Ameren MISSOURI

Callaway Plant

April 27, 2017

ULNRC-06367

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

40 CFR 190
10 CFR 72.44(d)

Ladies and Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
RENEWED FACILITY OPERATING LICENSE NPF-30
2016 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

Please find enclosed the 2016 Annual Radiological Environmental Operating Report for Callaway Plant. This report is submitted in accordance with Section 5.6.2 of the Callaway Plant Technical Specifications and Appendix B to the Callaway Plant Operating License.

This letter does not contain new commitments.

If there are any questions, please contact Johann S. Geyer at (314) 225-1589

Sincerely,

Johann S. Geyer
Director, Radiation Protection

JPK

Enclosure

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AMEREN MISSOURI
CALLAWAY ENERGY CENTER
FULTON, MISSOURI

Docket Numbers 50-483 and 72-1045

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

to

THE UNITED STATES NUCLEAR REGULATORY COMMISSION

Part I

January 1 to December 31, 2016

Prepared by

ENVIRONMENTAL, Inc.
Midwest Laboratory
and
Ameren Missouri
Callaway Energy Center

Submitted by

UNION ELECTRIC CO.
dba Ameren Missouri

Project No. 8036

PREFACE

This Annual Radiological Environmental Operating Report (AREOR) describes the Ameren Missouri Callaway Energy Center Radiological Environmental Monitoring Program (REMP), and the program results for the calendar year 2016. It is submitted in accordance with section 5.6.2 of the Callaway Energy Center Technical Specifications.

Staff members of the Environmental, Inc., Midwest Laboratory were responsible for the acquisition of data presented in this report. Environmental samples were collected by Ameren Missouri personnel or contractors to Ameren Missouri and shipped to Environmental, Inc. – Midwest Laboratory and Stanford Dosimetry, LLC, for analysis.

The report was prepared by Environmental, Inc., Midwest Laboratory and the Ameren Missouri Callaway Energy Center.

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1.0 INTRODUCTION

This report presents an analysis of the results of the Radiological Environmental Monitoring Program (REMP) conducted during 2016 for the Union Electric Company (dba Ameren Missouri) Callaway Energy Center.

The objectives of the REMP are to monitor potential critical pathways of radioactive effluent to man and determine the radiological impact on the environment caused by operation of the Callaway Energy Center. The Radiological Environmental Monitoring Program was initiated in April 1982.

The Callaway Energy Center consists of one 3565 MWt pressurized water reactor, which achieved initial criticality on October 2, 1984. The plant is located on a plateau approximately ten miles southeast of the City of Fulton in Callaway County, Missouri and approximately eighty miles west of the St. Louis metropolitan area. The Missouri River flows by the site in an easterly direction approximately five miles south of the site at its closest point.

Tabulation of the individual analyses for the year 2016 is included in Part II of this report.

2.0 SUMMARY

The Radiological Environmental Monitoring Program, as required by the U.S. Nuclear Regulatory Commission (NRC) Technical Specifications for the Callaway Energy Center is described herein. Results for the year 2016 are summarized and discussed.

For the year, the Callaway Energy Center was operated in compliance with Offsite Dose Calculation Manual (ODCM) and Radiological Effluent Controls (REC) requirements. Results from the REMP indicate the Callaway Energy Center has had no significant radiological impact on the health and safety of the public or on the environment.

3.0 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

3.1 Program Design and Data Interpretation

The purpose of the Radiological Environmental Monitoring Program at the Callaway Energy Center is to assess the impact of the plant on its environment. For this purpose, samples are collected from waterborne, airborne, ingestion and terrestrial pathways and analyzed for radioactive content. Direct radiation levels are monitored by thermoluminescent dosimeters (TLDs).

Sources of environmental radiation can include the following:

(1) Natural background radiation arising from cosmic rays and primordial radionuclides;
(2) Fallout from atmospheric nuclear detonations;
(3) Releases from nuclear power plants, planned or accidental; and
(4) Industrial and medical radioactive waste.

Effects due to operation of the Callaway Energy Center must be distinguished from those due to other sources in interpreting the data.

The indicator-control concept is a major interpretive aid; where feasible the design of the Callaway Energy Center program has both indicator and control stations. Most types of samples are collected at indicator locations (nearby, downwind, or downstream) and at control locations (distant, upwind, or upstream). A station effect would be indicated if the radiation level at an indicator location was significantly larger than that at the control location. The difference would have to be greater than could be accounted for by typical fluctuations in radiation levels arising from other sources.

The monitoring program includes analyses for iodine-131, a fission product, and tritium, which is produced by cosmic rays, atmospheric nuclear detonations, and also by nuclear power plants. Most samples are analyzed for gamma-emitting isotopes, with results for the following groups quantified: zirconium-95, cesium-137, and cerium-144. These three gamma-emitting isotopes are selected as radiological impact indicators because of the different characteristic proportions in which they appear in the fission product mix produced by a nuclear reactor and that produced by a nuclear detonation. Each of the three isotopes is produced in roughly equivalent amounts by a reactor: each constitutes about 10% of the total activity of fission products ten days after reactor shutdown. On the other hand, ten days after a nuclear explosion, the contributions of zirconium-95, cerium-144, and cesium-137 to the activity of the resulting debris are in the approximate ratio 4:1:0.03 (Eisenbud,1963).

The other group quantified consists of niobium-95, ruthenium-103 and -106, cesium-134, barium-lanthanum-140, and cerium-141. These isotopes are released in small quantities by nuclear power plants, but to date their major source of injection into the general environment has been atmospheric nuclear testing. Nuclides of the next group, manganese-54, cobalt-58 and-60, and zinc-65, are activation products and arise from activation of corrosion products. They are typical components of nuclear power plant effluents, but are not produced in significant quantities by nuclear detonation.

Nuclides of the final group, beryllium-7, which is of cosmogenic origin, and potassium-40, a naturally-occurring isotope, were chosen as analytical monitors and should not be considered radiological impact indicators.

Other means of distinguishing sources of environmental radiation can be employed in interpreting the data. Current radiation levels can be compared with previous levels, including pre-operational data. Results of the monitoring program can be related to those obtained in other parts of the world. Finally, results can be related to events known to cause elevated levels of radiation in the environment, e.g., a nuclear accident.

3.2 Program Description

The sampling and analysis schedules for the environmental radiological monitoring program at the Callaway Energy Center are summarized in Tables 5.1 and 5.2 and briefly reviewed below. Table 5.1 identifies sampling locations and specifies as to type (indicator or control) and its distance, and direction relative to the reactor site. The types of samples collected at each location, required analyses and the frequency of collections are presented in Table 5.2.

To monitor the air environment, airborne particulate and airborne iodine samples are collected by continuous pumping, at five locations. The airborne particulates are collected on glass fiber filters and the airborne iodine through activated charcoal cartridges. Both filters and cartridges are exchanged weekly. Airborne particulates are analyzed for gamma-emitting isotopes. Charcoal cartridges are analyzed for iodine-131.

The ingestion pathway is monitored by sampling of milk (if available), fish and green leafy vegetation.

Milk samples are collected semimonthly when animals are on pasture and monthly the rest of the year. There were no milk indicator stations identified by the Land Use Census for the subject year. The control station continued to be collected. Samples are analyzed for iodine-131 and gamma-emitting isotopes.

Monthly during the growing season, edible green leafy vegetation is collected from both indicator and control locations. Vegetation samples typically consist of mustard greens, turnip greens, cabbage, lettuce, collards, radish greens, Swiss chard, broccoli and poke. Other edible broad leaf vegetation is collected if primary varieties are not available. The samples are analyzed for iodine-131 and other gamma-emitting isotopes.

Feed crops (soybeans, sorghum, corn) are collected from locations FC-1 through FC-4. FC-1, FC-2 and FC-3 are located on Ameren property traversed by the discharge pipeline. The samples are collected at harvest and analyzed for tritium and gamma emitting isotopes. FC-4 is a control location, beyond the influence of plant operations. Feed crops are grown for animal feed and not for human consumption. The soybean field for sample FC-1 is planted by the Missouri State Department of Conservation (MODOC) to provide feed to wildlife living in the Reform Wildlife Conservation Area. MODOC did not plant the field this year and there was no crop to sample.

The waterborne pathway is monitored by sampling surface water, groundwater and drinking water, and bottom and shoreline sediments. Water samples are analyzed for tritium and gamma-emitting isotopes, and sediments are analyzed for gamma-emitting isotopes.

The waterborne pathway is also monitored by upstream and downstream semiannual collections of fish. The five most abundant recreational or commercial fish species are collected. Samples are analyzed for gamma-emitting isotopes.

Monthly composite samples of surface water from the Missouri River are collected from one indicator location (S02) and from one control location (S01). The surface water samples are composites of daily collections by automatic river samplers.

Onsite surface water from ten ponds is analyzed for tritium and gamma-emitting isotopes. The collection frequencies are either semiannually or quarterly.

To monitor possible sources of ground water contamination due to plant operations, non-potable ground water was collected monthly or quarterly from well locations both onsite and along the discharge pipeline. The samples were analyzed for tritium and gamma-emitting isotopes.

Potable well water samples are collected quarterly from the plant drinking water supply, neighboring property owners, and from the town of Portland, MO. The samples were analyzed for tritium and gamma-emitting isotopes.

3.2 Program Description(continued)

River bottom sediment is collected semiannually at the plant's intake (A) and discharge (C). The samples are taken from water at least 2 meters deep to prevent influence of bank erosion. Shoreline sediments are collected semiannually in the same area as bottom sediment. These samples are collected within two feet of the edge of the water. The samples are analyzed for gamma-emitting isotopes.

The direct ambient gamma radiation pathway is also considered. This exposure is monitored by thermoluminescent dosimeters (TLDs) at forty-eight locations in and around the Callaway site. The TLDs are placed in 16 sectors around the plant as specified in the ODCM-RECS. Five of the TLD stations have neutron monitoring capability and three locations are designated as controls. TLDs are exchanged and analyzed quarterly.

Soil is collected annually from seven indicator locations (F2, PR3, F6, PR7, W2, W3, and W4) and two control locations (M9, W1) to monitor the terrestrial environment. The samples are analyzed for gamma-emitting isotopes.

3.3 Program Execution

The program was executed as described in the preceding section with the following exceptions.

(1) Surface Water:

The sampler at S01 was out of service 8 days; the sampler at S02 was out-of service 32 days.

(2) Ground Water:

No groundwater was available from location 937B for the 1/14/16 scheduled collection due to construction in the area limiting safe access to the well.

(3) Drinking Water:

No drinking water sample was available at location DWA-05 for the 2/2/16 scheduled collection. The provider residence was unoccupied on the scheduled collection date. The new owner subsequently joined program.

(4) Broadleaf Vegetation:

Edible broadleaf vegetation, collected at the four area gardens was available for harvest from May through October, 2016 with the following exceptions: Location V-9 was unavailable in May (CR201604623) and August (Conditions too wet for planting CR201606827). Locations V-11 and V-16 started producing in May but were done producing in September. See Table 5.5.

The growing season is defined as April 1 through November 1 (ref: Hammer, Gregory R.). A vegetation sample unavailable after October 31 is not considered a missed sample.

(5) Inedible Crops:

Inedible crops were not collected at location FC-1 during the 2016 collection due to the field not being planted.(CR201607652)

(6) Direct Radiation:

The second quarter TLD at location IDM-33 was found missing (CR201606360).

3.3 Program Execution (continued)

(7) Airborne Particulates and Iodine.

Air sample station B-3 was permanently shut down on 12/28/16 and the sampling equipment was relocated to new location A-10. The program had one less than the required number of air sampling stations during this seven day transitional period. (CR201700071).

3.4 Laboratory Procedures

The iodine-131 analyses in milk were made using a sensitive radiochemical procedure involving separation of the iodine by ion-exchange, solvent extraction and subsequent beta counting.

Gamma-spectroscopic analyses were performed with HPGe detectors. Levels of iodine-131 in vegetation and concentrations of airborne iodine-131 in charcoal samples were also determined by gamma spectroscopy.

Tritium was measured by liquid scintillation.

Analytical Procedures used by Environmental, Inc. are on file at the laboratory and are available for inspection. Procedures are based on those prescribed by the Health and Safety Laboratory of the U.S. Dep't of Energy, Edition 28, 1997, U.S. Environmental Protection Agency for Measurement of Radioactivity in Drinking Water, 1980, and the U.S. Environmental Protection Agency, EERF, Radiochemical Procedures Manual, 1984.

Environmental, Inc., Midwest Laboratory has a comprehensive quality control/quality assurance program designed to assure the reliability of data obtained. Details of the QA Program are presented elsewhere (Environmental, Inc., Midwest Laboratory, 2012). The QA Program includes participation in Interlaboratory Comparison (crosscheck) Programs. Results obtained through Quality control samples and crosscheck program results are presented in Appendix A.

Environmental TLDs are processed by Stanford Dosimetry, LLC.

3.5 Program Modifications

The drinking water sample at location CA-DWA-05 was added back into the program. This location was previously deleted when the property was sold and left vacant for several months. The location was added back to the program after the new owners were located and agreed to participate in the sampling program (CR201601894).

Leafy green vegetables at location CA-FPL-V-17 were deleted from the program when the provider decided to discontinue broadleaf vegetation in his garden. Location CA-FPL-V-11 previously designated as a backup sample was re-designated as a primary sample and an ODCM required sample(CR201601894)

Air sampler station CA-APT/AIO-B3 was deleted and air sampler stations CA-APT/AIO-A10 and CA-APT/AIO-A11 were added as a result of the re-evaluation of long-term dispersion parameters. Refer to HPCI 1506, “Evaluation of Air Sampler Locations with Respect to the Recalculated Dispersion Parameters”.

A neutron sensitive TLD was added to the program at location IDM-60N which is collocated with TLD IDM-60. (CR201604129).

3.6 Detection and Reporting Limits

Table 5.3 gives the minimum required detection limits for radiological environmental sample analysis. For each sample type, the table lists the detection level for each isotope. The lower limit of detection (LLD) used in this report is described in NRC Regulatory Guide 4.1 Rev. 1, "Program for Monitoring Radioactivity in the Environs of Nuclear Power Plants" and the NRC Radiological Assessment Branch Technical Position, Rev. 1, November 1979, "An Acceptable Radiological Environmental Monitoring Program".

3.7 Land Use Census

The Land Use Census is performed annually during the growing season. In 2016, the survey was conducted within a five mile canvassing radius of the Callaway Energy Center. The location of the nearest resident, nearest milk animal, and nearest garden of greater than 50 square meters producing broadleaf vegetation was identified by aerial photography and by contacting residents by phone, mail and/or in field surveys for each of the sixteen meteorological sectors using the midpoint of the two units. Residences in the vicinity of the plant were surveyed in person and by telephone.

The field inspection of the sectors was conducted on September 23, 2016. The results of the census are presented in Table 5.4. The table includes radial direction and distance from the Callaway Energy Center for each location, determined by a Global Positioning System (GPS) receiver.

No new well water sources were identified along the Callaway Energy Center pipeline corridor. No irrigation uses of the Missouri River, within 10 miles downstream, were identified during the survey. The Missouri Department of Natural Resources confirmed that no new drinking water intakes have been located along the Missouri River within ten (10) river miles downstream from the plant.

4.0 RESULTS AND DISCUSSION

All collections and analyses were made as scheduled, except for the listing in Table 5.5.

Results are summarized in Table 5.6 as recommended by the Nuclear Regulatory Commission. For each type of analysis and sample medium, the table lists the mean and range of all indicator and control locations, as well as that location with the highest mean and range.

The tabulated results of all measurements are not included in this section, although references to these results will be made in the discussion. A complete tabulation of results for 2016 is contained in Part II of the Annual Report on the Radiological Environmental Monitoring Program for the Callaway Energy Center.

4.1 Atmospheric Nuclear Detonations and Nuclear Accidents

The Fukushima Daiichi nuclear accident occurred March 11, 2011. There were no reported accidents involving significant release to the environment at nuclear reactor facilities in 2016. The last reported atmospheric test was conducted on October 16, 1980 by the People's Republic of China. There were no reported atmospheric nuclear tests in 2016.

4.2 Program Findings

Airborne Particulates and Iodine

No gamma emitting isotopes were identified other than naturally occurring Be-7.

There was no I-131 activity detected in any of the charcoal canister samples.

Air sampling for 2016 indicates no radiological effects of plant operation.

Direct Radiation (TLDs)

Forty-three gamma sensitive TLDs were placed in 16 sectors around the Callaway site. Measurements from forty indicator locations averaged 15.6 mrem/quarter and the three control locations averaged 14.8 mrem/quarter. Readings ranged from 11.1 to 18.7 mrem /quarter, with the highest from the indicator location CA-IDM-11A, averaging 17.7 mrem/quarter. The differences are statistically insignificant. The TLD readings were consistent with the results for the years 2000 through 2015 as detailed in table 5.7.

Four neutron sensitive TLDs were placed in locations at the Site Boundary closest to the Independent Spent Fuel Storage Facility Installation (ISFSI) and at a control location approximately 14 miles from the site. There was no measureable neutron dose and there was no effect from the ISFSI.

Milk

There are no milk indicator stations. No iodine-131 was detected in samples from the control station. No gamma-emitting isotopes, with the exception of naturally occurring potassium-40, were detected in milk. Milk data for 2016 show no radiological effects of plant operation.

Broadleaf Vegetation

There was no I-131 activity detected in broadleaf vegetation samples. No gamma-emitting isotopes were detected in broadleaf vegetation samples excepting naturally occurring potassium-40. Vegetation data for 2016 show no radiological effects of plant operation.

Non-Food Crops

Soybean samples were analyzed for tritium and gamma-emitting isotopes. No tritium activity was detected. No gamma-emitting isotopes, excepting naturally occurring potassium-40, were detected in non-food crops.

Fish

Edible portions of fish were analyzed by gamma spectroscopy. No gamma-emitting isotopes, excepting naturally occurring potassium-40, were detected in fish.

Soil

Cesium-137 activity was detected at thirteen of the eighteen sample locations at an average concentration of 264 pCi/kg dry. 306 pCi/kg dry was the average activity for the ten of fourteen positive indicator locations and 108 pCi/kg dry was the average activity for the three of four positive control locations. The cesium-137 activity is consistent with levels observed from 1999 through 2015; these levels are attributable to the deposition of fallout from previous decades.

Surface Water

Low level tritium was detected in two of the twelve samples collected at the downstream location S02 at an average concentration of 304 pCi/L. There was no tritium detected in the remaining ten samples from S02. No gamma-emitting isotopes were detected.

Surface Water, Ponds

Eighteen pond samples were analyzed for 2016. No tritium activity or gamma activity was detected.

Drinking Water Wells (potable water)

Quarterly samples from fourteen locations were analyzed for tritium and gamma-emitting isotopes. No tritium or gamma-emitting isotopes were detected.

Wells and Ponds (non-potable water)

Groundwater samples from deep wells F-05 and F-15 were analyzed for tritium and gamma-emitting isotopes. There were no tritium or gamma emitting isotopes detected.

Wells MW-31, MW-34, MW-36, MW-39, MW-47, MW-58, and MW-59 were installed during the 2014 LSI (the 2014 LSI is described in detail in the Callaway Energy Center 2014 Annual Radioactive Effluents Release Report). These wells continue to monitor the natural attenuation of tritium which decreased significantly during 2015 and continued to decrease in 2016. Tritium activity was detected in 20 of 29 samples from these wells. The highest concentration was measured in MW-31 which peaked at 4,448 pCi/L in October. By years end, the concentration in MW-31 had fallen to 1,944 pCi/L. The average concentration among positive results for these wells was 1,072 pCi/L. The contamination is being remediated by monitored natural attenuation. There are no active leaks.

Wells GWS, 936, 937B, 937D, 939R, 940, 941 and IFSFI Sump are located in the Plant Protected Area, adjacent to the power block. Tritium activity in these wells is believed to be the result of washout from gaseous effluents. The low level tritium activity observed in wells MW-014, MW-018 and MW-019 is due to residual low level contamination from moisture carryover during normal operation of air release valves (ARVs) in manholes 5 and 6B on the now-retired discharge pipeline. The pipeline was replaced in 2008 and there has been no new contamination of this area since then. The existing contamination is being remediated by monitored natural attenuation. There are no active leaks and the results are consistent with 2015..

Sediments

Samples of shoreline and bottom sediments were analyzed for gamma-emitting isotopes. Cesium-137 was detected in one of the two bottom sediment control samples at a concentration of 74 pCi/kg dry weight, but measured below detection limits at both of the samples from the indicator location. Cesium-137 was also detected in one of the two shoreline sediment indicator samples at a measured concentration of 87 pCi/kg dry weight. These results are consistent with results from previous years. There were no other gamma-emitting isotopes excepting naturally occurring potassium-40 in any of the sediment samples.

5.0 TABLES

Table 5.1. Sampling Locations. (TLD's)

Location Code	Distance / Direction [1]	Description	Sample Types [2]
1a	10.8 mi. 310° NW	City of Fulton on Hwy Z, 0.65 mi. E of Bus. 54, W of Campus Apartments.	IDM
3	1.2 mi. 308° NW	0.1 mi. West of Hwy CC on Gravel Rd., 0.8 mi. South Hwy O, Pole No. 18559.	IDM
5	1.3 mi. 79° ENE	Primary Meteorological Tower.	IDM
6	2.0 mi. 274° W	Cty Rd. 428, 1.2 mi. West of Hwy CC, Utility Pole No. 18609.	IDM
7	1.4 mi. 184° S	Cty Rd. 459, 2.6 mi. North of Hwy 94, Utility Pole No. 35097.	IDM
9	3.8 mi. 183° S	NW Side of the Cty Rd. 459 and Hwy 94 Junction, Utility Pole No. 06754.	IDM
10	3.9 mi. 159° SSE	Hwy 94, 1.8 mi. East of Cty Rd. 459, Utility Pole No. 12182.	IDM
11a	4.7 mi. 139° SE	City of Portland, Utility Pole No. 12110.	IDM
14	4.9 mi. 122° ESE	SE Side of Intersection D and 94, Utility Pole No. 11940.	IDM
17	3.8 mi. 88° E	Cty Rd. 4053, 0.3 mi. E of Hwy 94, Kingdom Telephone Co., Pole No. 3X12.	IDM
18a	3.7 mi. 67° ENE	East side of Hwy D, 0.5 mi. South of O, Utility Pole No. 38579.	IDM
20	4.7 mi. 46° NE	City of Readsville, Utility Pole No. 12830.	IDM
21	3.8 mi. 23° NNE	Cty Rd. 155, 1.9 mi. North of Hwy O, Utility Pole No. 19100.	IDM
22a	0.9 mi. 10° NNE	North side of Hwy O, 100 feet East of Cty Rd. 150, Utility Pole No. 31094.	IDM
23	6.6 mi. 15° NNE	City of Yucatan, Utility Pole No. 12670.	IDM
26 [3]	11.7 mi. 82° E	Town of Americus, Utility Pole No. 11159.	IDM
27 [3]	9.3 mi. 114° ESE	Town of Bluffton, Utility Pole No. 11496.	IDM
30a	4.4 mi. 206° SSW	City of Steedman, Utility Pole No. 06557.	IDM
31a	7.8 mi. 224° SW	City of Mokane, Hwy C and Cty Rd. 400, 0.9 mi. N. of Hwy 94, Utility Pole.52071	IDM
32	5.4 mi. 250° WSW	Hwy VV, 0.6 mi.West of Cty Rd. 447, Utility Pole No. 27031.	IDM
32a	5.0 mi. 243° WSW	Cty Rd. 447, Utility Pole No. 06357.	IDM
33	7.4 mi. 272° W	City of Hams Prairie, SE of Hwy C and AD Junction.	IDM
34	9.5 mi. 292° WNW	NE Side of Hwy C and Cty Rd. 408 Junction.	IDM
35	5.8 mi. 340° NNW	City of Toledo, Utility Pole No. 17684.	IDM
36	4.9 mi. 7° N	Cty Rd. 155, 0.8 mi. South of Cty Rd. 132, Utility Pole No. 19137	IDM
37	0.5 mi. 195° SSW	Cty Rd. 459, 0.9 mi. South of Hwy CC, Utility Pole No. 35077.	IDM
38	4.6 mi. 334° NNW	Cty Rd. 133, 1.5 mi. South of Hwy UU, Utility Pole No. 34708.	IDM
39	5.4 mi. 312° NW	Cty Rd. 111, Utility Pole No. 17516.	IDM
39a	5.0 mi. 308° NW	Cty Rd. 111, Utility Pole No. 17526.	IDM
40	4.2 mi. 292° WNW	NE Side of Cty Rd. 112 and Hwy O, Utility Pole No. 18145.	IDM
41	4.9 mi. 277° W	Hwy AD, 2.8 mi. East of Hwy C, Utility Pole No. 18239.	IDM
42	4.4 mi. 231° SW	Cty Rd. 447, 2.6 mi. North of Cty Rd. 463, Utility Pole No. 06326.	IDM
43	0.5 mi. 223° SW	Cty Rd. 459, 0.7 mi. South of Hwy CC, Utility Pole No. 35073.	IDM
44	1.7 mi. 254° WSW	Hwy CC, 1.0 mi. South of Cty Rd. 459, Utility Pole No. 1877.	IDM
45	1.0 mi. 285° WNW	Cty Rd. 428, 0.1 mi. West of Hwy CC, Utility Pole No. 18580.	IDM
46	1.5 mi. 328° NNW	NE Side of Hwy CC and Cty Rd. 466 Intersection, Utility Pole No. 28242.	IDM
47	1.0 mi. 10° N	Cty Rd. 448, 0.9 mi. South of Hwy O, Utility Pole No. 28151.	IDM
48	0.4 mi. NE	Cty Rd. 448, 1.5 mi. South of Hwy O, Plant Security Sign Post.	IDM
49	1.6 mi. 94° E	Cty Rd. 448, Utility Pole No. 06959, Reform Wildlife Mgmt. Parking Area.	IDM
50	0.9 mi. 168° SSE	Cty Rd. 459, 3.3 mi. North of Hwy 94, Utility Pole No. 35086	IDM
51a	0.3 mi. 150° SE	Owner Control Fence, SE of the Water Treatment Plant.	IDM
52	0.4 mi. 111° ESE	Light Pole Near the East Plant Security Fence.	IDM
60 [3]	13.5 mi. 224° SW	Utility Pole No. 43744, just past Tebbetts City sign.	IDM

Table 5.1. Sampling Locations. (TLD's, continued)

Location Code	Distance / Direction [1]	Description	Sample Types [2]
60N [3]	13.5 mi 224 º SW	Co-located with location with IDM-60.	IDM
61N	1.9 mi 334 º NNW	Corner of CC and O.	IDM
62N	1.2 mi. 308 º NW	Co-located with location 3	IDM
63N	0.9 mi. 10 º NNE	Co-located with location 22a	IDM
64N	1.0 mi. 285 º WNW	Co-located with location 45	IDM

Table 5.1. Sampling Locations (Airborne Radioiodine and Particulate samples, Surface Ponds, Potable Water)

A1	1.3 mi. 79 º ENE	Primary Meteorological Tower.	APT, AIO
A7	9.5 mi. 312 º NW	C. Bartley Farm, Fulton, MO.	APT, AIO
A8	0.9 mi. 10 º NNE	Cty Rd. 448, 0.9 miles South of Hwy 0.	APT, AIO
A9	1.9 mi. 334 º NNW	Community of Reform.	APT, AIO
B3	1.8 mi. 341 º NNW	0.3 mi. East of the O and CC Junction, Utility Pole No. 50422.	APT, AIO
3	2.9 mi. 168 º	Potable water, County Road 448	DWA
4	2.6 mi. 158 º	Potable water, County Road 448	DWA
5	2.5 mi. 153 º	Potable water, County Road 448	DWA
6	2.2 mi. 141 º	Potable water, County Road 448	DWA
7	2.1 mi. 108 º	Potable water, County Road 448	DWA
8	3.4 mi. 193 º	Potable water, County Road 457	DWA
9	2.9 mi. 204 º	Potable water, County Road 457	DWA
10	2.7 mi. 208 º	Potable water, County Road 457	DWA
12	3.6 mi. 165 º	Potable water, County Road 464	DWA
21	2.4 mi. 120 º	Potable water, County Road 469	DWA
22	2.4 mi. 140 º	Potable water, State Road 94	DWA
V16	1.64 mi. 255 º WSW	Wallendorf Farm, Steedman, MO	DWA
D01	5.0 mi. 136 º	Potable water, Riverside Bar and Grill (Portland, MO).	DWA
PW1	Inside OCA	Potable water, Unit 1 Construction well #3 open from 400'-1400'	DWA
Pond 01	0.6 mi. 264 º	Fishing Pond	SWA
Pond 02	0.7 mi. 232 º	Fishing Pond	SWA
Outfall 010	0.6 mi. 42 º	Stormwater Run-Off Pond	SWA
Outfall 011	1.0 mi. 60 º	Stormwater Run-Off Pond	SWA
Outfall 012	0.5 mi. 178 º	Stormwater Run-Off Pond	SWA
Outfall 013	0.5 mi. 189 º	Stormwater Run-Off Pond	SWA
Outfall 014	0.6 mi. 343 º	Stormwater Run-Off Pond	SWA
Outfall 015	0.7 mi. 4 º	Stormwater Run-Off Pond	SWA
Sludge Lagoon, # 4	0.8 mi. 153 º	On service Sewage Sludge Lagoon	SWA
S01 [3]	4.8 mi. 150 º SSE	555 feet Upstream of Discharge North Bank	SWA
S02	4.9 mi. 138 º SE	1.1 River Miles Downstream of Discharge North Bank	SWA

Table 5.1. Sampling Locations, Non-potable Groundwater Wells

Location Code	Distance / Direction [1]	Description	Sample Types [2]
936	Inside OCA	Diesel Fuel Remediation Well, NW of SFSB	WWA
937B	Inside OCA	Monitoring Well, West of the Turbine Bldg.	WWA
937D	Inside OCA	Monitoring Well, North of Discharge Monitor Tanks.	WWA
939R	Inside OCA	Monitoring Well, East of the Fuel Bldg.	WWA
940	Inside OCA	Monitoring Well, West of the Radwaste Bldg.	WWA
941	Inside OCA	Monitoring Well, West of the Radwaste Bldg.	WWA
GWS	Inside OCA	Ground Water Sump, West of Reactor Bldg and SFSB	WWA
ISFSI	Inside OCA	ISFSI Sump	WWA
U1MW-001	0.3 mi. 334°	Outside OCA , Groundwater Monitoring Well	WWA
U1MW-002	0.4 mi. 206°	Outside OCA , Groundwater Monitoring Well	WWA
U1MW-004	3.7 mi. 165°	Dillon, Groundwater Monitoring Well	WWA
U1MW-005	3.8 mi. 160°	Brownlee / Hudson, Groundwater Monitoring Well	WWA
U1MW-006	3.0 mi. 171°	Ward, Groundwater Monitoring Well	WWA
U1MW-010	3.1 mi. 173°	Pipeline, Groundwater Monitoring Well	WWA
U1MW-012	3.0 mi. 172°	Ward, Groundwater Monitoring Well	WWA
U1MW-013	0.8 mi. 159°	Pipeline Corridor	WWA
U1MW-014	3.7 mi. 171°	Pipeline Corridor	WWA
U1MW-015	3.9 mi. 162°	Pipeline Corridor	WWA
U1MW-016	4.5 mi. 151°	Pipeline Corridor	WWA
U1MW-018	3.75 mi. 172°	Pipeline Corridor	WWA
U1MW-019	3.71 mi.172°	Pipeline Corridor	WWA
U1MW-020	3.88 mi.164°	Pipeline Corridor	WWA
U1MW-031	0.2 mi. ENE	~1m from manhole 86-2	WWA
U1MW-034	0.2 mi. E	~130m from manhole 86-2	WWA
U1MW-036	0.3 mi. ESE	~300m from manhole 86-2	WWA
U1MW-039	0.6 mi. SSE	~1100m from manhole 86-2	WWA
U1MW-047	4.6 mi. SSE	Upstream side of HDPE Gate Valve Vault inside HDPE pipeline bedding	WWA
U1MW-058	0.3 mi. SE	~400m from manhole 86-2	WWA
U1MW-059	1.0 mi. SSE	~1700m from MH86-2	WWA
Inside Old BDL	1.4 mi. SSE	Sampled through hole in Techite blowdown line	WWA
U2 MW 2S	1.8 mi. 5°	Groundwater Monitoring Well	WWA
U2 MW 5S	1.1 mi. 261°	Groundwater Monitoring Well	WWA
U2 MW 8	0.4 mi. 12°	Groundwater Monitoring Well	WWA
U2 MW 10	0.4 mi. 163°	Groundwater Monitoring Well	WWA
U2 MW 16	2.9 mi. 203°	Groundwater Monitoring Well	WWA
F05	0.9 mi. 169°	Groundwater Monitoring Well	WWA
F15	0.4 mi. 29°	Groundwater Monitoring Well	WWA

Table 5.1. Sampling Locations, Soil, Food Products, Milk, Fish, Bottom Sediments and Inedible Crops.

Location Code	Distance / Direction [1]	Description	Sample Types [2]
F2	1.0 mi. 235 º SW	Callaway Plant Forest Ecology Plot F2.	SOL
F6	1.6 mi. 51 º NE	Callaway Plant Forest Ecology Plot F6.	SOL
PR3	0.95 mi. 108 º ESE	Callaway Plant Forest Ecology Plot PR3.	SOL
PR7	0.5 mi. 320 º NNW	Callaway Plant Forest Ecology Plot PR7.	SOL
W1 [3]	0.52 mi. 150 º SE	Callaway Plant Wetlands, High Ground.	SOL
W2	0.52 mi. 149 º SSE	Callaway Plant Wetlands, Inlet Area.	SOL
W3	0.65 mi. 152 º SSE	Callaway Plant Wetlands, Discharge Area.	SOL
W4	0.63 mi. 155 º SSE	Callaway Plant Wetlands, SW Bank.	SOL
M9 [3]	13 mi. 228 º SW	Ferguson Farm, Tebbetts, MO.	SOL
V9	1.9 mi. 294 º WNW	Meehan Farm, Steedman, MO	FPL
V11	3.2 mi. 325 º NW	Hickman Farm, Steedman, MO	FPL
V12 [3]	18.7 mi. 255 º WSW	Kissock Farm, South of New Bloomfield, MO	FPL
V16	1.6 mi. 255 º WSW	Wallendorf Farm, Steedman, MO	FPL
M9 [3]	13 mi. 228 º SW	Ferguson Farm, Tebbetts, MO.	MLK
A [3,4]		Between 0.6 and 10.0 river miles upstream of the plant discharge.	AQF
A [3,]		Upstream of the plant intake.	AQS
C [4]		Downstream,of the plant discharge, between the confluence of the Missouri River and Logan Creek(longitude -91.7365º and the Portland boat ramp)..	AQF
C		Vicinity of Portland – north bank	AQS
FC1	3.4 mi. S	Between discharge pipeline MH-8 and the Katy Trail	FC
FC2	3.8 mi. ESE	Between discharge pipeline MH-5 and MH-3B.	FC
FC3	4.1 mi. SSE	Between Hwy 94 and the barge loading dock access road.	FC
FC4 [3]	7.9 mi. SW	South Callaway High School	FC

[1] Distances are measured from the midpoint of the two reactors as described in Final Safety Analysis Report (FSAR) Sec. 2.1.1.1.

