ATI Environmental, Inc.
Midwest Laboratory
700 Landwehr Road • Northbrook, IL 60062-2310
phone (847) 564-0700 • fax (847) 564-4517

AMEREN MISSOURI,
CALLAWAY ENERGY CENTER
FULTON, MISSOURI

DOCKET NO. 50-483

ANNUAL REPORT
to the

UNITED STATES NUCLEAR REGULATORY COMMISSION

Radiation Environmental Operating Report

January 1 to December 31, 2012

Prepared by

ENVIRONMENTAL, Inc.
Midwest Laboratory

Submitted by

UNION ELECTRIC CO.
dba Ameren Missouri Corp.

Project No. 8036

Approved : _____ 4/22/13

Bronia Grob, M.S.
Laboratory Manager

PREFACE

This Annual Radiological Environmental Operating Report describes the Ameren Missouri Corp., Callaway Energy Center Radiological Environmental Monitoring Program (REMP), and the program results for the calendar year 2012. 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 for the Ameren Missouri, Callaway Energy Center.

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

PART II Page

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

This report presents an analysis of the results of the Radiological Environmental Monitoring Program (REMP) conducted during 2012 for the Union Electric Company (dba Ameren Missouri Corp.), 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 2012 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 herein described. Results for the year 2012 are summarized and discussed.

For the year, the Callaway Energy Center was operated in compliance with Off Site Dose Calculation Manual (ODCM) and Radiological Effluent Controls (REC) requirements. Comparison of results for 2012 show no significant differences to the historical data. 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.

Short-lived radioactive elements released into the environment following the Fukushima Daiichi incident, March 11, 2011, are no longer detectable in the background. It is possible that a slight increase in soil and sediment background activity could be observed, attributable to the release of longer-lived isotopes, e.g. Cs-134 and Cs-137.

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. Ambient gamma 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.

In interpreting the data, effects due to operation of the Callaway Energy Center must be distinguished from those due to other sources.

A major interpretive aid in assessment of these effects is the design of the monitoring program at the Callaway Energy Center, based on the indicator-control concept. 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.

An additional interpretive technique involves analyses for specific radionuclides present in the environmental samples collected from the Callaway site. 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 calibration 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, direction, and sector 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 particulates 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 an activated charcoal cartridge. 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. 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.

Soybeans 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.

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).

Onsite surface water from eleven 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 is collected monthly or quarterly from 48 well locations both onsite and along the discharge pipeline. The samples are 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.

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.

3.2 Program Description (continued)

Another pathway considered is direct ambient gamma radiation. This exposure is monitored by thermoluminescent dosimeters (TLDs), at forty-three locations in and around the Callaway site. The TLDs are placed in 16 sectors around the plant as specified in the ODCM-RECS. Three locations are designated as controls (IDM-26, IDM-27 and IDM-60). TLDs are placed at each location and exchanged and analyzed quarterly.

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

Additional sampling for soil, surface and ground water was conducted in 2012. Results are included in Part II, App. A.

3.3 Program Execution

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

(1) Surface Water:

The surface water samples are composites of daily collections by automatic river sampler from two locations, S01 and S02. The sampler at S01 was out-of service approximately 15 days in 2012. The sampler at S02 was 100% operable. During sampler downtime, composites of daily grab samples are prepared and submitted for analysis.

(2) Ground Water:

Ground water collection has been intermittent for monitoring wells U1MW-28 and MW-939 since installation in 2010.

For the first quarter, 2012, a small sample (<100 ml.) was collected from location U1MW-28, and analyzed for tritium and gamma emitting isotopes. The second quarter sample was analyzed for tritium only, since there was insufficient volume for a gamma isotopic analysis. No sample was available during the third and fourth quarters. This well should normally be dry, since the area is rocky, with a shallow overburden of clay. U1MW-28 was installed specifically to monitor for leakage from the single vacuum breaker on the discharge pipeline.

There was only one collection from MW-939 in 2012. The well was dry from February through July due to lack of rain and draw down of the water table from the Groundwater Sump (GWS). The well was drilled approximately 10 feet bgs to monitor piping at that depth. In August, 2012, a replacement well, MW-939R, was installed about 3 feet from MW-939 at a depth of 25 feet bgs. MW-939 was closed out at that time.

The January CTBD sample was lost during shipment and could not be located. CTBD was subsequently eliminated from the program.

The Unit 2 Pond was eliminated from the program prior to the October sampling. The pond was drained to allow for site evaluation, prior to construction of a new plant facility in that location.

3.3 Program Execution (continued)

(3) Vegetation:

No area garden produced vegetation samples until the May collection. Location V-11 reached the end of its season with the October sampling. V-9 and V-12 ceased production after the November sampling. Location V-16 did not produce vegetation until June and was harvested prior to the October sampling. Missing samples during the periods when the gardens were producing are shown in Table 2.0. Most missing vegetation samples were due to the effects of drought on area gardens.

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

(4) Non- food Crops

Fields at stations FC-1, FC-2, and FC-3 were not planted this year, therefore there were no soybeans to sample.

(5) Air Iodine and Particulates

Air iodine and air particulate station A-8 was shut down on September 6, 2012, due to safety concerns resulting from a damaged electrical cord. The unsafe condition was repaired on September 10, 2012 and the sampler returned to service. Samples collected from station A-8 for the week ending September 13 had lower volume, due to the reduced run-time. Wiring at the remaining air sampling stations (A-1, A-7, A-9, and B-3) was also repaired, with approximately a one hour interruption in service for each station.

(6) Direct Radiation:

The TLD and fade dosimeters placed at location IDM-40 were missing for the 2nd quarter. In the third quarter, dosimeters from locations IDM-21, IDM-36 and IDM-49 were missing. The TLDs were replaced. Vandalism is suspected in all cases.

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

1. Sampling of surface water from the Cooling Tower Blowdown (CTBD) was discontinued in 2012 (CAR 201200833). The replacement of the discharge pipeline eliminated the recirculation of tritium in the river and the sample was no longer necessary.

2. Sampling of surface water from the Unit 2 pond (CA-SWA-Unit 2) was discontinued in the fourth quarter, 2012. The Unit 2 pond was drained for geotechnical borings and sampling to support construction in that location.

