91 | <4.17 | <2.16 | <3.69 | <2.00 | <3.51 | <3.04 | <2.35 | <1.98 | <3.41 | <3.41 |
| Station 8 (Indicator) | 08/31/2014 | 09/30/2014 | <3.46 | <3.55 | <8.19 | <4.31 | <8.10 | <3.40 | <7.74 | <4.87 | <4.37 | <4.41 | <3.28 | <3.28 |
| Station 10 (Control) | 08/31/2014 | 09/30/2014 | <1.40 | <1.38 | <3.05 | <1.71 | <3.17 | <1.46 | <2.76 | <2.02 | <1.61 | <1.85 | <2.00 | <2.00 |
| Station 8 (Indicator) | 09/30/2014 | 10/31/2014 | <4.55 | <4.01 | <9.18 | <4.28 | <10.20 | <5.40 | <8.95 | <8.66 | <5.76 | <5.38 | <10.10 | <10.10 |
| Station 10 (Control) | 09/30/2014 | 10/31/2014 | <4.06 | <4.98 | <7.54 | <4.64 | <9.06 | <5.41 | <5.25 | <8.88 | <5.90 | <5.24 | <7.89 | <7.89 |
| Station 8 (Indicator) | 10/31/2014 | 11/30/2014 | <5.14 | <5.08 | <10.40 | <5.20 | <9.18 | <5.13 | <10.10 | <10.70 | <5.58 | <5.60 | <6.74 | <6.74 |
| Station 10 (Control) | 10/31/2014 | 11/30/2014 | <3.37 | <3.95 | <10.20 | <4.84 | <10.30 | <5.16 | <8.45 | <8.80 | <4.35 | <3.81 | <4.92 | <4.92 |
| Station 8 (Indicator) | 11/30/2014 | 12/31/2014 | <3.92 | <3.89 | <8.66 | <4.48 | <7.11 | <4.52 | <7.43 | <7.24 | <4.55 | <4.44 | <6.26 | <6.26 |
| Station 10 (Control) | 11/30/2014 | 12/31/2014 | <5.72 | <5.53 | <9.45 | <4.88 | <10.30 | <6.01 | <9.53 | <8.05 | <6.68 | <5.56 | <11.10 | <11.10 |

**Table 3.2**

Sample Type: Surface Water  Analysis: Tritium  Units: pCi/l

| Location | Begin Date | End Date | H-3 |
|---|---|---|---|
| | | **Required LLD** ➔ | **3000** |
| **Station 8 (Indicator)** | 12/31/2013 | 03/31/2014 | 745 |
| **Station 10 (Control)** | 12/31/2013 | 03/31/2014 | < 334 |
| **Station 8 (Indicator)** | 03/31/2014 | 06/30/2014 | 344 |
| **Station 10 (Control)** | 03/31/2014 | 06/30/2014 | < 243 |
| **Station 8 (Indicator)** | 06/30/2014 | 09/30/2014 | 546 |
| **Station 10 (Control)** | 06/30/2014 | 09/30/2014 | < 343 |
| **Station 8 (Indicator)** | 09/30/2014 | 12/31/2014 | 583 |
| **Station 10 (Control)** | 09/30/2014 | 12/31/2014 | < 323 |

**Table 4.1**

Sample Type: Drinking Water  Analysis: Gross Beta, Iodine-131, Gamma Isotopic  Units: pCi/l

| Location | Collection Date | Gross Beta | I-131 | Mn-54 | Co-58 | Fe-59 | Co-60 | Zn-65 | Nb-95 | Zr-95 | Cs-134 | Cs-137 | Ba-140 | La-140 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Required LLD ➔** | | **4.0** | **1.0** | **15** | **15** | **30** | **15** | **30** | **15** | **30** | **15** | **18** | **60** | **15** |
| Station 14 (Indicator) | 03/11/2014 | < 3.08 | < 0.81 | < 3.95 | < 4.58 | < 7.62 | < 5.82 | < 8.98 | < 4.50 | < 8.17 | < 4.39 | < 5.02 | < 7.81 | < 7.81 |
| Station 57 (Control) | 03/11/2014 | < 3.47 | < 0.804 | < 4.47 | < 4.27 | < 9.84 | < 5.50 | < 6.48 | < 4.33 | < 6.83 | < 5.54 | < 5.23 | < 4.32 | < 4.32 |
| Station 14 (Indicator) | 06/17/2014 | < 2.62 | < 0.83 | < 4.38 | < 4.10 | < 7.51 | < 3.12 | < 6.70 | < 4.15 | < 7.00 | < 4.85 | < 4.20 | < 4.07 | < 4.07 |
| Station 57 (Control) | 06/17/2014 | < 2.71 | < 0.876 | < 3.51 | < 4.10 | < 8.86 | < 4.56 | < 9.97 | < 4.24 | < 7.45 | < 4.64 | < 4.31 | < 5.68 | < 5.68 |
| Station 14 (Indicator) | 08/26/2014 | < 2.71 | < 0.88 | < 2.47 | < 4.32 | < 8.82 | < 3.46 | < 8.36 | < 3.37 | < 6.25 | < 4.32 | < 4.65 | < 7.15 | < 7.15 |
| Station 57 (Control) | 08/26/2014 | < 2.55 | < 0.826 | < 4.34 | < 4.04 | < 11.60 | < 4.59 | < 9.86 | < 5.16 | < 8.32 | < 4.10 | < 5.26 | < 11.40 | < 11.40 |
| Station 14 (Indicator) | 11/18/2014 | < 2.79 | < 0.83 | < 3.79 | < 3.05 | < 6.17 | < 3.48 | < 6.05 | < 2.83 | < 4.68 | < 3.38 | < 2.91 | < 3.79 | < 3.79 |
| Station 57 (Control) | 11/18/2014 | < 3.10 | < 0.792 | < 2.10 | < 2.50 | < 5.07 | < 2.66 | < 6.38 | < 2.47 | < 4.67 | < 3.22 | < 3.24 | < 4.06 | < 4.06 |

**Table 4.2**

Sample Type: Drinking Water Analysis: Tritium Units: pCi/l

| Location | Collection Date | H-3 |
|---|---|---|
| | **Required LLD ➔** | **2000** |
| **Station 14 (Indicator)** | 03/11/2014 | < 300 |
| **Station 57 (Control)** | 03/11/2014 | < 296 |
| **Station 14 (Indicator)** | 06/17/2014 | < 317 |
| **Station 57 (Control)** | 06/17/2014 | < 314 |
| **Station 14 (Indicator)** | 08/26/2014 | < 295 |
| **Station 57 (Control)** | 08/26/2014 | < 297 |
| **Station 14 (Indicator)** | 11/18/2014 | < 330 |
| **Station 57 (Control)** | 11/18/2014 | < 329 |

**Table 5.1**

Sample Type: Sediment Analysis: Gamma Isotopic Units: pCi/kg

| Location | Collection Date | Cs-134 | Cs-137 |
|---|---|---|---|
| | **Required LLD ➔** | **150** | **180** |
| **Station 8 (Indicator)** | 10/24/2014 | < 83.30 | < 67.70 |
| **Station 16 (Control)*** | 10/24/2014 | < 67.50 | < 59.10 |

**Table 6.1**

Sample Type: Fish Analysis: Gamma Isotopic Units: pCi/kg

| Location | Collection Date | Mn-54 | Co-58 | Fe-59 | Co-60 | Zn-65 | Cs-134 | Cs-137 |
|---|---|---|---|---|---|---|---|---|
| | **Required LLD ➔** | **130** | **130** | **260** | **130** | **260** | **130** | **150** |
| **Station 8 (Indicator)** | 10/24/2014 | < 8.88 | < 8.64 | < 23.70 | < 8.81 | < 19.50 | < 83.30 | < 67.70 |
| **Station 16 (Control)** | 10/24/2014 | < 8.61 | < 9.01 | < 27.60 | < 9.96 | < 24.70 | < 67.50 | < 59.10 |

**Table 7.1**

Sample Type: Food Products Analysis: Iodine-131, Gamma Isotopic Units: pCi/kg

| Location | Collection Date | I-131 | Cs-134 | Cs-137 |
|---|---|---|---|---|
| | **Required LLD →** | **60** | **60** | **80** |
| **Station 13 (Indicator)** | 06/03/2014 | < 33.50 | < 29.90 | < 28.60 |
| **Station 55 (Control)** | 06/03/2014 | < 37.10 | < 35.40 | < 38.80 |
| **Station 13 (Indicator)** | 07/01/2014 | < 20.40 | < 12.70 | < 12.10 |
| **Station 55 (Control)** | 07/01/2014 | < 23.90 | < 15.20 | < 14.40 |
| **Station 13 (Indicator)** | 08/18/2014 | < 51.5 | < 28.4 | < 31.00 |
| **Station 55 (Control)** | 08/18/2014 | < 47.5 | < 26.3 | < 25.60 |

**Table 8.1**

Sample Type: Groundwater Analysis: Iodine-131, Gamma Isotopic Units: pCi/l

| Sample # | Collection Date | I-131 | Mn-54 | Co-58 | Fe-59 | Co-60 | Zn-65 | Nb-95 | Zr-95 | Cs-134 | Cs-137 | Ba-140 | La-140 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Required LLD ➔ | | 15 | 15 | 15 | 30 | 15 | 30 | 15 | 30 | 15 | 18 | 60 | 15 |
| 58* | 02/18/2014 | < 7.79 | < 3.41 | < 4.14 | < 9.23 | < 5.05 | < 6.61 | < 4.71 | < 6.51 | < 4.27 | < 4.38 | < 6.53 | < 6.53 |
| 62* | 02/18/2014 | < 10.70 | < 4.76 | < 6.41 | < 13.50 | < 5.70 | < 12.90 | < 4.80 | < 9.56 | < 8.17 | < 6.27 | < 14.10 | < 14.10 |
| 63 | 02/19/2014 | < 7.58 | < 4.16 | < 3.56 | < 6.06 | < 3.80 | < 9.80 | < 4.10 | < 7.16 | < 3.31 | < 4.54 | < 6.19 | < 6.19 |
| 64 | 02/18/2014 | < 10.20 | < 4.04 | < 4.89 | < 11.10 | < 6.23 | < 9.48 | < 6.32 | < 8.31 | < 5.41 | < 4.97 | < 10.20 | < 10.20 |
| 58* | 04/28/2014 | < 7.67 | < 5.66 | < 4.27 | < 9.94 | < 5.86 | < 7.12 | < 5.15 | < 8.60 | < 3.92 | < 4.18 | < 8.23 | < 8.23 |
| 62* | 04/28/2014 | < 8.09 | < 4.67 | < 4.09 | < 9.94 | < 3.46 | < 7.22 | < 4.26 | < 6.70 | < 4.92 | < 5.81 | < 7.66 | < 7.66 |
| 63 | 04/28/2014 | < 9.50 | < 5.00 | < 4.97 | < 9.24 | < 6.16 | < 11.00 | < 5.35 | < 10.20 | < 5.33 | < 5.26 | < 8.18 | < 8.18 |
| 64 | 04/29/2014 | < 6.63 | < 4.87 | < 4.56 | < 11.20 | < 5.09 | < 11.80 | < 5.78 | < 6.54 | < 5.92 | < 5.47 | < 7.54 | < 7.54 |
| 58* | 08/26/2014 | < 7.10 | < 1.77 | < 1.85 | < 4.09 | < 1.97 | < 3.43 | < 1.88 | < 3.21 | < 1.98 | < 1.69 | < 5.18 | < 5.18 |
| 62* | 08/26/2014 | < 8.17 | < 1.86 | < 2.23 | < 4.71 | < 2.27 | < 4.24 | < 2.29 | < 3.92 | < 2.25 | < 2.13 | < 5.35 | < 5.35 |
| 63 | 08/26/2014 | < 13.80 | < 3.07 | < 3.55 | < 7.43 | < 3.23 | < 6.82 | < 3.86 | < 5.88 | < 3.65 | < 3.12 | < 9.16 | < 9.16 |
| 64 | 08/25/2014 | < 5.30 | < 1.33 | < 1.55 | < 3.51 | < 1.60 | < 3.11 | < 1.67 | < 2.80 | < 1.60 | < 1.57 | < 3.70 | < 3.70 |
| 58* | 10/27/2014 | < 3.09 | < 1.89 | < 1.93 | < 3.80 | < 2.07 | < 3.88 | < 2.42 | < 3.37 | < 2.13 | < 2.04 | < 3.33 | < 3.33 |
| 62* | 10/27/2014 | < 2.66 | < 1.64 | < 1.67 | < 3.21 | < 1.83 | < 3.42 | < 1.77 | < 3.12 | < 1.81 | < 1.75 | < 2.70 | < 2.70 |
| 63 | 10/27/2014 | < 2.08 | < 1.42 | < 1.36 | < 2.88 | < 1.35 | < 2.99 | < 1.43 | < 2.60 | < 1.66 | < 1.89 | < 2.31 | < 2.31 |
| 64 | 10/27/2014 | < 4.98 | < 1.89 | < 2.00 | < 3.24 | < 2.00 | < 3.93 | < 2.40 | < 3.62 | < 1.90 | < 2.12 | < 4.23 | < 4.23 |

* Identifies Control Locations

**Table 8.2**

Sample Type: Groundwater Analysis: Tritium Units: pCi/l

| Location | Collection Date | H-3 |
|---|---|---|
| | **Required LLD** ➔ | **3000** |
| **Station 58 (Control)** | 02/18/2014 | < 249 |
| **Station 62 (Control)** | 02/18/2014 | < 246 |
| **Station 63 (Indicator)** | 02/19/2014 | < 252 |
| **Station 64 (Indicator)** | 02/18/2014 | < 277 |
| **Station 58 (Control)** | 04/28/2014 | < 279 |
| **Station 62 (Control)** | 04/28/2014 | < 281 |
| **Station 63 (Indicator)** | 04/28/2014 | < 281 |
| **Station 64 (Indicator)** | 04/29/2014 | < 283 |
| **Station 58 (Control)** | 08/26/2014 | < 293 |
| **Station 62 (Control)** | 08/26/2014 | < 291 |
| **Station 63 (Indicator)** | 08/26/2014 | < 287 |
| **Station 64 (Indicator)** | 08/25/2014 | < 318 |
| **Station 58 (Control)** | 10/27/2014 | < 341 |
| **Station 62 (Control)** | 10/27/2014 | < 339 |
| **Station 63 (Indicator)** | 10/27/2014 | < 338 |
| **Station 64 (Indicator)** | 10/27/2014 | < 327 |

**ATTACHMENT 2**

**INTERLABORATORY COMPARISON PROGRAM**

# GEL LABORATORIES LLC

# 2014 ANNUAL QUALITY ASSURANCE REPORT

# FOR THE

# RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM (REMP)

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# 2014 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 2014. 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 2014.
- Inter-laboratory QC results analyzed during 2014 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 Utah/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. 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 17025:2005
- 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 (13-RAD-001) was conducted in July, 2014. One (1) finding, four (4) observations, and eight (8) recommendations resulted from this assessment. By September, 2014, the finding was closed and appropriate laboratory staff addressed each observation and recommendation.

## 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 2013, forty-four (44) 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 2014. Of the four hundred forty-five (445) total results reported, 98.6% (439 of 445) 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 sixty-nine (69) 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 30 and 31 were analyzed by the laboratory. Of the one hundred thirty-eight (138) analyses, 97.8% (135 out of 138) of all results fell within the PT provider's acceptance criteria. Three analytical failures occurred: Uranium-234/233 and Uranium-238 in Soil and Uranium-238 in vegetation.

For the corrective actions associated with MAPEP Series 30, refer to CARR 140605-879 which is detailed in Table 8.

**10. Summary of Participation in the ERA MRaD PT Program**

The ERA MRad program provided samples (MRAD-20 and MRAD-21) for one hundred eighty-eight (188) individual environmental analyses. One hundred eighty-seven (187) of the 188 analyses fell within the PT provider's acceptance criteria (99.4%). One analytical failure occurred: Americium-241 in water.

For the corrective actions associated with MRAD-20, refer to CARR140520-874 which are detailed in Table 8.

**11. Summary of Participation in the ERA PT Program**

The ERA program provided samples (RAD-96, RAD-98, and 011014L) for fifty (50) individual environmental analyses. Of the 50 analyses, 98% (49 out of 50) of all results fell within the PT provider's acceptance criteria. One analytical failure occurred: Strontium-89 in water.