[2] AIO = Air Iodine, APT = Air Particulate, AQF = Fish, AQS = Sediment, FPL = Leafy Green Vegetables, FC = Food Crops, IDM = TLD, MLK = Milk, SOL = Soil, SWA = Surface Water, DWA = Drinking Water, WWA = Ground Water.

[3] Control Location.

[4] The expanded collection areas provide sufficient habitat to collect the required number of species.

Table 5.2. Collection Frequencies and Required Analyses [1] (January 1 through December 31, 2016)

Sample Type	Media Code	Collection Frequency	Required Analyses
Direct radiation	IDM	Quarterly	Deep Dose Equivalent (DDE)
Airborne iodine	AIO	Weekly	^{131}I
Air particulate	APT	Weekly	PGE[5] each sample
Surface water (river)	SWA	Monthly composite	PGE and ^{3}H
Surface water (except UHS & Unit 2 ponds)	SWA	Semiannually	PGE and ^{3}H. If contaminated with gamma emitting nuclides of plant origin, analyze for HTD[6] nuclides.
Surface water (UHS and Unit 2 ponds)	SWA	Semiannually	PGE and ^{3}H
Groundwater (not potable)	WWA	Quarterly	PGE and ^{3}H. If contaminated with gamma emitting nuclides of plant origin, analyze for HTD nuclides.
Well water-potable	DWA	Monthly	PGE and ^{3}H. If contaminated with gamma emitting nuclides of plant origin, analyze for HTD nuclides.
Shoreline sediment	AQS	Semiannually	PGE
Bottom sediment [2]	AQS	Semiannually	PGE
Sludge pond sediment	SOL	Annually	PGE
Soil	SOL	Annually	PGE
Milk animal	MLK	Semimonthly when animals are on pasture, monthly other times [3]	PGE and ^{131}I
Leafy green vegetables	FPL	Monthly when available [4]	PGE and ^{131}I
Inedible crops	FC	At time of harvest	PGE and ^{3}H
Fish	AQF	Semiannually	PGE on edible portion

[1] Samples required by ODCM unless specified otherwise.

[2] Required by NPDES permit.

[3] The grazing season is defined as April 15- December 15, but will vary according to weather conditions.

[4] The growing season is defined as the months April 1- November 1, but will vary according to weather conditions.

[5] Principal Gamma Emitters (PGE) are defined as ^{54}Mn, ^{59}Fe, ^{58}Co, ^{60}Co, ^{65}Zn, ^{95}Zr/Nb, ^{134}Cs, ^{137}Cs, ^{140}Ba/La and other gamma- emitting nuclides that may be identified during the gamma spectroscopy analysis.

[6] Hard to Detect (HTD) nuclides are defined as ^{89}Sr, ^{90}Sr, ^{55}Fe, ^{63}Ni, ^{237}Np, ^{238}Pu, $^{239/240}$Pu, ^{241}Pu, ^{241}Am, ^{242}Cm and $^{243/244}$Cm.

Table 5.3. Minimum Required Detection Capabilities for REMP Sample Analysis[1]

Analysis	Water (pCi/L)	Airborne (pCi/m^3)	Fish (pCi/kg wet)	Milk (pCi/L)	Food Products (pCi/kg wet)	Non-Food Products (pCi/kg wet)	Soil and Sediment (pCi/kg dry)
H-3	3000/2000[3]					3000	
Mn-54	15		130				
Fe-59	30		260				
Co-58/60	15		130				
Zn-65	30		260				
Zr-Nb-95 [2]	15						
I-131	1000/1[3]	0.07		1	60		
Cs-134	15	0.05	130	15	60	60	150
Cs-137	18	0.06	150	18	80	80	180
Ba-La-140 [2]	15			15			

[1] This list does not mean only these nuclides will be detected and reported. Other peaks which are measurable and identifiable will be reported.

[2] Total activity, parent plus daughter activity.

[3] LLDs for Surface and Drinking / Ground water are the same, with the exception of H-3 and I-131. The Drinking / Ground water LLDs for H-3 and I-131 are 2000 and 1 pCi/liter respectively.

Table 5.4 2016 Land Use Census Results

Closest Receptor in Miles

Sector	Residence	Garden [1, 2]	Milk [1]
N(A)	1.84	NI	NI
NNE(B)	2.16	NI	NI
NE(C)	2.26	NI	NI
ENE(D)	1.66	2.86	NI
E(E)	3.51	3.94	NI
ESE(F)	2.11	4.33	NI
SE(G)	3.64	NI	NI
SSE(H)	3.17	3.57	NI
S(J)	2.86	2.86	NI
SSW(K)	2.38	NI	NI
SW(L)	2.63	2.63	NI
WSW(M)	1.20	1.96	3.23*
W(N)	1.56	3.55	NI
WNW(P)	1.93	1.93	NI
NW(Q)	2.07	3.16	NI
NNW(R)	1.81	NI	NI

[1] NI = None Identified.
[2] Broadleaf Vegetation
* Declined to participate in the program.

Table 5.5. Missed collections and analyses, Callaway Energy Center

Sample Type	Analysis	Location(s)	Collection Date or Period	Comments
WWA	H-3, Gamma	WWA-937B	01-14-16	Construction in area. Not safely accessible.
DW	H-3, Gamma	CA-DWA-5	02-02-16	Property unoccupied at this time.
VE	Gamma	CA-FPL-V-9	05-09-16	Vegetables not available at this time.
IDM	Gamma	CA-IDM-33	06-30-16	TLD missing in field.
VE	Gamma	CA-FPL-V-9	08-09-16	Vegetables not available at this time.
FC	Gamma	CA-FC-1	09-12-16	Field not planted.
AIO	I-131	CA-AIO-B-3	12-28-16-1-05-17	Air station permanently shut down and moved to new location A-10.
APT	Gamma	CA-APT-B-3	12-28-16-01-05-17	Air station permanently shut down and moved to new location A-10.

Table 5.6 Radiological Environmental Monitoring Program Summary

Sample Type (Units)	Type and Number of Analyses(a)		Req'd LLD(b)	Indicator Locations Mean, Fraction, Range (c)	Location with Highest Annual Mean		Control Locations Mean, Fraction, Range (c)	Number Non-Routine Results(e)
					Location (d)	Mean, Fraction, Range (c)		
Waterborne Pathway								
Surface Water (pCi/L)	H-3	24	3000	304 (2/12) (283-324)	SWA-S02 4.9 mi SE	304 (2/12) (283-324)	ND	0
	GS	24	(b)	ND	-	-	ND	0
Surface Water, Ponds (pCi/L)	H-3	18	3000	ND			none	0
	GS	18	(b)	ND	-	-	ND	0
Potable Wells (pCi/L)	H-3	55	2000	ND	-	-	ND	0
	GS	55	(b)	ND	-	-	ND	0
Wells (non-potable) (pCi/L)	H-3	204	3000	533 (63/204) (181-4448)	CA-U1MW-31	1747 (5/5) (680-4448)	None	0
	GS	140	(b)	ND	-	-	ND	0
Sediments (pCi/kg) dry	Cs-134	8	150	ND	-	-	ND	0
	Cs-137	8	180	80 (2/4) (74-87)	CA-AQS-C 4.9 mi SE	80 (2/4) (74-87)	ND	0
Airborne Pathway								
Airborne Particulates (pCi/m^3)	GS	260	(b)	ND	-	-	None	0
Airborne Iodine (pCi/m^3)	I-131	260	0.07	ND	-	-	None	0
Soil								
Soil (pCi/kg) dry	Cs-134	18	150	ND	-	-	ND	0
	Cs-137	18	180	306 (10/14) (116-576)	F-002 1.0 mi. SW	501 (2/2) (425-576)	108 (3/4) (56-184)	0

Table 5.6 Radiological Environmental Monitoring Program Summary

Sample Type (Units)	Type and Number of Analyses(a)		Req'd LLD(b)	Indicator Locations Mean, Fraction, Range (c)	Location with Highest Annual Mean		Control Locations Mean, Fraction, Range (c)	Number Non-Routine Results(e)
					Location (d)	Mean, Fraction, Range (c)		
Ingestion Pathway								
Food Products Leafy Green Vegetables (pCi/kg wet)	GS	42	(b)	ND	-	-	ND	0
Non- food Products Soybeans (pCi/kg) wet	H-3 (f)	7	3000	ND	-	-	ND	0
	GS	7	(b)	ND	-	-	ND	0
Fish Edible Flesh (pCi/kg) wet	GS	20	(b)	ND	-	-	ND	0
Milk (pCi/L)	I-131	20	1	none	-	-	ND	0
	GS	20	(b)	ND	-	-	ND	0
Direct Radiation								
(Quarterly TLDs) (mrem/Qtr)	Gamma	171		15.6 (159/159) (11.1-18.7)	CA-IDM-11A, 4.7 mi. SE	17.7 (4/4) (16.3-18.7)	14.8 (12/12) (11.1-18.3)	0
	Neutron	20			-	-	ND	0

(a) GS = gamma spectroscopy.
(b) LLD = nominal lower limit of detection based on a 4.66 sigma counting error for background sample. LLD's for gamma spectroscopy are in Table 5.3.
(c) Mean and range are based on detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses (F). ND= not detected.
(d) Locations are specified by station code (Table 5.2) and distance (miles) and direction 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) Units: pCi/L.

Table 5.7 Direct Radiation Dose (mrem/91 days) for the Period 2000-2015

Station Code	Mean	3σ	Mean + 3σ	Max
CA-IDM-1A	16.0	3.0	19.0	18.0
CA-IDM-3	17.0	3.0	20.0	20.0
CA-IDM-5	14.4	2.9	17.3	17.1
CA-IDM-6	16.6	3.5	20.0	19.0
CA-IDM-7	16.3	3.3	19.5	19.0
CA-IDM-9	15.1	2.6	17.7	17.0
CA-IDM-10	17.1	2.8	19.9	19.3
CA-IDM-11A	17.2	2.7	19.9	19.3
CA-IDM-14	15.9	3.0	18.9	18.7
CA-IDM-17	16.2	3.1	19.3	18.3
CA-IDM-18A	16.2	5.1	21.3	18.9
CA-IDM-20	16.6	3.1	19.7	19.3
CA-IDM-21	16.5	3.4	20.0	19.0
CA-IDM-22A	14.9	4.7	19.7	18.0
CA-IDM-23	16.6	2.9	19.5	19.0
CA-IDM-26(C)	11.4	2.4	13.8	13.1
CA-IDM-27(C)	17.2	2.9	20.2	20.0
CA-IDM-30A	15.7	2.8	18.6	18.2
CA-IDM-31A	17.0	2.8	19.9	19.0
CA-IDM-32	16.7	2.9	19.6	19.0
CA-IDM-32A	16.3	4.0	20.3	20.0
CA-IDM-33	16.0	2.9	18.9	18.0
CA-IDM-34	15.4	3.1	18.5	18.0
CA-IDM-35	14.9	2.7	17.6	17.3
CA-IDM-36	15.7	3.3	19.0	18.7
CA-IDM-37	15.9	2.9	18.8	18.0
CA-IDM-38	11.5	2.4	13.8	13.9
CA-IDM-39	16.0	3.1	19.1	19.0
CA-IDM-39A	16.7	2.9	19.5	19.0
CA-IDM-40	17.2	3.0	20.2	19.2
CA-IDM-41	15.9	3.1	19.0	19.0
CA-IDM-42	13.7	2.6	16.3	15.6
CA-IDM-43	16.1	2.9	19.0	18.7
CA-IDM-44	16.4	3.1	19.6	19.0
CA-IDM-45	14.9	3.3	18.2	20.0
CA-IDM-46	16.5	2.9	19.4	19.9
CA-IDM-47	15.8	2.7	18.5	18.0
CA-IDM-48	16.7	2.8	19.5	19.0
CA-IDM-49	15.6	2.7	18.3	18.0
CA-IDM-50	16.3	2.9	19.3	20.0
CA-IDM-51A	17.1	2.8	20.0	19.8
CA-IDM-52	16.9	2.6	19.4	19.1
CA-IDM-60(C)	16.2	2.4	18.6	18.0

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APPENDIX A

INTERLABORATORY COMPARISON PROGRAM RESULTS

NOTE: Environmental Inc., Midwest Laboratory participates in intercomparison studies administered by Environmental Resources Associates, and serves as a replacement for studies conducted previously by the U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada. Results are reported in Appendix A. TLD Intercomparison results, in-house spikes, blanks, duplicates and mixed analyte performance evaluation program results are also reported. Appendix A is updated four times a year; the complete Appendix is included in March, June, September and December monthly progress reports only.

January, 2016 through December, 2016

Appendix A

Interlaboratory Comparison Program Results

Environmental, Inc., Midwest Laboratory has participated in interlaboratory comparison (crosscheck) programs since the formulation of it's quality control program in December 1971. These programs are operated by agencies which supply environmental type samples containing concentrations of radionuclides known to the issuing agency but not to participant laboratories. The purpose of such a program is to provide an independent check on a laboratory's analytical procedures and to alert it of any possible problems.

Participant laboratories measure the concentration of specified radionuclides and report them to the issuing agency. Several months later, the agency reports the known values to the participant laboratories and specifies control limits. Results consistently higher or lower than the known values or outside the control limits indicate a need to check the instruments or procedures used.

Results in Table A-1 were obtained through participation in the RAD PT Study Proficiency Testing Program administered by Environmental Resources Associates, serving as a replacement for studies conducted previously by the U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada.

Table A-2 lists results for thermoluminescent dosimeters (TLDs), via irradiation and evaluation by the University of Wisconsin-Madison Radiation Calibration Laboratory at the University of Wisconsin Medical Radiation Research Center.

Table A-3 lists results of the analyses on in-house "spiked" samples for the past twelve months. All samples are prepared using NIST traceable sources. Data for previous years available upon request.

Table A-4 lists results of the analyses on in-house "blank" samples for the past twelve months. Data for previous years available upon request.

Table A-5 lists REMP specific analytical results from the in-house "duplicate" program for the past twelve months. Acceptance is based on the difference of the results being less than the sum of the errors. Complete analytical data for duplicate analyses is available upon request.

The results in Table A-6 were obtained through participation in the Mixed Analyte Performance Evaluation Program.

Results in Table A-7 were obtained through participation in the MRAD PT Study Proficiency Testing Program administered by Environmental Resources Associates, serving as a replacement for studies conducted previously by the Environmental Measurement Laboratory Quality Assessment Program (EML).

Attachment A lists the laboratory precision at the 1 sigma level for various analyses. The acceptance criteria in Table A-3 is set at ± 2 sigma.

Out-of-limit results are explained directly below the result.

Attachment A

ACCEPTANCE CRITERIA FOR "SPIKED" SAMPLES

LABORATORY PRECISION: ONE STANDARD DEVIATION VALUES FOR VARIOUS ANALYSES[a]

Analysis	Level	One standard deviation for single determination
Gamma Emitters	5 to 100 pCi/liter or kg > 100 pCi/liter or kg	5.0 pCi/liter 5% of known value
Strontium-89[b]	5 to 50 pCi/liter or kg > 50 pCi/liter or kg	5.0 pCi/liter 10% of known value
Strontium-90[b]	2 to 30 pCi/liter or kg > 30 pCi/liter or kg	5.0 pCi/liter 10% of known value
Potassium-40	≥ 0.1 g/liter or kg	5% of known value
Gross alpha	≤ 20 pCi/liter > 20 pCi/liter	5.0 pCi/liter 25% of known value
Gross beta	≤ 100 pCi/liter > 100 pCi/liter	5.0 pCi/liter 5% of known value
Tritium	≤ 4,000 pCi/liter > 4,000 pCi/liter	$\pm 1\sigma$ = 169.85 x (known)$^{0.0933}$ 10% of known value
Radium-226,-228	≥ 0.1 pCi/liter	15% of known value
Plutonium	≥ 0.1 pCi/liter, gram, or sample	10% of known value
Iodine-131, Iodine-129[b]	≤ 55 pCi/liter > 55 pCi/liter	6 pCi/liter 10% of known value
Uranium-238, Nickel-63[b] Technetium-99[b]	≤ 35 pCi/liter > 35 pCi/liter	6 pCi/liter 15% of known value
Iron-55[b]	50 to 100 pCi/liter > 100 pCi/liter	10 pCi/liter 10% of known value
Other Analyses [b]	---	20% of known value

[a] From EPA publication, "Environmental Radioactivity Laboratory Intercomparison Studies Program", Fiscal Year, 1981-1982, EPA-600/4-81-004.

[b] Laboratory limit.

TABLE A-1. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)[a].
RAD study

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result	ERA Result	Control Limits	Acceptance
ERW-1392	4/4/2016	Sr-89	43.5 ± 4.3	48.2	37.8 - 55.6	Pass
ERW-1392	4/4/2016	Sr-90	27.5 ± 1.9	28.5	20.7 - 33.1	Pass
ERW-1394 [b]	4/4/2016	Ba-133	65.2 ± 3.8	58.8	48.7 - 64.9	Fail
ERW-1394 [c]	4/4/2016	Ba-133	57.8 ± 5.3	58.8	48.7 - 64.9	Pass
ERW-1394	4/4/2016	Cs-134	43.7 ± 3.0	43.3	34.6 - 47.6	Pass
ERW-1394	4/4/2016	Cs-137	86.1 ± 5.3	78.4	70.6 - 88.9	Pass
ERW-1394	4/4/2016	Co-60	108 ± 44	102	91.8 - 114	Pass
ERW-1394	4/4/2016	Zn-65	240 ± 13	214	193 - 251	Pass
ERW-1397	4/4/2016	Gr. Alpha	52.0 ± 2.2	62.7	32.9 - 77.8	Pass
ERW-1397	4/4/2016	Gr. Beta	33.9 ± 1.2	39.2	26.0 - 46.7	Pass
ERW-1400	4/4/2016	I-131	24.7 ± 0.6	26.6	22.1 - 31.3	Pass
ERW-1402	4/4/2016	Ra-226	15.6 ± 0.5	15.2	11.3 - 17.4	Pass
ERW-1402	4/4/2016	Ra-228	5.28 ± 0.76	5.19	3.12 - 6.93	Pass
ERW-1403	4/4/2016	Uranium	4.02 ± 0.42	4.64	3.39 - 5.68	Pass
ERW-1405	4/4/2016	H-3	8,150 ± 270	7,840	6,790 - 8,620	Pass
SPW-2845	7/7/2015	Ba-133	60.3 ± 5.7	64.7	53.9 - 71.2	Pass
SPW-2845	7/7/2015	Cs-134	48.8 ± 9.3	50.1	40.3 - 55.1	Pass
SPW-2845	7/7/2015	Cs-137	101 ± 8	89.8	80.8 - 101	Pass
SPW-2845	7/7/2015	Co-60	65.1 ± 5.8	59.9	53.9 - 68.4	Pass
SPW-2845	7/7/2015	Zn-65	288 ± 29	265	238 - 310	Pass
ERW-3485	7/11/2016	Sr-89	43.3 ± 6.5	53.3	42.3 - 60.9	Pass
ERW-3485	7/11/2016	Sr-90	39.0 ± 2.8	39.2	28.8 - 45.1	Pass
ERW-3487	7/11/2016	Ba-133	83.3 ± 4.9	82.9	69.7 - 91.2	Pass
ERW-3487	7/11/2016	Cs-134	62.5 ± 4.4	65.3	53.1 - 71.8	Pass
ERW-3487	7/11/2016	Cs-137	98.1 ± 5.6	95.2	85.7 - 107	Pass
ERW-3487	7/11/2016	Co-60	122 ± 5	117	105 - 131	Pass
ERW-3487	7/11/2016	Zn-65	124 ± 9	113	102 - 134	Pass
ERW-3490	7/11/2016	Gr. Alpha	46.6 ± 2.2	48.1	25.0 - 60.5	Pass
ERW-3490	7/11/2016	Gr. Beta	26.8 ± 1.1	28.6	18.2 - 36.4	Pass
ERW-3492	7/11/2016	I-131	23.7 ± 1.0	24.9	20.7 - 29.5	Pass
ERW-3493	7/11/2016	Ra-226	12.9 ± 0.4	12.3	9.2 - 14.2	Pass
ERW-3493	7/11/2016	Ra-228	5.8 ± 0.8	5.8	3.5 - 7.6	Pass
ERW-3493	7/11/2016	Uranium	32.8 ± 0.8	25.2	28.4 - 39.3	Pass
ERW-3495	7/11/2016	H-3	12,400 ± 334	12,400	10,800 - 13,600	Pass

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the crosscheck program for proficiency testing in drinking water conducted by Environmental Resources Associates (ERA).

[b] No reason determined for failure of Ba-133 result.

[c] The result of reanalysis (Compare to original result, footnoted "b" above).

TABLE A-2. Table has been intentionally omitted.

TABLE A-3. In-House "Spiked" Samples

Lab Code [b]	Date	Concentration [a] Analysis	Laboratory results 2s, n=1 [c]	Known Activity	Control Limits [d]	Acceptance
SPW-290	1/21/2016	Sr-90	38.6 ± 1.5	37.3	22.4 - 52.2	Pass
SPW-292	1/21/2016	Sr-90	35.8 ± 1.6	37.3	22.4 - 52.2	Pass
SPW-294	1/21/2016	C-14	4,689 ± 18	4,735	2,841 - 6,629	Pass
SPW-414	2/1/2016	Ra-228	18.4 ± 2.2	17.7	10.6 - 24.8	Pass
W-020416	2/4/2016	Gr. Alpha	20.8 ± 0.4	20.1	12.0 - 28.1	Pass
W-020416	2/4/2016	Gr. Beta	29.7 ± 0.3	28.9	17.3 - 40.4	Pass
W-021716	2/17/2016	Ra-226	17.9 ± 0.5	16.7	10.0 - 23.4	Pass
W-030716	3/7/2016	Gr. Alpha	16.3 ± 0.8	20.1	12.0 - 28.1	Pass
W-030716	3/7/2016	Gr. Beta	27.0 ± 0.7	28.9	17.3 - 40.4	Pass
SPDW-70046	3/29/2016	Ra-226	13.4 ± 0.4	16.7	10.0 - 23.4	Pass
SPW-1163	3/22/2016	Ra-228	4.2 ± 0.7	4.4	2.6 - 6.2	Pass
SPW-1235	3/29/2016	Gr. Alpha	21.0 ± 0.4	20.1	12.0 - 28.1	Pass
SPW-1235	3/29/2016	Gr. Beta	29.4 ± 0.3	28.9	17.3 - 40.4	Pass
SPW-1739	4/21/2016	Ra-228	16.2 ± 2.0	17.7	10.6 - 24.8	Pass
SPW-2052	4/21/2016	Ra-226	16.0 ± 0.5	16.7	10.0 - 23.4	Pass
W-042616	4/21/2016	Fe-55	1,519 ± 61	1,482	889 - 2,075	Pass
SPW-1823	4/23/2016	Gr. Alpha	21.0 ± 0.4	20.1	12.0 - 28.1	Pass
SPW-1823	4/23/2016	Gr. Beta	26.6 ± 0.3	28.9	17.3 - 40.4	Pass
SPW-1998	4/29/2016	Cs-134	35.9 ± 6.0	36.2	21.7 - 50.6	Pass
SPW-1998	4/29/2016	Cs-137	82.5 ± 7.6	71.9	43.1 - 100.6	Pass
SPW-2097	5/3/2016	H-3	3,349 ± 184	3,280	1,968 - 4,592	Pass
SPW-2132	5/4/2016	H-3	3,174 ± 178	3,280	1,968 - 4,592	Pass
SPW-2229	5/7/2016	H-3	3,182 ± 179	3,280	1,968 - 4,592	Pass
SPW-2313	5/13/2016	H-3	3,183 ± 179	3,280	1,968 - 4,592	Pass
SPW-2341	5/13/2016	H-3	3,201 ± 178	3,280	1,968 - 4,592	Pass
SPW-2374	5/14/2016	H-3	3,037 ± 175	3,280	1,968 - 4,592	Pass
SPW-2411	5/17/2016	Sr-90	37.3 ± 1.6	37.3	22.4 - 52.2	Pass
SPW-2455	5/19/2016	Gr. Alpha	19.3 ± 0.4	20.1	12.0 - 28.1	Pass
SPW-2455	5/19/2016	Gr. Beta	28.6 ± 0.3	28.9	17.3 - 40.4	Pass
SPW-2457	5/19/2016	U-238	48.2 ± 2.4	41.7	25.0 - 58.4	Pass
SPW-2504	5/20/2016	H-3	3,181 ± 178	3,280	1,968 - 4,592	Pass
SPW-2528	5/23/2016	H-3	2,998 ± 175	3,280	1,968 - 4,592	Pass
SPW-2566	5/24/2016	Gr. Alpha	19.8 ± 0.5	20.1	12.0 - 28.1	Pass
SPW-2566	5/24/2016	Gr. Beta	30.4 ± 0.3	28.9	17.3 - 40.4	Pass
W-053116	4/29/2016	Cs-134	34.0 ± 5.0	36.2	21.7 - 50.6	Pass
W-053116	4/29/2016	Cs-137	78.8 ± 7.0	71.9	43.1 - 100.6	Pass
SPW-2704	6/1/2016	Sr-90	38.0 ± 1.6	37.3	22.4 - 52.2	Pass
SPW-2719	6/2/2016	Ra-228	18.1 ± 2.1	17.7	10.6 - 24.8	Pass
SPW-2749	6/3/2016	H-3	3,197 ± 180	3,280	1,968 - 4,592	Pass
SPW-2843	6/7/2016	H-3	3,133 ± 179	3,280	1,968 - 4,592	Pass
SPW-3227	6/17/2016	Ra-226	18.6 ± 0.4	16.7	10.0 - 23.4	Pass
W-061716	4/29/2016	Cs-134	37.3 ± 8.2	36.2	21.7 - 50.6	Pass
W-061716	4/29/2016	Cs-137	79.7 ± 10.8	71.9	43.1 - 100.6	Pass
SPW-3240	6/28/2016	Gr. Alpha	25.3 ± 0.5	20.1	12.0 - 28.1	Pass
SPW-3240	6/28/2016	Gr. Beta	27.1 ± 0.3	28.9	17.3 - 40.4	Pass

TABLE A-3. In-House "Spiked" Samples

Lab Code [b]	Date	Concentration [a] Analysis	Laboratory results 2s, n=1 [c]	Known Activity	Control Limits [d]	Acceptance
SPW-3241	7/1/2016	H-3	8,821 ± 283	8,650	5,190 - 12,110	Pass
SPW-3309	7/1/2016	H-3	8,619 ± 278	8,650	5,190 - 12,110	Pass
SPW-3313	7/1/2016	Ra-228	16.6 ± 2.0	17.7	10.6 - 24.8	Pass
SPW-3328	7/6/2016	Sr-89	13.4 ± 9.2	14.8	8.9 - 20.7	Pass
SPW-3328	7/6/2016	Sr-90	12.3 ± 1.3	11.4	6.8 - 16.0	Pass
SPAP-3365	7/7/2016	Gr. Beta	39.7 ± 0.1	42.2	25.3 - 59.0	Pass
SPAP-3367	7/7/2016	Cs-134	1.2 ± 0.7	1.2	0.7 - 1.7	Pass
SPAP-3367	7/7/2016	Cs-137	94.4 ± 2.8	94.0	56.4 - 131.6	Pass
SPW-3370	7/7/2016	C-14	4,444 ± 17	4,735	2,841 - 6,629	Pass
SPW-3373	7/7/2016	Ni-63	446 ± 5	401	241 - 561	Pass
SPW-3375	7/7/2016	Tc-99	545 ± 9	539	324 - 755	Pass
SPW-3519	7/14/2016	H-3	8,621 ± 279	8650	5,190 - 12,110	Pass
SPW-3688	6/29/2016	Ra-226	17.5 ± 0.4	16.7	10.0 - 23.4	Pass
SPW-3711	7/20/2016	H-3	44,368 ± 612	43,766	26,260 - 61,273	Pass
SPW-3774	7/22/2016	H-3	45,259 ± 619	43,766	26,260 - 61,273	Pass
SPW-3776	7/22/2016	Gr. Alpha	23.3 ± 0.5	20.1	12.0 - 28.1	Pass
SPW-3776	7/22/2016	Gr. Beta	27.5 ± 0.3	28.9	17.3 - 40.4	Pass
SPW-3884	7/26/2016	H-3	45,850 ± 623	43,766	26,260 - 61,273	Pass
SPW-3950	7/28/2016	Ra-228	17.8 ± 1.8	16.7	10 - 23	Pass
SPW-3982	7/29/2016	H-3	45,273 ± 619	43,766	26,260 - 61,273	Pass
W-073016	4/29/2016	Cs-134	36.5 ± 6.1	36.2	21.7 - 50.6	Pass
W-073016	4/29/2016	Cs-137	80.6 ± 7.5	71.9	43.1 - 100.6	Pass
SPW-4134	8/4/2016	Ra-228	5.5 ± 0.8	6.7	4.0 - 9.3	Pass
SPW-4340	8/17/2016	Ra-228	19.9 ± 2.0	16.7	10.0 - 23.4	Pass
SPW-4386	7/15/2016	Ra-226	18.0 ± 0.4	16.7	10.0 - 23.4	Pass
W-082716	4/29/2016	Ra-228	32.5 ± 5.2	36.2	21.7 - 50.6	Pass
W-082716	4/29/2016	Ra-226	78.5 ± 8.3	71.9	43.1 - 100.6	Pass
SPW-4642	9/6/2016	U-238	45.8 ± 2.5	41.7	25.0 - 58.4	Pass
SPW-4999	9/26/2016	Sr-90	35.1 ± 2.2	36.8	22.1 - 51.5	Pass
SPW-5091	9/12/2016	Ra-226	18.2 ± 0.4	16.7	10.0 - 23.4	Pass
W-092716	4/29/2016	Cs-134	37.3 ± 11.8	36.2	21.7 - 50.6	Pass
W-092716	4/29/2016	Cs-137	78.3 ± 11.2	71.9	43.1 - 100.6	Pass
SPW-5165	9/30/2016	Gr. Alpha	22.2 ± 0.4	20.1	12.0 - 28.1	Pass
SPW-5165	9/30/2016	Gr. Beta	27.2 ± 0.3	28.9	17.3 - 40.4	Pass
SPW-5426	9/28/2016	Ra-226	18.2 ± 0.4	16.7	10.0 - 23.4	Pass
SPW-5510	10/18/2016	H-3	44,398 ± 618	43,766	26,260 - 61273	Pass
SPW-5553	10/19/2016	U-238	50.0 ± 2.6	41.7	25.0 - 58.4	Pass
SPW-5555	10/19/2016	Ra-228	17.4 ± 1.9	16.7	10.0 - 23.4	Pass
SPW-5612	10/20/2016	H-3	44,681 ± 622	43,766	26,260 - 61,273	Pass
SPW-5741	10/25/2016	H-3	44,946 ± 624	43,766	26,260 - 61,273	Pass
SPU-5833	10/26/2016	H-3	10,018 ± 946	8,622	5,173 - 12,071	Pass
SPW-5862	10/28/2016	H-3	18,061 ± 374	17,244	10,346 - 24,141	Pass
W-103116	4/29/2016	Cs-134	36.0 ± 4.6	36.2	21.7 - 50.6	Pass
W-103116	4/29/2016	Cs-137	81.1 ± 7.3	71.9	43.1 - 100.6	Pass

TABLE A-3. In-House "Spiked" Samples

Lab Code [b]	Date	Concentration [a] Analysis	Laboratory results 2s, n=1 [c]	Known Activity	Control Limits [d]	Acceptance
SPW-5984	11/2/2016	H-3	17,727 ± 399	17,244	10,346 - 24,141	Pass
SPW-6008	11/4/2016	H-3	17,854 ± 402	17,244	10,346 - 24,141	Pass
SPW-6124	11/8/2016	Ra-228	14.4 ± 1.9	16.0	9.6 - 22.4	Pass
SPW-6132	11/9/2016	H-3	18,135 ± 374	17,243	10,346 - 24,140	Pass
SPW-6135	10/12/2016	Ra-226	18.9 ± 0.4	16.7	10.0 - 23.4	Pass
SPW-6146	11/10/2016	H-3	17,488 ± 398	17,243	10,346 - 24,140	Pass
SPW-6222	11/12/2016	H-3	17,787 ± 408	17,243	10,346 - 24,140	Pass
SPW-6318	11/16/2016	H-3	17,379 ± 408	17,243	10,346 - 24,140	Pass
SPW-6349	11/17/2016	H-3	17,893 ± 371	17,243	10,346 - 24,140	Pass
SPW-6424	11/19/2016	H-3	18,258 ± 379	17,243	10,346 - 24,140	Pass
W-112616	4/29/2016	Cs-134	35.0 ± 6.0	36.2	21.7 - 50.6	Pass
W-112616	4/29/2016	Cs-137	75.0 ± 7.1	71.9	43.1 - 100.6	Pass
SPW-6456	11/28/2016	Sr-90	41.9 ± 2.5	36.8	22.1 - 51.5	Pass
SPW-6486	11/30/2016	Sr-90	35.6 ± 2.2	36.6	21.9 - 51.2	Pass
SPW-6490	11/29/2016	Ra-226	18.8 ± 0.4	16.7	10.0 - 23.4	Pass
SPW-6519	11/30/2016	Ni-63	438 ± 4	400	240 - 560	Pass
SPW-6527	12/1/2016	U-238	49.5 ± 2.5	41.7	25.0 - 58.4	Pass
SPW-6616	12/3/2016	H-3	18,018 ± 374	17,243	10,346 - 24,140	Pass
SPW-6669	12/5/2016	H-3	18,237 ± 377	17,243	10,346 - 24,140	Pass
SPW-6735	12/9/2016	H-3	17,939 ± 396	17,243	10,346 - 24,140	Pass
SPW-6880	12/21/2016	H-3	17,835 ± 396	17,243	10,346 - 24,140	Pass
SPW-6947	12/22/2016	Ni-63	450 ± 4	400	240 - 560	Pass
W-122316	4/29/2016	Cs-134	36.0 ± 2.2	36.2	21.7 - 50.6	Pass
W-122316	4/29/2016	Cs-134	76.1 ± 2.9	71.9	43.1 - 100.6	Pass
SPW-6948	12/30/2016	H-3	17,999 ± 398	17,243	10,346 - 24,140	Pass
SPW-6974	12/29/2016	Ra-226	17.6 ± 0.4	16.7	10.0 - 23.4	Pass

[a] Liquid sample results are reported in pCi/Liter, air filters (pCi/m3), charcoal (pCi/charcoal canister), and solid samples (pCi/kg).

[b] Laboratory codes : W (Water), MI (milk), AP (air filter), SO (soil), VE (vegetation), CH (charcoal canister), F (fish), U (urine).

[c] Results are based on single determinations.

[d] Control limits are established from the precision values listed in Attachment A of this report, adjusted to ± 2s.

NOTE: For fish, gelatin is used for the spike matrix. For vegetation, cabbage is used for the spike matrix.