3. Ground water collection has been intermittent from well site CA-WWA-939 since it was added to the program in 2010. The well was only 10' deep. The replacement well CA-WWA-939R is approximately 3 feet from CA-WWA-939 and 25 feet deep. Sample collection began in August, 2012.

4. For the 2012 growing season, vegetation sampling location V16 replaced station V15, due to a history of poor performance.

5. The soil control station (V3) was replaced by station M9 (CAR 201108365), due to the death of the property owner.

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 2012, the survey was conducted within a five mile canvassing radius of the Callaway Energy Center. The location of the nearest resident, milking animal, and broadleaf vegetation garden greater than 50 square meters was identified 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.

The Land Use Census was completed on October 12, 2012. 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.

The census includes identification of drinking water wells along Mud Creek, Logan Creek and along the discharge pipeline corridor. No new drinking water wells were identified in 2012.

No irrigation or drinking water intakes were found within 10 river miles downstream of the plant discharge point.

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 2012 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

There were no reported accidents involving significant release to the environment at nuclear reactor facilities in 2012. The Fukushima Daiichi nuclear accident occurred March 11, 2011.

There were no reported atmospheric nuclear tests in 2012. The last reported atmospheric test was conducted on October 16, 1980 by the People's Republic of China.

4.2 Program Findings

Results obtained show background levels of radioactivity in environmental samples collected beyond the plant property boundary in 2012. Tritium was identified in some groundwater samples collected within the Plant Protected Area and on Ameren property in the Missouri River alluvial plain. In no instances were REMP threshold reporting levels exceeded.

Airborne Particulates

The five air particulate sampling stations (A1, A7, A8, A9, and B3) are indicator locations. Station A-9 is located in Reform, MO, the community with the highest D/Q, station A-7 is on the outskirts of Fulton, Missouri, approximately 9.5 miles from the plant.

Gamma spectroscopic analysis of the air particulate filters yielded similar results for all locations. In 106 of the 264 samples tested, Beryllium-7 measured above an LLD value of 0.17 pCi/m^3, with an average activity of 0.23 pCi/m^3. Beryllium-7 is produced continuously in the upper atmosphere by cosmic radiation. No gamma emitting isotopes of plant origin were identified.

Airborne Iodine

There was no I-131 activity detected in weekly collections of charcoal canister samples. All measurements were below the required lower limit of detection (LLD) of 0.070 pCi/m^3.

Direct Radiation (TLDs)

Forty-three TLDs were placed in 16 sectors around the Callaway site. Measurements from forty indicator locations averaged 16.0 mrem/quarter and the three control locations averaged 15.3 mrem/quarter. Readings ranged from 10.6 to 18.6 mrem /quarter, with the highest from the control location CA-IDM-27, averaging 17.7 mrem/quarter. The differences are statistically insignificant.

The TLD readings were consistent with previously accumulated data and no effect from plant operation was identified.

4.2 Program Findings (continued)

Milk

Iodine-131 results were below the detection limit of 0.5 pCi/L in all samples.

No gamma-emitting isotopes, excepting naturally occurring potassium-40, were detected in milk. Average potassium-40 activity measured 1186 pCi/L and ranged from 977–1477 pCi/L.

In summary, milk data for 2012 show no radiological effects of plant operation.

Vegetation

There was no I-131 activity detected in broadleaf vegetation samples. Measurements were below an LLD level of 41.4 pCi/kg wet weight in all samples.

Except for naturally-occurring potassium-40, which was observed in all vegetation samples, gamma-emitting isotopes were below detection limits. No effect from plant operation is indicated.

Non-Food Crops

Soybeans were collected in September and October, 2012, and analyzed for tritium and gamma-emitting isotopes. One sample of corn was collected from the control location (FC-4)

No tritium activity was measured above a detection level of 161 pCi/L in any of the samples.

The potassium-40 activity ranged from 3,311–14,153 pCi/kg wet weight. All other gamma-emitting isotopes measured below detection limits.

No effect from the plant operation is indicated.

Fish

Edible portions of fish were analyzed by gamma spectroscopy. The potassium-40 levels measured were almost identical at indicator and control locations (2,908 and 2,897 pCi/kg wet, respectively).All other gamma-emitting isotopes measured below detection limits.

No plant effect on the fish population is indicated.

Soil

Cesium-137 activity was detected at both indicator and control locations, at average concentrations of 333 and 114 pCi/kg dry, respectively. The cesium-137 activity is similar to or less than levels observed from 1999 through 2011, these levels are generally attributable to the deposition of fallout from previous decades.

Naturally-occurring potassium-40 averaged 11,985 pCi/kg dry weight.

Analysis results for soil samples in 2012 were consistent with previously accumulated data and no plant operational effects were identified.

4.2 Program Findings (continued)

Surface Water

Slight tritium activity above the detection limit of 177 pCi/L was observed in two of the twelve samples collected from the downstream location S-02. The measurements averaged 363 pCi/L.

Gamma-emitting isotopes measured below detection limits and were consistent with previously accumulated data.

Surface Water, Ponds

To monitor possible sources of groundwater contamination due to plant operations, eleven onsite surface water locations (SWA) are included in the permanent REMP. Tritium was detected in one of four samples from the UHS pond at a level of 233 pCi/L. All other sample results measured below detection level. Traces of H-3 activity in these ponds is believed to be the result of washout from gaseous effluents.

Gamma-emitting isotopes measured below detection limits. No plant operational effects were identified.

Drinking Water Wells (potable water)

In addition to potable ground water from wells D-01 and PW-01, the REMP includes nine additional potable water wells from adjacent properties and one additional potable water well from the town of Portland, MO. The samples were analyzed for tritium and gamma-emitting isotopes.

No tritium activity was measured above a detection level of 152 pCi/L in any of the samples. All gamma-emitting isotopes were below detection limits.

Analysis results for drinking water samples were consistent with previously accumulated data and no plant operational effects were identified.

Wells (non-potable water)

Ground water from wells F-05 and F-15 was tested for tritium and gamma-emitting isotopes. Both tritium and gamma-emitting isotopes measured below detection levels.