For the corrective actions associated with RAD-98 refer to corrective actions CARR140825-902 (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 2014. **It has been determined that causes of the failures did not impact any data reported to our clients.**

**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. 2009 TNI Standard, The NELAC Institute, National Environmental Accreditation Program
12. MARLAP, Multi-Agency Radiological Laboratory Analytical Protocols
13. 10 CFR Part 21, Reporting of Defects and Noncompliance
14. 10 CFR Part 50 Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants
15. 10 CFR Part 61, Licensing Requirements for Land Disposal and Radioactive Waste
16. NRC REG Guide 4.15 and NRC REG Guide 4.8

## TABLE 1

## 2014 RADIOLOGICAL PROFICIENCY TESTING RESULTS AND ACCEPTANCE CRITERIA

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Barium-133 | 80.6 | 76.2 | 63.8-83.8 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Cesium-134 | 64.7 | 66.8 | 54.4-73.5 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Cesium-137 | 112.0 | 109 | 98.1-122 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Cobalt-60 | 95.0 | 88.7 | 79.8-99.9 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Zinc-65 | 200 | 185 | 166-218 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Gross Alpha | 34.8 | 36.1 | 18.6-46.4 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Gross Beta | 19.6 | 22.3 | 13.5-30.4 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Gross Alpha | 34.6 | 36.1 | 18.6-46.4 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Radium-226 | 16.2 | 16.8 | 12.5-19.2 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Radium-228 | 4.62 | 5.04 | 3.01-6.67 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Uranium (Nat) | 7.39 | 7.23 | 5.51-8.53 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | ug/L | Uranium (Nat) mass | 11.00 | 10.6 | 8.07-12.5 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Radium-226 | 15.10 | 16.8 | 12.5-19.2 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Radium-228 | 4.66 | 5.04 | 3.01-6.67 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Uranium (Nat) | 7.47 | 7.23 | 5.51-8.53 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | ug/L | Uranium (Nat) mass | 11.4 | 10.6 | 8.07-12.5 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Tritium | 3320 | 3580 | 3030-3950 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Strontium-89 | 44.1 | 44.4 | 34.4-51.6 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Strontium-90 | 34.2 | 30.3 | 22.1-35.2 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Strontium-89 | 38.9 | 44.4 | 34.4-51.6 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Strontium-90 | 27.1 | 30.3 | 22.1-35.2 | Acceptable |
| ERA | 1st / 2014 | 02/06/14 | 011014L | Water | pCi/L | Strontium-89 | 42.3 | 38.7 | 29.3-45.7 | Acceptable |
| ERA | 1st / 2014 | 02/06/14 | 011014L | Water | pCi/L | Strontium-89 | 42.2 | 38.7 | 29.3-45.7 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Iodine-131 | 25.2 | 24.4 | 20.2-28.9 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Iodine-131 | 22.4 | 24.4 | 20.2-28.9 | Acceptable |
| EZA | 1st / 2014 | 05/16/14 | E10846 | Cartridge | pCi | Iodine-131 | 7.83E+01 | 7.50E+03 | 1.04 | Acceptable |
| EZA | 1st / 2014 | 05/16/14 | E10847 | Milk | pCi/L | Strontium-89 | 9.14E+01 | 9.17E+01 | 1 | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| EZA | 1st/2014 | 05/16/14 | E10847 | Milk | pCi/L | Strontium-90 | 1.27E+01 | 1.51E+01 | 0.84 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Iodine-131 | 9.84E+01 | 9.85E+01 | 1 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Cerium-141 | 1.21E+02 | 1.19E+02 | 1.02 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Cr-51 | 5.19E+02 | 4.91E+02 | 1.06 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Cesium-134 | 1.79E+02 | 2.10E+02 | 0.85 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Cesium-137 | 2.55E+02 | 2.53E+02 | 1.01 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Cobalt-58 | 2.58E+02 | 2.68E+02 | 0.96 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Mn-54 | 3.01E+02 | 2.97E+02 | 1.01 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Iron-59 | 2.24E+02 | 2.19E+02 | 1.02 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Zinc-65 | 3.45E+02 | 3.23E+02 | 1.07 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Cobalt-60 | 3.39E+02 | 3.37E+02 | 1.00 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Iodine-131 | 9.24E+01 | 8.99E+01 | 1.03 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Cerium-141 | 8.19E+01 | 7.71E+01 | 1.06 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Cr-51 | 3.32E+02 | 3.19E+02 | 1.04 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Cesium-134 | 1.27E+02 | 1.36E+02 | 0.93 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Cesium-137 | 1.69E+02 | 1.64E+02 | 1.03 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Cobalt-58 | 1.75E+02 | 1.74E+02 | 1.01 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Mn-54 | 2.08E+02 | 1.93E+02 | 1.08 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Iron-59 | 1.68E+02 | 1.42E+02 | 1.18 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Zinc-65 | 2.25E+02 | 2.10E+02 | 1.07 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Cobalt-60 | 2.31E+02 | 2.19E+02 | 1.02 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-GrF30 | Filter | Bq/ sample | Gross Alpha | 1.980 | 1.77 | 0.53-3.01 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-GrF30 | Filter | Bq/ sample | Gross Beta | 0.823 | 0.77 | 0.39-1.16 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Americium-241 | 65 | 68 | 47.6-88.4 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Cesium-134 | 5.44 | 0 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Cesium-137 | 1270 | 1238 | 867-1609 | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Cobalt-57 | 947 | 966 | 676-1256 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Cobalt-60 | 0.581 | 1.220 | Sens. Eval. | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Iron-55 | 580 | 643 | 444-824 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Manganese-54 | 1470 | 1430 | 1001-1859 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Nickel-63 | 6.95 | 0 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Plutonium-238 | 89.7 | 96.0 | 67-125 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Plutonium-239/240 | 69.80 | 76.8 | 53.8-99.8 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Potassium-40 | 703 | 622 | 435-809 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Strontium-90 | 1.48 | 0 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Technetium-99 | 37.1 | 0 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | U-234/233 | 30.5 | 81.0 | 57-105 | Not Accept. |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Uranium-238 | 35 | 83 | 58-108 | Not Accept. |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Zinc-65 | 766 | 695 | 487-904 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Americium-241 | 0.759 | 0.720 | 0.504-0.936 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Cesium-134 | 21.4 | 23.1 | 16.2-30.0 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Cesium-137 | 29.70 | 28.9 | 20.2-37.6 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Cobalt-57 | 28.0 | 27.5 | 19.3-35.8 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Cobalt-60 | 16.6 | 16.0 | 11.2-20.8 | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Hydrogen-3 | 308 | 321 | 225-417 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Iron-55 | 0.3 | 0.0 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Manganese-54 | 14.4 | 13.9 | 9.7-18.1 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Nickel-63 | 31.4 | 34.0 | 23.8-44.2 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Plutonium-238 | 0.764 | 0.828 | 0.580-1.076 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Pu-239/240 | 0.6590 | 0.6760 | 0.473-0.879 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Potassium-40 | 0.460 | 0 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Strontium-90 | 8.32 | 8.51 | 5.96-11.06 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Technetium-99 | 9.5 | 10.3 | 7.2-13.4 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | U-234/233 | 0.210 | 0.225 | 0.158-0.293 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Uranium-238 | 1.41 | 1.45 | 1.02-1.89 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Zinc-65 | -0.126 | 0.0 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Gross Alpha | 0.96 | 0.85 | 0.255-1.443 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Gross Beta | 4.7 | 4.2 | 2.10-6.29 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Iodine-129 | 0.0227 | 0.00 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | ug/ sample | Uranium-235 | 0.018 | 0.020 | 0.014-0.026 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | ug/ sample | Uranium-238 | 8.77 | 10.4 | 7.3-13.5 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | ug/ sample | Uranium-Total | 8.80 | 10.4 | 7.3-13.5 | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | ug/ sample | Americium-241 | 0.086 | 0.090 | 0.063-0.117 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Cesium-134 | 1.85 | 1.91 | 1.34-2.48 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Cesium-137 | 1.81 | 1.76 | 1.23-2.29 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Cobalt-57 | 0.0757 | 0.00 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Cobalt-60 | 1.490 | 1.39 | 0.97-1.81 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Manganese-54 | 0.0138 | 0.00 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Plutonium-238 | 0.000819 | 0.00090 | Sens. Eval. | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Pu-239/240 | 0.071 | 0.7720 | 0.054-0.1004 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Strontium-90 | 1.19 | 1.18 | 0.83-1.53 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | U-234/233 | 0.0159 | 0.0195 | 0.0137-0.0254 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Uranium-238 | 0.118 | 0.129 | 0.090-0.168 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Zinc-65 | 0.246 | 0.00 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Gross Alpha | 0.656 | 1.20 | 0.36-2.04 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Gross Beta | 0.95 | 0.85 | 0.43-1.28 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Americium-241 | 0.106 | 0.104 | 0.073-0.135 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | ug/ sample | Uranium-235 | 0.261 | 0.0268 | 0.0188-0.0348 | Not Accept. |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | ug/ sample | Uranium-238 | 12.7 | 13.3 | 9.3-17.3 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | ug/ sample | Uranium-Total | 12.7 | 13.3 | 9.3-17.3 | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | ug/ sample | Americium-241 | 0.1100 | 0.108 | 0.076-0.140 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Cesium-134 | 5.65 | 6.04 | 4.23-7.85 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Cesium-137 | 4.98 | 4.74 | 3.32-6.16 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Cobalt-57 | 11.1 | 10.1 | 7.1-13.1 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Cobalt-60 | 7.21 | 6.93 | 4.85-9.01 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Manganese-54 | 9.24 | 8.62 | 6.03-11.21 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Plutonium-238 | 0.116 | 0.121 | 0.085-0.157 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Pu-239/240 | 0.134 | 0.154 | 0.108-0.0200 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Strontium-90 | 1.580 | 1.46 | 1.02-1.90 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | U-234/233 | 0.2640 | 0.2530 | 0.0177-0.0329 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Uranium-238 | 0.174 | 0.165 | 0.116-0.215 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Zinc-65 | 8.87 | 7.00 | 4.38-8.13 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Actinium-228 | 1140 | 1240 | 795-1720 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Americium-241 | 418 | 399 | 233-518 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Bismuth-212 | 976 | 1240 | 330-1820 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Bismuth-214 | 2290 | 1960 | 1180-2820 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Cesium-134 | 3080 | 3390 | 2220-4070 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Cesium-137 | 8310 | 8490 | 6510-10900 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Cobalt-60 | 6570 | 6830 | 4620-9400 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Lead-212 | 1330 | 1240 | 812-1730 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Lead-214 | 2800 | 2070 | 1210-3090 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Manganese-54 | <44.3 | <1000 | 0-1000 | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Plutonium-238 | 579 | 578 | 348-797 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Plutonium-239 | 488 | 471.00 | 308-651 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Potassium-40 | 10500 | 10500 | 7660-14100 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Strontium-90 | 2500 | 2780 | 1060-4390 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Thorium-234 | 3420 | 3360 | 1060-6320 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Zinc-65 | 5700 | 5400 | 4300-7180 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Strontium-90 | 6730 | 8530 | 3250-13500 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-234 | 2602 | 3390 | 2070-4350 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-238 | 2425 | 3360 | 2080-4260 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-Total | 5027 | 6910 | 3750-9120 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | ug/kg | Uranium-Total(mass) | 7110 | 10100 | 5570-12700 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-234 | 3440 | 3390 | 2070-4350 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-238 | 3680 | 3360 | 2080-4260 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-Total | 7310 | 6910 | 3750-9120 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | ug/kg | Uranium-Total (mass) | 11000 | 10100 | 5570-12700 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-234 | 3740 | 3390 | 2070-4350 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-238 | 3780 | 3360 | 2080-4260 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-Total | 7683 | 6910 | 3750-9120 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | ug/kg | Uranium-Total (mass) | 11300 | 10100 | 5570-12700 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | ug/kg | Uranium-Total (mass) | 11200 | 10100 | 5570-12700 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Americium-241 | 1670 | 1490 | 911-1980 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Cesium-134 | 657 | 646 | 415-839 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Cesium-137 | 861 | 880 | 638-1220 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Cobalt-60 | 997 | 926 | 639-1290 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Curium-244 | 514 | 516 | 253-804 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Manganese-54 | <62.2 | <300 | 0.00-300 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Plutonium-238 | 2230 | 2110 | 1260-2890 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Plutonium-239 | 3810 | 3740 | 2300-5150 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Potassium-40 | 30800 | 31900 | 23000-44800 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Strontium-90 | 2330 | 2580 | 1470-3420 | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Uranium-234 | 1920 | 1760 | 1160-2260 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Uranium-238 | 1970 | 1750 | 1170-2220 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Uranium-Total | 4025 | 3580 | 2430-4460 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | ug/kg | Uranium-Total (mass) | 5920 | 5240 | 3510-6650 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Zinc-65 | 1030 | 919 | 663-1290 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Uranium-234 | 1730 | 1760 | 1160-2260 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Uranium-238 | 2000 | 1750 | 1170-2220 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Uranium-Total | 3817 | 3580 | 2430-4460 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | ug/kg | Uranium-Total (mass) | 5990 | 5240 | 3510-6650 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | ug/kg | Uranium-Total (mass) | 5620 | 5240 | 3510-6650 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Americium-241 | 60.2 | 59.7 | 36.8-80.8 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Cesium-134 | 920 | 1010 | 643-1250 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Cesium-137 | 816 | 828 | 622-1090 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Cobalt-60 | 1130 | 1120 | 867-1400 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Iron-55 | 254 | 240 | 74.4-469 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Manganese-54 | <6.64 | <50.0 | 0-50.0 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Plutonium-238 | 51.3 | 56.3 | 38.6-74.0 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Plutonium-239 | 47.5 | 48.6 | 35.2-63.5 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Strontium-90 | 76.7 | 78.9 | 38.6-118 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Uranium-234 | 33.8 | 36.4 | 22.6-54 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Uranium-238 | 34.5 | 36.1 | 23.3-49.9 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Uranium-Total | 70.3 | 74.3 | 41.1-113 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | ug/Filter | Uranium-Total (mass) | 104 | 108 | 69.1-152 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Zinc-65 | 737 | 667 | 478-921 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Uranium-234 | 35.5 | 36.4 | 22.6-54 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Uranium-238 | 35.3 | 36.1 | 23.3-49.9 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Uranium-Total | 72.4 | 74.3 | 41.1-113 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | ug/Filter | Uranium-Total (mass) | 105 | 108 | 69.1-152 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | ug/Filter | Uranium-Total (mass) | 100 | 108 | 69.1-152 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Gross Alpha | 60.9 | 46 | 15.4-71.4 | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Gross Beta | 58.9 | 53.8 | 34.0-78.4 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Americium-241 | 186 | 114 | 76.8-153 | Not Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Cesium-134 | 1540 | 1660 | 1220-1910 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Cesium-137 | 2760 | 2690 | 2280-3220 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Cobalt-60 | 1320 | 1270 | 1100-1490 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Iron-55 | 1230 | 1200 | 716-1630 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Manganese-54 | <7.54 | <100 | 0.00-100 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Plutonium-238 | 37 | 44 | 32.6-54.9 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Plutonium-239 | 124 | 160 | 124-202 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Strontium-90 | 95 | 890 | 580-1180 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-234 | 77.8 | 82.4 | 61.9-106 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-238 | 50.8 | 48.4 | 36.9-59.4 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-Total | 156 | 168 | 123-217 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | ug/L | Uranium-Total (mass) | 233 | 245 | 195-296 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Zinc-65 | 2030 | 1800 | 1500-2270 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-234 | 82.1 | 82.4 | 61.9-106 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-238 | 84.6 | 48.4 | 36.9-59.4 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-Total | 170 | 168 | 123-217 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | ug/L | Uranium-Total (mass) | 253 | 245 | 195-296 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-234 | 80.5 | 82.4 | 61.9-106 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-238 | 90.0 | 48.4 | 36.9-59.4 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-Total | 175 | 168 | 123-217 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | ug/L | Uranium-Total (mass) | 269 | 245 | 195-296 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-234 | 77.8 | 82.4 | 61.9-106 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-238 | 78.3 | 48.4 | 36.9-59.4 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-Total | 156 | 168 | 123-217 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | ug/L | Uranium-Total (mass) | 233 | 245 | 195-296 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | ug/L | Uranium-Total (mass) | 232 | 245 | 195-296 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Gross Alpha | 141.0 | 133 | 47.2-206 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Gross Beta | 172 | 174.0 | 99.6-258 | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Tritium | 5280 | 5580 | 3740-7960 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10897 | Cartridge | pCi | Iodine-131 | 8.73E+01 | 8.54E+01 | 1.02 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10898 | Milk | pCi/L | Strontium-89 | 9.84E+01 | 9.13E+01 | 1.08 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10898 | Milk | pCi/L | Strontium-90 | 1.44E+01 | 1.45E+01 | 0.99 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Iodine-131 | 9.89E+01 | 9.09E+01 | 1.09 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Cerium-141 | 1.38E+02 | 1.24E+02 | 1.12 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Chromium-51 | 2.68E+02 | 2.53E+02 | 1.06 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Cesium-134 | 1.58E+02 | 1.62E+02 | 0.97 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Cesium-137 | 1.27E+02 | 1.20E+02 | 1.06 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Cobalt-58 | 1.20E+02 | 1.12E+02 | 1.07 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Manganese-54 | 1.67E+02 | 1.56E+02 | 1.07 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Iron-59 | 1.02E+02 | 1.02E+02 | 1.00 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Zinc-65 | 2.68E+02 | 2.52E+02 | 1.06 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Cobalt-60 | 2.42E+02 | 2.24E+02 | 1.08 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Iodine-131 | 1.13E+02 | 9.83E+01 | 1.15 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Cerium-141 | 1.52E+02 | 1.43E+02 | 1.06 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Chromium-51 | 3.62E+02 | 2.94E+02 | 1.23 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Cesium-134 | 1.69E+02 | 1.88E+02 | 0.90 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Cesium-137 | 1.48E+02 | 1.39E+02 | 1.06 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Cobalt-58 | 1.34E+02 | 1.30E+02 | 1.03 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Manganese-54 | 1.88E+02 | 1.80E+02 | 1.04 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Iron-59 | 1.29E+02 | 1.19E+02 | 1.09 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Zinc-65 | 3.29E+02 | 2.93E+02 | 1.12 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Cobalt-60 | 2.74E+02 | 2.60E+02 | 1.05 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Barium-133 | 67.8 | 68.7 | 57.3-75.6 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Cesium-134 | 71 | 72.3 | 59.0-79.5 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Cesium-137 | 161 | 163 | 147-181 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Cobalt-60 | 76.7 | 75.5 | 68.0-85.5 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Zinc-65 | 92 | 82 | 73.8-98.5 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Gross Alpha | 45.3 | 45.4 | 23.6-57.4 | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Gross Beta | 32.3 | 33.4 | 21.7-41.1 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Gross Alpha | 48.6 | 45.4 | 23.6-57.4 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Radium-226 | 8.26 | 9.06 | 6.80-10.6 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Radium-226 | 8.54 | 9.06 | 6.80-10.6 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Radium-226 | 9.7 | 9.06 | 6.80-10.6 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Radium-228 | 5.07 | 5.07 | 3.03-6.79 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Radium-228 | 5.74 | 5.07 | 3.03-6.79 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Uranium (Nat) | 13.9 | 13.5 | 10.7-15.4 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | ug/L | Uranium (Nat) mass | 22.25 | 19.8 | 15.6-22.6 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Uranium (Nat) | 13 | 13.5 | 10.7-15.4 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | ug/L | Uranium (Nat) mass | 20.7 | 19.8 | 15.6-22.6 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Tritium | 10200 | 11200 | 9750-12300 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Tritium | 10400 | 11200 | 9750-12300 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Strontium-89 | 56.3 | 42.7 | 32.9-49.8 | Not Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Strontium-90 | 28.2 | 31.7 | 23.1-36.7 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Strontium-89 | 56.5 | 42.7 | 32.9-49.8 | Not Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Strontium-90 | 26 | 31.7 | 23.1-36.7 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Iodine-131 | 28.6 | 26.1 | 21.7-30.8 | Acceptable |
| ERA | 3rd / 2013 | 08/25/14 | RAD - 98 | Water | pCi/L | Iodine-131 | 22.3 | 26.1 | 21.7-30.8 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10993 | Cartridge | pCi | Iodine-131 | 9.47E+01 | 8.99E+01 | 1.05 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10994 | Milk | pCi/L | Strontium-89 | 9.73E+01 | 9.69E+01 | 1.00 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10994 | Milk | pCi/L | Strontium-90 | 1.31E+01 | 1.64E+00 | 0.80 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Iodine-131 | 1.04E+02 | 9.76E+01 | 1.07 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Cerium-141 | 1.28E+02 | 1.26E+02 | 1.01 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Chromium-51 | 3.12E+02 | 2.88E+02 | 1.08 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Cesium-134 | 1.51E+02 | 1.58E+02 | 0.96 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Cesium-137 | 2.03E+02 | 1.93E+02 | 1.05 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Cobalt-58 | 1.44E+02 | 1.43E+02 | 1.01 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Manganese-54 | 1.49E+02 | 1.42E+02 | 1.05 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Iron-59 | 1.82E+02 | 1.58E+02 | 1.15 | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Zinc-65 | 7.41E+01 | 7.30E+01 | 1.01 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Cobalt-60 | 3.14E+02 | 2.94E+02 | 1.06 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Iodine-131 | 1.02E+02 | 9.88E+01 | 103 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Cerium-141 | 1.30E+02 | 1.25E+02 | 104 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Chromium-51 | 2.75E+02 | 2.86E+02 | 0.96 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Cesium-134 | 1.45E+02 | 1.56E+02 | 0.93 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Cesium-137 | 1.94E+02 | 1.92E+02 | 1.01 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Cobalt-58 | 1.43E+02 | 1.42E+02 | 1.01 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Manganese-54 | 1.46E+02 | 1.41E+02 | 1.04 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Iron-59 | 1.66E+02 | 1.57E+02 | 1.06 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Zinc-65 | 7.55E+01 | 7.24E+01 | 1.04 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Cobalt-60 | 3.09E+02 | 2.95E+02 | 1.05 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-GrF31 | Filter | Bq/ sample | Gross Alpha | 0.433 | 0.530 | 0.16-0.09 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-GrF31 | Filter | Bq/ sample | Gross Beta | 1.060 | 1.060 | 0.53-1.59 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Americium-241 | 88.4 | 85.5 | 59.9-111.2 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Cesium-134 | 588 | 622 | 435-809 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Cesium-137 | 1.67 | | False Pos Test | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Cobalt-57 | 1160 | 1116 | 781-1451 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Cobalt-60 | 821 | 779 | 545-1013 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Iron-55 | 796 | 680 | 476-884 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Manganese-54 | 1060 | 1009 | 706-1312 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Nickel-63 | 924 | 980 | 686-1274 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Plutonium-238 | 0.92 | 0.48 | Sens. Eval. | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Plutonium-239/240 | 61.5 | 58.6 | 41.0-76.2 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Potassium-40 | 879 | 824 | 577-1071 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Strontium-90 | 891 | 858 | 601-1115 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Technetium-99 | 466 | 589 | 412-766 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | U-234/233 | 905 | 89 | 62-116 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Uranium-238 | 257 | 259 | 181-337 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Zinc-65 | 605.0 | 541 | 379-703 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Americium-241 | 0.915 | 0.880 | 0.62-1.14 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Cesium-134 | -0.06 | | False Pos Test | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Cesium-137 | 18.4 | 18.4 | 12.9-23.9 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Cobalt-57 | 25 | 24.7 | 17.3-32.1 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Cobalt-60 | 12.5 | 12.4 | 8.7-16.1 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Hydrogen-3 | 216 | 208 | 146-270 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Iron-55 | 34.0 | 31.5 | 22.1-41.0 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Manganese-54 | 14.2 | 14.0 | 9.8-18.2 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Nickel-63 | 23.6 | 24.6 | 17.2-32.0 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Plutonium-238 | 0.547 | 0.618 | 0.433-0.803 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Plutonium-239/240 | 0.015 | 0.005 | Sens. Eval. | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Potassium-40 | 174 | 161 | 113-209 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Strontium-90 | 0.03 | | False Pos Test | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Technetium-99 | 6.92 | 6.99 | 4.89-9.09 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Uranium-234/233 | 0.206 | 0.205 | 0.144-0.267 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Uranium-238 | 1.280 | 1.420 | 0.99-1.85 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Zinc-65 | 11.900 | 10.90 | 7.6-14.2 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Gross Alpha | 0.793 | 0.701 | 0.201-1.192 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Gross Beta | 6.220 | 5.94 | 2.97-8.91 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | ug/ sample | Uranium-235 | 0.040 | 0.040 | 0.0278-0.0516 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | ug/ sample | Uranium-238 | 19.3 | 20.3 | 14.2-26.4 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | ug/ sample | Uranium-Total | 19.00 | 20.4 | 14.3-26.5 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | ug/ sample | Americium-241 | 0.0561 | 0.067 | 0.0472-0.0876 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Cesium-134 | 0.8640 | 0.96 | 0.67-1.25 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Cesium-137 | 1.190 | 1.20 | 0.84-1.56 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Cobalt-57 | 1.540 | 1.43 | 1.00-1.86 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Cobalt-60 | 1.200 | 1.10 | 0.77-1.43 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Manganese-54 | 0.808 | 0.75 | 0.53-0.98 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Plutonium-238 | 0.155 | 0.107 | 0.075-0.139 | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Plutonium-239/240 | 0.048 | 0.0468 | 0.0328-0.0608 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Strontium-90 | 0.762 | 0.70 | 0.492-0.914 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Uranium-234/233 | 0.037 | 0.0358 | 0.0251-0.0465 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Uranium-238 | 0.227 | 0.253 | 0.177-0.329 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Zinc-65 | 0.779 | 0.76 | 0.53-0.99 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Americium-241 | 0.226 | 0.19 | 0.135-0.251 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Cesium-134 | 4.750 | 5.20 | 3.64-6.67 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Cesium-137 | 6.910 | 6.60 | 4.62-8.58 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Cobalt-57 | -0.002 | 0.00 | False Pos Test | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Cobalt-60 | 0.008 | 0.00 | False Pos Test | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Manganese-54 | 7.980 | 7.88 | 5.52-10.24 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Plutonium-238 | 0.001 | 0.001 | Sens. Eval. | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Plutonium-239/240 | 0.1510 | 0.171 | 0.120-0.222 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Strontium-90 | 2.330 | 2.32 | 1.62-3.02 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq /sample | Uranium-234/233 | 0.046 | 0.047 | 0.0326-0.0606 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Uranium-238 | 0.332 | 0.324 | 0.227-0.421 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Zinc-65 | 2.850 | 2.63 | 1.84-3.42 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-SrF-31 | Filter | Bq/ sample | Strontium-89 | 3.62 | 3.79 | 2.65-4.93 | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-SrF-31 | Filter | Bq/ sample | Strontium-90 | 3.62 | 3.79 | 2.65-4.93 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-XaW-31 | Water | Bq/L | Iodine-129 | 4.56 | 4.55 | 3.19-5.92 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Actinium-228 | 1280 | 1240 | 795-1720 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Americium-241 | 825 | 763 | 431-956 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Bismuth-212 | 1620 | 1240 | 330-1820 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Bismuth-214 | 2900 | 2810 | 1690-4040 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Cesium-134 | 1960 | 2140 | 1400-2570 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Cesium-137 | 6760 | 6550 | 5020-8430 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Cobalt-60 | 4480 | 4260 | 2880-5860 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Lead-212 | 1260 | 1240 | 812-1730 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Lead-214 | 3480 | 2750 | 1610-4100 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Manganese-54 | <30.0 | <1000 | 0-1000 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Plutonium-238 | 732 | 739 | 444-1020 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Plutonium-239 | 281 | 309 | 202-427 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Potassium-40 | 11500 | 10700 | 7810-14400 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Strontium-90 | 8790 | 8420 | 3210-13300 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Thorium-234 | 2000 | 2350 | 743-4420 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Zinc-65 | 3910 | 3270 | 2600-4350 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Uranium-234 | 2280 | 2370 | 1450-3040 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Uranium-238 | 2340 | 2350 | 1450-2980 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Uranium-Total | 4762 | 4540 | 2360-6390 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | ug/kg | Uranium-Total(mass) | 7020 | 7050 | 3890-8870 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Americium-241 | 2260 | 2290 | 1400-3505 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Cesium-134 | 837 | 849 | 545-1100 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Cesium-137 | 729 | 644 | 467-896 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Cobalt-60 | 818 | 784 | 541-1100 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Curium-244 | 361 | 367 | 180-572 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Manganese-54 | <25.3 | <300 | 0-300 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Plutonium-238 | 886 | 862 | 514-1180 | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Plutonium-239 | 675 | 701 | 430-965 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Potassium-40 | 35300 | 30900 | 22300-43400 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Strontium-90 | 1230 | 1710 | 975-2270 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Uranium-234 | 1980 | 1780 | 1170-2290 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Uranium-238 | 1970 | 1760 | 1170-2240 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Uranium-Total | 4038 | 3620 | 2450-4510 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | ug/kg | Uranium-Total(mass) | 5910 | 5280 | 3540-6710 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Uranium-234 | 1670 | 1780 | 1170-2290 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Uranium-238 | 1800 | 1760 | 1170-2240 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Uranium-Total | 3556 | 3620 | 2450-4510 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | ug/kg | Uranium-Total(mass) | 5390 | 5280 | 3540-6710 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | ug/kg | Uranium-Total(mass) | 5860 | 5280 | 3540-6710 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Zinc-65 | 1930 | 1570 | 1130-2200 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Americium-241 | 41.4 | 38.6 | 23.8-52.2 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Cesium-134 | 742 | 765.0 | 487-949 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Cesium-137 | 677 | 647 | 486-850 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Cobalt-60 | 543 | 523 | 405-653 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Iron-55 | 117 | 120.0 | 37.2-234 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Manganese-54 | <5.87 | <50 | 0.00-50.0 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | ug/Filter | Plutonium-238 | 32.9 | 35.7 | 24.5-46.9 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Plutonium-239 | 26.8 | 29.1 | 21.1-38.0 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Strontium-90 | 187 | 168 | 82.1-252 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Uranium-234 | 26 | 28 | 27.8-41.9 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Uranium-238 | 28 | 27.60 | 17.8-38.2 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Uranium-Total | 56 | 57 | 31.4-86.3 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | ug/Filter | Uranium-Total (mass) | 82.6 | 82.7 | 52.9-116 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Zinc-65 | 629 | 547 | 392-755 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Uranium-234 | 28 | 28 | 27.8-41.9 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Uranium-238 | 25 | 27.60 | 17.8-38.2 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Uranium-Total | 55 | 57 | 31.4-86.3 | Acceptable |