TABLE A-4. In-House "Blank" Samples

Lab Code	Sample Type	Date	Analysis[b]	Concentration [a]		
				Laboratory results (4.66σ)		Acceptance
				LLD	Activity[c]	Criteria (4.66 σ)
SPW-289	Water	1/21/2016	Sr-90	0.55	0.28 ± 0.29	1
SPW-291	Water	1/21/2016	Sr-90	0.61	0.15 ± 0.30	1
SPW-293	Water	1/21/2016	C-14	147	-12 ± 89	200
SPW-413	Water	2/1/2016	Ra-228	0.86	1.86 ± 0.60	2
W-020416	Water	2/4/2016	Gr. Alpha	0.43	-0.17 ± 0.28	2
W-020416	Water	2/4/2016	Gr. Beta	0.73	0.36 ± 0.53	4
W-020916	Water	2/9/2016	Ra-226	0.02	0.01 ± 0.01	2
W-030716	Water	3/7/2016	Gr. Alpha	0.90	-0.36 ± 0.32	2
W-030716	Water	3/7/2016	Gr. Beta	1.59	-0.62 ± 0.71	4
SPDW-70045	Water	3/29/2016	Ra-226	0.03	0.01 ± 0.02	2
SPDW-1234	Water	3/30/2016	Gr. Alpha	0.44	-0.05 ± 0.30	2
SPDW-1234	Water	3/30/2016	Gr. Beta	0.79	-0.54 ± 0.54	4
SPW-1738	Water	4/21/2016	Ra-228	1.05	0.13 ± 0.50	2
SPW-1822	Water	4/23/2016	Gr. Alpha	0.50	-0.18 ± 0.33	2
SPW-1822	Water	4/23/2016	Gr. Beta	0.08	-0.35 ± 0.51	4
SPW-2051	Water	4/12/2016	Ra-226	0.02	0.03 ± 0.02	2
SPW-2069	Water	5/3/2016	I-131	0.15	0.06 ± 0.09	1
SPW-2133	Water	5/4/2016	H-3	148	55 ± 76	200
SPW-2230	Water	5/7/2016	H-3	149	-11 ± 73	200
SPW-2314	Water	5/13/2016	H-3	150	-29 ± 72	200
SPW-2342	Water	5/13/2016	H-3	143	50 ± 74	200
SPW-2364	Water	5/13/2016	I-131	0.22	-0.03 ± 0.12	1
SPW-2375	Water	5/14/2016	H-3	146	1 ± 70	200
SPW-2410	Water	5/17/2016	Sr-90	0.59	0.10 ± 0.29	1
SPW-2454	Water	5/19/2016	Gr. Alpha	0.47	-0.21 ± 0.31	2
SPW-2454	Water	5/19/2016	Gr. Beta	0.77	-0.49 ± 0.52	4
SPW-2456	Water	5/19/2016	U-238	0.15	0.00 ± 0.09	1
SPW-2485	Water	5/20/2016	I-131	0.18	-0.01 ± 0.10	1
SPW-2505	Water	5/20/2016	H-3	144	64 ± 75	200
SPW-2529	Water	5/23/2016	H-3	152	-3 ± 75	200
SPW-2530	Water	5/23/2016	Ra-228	0.96	-0.12 ± 0.43	2
SPW-2565	Water	5/24/2016	Gr. Alpha	0.47	0.03 ± 0.33	2
SPW-2565	Water	5/24/2016	Gr. Beta	0.77	-0.23 ± 0.53	4
SPW-2703	Water	6/1/2016	Sr-89	0.68	-0.13 ± 0.50	5
SPW-2703	Water	6/1/2016	Sr-90	0.55	0.11 ± 0.27	1
SPW-2718	Water	6/2/2016	Ra-228	0.67	0.23 ± 0.34	2
SPW-2720	Water	6/2/2016	I-131	0.16	0.01 ± 0.09	1
SPW-2750	Water	6/3/2016	H-3	151	-31 ± 73	200
SPW-2844	Water	6/7/2016	H-3	148	-55 ± 75	200
SPMI-2959	Milk	6/14/2016	I-131	0.16	0.09 ± 0.10	1
SPW-3137	Water	6/23/2016	I-131	0.15	-0.03 ± 0.08	1
SPW-3226	Water	6/17/2016	Ra-226	0.02	-0.01 ± 0.04	2
SPW-3239	Water	6/28/2016	Gr. Alpha	0.40	-0.15 ± 0.26	2
SPW-3239	Water	6/28/2016	Gr. Beta	0.73	0.14 ± 0.52	4
SPW-3687	Water	6/29/2016	Ra-226	0.04	0.03 ± 0.03	2

[a] Liquid sample results are reported in pCi/Liter, air filters (pCi/m^3), charcoal (pCi/charcoal canister), and solid samples (pCi/g).

[b] I-131(G); iodine-131 as analyzed by gamma spectroscopy.

[c] Activity reported is a net activity result.

TABLE A-4. In-House "Blank" Samples

Lab Code	Sample Type	Date	Analysis[b]	Concentration [a] Laboratory results (4.66σ) LLD	Activity[c]	Acceptance Criteria (4.66 σ)
SPW-3312	Water	7/1/2016	Ra-228	0.67	0.35 ± 0.35	2
SPW-3327	Water	7/6/2016	Sr-89	0.67	0.51 ± 0.51	5
SPW-3327	Water	7/6/2016	Sr-90	0.60	-0.14 ± 0.26	1
SPAP-3364	AP	7/7/2016	Gr.Beta	0.002	0.005 ± 0.001	0.01
SPW-3370	Water	7/7/2016	C-14	115	49 ± 71	200
SPW-3372	Water	7/7/2016	Ni-63	122	115 ± 76	200
SPW-3374	Water	7/7/2016	Tc-99	6.07	1.00 ± 3.70	10
SPW-3710	Water	7/20/2016	H-3	147	35 ± 75	200
SPW-3775	Water	7/22/2016	Gr. Alpha	0.73	0.41 ± 0.53	2
SPW-3775	Water	7/22/2016	Gr. Beta	0.45	-0.14 ± 0.30	4
SPW-3884	Water	7/26/2016	H-3	151	-1 ± 73	200
SPW-3949	Water	7/28/2016	Ra-228	0.76	0.32 ± 0.39	2
SPW-3982	Water	7/29/2016	H-3	145	49 ± 75	200
SPW-4133	Water	8/4/2016	Ra-228	0.80	0.26 ± 0.40	2
SPW-4257	Water	8/11/2016	I-131	0.17	-0.01 ± 0.10	1
SPW-4339	Water	8/17/2016	Ra-228	0.73	0.36 ± 0.39	2
SPW-4385	Water	7/15/2016	Ra-226	0.09	0.75 ± 0.09	2
SPW-4641	Water	9/6/2016	U-238	0.21	0.00 ± 0.13	1
SPW-4684	Water	9/8/2016	H-3	151	48 ± 78	200
SPW-4872	Water	9/16/2016	I-131	0.21	0.05 ± 0.11	1
SPW-4998	Water	9/26/2016	Sr-89	0.54	0.06 ± 0.39	5
SPW-4998	Water	9/26/2016	Sr-90	0.53	-0.03 ± 0.24	1
SPW-5090	Water	8/19/2016	Ra-226	0.03	0.03 ± 0.02	2
SPW-5164	Water	9/30/2016	Gr. Alpha	0.46	-0.05 ± 0.32	2
SPW-5164	Water	9/30/2016	Gr. Beta	0.74	-0.02 ± 0.52	4
SPW-5425	Water	9/28/2016	Ra-226	0.02	0.07 ± 0.05	2
SPW-5323	Water	10/7/2016	H-3	157	-12 ± 75	200
SPW-5552	Water	10/19/2016	U-238	0.18	0.00 ± 0.11	1
SPW-5554	Water	10/19/2016	Ra-228	0.72	0.22 ± 0.36	2
SPW-5611	Water	10/20/2016	H-3	153	67 ± 80	200
SPW-5613	Water	10/21/2016	Gr. Alpha	0.76	-0.55 ± 0.51	2
SPW-5613	Water	10/21/2016	Gr. Beta	0.42	0.02 ± 0.29	4
SPW-5740	Water	10/25/2016	H-3	154	-2 ± 72	200
SPW-5743	Water	10/25/2016	Sr-90	1.26	0.72 ± 0.67	1
SPW-5861	Water	10/28/2016	H-3	179	129 ± 91	200
SPW-5983	Water	11/2/2016	H-3	156	8 ± 78	200
SPW-6007	Water	11/4/2016	H-3	156	-34 ± 73	200
SPW-6131	Water	11/9/2016	H-3	180	80 ± 92	200
SPW-6134	Water	10/12/2016	Ra-226	0.05	-0.02 ± 0.12	2
SPW-6145	Water	11/10/2016	H-3	171	-46 ± 80	200
SPW-6317	Water	11/16/2016	H-3	180	-43 ± 82	200
SPW-6348	Water	11/17/2016	H-3	182	-45 ± 88	200
SPW-6423	Water	11/19/2016	H-3	181	8 ± 95	200
SPW-6455	Water	11/28/2016	Sr-89	0.58	-0.15 ± 0.46	5
SPW-6455	Water	11/28/2016	Sr-90	0.67	0.09 ± 0.32	1
SPW-6489	Water	11/29/2016	Ra-226	0.03	0.03 ± 0.02	2

[a] Liquid sample results are reported in pCi/Liter, air filters (pCi/m^3), charcoal (pCi/charcoal canister), and solid samples (pCi/g).

[b] I-131(G); iodine-131 as analyzed by gamma spectroscopy.

[c] Activity reported is a net activity result.

TABLE A-4. In-House "Blank" Samples

Lab Code	Sample Type	Date	Analysis[b]	Concentration [a]		
				Laboratory results (4.66σ)		Acceptance
				LLD	Activity[c]	Criteria (4.66 σ)
SPW-6529	Water	12/1/2016	I-131	0.18	-0.03 ± 0.10	1
SPW-6616	Water	12/3/2016	H-3	180	72 ± 92	200
SPW-6670	Water	12/5/2016	H-3	174	28 ± 92	200
SPW-6735	Water	12/9/2016	H-3	152	2 ± 73	200
SPW-6792	Water	12/15/2016	I-131	0.17	0.03 ± 0.12	1
SPW-6819	Water	12/16/2016	H-3	158	14 ± 77	200
SPW-6879	Water	12/21/2016	H-3	147	80 ± 75	200
SPW-6947	Water	12/22/2016	Ni-63	93	26 ± 57	200
SPW-6973	Water	12/29/2016	Ra-226	0.03	0.03 ± 0.02	2

[a] Liquid sample results are reported in pCi/Liter, air filters (pCi/m^3), charcoal (pCi/charcoal canister), and solid samples (pCi/g).

[b] I-131(G); iodine-131 as analyzed by gamma spectroscopy.

[c] Activity reported is a net activity result.

TABLE A-5. In-House "Duplicate" Samples

			Concentration [a]			
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
AP-010416	1/4/2016	Gr. Beta	0.044 ± 0.006	0.051 ± 0.006	0.047 ± 0.004	Pass
SPS-62, 63	1/7/2016	K-40	21.1 ± 1.9	21.2 ± 2.1	21.2 ± 1.4	Pass
WW-125, 126	1/7/2016	H-3	659 ± 102	748 ± 106	703 ± 74	Pass
SPS-199, 200	1/7/2016	Cs-137	0.09 ± 0.02	0.08 ± 0.03	0.08 ± 0.02	Pass
SPS-199, 200	1/7/2016	K-40	7.60 ± 0.60	8.62 ± 0.62	8.11 ± 0.43	Pass
AP-011116	1/11/2016	Gr. Beta	0.024 ± 0.005	0.027 ± 0.005	0.026 ± 0.003	Pass
AP-011216	1/12/2016	Gr. Beta	0.030 ± 0.004	0.034 ± 0.004	0.032 ± 0.003	Pass
WW-262, 263	1/14/2016	H-3	153 ± 78	141 ± 78	147 ± 55	Pass
WW-346, 347	1/14/2016	H-3	1,036 ± 117	959 ± 115	997 ± 82	Pass
WW-283, 284	1/18/2016	H-3	437 ± 92	427 ± 91	432 ± 65	Pass
AP-011916	1/19/2016	Gr. Beta	0.042 ± 0.005	0.037 ± 0.004	0.040 ± 0.003	Pass
AP-012016	1/20/2016	Gr. Beta	0.023 ± 0.003	0.030 ± 0.004	0.027 ± 0.002	Pass
AP-020116	2/1/2016	Gr. Beta	0.023 ± 0.005	0.023 ± 0.005	0.023 ± 0.004	Pass
SWU-472, 473	2/2/2016	Gr. Beta	4.37 ± 0.47	4.60 ± 0.49	4.49 ± 0.34	Pass
SG-493, 494	2/6/2016	Ac-228	2.10 ± 0.20	2.13 ± 0.20	2.12 ± 0.14	Pass
SG-493, 494	2/6/2016	K-40	5.79 ± 0.57	5.50 ± 0.69	5.65 ± 0.45	Pass
SG-493, 494	2/6/2016	Pb-214	1.84 ± 0.11	1.91 ± 0.11	1.88 ± 0.08	Pass
AP-020816	2/8/2016	Gr. Beta	0.020 ± 0.004	0.019 ± 0.004	0.020 ± 0.003	Pass
AP-020916	2/9/2016	Be-7	0.032 ± 0.005	0.041 ± 0.006	0.036 ± 0.004	Pass
SPS-619, 620	2/18/2016	K-40	20.0 ± 1.8	19.1 ± 1.6	19.5 ± 1.2	Pass
WW-640, 641	2/18/2016	H-3	90.1 ± 75.0	153.6 ± 78.4	121.8 ± 54.2	Pass
AP-021916	2/19/2016	Gr. Beta	0.021 ± 0.003	0.025 ± 0.004	0.023 ± 0.002	Pass
WW-822, 823	2/26/2016	H-3	2,770 ± 173	2,974 ± 178	2,872 ± 124	Pass
DW-70010, 70011	2/29/2016	Ra-226	4.88 ± 0.29	4.93 ± 0.28	4.91 ± 0.20	Pass
DW-70010, 70011	2/29/2016	Ra-228	3.00 ± 0.77	1.90 ± 0.62	2.45 ± 0.49	Pass
SW-934, 935	3/1/2016	Gr. Beta	0.94 ± 0.52	1.36 ± 0.60	1.15 ± 0.40	Pass
SPS-913, 914	3/3/2016	Cs-137	0.08 ± 0.03	0.10 ± 0.03	0.09 ± 0.02	Pass
SPS-913, 914	3/3/2016	K-40	17.45 ± 0.94	16.83 ± 0.95	17.14 ± 0.67	Pass
SPS-913, 914	3/3/2016	Ra-226	1.02 ± 0.08	1.13 ± 0.17	1.07 ± 0.09	Pass
SPS-913, 914	3/3/2016	Ra-228	1.09 ± 0.15	1.13 ± 0.17	1.11 ± 0.11	Pass
AP-030716	3/7/2016	Gr. Beta	0.018 ± 0.005	0.021 ± 0.005	0.019 ± 0.003	Pass
F-1303,1304	3/7/2016	K-40	3.320 ± 0.475	3.508 ± 0.396	3.414 ± 0.309	Pass
SG-976, 977	3/8/2016	Ra-226	6.75 ± 0.25	6.28 ± 0.22	6.52 ± 0.17	Pass
SG-976, 977	3/8/2016	Ra-228	9.21 ± 0.49	9.09 ± 0.49	9.15 ± 0.35	Pass
PM-1094, 1095	3/9/2016	K-40	14.01 ± 0.68	14.47 ± 0.72	14.24 ± 0.49	Pass
MI-1042,1043	3/7/2016	K-40	1,684 ± 124	1,804 ± 119	1,744 ± 86	Pass
DW-70023, 70024	3/7/2016	Ra-226	3.40 ± 0.43	2.68 ± 0.35	3.04 ± 0.28	Pass
DW-70023, 70024	3/7/2016	Ra-228	4.46 ± 0.83	5.74 ± 0.94	5.10 ± 0.63	Pass
DW-70014, 70015	3/7/2016	Gr. Alpha	13.38 ± 1.58	11.40 ± 1.43	12.39 ± 1.07	Pass
DW-70026, 70027	3/7/2016	Gr. Alpha	3.46 ± 0.79	3.08 ± 0.74	3.27 ± 0.54	Pass
DW-70038, 70039	3/8/2016	Gr. Alpha	1.14 ± 0.89	1.73 ± 0.95	1.44 ± 0.65	Pass
DW-70035, 70036	3/8/2016	Ra-226	0.47 ± 0.10	0.45 ± 0.09	0.46 ± 0.07	Pass
DW-70035, 70036	3/8/2016	Ra-228	0.56 ± 0.45	0.47 ± 0.44	0.52 ± 0.31	Pass
AP-031516	3/15/2016	Gr. Beta	0.014 ± 0.003	0.016 ± 0.004	0.015 ± 0.002	Pass
AP-032116	3/21/2016	Gr. Beta	0.014 ± 0.004	0.020 ± 0.004	0.017 ± 0.003	Pass
AP-1218,1219	3/24/2016	Be-7	0.135 ± 0.065	0.167 ± 0.081	0.151 ± 0.052	Pass
AP-1719,1720	3/28/2016	Be-7	0.075 ± 0.008	0.076 ± 0.007	0.076 ± 0.005	Pass
AP-033016	3/30/2016	Gr. Beta	0.023 ± 0.004	0.025 ± 0.004	0.024 ± 0.003	Pass
SPS-1260, 1261	3/30/2016	K-40	18.00 ± 1.92	19.67 ± 1.77	18.84 ± 1.30	Pass
XW-1467, 1468	3/30/2016	H-3	310 ± 87	295 ± 86	303 ± 61	Pass
XWW-1530, 1531	3/30/2016	H-3	198 ± 84	162 ± 82	180 ± 59	Pass
AP-1827, 1828	3/30/2016	Be-7	0.069 ± 0.011	0.072 ± 0.011	0.071 ± 0.008	Pass
AP-1323,1324	3/31/2016	Be-7	0.206 ± 0.120	0.197 ± 0.091	0.202 ± 0.076	Pass
LW-1446,1447	3/31/2016	Gr. Beta	2.36 ± 0.93	2.23 ± 1.01	2.29 ± 0.69	Pass

TABLE A-5. In-House "Duplicate" Samples

			Concentration [a]			
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
WW-1740,1741	4/2/2016	H-3	21,162 ± 120	21,091 ± 427	21,126 ± 222	Pass
SPS-1344, 1345	4/4/2016	K-40	17.98 ± 0.93	17.14 ± 0.96	17.56 ± 0.67	Pass
SPS-1344, 1345	4/4/2016	Pb-214	1.12 ± 0.09	1.04 ± 0.08	1.08 ± 0.06	Pass
SPS-1344, 1345	4/4/2016	Ac-228	1.23 ± 0.15	1.33 ± 0.19	1.28 ± 0.12	Pass
SPS-1344, 1345	4/4/2016	Cs-137	0.13 ± 0.03	0.13 ± 0.03	0.13 ± 0.02	Pass
P-1509,1510	4/8/2016	H-3	1,084 ± 120	1,038 ± 119	1,061 ± 85	Pass
AP-041116	4/11/2016	Gr. Beta	0.020 ± 0.004	0.019 ± 0.004	0.019 ± 0.003	Pass
SS-1551,1552	4/12/2016	Gr. Beta	8.71 ± 1.11	8.88 ± 1.13	8.80 ± 0.79	Pass
SS-1551,1552	4/12/2016	K-40	3.50 ± 0.25	3.06 ± 0.28	3.28 ± 0.19	Pass
SS-1551,1552	4/12/2016	Tl-208	0.05 ± 0.02	0.05 ± 0.02	0.05 ± 0.01	Pass
SS-1551,1552	4/12/2016	Bi-214	0.10 ± 0.02	0.09 ± 0.02	0.10 ± 0.02	Pass
SS-1551,1552	4/12/2016	Pb-212	0.13 ± 0.02	0.11 ± 0.02	0.12 ± 0.01	Pass
SS-1551,1552	4/12/2016	Ra-226	0.35 ± 0.17	0.30 ± 0.17	0.32 ± 0.12	Pass
SS-1551,1552	4/12/2016	Ac-228	0.16 ± 0.05	0.17 ± 0.05	0.17 ± 0.04	Pass
SS-1593,1594	4/12/2016	K-40	14.80 ± 0.73	14.89 ± 0.78	14.85 ± 0.53	Pass
WW-1677, 1678	4/14/2016	Ra-226	0.23 ± 0.13	0.35 ± 0.15	0.29 ± 0.10	Pass
WW-1783,1784	4/14/2016	H-3	768 ± 111	632 ± 107	700 ± 77	Pass
BS-1804,1805	4/18/2016	K-40	0.79 ± 0.02	0.87 ± 0.19	0.83 ± 0.10	Pass
WW-2021,2022	4/18/2016	H-3	5,548 ± 221	5,707 ± 224	5,627 ± 157	Pass
XWW-2240, 2241	4/18/2016	H-3	638 ± 104	543 ± 101	591 ± 72	Pass
XWW-2109, 2110	4/19/2016	H-3	3461 ± 185	3250 ± 180	3356 ± 129	Pass
SPS-2130, 2131	4/25/2016	K-40	7.80 ± 0.84	6.80 ± 0.60	7.30 ± 0.52	Pass
AP-042516	4/25/2016	Gr. Beta	0.020 ± 0.004	0.023 ± 0.004	0.022 ± 0.003	Pass
BS-2065, 2066	4/25/2016	K-40	14.40 ± 1.50	14.72 ± 1.19	14.56 ± 0.96	Pass
AP-042716	4/27/2016	Gr. Beta	0.023 ± 0.003	0.019 ± 0.003	0.021 ± 0.002	Pass
SPS-1999, 2000	4/28/2016	K-40	19.84 ± 1.76	18.963 ± 2.42	19.40 ± 1.50	Pass
SO-2153,2154	5/2/2016	K-40	21.80 ± 0.81	21.17 ± 0.85	21.48 ± 0.59	Pass
SO-2153,2154	5/2/2016	Cs-137	0.11 ± 0.03	0.11 ± 0.07	0.11 ± 0.04	Pass
SO-2153,2154	5/2/2016	Ra-226	1.50 ± 0.29	1.22 ± 0.29	1.36 ± 0.21	Pass
SO-2153,2154	5/2/2016	Pb-214	0.56 ± 0.06	0.57 ± 0.06	0.57 ± 0.04	Pass
W-2394,2395	5/5/2016	H-3	736 ± 106	631 ± 102	683 ± 74	Pass
VE-2284,2285	5/9/2016	K-40	3.50 ± 0.25	3.06 ± 0.28	3.28 ± 0.19	Pass
AP-051016	5/10/2016	Gr. Beta	0.020 ± 0.005	0.018 ± 0.005	0.019 ± 0.003	Pass
SG-2261, 2262	5/10/2016	Ac-228	34.4 ± 1.2	34.4 ± 1.4	34.4 ± 0.9	Pass
SG-2261, 2262	5/10/2016	Pb-214	29.5 ± 3.0	31.9 ± 3.3	30.7 ± 2.2	Pass
BS-2439, 2440	5/12/2016	K-40	9.96 ± 0.91	10.27 ± 0.76	10.11 ± 0.59	Pass
WW-2534,2535	5/16/2016	H-3	14,342 ± 354	14,613 ± 357	14,477 ± 252	Pass
AP-051716	5/17/2016	Gr. Beta	0.014 ± 0.004	0.015 ± 0.004	0.014 ± 0.003	Pass
SPS-2945, 2946	5/19/2016	K-40	30.71 ± 0.74	31.75 ± 0.78	31.23 ± 0.54	Pass
SPS-2945, 2946	5/19/2016	Be-7	1.55 ± 0.24	1.90 ± 0.35	1.73 ± 0.21	Pass
SPS-2578, 2579	5/24/2016	Pb-214	0.96 ± 0.12	0.80 ± 0.14	0.88 ± 0.09	Pass
AP-052516	5/25/2016	Gr. Beta	0.022 ± 0.004	0.022 ± 0.004	0.022 ± 0.003	Pass
G-2642,2643	5/26/2016	Be-7	0.443 ± 0.178	0.247 ± 0.247	0.345 ± 0.152	Pass
SO-2663, 2664	5/26/2016	Cs-137	0.08 ± 0.03	0.07 ± 0.03	0.07 ± 0.02	Pass
SO-2663, 2664	5/26/2016	K-40	12.44 ± 0.68	11.64 ± 0.63	12.04 ± 0.46	Pass
SO-2663, 2664	5/26/2016	Tl-208	0.13 ± 0.02	0.14 ± 0.03	0.14 ± 0.02	Pass
SO-2663, 2664	5/26/2016	Pb-212	0.43 ± 0.04	0.41 ± 0.04	0.42 ± 0.03	Pass
SO-2663, 2664	5/26/2016	Ra-226	1.19 ± 0.34	0.87 ± 0.28	1.03 ± 0.22	Pass
SO-2663, 2664	5/26/2016	Ac-228	0.45 ± 0.09	0.53 ± 0.10	0.49 ± 0.07	Pass
SPS-2817, 2818	5/31/2016	K-40	12.10 ± 0.70	11.05 ± 0.70	11.58 ± 0.49	Pass
DW-70091, 70092	6/1/2016	Ra-226	5.61 ± 0.29	5.53 ± 0.30	5.57 ± 0.21	Pass
DW-70091, 70092	6/1/2016	Ra-228	1.45 ± 0.58	1.91 ± 0.62	1.68 ± 0.42	Pass
BS-2925,2926	6/3/2016	K-40	7.74 ± 0.44	7.86 ± 0.42	7.80 ± 0.30	Pass
SPS-2796, 2797	6/2/2016	K-40	20.91 ± 2.38	21.16 ± 1.82	21.04 ± 1.50	Pass
SPS-2882, 2883	6/7/2016	K-40	14.64 ± 0.52	14.60 ± 0.52	14.62 ± 0.37	Pass
SPS-2882, 2883	6/7/2016	Be-7	2.00 ± 0.25	1.94 ± 0.20	1.97 ± 0.16	Pass
DW-70102, 70103	6/13/2016	Ra-226	0.34 ± 0.09	0.36 ± 0.08	0.35 ± 0.06	Pass

TABLE A-5. In-House "Duplicate" Samples

			Concentration [a]			
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
DW-70102, 70103	6/13/2016	Ra-228	0.93 ± 0.47	1.11 ± 0.53	1.02 ± 0.35	Pass
AP-061416	6/14/2016	Gr. Beta	0.026 ± 0.004	0.023 ± 0.004	0.024 ± 0.003	Pass
SG-3144, 3145	6/17/2016	Be-7	2.23 ± 0.12	2.24 ± 0.12	2.24 ± 0.08	Pass
SG-3144, 3145	6/17/2016	K-40	7.57 ± 0.25	7.09 ± 0.23	7.33 ± 0.17	Pass
SPS-3165, 3166	6/22/2016	K-40	21.14 ± 2.27	22.88 ± 1.60	22.01 ± 1.39	Pass
SPS-3323, 3324	6/24/2016	K-40	18.67 ± 1.57	21.53 ± 1.65	20.10 ± 1.14	Pass
WW-3231, 3232	6/27/2016	H-3	414 ± 104	498 ± 108	456 ± 75	Pass
AP-3830,3831	6/29/2016	Gr. Beta	0.088 ± 0.012	0.093 ± 0.015	0.091 ± 0.010	Pass
AP-070516A	7/5/2016	Gr. Beta	0.018 ± 0.002	0.014 ± 0.002	0.016 ± 0.002	Pass
AP-070516B	7/5/2016	Gr. Beta	0.025 ± 0.005	0.026 ± 0.005	0.025 ± 0.004	Pass
XWW-3605,3606	7/7/2016	H-3	3,316 ± 186	3,316 ± 181	3,316 ± 130	Pass
DW-70135,70136	7/8/2016	Gr. Alpha	3.68 ± 1.01	2.76 ± 0.98	3.22 ± 0.70	Pass
DW-70132,70133	7/8/2016	Ra-226	1.32 ± 0.14	1.11 ± 0.15	1.22 ± 0.10	Pass
DW-70132,70133	7/8/2016	Ra-228	3.92 ± 0.94	2.94 ± 0.90	3.43 ± 0.65	Pass
AP-071216	7/12/2016	Gr. Beta	0.014 ± 0.004	0.018 ± 0.004	0.016 ± 0.003	Pass
DW-70150,70151	7/14/2016	Gr. Alpha	5.00 ± 1.06	4.43 ± 1.04	4.72 ± 0.74	Pass
SPS-3649,3650	7/15/2016	Cs-137	0.12 ± 0.03	0.12 ± 0.03	0.12 ± 0.02	Pass
SPS-3649,3650	7/15/2016	K-40	16.68 ± 0.79	16.52 ± 0.86	16.6 ± 0.58	Pass
SPS-3649,3650	7/15/2016	Pb-214	1.20 ± 0.08	1.17 ± 0.08	1.19 ± 0.06	Pass
SPS-3649,3650	7/15/2016	Ac-228	1.28 ± 0.16	1.28 ± 0.16	1.28 ± 0.11	Pass
AP-071816	7/18/2016	Gr. Beta	0.022 ± 0.005	0.024 ± 0.005	0.023 ± 0.003	Pass
DW-70163,70164	7/19/2016	Gr. Alpha	1.08 ± 0.66	1.36 ± 0.70	1.22 ± 0.48	Pass
WW-3761,3762	7/20/2016	H-3	347 ± 90	466 ± 96	407 ± 66	Pass
SPS-4003,4004	7/23/2016	K-40	7.15 ± 1.59	6.86 ± 1.21	7.00 ± 1.00	Pass
AP-072516	7/25/2016	Gr. Beta	0.023 ± 0.004	0.020 ± 0.004	0.022 ± 0.003	Pass
VE-3936,3937	7/25/2016	Sr-90	0.048 ± 0.007	0.058 ± 0.010	0.053 ± 0.006	Pass
VE-3936,3937	7/25/2016	Be-7	0.49 ± 0.15	0.51 ± 0.15	0.50 ± 0.10	Pass
VE-3936,3937	7/25/2016	K-40	4.70 ± 0.35	4.86 ± 0.37	4.78 ± 0.25	Pass
VE-3959,3960	7/27/2016	Sr-90	0.002 ± 0.002	0.003 ± 0.001	0.003 ± 0.001	Pass
VE-3959,3960	7/27/2016	Be-7	0.30 ± 0.14	0.25 ± 0.12	0.27 ± 0.09	Pass
VE-3959,3960	7/27/2016	K-40	4.01 ± 0.37	4.16 ± 0.34	4.08 ± 0.25	Pass
DW-70169,70170	7/28/2016	Ra-226	0.83 ± 0.11	0.69 ± 0.11	0.76 ± 0.08	Pass
DW-70169,70170	7/28/2016	Ra-228	1.85 ± 0.63	1.31 ± 0.84	1.58 ± 0.53	Pass
AP-080116	8/1/2016	Gr. Beta	0.029 ± 0.003	0.033 ± 0.003	0.031 ± 0.002	Pass
SS-4131,4132	8/1/2016	K-40	12.47 ± 0.71	13.24 ± 0.81	12.86 ± 0.54	Pass
SS-4131,4132	8/1/2016	Cs-137	0.10 ± 0.03	0.13 ± 0.04	0.12 ± 0.02	Pass
SPS-4087,4088	8/2/2016	K-40	17.06 ± 1.58	19.5 ± 1.97	18.28 ± 1.26	Pass
WW-4976,4977	8/4/2016	H-3	17,043 ± 390	16,821 ± 388	16,932 ± 275	Pass
SPS-4266,4267	8/10/2016	K-40	1.06 ± 0.47	1.69 ± 0.52	1.375 ± 0.35	Pass
AP-081616	8/16/2016	Gr. Beta	0.029 ± 0.005	0.025 ± 0.004	0.027 ± 0.003	Pass
VE-4399,4400	8/18/2016	K-40	3.85 ± 0.23	3.27 ± 0.41	3.56 ± 0.24	Pass
VE-4399,4400	8/18/2016	Be-7	0.30 ± 0.08	0.45 ± 0.20	0.37 ± 0.11	Pass
WW-5394,5395	8/18/2016	H-3	947 ± 122	846 ± 119	896 ± 85	Pass
SPS-4441,4442	8/22/2016	K-40	20.55 ± 2.23	19.69 ± 1.74	20.12 ± 1.41	Pass
AP-082216	8/22/2016	Gr. Beta	0.021 ± 0.005	0.015 ± 0.005	0.018 ± 0.003	Pass
VE-4462,4463	8/22/2016	Be-7	0.91 ± 0.09	0.89 ± 0.11	0.90 ± 0.07	Pass
VE-4462,4463	8/22/2016	K-40	7.48 ± 0.26	7.60 ± 0.23	7.54 ± 0.17	Pass
WW-4594,4595	8/26/2016	H-3	675 ± 107	788 ± 111	731 ± 77	Pass
WW-4663,4664	8/26/2016	H-3	607 ± 104	501 ± 100	554 ± 72	Pass
SPS-4529,4530	8/26/2016	K-40	21.98 ± 2.52	21.85 ± 1.56	21.92 ± 1.48	Pass
AP-083016A	8/30/2016	Gr. Beta	0.030 ± 0.003	0.035 ± 0.004	0.033 ± 0.002	Pass
AP-083016B	8/30/2016	Gr. Beta	0.032 ± 0.009	0.026 ± 0.004	0.029 ± 0.005	Pass
VE-4615,4616	8/31/2016	K-40	2.96 ± 0.16	3.11 ± 0.17	3.03 ± 0.11	Pass