Forty-six additional indicator ground water locations, on-site and along the discharge pipeline, are included in the REMP. Tritium activity (above a detection limit of 178 pCi/L) was detected in 36 of the 280 samples tested, with an average activity of 366 pCi/L. The highest concentrations were measured at the Ground Water Sump (CA-WWA-GWS), with an average activity of 794 pCi/L.

Wells OW-4, OW-5, GWS, 936, 937A to 937F, 938, 939, 940 and 941 are located in the Plant Protected Area, adjacent to the powerblock. 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-017, MW-018 and MW-019 is due to residual low level contamination of the area down gradient from manholes 5 and 6B. The contamination was caused by moisture carryover during normal operation of air release valves (ARVs) in the now-retired discharge pipeline. The exhaust of the ARV's was secured in 2007, and the pipeline was replaced in 2008. The new discharge pipeline has no ARV's and only a single vacuum breaker, which is completely contained to prevent possible leakage to the ground water. The old pipeline has been abandoned in place. The contamination is being remediated by monitored natural attenuation. There are no active leaks.

4.2 Program Findings, Wells and Ponds (non-potable water, continued)

Wells have been established along the pipeline corridor to monitor the old pipeline and to ensure there is no leakage from the new pipeline. Monitored natural attenuation will be utilized to remediate the low level residual tritium contamination.

.

Samples were also analyzed for gamma-emitting isotopes. No gamma-emitting activities were detected above the respective LLDs.

Sediments

Bottom sediments were collected in May and October, 2012, and analyzed for gamma-emitting isotopes. A low level of cesium-137 was detected in both of the control samples with an average concentration of 78 pCi/kg dry weight and one of the two indicator samples at a concentration of 46 pCi/kg dry weight. Potassium-40 activity ranged from 12,617 to 13,743 pCi/kg dry weight and averaged 13,060 pCi/kg dry weight.

Shoreline sediments were also collected in May and October, 2012. Trace cesium-137 activity was detected in the two control samples at a concentration of 43 pCi/kg dry weight, but measured below detection limits at the indicator location. Potassium-40 activity ranged from 12,569 to 13,930 pCi/kg dry weight and averaged 13,551 pCi/kg dry weight.

Potassium-40 is a naturally occurring isotope. The slight cesium-137 activities observed are indicative of the influence of fallout deposition. All other gamma-emitting isotopes were below detection limits. No effect from the plant operation is indicated.

5.0 TABLES AND FIGURES

Table 5.1. Sampling Locations.

Location Code	Distance / Direction [1]	Description	Sample Types [2]
1a	10.8 mi. NW	City of Fulton on Hwy Z, 0.65 mi. E of Bus. 54, W of Campus Apartments.	IDM
3	1.2 mi. 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. ENE	Primary Meteorological Tower.	IDM
6	2.0 mi. W	Cty Rd. 428, 1.2 mi. West of Hwy CC, Utility Pole No. 18609.	IDM
7	1.4 mi. S	Cty Rd. 459, 2.6 mi. North of Hwy 94, Utility Pole No. 35097.	IDM
9	3.8 mi. S	NW Side of the Cty Rd. 459 and Hwy 94 Junction, Utility Pole No. 06754.	IDM
10	3.9 mi. SSE	Hwy 94, 1.8 mi. East of Cty Rd. 459, Utility Pole No. 12182.	IDM
11a	4.7 mi. SE	City of Portland, Utility Pole No. 12110.	IDM
14	4.9 mi. ESE	SE Side of Intersection D and 94, Utility Pole No. 11940.	IDM
17	3.8 mi. E	Cty Rd. 4053, 0.3 mi. E of Hwy 94, Kingdom Telephone Co., Pole No. 3X12.	IDM
18a	3.7 mi. ENE	East side of Hwy D, 0.5 mi. South of O, Utility Pole No. 38579.	IDM
20	4.7 mi. NE	City of Readsville, Utility Pole No. 12830.	IDM
21	3.8 mi. NNE	Cty Rd. 155, 1.9 mi. North of Hwy O, Utility Pole No. 19100.	IDM
22a	1.9 mi. NNE	North side of Hwy O, 100 feet East of Cty Rd. 150, Utility Pole No. 31094.	IDM
23	6.6 mi. NNE	City of Yucatan, Utility Pole No. 12670.	IDM
26 [3]	11.7 mi. E	Town of Americus, Utility Pole No. 11159.	IDM
27 [3]	9.3 mi. ESE	Town of Bluffton, Utility Pole No. 11496.	IDM
30a	4.4 mi. SSW	City of Steedman, Utility Pole No. 06557.	IDM
31a	7.8 mi. SW	City of Mokane, Hwy C and Cty Rd. 400, 0.9 mi. North of Hwy 94, Utility Pole.	IDM
32	5.4 mi. WSW	Hwy VV, 0.6 mi.West of Cty Rd. 447, Utility Pole No. 27031.	IDM
32a	5.0 mi. WSW	Cty Rd. 447, Utility Pole No. 06354.	IDM
33	7.4 mi. W	City of Hams Prairie, SE of Hwy C and AD Junction.	IDM
34	9.5 mi. WNW	NE Side of Hwy C and Cty Rd. 408 Junction.	IDM
35	5.8 mi. NNW	City of Toledo, Utility Pole No. 17684.	IDM
36	4.9 mi. N	Cty Rd. 155, 0.8 mi. South of Cty Rd. 132, Utility Pole No. 19137	IDM
37	0.5 mi. SSW	Cty Rd. 459, 0.9 mi. South of Hwy CC, Utility Pole No. 35077.	IDM
38	4.6 mi. NNW	Cty Rd. 133, 1.5 mi. South of Hwy UU, Utility Pole No. 34708.	IDM
39	5.4 mi. NW	Cty Rd. 111, Utility Pole No. 17516.	IDM
39a	5.0 mi. NW	Cty Rd. 111, Utility Pole No. 17526.	IDM
40	4.2 mi. WNW	NE Side of Cty Rd. 112 and Hwy O, Utility Pole No. 18145.	IDM
41	4.9 mi. W	Hwy AD, 2.8 mi. East of Hwy C, Utility Pole No. 18239.	IDM
42	4.4 mi. SW	Cty Rd. 447, 2.6 mi. North of Cty Rd. 463, Utility Pole No. 06326.	IDM
43	0.5 mi. SW	Cty Rd. 459, 0.7 mi. South of Hwy CC, Utility Pole No. 35073.	IDM
44	1.7 mi. WSW	Hwy CC, 1.0 mi. South of Cty Rd. 459, Utility Pole No. 18769.	IDM
45	1.0 mi. WNW	Cty Rd. 428, 0.1 mi. West of Hwy CC, Utility Pole No. 18580.	IDM
46	1.5 mi. NNW	NE Side of Hwy CC and Cty Rd. 466 Intersection, Utility Pole No. 28242.	IDM
47	1.0 mi. 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. E	Cty Rd. 448, Utility Pole No. 06959, Reform Wildlife Mgmt. Parking Area.	IDM
50	0.9 mi. SSE	Cty Rd. 459, 3.3 mi. North of Hwy 94, Utility Pole No. 35086	IDM
51a	0.3 mi. SE	Owner Control Fence, SE of the Water Treatment Plant.	IDM
52	0.4 mi. ESE	Light Pole Near the East Plant Security Fence.	IDM
60 [3]	13.5 mi. SW	Utility Pole No. 43744, just past Tebbetts City sign.	IDM