| PT Provider | Quarter / Year | Report Received Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | ug/Filter | Uranium-Total (mass) | 75.1 | 82.7 | 52.9-116 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | ug/Filter | Uranium-Total (mass) | 90.7 | 82.7 | 52.9-116 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Gross Alpha | 47.4 | 36.9 | 12.4-57.3 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Gross Beta | 27.2 | 21.1 | 13.3-30.8 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Americium-241 | 72.4 | 68.6 | 46.2-92.0 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Cesium-134 | 816.0 | 850 | 624-977 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Cesium-137 | 1310 | 1240 | 1060-1490 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Cobalt-60 | 1130 | 1070 | 930-1250 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Iron-55 | 130 | 134 | 79.9-182 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Manganese-54 | <6.34 | <100 | 0.00-100 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Plutonium-238 | 35 | 33 | 24.6-41.4 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Plutonium-239 | 46.4 | 51 | 39.7-64.4 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Strontium-90 | 300 | 254 | 165-336 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-234 | 42 | 44 | 32.9-56.5 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-238 | 50 | 43.50 | 33.2-53.4 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-Total | 92 | 89 | 65.5-115 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | ug/L | Uranium-Total (mass) | 137 | 130 | 104-157 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Zinc-65 | 1070 | 921 | 768-1160 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-234 | 43 | 44 | 32.9-56.5 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-238 | 45 | 43.50 | 33.2-53.4 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-Total | 90 | 89 | 65.5-115 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | ug/L | Uranium-Total (mass) | 134 | 130 | 104-157 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-234 | 49 | 44 | 32.9-56.5 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-238 | 42 | 43.50 | 33.2-53.4 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-Total | 93 | 89 | 65.5-115 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | ug/L | Uranium-Total (mass) | 126 | 130 | 104-157 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | ug/L | Uranium-Total (mass) | 144 | 130 | 104-157 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Gross Alpha | 96.2 | 98 | 34.8-152 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Gross Beta | 86.1 | 77.5 | 44.4-115 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Tritium | 5490 | 5500 | 3680-7840 | Acceptable |

## TABLE 2

## 2014 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/2014 | 05/16/14 | E10846 | Cartridge | pCi | Iodine-131 | 7.83E+01 | 7.52E+01 | 1.04 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10847 | Milk | pCi/L | Strontium-89 | 9.14E+01 | 9.17E+01 | 1 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10847 | Milk | pCi/L | Strontium-90 | 1.27E+01 | 1.51E+01 | 0.84 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Iodine-131 | 9.84E+01 | 9.85E+01 | 1 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Cerium-141 | 1.21E+02 | 1.19E+02 | 1.02 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Cr-51 | 5.19E+02 | 4.91E+02 | 1.06 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Cesium-134 | 1.79E+02 | 2.10E+02 | 0.85 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Cesium-137 | 2.55E+02 | 2.53E+02 | 1.01 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Cobalt-58 | 2.58E+02 | 2.68E+02 | 0.96 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Mn-54 | 3.01E+02 | 2.97E+02 | 1.01 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Iron-59 | 2.24E+02 | 2.19E+02 | 1.02 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Zinc-65 | 3.45E+02 | 3.23E+02 | 1.07 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10848 | Milk | pCi/L | Cobalt-60 | 3.39E+02 | 3.37E+02 | 1.00 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Iodine-131 | 9.24E+01 | 8.99E+01 | 1.03 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Cerium-141 | 8.19E+01 | 7.71E+01 | 1.06 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Cr-51 | 3.32E+02 | 3.19E+02 | 1.04 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Cesium-134 | 1.27E+02 | 1.36E+02 | 0.93 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Cesium-137 | 1.69E+02 | 1.64E+02 | 1.03 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Cobalt-58 | 1.75E+02 | 1.74E+02 | 1.01 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Mn-54 | 2.08E+02 | 1.93E+02 | 1.08 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Iron-59 | 1.68E+02 | 1.42E+02 | 1.18 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Zinc-65 | 2.25E+02 | 2.10E+02 | 1.07 | Acceptable |
| EZA | 1st/2014 | 05/16/14 | E10849 | Water | pCi/L | Cobalt-60 | 2.31E+02 | 2.19E+02 | 1.02 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10897 | Cartridge | pCi | Iodine-131 | 8.73E+01 | 8.54E+01 | 1.02 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10898 | Milk | pCi/L | Strontium-89 | 9.84E+01 | 9.13E+01 | 1.08 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10898 | Milk | pCi/L | Strontium-90 | 1.44E+01 | 1.45E+01 | 0.99 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Iodine-131 | 9.89E+01 | 9.09E+01 | 1.09 | Acceptable |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Cerium-141 | 1.38E+02 | 1.24E+02 | 1.12 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Chromium-51 | 2.68E+02 | 2.53E+02 | 1.06 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Cesium-134 | 1.58E+02 | 1.62E+02 | 0.97 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Cesium-137 | 1.27E+02 | 1.20E+02 | 1.06 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Cobalt-58 | 1.20E+02 | 1.12E+02 | 1.07 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Manganese-54 | 1.67E+02 | 1.56E+02 | 1.07 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Iron-59 | 1.02E+02 | 1.02E+02 | 1.00 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Zinc-65 | 2.68E+02 | 2.52E+02 | 1.06 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10899 | Milk | pCi/L | Cobalt-60 | 2.42E+02 | 2.24E+02 | 1.08 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Iodine-131 | 1.13E+02 | 9.83E+01 | 1.15 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Cerium-141 | 1.52E+02 | 1.43E+02 | 1.06 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Chromium-51 | 3.62E+02 | 2.94E+02 | 1.23 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Cesium-134 | 1.69E+02 | 1.88E+02 | 0.90 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Cesium-137 | 1.48E+02 | 1.39E+02 | 1.06 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Cobalt-58 | 1.34E+02 | 1.30E+02 | 1.03 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Manganese-54 | 1.88E+02 | 1.80E+02 | 1.04 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Iron-59 | 1.29E+02 | 1.19E+02 | 1.09 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Zinc-65 | 3.29E+02 | 2.93E+02 | 1.12 | Acceptable |
| EZA | 2nd/2014 | 08/08/14 | E10900 | Water | pCi/L | Cobalt-60 | 2.74E+02 | 2.60E+02 | 1.05 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10993 | Cartridge | pCi | Iodine-131 | 9.47E+01 | 8.99E+01 | 1.05 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10994 | Milk | pCi/L | Strontium-89 | 9.73E+01 | 9.69E+01 | 1.00 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10994 | Milk | pCi/L | Strontium-90 | 1.31E+01 | 1.64E+01 | 0.80 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Iodine-131 | 1.04E+02 | 9.76E+01 | 1.07 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Cerium-141 | 1.28E+02 | 1.26E+02 | 1.01 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Chromium-51 | 3.12E+02 | 2.88E+02 | 1.08 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Cesium-134 | 1.51E+02 | 1.58E+02 | 0.96 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Cesium-137 | 2.03E+02 | 1.93E+02 | 1.05 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Cobalt-58 | 1.44E+02 | 1.43E+02 | 1.01 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Manganese-54 | 1.49E+02 | 1.42E+02 | 1.05 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Iron-59 | 1.82E+02 | 1.58E+02 | 1.15 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Zinc-65 | 7.41E+01 | 7.30E+01 | 1.01 | Acceptable |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| EZA | 3rd/2014 | 11/22/14 | E10995 | Milk | pCi/L | Cobalt-60 | 3.14E+02 | 2.94E+02 | 1.06 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Iodine-131 | 1.02E+02 | 9.88E+01 | 103 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Cerium-141 | 1.30E+02 | 1.25E+02 | 104 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Chromium-51 | 2.75E+02 | 2.86E+02 | 0.96 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Cesium-134 | 1.45E+02 | 1.56E+02 | 0.93 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Cesium-137 | 1.94E+02 | 1.92E+02 | 1.01 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Cobalt-58 | 1.43E+02 | 1.42E+02 | 1.01 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Manganese-54 | 1.46E+02 | 1.41E+02 | 1.04 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Iron-59 | 1.66E+02 | 1.57E+02 | 1.06 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Zinc-65 | 7.55E+01 | 7.24E+01 | 1.04 | Acceptable |
| EZA | 3rd/2014 | 11/22/14 | E10996 | Water | pCi/L | Cobalt-60 | 3.09E+02 | 2.95E+02 | 1.05 | Acceptable |