TABLE A-5. In-House "Duplicate" Samples

			Concentration [a]			
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
AP-090216	9/2/2016	Gr. Beta	0.022 ± 0.004	0.027 ± 0.004	0.024 ± 0.003	Pass
AP-090616	9/6/2016	Gr. Beta	0.023 ± 0.005	0.023 ± 0.005	0.023 ± 0.003	Pass
MI-4751,4752	9/7/2016	K-40	1,693 ± 112	1,760 ± 99	1,726 ± 75	Pass
MI-4751,4752	9/7/2016	Sr-90	1.23 ± 0.38	1.00 ± 0.33	1.11 ± 0.25	Pass
SW-4772,4773	9/8/2016	H-3	196 ± 91	236 ± 93	216 ± 65	Pass
WW-5285,5286	9/13/2016	H-3	18,010 ± 400	18,686 ± 407	18,348 ± 286	Pass
MI-4826,4827	9/14/2016	K-40	1,372.6 ± 105	1,198.1 ± 97	1,285.4 ± 71	Pass
VE-4868,4869	9/15/2016	Gr. Beta	2.50 ± 0.06	2.57 ± 0.06	2.53 ± 0.04	Pass
VE-4868,4869	9/15/2016	K-40	2.20 ± 0.17	2.30 ± 0.17	2.25 ± 0.12	Pass
CF-4934,4935	9/19/2016	K-40	11.47 ± 0.82	11.76 ± 0.50	11.61 ± 0.48	Pass
CF-4934,4935	9/19/2016	Be-7	0.43 ± 0.22	0.46 ± 0.13	0.45 ± 0.13	Pass
AP-092016	9/20/2016	Gr. Beta	0.021 ± 0.004	0.017 ± 0.004	0.019 ± 0.003	Pass
DW-70196,70197	9/20/2016	Gr. Alpha	13.8 ± 1.36	15.28 ± 1.36	14.54 ± 0.96	Pass
F-4955,4956	9/20/2016	K-40	3.40 ± 0.44	2.86 ± 0.39	3.13 ± 0.30	Pass
VE-5044,5045	9/20/2016	Be-7	0.46 ± 0.05	0.50 ± 0.11	0.48 ± 0.06	Pass
VE-5044,5045	9/20/2016	K-40	4.37 ± 0.12	4.68 ± 0.24	4.53 ± 0.13	Pass
WW-5219,5220	9/20/2016	H-3	63,744 ± 743	64,755 ± 749	64,250 ± 527	Pass
SPS-5087,5088	9/23/2016	K-40	21.04 ± 2.32	18.84 ± 1.88	19.94 ± 1.49	Pass
AP-092716	9/27/2016	Gr. Beta	0.031 ± 0.005	0.032 ± 0.005	0.031 ± 0.003	Pass
AP-5660,5661	9/28/2016	Be-7	0.093 ± 0.014	0.086 ± 0.019	0.089 ± 0.012	Pass
AP-5681,5682	9/27/2016	Be-7	0.079 ± 0.019	0.071 ± 0.015	0.075 ± 0.012	Pass
VE-5110,5111	9/28/2016	K-40	1.82 ± 0.15	2.14 ± 0.18	1.98 ± 0.12	Pass
AP-5154,5155	9/29/2016	Be-7	0.237 ± 0.116	0.195 ± 0.096	0.216 ± 0.075	Pass
AP-5702,5703	9/30/2016	Be-7	0.084 ± 0.015	0.070 ± 0.018	0.077 ± 0.012	Pass
MI-5264,5265	10/4/2016	K-40	1,636 ± 128	1,610 ± 124	1,623 ± 89	Pass
MI-5264,5265	10/4/2016	Sr-90	2.00 ± 0.44	1.28 ± 0.37	1.64 ± 0.29	Pass
SS-5547,5548	10/11/2016	Gr. Beta	11.27 ± 1.19	9.47 ± 1.20	10.37 ± 0.84	Pass
SS-5547,5548	10/11/2016	K-40	8.03 ± 0.45	7.23 ± 0.46	7.63 ± 0.32	Pass
SS-5547,5548	10/11/2016	Tl-208	0.04 ± 0.02	0.04 ± 0.02	0.04 ± 0.01	Pass
SS-5547,5548	10/11/2016	Bi-214	0.14 ± 0.03	0.12 ± 0.03	0.13 ± 0.02	Pass
SS-5547,5548	10/11/2016	Pb-212	0.12 ± 0.02	0.11 ± 0.02	0.11 ± 0.01	Pass
SS-5547,5548	10/11/2016	Ac-228	0.10 ± 0.05	0.16 ± 0.05	0.13 ± 0.04	Pass
AP-101116	10/11/2016	Gr. Beta	0.032 ± 0.004	0.028 ± 0.004	0.030 ± 0.003	Pass
WW-5526.5527	10/11/2016	H-3	18,865 ± 408	18,904 ± 408	18,884 ± 289	Pass
WW-5639,5640	10/19/2016	H-3	192 ± 103	52 ± 98	122 ± 71	Pass
WW-5723,5724	10/18/2016	H-3	36,012 ± 560	36,207 ± 561	36,110 ± 396	Pass
F-5811,5812	10/20/2016	K-40	0.91 ± 0.30	0.75 ± 0.22	0.83 ± 0.19	Pass
SO-5900,5901	10/22/2016	Cs-137	0.05 ± 0.02	0.03 ± 0.02	0.04 ± 0.02	Pass
SO-5900,5901	10/22/2016	K-40	9.82 ± 0.60	10.77 ± 0.61	10.29 ± 0.43	Pass
SO-5900,5901	10/22/2016	Tl-208	0.10 ± 0.02	0.14 ± 0.03	0.12 ± 0.02	Pass
SO-5900,5901	10/22/2016	Pb-212	0.32 ± 0.03	0.33 ± 0.03	0.32 ± 0.02	Pass
SO-5900,5901	10/22/2016	Bi-214	0.20 ± 0.04	0.27 ± 0.04	0.23 ± 0.03	Pass
SO-5900,5901	10/22/2016	Ac-228	0.41 ± 0.08	0.48 ± 0.09	0.44 ± 0.06	Pass
SO-5900,5901	10/22/2016	Ra-226	0.45 ± 0.23	0.61 ± 0.27	0.53 ± 0.18	Pass
SO-5900,5901	10/22/2016	Gr. Beta	16.49 ± 1.01	17.71 ± 1.03	17.10 ± 0.72	Pass
SS-5879,5880	10/25/2016	K-40	14.94 ± 0.83	15.26 ± 0.84	15.10 ± 0.59	Pass
SS-5879,5880	10/25/2016	Cs-137	0.06 ± 0.03	0.09 ± 0.04	0.08 ± 0.02	Pass
LW-6072,6073	10/27/2016	Gr. Beta	0.88 ± 0.49	1.53 ± 0.56	1.21 ± 0.37	Pass
BS-6009, 6010	10/27/2016	Cs-137	0.14 ± 0.08	0.13 ± 0.06	0.13 ± 0.05	Pass
BS-6009, 6010	10/27/2016	K-40	17.04 ± 1.58	18.30 ± 1.42	17.67 ± 1.06	Pass
F-6211,6212	10/28/2016	Gr. Beta	3.25 ± 0.07	3.27 ± 0.07	3.26 ± 0.05	Pass
F-6211,6212	10/28/2016	K-40	2.45 ± 0.33	2.49 ± 0.37	2.47 ± 0.25	Pass
DW-70230, 70231	10/28/2016	Ra-226	4.00 ± 0.20	4.10 ± 0.30	4.05 ± 0.18	Pass
DW-70230, 70231	10/28/2016	Ra-228	5.30 ± 0.80	5.20 ± 0.80	5.25 ± 0.57	Pass
F-6093,6094	10/31/2016	K-40	3.77 ± 0.50	3.51 ± 0.44	3.64 ± 0.33	Pass

TABLE A-5. In-House "Duplicate" Samples

			Concentration [a]			
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
AP-110116	11/1/2016	Gr. Beta	0.021 ± 0.004	0.024 ± 0.004	0.023 ± 0.003	Pass
S-5963, 5964	11/1/2016	K-40	20.35 ± 2.29	18.59 ± 1.90	19.47 ± 1.49	Pass
SG-6119, 6120	11/1/2016	Ac-228	5.70 ± 0.44	6.28 ± 0.57	5.99 ± 0.36	Pass
SG-6119, 6120	11/1/2016	Gr. Alpha	21.59 ± 1.88	24.35 ± 1.93	22.97 ± 1.35	Pass
SG-6119, 6120	11/1/2016	K-40	4.89 ± 1.10	5.90 ± 1.08	5.40 ± 0.77	Pass
SG-6119, 6120	11/1/2016	Pb-214	3.99 ± 0.21	4.35 ± 0.32	4.17 ± 0.19	Pass
S-6051, 6052	11/4/2016	K-40	7.05 ± 0.60	7.56 ± 0.53	7.31 ± 0.40	Pass
WW-6297, 6298	11/8/2016	H-3	207 ± 98	165 ± 97	186 ± 69	Pass
WW-6341,6342	11/8/2016	H-3	1,356 ± 140	1,404 ± 141	1,380 ± 99	Pass
SO-6406,6407	11/9/2016	Cs-137	0.36 ± 0.04	0.43 ± 0.05	0.40 ± 0.03	Pass
SO-6406,6407	11/9/2016	K-40	10.90 ± 0.68	11.29 ± 0.74	11.09 ± 0.50	Pass
AP-111416	11/14/2016	Gr. Beta	0.024 ± 0.005	0.021 ± 0.006	0.022 ± 0.004	Pass
WW-6829,6830	11/15/2016	H-3	39,982 ± 589	40,315 ± 591	40,149 ± 417	Pass
DW-70239, 70240	11/17/2016	Gr. Alpha	7.99 ± 1.15	6.41 ± 1.05	7.20 ± 0.78	Pass
AP-112216	11/22/2016	Gr. Beta	0.049 ± 0.005	0.045 ± 0.005	0.047 ± 0.003	Pass
S-6473, 6474	11/24/2016	K-40	19.37 ± 1.97	23.80 ± 3.54	21.58 ± 2.02	Pass
SG-6938, 6939	11/28/2016	Ac-228	18.99 ± 0.59	19.92 ± 0.79	19.46 ± 0.49	Pass
SG-6938, 6939	11/28/2016	Pb-214	15.28 ± 0.34	14.96 ± 0.43	15.12 ± 0.27	Pass
AP-120116	12/1/2016	Gr. Beta	0.029 ± 0.003	0.030 ± 0.003	0.030 ± 0.002	Pass
F-6567,6568	12/1/2016	K-40	3.76 ± 0.40	3.83 ± 0.46	3.80 ± 0.30	Pass
S-6522, 6523	12/1/2016	Ac-228	1.08 ± 0.13	1.29 ± 0.16	1.19 ± 0.10	Pass
S-6522, 6523	12/1/2016	Pb-214	1.00 ± 0.08	1.01 ± 0.09	1.01 ± 0.06	Pass
S-6609, 6610	12/1/2016	K-40	15.57 ± 1.01	15.99 ± 0.78	15.78 ± 0.64	Pass
S-6718, 6719	12/7/2016	K-40	18.19 ± 2.13	18.76 ± 1.80	18.48 ± 1.39	Pass
WW-6784, 6785	12/7/2016	H-3	922 ± 117	905 ± 116	914 ± 82	Pass
AP-121216	12/12/2016	Gr. Beta	0.026 ± 0.005	0.028 ± 0.005	0.027 ± 0.003	Pass
AP-7178,7179	1/3/2017	Be-7	0.047 ± 0.015	0.062 ± 0.017	0.054 ± 0.012	Pass

Note: Duplicate analyses are performed on every twentieth sample received in-house. Results are not listed for those analyses with activities that measure below the LLD.

[a] Results are reported in units of pCi/L, except for air filters (pCi/Filter or pCi/m3), food products, vegetation, soil and sediment (pCi/g).

TABLE A-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP).

			Concentration [a]			
Lab Code [b]	Reference Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
MASO-1053	2/1/2016	Ni-63	1,206 ± 20	1250	875 - 1625	Pass
MASO-1053	2/1/2016	Sr-90	0.65 ± 1.27	0.00	NA [c]	Pass
MASO-1053	2/1/2016	Tc-99	0.1 ± 5.5	0.0	NA [c]	Pass
MASO-1053	2/1/2016	Cs-134	908 ± 26	1030	721 - 1339	Pass
MASO-1053	2/1/2016	Cs-137	0.10 ± 6.20	0.00	NA [c]	Pass
MASO-1053	2/1/2016	Co-57	1058 ± 26	992	694 - 1290	Pass
MASO-1053	2/1/2016	Co-60	1229 ± 28	1190	833 - 1547	Pass
MASO-1053	2/1/2016	Mn-54	1235 ± 43	1160	812 - 1508	Pass
MASO-1053	2/1/2016	Zn-65	753 ± 64	692	484 - 900	Pass
MASO-1053	2/1/2016	K-40	753 ± 140	607	425 - 789	Pass
MASO-1053	2/1/2016	Am-241	79 ± 6	103	72 - 134	Pass
MASO-1053	2/1/2016	Pu-238	73.9 ± 9.2	63.6	44.5 - 82.7	Pass
MASO-1053	2/1/2016	Pu-239/240	0.76 ± 1.34	0.21	NA [d]	Pass
MASO-1053	2/1/2016	U-234/233	45.0 ± 5.1	45.9	32.1 - 59.7	Pass
MASO-1053	2/1/2016	U-238	129 ± 9	146	102 - 190	Pass
MAW-989	2/1/2016	Am-241	0.018 ± 0.015	0.00	NA [c]	Pass
MAW-989	2/1/2016	H-3	0.2 ± 2.8	0.0	NA [c]	Pass
MAW-989	2/1/2016	Ni-63	12.8 ± 2.7	12.3	8.6 - 16.0	Pass
MAW-989	2/1/2016	Sr-90	8.70 ± 1.20	8.74	6.12 - 11.36	Pass
MAW-989	2/1/2016	Tc-99	-1.1 ± 0.6	0.0	NA [c]	Pass
MAW-989	2/1/2016	Cs-134	15.5 ± 0.3	16.1	11.3 ± 20.9	Pass
MAW-989	2/1/2016	Cs-137	23.7 ± 0.5	21.2	14.8 - 27.6	Pass
MAW-989[e]	2/1/2016	Co-57	1.38 ± 0.12	0.00	NA [c]	Fail
MAW-989	2/1/2016	Co-60	12.5 ± 0.3	11.8	8.3 - 15.3	Pass
MAW-989	2/1/2016	Mn-54	12.2 ± 0.4	11.1	7.8 - 14.4	Pass
MAW-989	2/1/2016	Zn-65	15.7 ± 0.7	13.6	9.5 - 17.7	Pass
MAW-989	2/1/2016	K-40	288 ± 5	251	176 - 326	Pass
MAW-989	2/1/2016	Fe-55	17.3 ± 7.0	16.2	11.3 - 21.1	Pass
MAW-989	2/1/2016	Ra-226	0.710 ± 0.070	0.718	0.503 - 0.933	Pass
MAW-989	2/1/2016	Pu-238	1.280 ± 0.110	1.244	0.871 ± 1.617	Pass
MAW-989	2/1/2016	Pu-239/240	0.640 ± 0.080	0.641	0.449 - 0.833	Pass
MAW-989	2/1/2016	U-234/233	1.39 ± 0.12	1.48	1.04 - 1.92	Pass
MAW-989	2/1/2016	U-238	1.43 ± 0.12	1.53	1.07 - 1.99	Pass
MAW-893	2/1/2016	Gross Alpha	0.600 ± 0.050	0.673	0.202 - 1.144	Pass
MAW-893	2/1/2016	Gross Beta	2.10 ± 0.06	2.15	1.08 - 3.23	Pass
MAW-896	2/1/2016	I-129	3.67 ± 0.20	3.85	2.70 - 5.01	Pass
MAAP-1056	2/1/2016	Gross Alpha	0.39 ± 0.05	1.20	0.36 - 2.04	Pass
MAAP-1056	2/1/2016	Gross Beta	1.03 ± 0.07	0.79	0.40 - 1.19	Pass

TABLE A-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP).

			Concentration [a]			
Lab Code [b]	Reference Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
MAAP-1057	2/1/2016	Sr-90	1.34 ± 0.15	1.38	0.97 ± 1.79	Pass
MAAP-1057	2/1/2016	Cs-134	-0.01 ± 0.03	0.00	NA [c]	Pass
MAAP-1057	2/1/2016	Cs-137	2.57 ± 0.10	2.30	1.61 - 2.99	Pass
MAAP-1057	2/1/2016	Co-57	3.01 ± 0.06	2.94	2.06 - 3.82	Pass
MAAP-1057	2/1/2016	Co-60	4.28 ± 0.10	4.02	2.81 - 5.23	Pass
MAAP-1057	2/1/2016	Mn-54	4.90 ± 0.13	4.53	3.17 - 5.89	Pass
MAAP-1057	2/1/2016	Zn-65	4.09 ± 0.18	3.57	2.50 - 4.64	Pass
MAAP-1057	2/1/2016	Am-241	0.059 ± 0.015	0.0805	0.0564 - 0.1047	Pass
MAAP-1057	2/1/2016	Pu-238	0.066 ± 0.020	0.0637	0.0446 - 0.0828	Pass
MAAP-1057	2/1/2016	Pu-239/240	0.074 ± 0.020	0.099	NA [d]	Pass
MAAP-1057	2/1/2016	U-234/233	0.151 ± 0.026	0.165	0.116 - 0.215	Pass
MAAP-1057	2/1/2016	U-238	0.160 ± 0.026	0.172	0.120 - 0.224	Pass
MAVE-1050	2/1/2016	Cs-134	9.83 ± 0.19	10.62	7.43 - 13.81	Pass
MAVE-1050	2/1/2016	Cs-137	6.06 ± 0.19	5.62	3.93 - 7.31	Pass
MAVE-1050	2/1/2016	Co-57	13.8 ± 0.2	11.8	8.3 - 15.3	Pass
MAVE-1050	2/1/2016	Co-60	0.022 ± 0.040	0.00	NA [c]	Pass
MAVE-1050	2/1/2016	Mn-54	0.009 ± 0.044	0.000	NA [c]	Pass
MAVE-1050	2/1/2016	Zn-65	10.67 ± 0.39	9.60	6.70 - 12.50	Pass
MASO-4780[f]	8/1/2016	Ni-63	648 ± 14	990	693 - 1287	Fail
MASO-4780[g]	8/1/2016	Ni-63	902 ± 46	990	693 - 1287	Pass
MASO-4780	8/1/2016	Sr-90	757 ± 16	894	626 - 1162	Pass
MASO-4780	8/1/2016	Tc-99	559 ± 12	556	389 - 723	Pass
MASO-4780	8/1/2016	Cs-134	0.93 ± 2.92	0.00	NA [c]	Pass
MASO-4780	8/1/2016	Cs-137	1061 ± 12	1067	747 - 1387	Pass
MASO-4780	8/1/2016	Co-57	1178 ± 8	1190	833 - 1547	Pass
MASO-4780	8/1/2016	Co-60	841 ± 9	851	596 - 1106	Pass
MASO-4780	8/1/2016	Mn-54	0.69 ± 2.53	0.00	NA [c]	Pass
MASO-4780	8/1/2016	Zn-65	724 ± 19	695	487 - 904	Pass
MASO-4780	8/1/2016	K-40	566 ± 52	588	412 - 764	Pass
MASO-4780	8/1/2016	Am-241	0.494 ± 0.698	0.000	NA [c]	Pass
MASO-4780	8/1/2016	Pu-238	69.7 ± 7.4	70.4	49.3 - 91.5	Pass
MASO-4780	8/1/2016	Pu-239/240	53.9 ± 6.3	53.8	37.7 - 69.9	Pass
MASO-4780[h]	8/1/2016	U-233/234	46.8 ± 3.9	122	85 - 159	Fail
MASO-4780[h]	8/1/2016	U-238	46.6 ± 3.9	121	85 - 157	Fail
MAW-4776	8/1/2016	I-129	4.40 ± 0.20	4.54	3.18 - 5.90	Pass
MAVE-4782	8/1/2016	Cs-134	-0.01 ± 0.05	0.00	NA [c]	Pass
MAVE-4782	8/1/2016	Cs-137	6.18 ± 0.20	5.54	3.88 - 7.20	Pass
MAVE-4782	8/1/2016	Co-57	8.13 ± 0.16	6.81	4.77 - 8.85	Pass
MAVE-4782	8/1/2016	Co-60	5.30 ± 0.15	4.86	3.40 - 6.32	Pass
MAVE-4782	8/1/2016	Mn-54	8.08 ± 0.24	7.27	5.09 - 9.45	Pass
MAVE-4782	8/1/2016	Zn-65	6.24 ± 0.36	5.40	3.78 - 7.02	Pass

TABLE A-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP).

			Concentration [a]			
Lab Code [b]	Reference Date	Analysis	Laboratory result	Known Activity	NA [c] Limits [c]	Acceptance
MAAP-4784	8/1/2016	Sr-90	1.18 ± 0.10	1.03	0.72 - 1.34	Pass
MAAP-4784	8/1/2016	Cs-134	1.58 ± 0.08	2.04	1.43 - 2.65	Pass
MAAP-4784	8/1/2016	Cs-137	1.85 ± 0.09	1.78	1.25 - 2.31	Pass
MAAP-4784	8/1/2016	Co-57	2.39 ± 0.52	2.48	1.74 - 3.22	Pass
MAAP-4784	8/1/2016	Co-60	3.22 ± 0.08	3.26	2.28 - 4.24	Pass
MAAP-4784	8/1/2016	Mn-54	2.82 ± 0.12	2.75	1.93 - 3.58	Pass
MAAP-4784	8/1/2016	Zn-65	-0.015 ± 0.062	0.00	NA [c]	Pass
MAAP-4784	8/1/2016	Am-241	-0.001 ± 0.006	0.00	NA [c]	Pass
MAAP-4784	8/1/2016	Pu-238	0.075 ± 0.022	0.069	0.049 - 0.090	Pass
MAAP-4784	8/1/2016	Pu-239/240	0.048 ± 0.015	0.054	0.038 - 0.070	Pass
MAAP-4784	8/1/2016	U-234/233	0.151 ± 0.036	0.150	0.105 - 0.195	Pass
MAAP-4784	8/1/2016	U-238	0.147 ± 0.034	0.156	0.109 - 0.203	Pass
MAW-4778	8/1/2016	H-3	365 ± 11	334	234 - 434	Pass
MAW-4778	8/1/2016	Fe-55	23.6 ± 16.3	21.5	15.1 ± 28.0	Pass
MAW-4778	8/1/2016	Ni-63	17.0 ± 2.8	17.2	12.0 ± 22.4	Pass
MAW-4778	8/1/2016	Sr-90	0.17 ± 0.28	0.00	NA [c]	Pass
MAW-4778	8/1/2016	Tc-99	9.50 ± 0.41	11.60	8.10 - 15.10	Pass
MAW-4778	8/1/2016	Cs-134	22.6 ± 0.4	23.9	16.7 - 31.1	Pass
MAW-4778	8/1/2016	Cs-137	0.018 ± 0.117	0.00	NA [c]	Pass
MAW-4778	8/1/2016	Co-57	27.6 ± 0.2	27.3	19.1 ± 35.5	Pass
MAW-4778	8/1/2016	Co-60	0.018 ± 0.090	0.00	NA [c]	Pass
MAW-4778	8/1/2016	Mn-54	16.2 ± 0.4	14.8	10.4 - 19.2	Pass
MAW-4778	8/1/2016	Zn-65	19.3 ± 0.7	17.4	12.2 - 22.6	Pass
MAW-4778	8/1/2016	K-40	286 ± 6	252	176 - 328	Pass
MAW-4778	8/1/2016	Ra-226	1.48 ± 0.09	1.33	0.93 - 1.73	Pass
MAW-4778	8/1/2016	Pu-238	1.09 ± 0.13	1.13	0.79 - 1.47	Pass
MAW-4778	8/1/2016	Pu-239/240	0.003 ± 0.011	0.016	NA [d]	Pass
MAW-4778	8/1/2016	U-234/233	1.80 ± 0.13	1.86	1.30 - 2.42	Pass
MAW-4778	8/1/2016	U-238	1.77 ± 0.13	1.92	1.34 - 2.50	Pass
MAW-4778	8/1/2016	Am-241	0.678 ± 0.086	0.814	0.570 ± 1.058	Pass

[a] Results are reported in units of Bq/kg (soil), Bq/L (water) or Bq/total sample (filters, vegetation).

[b] Laboratory codes as follows: MAW (water), MAAP (air filter), MASO (soil), MAVE (vegetation).

[c] MAPEP results are presented as the known values and expected laboratory precision (1 sigma, 1 determination) and control limits as defined by the MAPEP. A known value of "zero" indicates an analysis was included in the testing series as a "false positive". MAPEP does not provide control limits.

[d] Provided in the series for "sensitivity evaluation". MAPEP does not provide control limits.

[e] The laboratory properly identified the Sn-75 interfering peak in the vicinity of Co-57 and stated so in the comment field. MAPEP requires results to be reported as an activity with an uncertainty. Since the calculated uncertainty was less than the activity MAPEP interpreted the submitted result as a "false positive" resulting in a failure.

[f] Original analysis for Ni-63 failed.

[g] Reanalysis with a smaller aliquot resulted in acceptable results. An investigation is in process to identify better techniques for analyzing samples with complex matrices.

[h] MAPEP states that samples contain two fractions of Uranium; one that is soluble in concentrated HNO^3 and HCl acid and one that is "fundamentally insoluble in these acids". They also state that HF treatment can not assure complete dissolution. Results are consistent with measuring the soluble form.

TABLE A-7. Interlaboratory Comparison Crosscheck Program, Environmental Resource Associates (ERA)[a].

MRAD Study

Lab Code [b]	Date	Analysis	Concentration [a] Laboratory Result	ERA Result	Control Limits	Acceptance
ERAP-1101	3/14/2016	Am-241	37.3	45.9	28.3 - 62.1	Pass
ERAP-1101	3/14/2016	Co-60	637	623	482 - 778	Pass
ERAP-1101	3/14/2016	Cs-134	251	304	193 - 377	Pass
ERAP-1101	3/14/2016	Cs-137	1,273	1,150	864 - 1,510	Pass
ERAP-1101	3/14/2016	Fe-55	< 162	126	39.1 - 246	Pass
ERAP-1101	3/14/2016	Mn-54	< 2.64	< 50.0	0.00 - 50.0	Pass
ERAP-1101	3/14/2016	Pu-238	68.0	70.5	48.3 - 92.7	Pass
ERAP-1101	3/14/2016	Pu-239/240	54.1	54.8	39.70 - 71.60	Pass
ERAP-1101	3/14/2016	Sr-90	139	150	73.3 - 225.0	Pass
ERAP-1101	3/14/2016	U-233/234	59.3	64.8	40.2 - 97.7	Pass
ERAP-1101	3/14/2016	U-238	55.5	64.2	41.5 - 88.8	Pass
ERAP-1101	3/14/2016	Zn-65	428	356	255 - 492	Pass
ERAP-1101	3/14/2016	Gr. Alpha	98.0	70.1	23.5 - 109	Pass
ERAP-1101	3/14/2016	Gr. Beta	78.6	54.4	34.4 - 79.3	Pass
ERSO-1105	3/14/2016	Am-241	1,030	1,360	796 - 1,770	Pass
ERSO-1105	3/14/2016	Ac-228	1,540	1,240	795 - 1,720	Pass
ERSO-1105	3/14/2016	Bi-212	1,550	1,240	330 - 1,820	Pass
ERSO-1105	3/14/2016	Bi-214	3,100	3,530	2,130 - 5,080	Pass
ERSO-1105	3/14/2016	Co-60	5,600	5,490	3,710 - 7,560	Pass
ERSO-1105	3/14/2016	Cs-134	3,030	3,450	2,260 - 4,140	Pass
ERSO-1105	3/14/2016	Cs-137	4,440	4,310	3,300 - 5,550	Pass
ERSO-1105	3/14/2016	K-40	10,300	10,600	7,740 - 14,200	Pass
ERSO-1105	3/14/2016	Mn-54	< 50.8	< 1000	0.0 - 1,000	Pass
ERSO-1105	3/14/2016	Pb-212	1,140	1,240	812 - 1,730	Pass
ERSO-1105	3/14/2016	Pb-214	3,190	3,710	2,170 - 5,530	Pass
ERSO-1105	3/14/2016	Pu-238	680	658	396 - 908	Pass
ERSO-1105	3/14/2016	Pu-239/240	460	496	324 - 0,685	Pass
ERSO-1105	3/14/2016	Sr-90	7,740	8,560	3,260 - 13,500	Pass
ERSO-1105	3/14/2016	Th-234	3,630	3,430	1,080 - 6,450	Pass
ERSO-1105	3/14/2016	U-233/234	3,090	3,460	2,110 - 4,430	Pass
ERSO-1105	3/14/2016	U-238	3,280	3,430	2,120 - 4,350	Pass
ERSO-1105	3/14/2016	Zn-65	2,940	2,450	1,950 - 3,260	Pass
ERW-1115	3/14/2016	Gr. Alpha	105.0	117.0	41.5 - 181.0	Pass
ERW-1115	3/14/2016	Gr. Beta	76.2	75.5	43.2 - 112.0	Pass
ERW-1117	3/14/2016	H-3	8,870	8,650	5,800 - 12,300	Pass

TABLE A-7. Interlaboratory Comparison Crosscheck Program, Environmental Resource Associates (ERA)[a].

MRAD Study

Lab Code [b]	Date	Analysis	Concentration [a] Laboratory Result	ERA Result	Control Limits	Acceptance
ERVE-1108	3/14/2016	Am-241	1,930	2,120	1,300 - 2,820	Pass
ERVE-1108	3/14/2016	Cm-244	1,294	1,560	764 - 2,430	Pass
ERVE-1108	3/14/2016	Co-60	1,164	1,100	759 - 1,540	Pass
ERVE-1108	3/14/2016	Cs-134	1,056	1,070	687 - 1,390	Pass
ERVE-1108	3/14/2016	Cs-137	930	838	608 - 1,170	Pass
ERVE-1108	3/14/2016	K-40	32,200	31,000	22,400 - 43,500	Pass
ERVE-1108	3/14/2016	Mn-54	< 24.5	< 300	0.00 - 300	Pass
ERVE-1108	3/14/2016	Zn-65	3,320	2,820	2,030 - 3,960	Pass
ERVE-1108	3/14/2016	Pu-238	3,410	2,810	1,680 - 3,850	Pass
ERVE-1108	3/14/2016	Pu-239/240	4,120	3,640	2,230 - 5,010	Pass
ERVE-1108	3/14/2016	Sr-90	8,120	8,710	4,960 - 11,500	Pass
ERVE-1108	3/14/2016	U-233/234	4,350	4,160	2,740 - 5,340	Pass
ERVE-1108	3/14/2016	U-238	4,220	4,120	2,750 - 5,230	Pass
ERW-1111	3/14/2016	Am-241	113	121	81.5 - 162	Pass
ERW-1111	3/14/2016	Co-60	1,120	1,050	912 - 1,230	Pass
ERW-1111	3/14/2016	Cs-134	806	842	618 - 968	Pass
ERW-1111	3/14/2016	Cs-137	1,190	1,100	934 - 1,320	Pass
ERW-1111	3/14/2016	Mn-54	< 5.89	< 100	0.00 - 100	Pass
ERW-1111	3/14/2016	Pu-238	159	138	102 - 172	Pass
ERW-1111	3/14/2016	Pu-239/240	113	98.7	76.6 - 124	Pass
ERW-1111	3/14/2016	U-233/234	46.9	52.7	39.6 - 68.0	Pass
ERW-1111	3/14/2016	U-238	50.4	52.3	39.9 - 64.2	Pass
ERW-1111	3/14/2016	Zn-65	1,160	1,010	842 - 1,270	Pass
ERW-1111	3/14/2016	Fe-55	1,600	1,650	984 - 2,240	Pass
ERW-1111	3/14/2016	Sr-90	430	434	283 - 574	Pass

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the crosscheck program for proficiency testing administered by Environmental Resources Associates, serving as a replacement for studies conducted previously by the Environmental Measurements Laboratory Quality Assessment Program (EML).

[b] Laboratory codes as follows: ERW (water), ERAP (air filter), ERSO (soil), ERVE (vegetation). Results are reported in units of pCi/L, except for air filters (pCi/Filter), vegetation and soil (pCi/kg).

[c] Results are presented as the known values, expected laboratory precision (1 sigma, 1 determination) and control limits as provided by ERA.

APPENDIX B. DATA REPORTING CONVENTIONS

Data Reporting Conventions

1.0. All activities, except gross alpha and gross beta, are decay corrected to collection time or the end of the collection period.

2.0. Single Measurements

Each single measurement is reported as follows: $x \pm s$

where: x = value of the measurement;

$s = 2\sigma$ counting uncertainty (corresponding to the 95% confidence level).

In cases where the activity is less than the lower limit of detection L, it is reported as: < L, where L = the lower limit of detection based on 4.66σ uncertainty for a background sample.

3.0. Duplicate analyses

If duplicate analyses are reported, the convention is as follows. :

3.1 Individual results: For two analysis results; $x_1 \pm s_1$ and $x_2 \pm s_2$

Reported result: $x \pm s$; where $x = (1/2)(x_1 + x_2)$ and $s = (1/2)\sqrt{s_1^2 + s_2^2}$

3.2. Individual results: $< L_1$, $< L_2$ Reported result: < L, where L = lower of L_1 and L_2

3.3. Individual results: $x \pm s$, < L Reported result: $x \pm s$ if $x \geq L$; < L otherwise.

4.0. Computation of Averages and Standard Deviations

4.1 Averages and standard deviations listed in the tables are computed from all of the individual measurements over the period averaged; for example, an annual standard deviation would not be the average of quarterly standard deviations. The average and standard deviation "s" of a set of n numbers $x_1, x_2 \ldots x_n$ are defined as follows:

$$= \frac{1}{n} \sum x \qquad s = \sqrt{\frac{\sum (x-)^2}{n-1}}$$

4.2 Values below the highest lower limit of detection are not included in the average.

4.3 If all values in the averaging group are less than the highest LLD, the highest LLD is reported.

4.4 If all but one of the values are less than the highest LLD, the single value x and associated two sigma error is reported.

4.5 In rounding off, the following rules are followed:

4.5.1. If the number following those to be retained is less than 5, the number is dropped, and the retained numbers are kept unchanged. As an example, 11.443 is rounded off to 11.44.

4.5.2. If the number following those to be retained is equal to or greater than 5, the number is dropped and the last retained number is raised by 1. As an example, 11.445 is rounded off to 11.45.

Appendix C. NON-RADIOLOGICAL MONITORING PROGRAM

1.0. Introduction

Union Electric Company Callaway Plant, d.b.a. Ameren Missouri Callaway Energy Center, in accordance with federal regulations and a desire to maintain the quality of the local environment around Callaway Plant has implemented an Environmental Protection Plan, (EPP) contained in Appendix B of the Callaway Plant Operating License.

The objective of the EPP is to provide for protection of non-radiological environmental values during operation of the Callaway Plant.

This report describes the conduct of the EPP for the Callaway Plant during 2016.

2.0. Unusual or Important Events

No unusual or important events reportable under the EPP Section 4.1 were identified during 2016.

3.0. EPP Non-compliances

During 2016, there were no non-compliances with the EPP.

4.0. Nonroutine Reports

There were no nonroutine reports submitted in accordance with the EPP, Section 5.4.2 in 2016.

5.0. Plant Design and Operation Environmental Evaluations.

This section lists all changes in the plant design, operation, tests or experiments installed during 2016, which could have involved a potentially significant unreviewed environmental question in accordance with section 3.1 of Appendix B.

During 2016, three plant changes could have involved a potentially significant unreviewed environmental question. The interpretations and conclusions regarding these plant changes along with a description of the change and activity are presented below.

MP 15-0004, MP 15-0011, MP 15-0012, MP 13-0033 – Construction of the New Hardened Condensate Storage Tank

Description of Change:

Modifications MP 15-0004, MP 15-0011, MP 15-0012, and MP 13-0033 include all construction and connections associated with the new Hardened Condensate Storage Tank (HCST) at Callaway Energy Center. This evaluation includes a review of the modification packages for this work as follows:

MP 15-0004 – Demolition and excavation work for placement of the new HCST
MP 15-0011 – Construction of the foundation and underground piping
MP 15-0012 – Construction of the tank, protective barrier system, valve house, & electrical
MP 13-0033 – Connections to balance of plant equipment

The 500,000 gallon stainless steel HCST was constructed on a 5.5 foot thick concrete slab, surrounded by a protective structural steel frame with a mesh barrier system to withstand a design basis accident. The foundation includes 64 drilled shafts to support the tank with 46 piers installed to a depth of 45 feet with a diameter of 3 feet and 18 piers installed to a depth of 60 feet. A 10 foot by 10 foot pipe trench was also excavated to route necessary stainless steel and fused high density polyethylene (HDPE) piping for connection to the existing secondary systems. Hydro excavation was used to remove backfill for the piping trench and connections to the current CST tunnel and turbine building.