Table 5.1. Sampling Locations continued.

Location Code	Distance / Direction [1]	Description	Sample Types [2]
A1	1.3 mi. ENE	Primary Meteorological Tower.	APT, AIO
A7	9.5 mi. NW	C. Bartley Farm, Fulton, MO.	APT, AIO
A8	0.9 mi. NNE	Cty Rd. 448, 0.9 miles South of Hwy 0.	APT, AIO
A9	1.9 mi. NNW	Community of Reform.	APT, AIO
B3	1.8 mi. NNW	0.3 mi. East of the O and CC Junction, Utility Pole No. 50422.	APT, AIO
D01	5.0 mi. SE	Holzhouser Grocery Store/Tavern (Portland, MO).	DWA
PW1	Onsite	Unit 1 Construction well #3	DWA
F05	0.9 mi. SSE	Offsite Groundwater Monitoring well.	WWA
F15	0.4 mi. NNE	Onsite Groundwater Monitoring well.	WWA
M9 [3]	13 mi. SW	Ferguson Farm, Tebbetts, MO.	MLK, SOL
V9	1.9 mi. WNW	Meehan Farm.	FPL
V11	3.2 mi. NW	Hickman Farm.	FPL
V12 [3]	18.7 mi. WSW	Kissock Farm, South of New Bloomfield, MO	FPL
V16	1.6 mi. WSW	Wallendorf Farm, Steedman, MO	FPL
A [3,4]	4.9 mi. SSE	0.6 River Miles Upstream of Discharge North Bank.	AQS, AQF
C [4]	4.9 mi. SE	1.0 River Miles Downstream of Discharge North Bank.	AQS, AQF
S01 [3]	4.8 mi. SSE	555 feet Upstream of Discharge North Bank.	SWA
S02	4.9 mi. SE	1.1 River Miles Downstream of Discharge North Bank.	SWA
F2	1.0 mi. SW	Callaway Plant Forest Ecology Plot F2.	SOL
F6	1.6 mi. NE	Callaway Plant Forest Ecology Plot F6.	SOL
PR3	0.95 mi. ESE	Callaway Plant Forest Ecology Plot PR3.	SOL
PR7	0.46 mi. NNW	Callaway Plant Forest Ecology Plot PR7.	SOL
W1 [3]	0.52 mi. SE	Callaway Plant Wetlands, High Ground.	SOL
W2	0.52 mi. SSE	Callaway Plant Wetlands, Inlet Area.	SOL
W3	0.65 mi. SSE	Callaway Plant Wetlands, Discharge Area.	SOL
W4	0.63 mi. SSE	Callaway Plant Wetlands, SW Bank.	SOL
FC1	-	Between discharge pipeline MH-8 and the Katy Trail	FC
FC2	-	Between discharge pipeline MH-5 and MH-3B.	FC
FC3	-	Between Hwy 94 and the barge loading dock access road.	FC
FC4 [3]	-	Location unlikely to be influenced by Plant operations.	FC
3	2.9 mi. SSE	Potable water, County Road 448	DWA
4	2.6 mi. SSE	Potable water, County Road 448	DWA
5	2.5 mi. SSE	Potable water, County Road 448	DWA
6	2.2 mi. SE	Potable water, County Road 448	DWA
7	2.1 mi. ESE	Potable water, County Road 448	DWA
8	3.4 mi. SSW	Potable water, County Road 457	DWA
9	2.9 mi. SSW	Potable water, County Road 457	DWA
10	2.7 mi. SSW	Potable water, County Road 457	DWA
12	3.6 mi. SSE	Potable water, County Road 464	DWA
22	4.8 mi. SE	Potable water, State Road 94	DWA

Table 5.1. Sampling Locations, Wells and Ponds (non-potable water).