## TABLE 3

## 2014 DEPARTMENT OF ENERGY MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP) RESULTS

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-GrF30 | Filter | Bq/ sample | Gross Alpha | 1.980 | 1.77 | 0.53-3.01 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-GrF30 | Filter | Bq/ sample | Gross Beta | 0.823 | 0.77 | 0.39-1.16 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Americium-241 | 65 | 68 | 47.6-88.4 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Cesium-134 | 5.44 | 0 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Cesium-137 | 1270 | 1238 | 867-1609 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Cobalt-57 | 947 | 966 | 676-1256 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Cobalt-60 | 0.581 | 1.220 | Sens. Eval. | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Iron-55 | 580 | 643 | 444-824 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Manganese-54 | 1470 | 1430 | 1001-1859 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Nickel-63 | 6.95 | 0 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Plutonium-238 | 89.7 | 96.0 | 67-125 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Plutonium-239/240 | 69.80 | 76.8 | 53.8-99.8 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Potassium-40 | 703 | 622 | 435-809 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Strontium-90 | 1.48 | 0 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Technetium-99 | 37.1 | 0 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | U-234/233 | 30.5 | 81.0 | 57-105 | Not Accept. |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Uranium-238 | 35 | 83 | 58-108 | Not Accept. |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaS30 | Soil | Bq/kg | Zinc-65 | 766 | 695 | 487-904 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Am-241 | 0.759 | 0.720 | 0.504-0.936 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Cesium-134 | 21.4 | 23.1 | 16.2-30.0 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Cesium-137 | 29.70 | 28.9 | 20.2-37.6 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Cobalt-57 | 28.0 | 27.5 | 19.3-35.8 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Cobalt-60 | 16.6 | 16.0 | 11.2-20.8 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Hydrogen-3 | 308 | 321 | 225-417 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Iron-55 | 0.3 | 0.0 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Manganese-54 | 14.4 | 13.9 | 9.7-18.1 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Nickel-63 | 31.4 | 34.0 | 23.8-44.2 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Plutonium-238 | 0.764 | 0.828 | 0.580-1.076 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Pu-239/240 | 0.6590 | 0.6760 | 0.473-0.879 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Potassium-40 | 0.460 | 0 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Strontium-90 | 8.32 | 8.51 | 5.96-11.06 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Technetium-99 | 9.5 | 10.3 | 7.2-13.4 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | U-234/233 | 0.210 | 0.225 | 0.158-0.293 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Uranium-238 | 1.41 | 1.45 | 1.02-1.89 | Acceptable |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Zinc-65 | -0.126 | 0.0 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Gross Alpha | 0.96 | 0.85 | 0.255-1.443 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Gross Beta | 4.7 | 4.2 | 2.10-6.29 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-MaW30 | Water | Bq/L | Iodine-129 | 0.0227 | 0.00 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | ug/ sample | Uranium-235 | 0.018 | 0.020 | 0.014-0.026 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | ug/ sample | Uranium-238 | 8.77 | 10.4 | 7.3-13.5 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | ug/ sample | Uranium-Total | 8.80 | 10.4 | 7.3-13.5 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | ug/ sample | Americium-241 | 0.086 | 0.090 | 0.063-0.117 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Cesium-134 | 1.85 | 1.91 | 1.34-2.48 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Cesium-137 | 1.81 | 1.76 | 1.23-2.29 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Cobalt-57 | 0.0757 | 0.00 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Cobalt-60 | 1.490 | 1.39 | 0.97-1.81 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Manganese-54 | 0.0138 | 0.00 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Plutonium-238 | 0.000819 | 0.00090 | Sens. Eval. | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Pu-239/240 | 0.071 | 0.7720 | 0.054-0.1004 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Strontium-90 | 1.19 | 1.18 | 0.83-1.53 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | U-234/233 | 0.0159 | 0.0195 | 0.0137-0.0254 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Uranium-238 | 0.118 | 0.129 | 0.090-0.168 | Acceptable |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Zinc-65 | 0.246 | 0.00 | False Pos Test | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Gross Alpha | 1.980 | 1.77 | 0.53-3.01 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Gross Beta | 0.83 | 0.77 | 0.39-1.16 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdF30 | Filter | Bq/ sample | Americium-241 | 0.106 | 0.104 | 0.073-0.135 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | ug/ sample | Uranium-235 | 0.261 | 0.0268 | 0.0188-0.0348 | Not Accept. |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | ug/ sample | Uranium-238 | 12.7 | 13.3 | 9.3-17.3 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | ug/ sample | Uranium-Total | 12.7 | 13.3 | 9.3-17.3 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | ug/ sample | Americium-241 | 0.1100 | 0.108 | 0.076-0.140 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Cesium-134 | 5.65 | 6.04 | 4.23-7.85 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Cesium-137 | 4.98 | 4.74 | 3.32-6.16 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq /sample | Cobalt-57 | 11.1 | 10.1 | 7.1-13.1 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Cobalt-60 | 7.21 | 6.93 | 4.85-9.01 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Manganese-54 | 9.24 | 8.62 | 6.03-11.21 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Plutonium-238 | 0.116 | 0.121 | 0.085-0.157 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Pu-239/240 | 0.134 | 0.154 | 0.108-0.0200 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Strontium-90 | 1.580 | 1.46 | 1.02-1.90 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | U-234/233 | 0.2640 | 0.2530 | 0.0177-0.0329 | Acceptable |
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Uranium-238 | 0.174 | 0.165 | 0.116-0.215 | Acceptable |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 2nd/2014 | 06/05/14 | MAPEP-14-RdV30 | Vegetation | Bq/ sample | Zinc-65 | 8.87 | 7.00 | 4.38-8.13 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-GrF31 | Filter | Bq/ sample | Gross Alpha | 0.433 | 0.530 | 0.16-0.09 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-GrF31 | Filter | Bq/ sample | Gross Beta | 1.060 | 1.060 | 0.53-1.59 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Americium-241 | 88.4 | 85.5 | 59.9-111.2 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Cesium-134 | 588 | 622 | 435-809 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Cesium-137 | 1.67 | | False Pos Test | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Cobalt-57 | 1160 | 1116 | 781-1451 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Cobalt-60 | 821 | 779 | 545-1013 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Iron-55 | 796 | 680 | 476-884 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Manganese-54 | 1060 | 1009 | 706-1312 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Nickel-63 | 924 | 980 | 686-1274 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Plutonium-238 | 0.92 | 0.48 | Sens. Eval. | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Plutonium-239/240 | 61.5 | 58.6 | 41.0-76.2 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Potassium-40 | 879 | 824 | 577-1071 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Strontium-90 | 891 | 858 | 601-1115 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Technetium-99 | 466 | 589 | 412-766 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | U-234/233 | 905 | 89 | 62-116 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Uranium-238 | 257 | 259 | 181-337 | Acceptable |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaS31 | Soil | Bq/Kg | Zinc-65 | 605.0 | 541 | 379-703 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Americium-241 | 0.915 | 0.880 | 0.62-1.14 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Cesium-134 | -0.06 | | False Pos Test | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Cesium-137 | 18.4 | 18.4 | 12.9-23.9 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Cobalt-57 | 25 | 24.7 | 17.3-32.1 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Cobalt-60 | 12.5 | 12.4 | 8.7-16.1 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Hydrogen-3 | 216 | 208 | 146-270 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Iron-55 | 34.0 | 31.5 | 22.1-41.0 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Manganese-54 | 14.2 | 14.0 | 9.8-18.2 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Nickel-63 | 23.6 | 24.6 | 17.2-32.0 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Plutonium-238 | 0.547 | 0.618 | 0.433-0.803 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Plutonium-239/240 | 0.015 | 0.005 | Sens. Eval. | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Potassium-40 | 174 | 161 | 113-209 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Strontium-90 | 0.03 | | False Pos Test | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Technetium-99 | 6.92 | 6.99 | 4.89-9.09 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Uranium-234/233 | 0.206 | 0.205 | 0.144-0.267 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Uranium-238 | 1.280 | 1.420 | 0.99-1.85 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Zinc-65 | 11.900 | 10.90 | 7.6-14.2 | Acceptable |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Gross Alpha | 0.793 | 0.701 | 0.201-1.192 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-MaW31 | Water | Bq/L | Gross Beta | 6.220 | 5.94 | 2.97-8.91 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | ug/ sample | Uranium-235 | 0.040 | 0.040 | 0.0278-0.0516 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | ug/ sample | Uranium-238 | 19.3 | 20.3 | 14.2-26.4 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | ug/ sample | Uranium-Total | 19.00 | 20.4 | 14.3-26.5 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | ug/ sample | Americium-241 | 0.0561 | 0.067 | 0.0472-0.0876 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Cesium-134 | 0.8640 | 0.96 | 0.67-1.25 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Cesium-137 | 1.190 | 1.20 | 0.84-1.56 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Cobalt-57 | 1.540 | 1.43 | 1.00-1.86 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Cobalt-60 | 1.200 | 1.10 | 0.77-1.43 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Manganese-54 | 0.808 | 0.75 | 0.53-0.98 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Plutonium-238 | 0.115 | 0.107 | 0.075-0.139 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Plutonium-239/240 | 0.048 | 0.0468 | 0.0328-0.0608 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Strontium-90 | 0.762 | 0.70 | 0.492-0.914 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Uranium-234/233 | 0.037 | 0.0358 | 0.0251-0.0465 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Uranium-238 | 0.227 | 0.253 | 0.177-0.329 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdF31 | Filter | Bq/ sample | Zinc-65 | 0.779 | 0.76 | 0.53-0.99 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Americium-241 | 0.226 | 0.19 | 0.135-0.251 | Acceptable |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Cesium-134 | 4.750 | 5.20 | 3.64-6.67 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Cesium-137 | 6.910 | 6.60 | 4.62-8.58 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Cobalt-57 | -0.002 | 0.00 | False Pos Test | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Cobalt-60 | 0.008 | 0.00 | False Pos Test | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Manganese-54 | 7.980 | 7.88 | 5.52-10.24 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Plutonium-238 | 0.001 | 0.001 | Sens. Eval. | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Plutonium-239/240 | 0.1510 | 0.171 | 0.120-0.222 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Strontium-90 | 2.330 | 2.32 | 1.62-3.02 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Uranium-234/233 | 0.046 | 0.047 | 0.0326-0.0606 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Uranium-238 | 0.332 | 0.324 | 0.227-0.421 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-RdV31 | Vegetation | Bq/ sample | Zinc-65 | 2.850 | 2.63 | 1.84-3.42 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-SrF-31 | Filter | Bq/ sample | Strontium-89 | 3.62 | 3.79 | 2.65-4.93 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-SrF-31 | Filter | Bq/ sample | Strontium-90 | 3.62 | 3.79 | 2.65-4.93 | Acceptable |
| MAPEP | 4th /2014 | 01/09/15 | MAPEP-14-XaW-31 | Water | Bq/L | Iodine-129 | 4.56 | 4.55 | 3.19-5.92 | Acceptable |

## TABLE 4

## 2014 ERA PROGRAM PERFORMANCE EVALUATION RESULTS

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range/ Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Barium-133 | 80.6 | 76.2 | 63.8-83.8 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Cesium-134 | 64.7 | 66.8 | 54.4-73.5 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Cesium-137 | 112.0 | 109 | 98.1-122 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Cobalt-60 | 95.0 | 88.7 | 79.8-99.9 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Zinc-65 | 200 | 185 | 166-218 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Gross Alpha | 34.8 | 36.1 | 18.6-46.4 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Gross Beta | 19.6 | 22.3 | 13.5-30.4 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Gross Alpha | 34.6 | 36.1 | 18.6-46.4 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Radium-226 | 16.2 | 16.8 | 12.5-19.2 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Radium-228 | 4.62 | 5.04 | 3.01-6.67 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Uranium (Nat) | 7.39 | 7.23 | 5.51-8.53 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | ug/L | Uranium (Nat) mass | 11.00 | 10.6 | 8.07-12.5 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Radium-226 | 15.10 | 16.8 | 12.5-19.2 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Radium-228 | 4.66 | 5.04 | 3.01-6.67 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Uranium (Nat) | 7.47 | 7.23 | 5.51-8.53 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | ug/L | Uranium (Nat) mass | 11.4 | 10.6 | 8.07-12.5 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Tritium | 3320 | 3580 | 3030-3950 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Strontium-89 | 44.1 | 44.4 | 34.4-51.6 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Strontium-90 | 34.2 | 30.3 | 22.1-35.2 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Strontium-89 | 38.9 | 44.4 | 34.4-51.6 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Strontium-90 | 27.1 | 30.3 | 22.1-35.2 | Acceptable |
| ERA | 1st / 2014 | 02/06/14 | 011014L | Water | pCi/L | Strontium-89 | 42.3 | 38.7 | 29.3-45.7 | Acceptable |
| ERA | 1st / 2014 | 02/06/14 | 011014L | Water | pCi/L | Strontium-89 | 42.2 | 38.7 | 29.3-45.7 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Iodine-131 | 25.2 | 24.4 | 20.2-28.9 | Acceptable |
| ERA | 1st / 2014 | 02/24/14 | RAD - 96 | Water | pCi/L | Iodine-131 | 22.4 | 24.4 | 20.2-28.9 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Barium-133 | 67.8 | 68.7 | 57.3-75.6 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Cesium-134 | 71 | 72.3 | 59.0-79.5 | Acceptable |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range/ Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Cesium-137 | 161 | 163 | 147-181 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Cobalt-60 | 76.7 | 75.5 | 68.0-85.5 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Zinc-65 | 92 | 82 | 73.8-98.5 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Gross Alpha | 45.3 | 45.4 | 23.6-57.4 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Gross Beta | 32.3 | 33.4 | 21.7-41.1 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Gross Alpha | 48.6 | 45.4 | 23.6-57.4 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Radium-226 | 8.26 | 9.06 | 6.80-10.6 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Radium-226 | 8.54 | 9.06 | 6.80-10.6 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Radium-226 | 9.7 | 9.06 | 6.80-10.6 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Radium-228 | 5.07 | 5.07 | 3.03-6.79 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Radium-228 | 5.74 | 5.07 | 3.03-6.79 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Uranium (Nat) | 13.9 | 13.5 | 10.7-15.4 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | ug/L | Uranium (Nat) mass | 22.25 | 19.8 | 15.6-22.6 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Uranium (Nat) | 13 | 13.5 | 10.7-15.4 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | ug/L | Uranium (Nat) mass | 20.7 | 19.8 | 15.6-22.6 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Tritium | 10200 | 11200 | 9750-12300 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Tritium | 10400 | 11200 | 9750-12300 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Strontium-89 | 56.3 | 42.7 | 32.9-49.8 | Not Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Strontium-90 | 14.3 | 31.7 | 23.1-36.7 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Strontium-89 | 56.5 | 42.7 | 32.9-49.8 | Not Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Strontium-90 | 26 | 31.7 | 23.1-36.7 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Iodine-131 | 28.6 | 26.1 | 21.7-30.8 | Acceptable |
| ERA | 3rd / 2014 | 08/25/14 | RAD - 98 | Water | pCi/L | Iodine-131 | 22.3 | 26.1 | 21.7-30.8 | Acceptable |