The HCST will store demineralized water. All construction was completed within the protected area and near the existing power block.

Evaluation of Change:

As part of the Final Environmental Evaluation, both the ER and FES-OL were reviewed for any previously evaluated adverse environmental impacts and any new adverse environmental impacts not previously evaluated. No adverse environmental impacts were identified. All construction was completed within the protected area close to the power block in areas that had been previously disturbed. During construction storm water from this area was directed to two

permanently permitted NPDES Outfalls. Therefore, this change does not involve an unreviewed environmental question and NRC approval is not required for this construction project.

MP 15-0018 – Replacement of Existing Transformer XPB218 at the Callaway Intake Facility

Description of Change:

MP 15-0018 covers the replacement of the existing transformer XPB218 at the Callaway intake facility. The new transformer will contain 1667 gallons of refined mineral oil (approximately 588 gallons more than the original transformer). The original transformer was located above a permanent rock filled concrete pit to contain the total volume of oil should a leak develop. Rock will be removed from this pit to allow additional volume to contain the 1667 gallons should a leak occur in the new transformer. The containment pit will also contain a new double grating with an absorbent rock layer.

Evaluation of Change:

As part of the Final Environmental Evaluation, both the ER and FES-OL were reviewed for any previously evaluated adverse environmental impacts and any new adverse environmental impacts not previously evaluated. No adverse environmental impacts were identified. Although the replacement transformer will contain a larger volume on mineral oil, the concrete containment located under the transformer was redesigned to contain the entire volume of the new transformer. Therefore, should a leak develop, oil will be contained within the concrete pit and there is no increased risk of this oil being discharged to the Missouri River.

This change does not involve an unreviewed environmental question and NRC approval was not required.

RFR 201606690 – Use of BULAB 5011P a new Polymer/Coagulant

Description of Change:

This change involves the use of BULAB 5011P (a new water soluble cationic polymer/coagulant) for removal of solids from makeup water withdrawn from the Missouri River. This product will be utilized at the Water Treatment Plant (WTP) to treat makeup to plant raw water systems. Callaway was previously using BULAB 5013, Dimethyl Ammonium Chloride (DADMAC) a similar polymer/coagulant for solids removal. This change allows the use of either product or a blend of these two products to reduce solids carried to plant raw water systems. As a result, it is expected that suspended solids will also be reduced in plant discharges from Outfalls 002 and 016. BULAB 5011P is a similar product to the current polymer but has a larger molecular weight. The new product is less toxic to aquatic life and will be used at the same treatment concentrations as previously used for BULAB 5013.

Evaluation of Change:

As part of the Final Environmental Evaluation, both the ER and FES-OL were reviewed for any previously evaluated adverse environmental impacts and any new adverse environmental impacts not previously evaluated. No adverse environmental impacts were identified. Missouri DNR approval or permit changes were not required as similar coagulants/ organic polymers were previously approved by the state. In addition, use of coagulants/organic polymers at the WTP was included in the last Callaway NPDES Permit re-application. Both products contain a similar water soluble cationic polymer which will be maintained at the same concentration range. Aquatic toxicity data was reviewed for both BULAB products and BULAB 5011P was found to have a less toxic 48-hour LC50 and 96 hour LC50 than BULAB 5013. Therefore, use of BULAB 5011P for solids removal at the WTP should have no adverse effect on the environment.

This evaluation concluded that this change to utilize BULAB 5011P as a coagulant for solids removal at the WTP does not involve an unreviewed environmental question and NRC approval was not required.

APPENDIX D

Sampling Location Maps

Figure D-1. Radiological Environmental Sampling Locations 1, 2, 3, mile radius from site location.

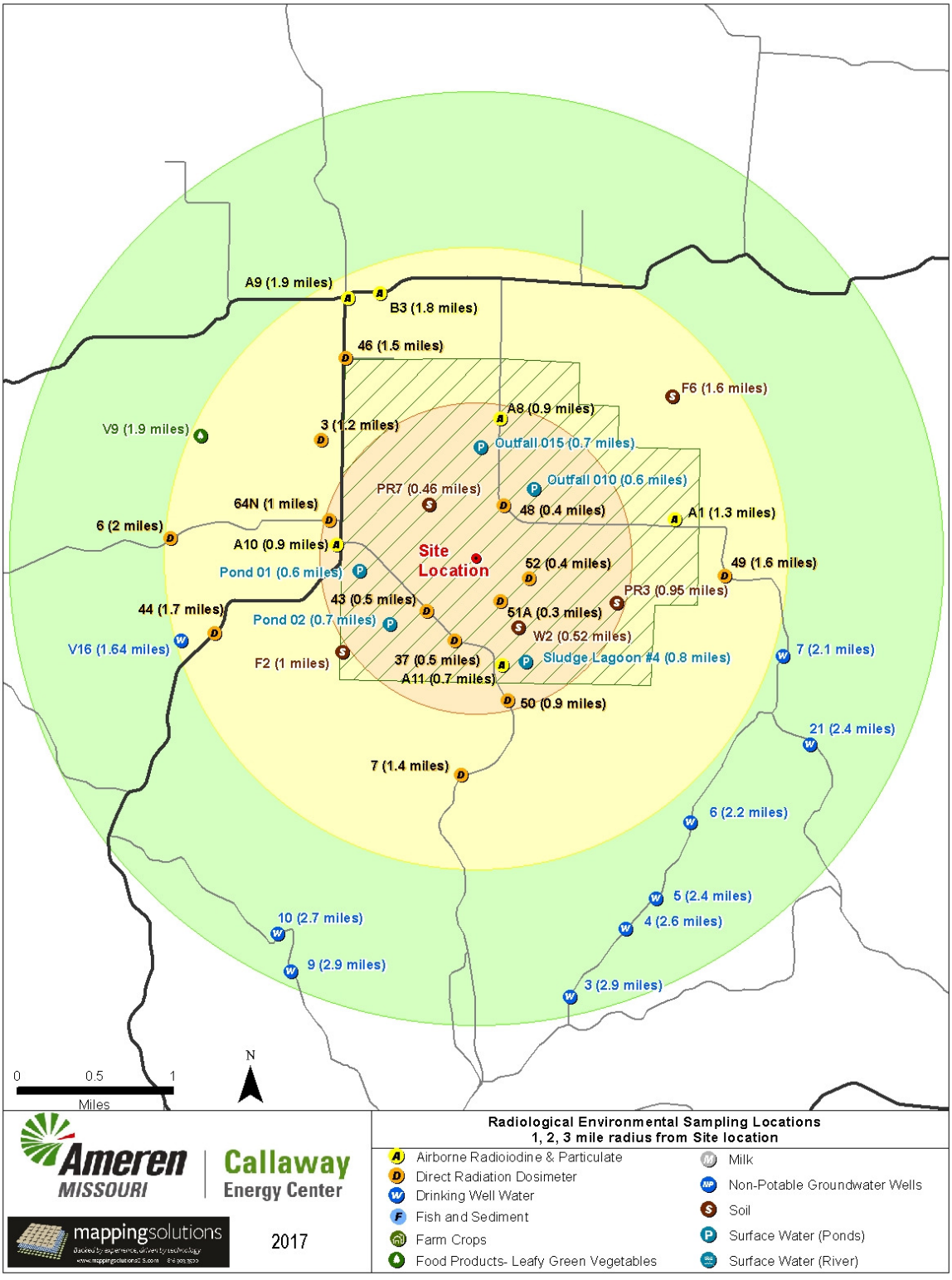


Figure D-2. Radiological Environmental Sampling Locations 3, 4, 5, 6 mile radius from site location.

Figure D-3. Radiological Environmental Sampling Locations 5, 10, 15 mile radius from site location.

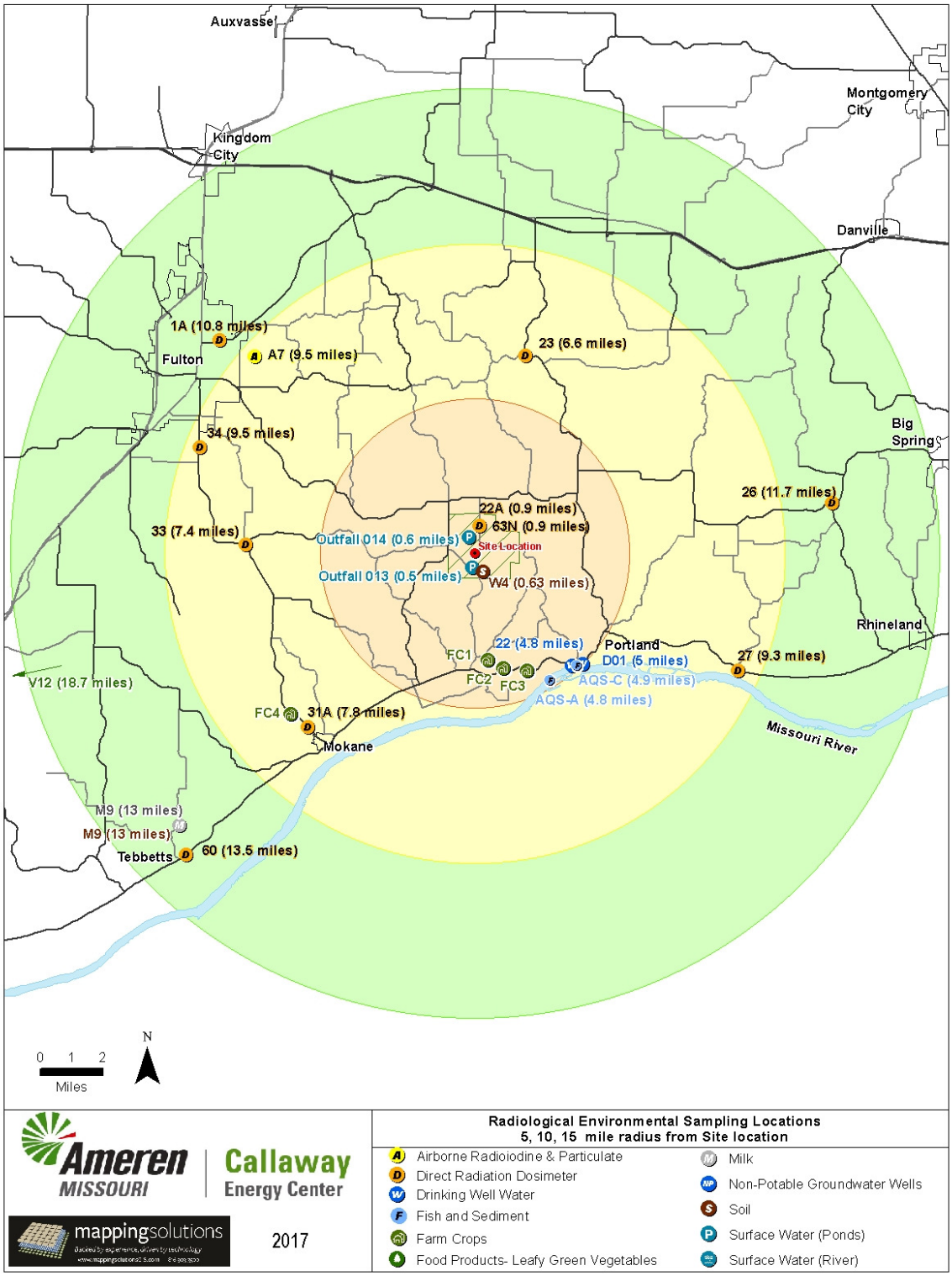


Figure D-4. Non-Potable Groundwater Monitoring Wells, 600 ft radius from Site.

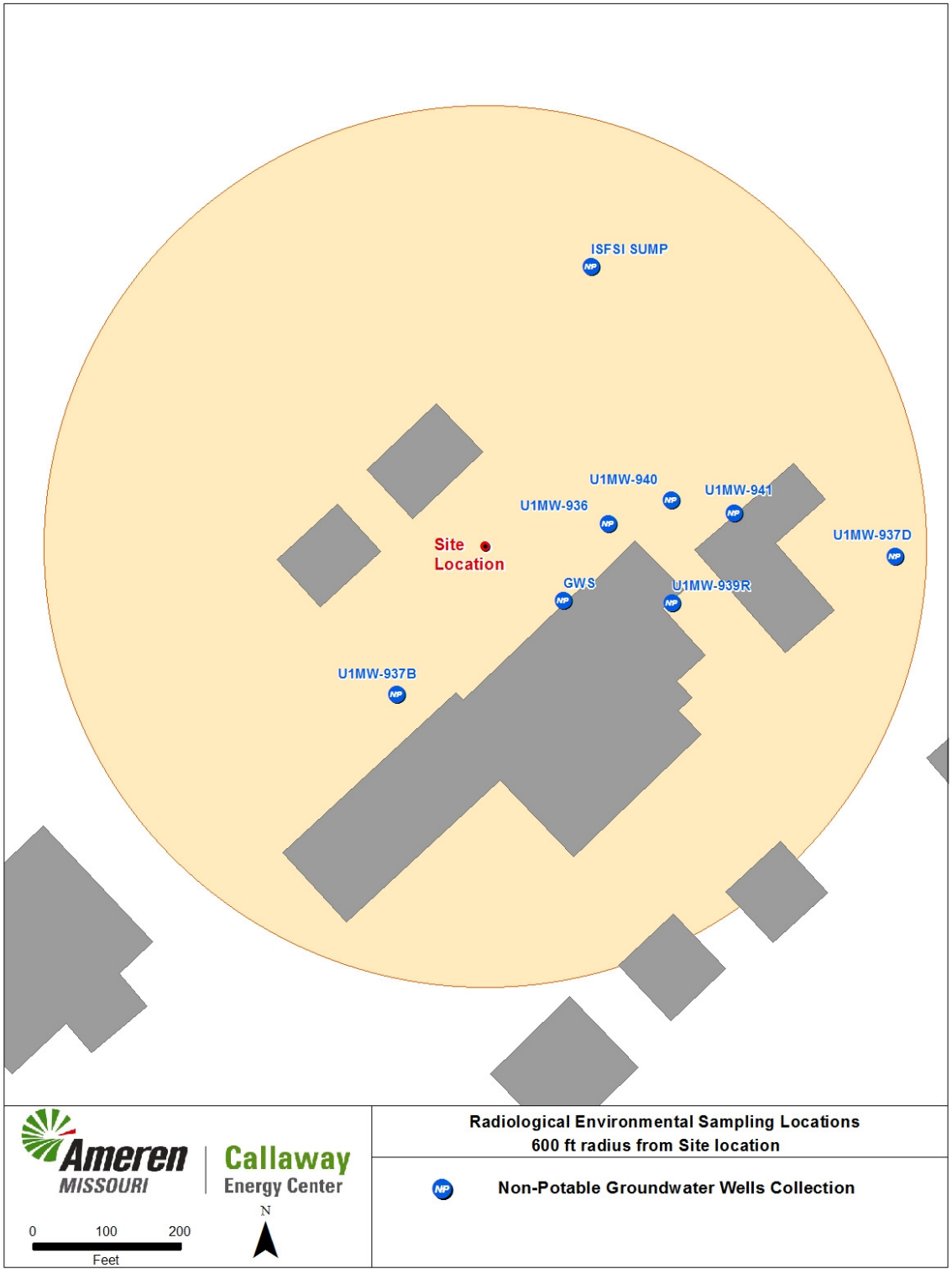
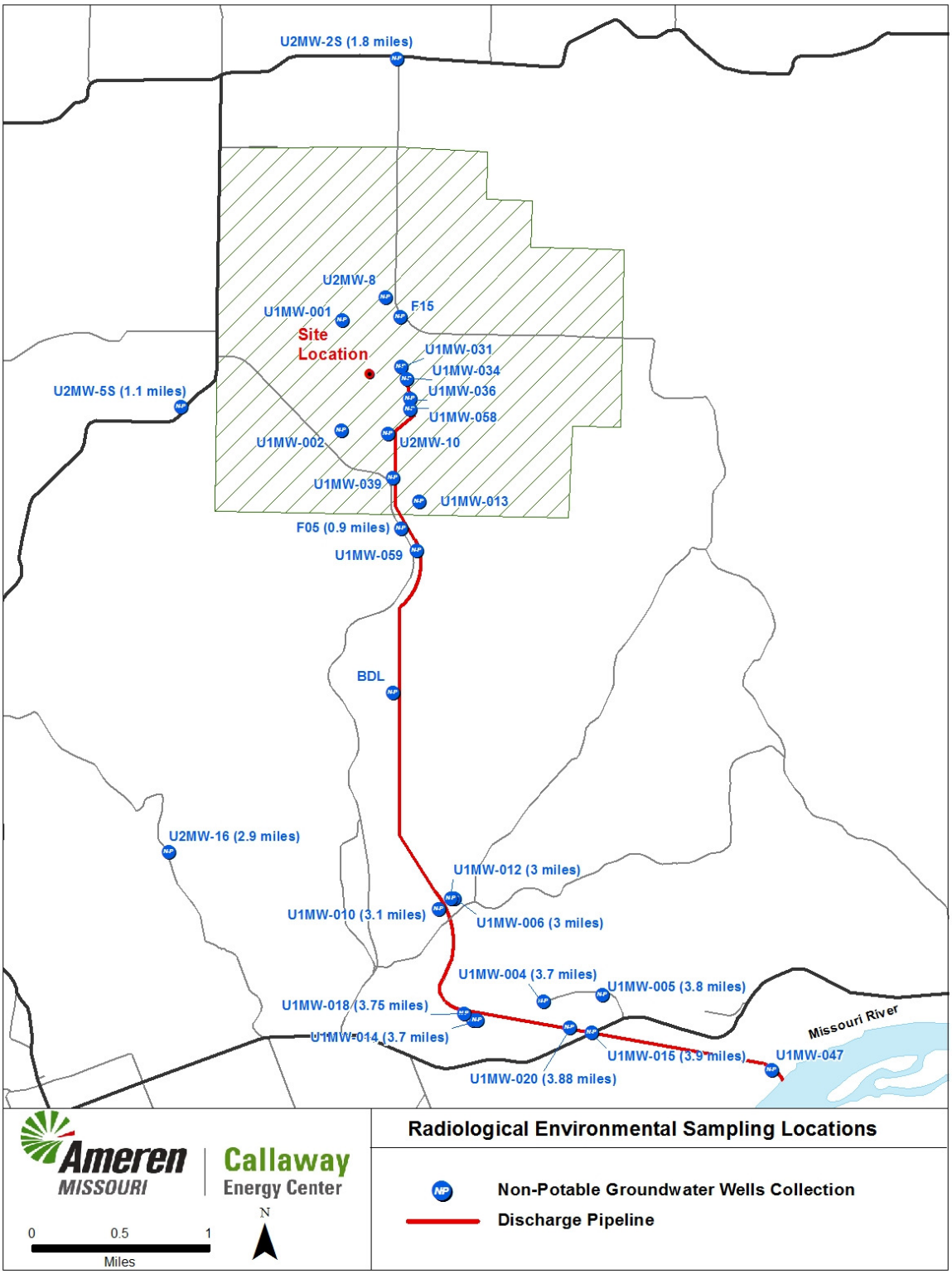


Figure D-5. Non-Potable Groundwater Monitoring Wells Collection.



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AMEREN MISSOURI,
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FULTON, MISSOURI

Docket Numbers 50-483 and 72-1045

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

to

THE UNITED STATES NUCLEAR REGULATORY COMMISSION

Part II

DATA TABULATIONS AND ANALYSES

January 1 to December 31, 2016

Prepared by

ENVIRONMENTAL, Inc.
Midwest Laboratory

Submitted by

Union Electric Co.
dba Ameren Missouri

Project No. 8036

TABLE OF CONTENTS

LIST OF TABLES

1.0 INTRODUCTION

The following constitutes a supplement to the Annual Report for the Radiological Environmental Monitoring Program conducted at the Ameren Missouri, Callaway Energy Center, Fulton, Missouri in 2016. Results of completed analyses are presented in the attached tables.

For information regarding sampling locations, type and frequency of collection, and sample codes, refer to Part I, Tables 5.1 - 5.2 and Figures 5.1 through 5.8.

Analyses results from additional sampling may be found in Appendix A.

2.0 DATA TABLES

Table 1. Air particulates and charcoal cartridges, analyses for gamma-emitting isotopes and I-131[a].

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-A-001							
		^{7}Be	^{58}Co	^{60}Co	^{95}Zr	^{134}Cs	^{137}Cs	$^{140}BaLa$	^{144}Ce
Required LLDs		-	-	-	-	0.050	0.060	-	-
Date Collected	Vol.								
01-08-16	290	< 0.10	< 0.005	< 0.005	< 0.014	< 0.008	< 0.007	< 0.009	< 0.041
01-15-16	279	< 0.14	< 0.011	< 0.012	< 0.020	< 0.012	< 0.006	< 0.037	< 0.064
01-22-16	277	< 0.09	< 0.008	< 0.008	< 0.017	< 0.010	< 0.006	< 0.016	< 0.051
01-29-16	302	< 0.10	< 0.008	< 0.005	< 0.016	< 0.009	< 0.009	< 0.007	< 0.046
02-04-16	294	< 0.09	< 0.004	< 0.005	< 0.015	< 0.009	< 0.009	< 0.006	< 0.046
02-11-16	291	< 0.10	< 0.009	< 0.005	< 0.017	< 0.010	< 0.011	< 0.020	< 0.052
02-18-16	290	< 0.10	< 0.007	< 0.003	< 0.013	< 0.009	< 0.007	< 0.010	< 0.037
02-25-16	306	< 0.10	< 0.010	< 0.008	< 0.013	< 0.008	< 0.005	< 0.015	< 0.039
03-03-16	307	0.23 ± 0.09	< 0.005	< 0.005	< 0.014	< 0.009	< 0.006	< 0.018	< 0.032
03-10-16	306	< 0.09	< 0.004	< 0.009	< 0.010	< 0.005	< 0.009	< 0.017	< 0.027
03-17-16	311	< 0.08	< 0.008	< 0.006	< 0.012	< 0.008	< 0.008	< 0.013	< 0.032
03-24-16	307	< 0.08	< 0.008	< 0.005	< 0.010	< 0.009	< 0.007	< 0.006	< 0.037
03-31-16	307	0.18 ± 0.09	< 0.005	< 0.008	< 0.012	< 0.009	< 0.006	< 0.014	< 0.041
04-07-16	314	0.18 ± 0.08	< 0.007	< 0.007	< 0.008	< 0.008	< 0.005	< 0.008	< 0.031
04-14-16	303	0.19 ± 0.09	< 0.009	< 0.009	< 0.012	< 0.010	< 0.007	< 0.015	< 0.038
04-21-16	311	< 0.13	< 0.006	< 0.005	< 0.014	< 0.009	< 0.010	< 0.015	< 0.038
04-28-16	310	< 0.13	< 0.006	< 0.005	< 0.018	< 0.009	< 0.008	< 0.017	< 0.046
05-05-16	305	< 0.09	< 0.007	< 0.007	< 0.008	< 0.010	< 0.011	< 0.009	< 0.049
05-12-16	312	< 0.14	< 0.006	< 0.008	< 0.017	< 0.010	< 0.007	< 0.038	< 0.036
05-19-16	309	0.21 ± 0.10	< 0.007	< 0.005	< 0.016	< 0.010	< 0.010	< 0.019	< 0.045
05-26-16	316	0.19 ± 0.10	< 0.006	< 0.005	< 0.015	< 0.009	< 0.006	< 0.016	< 0.042
06-02-16	316	0.26 ± 0.13	< 0.007	< 0.006	< 0.008	< 0.006	< 0.007	< 0.015	< 0.031
06-09-16	317	0.20 ± 0.12	< 0.006	< 0.003	< 0.014	< 0.008	< 0.005	< 0.017	< 0.033
06-16-16	317	< 0.11	< 0.008	< 0.005	< 0.012	< 0.007	< 0.005	< 0.035	< 0.047
06-23-16	317	< 0.15	< 0.007	< 0.007	< 0.011	< 0.010	< 0.010	< 0.025	< 0.044
06-30-16	317	0.17 ± 0.07	< 0.006	< 0.005	< 0.015	< 0.009	< 0.008	< 0.011	< 0.041
07-07-16	316	< 0.13	< 0.005	< 0.006	< 0.018	< 0.008	< 0.009	< 0.016	< 0.051
07-14-16	319	< 0.15	< 0.010	< 0.003	< 0.015	< 0.008	< 0.006	< 0.045	< 0.039
07-21-16	318	< 0.10	< 0.005	< 0.003	< 0.012	< 0.008	< 0.008	< 0.019	< 0.029
07-28-16	284	< 0.15	< 0.009	< 0.006	< 0.014	< 0.010	< 0.011	< 0.031	< 0.061
08-04-16	297	0.10 ± 0.05	< 0.005	< 0.004	< 0.014	< 0.006	< 0.005	< 0.007	< 0.024
08-11-16	298	< 0.11	< 0.015	< 0.008	< 0.016	< 0.009	< 0.010	< 0.022	< 0.044
08-18-16	304	< 0.12	< 0.010	< 0.008	< 0.017	< 0.010	< 0.008	< 0.019	< 0.041
08-25-16	309	0.18 ± 0.10	< 0.007	< 0.007	< 0.015	< 0.009	< 0.007	< 0.014	< 0.027
08-31-16	261	0.14 ± 0.08	< 0.006	< 0.010	< 0.009	< 0.008	< 0.005	< 0.013	< 0.036
09-08-16	354	< 0.09	< 0.007	< 0.005	< 0.009	< 0.007	< 0.007	< 0.010	< 0.039
09-15-16	310	< 0.11	< 0.011	< 0.006	< 0.017	< 0.009	< 0.005	< 0.041	< 0.035
09-22-16	310	0.21 ± 0.10	< 0.005	< 0.005	< 0.016	< 0.007	< 0.008	< 0.018	< 0.033
09-29-16	306	0.20 ± 0.10	< 0.006	< 0.008	< 0.018	< 0.008	< 0.006	< 0.010	< 0.035

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.

Table 1. Air particulates and charcoal cartridges, analyses for gamma-emitting isotopes and I-131[a].

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-A-001 (cont.)							
		^{7}Be	^{58}Co	^{60}Co	^{95}Zr	^{134}Cs	^{137}Cs	$^{140}BaLa$	^{144}Ce
Required LLDs		-	-	-	-	0.050	0.060	-	-
Date Collected	Vol.								
10-06-16	311	< 0.12	< 0.010	< 0.005	< 0.016	< 0.010	< 0.009	< 0.083	< 0.049
10-13-16	313	0.18 ± 0.10	< 0.006	< 0.007	< 0.017	< 0.009	< 0.009	< 0.075	< 0.037
10-21-16	351	< 0.11	< 0.008	< 0.007	< 0.016	< 0.007	< 0.003	< 0.039	< 0.031
10-27-16	264	< 0.11	< 0.009	< 0.008	< 0.015	< 0.010	< 0.010	< 0.057	< 0.054
11-03-16	312	< 0.11	< 0.011	< 0.006	< 0.015	< 0.008	< 0.008	< 0.041	< 0.048
11-10-16	311	< 0.12	< 0.010	< 0.008	< 0.021	< 0.011	< 0.008	< 0.058	< 0.050
11-17-16	307	< 0.14	< 0.007	< 0.008	< 0.014	< 0.009	< 0.008	< 0.060	< 0.040
11-23-16	256	< 0.11	< 0.014	< 0.009	< 0.030	< 0.010	< 0.011	< 0.052	< 0.053
12-01-16	346	< 0.10	< 0.006	< 0.010	< 0.023	< 0.012	< 0.006	< 0.037	< 0.052
12-08-16	300	< 0.07	< 0.008	< 0.009	< 0.013	< 0.008	< 0.007	< 0.017	< 0.043
12-16-16	324	< 0.09	< 0.013	< 0.008	< 0.016	< 0.009	< 0.006	< 0.032	< 0.039
12-22-16	239	0.19 ± 0.11	< 0.008	< 0.009	< 0.014	< 0.009	< 0.006	< 0.021	< 0.055
12-29-16	301	< 0.10	< 0.008	< 0.010	< 0.007	< 0.008	< 0.005	< 0.017	< 0.047

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.

Table 1. Air particulates and charcoal cartridges, analyses for gamma-emitting isotopes and I-131[a].

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-A-007							
		^{7}Be	^{58}Co	^{60}Co	^{95}Zr	^{134}Cs	^{137}Cs	$^{140}BaLa$	^{144}Ce
Required LLDs		-	-	-	-	0.050	0.060	-	-
Date Collected	Vol.								
01-08-16	283	< 0.10	< 0.007	< 0.007	< 0.018	< 0.010	< 0.009	< 0.016	< 0.052
01-15-16	276	< 0.14	< 0.010	< 0.006	< 0.026	< 0.011	< 0.009	< 0.016	< 0.032
01-22-16	283	0.20 ± 0.09	< 0.007	< 0.004	< 0.022	< 0.008	< 0.005	< 0.010	< 0.048
01-29-16	300	< 0.10	< 0.007	< 0.005	< 0.015	< 0.009	< 0.005	< 0.008	< 0.029
02-04-16	290	< 0.11	< 0.012	< 0.009	< 0.018	< 0.013	< 0.012	< 0.009	< 0.038
02-11-16	288	< 0.10	< 0.006	< 0.006	< 0.012	< 0.009	< 0.007	< 0.012	< 0.039
02-18-16	288	< 0.08	< 0.008	< 0.003	< 0.014	< 0.008	< 0.006	< 0.013	< 0.039
02-25-16	287	< 0.11	< 0.010	< 0.006	< 0.016	< 0.011	< 0.008	< 0.016	< 0.048
03-03-16	294	< 0.10	< 0.005	< 0.007	< 0.014	< 0.008	< 0.007	< 0.017	< 0.046
03-10-16	289	0.12 ± 0.07	< 0.010	< 0.005	< 0.009	< 0.010	< 0.006	< 0.008	< 0.056
03-17-16	291	< 0.11	< 0.005	< 0.005	< 0.015	< 0.010	< 0.006	< 0.010	< 0.049
03-24-16	290	0.14 ± 0.06	< 0.009	< 0.004	< 0.019	< 0.009	< 0.006	< 0.017	< 0.036
03-31-16	290	0.21 ± 0.12	< 0.010	< 0.006	< 0.013	< 0.010	< 0.009	< 0.010	< 0.059
04-07-16	286	< 0.11	< 0.004	< 0.007	< 0.016	< 0.010	< 0.008	< 0.016	< 0.030
04-14-16	286	0.27 ± 0.12	< 0.007	< 0.004	< 0.015	< 0.010	< 0.007	< 0.011	< 0.045
04-21-16	279	< 0.11	< 0.009	< 0.009	< 0.017	< 0.010	< 0.006	< 0.013	< 0.048
04-28-16	285	0.20 ± 0.10	< 0.005	< 0.007	< 0.016	< 0.010	< 0.011	< 0.009	< 0.044
05-05-16	282	< 0.09	< 0.009	< 0.006	< 0.010	< 0.009	< 0.009	< 0.006	< 0.048
05-12-16	283	< 0.12	< 0.006	< 0.012	< 0.021	< 0.009	< 0.011	< 0.042	< 0.060
05-19-16	291	0.19 ± 0.10	< 0.007	< 0.006	< 0.016	< 0.010	< 0.008	< 0.013	< 0.038
05-26-16	290	0.21 ± 0.11	< 0.004	< 0.008	< 0.016	< 0.008	< 0.007	< 0.032	< 0.056
06-02-16	284	0.20 ± 0.12	< 0.006	< 0.007	< 0.019	< 0.010	< 0.010	< 0.015	< 0.055
06-09-16	281	0.21 ± 0.10	< 0.011	< 0.006	< 0.016	< 0.010	< 0.005	< 0.035	< 0.034
06-16-16	281	0.24 ± 0.12	< 0.006	< 0.006	< 0.015	< 0.008	< 0.006	< 0.014	< 0.038
06-23-16	277	0.17 ± 0.10	< 0.010	< 0.007	< 0.023	< 0.012	< 0.008	< 0.028	< 0.044
06-30-16	277	0.19 ± 0.10	< 0.009	< 0.003	< 0.011	< 0.008	< 0.007	< 0.015	< 0.034
07-07-16	275	< 0.11	< 0.008	< 0.004	< 0.021	< 0.010	< 0.006	< 0.045	< 0.046
07-14-16	257	< 0.14	< 0.007	< 0.010	< 0.016	< 0.010	< 0.007	< 0.048	< 0.040
07-21-16	275	0.20 ± 0.09	< 0.008	< 0.005	< 0.019	< 0.010	< 0.008	< 0.033	< 0.043
07-28-16	275	< 0.16	< 0.016	< 0.010	< 0.026	< 0.009	< 0.011	< 0.071	< 0.039
08-04-16	272	< 0.08	< 0.004	< 0.006	< 0.011	< 0.008	< 0.007	< 0.008	< 0.027
08-11-16	268	< 0.19	< 0.011	< 0.010	< 0.034	< 0.010	< 0.010	< 0.079	< 0.045
08-18-16	269	< 0.13	< 0.015	< 0.009	< 0.021	< 0.009	< 0.010	< 0.019	< 0.052
08-25-16	267	< 0.11	< 0.007	< 0.008	< 0.016	< 0.010	< 0.009	< 0.013	< 0.053
08-31-16	226	< 0.15	< 0.010	< 0.012	< 0.021	< 0.013	< 0.010	< 0.014	< 0.057
09-08-16	304	< 0.11	< 0.005	< 0.008	< 0.018	< 0.010	< 0.010	< 0.051	< 0.052
09-15-16	263	0.17 ± 0.10	< 0.007	< 0.009	< 0.014	< 0.006	< 0.008	< 0.055	< 0.031
09-22-16	261	< 0.12	< 0.006	< 0.006	< 0.014	< 0.009	< 0.010	< 0.040	< 0.039
09-29-16	258	< 0.11	< 0.007	< 0.009	< 0.014	< 0.009	< 0.007	< 0.048	< 0.037

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.

Table 1. Air particulates and charcoal cartridges, analyses for gamma-emitting isotopes and I-131[a].

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-A-007 (cont.)							
		^{7}Be	^{58}Co	^{60}Co	^{95}Zr	^{134}Cs	^{137}Cs	$^{140}BaLa$	^{144}Ce
Required LLDs		-	-	-	-	0.050	0.060	-	-
Date Collected	Vol.								
10-06-16	254	< 0.14	< 0.011	< 0.008	< 0.018	< 0.011	< 0.011	< 0.086	< 0.051
10-13-16	253	< 0.14	< 0.008	< 0.006	< 0.014	< 0.011	< 0.009	< 0.036	< 0.061
10-21-16	279	< 0.12	< 0.007	< 0.008	< 0.020	< 0.010	< 0.010	< 0.072	< 0.049
10-27-16	211	< 0.18	< 0.009	< 0.008	< 0.023	< 0.012	< 0.008	< 0.093	< 0.050
11-03-16	245	0.23 ± 0.13	< 0.012	< 0.010	< 0.017	< 0.011	< 0.010	< 0.067	< 0.059
11-10-16	241	< 0.13	< 0.009	< 0.010	< 0.016	< 0.011	< 0.008	< 0.096	< 0.047
11-17-16	239	< 0.14	< 0.007	< 0.007	< 0.021	< 0.012	< 0.012	< 0.024	< 0.071
11-23-16	196	< 0.18	< 0.009	< 0.009	< 0.023	< 0.011	< 0.015	< 0.029	< 0.057
12-01-16	241	< 0.10	< 0.006	< 0.012	< 0.022	< 0.011	< 0.012	< 0.061	< 0.058
12-08-16	265	< 0.11	< 0.012	< 0.009	< 0.015	< 0.008	< 0.006	< 0.026	< 0.055
12-16-16	301	< 0.10	< 0.006	< 0.009	< 0.018	< 0.010	< 0.007	< 0.019	< 0.031
12-22-16	224	< 0.12	< 0.014	< 0.011	< 0.021	< 0.012	< 0.007	< 0.025	< 0.052
12-29-16	263	< 0.11	< 0.004	< 0.008	< 0.019	< 0.010	< 0.009	< 0.009	< 0.049

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.