Location Code	Distance / Direction [1]	Description	Sample Types [2]
OW-4	Inside OCA	UHS Pond Berm	WWA
OW-5	Inside OCA	UHS Pond Berm	WWA
U1MW-001	0.3 mi. NNW	Outside OCA , Groundwater Monitoring Well	WWA
U1MW-002	0.4 mi. SSW	Outside OCA , Groundwater Monitoring Well	WWA
U1MW-004	3.7 mi. SSE	Dillon, Groundwater Monitoring Well	WWA
U1MW-005	3.8 mi. SSE	Brownlee / Hudson, Groundwater Monitoring Well	WWA
U1MW-006	3.0 mi. S	Ward, Groundwater Monitoring Well	WWA
U1MW-010	3.1 mi. S	Pipeline, Groundwater Monitoring Well	WWA
U1MW-012	3.0 mi. S	Ward, Groundwater Monitoring Well	WWA
U1MW-013	0.8 mi. SSE	Pipeline Corridor	WWA
U1MW-014	3.7 mi. S	Pipeline Corridor	WWA
U1MW-015	3.9 mi. SSE	Pipeline Corridor	WWA
U1MW-016	4.5 mi. SSE	Pipeline Corridor	WWA
U1MW-017	3.75 mi. S	Pipeline Corridor	WWA
U1MW-018	3.75 mi. S	Pipeline Corridor	WWA
U1MW-019	3.71 mi. S	Pipeline Corridor	WWA
U1MW-020	3.88 mi. SSE	Pipeline Corridor	WWA
U1MW-021	3.74 mi. S	Down gradient of Pipeline Corridor	WWA
U1MW-022	3.76 mi. S	Down gradient of Pipeline Corridor	WWA
U1MW-023	3.84 mi. S	Down gradient of Pipeline Corridor	WWA
U1MW-024	3.85 mi. S	Down gradient of Pipeline Corridor	WWA
U1MW-025	3.93 mi. S	Down gradient of Pipeline Corridor	WWA
U1MW-026	3.94 mi. S	Down gradient of Pipeline Corridor	WWA
U1MW-027	1.5 mi. S	Pipeline Corridor, downgrade of discharge vacuum breaker	WWA
U1MW-028	3.15 mi. S	Pipeline Corridor, downgrade of MH-9B	WWA
U1MW-029	0.2 mi. E	Down gradient of DMTdischarge piping	WWA
U1MW-030	0.2 mi. ESE	Down gradient of DMTdischarge piping	WWA
GWS	Inside OCA	Ground Water Sump, Plant East of containment and SFPB	WWA
936	Inside OCA	Diesel Fuel Remediation Well, Plant SE of SFPB	WWA
937A	Inside OCA	Monitoring Well, Plant, South of the Powerblock area	WWA
937B	Inside OCA	Monitoring Well, Plant, East of the Turbine Bldg.	WWA
937C	Inside OCA	Monitoring Well, Plant, E of Radwaste Bldg Drum Storage.	WWA
937D	Inside OCA	Monitoring Well, Plant, South of Discharge Monitor Tanks.	WWA
937E	Inside OCA	Monitoring Well, Plant, West of Auxilliary Bldg.	WWA
937F	Inside OCA	Monitoring Well, Plant, East of the Turbine Bldg.	WWA
MW-938	Inside OCA	Monitoring Well, Plant, East of the Powerblock area	WWA
MW-939	Inside OCA	Monitoring Well, Plant, West of the Fuel Bldg.	WWA
MW-939R	Inside OCA	Monitoring Well, Plant, West of the Fuel Bldg.	WWA
MW-940	Inside OCA	Monitoring Well, Plant, East of the Radwaste Bldg.	WWA
MW-941	Inside OCA	Monitoring Well, Plant, East of the Radwaste Bldg.	WWA
U2 MW-2S	1.8 mi. N	Groundwater Monitoring Well	WWA
U2 MW-5S	1.1 mi. E	Groundwater Monitoring Well	WWA
U2 MW-8	0.4 mi. N	Groundwater Monitoring Well	WWA
U2 MW-9	0.3 mi. W	Groundwater Monitoring Well	WWA
U2 MW-10	0.4 mi. SSW	Groundwater Monitoring Well	WWA

Table 5.1. Sampling Locations, Wells and Ponds (non-potable water).

Location Code	Distance / Direction [1]	Description	Sample Types [2]
U2 MW-12	0.5 mi. ENE	Groundwater Monitoring Well	WWA
U2 MW-16	2.9 mi. SSE	Groundwater Monitoring Well	WWA
UHS	Inside OCA	UHS Pond	SWA
Unit 2 Pond	Inside OCA	Unit 2 Pond	SWA
POND 01	0.6 mi. W	Fishing Pond	SWA
POND 02	0.7 mi. SW	Fishing Pond	SWA
Outfall 010	0.6 mi. NE	Stormwater Run-Off Pond	SWA
Outfall 011	1.0 mi. ENE	Stormwater Run-Off Pond	SWA
Outfall 012	0.5 mi. S	Stormwater Run-Off Pond	SWA
Outfall 013	0.5 mi. S	Stormwater Run-Off Pond	SWA
Outfall 014	0.6 mi. NNW	Stormwater Run-Off Pond	SWA
Outfall 015	0.7 mi. N	Stormwater Run-Off Pond	SWA
Sludge Lagoon # 4	0.8 mi. SSE	On service Sewage Sludge Lagoon	SWA

[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 fish collection area for location "A" is between 0.6 and 3.0 river miles upstream of the plant discharge on the north bank. Location "C" is sampled between the discharge area and 1.5 miles downstream of the discharge, on the north bank. The expanded collection areas provide sufficient habitat to collect the required number of species.

Figure 5.1. REMP Sampling Locations for Air, Drinking Well Water, Milk and Edible Vegetation, Non-Food Crops, Soil, Fish, Sediment and Surface Water.