## TABLE 5

## 2014 ERA PROGRAM (MRAD) PERFORMANCE EVALUATION RESULTS

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Actinium-228 | 1140 | 1240 | 795-1720 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Americium-241 | 418 | 399 | 233-518 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Bismuth-212 | 976 | 1240 | 330-1820 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Bismuth-214 | 2290 | 1960 | 1180-2820 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Cesium-134 | 3080 | 3390 | 2220-4070 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Cesium-137 | 8310 | 8490 | 6510-10900 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Cobalt-60 | 6570 | 6830 | 4620-9400 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Lead-212 | 1330 | 1240 | 812-1730 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Lead-214 | 2800 | 2070 | 1210-3090 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Manganese-54 | <44.3 | <1000 | 0-1000 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Plutonium-238 | 579 | 578 | 348-797 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Plutonium-239 | 488 | 471.00 | 308-651 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Potassium-40 | 10500 | 10500 | 7660-14100 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Strontium-90 | 2500 | 2780 | 1060-4390 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Thorium-234 | 3420 | 3360 | 1060-6320 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Zinc-65 | 5700 | 5400 | 4300-7180 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Strontium-90 | 6730 | 8530 | 3250-13500 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-234 | 2602 | 3390 | 2070-4350 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-238 | 2425 | 3360 | 2080-4260 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-Total | 5027 | 6910 | 3750-9120 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | ug/kg | Uranium-Total (mass) | 7110 | 10100 | 5570-12700 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-234 | 3440 | 3390 | 2070-4350 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-238 | 3680 | 3360 | 2080-4260 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-Total | 7310 | 6910 | 3750-9120 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | ug/kg | Uranium-Total (mass) | 11000 | 10100 | 5570-12700 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-234 | 3740 | 3390 | 2070-4350 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-238 | 3780 | 3360 | 2080-4260 | Acceptable |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | pCi/kg | Uranium-Total | 7683 | 6910 | 3750-9120 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | ug/kg | Uranium-Total (mass) | 11300 | 10100 | 5570-12700 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Soil | ug/kg | Uranium-Total (mass) | 11200 | 10100 | 5570-12700 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Am-241 | 1670 | 1490 | 911-1980 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Cesium-134 | 657 | 646 | 415-839 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Cesium-137 | 861 | 880 | 638-1220 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Cobalt-60 | 997 | 926 | 639-1290 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Curium-244 | 514 | 516 | 253-804 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Manganese-54 | <62.2 | <300 | 0.00-300 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Plutonium-238 | 2230 | 2110 | 1260-2890 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Plutonium-239 | 3810 | 3740 | 2300-5150 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Potassium-40 | 30800 | 31900 | 23000-44800 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Strontium-90 | 2330 | 2580 | 1470-3420 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Uranium-234 | 1920 | 1760 | 1160-2260 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Uranium-238 | 1970 | 1750 | 1170-2220 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Uranium-Total | 4025 | 3580 | 2430-4460 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | ug/kg | Uranium-Total (mass) | 5920 | 5240 | 3510-6650 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Zinc-65 | 1030 | 919 | 663-1290 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Uranium-234 | 1730 | 1760 | 1160-2260 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Uranium-238 | 2000 | 1750 | 1170-2220 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | pCi/kg | Uranium-Total | 3817 | 3580 | 2430-4460 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | ug/kg | Uranium-Total (mass) | 5990 | 5240 | 3510-6650 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Vegetation | ug/kg | Uranium-Total (mass) | 5620 | 5240 | 3510-6650 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Americium-241 | 60.2 | 59.7 | 36.8-80.8 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Cesium-134 | 920 | 1010 | 643-1250 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Cesium-137 | 816 | 828 | 622-1090 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Cobalt-60 | 1130 | 1120 | 867-1400 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Iron-55 | 254 | 240 | 74.4-469 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Manganese-54 | <6.64 | <50.0 | 0-50.0 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Plutonium-238 | 51.3 | 56.3 | 38.6-74.0 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Plutonium-239 | 47.5 | 48.6 | 35.2-63.5 | Acceptable |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Strontium-90 | 76.7 | 78.9 | 38.6-118 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Uranium-234 | 33.8 | 36.4 | 22.6-54 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Uranium-238 | 34.5 | 36.1 | 23.3-49.9 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Uranium-Total | 70.3 | 74.3 | 41.1-113 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | ug/Filter | Uranium-Total (mass) | 104 | 108 | 69.1-152 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Zinc-65 | 737 | 667 | 478-921 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Uranium-234 | 35.5 | 36.4 | 22.6-54 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Uranium-238 | 35.3 | 36.1 | 23.3-49.9 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Uranium-Total | 72.4 | 74.3 | 41.1-113 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | ug/Filter | Uranium-Total (mass) | 105 | 108 | 69.1-152 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | ug/Filter | Uranium-Total (mass) | 100 | 108 | 69.1-152 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Gross Alpha | 60.9 | 46 | 15.4-71.4 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Filter | pCi/Filter | Gross Beta | 58.9 | 53.8 | 34.0-78.4 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Americium-241 | 186 | 114 | 76.8-153 | Not Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Cesium-134 | 1540 | 1660 | 1220-1910 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Cesium-137 | 2760 | 2690 | 2280-3220 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Cobalt-60 | 1320 | 1270 | 1100-1490 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Iron-55 | 1230 | 1200 | 716-1630 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Manganese-54 | <7.54 | <100 | 0.00-100 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Plutonium-238 | 37 | 44 | 32.6-54.9 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Plutonium-239 | 124 | 160 | 124-202 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Strontium-90 | 95 | 890 | 580-1180 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-234 | 77.8 | 82.4 | 61.9-106 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-238 | 50.8 | 48.4 | 36.9-59.4 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-Total | 156 | 168 | 123-217 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | ug/L | Uranium-Total (mass) | 233 | 245 | 195-296 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Zinc-65 | 2030 | 1800 | 1500-2270 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-234 | 82.1 | 82.4 | 61.9-106 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-238 | 84.6 | 48.4 | 36.9-59.4 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-Total | 170 | 168 | 123-217 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | ug/L | Uranium-Total (mass) | 253 | 245 | 195-296 | Acceptable |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-234 | 80.5 | 82.4 | 61.9-106 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-238 | 90.0 | 48.4 | 36.9-59.4 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-Total | 175 | 168 | 123-217 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | ug/L | Uranium-Total(mass) | 269 | 245 | 195-296 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-234 | 77.8 | 82.4 | 61.9-106 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-238 | 78.3 | 48.4 | 36.9-59.4 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Uranium-Total | 156 | 168 | 123-217 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | ug/L | Uranium-Total (mass) | 233 | 245 | 195-296 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | ug/L | Uranium-Total (mass) | 232 | 245 | 195-296 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Gross Alpha | 141.0 | 133 | 47.2-206 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Gross Beta | 172 | 174.0 | 99.6-258 | Acceptable |
| ERA | 2nd/2014 | 05/16/14 | MRAD-20 | Water | pCi/L | Tritium | 5280 | 5580 | 3740-7960 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Actinium-228 | 1280 | 1240 | 795-1720 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Americium-241 | 825 | 763 | 431-956 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Bismuth-212 | 1620 | 1240 | 330-1820 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Bismuth-214 | 2900 | 2810 | 1690-4040 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Cesium-134 | 1960 | 2140 | 1400-2570 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Cesium-137 | 6760 | 6550 | 5020-8430 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Cobalt-60 | 4480 | 4260 | 2880-5860 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Lead-212 | 1260 | 1240 | 812-1730 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Lead-214 | 3480 | 2750 | 1610-4100 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Manganese-54 | <30.0 | <1000 | 0-1000 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Plutonium-238 | 732 | 739 | 444-1020 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Plutonium-239 | 281 | 309 | 202-427 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Potassium-40 | 11500 | 10700 | 7810-14400 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Strontium-90 | 8790 | 8420 | 3210-13300 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Thorium-234 | 2000 | 2350 | 743-4420 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Zinc-65 | 3910 | 3270 | 2600-4350 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Uranium-234 | 2280 | 2370 | 1450-3040 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Uranium-238 | 2340 | 2350 | 1450-2980 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | pCi/kg | Uranium-Total | 4762 | 4540 | 2360-6390 | Acceptable |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Soil | ug/kg | Uranium-Total(mass) | 7020 | 7050 | 3890-8870 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Am-241 | 2260 | 2290 | 1400-3505 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Cesium-134 | 837 | 849 | 545-1100 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Cesium-137 | 729 | 644 | 467-896 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Cobalt-60 | 818 | 784 | 541-1100 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Curium-244 | 361 | 367 | 180-572 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Manganese-54 | <25.3 | <300 | 0-300 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Plutonium-238 | 886 | 862 | 514-1180 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Plutonium-239 | 675 | 701 | 430-965 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Potassium-40 | 35300 | 30900 | 22300-43400 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Strontium-90 | 1230 | 1710 | 975-2270 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Uranium-234 | 1980 | 1780 | 1170-2290 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Uranium-238 | 1970 | 1760 | 1170-2240 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Uranium-Total | 4038 | 3620 | 2450-4510 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | ug/kg | Uranium-Total (mass) | 5910 | 5280 | 3540-6710 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Uranium-234 | 1670 | 1780 | 1170-2290 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Uranium-238 | 1800 | 1760 | 1170-2240 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Uranium-Total | 3556 | 3620 | 2450-4510 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | ug/kg | Uranium-Total (mass) | 5390 | 5280 | 3540-6710 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | ug/kg | Uranium-Total (mass) | 5860 | 5280 | 3540-6710 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Vegetation | pCi/kg | Zinc-65 | 1930 | 1570 | 1130-2200 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Americium-241 | 41.4 | 38.6 | 23.8-52.2 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Cesium-134 | 742 | 765.0 | 487-949 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Cesium-137 | 677 | 647 | 486-850 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Cobalt-60 | 543 | 523 | 405-653 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Iron-55 | 117 | 120.0 | 37.2-234 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Manganese-54 | <5.87 | <50 | 0.00-50.0 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | ug/Filter | Plutonium-238 | 32.9 | 35.7 | 24.5-46.9 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Plutonium-239 | 26.8 | 29.1 | 21.1-38.0 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Strontium-90 | 187 | 168 | 82.1-252 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Uranium-234 | 26 | 28 | 27.8-41.9 | Acceptable |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Uranium-238 | 28 | 27.60 | 17.8-38.2 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Uranium-Total | 56 | 57 | 31.4-86.3 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | ug/Filter | Uranium-Total (mass) | 82.6 | 82.7 | 52.9-116 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Zinc-65 | 629 | 547 | 392-755 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Uranium-234 | 28 | 28 | 27.8-41.9 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Uranium-238 | 25 | 27.60 | 17.8-38.2 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Uranium-Total | 55 | 57 | 31.4-86.3 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | ug/Filter | Uranium-Total (mass) | 75.1 | 82.7 | 52.9-116 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | ug/Filter | Uranium-Total (mass) | 90.7 | 82.7 | 52.9-116 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Gross Alpha | 47.4 | 36.9 | 12.4-57.3 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Filter | pCi/Filter | Gross Beta | 27.2 | 21.1 | 13.3-30.8 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Americium-241 | 72.4 | 68.6 | 46.2-92.0 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Cesium-134 | 816.0 | 850 | 624-977 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Cesium-137 | 1310 | 1240 | 1060-1490 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Cobalt-60 | 1130 | 1070 | 930-1250 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Iron-55 | 130 | 134 | 79.9-182 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Manganese-54 | <6.34 | <100 | 0.00-100 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Plutonium-238 | 35 | 33 | 24.6-41.4 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Plutonium-239 | 46.4 | 51 | 39.7-64.4 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Strontium-90 | 300 | 254 | 165-336 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-234 | 42 | 44 | 32.9-56.5 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-238 | 50 | 43.50 | 33.2-53.4 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-Total | 92 | 89 | 65.5-115 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | ug/L | Uranium-Total (mass) | 137 | 130 | 104-157 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Zinc-65 | 1070 | 921 | 768-1160 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-234 | 43 | 44 | 32.9-56.5 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-238 | 45 | 43.50 | 33.2-53.4 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-Total | 90 | 89 | 65.5-115 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | ug/L | Uranium-Total (mass) | 134 | 130 | 104-157 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-234 | 49 | 44 | 32.9-56.5 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-238 | 42 | 43.50 | 33.2-53.4 | Acceptable |

| PT Provider | Quarter / Year | Report Date | Sample Number | Sample Media | Unit | Analyte / Nuclide | GEL Value | Known value | Acceptance Range / Ratio | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Uranium-Total | 93 | 89 | 65.5-115 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | ug/L | Uranium-Total (mass) | 126 | 130 | 104-157 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | ug/L | Uranium-Total (mass) | 144 | 130 | 104-157 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Gross Alpha | 96.2 | 98 | 34.8-152 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Gross Beta | 86.1 | 77.5 | 44.4-115 | Acceptable |
| ERA | 3rd / 2014 | 11/25/14 | MRAD-21 | Water | pCi/L | Tritium | 5490 | 5500 | 3680-7840 | Acceptable |