Table 1. Air particulates and charcoal cartridges, analyses for gamma-emitting isotopes and I-131[a].

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-A-008							
		^{7}Be	^{58}Co	^{60}Co	^{95}Zr	^{134}Cs	^{137}Cs	^{140}BaLa	^{144}Ce
Required LLDs		-	-	-	-	0.050	0.060	-	-
Date Collected	Vol.								
01-08-16	238	< 0.13	< 0.006	< 0.008	< 0.022	< 0.010	< 0.009	< 0.040	< 0.058
01-15-16	230	< 0.11	< 0.004	< 0.006	< 0.014	< 0.010	< 0.011	< 0.012	< 0.047
01-22-16	268	0.14 ± 0.08	< 0.003	< 0.008	< 0.014	< 0.008	< 0.007	< 0.009	< 0.045
01-29-16	288	< 0.10	< 0.007	< 0.006	< 0.016	< 0.009	< 0.011	< 0.009	< 0.038
02-04-16	270	< 0.09	< 0.009	< 0.010	< 0.016	< 0.009	< 0.005	< 0.010	< 0.037
02-11-16	273	< 0.12	< 0.005	< 0.006	< 0.015	< 0.010	< 0.009	< 0.012	< 0.069
02-18-16	271	< 0.13	< 0.010	< 0.008	< 0.016	< 0.009	< 0.009	< 0.031	< 0.051
02-25-16	278	0.14 ± 0.08	< 0.005	< 0.005	< 0.013	< 0.010	< 0.005	< 0.031	< 0.058
03-03-16	280	0.16 ± 0.10	< 0.010	< 0.009	< 0.010	< 0.009	< 0.008	< 0.019	< 0.031
03-10-16	274	< 0.13	< 0.009	< 0.005	< 0.016	< 0.010	< 0.009	< 0.009	< 0.042
03-17-16	279	< 0.10	< 0.007	< 0.008	< 0.009	< 0.010	< 0.007	< 0.016	< 0.038
03-24-16	273	0.13 ± 0.07	< 0.004	< 0.006	< 0.010	< 0.007	< 0.007	< 0.010	< 0.022
03-31-16	275	< 0.12	< 0.008	< 0.010	< 0.017	< 0.011	< 0.008	< 0.016	< 0.047
04-07-16	278	0.16 ± 0.09	< 0.004	< 0.007	< 0.016	< 0.008	< 0.006	< 0.016	< 0.033
04-14-16	269	< 0.15	< 0.006	< 0.006	< 0.014	< 0.011	< 0.006	< 0.028	< 0.047
04-21-16	271	< 0.16	< 0.011	< 0.005	< 0.018	< 0.009	< 0.010	< 0.019	< 0.058
04-28-16	273	0.20 ± 0.09	< 0.008	< 0.007	< 0.021	< 0.010	< 0.010	< 0.010	< 0.053
05-05-16	268	< 0.10	< 0.004	< 0.005	< 0.017	< 0.010	< 0.007	< 0.016	< 0.052
05-12-16	272	< 0.14	< 0.005	< 0.010	< 0.017	< 0.010	< 0.007	< 0.041	< 0.048
05-19-16	271	< 0.12	< 0.007	< 0.013	< 0.012	< 0.011	< 0.006	< 0.019	< 0.067
05-26-16	277	< 0.13	< 0.010	< 0.007	< 0.015	< 0.009	< 0.008	< 0.019	< 0.037
06-02-16	278	< 0.12	< 0.009	< 0.006	< 0.014	< 0.009	< 0.009	< 0.020	< 0.061
06-09-16	281	< 0.17	< 0.012	< 0.006	< 0.018	< 0.011	< 0.011	< 0.053	< 0.066
06-16-16	285	0.17 ± 0.09	< 0.010	< 0.009	< 0.013	< 0.010	< 0.008	< 0.031	< 0.051
06-23-16	294	< 0.15	< 0.009	< 0.009	< 0.016	< 0.009	< 0.010	< 0.018	< 0.046
06-30-16	302	< 0.12	< 0.008	< 0.010	< 0.017	< 0.009	< 0.007	< 0.018	< 0.049
07-07-16	301	< 0.15	< 0.008	< 0.008	< 0.015	< 0.008	< 0.010	< 0.039	< 0.045
07-14-16	306	< 0.13	< 0.011	< 0.008	< 0.022	< 0.009	< 0.007	< 0.040	< 0.045
07-21-16	310	0.18 ± 0.10	< 0.009	< 0.007	< 0.015	< 0.008	< 0.006	< 0.014	< 0.033
07-28-16	314	0.22 ± 0.12	< 0.008	< 0.006	< 0.020	< 0.009	< 0.009	< 0.015	< 0.044
08-04-16	314	< 0.10	< 0.012	< 0.007	< 0.020	< 0.009	< 0.008	< 0.032	< 0.058
08-11-16	314	0.17 ± 0.10	< 0.007	< 0.006	< 0.013	< 0.009	< 0.008	< 0.041	< 0.040
08-18-16	314	< 0.11	< 0.008	< 0.007	< 0.018	< 0.010	< 0.006	< 0.042	< 0.037
08-25-16	319	0.15 ± 0.09	< 0.008	< 0.008	< 0.016	< 0.009	< 0.008	< 0.013	< 0.041
08-31-16	270	< 0.12	< 0.010	< 0.009	< 0.022	< 0.011	< 0.007	< 0.013	< 0.042
09-08-16	363	0.17 ± 0.10	< 0.007	< 0.008	< 0.014	< 0.008	< 0.006	< 0.051	< 0.037
09-15-16	316	< 0.12	< 0.007	< 0.006	< 0.015	< 0.009	< 0.006	< 0.046	< 0.045
09-22-16	316	0.18 ± 0.11	< 0.006	< 0.006	< 0.013	< 0.009	< 0.009	< 0.014	< 0.034
09-29-16	313	0.19 ± 0.06	< 0.003	< 0.007	< 0.009	< 0.006	< 0.007	< 0.012	< 0.036

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.

Table 1. Air particulates and charcoal cartridges, analyses for gamma-emitting isotopes and I-131[a].

Collection: Continuous, weekly exchange.
Units: pCi/m^3

Location		CA-A-008 (cont.)							
		^{7}Be	^{58}Co	^{60}Co	^{95}Zr	^{134}Cs	^{137}Cs	$^{140}BaLa$	^{144}Ce
Required LLDs		-	-	-	-	0.050	0.060	-	-
Date Collected	Vol.								
10-06-16	312	< 0.12	< 0.009	< 0.009	< 0.014	< 0.008	< 0.006	< 0.069	< 0.044
10-13-16	312	< 0.14	< 0.011	< 0.008	< 0.015	< 0.010	< 0.009	< 0.084	< 0.043
10-21-16	349	< 0.09	< 0.004	< 0.006	< 0.010	< 0.007	< 0.005	< 0.053	< 0.054
10-27-16	263	< 0.12	< 0.008	< 0.008	< 0.015	< 0.011	< 0.010	< 0.069	< 0.034
11-03-16	308	0.23 ± 0.12	< 0.008	< 0.008	< 0.014	< 0.010	< 0.010	< 0.052	< 0.029
11-10-16	284	< 0.12	< 0.011	< 0.007	< 0.019	< 0.010	< 0.009	< 0.094	< 0.032
11-17-16	282	< 0.14	< 0.012	< 0.007	< 0.018	< 0.010	< 0.008	< 0.072	< 0.051
11-23-16	232	< 0.12	< 0.006	< 0.009	< 0.020	< 0.013	< 0.010	< 0.071	< 0.053
12-01-16	310	< 0.11	< 0.009	< 0.009	< 0.012	< 0.009	< 0.006	< 0.055	< 0.039
12-08-16	265	< 0.11	< 0.010	< 0.007	< 0.013	< 0.009	< 0.008	< 0.023	< 0.053
12-16-16	293	< 0.09	< 0.008	< 0.007	< 0.017	< 0.010	< 0.007	< 0.021	< 0.046
12-22-16	217	< 0.14	< 0.012	< 0.012	< 0.018	< 0.013	< 0.012	< 0.020	< 0.056
12-29-16	267	0.18 ± 0.10	< 0.014	< 0.010	< 0.011	< 0.011	< 0.007	< 0.019	< 0.047

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.

Table 1. Air particulates and charcoal cartridges, analyses for gamma-emitting isotopes and I-131[a].

Collection: Continuous, weekly exchange.
Units: pCi/m^3

Location		CA-A-009							
		^{7}Be	^{58}Co	^{60}Co	^{95}Zr	^{134}Cs	^{137}Cs	^{140}BaLa	^{144}Ce
Required LLDs		-	-	-	-	0.050	0.060	-	-
Date Collected	Vol.								
01-08-16	265	< 0.11	< 0.011	< 0.009	< 0.009	< 0.010	< 0.007	< 0.021	< 0.050
01-15-16	300	< 0.10	< 0.007	< 0.008	< 0.012	< 0.010	< 0.007	< 0.022	< 0.049
01-22-16	306	< 0.10	< 0.007	< 0.006	< 0.017	< 0.009	< 0.005	< 0.016	< 0.050
01-29-16	329	0.13 ± 0.06	< 0.005	< 0.007	< 0.013	< 0.007	< 0.005	< 0.016	< 0.044
02-04-16	321	< 0.09	< 0.008	< 0.005	< 0.011	< 0.007	< 0.007	< 0.007	< 0.041
02-11-16	320	< 0.10	< 0.003	< 0.005	< 0.009	< 0.008	< 0.008	< 0.009	< 0.035
02-18-16	320	0.19 ± 0.11	< 0.009	< 0.008	< 0.010	< 0.009	< 0.007	< 0.024	< 0.042
02-25-16	332	< 0.07	< 0.007	< 0.005	< 0.010	< 0.008	< 0.007	< 0.019	< 0.034
03-03-16	329	0.18 ± 0.09	< 0.008	< 0.007	< 0.014	< 0.008	< 0.007	< 0.022	< 0.037
03-10-16	332	< 0.10	< 0.004	< 0.007	< 0.009	< 0.007	< 0.008	< 0.010	< 0.035
03-17-16	335	< 0.09	< 0.006	< 0.004	< 0.016	< 0.007	< 0.008	< 0.010	< 0.033
03-24-16	332	< 0.10	< 0.008	< 0.004	< 0.017	< 0.009	< 0.009	< 0.010	< 0.034
03-31-16	332	< 0.09	< 0.003	< 0.006	< 0.016	< 0.008	< 0.008	< 0.013	< 0.039
04-07-16	333	0.19 ± 0.08	< 0.006	< 0.005	< 0.011	< 0.007	< 0.007	< 0.016	< 0.032
04-14-16	328	0.19 ± 0.09	< 0.006	< 0.006	< 0.015	< 0.008	< 0.006	< 0.018	< 0.040
04-21-16	292	< 0.11	< 0.008	< 0.007	< 0.015	< 0.010	< 0.006	< 0.020	< 0.041
04-28-16	306	< 0.11	< 0.005	< 0.006	< 0.011	< 0.009	< 0.006	< 0.013	< 0.040
05-05-16	312	< 0.09	< 0.009	< 0.009	< 0.009	< 0.009	< 0.008	< 0.010	< 0.041
05-12-16	321	< 0.12	< 0.005	< 0.006	< 0.018	< 0.008	< 0.008	< 0.032	< 0.046
05-19-16	315	0.29 ± 0.12	< 0.010	< 0.003	< 0.012	< 0.009	< 0.008	< 0.012	< 0.042
05-26-16	325	0.22 ± 0.10	< 0.007	< 0.004	< 0.013	< 0.008	< 0.007	< 0.025	< 0.045
06-02-16	271	< 0.17	< 0.014	< 0.011	< 0.020	< 0.015	< 0.010	< 0.044	< 0.053
06-09-16	272	0.25 ± 0.13	< 0.009	< 0.006	< 0.023	< 0.009	< 0.009	< 0.021	< 0.055
06-16-16	270	0.30 ± 0.15	< 0.010	< 0.003	< 0.015	< 0.010	< 0.007	< 0.018	< 0.045
06-23-16	270	0.20 ± 0.09	< 0.009	< 0.005	< 0.020	< 0.009	< 0.012	< 0.026	< 0.045
06-30-16	271	0.20 ± 0.12	< 0.007	< 0.007	< 0.022	< 0.011	< 0.010	< 0.031	< 0.047
07-07-16	273	< 0.13	< 0.008	< 0.005	< 0.010	< 0.010	< 0.007	< 0.024	< 0.052
07-14-16	268	< 0.15	< 0.009	< 0.008	< 0.014	< 0.010	< 0.010	< 0.045	< 0.057
07-21-16	270	< 0.15	< 0.007	< 0.004	< 0.016	< 0.009	< 0.008	< 0.023	< 0.049
07-28-16	270	< 0.10	< 0.013	< 0.007	< 0.012	< 0.009	< 0.009	< 0.024	< 0.032
08-04-16	275	< 0.13	< 0.008	< 0.009	< 0.017	< 0.009	< 0.004	< 0.056	< 0.047
08-11-16	267	< 0.12	< 0.009	< 0.007	< 0.024	< 0.010	< 0.009	< 0.027	< 0.049
08-18-16	268	< 0.15	< 0.011	< 0.009	< 0.027	< 0.009	< 0.010	< 0.035	< 0.042
08-25-16	274	< 0.11	< 0.007	< 0.008	< 0.013	< 0.010	< 0.006	< 0.018	< 0.047
08-31-16	230	< 0.13	< 0.011	< 0.009	< 0.022	< 0.011	< 0.012	< 0.015	< 0.036
09-08-16	310	< 0.11	< 0.010	< 0.007	< 0.020	< 0.007	< 0.008	< 0.050	< 0.047
09-15-16	269	< 0.13	< 0.009	< 0.014	< 0.017	< 0.011	< 0.008	< 0.059	< 0.047
09-22-16	268	< 0.13	< 0.008	< 0.009	< 0.011	< 0.010	< 0.006	< 0.051	< 0.046
09-29-16	268	0.21 ± 0.10	< 0.008	< 0.007	< 0.018	< 0.010	< 0.005	< 0.056	< 0.031

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.

Table 1. Air particulates and charcoal cartridges, analyses for gamma-emitting isotopes and I-131[a].

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-A-009 (cont.)							
		^{7}Be	^{58}Co	^{60}Co	^{95}Zr	^{134}Cs	^{137}Cs	$^{140}BaLa$	^{144}Ce
Required LLDs		-	-	-	-	0.050	0.060	-	-
Date Collected	Vol.								
10-06-16	269	< 0.13	< 0.008	< 0.009	< 0.026	< 0.010	< 0.008	< 0.075	< 0.032
10-13-16	272	< 0.12	< 0.011	< 0.007	< 0.013	< 0.010	< 0.009	< 0.045	< 0.053
10-21-16	303	< 0.13	< 0.005	< 0.007	< 0.022	< 0.010	< 0.004	< 0.067	< 0.028
10-27-16	230	< 0.14	< 0.010	< 0.011	< 0.025	< 0.010	< 0.010	< 0.086	< 0.037
11-03-16	267	0.23 ± 0.11	< 0.010	< 0.009	< 0.013	< 0.010	< 0.010	< 0.063	< 0.035
11-10-16	273	< 0.13	< 0.015	< 0.006	< 0.017	< 0.009	< 0.010	< 0.045	< 0.036
11-17-16	269	< 0.12	< 0.006	< 0.008	< 0.017	< 0.010	< 0.009	< 0.077	< 0.056
11-23-16	224	< 0.16	< 0.010	< 0.011	< 0.020	< 0.014	< 0.012	< 0.038	< 0.063
12-01-16	300	0.18 ± 0.10	< 0.010	< 0.008	< 0.013	< 0.009	< 0.007	< 0.047	< 0.055
12-08-16	283	< 0.10	< 0.010	< 0.008	< 0.016	< 0.010	< 0.007	< 0.021	< 0.044
12-16-16	342	0.19 ± 0.09	< 0.006	< 0.006	< 0.011	< 0.007	< 0.005	< 0.010	< 0.047
12-22-16	258	0.28 ± 0.14	< 0.010	< 0.011	< 0.015	< 0.011	< 0.009	< 0.020	< 0.053
12-29-16	289	< 0.11	< 0.010	< 0.007	< 0.015	< 0.009	< 0.007	< 0.009	< 0.050

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.

Table 1. Air particulates and charcoal cartridges, analyses for gamma-emitting isotopes and I-131[a].

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-B-003							
		^{7}Be	^{58}Co	^{60}Co	^{95}Zr	^{134}Cs	^{137}Cs	$^{140}BaLa$	^{144}Ce
Required LLDs		-	-	-	-	0.050	0.060	-	-
Date Collected	Vol.								
01-08-16	265	< 0.12	< 0.007	< 0.003	< 0.015	< 0.008	< 0.004	< 0.015	< 0.054
01-15-16	256	< 0.09	< 0.005	< 0.005	< 0.020	< 0.010	< 0.010	< 0.029	< 0.033
01-22-16	256	< 0.12	< 0.005	< 0.007	< 0.013	< 0.008	< 0.007	< 0.008	< 0.039
01-29-16	268	< 0.11	< 0.005	< 0.003	< 0.017	< 0.009	< 0.007	< 0.009	< 0.050
02-04-16	268	< 0.11	< 0.010	< 0.008	< 0.022	< 0.011	< 0.006	< 0.017	< 0.063
02-11-16	262	< 0.13	< 0.005	< 0.007	< 0.017	< 0.009	< 0.009	< 0.018	< 0.046
02-18-16	258	< 0.11	< 0.007	< 0.008	< 0.019	< 0.010	< 0.010	< 0.031	< 0.035
02-25-16	272	< 0.09	< 0.008	< 0.005	< 0.011	< 0.010	< 0.011	< 0.027	< 0.063
03-03-16	272	< 0.12	< 0.010	< 0.007	< 0.016	< 0.009	< 0.007	< 0.014	< 0.061
03-10-16	271	0.17 ± 0.10	< 0.008	< 0.009	< 0.015	< 0.010	< 0.006	< 0.016	< 0.029
03-17-16	281	< 0.10	< 0.008	< 0.011	< 0.016	< 0.013	< 0.012	< 0.015	< 0.035
03-24-16	274	< 0.12	< 0.011	< 0.010	< 0.018	< 0.010	< 0.011	< 0.026	< 0.050
03-31-16	274	0.17 ± 0.10	< 0.011	< 0.008	< 0.013	< 0.008	< 0.009	< 0.021	< 0.038
04-07-16	276	0.19 ± 0.10	< 0.006	< 0.005	< 0.019	< 0.009	< 0.007	< 0.019	< 0.053
04-14-16	270	< 0.12	< 0.007	< 0.006	< 0.011	< 0.008	< 0.008	< 0.023	< 0.042
04-21-16	280	< 0.11	< 0.010	< 0.009	< 0.018	< 0.009	< 0.009	< 0.017	< 0.050
04-28-16	281	< 0.13	< 0.009	< 0.005	< 0.011	< 0.009	< 0.007	< 0.015	< 0.032
05-05-16	276	< 0.09	< 0.005	< 0.006	< 0.014	< 0.010	< 0.010	< 0.012	< 0.038
05-12-16	280	< 0.14	< 0.005	< 0.007	< 0.023	< 0.011	< 0.011	< 0.035	< 0.052
05-19-16	276	< 0.12	< 0.012	< 0.010	< 0.019	< 0.012	< 0.010	< 0.021	< 0.060
05-26-16	283	< 0.17	< 0.006	< 0.006	< 0.011	< 0.010	< 0.010	< 0.027	< 0.052
06-02-16	283	< 0.12	< 0.006	< 0.007	< 0.016	< 0.009	< 0.010	< 0.022	< 0.046
06-09-16	286	< 0.16	< 0.007	< 0.009	< 0.010	< 0.009	< 0.006	< 0.029	< 0.052
06-16-16	286	0.24 ± 0.12	< 0.007	< 0.006	< 0.017	< 0.010	< 0.006	< 0.024	< 0.049
06-23-16	286	< 0.16	< 0.005	< 0.008	< 0.019	< 0.010	< 0.009	< 0.024	< 0.058
06-30-16	291	< 0.12	< 0.008	< 0.005	< 0.014	< 0.009	< 0.006	< 0.021	< 0.039
07-07-16	258	< 0.14	< 0.011	< 0.005	< 0.023	< 0.011	< 0.008	< 0.033	< 0.050
07-14-16	250	< 0.22	< 0.015	< 0.012	< 0.029	< 0.015	< 0.011	< 0.104	< 0.073
07-21-16	254	< 0.12	< 0.010	< 0.004	< 0.018	< 0.010	< 0.005	< 0.031	< 0.033
07-28-16	258	< 0.13	< 0.010	< 0.007	< 0.017	< 0.010	< 0.007	< 0.024	< 0.067
08-04-16	255	< 0.15	< 0.012	< 0.007	< 0.022	< 0.010	< 0.010	< 0.034	< 0.034
08-11-16	246	< 0.14	< 0.010	< 0.008	< 0.016	< 0.011	< 0.006	< 0.035	< 0.045
08-18-16	276	0.25 ± 0.12	< 0.009	< 0.009	< 0.016	< 0.009	< 0.009	< 0.050	< 0.040
08-25-16	285	< 0.11	< 0.009	< 0.009	< 0.016	< 0.009	< 0.007	< 0.016	< 0.055
08-31-16	241	< 0.12	< 0.014	< 0.010	< 0.019	< 0.012	< 0.013	< 0.016	< 0.049
09-08-16	328	0.20 ± 0.10	< 0.003	< 0.007	< 0.015	< 0.008	< 0.005	< 0.045	< 0.024
09-15-16	286	< 0.12	< 0.009	< 0.011	< 0.015	< 0.009	< 0.008	< 0.056	< 0.048
09-22-16	288	0.20 ± 0.09	< 0.008	< 0.005	< 0.010	< 0.008	< 0.004	< 0.020	< 0.041
09-29-16	288	< 0.13	< 0.005	< 0.006	< 0.022	< 0.010	< 0.007	< 0.037	< 0.044

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.

Table 1. Air particulates and charcoal cartridges, analyses for gamma-emitting isotopes and I-131[a].

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-B-003 (cont.)							
		^{7}Be	^{58}Co	^{60}Co	^{95}Zr	^{134}Cs	^{137}Cs	$^{140}BaLa$	^{144}Ce
Required LLDs		-	-	-	-	0.050	0.060	-	-
Date Collected	Vol.								
10-06-16	290	< 0.13	< 0.006	< 0.005	< 0.016	< 0.008	< 0.009	< 0.070	< 0.036
10-13-16	294	0.19 ± 0.10	< 0.012	< 0.007	< 0.022	< 0.010	< 0.006	< 0.079	< 0.042
10-21-16	327	< 0.10	< 0.008	< 0.007	< 0.018	< 0.008	< 0.005	< 0.058	< 0.034
10-27-16	251	< 0.12	< 0.011	< 0.011	< 0.021	< 0.012	< 0.009	< 0.078	< 0.038
11-03-16	298	0.24 ± 0.12	< 0.005	< 0.010	< 0.012	< 0.008	< 0.010	< 0.054	< 0.025
11-10-16	300	0.21 ± 0.09	< 0.006	< 0.009	< 0.021	< 0.007	< 0.005	< 0.058	< 0.033
11-17-16	299	< 0.11	< 0.009	< 0.007	< 0.011	< 0.007	< 0.006	< 0.062	< 0.043
11-23-16	249	< 0.13	< 0.010	< 0.011	< 0.014	< 0.010	< 0.012	< 0.069	< 0.059
12-01-16	336	< 0.10	< 0.010	< 0.006	< 0.014	< 0.007	< 0.009	< 0.025	< 0.049
12-08-16	290	< 0.06	< 0.005	< 0.008	< 0.018	< 0.010	< 0.009	< 0.026	< 0.043
12-16-16	324	< 0.09	< 0.006	< 0.006	< 0.014	< 0.008	< 0.004	< 0.013	< 0.047
12-22-16	246	0.22 ± 0.13	< 0.007	< 0.012	< 0.025	< 0.011	< 0.010	< 0.019	< 0.054
12-28-16	269	0.23 ± 0.13	< 0.008	< 0.011	< 0.021	< 0.010	< 0.007	< 0.011	< 0.046

[a] Iodine-131 concentrations are < 0.07 pCi/m^3 unless noted otherwise.

Table 2. Milk, analyses for iodine-131 and gamma-emitting isotopes.

Collection: Semimonthly during grazing season, monthly otherwise.

Units: pCi/L

Location		CA-MLK-M9					
Date	Lab	Concentration (pCi/L)					
Collected	Code	I-131	K-40	Zn-65	Cs-134	Cs-137	Ba-La-140
Required LLDs		1	-	-	15	18	15
01-11-16	CAMI -191	< 0.3	849 ± 43	< 3.4	< 1.8	< 1.7	< 2.1
02-09-16	CAMI -576	< 0.4	1124 ± 101	< 6.2	< 3.2	< 3.1	< 3.0
03-08-16	CAMI -1005	< 0.3	1243 ± 104	< 5.7	< 3.8	< 3.0	< 2.5
03-22-16	CAMI -1195	< 0.3	1135 ± 91	< 5.4	< 3.2	< 2.9	< 1.8
04-11-16	CAMI -1537	< 0.3	947 ± 84	< 4.4	< 3.0	< 4.1	< 1.7
04-25-16	CAMI -1954	< 0.4	1615 ± 191	< 8.0	< 7.6	< 7.9	< 7.5
05-09-16	CAMI -2280	< 0.2	1308 ± 124	< 4.7	< 2.9	< 3.5	< 2.4
05-23-16	CAMI -2617	< 0.5	1504 ± 128	< 8.1	< 4.6	< 4.8	< 4.6
06-14-16	CAMI -2999	< 0.3	1375 ± 119	< 6.2	< 4.0	< 3.4	< 2.0
06-28-16	CAMI -3247	< 0.2	1076 ± 103	< 5.9	< 3.1	< 3.1	< 2.5
07-12-16	CAMI -3655	< 0.4	1405 ± 124	< 3.7	< 3.6	< 4.4	< 3.7
07-26-16	CAMI -3969	< 0.3	1258 ± 102	< 6.5	< 3.3	< 2.2	< 2.6
08-08-16	CAMI -4265	< 0.4	1370 ± 114	< 4.5	< 4.1	< 4.4	< 2.6
08-22-16	CAMI -4471	< 0.5	1093 ± 102	< 6.8	< 4.1	< 4.1	< 3.4
09-13-16	CAMI -4873	< 0.4	1095 ± 152	< 6.3	< 7.6	< 4.7	< 5.7
09-26-16	CAMI -5130	< 0.4	1019 ± 104	< 4.9	< 3.8	< 3.7	< 2.6
10-11-16	CAMI -5477	< 0.4	1105 ± 127	< 5.6	< 4.7	< 5.4	< 2.0
10-24-16	CAMI -5858	< 0.3	1352 ± 122	< 6.9	< 5.0	< 4.2	< 3.1
11-22-16	CAMI -6452	< 0.2	1122 ± 108	< 8.7	< 4.9	< 3.9	< 2.3
12-13-16	CAMI -6793	< 0.2	1360 ± 108	< 4.1	< 3.4	< 1.9	< 2.4

Table 3. Vegetation, analyses for iodine-131 and gamma-emitting isotopes.

Collection: Monthly, during growing season

Units: pCi/kg wet

Lab Code	Collection Date	Sample Type	Concentration (pCi/kg wet) ^{40}K	^{54}Mn	^{58}Co	^{60}Co	^{131}I	^{134}Cs	^{137}Cs
			Location: CA-FPL-V9						
	5/9/2016			NS[a]					
CAVE- 3000	6/14/2016	Lettuce	5821 ± 328	< 10.3	< 9.0	< 7.0	< 22.2	< 9.4	< 10.2
CAVE- 3001	6/14/2016	Cabbage	4396 ± 235	< 6.6	< 3.9	< 4.2	< 20.1	< 7.0	< 7.2
CAVE- 3002	6/14/2016	Mustard	4645 ± 241	< 4.7	< 3.5	< 5.6	< 13.3	< 6.7	< 7.4
CAVE- 3003	6/14/2016	Swiss Chard	5878 ± 342	< 6.7	< 4.9	< 7.0	< 12.4	< 7.5	< 8.1
CAVE- 3004	6/14/2016	Collard Greens	4028 ± 284	< 5.1	< 8.6	< 7.0	< 20.4	< 8.9	< 9.1
CAVE- 3656	7/12/2016	Collard Greens	4088 ± 298	< 9.3	< 9.2	< 9.6	< 33.2	< 7.6	< 8.2
CAVE- 3657	7/12/2016	Cabbage	4088 ± 264	< 7.9	< 4.8	< 4.6	< 17.4	< 7.4	< 4.7
	8/9/2016			NS[a]					
CAVE- 4896	9/13/2016	Mustard Greens	3855 ± 213	< 4.9	< 6.8	< 4.2	< 17.2	< 5.7	< 7.0
CAVE- 5486	10/11/2016	Collard Greens	3457 ± 220	< 4.6	< 7.6	< 4.2	< 25.8	< 6.9	< 7.6
CAVE- 5487	10/11/2016	Mustard Greens	4111 ± 237	< 4.1	< 5.5	< 4.1	< 26.5	< 6.4	< 5.6
			Location: CA-FPL-V11						
CAVE- 2281	5/9/2016	Lettuce	4741 ± 364	< 9.4	< 8.0	< 7.2	< 17.1	< 8.9	< 10.0
CAVE- 2282	5/9/2016	Collard Greens	3504 ± 247	< 6.4	< 7.3	< 7.2	< 12.6	< 6.9	< 7.0
CAVE- 3005	6/13/2016	Lettuce	6314 ± 499	< 15.7	< 10.7	< 14.1	< 32.9	< 17.8	< 9.4
CAVE- 3006	6/13/2016	Collard Greens	4402 ± 320	< 5.7	< 7.8	< 8.8	< 17.3	< 12.0	< 7.5
CAVE- 3658	7/12/2016	Collard Greens	3287 ± 204	< 5.9	< 5.3	< 3.7	< 22.0	< 5.2	< 6.6
CAVE- 3659	7/12/2016	Cabbage	2103 ± 177	< 5.2	< 6.6	< 4.6	< 14.9	< 5.5	< 5.4
CAVE- 4269	8/8/2016	Swiss Chard	4290 ± 267	< 5.6	< 8.1	< 7.4	< 26.9	< 9.0	< 9.7
CAVE- 4270	8/8/2016	Collard Greens	3187 ± 245	< 7.8	< 5.3	< 5.4	< 17.4	< 7.8	< 9.3
CAVE- 4897	9/13/2016	Collard Greens	3572 ± 253	< 4.9	< 6.9	< 5.1	< 28.0	< 8.4	< 6.5
CAVE- 4898	9/13/2016	Kale	5845 ± 392	< 7.5	< 8.0	< 11.6	< 37.0	< 11.4	< 6.6

[a] "NS" = No sample; refer to Part I Table 5.5, Missed Collections and Analyses.

Table 3. Vegetation, analyses for iodine-131 and gamma-emitting isotopes.

Collection: Monthly, during growing season

Units: pCi/kg wet

Lab Code	Collection Date	Sample Type	Concentration (pCi/kg wet) ^{40}K	^{54}Mn	^{58}Co	^{60}Co	^{131}I	^{134}Cs	^{137}Cs
			Location: CA-FPL-V12						
CAVE- 2284	5/9/2016	Lettuce	4343 ± 321	< 9.2	< 9.1	< 6.6	< 17.0	< 10.8	< 13.3
CAVE- 2285	5/9/2016	Mustard Greens	3464 ± 408	< 13.6	< 10.8	< 7.3	< 27.8	< 14.5	< 7.9
CAVE- 2286	5/10/2016	Chard	5678 ± 387	< 11.1	< 7.8	< 8.9	< 21.7	< 11.4	< 5.9
CAVE- 3007	6/14/2016	Swiss Chard	6694 ± 310	< 5.5	< 6.0	< 8.6	< 13.6	< 7.1	< 9.6
CAVE- 3008	6/14/2016	Lettuce	4186 ± 324	< 11.9	< 9.5	< 4.9	< 31.8	< 10.2	< 11.4
CAVE- 3009	6/14/2016	Cabbage	3204 ± 235	< 5.4	< 6.1	< 4.9	< 14.7	< 9.6	< 10.5
CAVE- 3660	7/12/2016	Cabbage	3635 ± 232	< 7.2	< 7.7	< 5.3	< 18.9	< 6.8	< 8.5
CAVE- 3661	7/12/2016	Chard	6434 ± 314	< 6.1	< 8.8	< 6.3	< 15.9	< 8.2	< 10.4
CAVE- 3662	7/12/2016	Lettuce	6983 ± 358	< 8.6	< 8.6	< 9.1	< 24.5	< 8.4	< 8.4
CAVE- 4271	8/8/2016	Swiss Chard	4879 ± 312	< 4.6	< 9.5	< 5.3	< 23.1	< 8.9	< 8.5
CAVE- 4899	9/13/2016	Swiss Chard	5836 ± 369	< 10.3	< 6.8	< 7.8	< 38.5	< 9.0	< 10.4
CAVE- 5488	10/11/2016	Swiss Chard	5806 ± 397	< 12.3	< 12.4	< 8.5	< 45.9	< 10.3	< 8.8
			Location: CA-FPL-V16						
CAVE- 2287	5/10/2016	Lettuce	5112 ± 406	< 8.3	< 12.3	< 11.6	< 21.5	< 10.9	< 11.4
CAVE- 2288	5/10/2016	Turnip greens	6433 ± 488	< 12.4	< 7.6	< 10.4	< 27.1	< 13.5	< 13.8
CAVE- 3010	6/13/2016	Lettuce	7800 ± 415	< 15.3	< 11.2	< 12.3	< 21.6	< 14.8	< 16.4
CAVE- 3011	6/13/2016	Turnip Greens	9059 ± 634	< 19.8	< 10.5	< 18.6	< 45.2	< 20.7	< 28.2
CAVE- 3013	6/13/2016	Mustard	9782 ± 699	< 21.5	< 22.7	< 24.8	< 37.4	< 22.5	< 22.1
CAVE- 3136	6/13/2016	Collard Greens	6241 ± 419	< 14.9	< 13.1	< 7.8	< 18.8	< 11.4	< 11.9
CAVE- 3663	7/12/2016	Lettuce	3682 ± 117	< 4.4	< 3.8	< 4.7	< 6.0	< 3.6	< 3.1
CAVE- 4272	8/8/2016	Collard Greens	6935 ± 340	< 10.0	< 5.1	< 6.2	< 17.3	< 8.9	< 7.1
CAVE- 4273	8/8/2016	Lettuce	7567 ± 602	< 30.3	< 19.5	< 23.1	< 55.0	< 28.6	< 31.1
CAVE- 4900	9/13/2016	Collard Greens	8228 ± 836	< 23.2	< 29.1	< 15.4	< 31.2	< 22.4	< 24.9

Table 4. Non-food Crops, analyses for tritium and gamma-emitting isotopes.