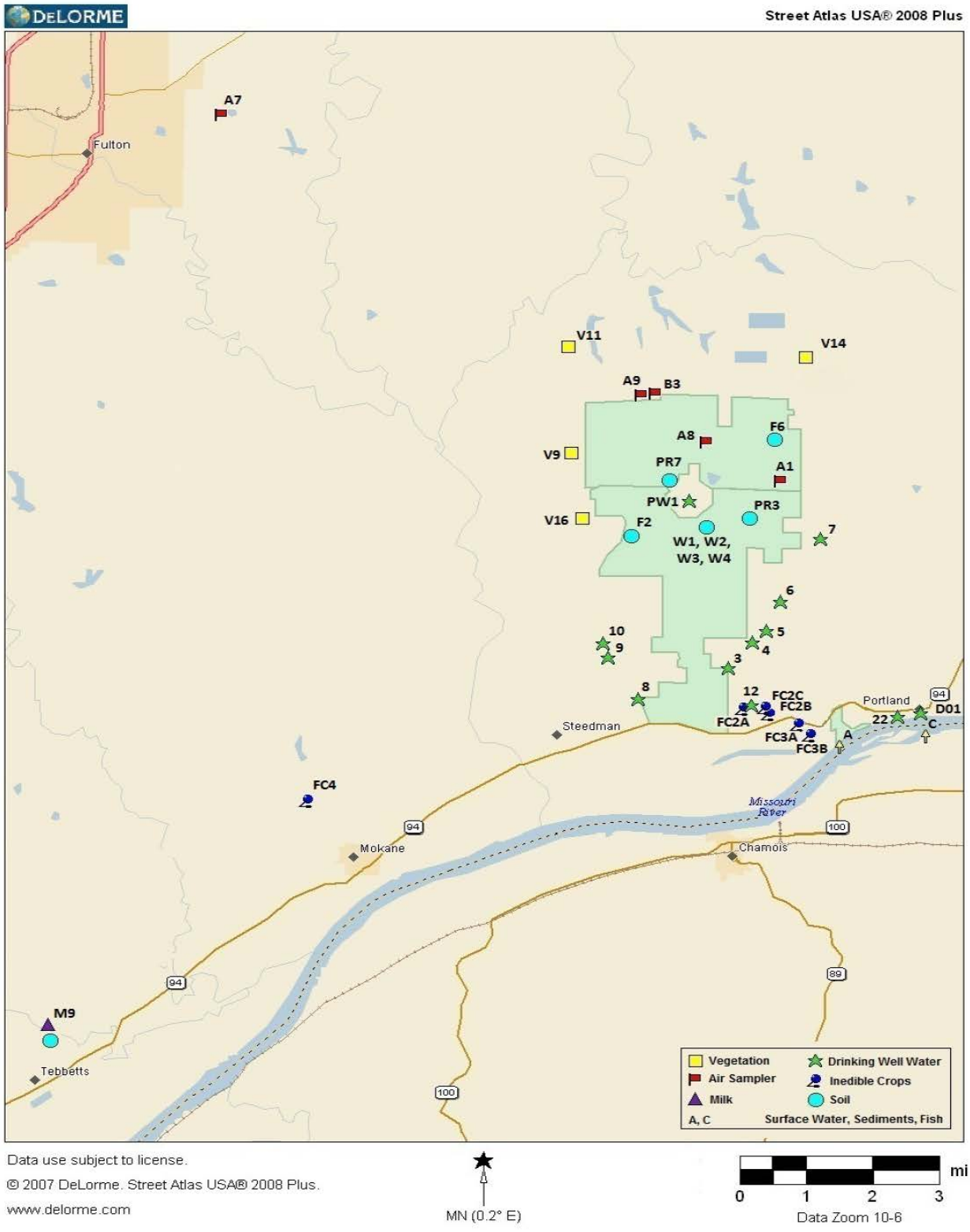


Figure 5.2a. Direct Radiation Monitoring Stations, Inner Ring Locations.

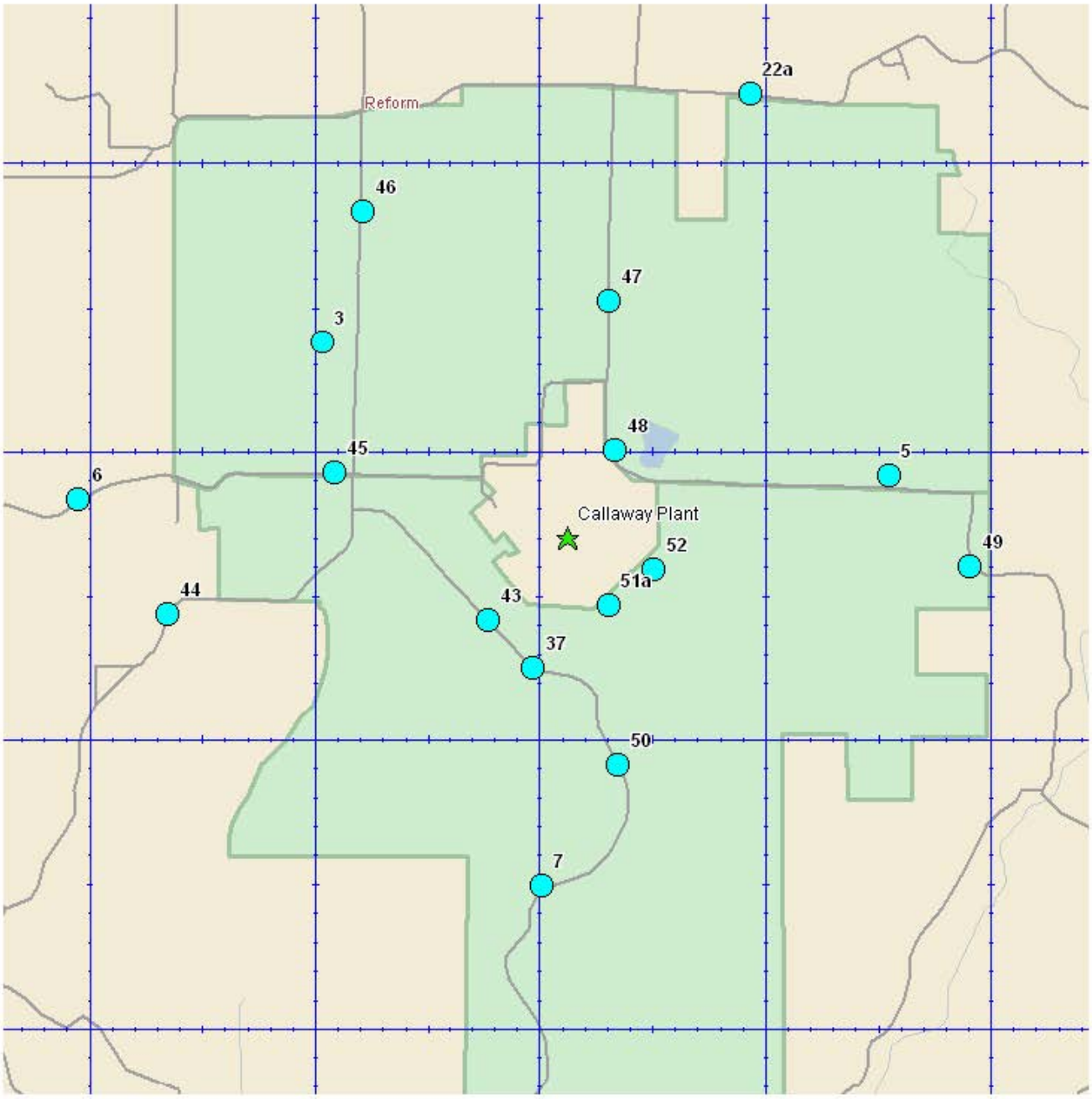


Figure 5.2b. Direct Radiation Monitoring, Outer Ring and Special Interest Locations.