**FIGURE 1**

**COBALT-60 PERFORMANCE EVALUATION RESULTS AND % BIAS**

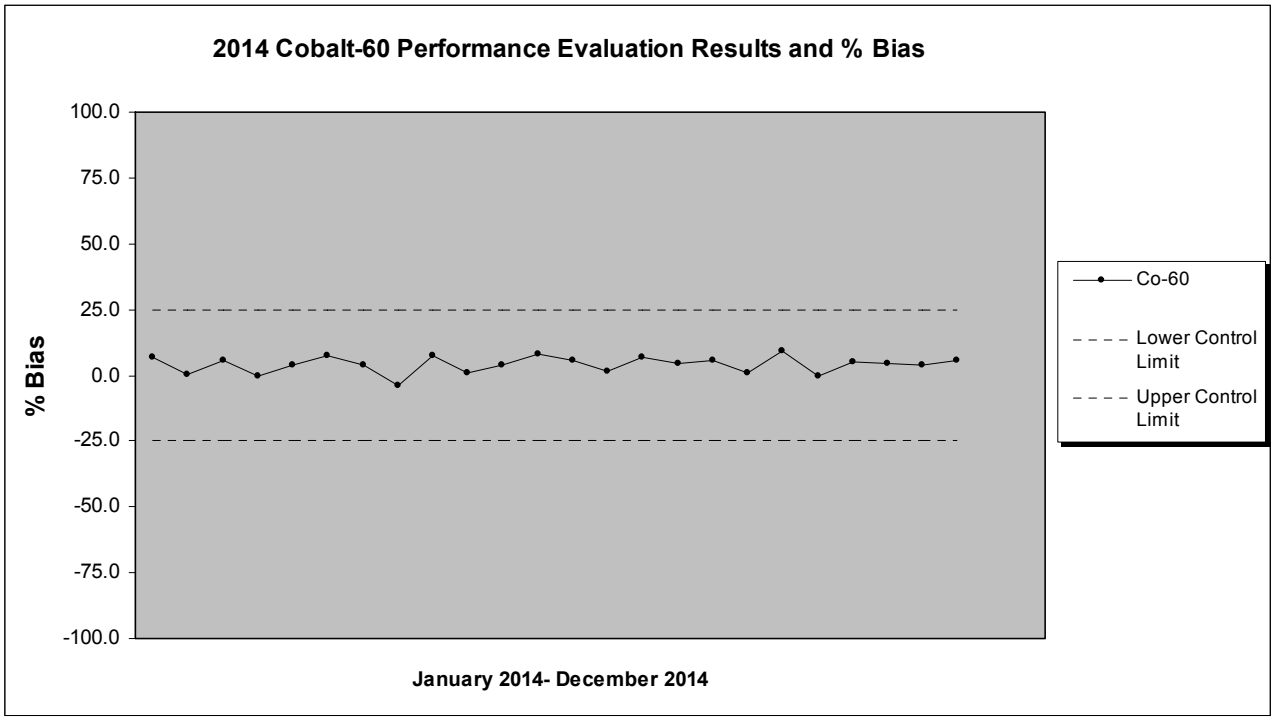



**FIGURE 2**

**CESIUM-137 PERFORMANCE EVALUATION RESULTS AND % BIAS**

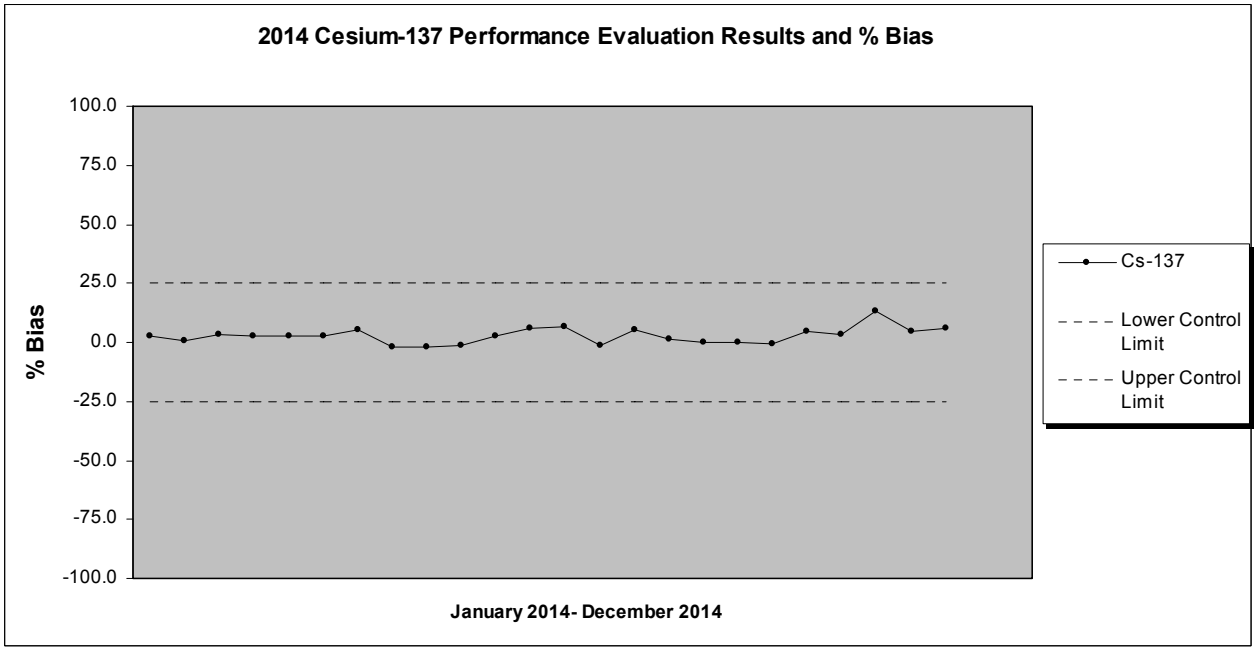


**FIGURE 3**

**TRITIUM PERFORMANCE EVALUATION RESULTS AND % BIAS**

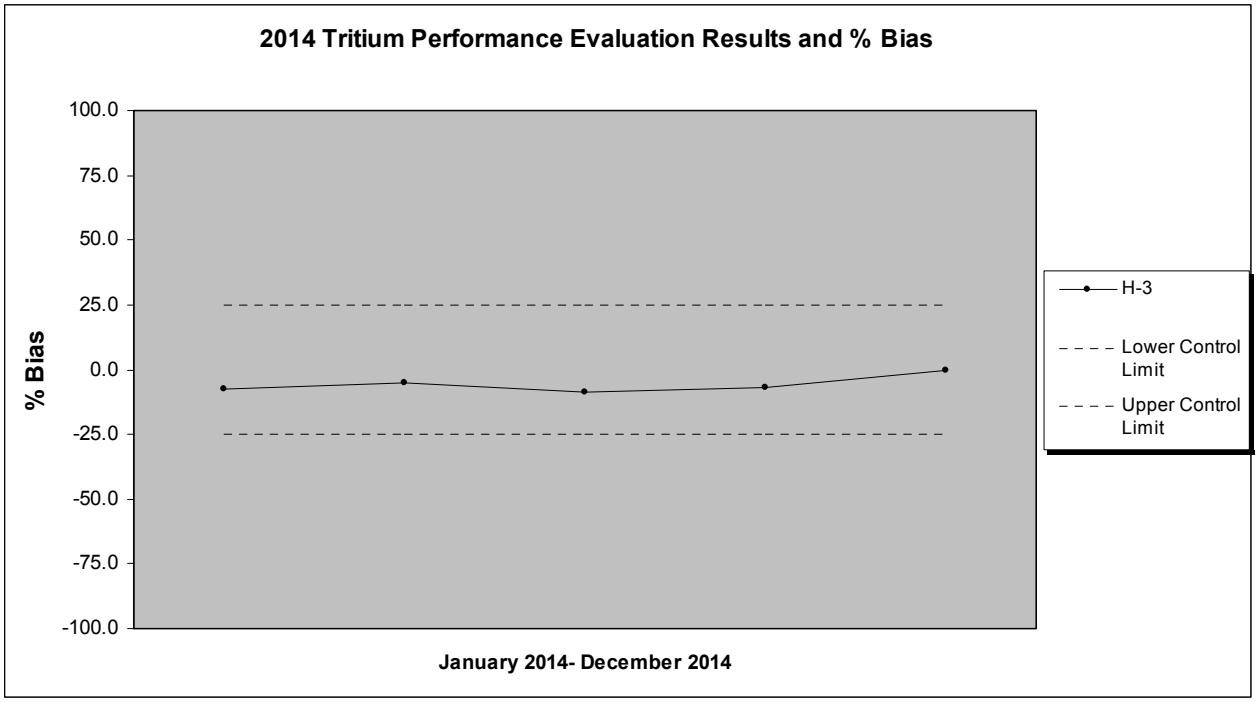



**FIGURE 4**

**STRONTIUM-90 PERFORMANCE EVALUATION RESULTS AND % BIAS**

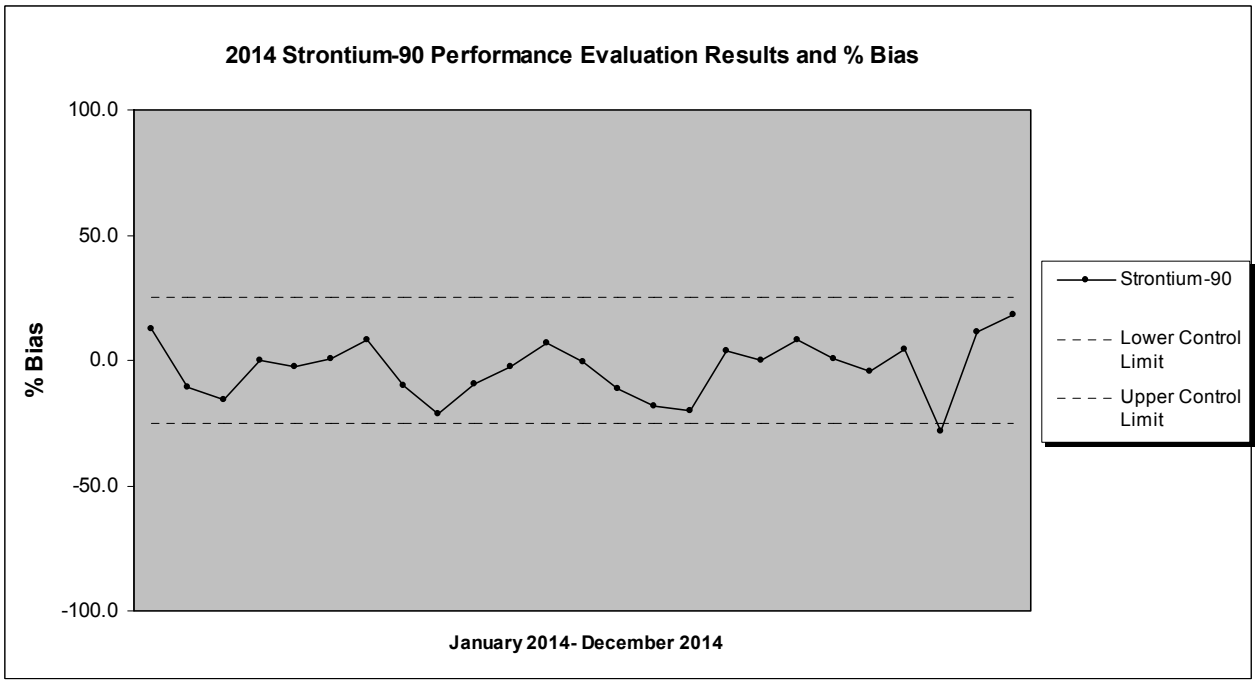


**FIGURE 5**

**GROSS ALPHA PERFORMANCE EVALUATION RESULTS AND % BIAS**

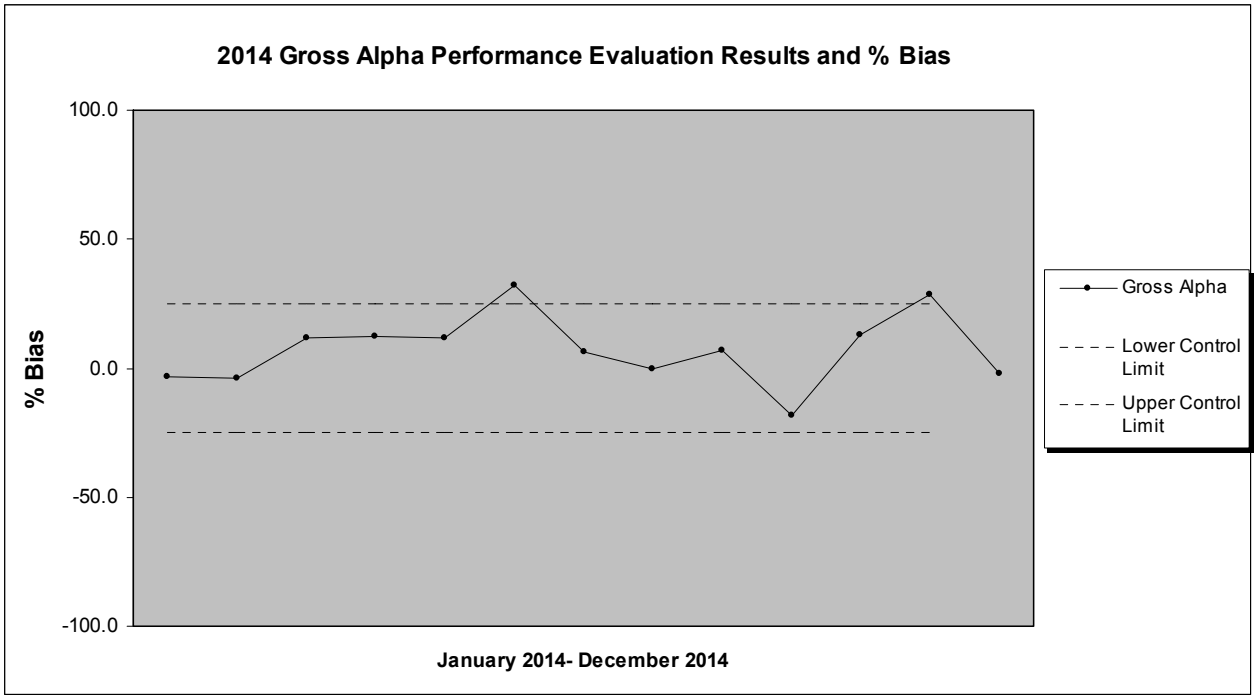



**FIGURE 6**

**GROSS BETA PERFORMANCE EVALUATION RESULTS AND % BIAS**

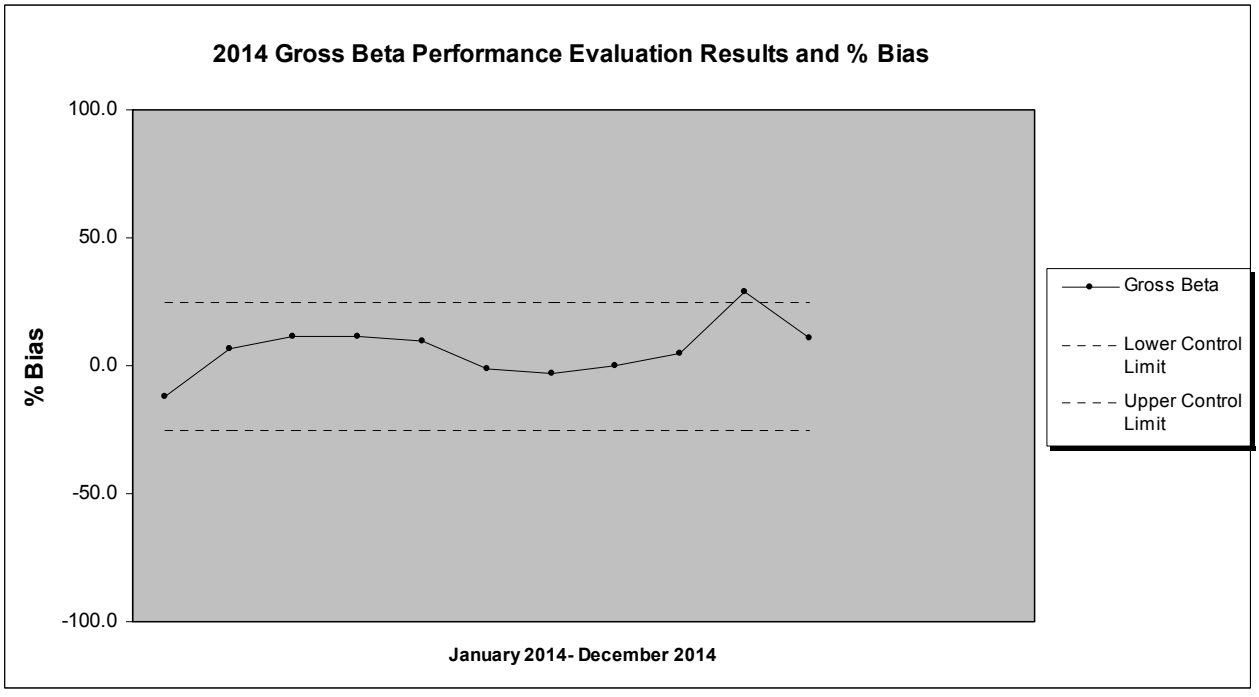


**FIGURE 7**

**IODINE-131 PERFORMANCE EVALUATION RESULTS AND % BIAS**

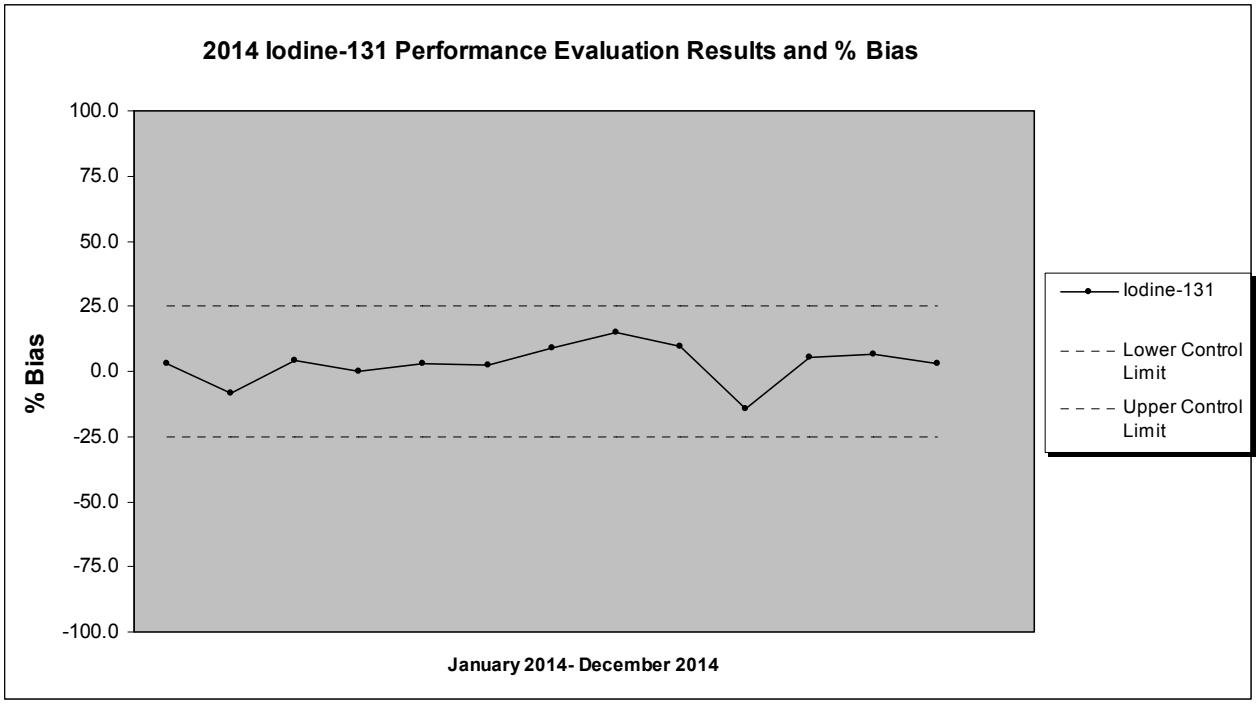
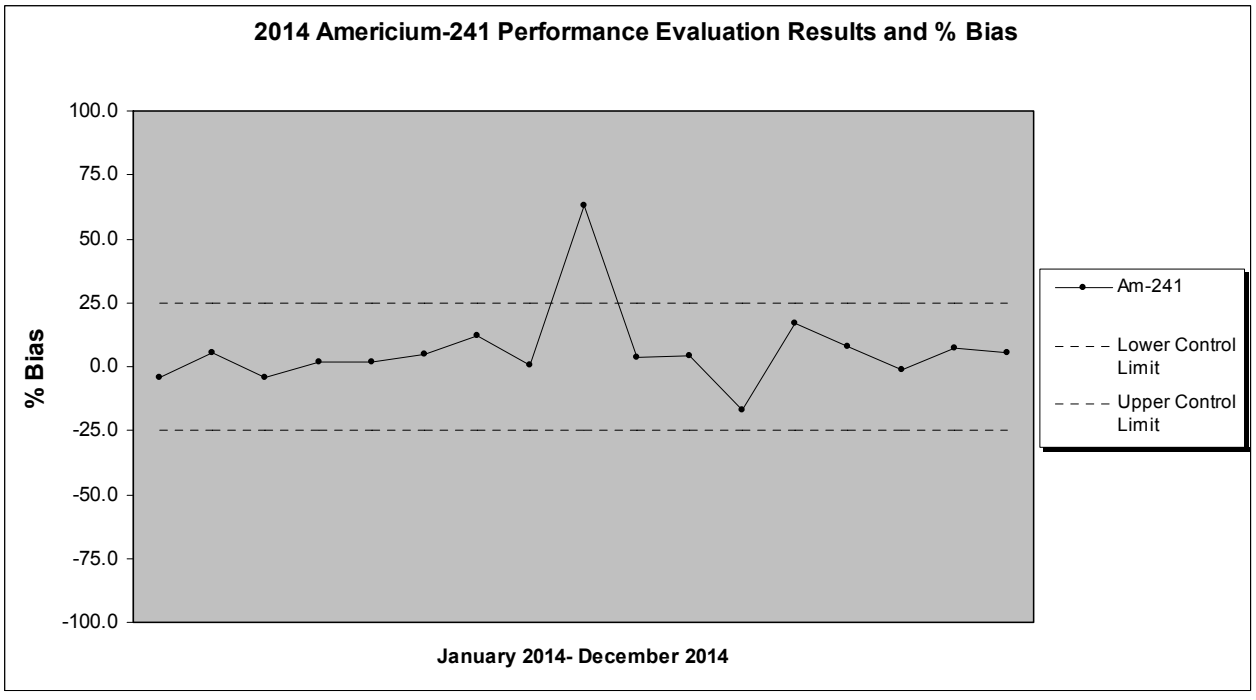