Collection: Annually, at harvest

Units: pCi/kg wet

Lab Code	Sample Type	Collection Date	(pCi/L) ^{3}H	Concentration (pCi/kg wet) ^{40}K	^{54}Mn	^{58}Co	^{60}Co	^{134}Cs	^{137}Cs
				Location: CA-FC-1					
		9/12/2016			NS[a]				
		9/12/2016			NS[a]				
		9/12/2016			NS[a]				
				Location: CA-FC-2					
CAVE- 4884	1-Soybeans	9/12/2016	< 152	5414 ± 385	< 9.3	< 6.7	< 10.3	< 9.7	< 10.3
CAVE- 4885	2-Soybeans	9/12/2016	< 152	5857 ± 448	< 10.1	< 15.4	< 10.2	< 12.3	< 11.6
CAVE- 4886	3-Soybeans	9/12/2016	< 152	6521 ± 477	< 7.2	< 10.8	< 9.3	< 13.5	< 10.1
				Location: CA-FC-3					
CAVE- 4887	1-Soybeans	9/12/2016	< 152	5997 ± 433	< 10.4	< 12.7	< 11.2	< 10.9	< 12.9
CAVE- 4888	2-Soybeans	9/12/2016	< 187	5733 ± 417	< 12.9	< 5.5	< 12.4	< 11.4	< 11.1
CAVE- 4889	3-Soybeans	9/12/2016	< 187	5308 ± 382	< 12.1	< 12.6	< 8.1	< 11.7	< 14.2
				Location: CA-FC-4(C)					
CAVE- 5063	Soybeans	9/20/2016	< 187	6652 ± 423	< 11.1	< 14.3	< 10.2	< 12.8	< 12.0

[a] "NS" = No sample; refer to Part I Table 5.5, Missed Collections and Analyses.

Table 5. Soil, analyses for gamma-emitting isotopes.
Collection: Annually

Lab Code	Collection Date	Concentration (pCi/kg dry) ^{40}K	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{95}ZrNb	^{134}Cs	^{137}Cs	^{140}BaLa
Location: SOL-F-002										
CASO- 6404	11/9/2016	12960 ± 823	< 28.0	< 92.7	< 44.9	< 19.0	< 95.5	< 21.8	425 ± 58	< 283.1
CASO- 6405	11/9/2016	11400 ± 765	< 27.9	< 122.5	< 28.9	< 24.3	< 38.3	< 26.9	576 ± 47	< 166.3
Location: SOL-F-006										
CASO- 6406	11/9/2016	11287 ± 744	< 26.5	< 65.2	< 45.8	< 18.7	< 50.2	< 29.4	426 ± 49	< 201.1
CASO- 6408	11/9/2016	10593 ± 704	< 28.9	< 43.9	< 44.2	< 19.3	< 75.4	< 21.0	421 ± 41	< 261.5
Location: SOL-PR-003										
CASO- 6411	11/9/2016	10518 ± 633	< 27.6	< 57.2	< 30.3	< 16.3	< 62.8	< 22.1	165 ± 30	< 132.0
CASO- 6412	11/9/2016	9790 ± 642	< 22.8	< 98.8	< 25.6	< 12.5	< 67.5	< 16.8	349 ± 37	< 228.4
Location: SOL-PR-007										
CASO- 6413	11/9/2016	10791 ± 598	< 25.6	< 66.5	< 23.4	< 16.0	< 59.1	< 14.8	217 ± 30	< 203.5
CASO- 6414	11/9/2016	10595 ± 700	< 38.3	< 87.0	< 34.9	< 18.1	< 43.7	< 27.9	228 ± 36	< 211.7
Location: SOL-M-009										
CASO- 6409	11/8/2016	14409 ± 849	< 27.8	< 137.8	< 31.4	< 12.7	< 65.4	< 28.3	136 ± 40	< 219.2
CASO- 6410	11/8/2016	16262 ± 803	< 32.5	< 71.5	< 33.5	< 25.8	< 83.0	< 23.3	184 ± 33	< 249.1
Location: SOL-W-001										
CASO- 6415	11/9/2016	11317 ± 777	< 23.7	< 78.7	< 35.9	< 15.7	< 58.4	< 21.4	< 33	< 312.2
CASO- 6416	11/9/2016	11824 ± 628	< 22.7	< 62.0	< 25.1	< 21.1	< 50.7	< 15.2	56 ± 23.2	< 120.7
Location: SOL-W-002										
CASO- 6417	11/9/2016	14900 ± 928	< 38.1	< 89.1	< 47.0	< 24.0	< 88.9	< 23.3	116 ± 32	< 231.0
CASO- 6418	11/9/2016	15243 ± 927	< 34.2	< 86.3	< 35.0	< 19.6	< 80.6	< 26.6	134 ± 36	< 352.7
Location: SOL-W-003										
CASO- 6419	11/9/2016	9137 ± 741	< 29.6	< 88.7	< 37.9	< 22.9	< 46.1	< 24.0	< 26.9	< 105.1
CASO- 6420	11/9/2016	4891 ± 639	< 31.0	< 103.2	< 34.8	< 20.7	< 53.2	< 31.8	< 28.6	< 216.3
Location: SOL-W-004										
CASO- 6421	11/9/2016	3865 ± 615	< 37.9	< 105.2	< 46.6	< 17.7	< 74.1	< 34.2	< 36.6	< 258.1
CASO- 6422	11/9/2016	2399 ± 613	< 35.3	< 117.9	< 39.1	< 27.9	< 43.8	< 25.5	< 31.2	< 386.2

Table 6. Surface water, analyses for tritium and gamma-emitting isotopes.

Collection: Monthly
Location: CA-SWA-S01 Units: pCi/L

Lab Code	Required	CASW- 427	CASW- 812	CASW- 1319	CASW- 1961
Date Collected	LLD	01-26-16	02-23-16	03-29-16	04-26-16
H-3	3000	< 143	< 172	< 152	< 174
Mn-54	15	< 2.7	< 1.8	< 5.3	< 2.9
Fe-59	30	< 4.7	< 5.6	< 7.1	< 5.1
Co-58	15	< 2.2	< 2.1	< 3.9	< 1.4
Co-60	15	< 2.5	< 2.5	< 5.1	< 2.7
Zn-65	30	< 4.1	< 4.6	< 5.7	< 3.9
Zr-Nb-95	15	< 2.8	< 3.2	< 5.3	< 3.5
I-131	1000	< 11.3	< 6.0	< 6.1	< 13.0
Cs-134	15	< 2.9	< 2.6	< 6.6	< 3.4
Cs-137	18	< 2.6	< 1.8	< 4.2	< 3.2
Ba-La-140	15	< 4.2	< 3.5	< 5.3	< 2.8

Lab Code	Required	CASW- 2771	CASW- 3303	CASW- 3974	CASW- 4573
Date Collected	LLD	05-31-16	06-28-16	07-26-16	08-30-16
H-3	3000	< 183	< 150	< 145	< 155
Mn-54	15	< 2.3	< 2.0	< 1.4	< 2.6
Fe-59	30	< 5.1	< 3.0	< 4.8	< 4.3
Co-58	15	< 2.8	< 2.3	< 1.4	< 2.7
Co-60	15	< 2.3	< 1.5	< 1.1	< 2.3
Zn-65	30	< 5.4	< 3.9	< 1.3	< 3.9
Zr-Nb-95	15	< 1.9	< 2.0	< 2.3	< 2.9
I-131	1000	< 4.7	< 14.9	< 27.7	< 18.8
Cs-134	15	< 3.2	< 1.9	< 1.3	< 2.5
Cs-137	18	< 1.6	< 1.6	< 1.4	< 2.9
Ba-La-140	15	< 2.8	< 7.4	< 6.8	< 4.9

Lab Code	Required	CASW- 5142	CASW- 5949	CASW- 6697	CASW- 6953
Date Collected	LLD	09-27-16	10-25-16	11-29-16	12-27-16
H-3	3000	< 148	< 156	< 152	< 143
Mn-54	15	< 1.3	< 1.4	< 2.5	< 1.8
Fe-59	30	< 4.7	< 3.9	< 4.3	< 3.8
Co-58	15	< 2.8	< 1.8	< 3.0	< 2.0
Co-60	15	< 2.0	< 1.2	< 2.5	< 1.3
Zn-65	30	< 1.5	< 2.5	< 4.4	< 4.2
Zr-Nb-95	15	< 4.2	< 1.7	< 3.4	< 2.8
I-131	1000	< 14.8	< 20.2	< 33.9	< 7.3
Cs-134	15	< 2.7	< 1.4	< 2.4	< 2.1
Cs-137	18	< 2.5	< 1.4	< 1.9	< 2.5
Ba-La-140	15	< 5.8	< 5.8	< 7.4	< 2.8

Table 6. Surface water, analyses for tritium and gamma-emitting isotopes.

Collection: Monthly
Location: CA-SWA-S02 Units: pCi/L

Lab Code Date Collected	Required LLD	CASW- 428 01-26-16	CASW- 813 02-23-16	CASW- 1320 03-29-16	CASW- 1962 04-26-16
H-3	3000	< 143	324 ± 96	< 152	283 ± 102
Mn-54	15	< 2.1	< 2.8	< 3.2	< 5.7
Fe-59	30	< 4.5	< 6.4	< 2.5	< 8.5
Co-58	15	< 2.8	< 2.5	< 4.2	< 5.0
Co-60	15	< 2.0	< 1.5	< 2.3	< 5.2
Zn-65	30	< 2.5	< 5.5	< 3.6	< 8.6
Zr-Nb-95	15	< 2.7	< 2.7	< 4.2	< 4.4
I-131	1000	< 6.0	< 6.4	< 6.9	< 8.2
Cs-134	15	< 2.7	< 3.2	< 4.1	< 5.8
Cs-137	18	< 2.9	< 3.2	< 3.4	< 4.8
Ba-La-140	15	< 3.6	< 2.6	< 1.8	< 4.0

Lab Code Date Collected	Required LLD	CASW- 2772 05-31-16	CASW- 3304 06-28-16	CASW- 3975 07-26-16	CASW- 4575 08-30-16
H-3	3000	< 183	< 150	< 145	< 155
Mn-54	15	< 4.9	< 2.2	< 2.7	< 1.8
Fe-59	30	< 8.4	< 3.2	< 4.9	< 4.8
Co-58	15	< 4.7	< 1.6	< 2.8	< 3.6
Co-60	15	< 3.0	< 1.0	< 2.1	< 2.0
Zn-65	30	< 4.0	< 2.7	< 4.4	< 2.8
Zr-Nb-95	15	< 3.7	< 2.9	< 3.8	< 3.0
I-131	1000	< 7.3	< 18.5	< 27.4	< 15.9
Cs-134	15	< 5.4	< 2.1	< 2.5	< 2.6
Cs-137	18	< 6.0	< 2.4	< 2.4	< 2.1
Ba-La-140	15	< 2.6	< 8.3	< 12.5	< 5.9

Lab Code Date Collected	Required LLD	CASW- 5143 09-27-16	CASW- 5950 10-25-16	CASW- 6699 11-29-16	CASW- 6954 12-27-16
H-3	3000	< 148	< 156	< 152	< 143
Mn-54	15	< 2.4	< 1.4	< 1.5	< 1.2
Fe-59	30	< 7.0	< 1.8	< 4.5	< 3.0
Co-58	15	< 1.3	< 1.4	< 2.2	< 1.8
Co-60	15	< 2.3	< 0.9	< 1.6	< 2.1
Zn-65	30	< 3.9	< 2.5	< 2.0	< 2.1
Zr-Nb-95	15	< 3.3	< 1.6	< 2.3	< 2.4
I-131	1000	< 23.1	< 23.1	< 27.0	< 5.4
Cs-134	15	< 2.7	< 1.2	< 1.7	< 2.5
Cs-137	18	< 3.0	< 1.2	< 1.7	< 1.8
Ba-La-140	15	< 9.8	< 6.6	< 5.4	< 3.8

Table 7. Surface Water (Ponds), analyses for tritium and gamma-emitting isotopes.

Lab Code	Collection Date	Concentration (pCi/L) ^{3}H	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{134}Cs	^{137}Cs	$^{140}BaLa$
					Location: CA-SWA-POND 01						
CASW- 961	02/29/16	< 142	< 1.6	< 1.9	< 1.8	< 2.2	< 2.5	< 2.3	< 2.0	< 1.9	< 2.9
CASW- 4813	09/06/16	< 149	< 4.8	< 5.0	< 5.9	< 5.6	< 5.4	< 6.0	< 6.2	< 5.2	< 11.3
					Location: CA-SWA-POND 02						
CASW- 962	03/01/16	< 142	< 1.7	< 4.4	< 1.9	< 1.9	< 2.5	< 1.8	< 1.8	< 1.9	< 1.8
CASW- 4814	09/06/16	< 149	< 2.0	< 3.3	< 3.0	< 1.8	< 2.1	< 2.9	< 2.8	< 2.4	< 8.4
					Location: CA-SWA-SLUDGE LAGOON #4						
CASW- 963	02/29/16	< 146	< 2.1	< 3.9	< 1.5	< 1.3	< 2.8	< 2.4	< 1.7	< 2.6	< 3.2
CASW- 4821	09/06/16	< 149	< 2.4	< 4.8	< 3.7	< 1.7	< 4.6	< 3.7	< 2.5	< 2.0	< 10.9

Table 7. Surface Water (Ponds), analyses for tritium and gamma-emitting isotopes.

Lab Code	Collection Date	Concentration (pCi/L) ^{3}H	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{134}Cs	^{137}Cs	$^{140}BaLa$
					Location: CA-SWA-OUTFALL 010						
CASW- 954	02/29/16	< 146	< 2.6	< 4.0	< 1.9	< 2.6	< 2.4	< 3.9	< 3.3	< 2.8	< 4.5
CASW- 4815	09/06/16	< 149	< 2.2	< 5.1	< 2.2	< 1.5	< 2.7	< 3.0	< 2.8	< 3.1	< 10.7
					Location: CA-SWA-OUTFALL 011						
CASW- 955	02/29/16	< 146	< 5.1	< 8.4	< 4.4	< 4.1	< 5.3	< 6.3	< 5.1	< 5.7	< 8.6
CASW- 4816	09/06/16	< 149	< 3.8	< 4.3	< 2.2	< 2.4	< 1.8	< 5.4	< 3.5	< 2.3	< 12.4
					Location: CA-SWA-OUTFALL 012						
CASW- 957	02/29/16	< 146	< 2.1	< 6.1	< 1.2	< 2.3	< 3.4	< 2.4	< 2.5	< 2.8	< 4.0
CASW- 4817	09/06/16	< 149	< 2.6	< 3.6	< 3.3	< 2.1	< 5.6	< 2.7	< 2.7	< 2.0	< 7.2
					Location: CA-SWA-OUTFALL 013						
CASW- 958	03/01/16	< 146	< 5.0	< 5.4	< 4.1	< 3.9	< 6.4	< 5.8	< 3.8	< 3.8	< 5.4
CASW- 4818	09/06/16	< 149	< 2.7	< 8.6	< 3.7	< 1.2	< 3.8	< 5.6	< 3.1	< 3.1	< 7.8
					Location: CA-SWA-OUTFALL 014						
CASW- 959	02/29/16	< 146	< 1.9	< 3.3	< 1.7	< 2.2	< 3.9	< 3.4	< 3.1	< 1.8	< 3.6
CASW- 4819	09/06/16	< 149	< 1.8	< 4.9	< 3.4	< 1.6	< 4.5	< 2.9	< 2.6	< 2.0	< 12.9
					Location: CA-SWA-OUTFALL 015						
CASW- 960	02/29/16	< 142	< 2.0	< 5.4	< 2.3	< 1.3	< 2.8	< 2.9	< 2.6	< 2.2	< 4.4
CASW- 4820	09/06/16	< 149	< 1.8	< 7.9	< 2.7	< 1.3	< 4.6	< 3.5	< 2.4	< 2.2	< 7.1

Table 8. Drinking Water Wells, analysis for tritium and gamma-emitting isotopes.

Lab Code	Collection Date	Concentration (pCi/L) ^{3}H	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{134}Cs	^{137}Cs	$^{140}BaLa$
						CA-DWA-003 (Ward)					
CADW- 540	2/2/2016	< 141	< 2.2	< 3.9	< 2.8	< 2.2	< 2.5	< 3.0	< 2.6	< 2.0	< 4.9
CADW- 2081	4/27/2016	< 160	< 1.5	< 7.6	< 2.3	< 2.1	< 4.3	< 3.9	< 3.0	< 2.1	< 4.8
CADW- 4200	7/27/2016	< 149	< 2.7	< 6.2	< 3.6	< 1.1	< 2.9	< 4.6	< 2.9	< 3.3	< 9.3
CADW- 5934	10/24/2016	< 156	< 2.8	< 6.2	< 3.2	< 1.8	< 5.8	< 3.5	< 3.7	< 2.8	< 4.8
						CA-DWA-004 (Miller)					
CADW- 541	2/2/2016	< 141	< 1.6	< 5.3	< 2.1	< 2.2	< 3.2	< 3.2	< 2.2	< 2.4	< 3.2
CADW- 2082	4/28/2016	< 160	< 2.4	< 5.8	< 2.7	< 2.6	< 4.2	< 5.1	< 3.9	< 2.3	< 7.8
CADW- 4202	7/27/2016	< 149	< 1.4	< 4.3	< 1.1	< 1.5	< 2.6	< 2.2	< 1.2	< 1.2	< 5.4
CADW- 5935	10/25/2016	< 156	< 1.6	< 6.2	< 2.2	< 2.1	< 3.2	< 4.4	< 2.3	< 2.9	< 10.2
						CA-DWA-005 (Brucker Bros.)					
	2/2/2016						NS[a]				
CADW- 2083	4/27/2016	< 160	< 1.2	< 5.6	< 2.0	< 2.7	< 4.0	< 5.2	< 3.8	< 3.2	< 8.4
CADW- 4203	8/1/2016	< 148	< 2.7	< 6.1	< 3.0	< 2.5	< 4.7	< 4.4	< 3.6	< 3.3	< 4.0
CADW- 5936	10/24/2016	< 156	< 2.3	< 7.6	< 3.4	< 1.9	< 3.9	< 3.3	< 3.1	< 2.9	< 14.2
						CA-DWA-006 (Lindeman)					
CADW- 542	2/2/2016	< 141	< 2.6	< 9.3	< 3.0	< 2.5	< 4.3	< 3.7	< 4.7	< 3.5	< 4.5
CADW- 2084	4/27/2016	< 160	< 2.4	< 6.0	< 3.0	< 2.0	< 4.2	< 3.5	< 2.8	< 3.5	< 4.8
CADW- 4204	7/27/2016	< 149	< 1.8	< 4.6	< 2.7	< 1.7	< 3.6	< 5.2	< 2.3	< 2.9	< 9.2
CADW- 5937	10/24/2016	< 156	< 1.8	< 3.8	< 1.9	< 1.4	< 3.2	< 3.0	< 1.6	< 1.5	< 6.9
						CA-DWA-007 (Kriete)					
CADW- 543	2/2/2016	< 141	< 2.2	< 5.3	< 2.1	< 1.7	< 3.5	< 2.8	< 2.2	< 1.9	< 4.2
CADW- 2085	4/27/2016	< 160	< 1.3	< 3.4	< 2.2	< 2.1	< 3.8	< 4.8	< 3.3	< 2.9	< 11.9
CADW- 4205	7/27/2016	< 149	< 1.4	< 3.7	< 1.8	< 0.9	< 2.0	< 2.3	< 1.3	< 0.9	< 5.4
CADW- 5938	10/24/2016	< 156	< 1.6	< 3.7	< 4.2	< 2.5	< 3.4	< 4.8	< 2.7	< 2.0	< 7.8
						CA-DWA-008 (Brandt)					
CADW- 544	2/2/2016	< 141	< 1.8	< 2.1	< 1.7	< 1.5	< 1.7	< 2.5	< 2.2	< 2.4	< 3.1
CADW- 2086	4/27/2016	< 160	< 4.5	< 9.9	< 6.9	< 6.0	< 13.0	< 6.9	< 7.9	< 5.5	< 6.6
CADW- 4206	7/29/2016	< 148	< 3.1	< 8.6	< 2.6	< 2.2	< 4.8	< 3.9	< 3.9	< 2.6	< 6.8
CADW- 5939	10/24/2016	< 156	< 3.1	< 4.2	< 2.9	< 2.7	< 3.6	< 4.9	< 3.7	< 2.1	< 11.6

a "NS" = No sample; refer to Part I Table 5.5, Missed Collections and Analyses.

Table 8. Drinking Water Wells, analysis for tritium and gamma-emitting isotopes.

Lab Code	Collection Date	Concentration (pCi/L) ^{3}H	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{134}Cs	^{137}Cs	$^{140}BaLa$
					CA-DWA-009 (Clardy)						
CADW- 545	2/2/2016	< 141	< 1.9	< 2.7	< 1.0	< 1.5	< 3.4	< 1.9	< 1.7	< 2.3	< 3.4
CADW- 2087	4/27/2016	< 160	< 7.1	< 6.2	< 5.1	< 3.5	< 3.5	< 6.6	< 6.7	< 7.3	< 4.0
CADW- 4207	7/27/2016	< 149	< 3.2	< 5.5	< 3.1	< 2.6	< 4.1	< 3.6	< 2.3	< 2.4	< 10.5
CADW- 5940	10/24/2016	< 156	< 1.7	< 4.6	< 2.5	< 2.6	< 3.5	< 4.6	< 2.5	< 2.8	< 9.0
					CA-DWA-010 (Dillon, Susan)						
CADW- 546	2/2/2016	< 141	< 1.6	< 3.3	< 2.1	< 2.2	< 3.4	< 2.3	< 1.8	< 2.4	< 4.5
CADW- 2089	4/27/2016	< 160	< 2.9	< 4.3	< 2.6	< 2.1	< 6.3	< 4.4	< 3.5	< 2.7	< 4.9
CADW- 4208	7/27/2016	< 149	< 2.1	< 5.6	< 2.6	< 2.2	< 3.8	< 5.0	< 2.7	< 2.4	< 12.1
CADW- 5941	10/24/2016	< 156	< 2.7	< 8.2	< 2.2	< 2.5	< 4.3	< 4.6	< 3.3	< 2.8	< 13.7
					CA-DWA-012 (Dillon, Joe)						
CADW- 547	2/2/2016	< 141	< 2.1	< 4.7	< 1.5	< 1.5	< 2.8	< 2.6	< 1.8	< 1.7	< 4.4
CADW- 2090	4/27/2016	< 160	< 3.1	< 8.0	< 2.2	< 1.5	< 5.4	< 3.7	< 2.8	< 2.0	< 4.3
CADW- 4209	7/29/2016	< 148	< 2.0	< 3.5	< 2.8	< 2.1	< 3.3	< 4.0	< 2.3	< 2.1	< 8.9
CADW- 5942	10/24/2016	< 156	< 2.2	< 4.0	< 1.8	< 1.7	< 4.2	< 4.4	< 2.9	< 2.0	< 14.6
					CA-DWA-022 (Plummer)						
CADW- 549	2/2/2016	< 141	< 1.8	< 3.1	< 2.7	< 1.5	< 3.6	< 2.3	< 2.3	< 2.1	< 2.2
CADW- 2092	4/27/2016	< 160	< 1.9	< 6.6	< 3.6	< 1.2	< 1.5	< 3.4	< 2.0	< 2.7	< 6.9
CADW- 4211	7/29/2016	< 148	< 2.3	< 6.6	< 1.7	< 2.0	< 5.3	< 4.6	< 2.3	< 2.5	< 5.2
CADW- 5945	10/24/2016	< 156	< 1.3	< 3.0	< 0.9	< 1.2	< 2.1	< 1.9	< 1.1	< 1.4	< 8.0
					CA-DWA-D01 (Portland Bar/Grill)						
CADW- 551	2/2/2016	< 141	< 1.7	< 2.9	< 1.2	< 1.9	< 3.5	< 2.9	< 1.7	< 2.0	< 5.5
CADW- 2093	4/27/2016	< 160	< 2.0	< 5.8	< 2.0	< 0.6	< 4.6	< 4.4	< 3.0	< 1.9	< 5.0
CADW- 4213	7/29/2016	< 148	< 1.3	< 2.1	< 2.0	< 0.9	< 2.2	< 1.9	< 1.3	< 1.1	< 7.0
CADW- 5947	10/24/2016	< 156	< 1.9	< 4.1	< 1.6	< 1.7	< 2.6	< 2.9	< 1.6	< 1.8	< 8.5

Table 8. Drinking Water Wells, analysis for tritium and gamma-emitting isotopes.

Lab Code	Collection Date	Concentration (pCi/L)									
		^{3}H	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{134}Cs	^{137}Cs	$^{140}BaLa$
						CA-DWA-PW1 (Plant Cafeteria)					
CADW- 552	2/3/2016	< 141	< 1.8	< 3.7	< 2.3	< 1.5	< 2.7	< 2.2	< 2.0	< 2.0	< 4.9
CADW- 2094	4/28/2016	< 160	< 1.8	< 3.4	< 2.6	< 1.8	< 4.8	< 4.7	< 2.7	< 2.7	< 6.5
CADW- 4214	7/29/2016	< 148	< 1.3	< 3.0	< 1.5	< 1.6	< 1.4	< 2.5	< 1.2	< 1.4	< 7.1
CADW- 5948	10/25/2016	< 156	< 1.1	< 3.9	< 1.2	< 1.8	< 3.4	< 3.4	< 1.6	< 1.7	< 9.1
						CA-DWA-21					
CADW- 548	2/2/2016	< 141	< 1.3	< 3.4	< 1.8	< 1.1	< 2.3	< 2.9	< 2.0	< 2.2	< 4.3
CADW- 2091	4/27/2016	< 160	< 2.0	< 4.1	< 1.5	< 1.6	< 2.9	< 4.8	< 2.4	< 2.4	< 10.7
CADW- 4210	7/27/2016	< 149	< 1.3	< 2.2	< 1.0	< 1.3	< 1.6	< 2.2	< 1.1	< 1.5	< 7.4
CADW- 5944	10/24/2016	< 156	< 1.7	< 2.5	< 1.9	< 1.8	< 2.8	< 3.1	< 1.6	< 1.8	< 7.6
						CA-DWA-V16					
CADW- 550	2/2/2016	< 141	< 1.4	< 3.9	< 0.9	< 1.7	< 3.1	< 2.3	< 2.0	< 1.9	< 2.6
CADW- 2095	4/27/2016	< 160	< 1.9	< 5.5	< 2.1	< 1.9	< 2.4	< 4.7	< 2.6	< 3.0	< 8.1
CADW- 4212	7/29/2016	< 148	< 1.8	< 6.1	< 3.0	< 2.3	< 3.5	< 3.2	< 2.4	< 3.3	< 10.0
CADW- 5946	10/25/2016	< 156	< 1.1	< 3.2	< 1.2	< 0.7	< 2.3	< 1.9	< 1.0	< 1.0	< 3.9

Table 9. Wells and Ponds (non-potable), analyses for tritium and gamma-emitting isotopes.

Lab Code	Collection Date	Concentration (pCi/L) ^{3}H	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{134}Cs	^{137}Cs	$^{140}BaLa$
		Location: CA-WWA-936									
CAWW- 259	1/14/2016	189 ± 80	< 3.6	< 2.5	< 2.1	< 1.6	< 4.5	< 3.6	< 3.5	< 3.1	< 4.7
CAWW- 637	2/18/2016	288 ± 99	< 1.7	< 4.9	< 1.6	< 2.7	< 5.3	< 2.8	< 2.9	< 1.6	< 2.1
CAWW- 1131	3/15/2016	269 ± 91	< 3.0	< 6.6	< 2.9	< 1.9	< 3.6	< 3.6	< 3.1	< 3.3	< 2.9
CAWW- 1853	4/13/2016	189 ± 84	< 2.0	< 3.8	< 4.7	< 2.7	< 4.1	< 4.7	< 2.8	< 2.9	< 6.3
CAWW- 2367	5/12/2016	402 ± 91	< 3.1	< 3.5	< 1.4	< 2.5	< 5.1	< 6.0	< 3.0	< 3.3	< 7.7
CAWW- 2964	6/13/2016	338 ± 88	< 3.4	< 11.0	< 2.8	< 3.8	< 9.2	< 4.6	< 4.3	< 3.4	< 4.2
CAWW- 3582	7/13/2016	354 ± 91	< 3.3	< 3.3	< 3.5	< 2.2	< 5.3	< 3.7	< 3.3	< 2.8	< 8.8
CAWW- 4428	8/18/2016	298 ± 89	< 2.2	< 7.4	< 2.5	< 2.3	< 5.5	< 4.4	< 4.0	< 3.0	< 4.3
CAWW- 4805	9/9/2016	152 ± 86	< 5.6	< 5.9	< 3.7	< 3.4	< 8.0	< 5.1	< 5.3	< 4.8	< 7.5
CAWW- 5431	10/10/2016	222 ± 87	< 3.6	< 4.1	< 2.1	< 2.1	< 3.0	< 5.6	< 2.9	< 1.5	< 13.0
CAWW- 6200	11/9/2016	< 180	< 2.8	< 8.4	< 3.4	< 3.1	< 3.5	< 4.6	< 3.5	< 2.8	< 12.5
CAWW- 6765	12/9/2016	< 158	< 1.8	< 2.8	< 1.3	< 1.8	< 3.4	< 3.1	< 1.9	< 1.7	< 5.0
		Location: CA-WWA-937B									
	1/14/2016					NS[a]					
CAWW- 814	2/24/2016	< 172	< 3.6	< 5.9	< 3.1	< 2.7	< 3.8	< 2.6	< 3.4	< 3.7	< 3.8
CAWW- 1132	3/15/2016	< 149	< 3.2	< 6.1	< 2.2	< 4.2	< 7.1	< 4.0	< 3.9	< 4.3	< 5.0
CAWW- 1854	4/13/2016	< 149	< 2.8	< 6.5	< 2.6	< 1.9	< 3.9	< 2.9	< 3.2	< 3.0	< 6.8
CAWW- 2368	5/12/2016	207 ± 82	< 3.8	< 6.3	< 3.3	< 1.7	< 3.0	< 5.6	< 4.7	< 4.7	< 9.2
CAWW- 2965	6/13/2016	236 ± 83	< 4.6	< 8.2	< 2.7	< 2.6	< 4.6	< 4.7	< 5.3	< 4.8	< 4.7
CAWW- 3583	7/13/2016	183 ± 83	< 2.5	< 4.4	< 1.8	< 2.6	< 3.3	< 4.7	< 2.9	< 3.6	< 10.8
CAWW- 4429	8/18/2016	< 148	< 2.3	< 5.1	< 1.3	< 2.2	< 4.1	< 2.0	< 2.2	< 2.5	< 6.5
CAWW- 4807	9/9/2016	< 149	< 3.5	< 6.9	< 1.9	< 2.4	< 3.9	< 3.6	< 4.1	< 4.2	< 5.1
CAWW- 5432	10/10/2016	< 153	< 3.2	< 4.9	< 3.9	< 2.5	< 5.2	< 5.8	< 3.3	< 2.1	< 8.1
CAWW- 6201	11/9/2016	< 180	< 2.6	< 7.2	< 2.2	< 2.1	< 3.9	< 3.7	< 2.7	< 2.7	< 6.9
CAWW- 6766	12/7/2016	< 158	< 3.2	< 3.6	< 2.6	< 2.0	< 2.2	< 4.2	< 2.7	< 1.8	< 6.4
		Location: CA-WWA-937D									
CAWW- 260	1/14/2016	< 141	< 3.5	< 5.1	< 3.1	< 3.1	< 5.3	< 4.6	< 4.3	< 4.6	< 5.1
CAWW- 638	2/17/2016	< 142	< 3.7	< 3.3	< 2.9	< 3.7	< 3.4	< 3.5	< 3.0	< 4.4	< 4.5
CAWW- 1133	3/15/2016	< 149	< 3.3	< 6.4	< 2.9	< 3.7	< 4.8	< 5.2	< 4.5	< 3.3	< 10.4
CAWW- 1855	4/13/2016	160 ± 82	< 3.2	< 7.6	< 2.3	< 3.5	< 5.0	< 4.2	< 3.5	< 3.6	< 8.4
CAWW- 2369	5/12/2016	205 ± 81	< 4.6	< 6.1	< 2.5	< 2.7	< 4.8	< 4.7	< 5.3	< 6.3	< 7.4
CAWW- 2966	6/13/2016	< 146	< 1.4	< 4.2	< 3.3	< 2.0	< 3.8	< 2.3	< 3.6	< 3.1	< 4.8
CAWW- 3584	7/13/2016	< 147	< 2.9	< 9.7	< 3.4	< 4.2	< 11.6	< 6.8	< 5.4	< 5.8	< 5.4
CAWW- 4430	8/18/2016	< 149	< 3.0	< 5.8	< 4.7	< 2.7	< 7.0	< 3.8	< 4.1	< 2.3	< 10.9
CAWW- 4808	9/8/2016	< 149	< 2.8	< 7.3	< 4.0	< 1.9	< 6.7	< 5.3	< 3.3	< 3.8	< 11.5
CAWW- 5433	10/10/2016	163 ± 85	< 3.2	< 2.5	< 2.0	< 2.6	< 3.6	< 5.6	< 2.9	< 2.9	< 14.1
CAWW- 6202	11/9/2016	< 180	< 3.5	< 3.9	< 3.2	< 2.9	< 3.2	< 3.3	< 3.2	< 3.7	< 4.9
CAWW- 6767	12/7/2016	< 158	< 1.3	< 2.9	< 1.5	< 0.9	< 2.8	< 1.3	< 1.3	< 1.4	< 6.3

a "NS" = No sample; refer to Part I Table 5.5, Missed Collections and Analyses.

Table 9. Wells and Ponds (non-potable), analyses for tritium and gamma-emitting isotopes.