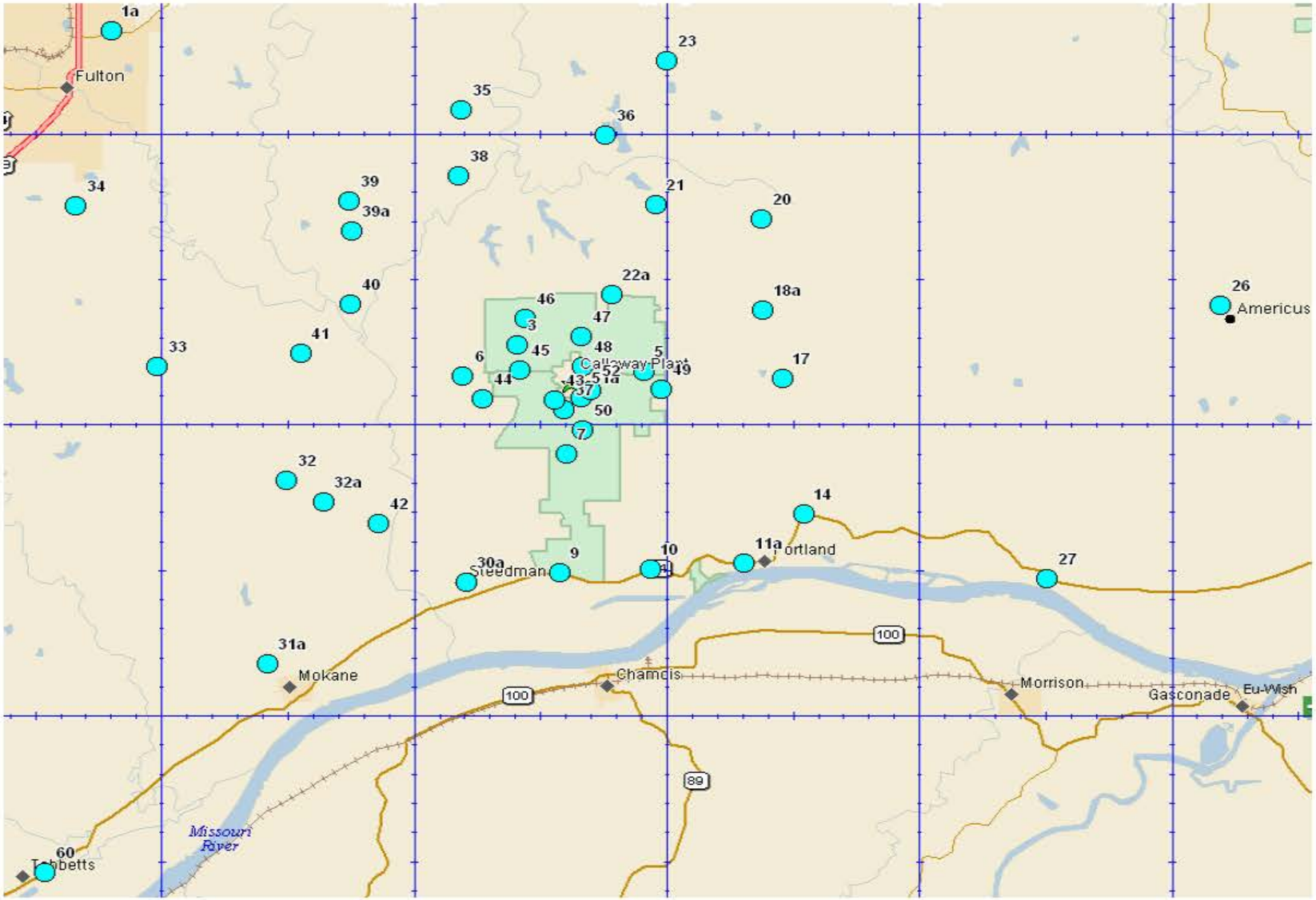
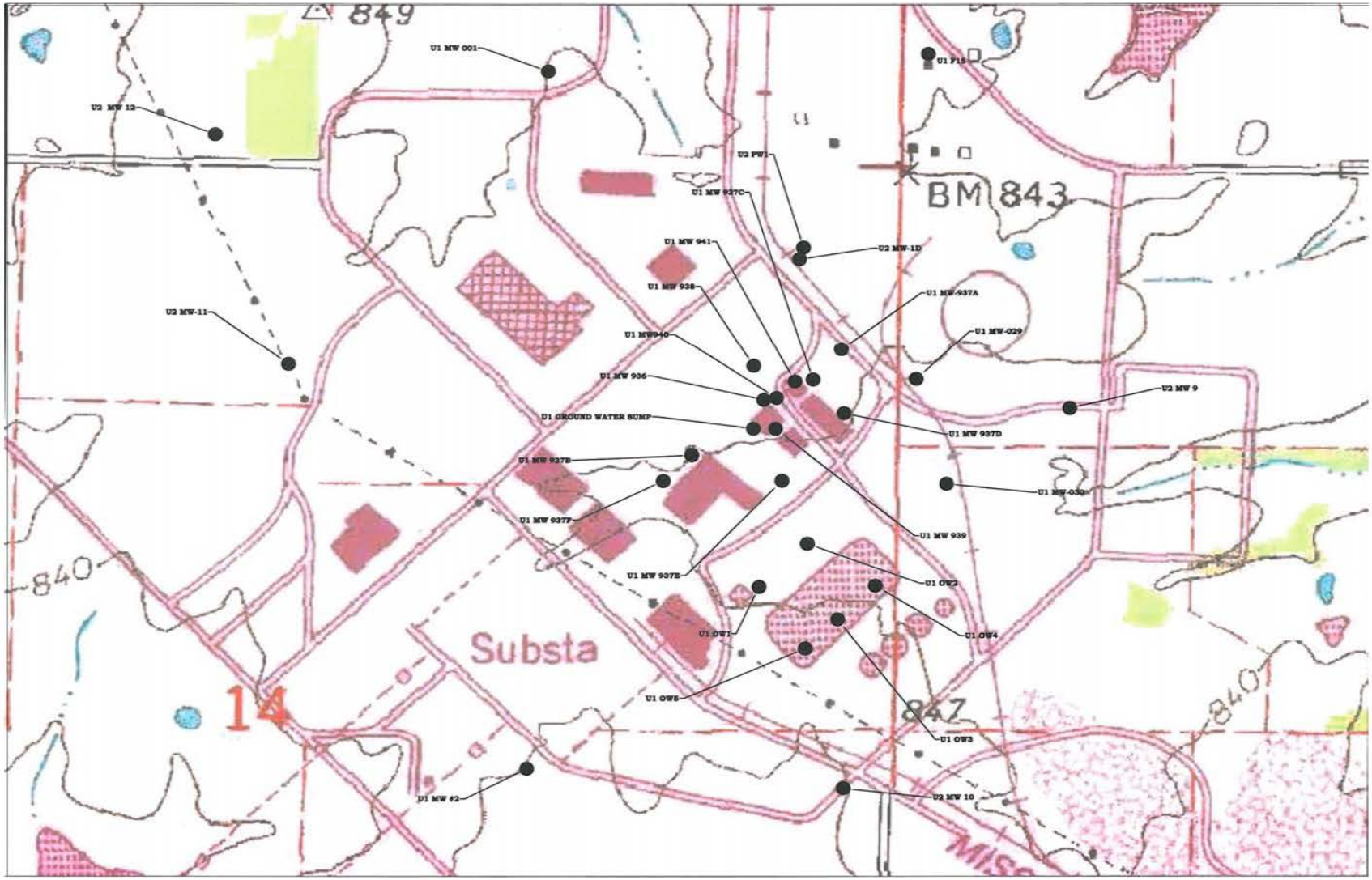