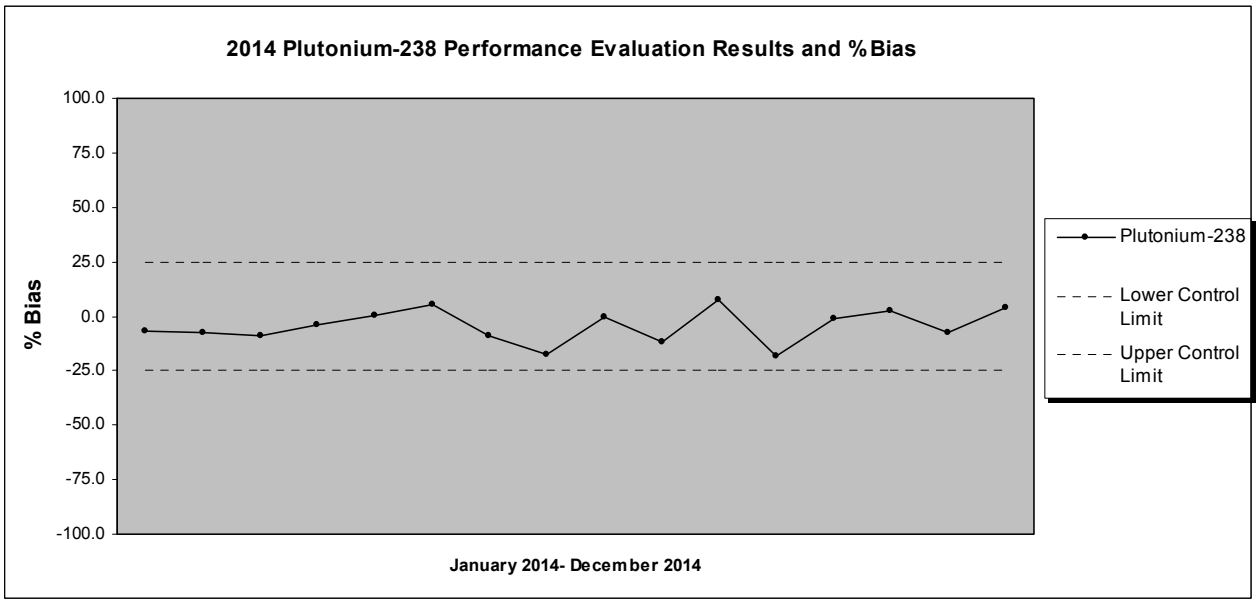

**FIGURE 8**

**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

| REMP 2014 | Bias Criteria (+ / - 25%) | | Precision Criteria (Note 1) | |
|---|---|---|---|---|
| | WITHIN CRITERIA | OUTSIDE CRITERIA | WITHIN CRITERIA | OUTSIDE CRITERIA |
| **MILK** | | | | |
| Gas Flow Sr 2nd count | 36 | 0 | 36 | 0 |
| Gas Flow Total Strontium | 23 | 0 | 23 | 0 |
| Gamma Spec Liquid RAD A-013 with Ba, La | 48 | 0 | 109 | 0 |
| **SOLID** | | | | |
| LSC Iron-55 | 3 | 0 | 3 | 0 |
| Gamma Spec Solid RAD A-013 | 30 | 0 | 43 | 0 |
| LSC Nickel 63 | 3 | 0 | 3 | 0 |
| Gas Flow Sr 2nd count | 5 | 0 | 5 | 0 |
| Gas Flow Total Strontium | 5 | 0 | 5 | 0 |
| Gamma Spec Solid RAD A-013 with Ba, La | 2 | 0 | 8 | 0 |
| Gamma Spec Solid RAD A-013 with Iodine | 6 | 0 | 7 | 0 |
| **FILTER** | | | | |
| Gas Flow Sr 2nd Count | 5 | 0 | 5 | 0 |
| Gross A & B | 429 | 0 | 429 | 0 |
| Gas Flow Sr-90 | 1 | 0 | 1 | 0 |
| Gamma Spec Filter | 45 | 0 | 47 | 0 |
| **LIQUID** | | | | |
| Alpha Spec Uranium | 1 | 0 | 2 | 0 |
| Tritium | 206 | 0 | 205 | 0 |
| Plutonium | 1 | 0 | 1 | 0 |
| LSC Iron-55 | 12 | 0 | 12 | 0 |
| LSC Nickel 63 | 13 | 0 | 13 | 0 |
| Gamma Spec Liquid RAD A-013 | 4 | 0 | 4 | 0 |
| Alpha Spec Am243 | 6 | 0 | 6 | 0 |
| Gamma Iodine-131 | 28 | 0 | 28 | 0 |
| Alpha Spec Plutonium | 10 | 0 | 10 | 0 |
| Gas Flow Sr 2nd count | 15 | 0 | 15 | 0 |
| Alpha Spec Am241 Curium | 8 | 0 | 8 | 0 |
| Gas Flow Total Strontium | 30 | 0 | 31 | 0 |
| Gross Alpha Non Vol Beta | 45 | 0 | 45 | 0 |
| Gamma Spec Liquid RAD A-013 with Ba, La | 84 | 0 | 159 | 0 |
| Gamma Spec Liquid RAD A-013 with Iodine | 40 | 0 | 40 | 0 |

| REMP 2014 | Bias Criteria (+ / - 25%) | | Precision Criteria (Note 1) | |
|---|---|---|---|---|
| | WITHIN CRITERIA | OUTSIDE CRITERIA | WITHIN CRITERIA | OUTSIDE CRITERIA |
| **TISSUE** | | | | |
| Gamma Spec Solid RAD A-013 | 48 | 0 | 46 | 0 |
| Gas Flow Sr 2nd count | 8 | 0 | 8 | 0 |
| Gas Flow Total Strontium | 17 | 0 | 17 | 0 |
| Gamma Spec Solid RAD A-013 with Ba, La | 10 | 0 | 10 | 0 |
| Gamma Spec Solid RAD A-013 with Iodine | 23 | 0 | 22 | 0 |
| **SEA WATER** | | | | |
| LSC Iron-55 | 5 | 0 | 6 | 0 |
| LSC Nickel 63 | 5 | 0 | 6 | 0 |
| Gas Flow Total Strontium | 6 | 0 | 6 | 0 |
| Gross Alpha Non Vol Beta | 6 | 0 | 6 | 0 |
| Gamma Spec Liquid RAD A-013 with Iodine | 7 | 0 | 11 | 0 |
| **VEGETATION** | | | | |
| Gas Flow Sr 2nd count | 10 | 0 | 10 | 0 |
| Gamma Spec Solid RAD A-013 with Iodine | 86 | 0 | 96 | 0 |
| **AIR CHARCOAL** | | | | |
| Gamma Iodine 131 RAD A-013 | 560 | 0 | 606 | 0 |
| Carbon-14 (Ascarite/Soda Lime Filter per Liter) | 28 | 0 | 28 | 0 |
| **DRINKING WATER** | | | | |
| Tritium | 39 | 0 | 40 | 0 |
| LSC Iron-55 | 17 | 0 | 16 | 0 |
| LSC Nickel 63 | 16 | 0 | 15 | 0 |
| Gamma Iodine-131 | 27 | 0 | 26 | 0 |
| Gas Flow Sr 2nd count | 12 | 0 | 12 | 0 |
| Gas Flow Total Strontium | 19 | 0 | 18 | 0 |
| Gross Alpha Non Vol Beta | 72 | 0 | 73 | 0 |
| Gamma Spec Liquid RAD A-013 with Ba, La | 35 | 0 | 75 | 0 |
| **Total** | **2200** | | **2456** | |

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.

## TABLE 7

## ALL RADIOLOGICAL INTRA-LABORATORY DATA SUMMARY:

## BIAS AND PRECISION BY MATRIX:

| Total Radiological 2014 | Bias Criteria (+ / - 25%) | | Precision Criteria (Note 1) | |
|---|---|---|---|---|
| | WITHIN CRITERIA | OUTSIDE CRITERIA | WITHIN CRITERIA | OUTSIDE CRITERIA |
| **MILK** | | | | |
| Gamma Iodine-129 | 0 | 0 | 1 | 0 |
| Gamma Iodine-131 | 36 | 0 | 110 | 0 |
| Gas Flow Sr 2nd count | 36 | 0 | 36 | 0 |
| Gas Flow Strontium 90 | 5 | 0 | 5 | 0 |
| Gas Flow Total Strontium | 23 | 0 | 23 | 0 |
| Gamma Spec Liquid RAD A-013 with Ba, La | 48 | 0 | 109 | 0 |
| Gamma Spec Liquid RAD A-013 with Iodine | 3 | 0 | 4 | 0 |
| **SOLID** | | | | |
| Gamma Percent Leach | 5 | 0 | 0 | 0 |
| Gas Flow Radium 228 | 16 | 0 | 20 | 0 |
| Tritium | 211 | 0 | 247 | 0 |
| Tritium by Combustion | 1 | 0 | 1 | 0 |
| Carbon-14 | 130 | 0 | 181 | 0 |
| LSC Iron-55 | 103 | 0 | 121 | 0 |
| Alpha Spec Polonium Solid | 52 | 0 | 54 | 0 |
| Gamma Nickel 59 RAD A-022 | 99 | 0 | 117 | 0 |
| LSC Chlorine-36 in Solids | 4 | 0 | 4 | 0 |
| Gamma Spec Ra226 RAD A-013 | 21 | 0 | 24 | 0 |
| Gamma Spec Solid RAD A-013 | 649 | 0 | 812 | 0 |
| LSC Nickel 63 | 141 | 0 | 154 | 0 |
| LSC Plutonium | 181 | 0 | 202 | 0 |
| Technetium-99 | 224 | 0 | 250 | 0 |
| Gamma Spec Liquid RAD A-013 | 2 | 0 | 2 | 0 |
| ICP-MS Technetium-99 in Soil | 61 | 0 | 60 | 0 |
| LSC Selenium 79 | 11 | 0 | 11 | 0 |
| Total Activity, | 4 | 0 | 4 | 0 |
| Tritium | 16 | 0 | 17 | 0 |
| Alpha Spec Am243 | 23 | 0 | 37 | 0 |
| Gamma Iodine-129 | 100 | 0 | 120 | 0 |

| Total Radiological 2014 | Bias Criteria (+ / - 25%) | | Precision Criteria (Note 1) | |
|---|---|---|---|---|
| | WITHIN CRITERIA | OUTSIDE CRITERIA | WITHIN CRITERIA | OUTSIDE CRITERIA |
| Gas Flow Lead 210 | 6 | 0 | 6 | 0 |
| Total Uranium KPA | 7 | 0 | 10 | 0 |
| Alpha Spec Uranium | 214 | 0 | 309 | 0 |
| LSC Promethium 147 | 2 | 0 | 2 | 0 |
| LSC, Rapid Strontium 89 and 90 | 42 | 0 | 61 | 0 |
| Alpha Spec Thorium | 152 | 0 | 196 | 0 |
| ICP-MS Uranium-233, 234 in Solid | 49 | 0 | 47 | 0 |
| Alpha Spec Plutonium | 231 | 0 | 240 | 0 |
| ICP-MS Technetium-99 Prep in Soil | 62 | 0 | 61 | 0 |
| Alpha Spec Neptunium | 213 | 0 | 237 | 0 |
| Alpha Spec Plutonium | 158 | 0 | 206 | 0 |
| Gamma Spec Solid with Ra226, Ra228 | 9 | 0 | 13 | 0 |
| Gas Flow Sr 2nd count | 21 | 0 | 25 | 0 |
| Gas Flow Strontium 90 | 195 | 0 | 201 | 0 |
| Gas Flow Total Radium | 2 | 0 | 3 | 0 |
| Lucas Cell Radium 226 | 38 | 0 | 47 | 0 |
| Total Activity Screen | 9 | 0 | 10 | 0 |
| Alpha Spec Am241 Curium | 304 | 0 | 339 | 0 |
| Alpha Spec Total Uranium | 4 | 0 | 8 | 0 |
| Gas Flow Total Strontium | 43 | 0 | 46 | 0 |
| Gross Alpha Non Vol Beta | 1 | 0 | 1 | 0 |
| ICP-MS Uranium-233, 234 Prep in Solid | 49 | 0 | 48 | 0 |
| ICP-MS Uranium-235, 236, 238 in Solid | 60 | 0 | 81 | 0 |
| Gamma Spec Solid RAD A-013 with Ba, La | 2 | 0 | 8 | 0 |
| Gamma Spec Solid RAD A-013 with Iodine | 6 | 0 | 7 | 0 |
| GFC Chlorine-36 in Solids | 3 | 0 | 3 | 0 |
| Gamma Spec Solid RAD A-013 (pCi/Sample) | 2 | 0 | 2 | 0 |
| Tritium | 8 | 0 | 8 | 0 |
| Alpha Spec Am241 (pCi/Sample) | 2 | 0 | 2 | 0 |
| ICP-MS Uranium-234, 235, 236, 238 in Solid | 148 | 0 | 132 | 0 |
| ICP-MS Uranium-235, 236, 238 Prep in Solid | 50 | 0 | 49 | 0 |
| Alpha Spec Thorium | 1 | 0 | 1 | 0 |
| Alpha Spec Uranium | 1 | 0 | 1 | 0 |
| Gross Alpha/Beta | 235 | 0 | 316 | 3 |
| Alpha Spec Neptunium | 1 | 0 | 1 | 0 |

| Total Radiological 2014 | Bias Criteria (+ / - 25%) | | Precision Criteria (Note 1) | |
|---|---|---|---|---|
| | WITHIN CRITERIA | OUTSIDE CRITERIA | WITHIN CRITERIA | OUTSIDE CRITERIA |
| Gas Flow Sr 2nd count | 2 | 0 | 1 | 0 |
| Gross Alpha/Beta (Americium Calibration) Solid | 2 | 0 | 3 | 0 |
| ICP-MS Uranium-234, 235, 236, 238 Prep in Solid | 69 | 0 | 65 | 0 |
| **FILTER** | | | | |
| Alpha Spec Uranium | 14 | 0 | 18 | 0 |
| Alpha Spec Polonium | 1 | 0 | 5 | 0 |
| Gamma I-131, filter | 4 | 0 | 4 | 0 |
| LSC Plutonium Filter | 84 | 0 | 102 | 0 |
| Tritium | 76 | 0 | 112 | 0 |
| Carbon-14 | 35 | 0 | 66 | 0 |
| Nickel-63 | 0 | 0 | 8 | 0 |
| LSC Iron-55 | 69 | 0 | 84 | 0 |
| Gamma Nickel 59 RAD A-022 | 55 | 0 | 68 | 0 |
| LSC Nickel 63 | 60 | 0 | 78 | 0 |
| Technetium-99 | 51 | 0 | 75 | 0 |
| Gamma Spec Filter RAD A-013 | 143 | 0 | 174 | 6 |
| Alphaspec Np Filter per Liter | 8 | 0 | 13 | 0 |
| Alphaspec Pu Filter per Liter | 11 | 0 | 22 | 0 |
| Gamma Iodine-125 | 5 | 0 | 0 | 0 |
| Gamma Iodine-129 | 46 | 0 | 60 | 0 |
| Gross Alpha/Beta | 5 | 0 | 5 | 0 |
| Alpha Spec Am243 | 10 | 0 | 28 | 0 |
| Gas Flow Lead 210 | 0 | 0 | 4 | 0 |
| LSC Plutonium Filter per Liter | 9 | 0 | 15 | 0 |
| Total Uranium KPA | 9 | 0 | 14 | 0 |
| Alpha Spec Uranium | 55 | 0 | 96 | 0 |
| LSC Promethium 147 | 1 | 0 | 2 | 0 |
| LSC, Rapid Strontium 89 and 90 | 72 | 0 | 94 | 0 |
| Alpha Spec Thorium | 42 | 0 | 66 | 0 |
| Gas Flow Radium 228 | 1 | 0 | 1 | 0 |
| Alpha Spec Plutonium | 81 | 0 | 98 | 0 |
| ICP-MS Uranium-233, 234 in Filter | 0 | 0 | 3 | 0 |
| Alpha Spec Neptunium | 62 | 0 | 83 | 0 |
| Alpha Spec Plutonium | 66 | 0 | 96 | 0 |
| Alpha Spec Polonium,(Filter/Liter) | 0 | 0 | 14 | 0 |

| Total Radiological 2014 | Bias Criteria (+ / - 25%) | | Precision Criteria (Note 1) | |
|---|---|---|---|---|
| | WITHIN CRITERIA | OUTSIDE CRITERIA | WITHIN CRITERIA | OUTSIDE CRITERIA |
| Alpha Spec Radium 226 | 0 | 0 | 2 | 0 |
| Gas Flow Sr 2nd Count | 72 | 0 | 81 | 1 |
| Gas Flow Strontium 90 | 61 | 0 | 68 | 0 |
| Lucas Cell Radium-226 | 1 | 0 | 1 | 0 |
| Alpha Spec Am241Curium | 95 | 0 | 117 | 0 |
| Gas Flow Total Strontium | 5 | 0 | 5 | 0 |
| ICP-MS Uranium-233, 234 Prep in Filter | 0 | 0 | 3 | 0 |
| ICP-MS Uranium-235, 236, 238 in Filter | 0 | 0 | 6 | 0 |
| Total Activity in Filter, | 1 | 0 | 10 | 0 |
| Alphaspec Am241 Curium Filter per Liter | 15 | 0 | 20 | 0 |
| Tritium | 86 | 0 | 89 | 0 |
| Gamma Spec Filter RAD A-013 Direct Count | 6 | 0 | 6 | 0 |
| Carbon-14 | 12 | 0 | 12 | 0 |
| GFC Chlorine-36 in Filters PL | 1 | 0 | 1 | 0 |
| Direct Count-Gross Alpha/Beta | 48 | 0 | 1 | 0 |
| Gross Alpha/Beta | 48 | 0 | 60 | 0 |
| ICP-MS Uranium-234, 235, 236, 238 in Filter | 4 | 0 | 6 | 0 |
| ICP-MS Uranium-235, 236, 238 Prep in Filter | 0 | 0 | 3 | 0 |
| Alpha Spec U | 13 | 0 | 35 | 0 |
| Gross A & B | 497 | 0 | 473 | 0 |
| LSC Iron-55 | 8 | 0 | 19 | 0 |
| Technetium-99 | 7 | 0 | 13 | 0 |
| Gas Flow Sr-90 | 6 | 0 | 13 | 0 |
| LSC Nickel 63 | 14 | 0 | 19 | 0 |
| Gas Flow Pb-210 | 8 | 0 | 22 | 0 |
| Gas Flow Ra-228 | 5 | 0 | 10 | 0 |
| Gamma Iodine 129 | 8 | 0 | 8 | 0 |
| ICP-MS Uranium-234, 235, 236, 238 Prep in Filter | 2 | 0 | 3 | 0 |
| Gamma Spec Filter | 97 | 0 | 117 | 0 |
| Lucas Cell Ra-226 | 8 | 0 | 23 | 0 |
| Alpha Spec Thorium | 7 | 0 | 22 | 0 |
| **LIQUID** | | | | |
| Alpha Spec Uranium | 390 | 0 | 553 | 0 |
| Alpha Spec Polonium | 4 | 0 | 7 | 0 |
| Electrolytic Tritium | 14 | 0 | 25 | 0 |