Lab Code	Collection Date	Concentration (pCi/L) ^{3}H	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{134}Cs	^{137}Cs	$^{140}BaLa$
		Location: CA-WWA-939R									
CAWW- 261	1/14/2016	364 ± 89	< 4.0	< 7.6	< 3.8	< 2.2	< 6.5	< 3.2	< 4.4	< 4.8	< 4.5
CAWW- 639	2/18/2016	245 ± 97	< 2.4	< 3.3	< 2.5	< 2.1	< 5.7	< 2.5	< 2.9	< 2.5	< 2.5
CAWW- 1134	3/15/2016	< 149	< 4.1	< 8.5	< 2.5	< 3.5	< 6.7	< 4.3	< 4.0	< 3.6	< 3.4
CAWW- 1856	4/13/2016	< 149	< 2.8	< 7.0	< 2.2	< 3.3	< 5.3	< 4.5	< 3.2	< 1.8	< 2.9
CAWW- 2370	5/12/2016	181 ± 80	< 3.7	< 6.8	< 3.7	< 3.7	< 4.1	< 6.0	< 4.3	< 5.8	< 8.5
CAWW- 2967	6/13/2016	240 ± 83	< 2.6	< 5.3	< 1.9	< 1.2	< 2.4	< 4.1	< 2.7	< 1.6	< 4.3
CAWW- 3586	7/13/2016	283 ± 88	< 1.2	< 3.7	< 1.3	< 0.7	< 2.2	< 1.5	< 1.5	< 1.7	< 5.9
CAWW- 4431	8/18/2016	572 ± 101	< 3.0	< 5.1	< 2.7	< 2.4	< 6.1	< 3.9	< 3.2	< 3.9	< 4.9
CAWW- 4809	9/9/2016	190 ± 84	< 1.5	< 7.0	< 3.3	< 2.1	< 4.6	< 4.3	< 2.3	< 3.2	< 14.4
CAWW- 5434	10/10/2016	240 ± 89	< 3.1	< 7.5	< 4.7	< 3.2	< 3.0	< 5.5	< 3.5	< 3.7	< 6.4
CAWW- 6203	11/9/2016	< 180	< 3.6	< 5.2	< 3.3	< 2.0	< 3.5	< 5.9	< 3.9	< 2.7	< 9.4
CAWW- 6768	12/9/2016	218 ± 87	< 2.8	< 2.9	< 3.4	< 1.9	< 4.3	< 4.2	< 2.8	< 2.7	< 8.7
		Location: CA-WWA-940									
CAWW- 282	1/18/2016	< 141	< 3.2	< 6.5	< 3.4	< 2.8	< 4.5	< 4.5	< 4.5	< 2.9	< 2.7
CAWW- 640	2/18/2016	< 146	< 1.9	< 4.8	< 2.4	< 2.7	< 4.0	< 2.1	< 2.8	< 2.6	< 3.6
CAWW- 1136	3/15/2016	< 149	< 1.9	< 5.7	< 2.6	< 2.7	< 2.1	< 2.2	< 2.6	< 2.6	< 5.3
CAWW- 1857	4/13/2016	< 149	< 2.4	< 6.1	< 2.6	< 2.8	< 4.8	< 2.7	< 3.3	< 4.1	< 3.6
CAWW- 2371	5/12/2016	< 146	< 4.0	< 3.9	< 4.4	< 4.0	< 7.0	< 4.5	< 4.8	< 4.4	< 4.9
CAWW- 2969	6/13/2016	< 146	< 1.7	< 3.3	< 2.0	< 1.1	< 3.1	< 2.9	< 1.6	< 1.9	< 5.0
CAWW- 3587	7/13/2016	< 147	< 3.1	< 6.3	< 2.5	< 1.6	< 3.5	< 3.0	< 2.8	< 3.4	< 5.1
CAWW- 4432	8/18/2016	< 149	< 2.3	< 6.3	< 2.6	< 2.3	< 3.2	< 5.0	< 2.9	< 3.9	< 6.6
CAWW- 4810	9/9/2016	161 ± 87	< 2.9	< 8.4	< 2.4	< 2.3	< 3.0	< 6.1	< 4.3	< 3.8	< 13.8
CAWW- 5435	10/10/2016	< 153	< 2.6	< 6.9	< 2.1	< 1.4	< 5.2	< 4.2	< 2.9	< 2.9	< 4.8
CAWW- 6204	11/9/2016	< 180	< 2.1	< 8.5	< 1.5	< 1.7	< 3.9	< 3.5	< 2.9	< 3.0	< 6.6
CAWW- 6769	12/9/2016	< 158	< 1.7	< 5.4	< 1.0	< 1.9	< 2.8	< 3.1	< 1.9	< 1.8	< 7.4
		Location: CA-WWA-941									
CAWW- 263	1/14/2016	< 141	< 2.5	< 9.2	< 2.1	< 1.1	< 8.1	< 2.8	< 3.8	< 2.7	< 4.4
CAWW- 642	2/18/2016	202 ± 95	< 2.8	< 4.0	< 1.6	< 1.5	< 5.1	< 2.4	< 2.9	< 2.6	< 2.8
CAWW- 1137	3/15/2016	184 ± 87	< 3.8	< 7.4	< 2.8	< 3.0	< 7.2	< 3.6	< 3.8	< 3.1	< 7.0
CAWW- 1858	4/13/2016	< 149	< 1.8	< 4.0	< 3.4	< 2.6	< 5.2	< 3.2	< 3.3	< 3.3	< 3.6
CAWW- 2386	5/13/2016	207 ± 82	< 3.8	< 6.9	< 3.8	< 4.5	< 6.0	< 5.4	< 6.4	< 4.9	< 4.2
CAWW- 2970	6/13/2016	176 ± 80	< 1.3	< 3.4	< 1.8	< 1.6	< 2.0	< 2.4	< 1.7	< 1.8	< 6.1
CAWW- 3588	7/13/2016	< 147	< 1.3	< 2.5	< 2.0	< 1.3	< 2.7	< 2.5	< 2.0	< 1.9	< 8.2
CAWW- 4433	8/18/2016	< 148	< 2.7	< 8.1	< 3.1	< 1.9	< 7.1	< 5.5	< 3.4	< 4.1	< 10.2
CAWW- 4811	9/8/2016	< 149	< 3.8	< 4.3	< 1.9	< 2.4	< 4.6	< 4.3	< 3.6	< 3.3	< 14.1
CAWW- 5436	10/10/2016	< 153	< 2.9	< 9.7	< 3.1	< 2.5	< 4.7	< 3.3	< 3.1	< 2.7	< 6.4
CAWW- 6205	11/9/2016	< 180	< 2.6	< 7.0	< 2.2	< 2.4	< 4.1	< 5.7	< 3.2	< 3.5	< 6.8
CAWW- 6770	12/9/2016	< 158	< 1.2	< 3.3	< 1.7	< 1.5	< 1.5	< 1.9	< 1.4	< 1.7	< 6.9

Table 9. Wells and Ponds (non-potable), analyses for tritium and gamma-emitting isotopes.

Lab Code	Collection Date	Concentration (pCi/L) ^{3}H	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{134}Cs	^{137}Cs	$^{140}BaLa$
					Location: CA-WWA-GWS						
CAWW- 264	1/14/2016	254 ± 84	< 4.1	< 6.4	< 3.3	< 3.5	< 4.3	< 5.1	< 3.6	< 3.4	< 4.1
CAWW- 643	2/18/2016	249 ± 97	< 2.2	< 6.5	< 1.4	< 2.8	< 4.5	< 2.1	< 3.1	< 2.3	< 2.7
CAWW- 1138	3/15/2016	< 149	< 3.7	< 4.8	< 2.9	< 3.3	< 5.1	< 4.8	< 3.8	< 4.4	< 7.5
CAWW- 1859	4/13/2016	166 ± 83	< 3.1	< 6.2	< 4.5	< 2.5	< 4.0	< 3.3	< 3.3	< 2.2	< 5.9
CAWW- 2372	5/12/2016	224 ± 82	< 5.1	< 7.5	< 3.6	< 3.2	< 7.1	< 4.5	< 6.1	< 4.3	< 3.3
CAWW- 2971	6/13/2016	192 ± 81	< 1.4	< 3.4	< 1.7	< 1.0	< 2.5	< 1.8	< 1.3	< 1.5	< 5.1
CAWW- 3589	7/13/2016	223 ± 85	< 1.7	< 2.3	< 0.8	< 1.2	< 2.6	< 2.3	< 1.5	< 1.4	< 4.4
CAWW- 4434	8/18/2016	392 ± 94	< 2.8	< 8.1	< 1.9	< 2.9	< 3.8	< 5.1	< 3.3	< 3.8	< 6.4
CAWW- 4812	9/9/2016	727 ± 111	< 3.5	< 8.9	< 3.7	< 2.0	< 3.8	< 3.3	< 3.9	< 3.2	< 9.6
CAWW- 5437	10/10/2016	178 ± 85	< 1.8	< 3.3	< 1.9	< 1.6	< 3.3	< 3.5	< 2.1	< 1.3	< 4.9
CAWW- 6206	11/9/2016	< 180	< 2.9	< 3.4	< 3.2	< 2.0	< 2.1	< 4.1	< 2.6	< 2.2	< 3.8
CAWW- 6771	12/9/2016	169 ± 85	< 1.8	< 2.7	< 1.2	< 1.6	< 3.8	< 2.6	< 1.8	< 2.2	< 7.7
					ISFSI Sump						
CAWW- 265	1/14/2016	198 ± 81	< 3.5	< 7.2	< 3.9	< 3.2	< 5.4	< 4.3	< 3.6	< 4.0	< 4.0
CAWW- 2041	4/29/2016	< 150									
CAWW- 3760	7/20/2016	< 151									
CAWW- 5782	10/21/2016	< 156									
					Location: CA-WWA-U1MW-001						
CAWW- 81	1/6/2016	< 143	< 2.5	< 4.6	< 4.2	< 3.1	< 5.4	< 4.8	< 4.4	< 2.8	< 4.5
CAWW- 1451	4/6/2016	< 138	< 5.0	< 8.3	< 2.8	< 6.2	< 9.5	< 8.1	< 6.4	< 5.8	< 4.8
CAWW- 3412	7/6/2016	< 149	< 1.0	< 3.0	< 1.3	< 1.1	< 2.5	< 2.2	< 1.5	< 1.1	< 4.3
CAWW- 5597	10/14/2016	< 154	< 3.3	< 7.8	< 2.1	< 1.5	< 4.7	< 5.6	< 3.1	< 1.6	< 10.3
					Location: CA-WWA-U1MW-002						
CAWW- 258	1/15/2016	< 141	< 3.2	< 6.7	< 3.3	< 4.3	< 8.1	< 3.2	< 4.8	< 3.9	< 2.5
CAWW- 1919	4/26/2016	< 166	< 5.7	< 9.1	< 4.4	< 3.6	< 4.3	< 4.2	< 4.6	< 3.5	< 5.3
CAWW- 3552	7/11/2016	< 147	< 2.2	< 5.6	< 2.4	< 1.9	< 3.8	< 3.1	< 2.1	< 2.5	< 4.8
CAWW- 5430	10/6/2016	< 151	< 2.2	< 4.1	< 2.0	< 1.2	< 4.0	< 2.7	< 2.0	< 1.7	< 4.6
					Location: CA-WWA-U1MW-004						
CAWW- 85	1/6/2016	< 143	< 2.4	< 4.9	< 2.4	< 2.2	< 4.9	< 3.7	< 3.7	< 2.6	< 2.0
CAWW- 1848	4/12/2016	< 149	< 1.9	< 4.9	< 2.9	< 1.2	< 5.2	< 2.9	< 3.5	< 3.1	< 4.4
CAWW- 3410	7/5/2016	< 149	< 2.4	< 4.2	< 2.6	< 2.7	< 4.7	< 3.6	< 3.4	< 2.7	< 4.4
CAWW- 5596	10/14/2016	< 154	< 2.8	< 5.2	< 2.3	< 1.8	< 2.7	< 2.2	< 2.3	< 1.8	< 13.7

Table 9. Wells and Ponds (non-potable), analyses for tritium and gamma-emitting isotopes.

Lab Code	Collection Date	Concentration (pCi/L) ^{3}H	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{134}Cs	^{137}Cs	$^{140}BaLa$
						Location: CA-WWA-U1MW-005					
CAWW- 86	1/6/2016	< 143	< 3.0	< 6.8	< 4.0	< 4.1	< 7.0	< 4.2	< 4.9	< 2.5	< 10.2
CAWW- 1847	4/12/2016	< 149	< 2.5	< 7.9	< 3.3	< 1.1	< 3.4	< 2.2	< 2.9	< 2.8	< 4.4
CAWW- 3411	7/5/2016	< 149	< 1.0	< 2.5	< 1.5	< 0.8	< 3.0	< 1.6	< 1.5	< 1.3	< 3.6
CAWW- 5595	10/14/2016	< 154	< 1.7	< 3.9	< 3.6	< 1.7	< 3.4	< 3.2	< 2.8	< 2.4	< 6.4
						Location: CA-WWA-U1MW-006					
CAWW- 257	1/13/2016	< 141	< 2.6	< 7.0	< 3.0	< 4.4	< 7.0	< 5.8	< 3.8	< 3.8	< 2.8
CAWW- 1915	4/25/2016	< 166	< 6.2	< 5.0	< 6.8	< 6.5	< 11.1	< 8.1	< 8.1	< 8.9	< 5.4
CAWW- 3971	7/28/2016	< 145	< 3.0	< 8.3	< 2.9	< 1.9	< 3.2	< 3.3	< 3.4	< 2.6	< 14.0
CAWW- 5607	10/17/2016	< 154	< 1.9	< 4.8	< 2.4	< 1.1	< 2.7	< 3.0	< 1.9	< 1.7	< 7.6
						Location: CA-WWA-U1MW-010					
CAWW- 117	1/8/2016	< 145	< 4.9	< 5.5	< 3.1	< 3.5	< 2.6	< 2.6	< 4.4	< 4.5	< 8.8
CAWW- 1851	4/12/2016	< 149	< 2.8	< 6.8	< 1.4	< 2.6	< 4.0	< 4.4	< 3.7	< 2.8	< 4.8
CAWW- 3758	7/18/2016	< 152	< 3.0	< 7.1	< 3.4	< 3.6	< 5.4	< 5.3	< 2.9	< 2.7	< 10.1
CAWW- 5606	10/17/2016	< 154	< 2.9	< 4.5	< 4.1	< 2.6	< 7.3	< 5.6	< 3.1	< 1.9	< 6.6
						Location: CA-WWA-U1MW-012					
CAWW- 256	1/13/2016	< 141	< 3.4	< 5.4	< 3.4	< 2.9	< 5.1	< 2.5	< 3.2	< 3.4	< 2.1
CAWW- 1916	4/25/2016	< 166	< 2.8	< 9.0	< 2.3	< 2.2	< 5.0	< 4.8	< 4.6	< 2.4	< 1.8
CAWW- 3972	7/28/2016	< 145	< 1.4	< 4.8	< 1.4	< 1.1	< 1.3	< 2.3	< 1.3	< 1.4	< 6.8
CAWW- 5787	10/18/2016	< 156	< 2.5	< 3.7	< 3.0	< 2.9	< 2.9	< 5.1	< 3.5	< 2.4	< 10.0
						Location: CA-WWA-U1MW-013					
CAWW- 82	1/6/2016	< 143	< 2.9	< 5.6	< 3.0	< 1.9	< 2.4	< 3.3	< 2.9	< 3.1	< 2.8
CAWW- 1649	4/15/2016	< 148	< 5.7	< 6.7	< 4.2	< 2.3	< 9.3	< 5.3	< 5.4	< 4.9	< 6.2
CAWW- 3754	7/18/2016	< 152	< 2.2	< 4.9	< 2.6	< 1.9	< 4.9	< 3.7	< 2.8	< 2.3	< 10.6
CAWW- 5604	10/15/2016	< 154	< 2.4	< 4.1	< 1.5	< 2.5	< 2.0	< 3.1	< 2.0	< 2.3	< 8.7
						Location: CA-WWA-U1MW-014					
CAWW- 203	1/11/2016	< 146	< 3.4	< 6.5	< 2.0	< 3.5	< 7.3	< 3.8	< 3.2	< 1.9	< 3.2
CAWW- 1850	4/12/2016	313 ± 90	< 2.9	< 6.5	< 1.8	< 1.2	< 2.1	< 4.1	< 3.2	< 3.7	< 7.5
CAWW- 3551	7/11/2016	319 ± 93	< 1.4	< 5.7	< 2.1	< 1.3	< 4.8	< 2.1	< 2.2	< 2.0	< 8.5
CAWW- 5428	10/6/2016	211 ± 86	< 3.5	< 4.6	< 2.1	< 2.8	< 3.7	< 3.6	< 3.4	< 2.6	< 11.0
						Location: CA-WWA-U1MW-015					
CAWW- 116	1/8/2016	< 145	< 2.6	< 4.5	< 2.7	< 2.5	< 7.6	< 2.2	< 4.0	< 4.2	< 6.9
CAWW- 1647	4/15/2016	< 148	< 2.4	< 6.9	< 2.9	< 1.1	< 3.9	< 3.5	< 2.5	< 3.0	< 8.1
CAWW- 3757	7/18/2016	< 152	< 1.6	< 4.9	< 2.1	< 1.6	< 3.1	< 1.7	< 2.0	< 1.8	< 9.6
CAWW- 5602	10/15/2016	< 154	< 3.0	< 7.4	< 2.2	< 2.1	< 2.3	< 4.5	< 2.4	< 2.0	< 10.0

Table 9. Wells and Ponds (non-potable), analyses for tritium and gamma-emitting isotopes.

Lab Code	Collection Date	Concentration (pCi/L) ^{3}H	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{134}Cs	^{137}Cs	$^{140}BaLa$
						Location: CA-WWA-U1MW-016					
CAWW- 204	1/11/2016	< 146	< 4.9	< 9.3	< 4.9	< 5.6	< 6.6	< 6.5	< 5.5	< 5.1	< 6.0
CAWW- 1648	4/15/2016	< 148	< 4.5	< 7.6	< 4.5	< 1.8	< 4.6	< 6.0	< 4.8	< 3.6	< 10.0
CAWW- 3414	7/6/2016	< 149	< 1.0	< 2.6	< 1.2	< 1.0	< 2.7	< 1.8	< 1.2	< 1.6	< 3.6
CAWW- 5598	10/14/2016	< 154	< 6.0	< 8.7	< 5.4	< 4.3	< 11.2	< 6.1	< 6.9	< 4.0	< 4.6
						Location: CA-WWA-U1MW-18					
CAWW- 202	1/11/2016	< 146									
CAWW- 1640	4/12/2016	282 ± 86									
CAWW- 3553	7/11/2016	173 ± 86									
CAWW- 5427	10/6/2016	< 151									
						Location: CA-WWA-U1MW-19					
CAWW- 205	1/12/2016	< 146									
CAWW- 1917	4/26/2016	188 ± 95									
CAWW- 3755	7/18/2016	< 152									
CAWW- 5600	10/14/2016	201 ± 83									
						Location: CA-WWA-U1MW-20					
CAWW- 206	1/12/2016	< 146									
CAWW- 1918	4/26/2016	< 166									
CAWW- 3756	7/18/2016	< 152									
CAWW- 5429	10/6/2016	< 151									
						Location: CA-WWA-U1MW-31					
CAWW- 76	1/5/2016	680 ± 103									
CAWW- 1643	4/14/2016	846 ± 110									
CAWW- 3594	7/14/2016	818 ± 109									
CAWW- 5592	10/13/2016	4448 ± 208 [a]									
CAWW- 6772	12/9/2016	1944 ± 149									

[a] Tritium reanalyzed with a result of 4,590±213 pCi/L.

Table 9. Wells and Ponds (non-potable), analyses for tritium and gamma-emitting isotopes.

Lab Code	Collection Date	Concentration (pCi/L) ^{3}H	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{134}Cs	^{137}Cs	$^{140}BaLa$
		Location: CA-WWA-U1MW-34									
CAWW- 77	1/5/2016	755 ± 106									
CAWW- 1646	4/14/2016	743 ± 106									
CAWW- 3591	7/14/2016	536 ± 97									
CAWW- 5785	10/19/2016	620 ± 107									
		Location: CA-WWA-U1MW-36									
CAWW- 78	1/5/2016	1036 ± 116									
CAWW- 1644	4/14/2016	966 ± 115									
CAWW- 3592	7/14/2016	707 ± 104									
CAWW- 5786	10/19/2016	889 ± 117									
		Location: CA-WWA-U1MW-39									
CAWW- 80	1/5/2016	< 143									
CAWW- 1641	4/14/2016	< 148									
CAWW- 3554	7/11/2016	< 147									
CAWW- 5601	10/15/2016	< 154									

Table 9. Wells and Ponds (non-potable), analyses for tritium and gamma-emitting isotopes.

Lab Code	Collection Date	Concentration (pCi/L) ^{3}H	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{134}Cs	^{137}Cs	$^{140}BaLa$
		Location: CA-WWA-U1MW-47									
CAWW- 83	1/6/2016	< 143									
CAWW- 1453	4/6/2016	1373 ± 129									
CAWW- 3590	7/14/2016	620 ± 101									
CAWW- 5599	10/14/2016	597 ± 102									
		Location: CA-WWA-U1MW-58									
CAWW- 79	1/5/2016	1302 ± 125									
CAWW- 1645	4/14/2016	997 ± 116									
CAWW- 3593	7/14/2016	847 ± 110									
CAWW- 5783	10/19/2016	717 ± 111									
		Location: CA-WWA-U1MW-59									
CAWW- 118	1/8/2016	< 145									
CAWW- 1865	4/19/2016	< 149									
CAWW- 3759	7/20/2016	< 151									
CAWW- 5784	10/19/2016	< 156									
		Inside Old Blowdown Pipeline									
CAWW- 283	1/18/2016	437 ± 92									
CAWW- 1864	4/19/2016	383 ± 93									
CAWW- 3761	7/20/2016	466 ± 96									
CAWW- 5605	10/17/2016	391 ± 93									

Table 9. Wells and Ponds (non-potable), analyses for tritium and gamma-emitting isotopes.

Lab Code	Collection Date	Concentration (pCi/L) ^{3}H	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{134}Cs	^{137}Cs	$^{140}BaLa$
		Location: CA-WWA-U2MW-2S									
CAWW- 75	1/5/2016	< 143									
CAWW- 1650	4/15/2016	< 148									
CAWW- 3314	7/1/2016	< 150									
CAWW- 5589	10/13/2016	< 154									
		Location: CA-WWA-U2MW-5S									
CAWW- 72	1/4/2016	< 143									
CAWW- 1452	4/6/2016	< 138									
CAWW- 3315	7/1/2016	< 150									
CAWW- 5590	10/13/2016	< 154									
		Location: CA-WWA-U2MW-8									
CAWW- 73	1/4/2016	< 143									
CAWW- 1642	4/14/2016	< 148									
CAWW- 3555	7/11/2016	< 147									
CAWW- 5593	10/13/2016	< 154									
		Location: CA-WWA-U2MW-10									
CAWW- 74	1/4/2016	< 143	< 7.3	< 9.8	< 2.8	< 2.7	< 6.7	< 7.8	< 6.1	< 3.9	< 10.9
CAWW- 1852	4/14/2016	< 149	< 2.6	< 6.2	< 3.5	< 3.6	< 3.7	< 4.5	< 4.9	< 4.7	< 4.6
CAWW- 3413	7/6/2016	< 149	< 1.2	< 2.4	< 1.4	< 1.5	< 2.4	< 2.1	< 1.3	< 1.2	< 3.6
CAWW- 5603	10/15/2016	< 154	< 2.8	< 4.7	< 2.9	< 2.0	< 3.9	< 4.1	< 2.5	< 1.8	< 8.7
		Location: CA-WWA-U2MW-16									
CAWW- 71	1/4/2016	< 143									
CAWW- 1913	4/25/2016	< 174									
CAWW- 3409	7/5/2016	< 149									
CAWW- 5591	10/13/2016	< 154									
		Location: CA-WWA-F-005									
CAWW- 69	1/5/2016	< 143	< 2.6	< 4.5	< 4.3	< 1.0	< 4.2	< 4.9	< 3.0	< 4.3	< 5.8
CAWW- 1455	4/5/2016	< 138	< 2.3	< 4.3	< 2.2	< 1.9	< 2.8	< 3.8	< 2.5	< 3.0	< 2.8
CAWW- 3752	7/13/2016	< 152	< 1.2	< 3.0	< 1.3	< 1.0	< 2.4	< 2.0	< 1.1	< 1.3	< 8.7
CAWW- 5371	10/3/2016	< 152	< 3.3	< 8.4	< 2.1	< 1.6	< 5.7	< 4.7	< 3.2	< 2.5	< 2.4
		Location: CA-WWA-F-015									
CAWW- 70	1/5/2016	< 143	< 3.1	< 6.7	< 3.4	< 3.5	< 4.5	< 3.9	< 3.7	< 3.0	< 3.8
CAWW- 1454	4/5/2016	< 138	< 1.6	< 5.8	< 2.9	< 1.8	< 3.6	< 4.2	< 2.9	< 2.0	< 6.8
CAWW- 3753	7/13/2016	< 152	< 2.0	< 3.3	< 2.1	< 2.2	< 2.0	< 3.5	< 2.5	< 2.2	< 5.5
CAWW- 5372	10/3/2016	< 152	< 3.1	< 3.0	< 1.9	< 3.0	< 4.8	< 5.0	< 2.7	< 2.6	< 6.9

Table 10a. Bottom sediments, analyses for gamma-emitting isotopes.

Collection: Semiannually

Units: pCi/kg dry

Location		CA-AQS-A	
Lab Code	Req. LLD	CABS- 1595	CABS- 5882
Date Collected	-	04-12-16	10-25-16
K-40	-	12530 ± 614	14818 ± 1026
Mn-54	-	< 17.7	< 45.7
Fe-59	-	< 54.0	< 127.9
Co-58	-	< 19.3	< 55.4
Co-60	-	< 6.8	< 26.3
Zr-Nb-95	-	< 22.6	< 63.0
Cs-134	150	< 17.1	< 35.4
Cs-137	180	< 12.8	73.5 ± 42.3
Ba-La-140	-	< 52.0	< 283.3

Location		CA-AQS-C	
Lab Code	Req. LLD	CABS- 1596	CABS- 5883
Date Collected	-	04-12-16	10-25-16
K-40	-	14594 ± 754	11855 ± 520
Mn-54	-	< 29.7	< 16.5
Fe-59	-	< 46.0	< 40.3
Co-58	-	< 33.0	< 22.7
Co-60	-	< 23.9	< 15.9
Zr-Nb-95	-	< 57.0	< 41.8
Cs-134	150	< 24.5	< 12.8
Cs-137	180	< 29.5	< 15.3
Ba-La-140	-	< 109.9	< 102.4

Table 10b. Shoreline sediments, analyses for gamma-emitting isotopes.

Collection: Semiannually

Units: pCi/kg dry

Location		CA-AQS-A	
Lab Code	Req. LLD	CASS- 1592	CASS- 5879
Date Collected	-	04-12-16	10-25-16
K-40	-	14609 ± 807	15261 ± 841
Mn-54	-	< 32.0	< 29.0
Fe-59	-	< 96.4	< 94.6
Co-58	-	< 38.4	< 31.6
Co-60	-	< 16.2	< 21.9
Zr-Nb-95	-	< 57.7	< 65.3
Cs-134	150	< 26.6	< 18.8
Cs-137	180	< 34.7	86.5 ± 38.4
Ba-La-140	-	< 78.5	< 67.4

Location		CA-AQS-C	
Lab Code	Req. LLD	CASS- 1593	CASS- 5881
Date Collected	-	04-12-16	10-25-16
K-40	-	14796 ± 732	15475 ± 746
Mn-54	-	< 24.3	< 25.5
Fe-59	-	< 56.0	< 44.8
Co-58	-	< 29.3	< 33.6
Co-60	-	< 13.1	< 19.6
Zr-Nb-95	-	< 45.9	< 61.4
Cs-134	150	< 25.2	< 24.8
Cs-137	180	< 29.5	< 28.0
Ba-La-140	-	< 75.9	< 133.1

Table 11. Fish, analyses for gamma-emitting isotopes.

Collection: Semiannually

Units: pCi/kg wet

Location		CA-AQF-A				
Lab Code	Req. LLD	CAF- 1597	CAF- 1598	CAF- 1599	CAF- 1600	CAF- 1601
Date Collected		04-12-16	04-12-16	04-12-16	04-12-16	04-12-16
Sample Type		Silver Carp	Common Carp	River Carpsucker	Freshwater Drum	Channel Catfish
K-40	-	2449 ± 372	2650 ± 381	2832 ± 369	3118 ± 401	3431 ± 411
Mn-54	130	< 10.9	< 11.5	< 16.8	< 21.6	< 19.5
Fe-59	260	< 37.7	< 49.2	< 61.8	< 42.3	< 31.3
Co-58	130	< 21.3	< 25.5	< 11.9	< 17.4	< 25.5
Co-60	130	< 12.0	< 6.3	< 15.9	< 15.7	< 9.0
Zn-65	260	< 20.0	< 32.5	< 19.8	< 32.9	< 19.5
Cs-134	130	< 16.8	< 17.6	< 15.0	< 15.8	< 18.2
Cs-137	150	< 11.2	< 9.0	< 13.7	< 13.3	< 15.8
Lab Code	Req. LLD	CAF- 5869	CAF- 5870	CAF- 5871	CAF- 5872	CAF- 5873
Date Collected		10-25-16	10-25-16	10-25-16	10-25-16	10-25-16
Sample Type		Common Carp	River Carpsucker	Blue Catfish	Freshwater Drum	Silver Carp
K-40	-	2808 ± 378	2400 ± 337	2988 ± 443	3178 ± 364	2895 ± 410
Mn-54	130	< 11.2	< 12.8	< 13.7	< 14.7	< 15.5
Fe-59	260	< 33.0	< 25.5	< 47.3	< 35.5	< 47.8
Co-58	130	< 9.3	< 13.3	< 14.4	< 16.2	< 13.8
Co-60	130	< 9.9	< 10.9	< 15.4	< 11.7	< 8.5
Zn-65	260	< 20.5	< 25.4	< 27.7	< 28.4	< 15.1
Cs-134	130	< 14.9	< 14.3	< 18.1	< 15.3	< 18.4
Cs-137	150	< 12.9	< 11.1	< 18.7	< 9.0	< 13.5

Table 11. Fish, analyses for gamma-emitting isotopes.
Collection: Semiannually
Units: pCi/kg wet

Location		CA-AQF-C				
Lab Code	Req. LLD	CAF- 1602	CAF- 1603	CAF- 1604	CAF- 1605	CAF- 1606
Date Collected		04-12-16	04-12-16	04-12-16	04-12-16	04-12-16
Sample Type		Silver Carp	Common Carp	River Carpsucker	Freshwater Drum	Channel Catfish
K-40	-	3026 ± 433	3231 ± 411	2926 ± 416	3416 ± 381	3145 ± 394
Mn-54	130	< 18.1	< 11.5	< 17.8	< 14.3	< 17.1
Fe-59	260	< 65.1	< 42.3	< 64.7	< 58.0	< 68.3
Co-58	130	< 21.1	< 22.5	< 28.7	< 14.3	< 25.8
Co-60	130	< 12.7	< 14.7	< 14.7	< 9.3	< 11.2
Zn-65	260	< 21.3	< 18.3	< 19.5	< 14.9	< 27.8
Cs-134	130	< 20.5	< 14.8	< 15.8	< 15.8	< 19.0
Cs-137	150	< 14.4	< 18.0	< 15.7	< 14.5	< 20.2
Lab Code	Req. LLD	CAF- 5874	CAF- 5875	CAF- 5876	CAF- 5877	CAF- 5878
Date Collected		10-25-16	10-25-16	10-25-16	10-25-16	10-25-16
Sample Type		Common Carp	River Carpsucker	Blue Catfish	Freshwater Drum	Freshwater Drum
K-40	-	3532 ± 488	2771 ± 433	3058 ± 478	2593 ± 316	1915 ± 336
Mn-54	130	< 19.5	< 13.2	< 19.2	< 11.9	< 16.0
Fe-59	260	< 32.5	< 29.7	< 64.0	< 28.1	< 44.4
Co-58	130	< 18.2	< 18.5	< 19.3	< 10.2	< 14.5
Co-60	130	< 19.3	< 12.2	< 17.0	< 11.4	< 11.4
Zn-65	260	< 17.5	< 21.3	< 45.8	< 15.2	< 18.2
Cs-134	130	< 18.0	< 17.7	< 19.2	< 12.2	< 15.2
Cs-137	150	< 16.4	< 18.5	< 13.1	< 12.1	< 10.0

Table 12. Direct Radiation (quarterly exposure)

Location	Gamma Dose (mrem/90 days)			
	QTR 1	QTR 2	QTR 3	QTR 4
CA-IDM-1A	16.24	15.81	15.88	16.22
CA-IDM-3	16.76	16.46	16.73	17.02
CA-IDM-5	15.19	13.35	14.50	14.27
CA-IDM-6	16.35	15.34	16.12	16.52
CA-IDM-7	16.39	15.97	15.02	16.05
CA-IDM-9	14.78	14.10	15.08	15.65
CA-IDM-10	17.69	16.23	16.43	17.28
CA-IDM-11A	18.54	16.31	18.71	17.19
CA-IDM-14	16.85	15.69	16.17	16.32
CA-IDM-17	16.16	15.15	15.62	15.77
CA-IDM-18A	16.29	15.49	15.81	16.03
CA-IDM-20	16.43	16.11	16.12	16.99
CA-IDM-21	16.35	15.31	15.94	16.10
CA-IDM-22A	13.16	13.13	12.56	12.41
CA-IDM-23	16.89	16.16	16.55	16.15
CA-IDM-26 (C)	12.20	11.14	11.32	11.84
CA-IDM-27 (C)	17.54	16.44	17.01	18.25
CA-IDM-30A	16.34	15.22	17.96	15.26
CA-IDM-31A	16.69	16.40	16.89	16.67
CA-IDM-32	17.01	15.41	16.21	16.39
CA-IDM-32A	15.86	14.80	16.54	15.20
CA-IDM-33	15.95	NS[a]	15.70	16.49
CA-IDM-34	16.26	15.56	16.13	15.14
CA-IDM-35	15.11	14.41	15.15	14.62
CA-IDM-36	15.36	14.32	15.07	14.53
CA-IDM-37	15.61	15.67	15.54	15.65
CA-IDM-38	11.84	11.09	11.32	11.17
CA-IDM-39	16.08	15.82	14.97	15.43
CA-IDM-39A	16.27	16.13	14.50	16.18
CA-IDM-40	17.13	17.25	15.68	16.81
CA-IDM-41	16.44	15.82	14.08	15.80
CA-IDM-42	14.56	13.27	12.58	13.44
CA-IDM-43	16.42	15.59	14.38	15.19
CA-IDM-44	16.26	15.10	14.45	15.76
CA-IDM-45	14.22	14.41	13.83	14.59
CA-IDM-46	16.69	16.03	15.26	16.30
CA-IDM-47	15.71	14.76	14.87	15.28
CA-IDM-48	16.80	15.82	16.09	16.31
CA-IDM-49	15.99	15.00	14.58	14.75
CA-IDM-50	16.38	15.77	15.45	16.07
CA-IDM-51A	17.29	16.49	15.20	17.24
CA-IDM-52	16.89	15.98	15.26	16.29
CA-IDM-60 (C)	16.17	16.12	13.80	15.79

a "NS" = No sample; refer to Part I Table 5.5, Missed Collections and Analyses.

Table 12b. Direct Radiation Neutron (quarterly exposure)

Location	Neutron Dose (mrem/91 days)			
	QTR 1	QTR 2	QTR 3	QTR 4
CA-IDM-60N (C)	0.0	0.0	0.0	0.0
CA-IDM-61N	0.0	0.0	0.0	0.0
CA-IDM-62N	0.0	0.0	0.0	0.0
CA-IDM-63N	0.0	0.0	0.0	0.0
CA-IDM-64N	0.0	0.0	0.0	0.0