| Total Radiological 2014 | Bias Criteria (+ / - 25%) | | Precision Criteria (Note 1) | |
|---|---|---|---|---|
| | WITHIN CRITERIA | OUTSIDE CRITERIA | WITHIN CRITERIA | OUTSIDE CRITERIA |
| Tritium | 1125 | 0 | 1177 | 0 |
| Carbon-14 | 149 | 0 | 161 | 0 |
| Plutonium | 43 | 0 | 63 | 0 |
| Iodine-131 | 3 | 0 | 4 | 0 |
| LSC Iron-55 | 192 | 0 | 233 | 0 |
| Gamma Nickel 59 RAD A-022 | 18 | 0 | 21 | 0 |
| Gamma Iodine 131 RAD A-013 | 2 | 0 | 2 | 0 |
| Gamma Radium 228 RAD A-013 | 3 | 0 | 3 | 0 |
| LSC Nickel 63 | 209 | 0 | 236 | 0 |
| LSC Radon 222 | 18 | 0 | 21 | 0 |
| Technetium-99 | 377 | 0 | 425 | 0 |
| Gamma Spec Liquid RAD A-013 | 702 | 0 | 732 | 0 |
| Alpha Spec Total U RAD A-011 | 31 | 0 | 56 | 0 |
| LSC Selenium 79 | 2 | 0 | 2 | 0 |
| Alpha Spec Am243 | 17 | 0 | 18 | 0 |
| Gamma Iodine-129 | 80 | 0 | 92 | 0 |
| Gamma Iodine-131 | 28 | 0 | 28 | 0 |
| ICP-MS Technetium-99 in Water | 8 | 0 | 31 | 0 |
| Gas Flow Lead 210 | 19 | 0 | 19 | 0 |
| Total Uranium KPA | 101 | 0 | 203 | 0 |
| LSC Promethium 147 | 4 | 0 | 4 | 0 |
| LSC, Rapid Strontium 89 and 90 | 7 | 0 | 8 | 0 |
| Alpha Spec Thorium | 145 | 0 | 186 | 0 |
| Gas Flow Radium 228 | 171 | 0 | 206 | 0 |
| Gas Flow Radium 228 | 40 | 0 | 37 | 0 |
| Gas Flow Radium 228 | 1 | 0 | 1 | 0 |
| Alpha Spec Plutonium | 288 | 0 | 387 | 0 |
| LSC Sulfur 35 | 1 | 0 | 1 | 0 |
| Alpha Spec Neptunium | 90 | 0 | 141 | 0 |
| Alpha Spec Plutonium | 21 | 0 | 49 | 0 |
| Alpha Spec Radium 226 | 7 | 0 | 7 | 0 |
| Gas Flow Sr 2nd count | 191 | 0 | 199 | 0 |
| Gas Flow Strontium 90 | 365 | 0 | 422 | 0 |
| Gas Flow Strontium 90 | 1 | 0 | 1 | 0 |
| Gas Flow Total Radium | 78 | 0 | 103 | 0 |

| Total Radiological 2014 | Bias Criteria (+ / - 25%) | | Precision Criteria (Note 1) | |
|---|---|---|---|---|
| | WITHIN CRITERIA | OUTSIDE CRITERIA | WITHIN CRITERIA | OUTSIDE CRITERIA |
| ICP-MS Technetium-99 Prep in Water | 8 | 0 | 32 | 0 |
| ICP-MS Uranium-233, 234 in Liquid | 6 | 0 | 11 | 0 |
| LSC Calcuim 45 | 1 | 0 | 1 | 0 |
| Lucas Cell Radium 226 | 310 | 0 | 366 | 0 |
| Lucas Cell Radium-226 | 10 | 0 | 10 | 0 |
| Total Activity Screen | 7 | 0 | 7 | 0 |
| Chlorine-36 in Liquids | 13 | 0 | 14 | 0 |
| Alpha Spec Am241 Curium | 217 | 0 | 333 | 0 |
| Gas Flow Total Strontium | 112 | 0 | 116 | 0 |
| Gross Alpha Non Vol Beta | 980 | 0 | 1167 | 0 |
| LSC Phosphorus-32 | 2 | 0 | 3 | 0 |
| Lucas Cell Radium 226 by Method Ra-04 | 2 | 0 | 2 | 0 |
| ICP-MS Uranium-233, 234 Prep in Liquid | 6 | 0 | 11 | 0 |
| Tritium in Drinking Water by EPA 906.0 | 9 | 0 | 12 | 0 |
| Gamma Spec Liquid RAD A-013 with Ba, La | 84 | 0 | 159 | 0 |
| Gamma Spec Liquid RAD A-013 with Iodine | 162 | 0 | 189 | 0 |
| Gas Flow Strontium 89 & 90 | 5 | 0 | 3 | 0 |
| ICP-MS Uranium-235, 236, 238 in Liquid | 10 | 0 | 18 | 0 |
| Gas Flow Total Alpha Radium | 6 | 0 | 7 | 0 |
| Gross Alpha Co-precipitation | 3 | 0 | 13 | 0 |
| ICP-MS Uranium-235, 236, 238 Prep in Liquid | 6 | 0 | 11 | 0 |
| ICP-MS Uranium-234, 235, 236, 238 in Liquid | 31 | 0 | 74 | 0 |
| Gross Alpha Beta (Americium Calibration) Liquid | 32 | 0 | 46 | 0 |
| ICP-MS Uranium-234, 235, 236, 238 Prep in Liquid | 15 | 0 | 38 | 0 |
| Alpha/Beta (Americium Calibration) Drinking Water | 23 | 0 | 18 | 0 |
| **TISSUE** | | | | |
| Carbon-14 | 3 | 0 | 3 | 0 |
| Gamma Spec Solid RAD A-013 | 76 | 0 | 78 | 0 |
| Technetium-99 | 4 | 0 | 4 | 0 |
| Tritium | 1 | 0 | 1 | 0 |
| Alpha Spec Uranium | 5 | 0 | 8 | 0 |
| Alpha Spec Plutonium | 5 | 0 | 10 | 0 |
| Gas Flow Sr 2nd count | 8 | 0 | 8 | 0 |
| Gas Flow Strontium 90 | 11 | 0 | 12 | 0 |
| Alpha Spec Am241 Curium | 2 | 0 | 2 | 0 |

| Total Radiological 2014 | Bias Criteria (+ / - 25%) | | Precision Criteria (Note 1) | |
|---|---|---|---|---|
| | WITHIN CRITERIA | OUTSIDE CRITERIA | WITHIN CRITERIA | OUTSIDE CRITERIA |
| Gas Flow Total Strontium | 17 | 0 | 17 | 0 |
| Gamma Spec Solid RAD A-013 with Ba, La | 10 | 0 | 10 | 0 |
| Gamma Spec Solid RAD A-013 with Iodine | 23 | 0 | 22 | 0 |
| Gross Alpha/Beta | 2 | 0 | 2 | 0 |
| **SEA WATER** | | | | |
| LSC Iron-55 | 5 | 0 | 6 | 0 |
| LSC Nickel 63 | 5 | 0 | 6 | 0 |
| Gas Flow Total Strontium | 6 | 0 | 6 | 0 |
| Gross Alpha Non Vol Beta | 6 | 0 | 6 | 0 |
| Gamma Spec Liquid RAD A-013 with Iodine | 7 | 0 | 11 | 0 |
| **VEGETATION** | | | | |
| LSC Iron-55 | 2 | 0 | 2 | 0 |
| Gamma Nickel 59 RAD A-022 | 1 | 0 | 0 | 0 |
| Gamma Spec Solid RAD A-013 | 26 | 0 | 25 | 0 |
| LSC Nickel 63 | 2 | 0 | 1 | 0 |
| LSC Plutonium | 1 | 0 | 1 | 0 |
| Technetium-99 | 4 | 0 | 3 | 0 |
| Tritium | 11 | 0 | 11 | 0 |
| Gamma Iodine-129 | 1 | 0 | 0 | 0 |
| Gas Flow Lead 210 | 2 | 0 | 3 | 0 |
| Total Uranium KPA | 4 | 0 | 4 | 0 |
| Alpha Spec Uranium | 22 | 0 | 22 | 0 |
| Alpha Spec Thorium | 5 | 0 | 5 | 0 |
| Alpha Spec Plutonium | 13 | 0 | 11 | 0 |
| Alpha Spec Neptunium | 1 | 0 | 1 | 0 |
| Alpha Spec Plutonium | 1 | 0 | 1 | 0 |
| Gas Flow Sr 2nd count | 10 | 0 | 10 | 0 |
| Gas Flow Strontium 90 | 12 | 0 | 11 | 0 |
| Gas Flow Total Radium | 2 | 0 | 2 | 0 |
| Alpha Spec Am241 Curium | 6 | 0 | 6 | 0 |
| Gamma Spec Solid RAD A-013 with Iodine | 86 | 0 | 96 | 0 |
| Gamma Spec Solid RAD A-013 (pCi/Sample) | 2 | 0 | 2 | 0 |
| Alpha Spec Am241 (pCi/Sample) | 1 | 0 | 2 | 0 |
| ICP-MS Uranium-234, 235, 236, 238 in Solid | 12 | 0 | 7 | 0 |
| Alpha Spec Uranium | 0 | 0 | 2 | 0 |

| Total Radiological 2014 | Bias Criteria (+ / - 25%) | | Precision Criteria (Note 1) | |
|---|---|---|---|---|
| | WITHIN CRITERIA | OUTSIDE CRITERIA | WITHIN CRITERIA | OUTSIDE CRITERIA |
| Gross Alpha/Beta | 7 | 0 | 9 | 0 |
| Alpha Spec Plutonium | 0 | 0 | 2 | 0 |
| Gas Flow Strontium 90 | 4 | 0 | 2 | 0 |
| ICP-MS Uranium-234, 235, 236, 238 Prep in Solid | 7 | 0 | 4 | 0 |
| **AIR CHARCOAL** | | | | |
| Gamma Iodine 131 RAD A-013 | 560 | 0 | 606 | 0 |
| Gamma Iodine-129 | 7 | 0 | 6 | 0 |
| Carbon-14 | 7 | 0 | 7 | 0 |
| Carbon-14 (Ascarite/Soda Lime Filter per Liter) | 28 | 0 | 28 | 0 |
| Gamma Iodine 129 | 7 | 0 | 7 | 0 |
| Gamma Spec Filter | 7 | 0 | 7 | 0 |
| **DRINKING WATER** | | | | |
| Alpha Spec Uranium | 4 | 0 | 5 | 0 |
| Alpha Spec Polonium | 1 | 0 | 25 | 0 |
| Tritium | 39 | 0 | 40 | 0 |
| Carbon-14 | 3 | 0 | 2 | 0 |
| Iodine-131 | 2 | 0 | 2 | 0 |
| LSC Iron-55 | 17 | 0 | 16 | 0 |
| LSC Nickel 63 | 16 | 0 | 15 | 0 |
| LSC Radon 222 | 13 | 0 | 13 | 0 |
| Technetium-99 | 2 | 0 | 1 | 0 |
| Gamma Spec Liquid RAD A-013 | 17 | 0 | 18 | 0 |
| Gamma Iodine-129 | 2 | 0 | 4 | 0 |
| Gamma Iodine-131 | 27 | 0 | 26 | 0 |
| Gas Flow Lead 210 | 4 | 0 | 3 | 0 |
| Total Uranium KPA | 17 | 0 | 34 | 0 |
| Alpha Spec Thorium | 1 | 0 | 1 | 0 |
| Gas Flow Radium 228 | 22 | 0 | 26 | 0 |
| Alpha Spec Plutonium | 3 | 0 | 3 | 0 |
| Gas Flow Sr 2nd count | 12 | 0 | 12 | 0 |
| Gas Flow Strontium 90 | 20 | 0 | 22 | 0 |
| LSC Calcuim 45 | 2 | 0 | 2 | 0 |
| Lucas Cell Radium-226 | 23 | 0 | 49 | 0 |
| Alpha Spec Am241 Curium | 2 | 0 | 2 | 0 |
| Gas Flow Total Strontium | 19 | 0 | 18 | 0 |

| Total Radiological 2014 | Bias Criteria (+ / - 25%) | | Precision Criteria (Note 1) | |
|---|---|---|---|---|
| | WITHIN CRITERIA | OUTSIDE CRITERIA | WITHIN CRITERIA | OUTSIDE CRITERIA |
| Gross Alpha Non Vol Beta | 247 | 0 | 214 | 0 |
| Tritium in Drinking Water by EPA 906.0 | 28 | 0 | 26 | 0 |
| Gamma Spec Liquid RAD A-013 with Ba, La | 35 | 0 | 75 | 0 |
| Gas Flow Strontium 89 & 90 | 17 | 0 | 11 | 0 |
| Gas Flow Total Alpha Radium | 1 | 0 | 1 | 0 |
| Gross Alpha Co-precipitation | 99 | 0 | 91 | 0 |
| Alpha/Beta (Americium Calibration) Drinking Water | 16 | 0 | 16 | 0 |
| ECLS-R-GA NJ 48 Hr Rapid Gross Alpha | 7 | 0 | 7 | 0 |
| **Total** | **16535** | | **19734** | |

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.

**TABLE 8**
**2014 CORRECTIVE ACTION REPORT SUMMARY**

| CORRECTIVE ACTION ID# & PE FAILURE | DISPOSITION |
|---|---|
| **CARR140605-879**<br><br>ISO Documentation of PT Failures in MAPEP-14-RdV30 for Uranium 235 in Vegetation by ICP/MS and 14-MaS30 Uranium-233/234 and Uranium 238 by Alpha Spec. | **Root Cause Analysis of MAPEP-14-RdV28 in vegetation for Uranium-235 by ICP/MS**<br><br>The root cause of this failure was human error and inattention to detail. The QAO inadvertently entered the incorrect activity for this parameter when she was entering the results on the MAPEP website. 0.261 ug/sample instead of 0.0261 ug/sample was entered. The data entry error was not caught during the GL review process. MAPEP results only are peer reviewed by the GL of the applicable area to ensure that the data was entered correctly.<br><br>**A second PT was successfully analyzed for this matrix.**<br><br>**Uranium-234/233, and Uranium-238 in soil by Alpha Spec:**<br><br>Following reviews of our process and data and conversations with personnel from the affected laboratories, it was determined that all failures were due to an incomplete sample digestion. A total digestion technique using Hydrofluoric Acid was performed on the sample. However, this digestion was not vigorous enough to extract all the U-234 and U-238 from the soil because the analytes were fused into the soil at an extremely high temperature. Due to the high number of labs that received a Not Acceptable rating for this analysis, MAPEP has posted an explanation on the preparation of the Uranium Soil standard on their website.<br><br>**Permanent Corrective/Preventive Actions or Improvements**:<br><br>Upon notification of the failure, the sample was re-digested using a Sodium Hydroxide fusion method prior to ion-exchange separation chemistry. The results for both the U-234 and U-238 fall within acceptable range. In the future, all MAPEP soil samples will be analyzed with a NaOH fusion dissolution technique. Our analytical procedures provide the flexibility to perform different extraction techniques (leaching, HF dissolution) based on client requests. For our DOE clients, complete dissolution using HF has been the approved method for Uranium. Some clients also ask for the Uranium analysis using a leach procedure. In all cases, GEL performs the required contractual procedure for the analysis.<br><br>**A second PT was successfully analyzed for this matrix.** |

| CORRECTIVE ACTION ID# & PE FAILURE | DISPOSITION |
|---|---|
| **CARR140520-874**<br><br>ISO Documentation of PT Failures in –MRAD-20 for Americium-241 in water. | **Root Cause Analysis**<br><br>After a thorough review of all data, a definite reason for the failure could not be determined.<br><br>The following steps were taken to prove that this elevated bias was an isolated occurrence and that our overall process is within control.<br><br>1. The batch quality control samples were reviewed and found to be compliant. The recoveries in the Laboratory Control Sample (LCS) recovered at 98.2%. Two sample duplicates were also prepared in the batch. The RPDs were 4.8 and 8.6.<br><br>2. The sample was re-analyzed in duplicate after the report was received. One with our normal Am-243 tracer, and another with Cm-244 tracer. Both of the reanalysis confirm the original reported result (which is outside the range of acceptable results).<br><br>Control charts for all Am tracer recoveries were also reviewed to determine if there may be an issue with the tracers. While there is a slight bias in the average LCS recovery, it was not significant enough to consider abnormal, and did not come close to accounting for the high result on this analysis. Additionally, since the sample was reanalyzed using two different tracers and achieved the same result, a tracer issue was ruled out as the potential culprit.<br><br>**Permanent Corrective/Preventive Actions or Improvements**:<br><br>The laboratory must assume unidentified random error caused the elevated bias because all quality control criteria were met for the batch. Additionally, a well characterized performance evaluation sample from another vendor was prepped and analyzed a few weeks after this sample. The Am-241 recovered at 105% for this sample and fell well within its acceptance range.<br><br>**A second PT was successfully analyzed for this matrix.** |

| CORRECTIVE ACTION ID# & PE FAILURE | DISPOSITION |
|---|---|
| **CARR140825-902**<br>For Failures of RAD-98 for Strontium-89 in Water | **Root Cause Analysis of Strontium-89 (Sr-89)**<br>After a review of the data, an apparent reason for this discrepancy could not be determined. The following steps were taken to prove that this high bias was an isolated occurrence and that our overall process is within control.<br>1. The batch quality control samples were reviewed and found to be compliant. The LCS recovered at 103%.<br>2. Laboratory control data were also reviewed for trends. None was noted.<br>3. The instrument calibrations were reviewed for positive biases that could have attributed to this failure. None were noted.<br>4. Sample duplicates were also prepared and counted along with the reported result. All results fell within the method's acceptance range for duplicates.<br>**Permanent Corrective/Preventive Actions or Improvements:**<br>The laboratory must assume an unidentified random error caused the high bias for this batch. While the LCS recovered outside to its acceptance range, the matrix spike (MS) recovery fell within both the acceptance range for the MS (80%-120%) and the acceptance range for the LCS (90%-110%). The result was also confirmed using Method LAB PBMS-A-004. The lab will continue to monitor the recoveries of this radionuclide to ensure that there are no issues.<br>**A second PT was successfully analyzed for this matrix.** |

**ATTACHMENT 3**

**SEDIMENT DOSE CALCULATIONS**

## Sediment Sample Results

Sediment samples were collected from two locations in 2014 and analyzed for gamma radionuclides. Although Cesium-137 has been detected in previous years prior to 2013, all gamma radionuclides from 2014 samples were below detectable limits. These results are consistent with 2013 results where all gamma radionuclides were also below detectable limits. Therefore, ANO operations had no significant impact on the environment or public by this waterborne pathway.

In previous reports, ANO has included annual maximum dose calculations to the skin and total body. However since gamma radionuclides were below detectable limits, no calculation is being provided since there is no associated dose.