Figure 5.3a. Groundwater Monitoring Wells, Owner Controlled Area and Vicinity.



Note: Not all wells shown are included in the REMP. Refer to Table 5.1 for a listing of monitored wells.

Figure 5.3b. Groundwater Monitoring Wells, Northern Area.

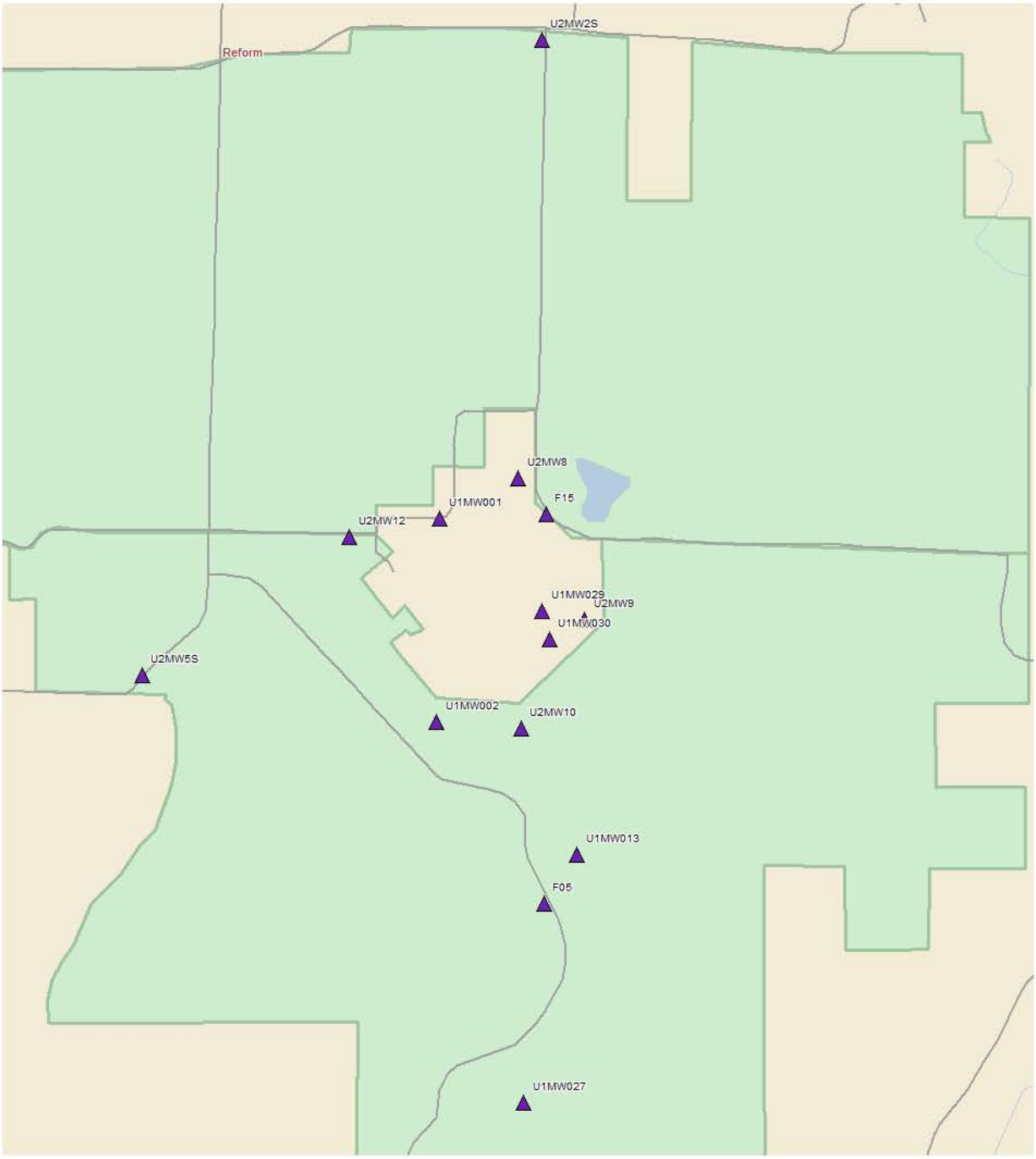


Figure 5.3c. Groundwater Monitoring Wells, Central Area.

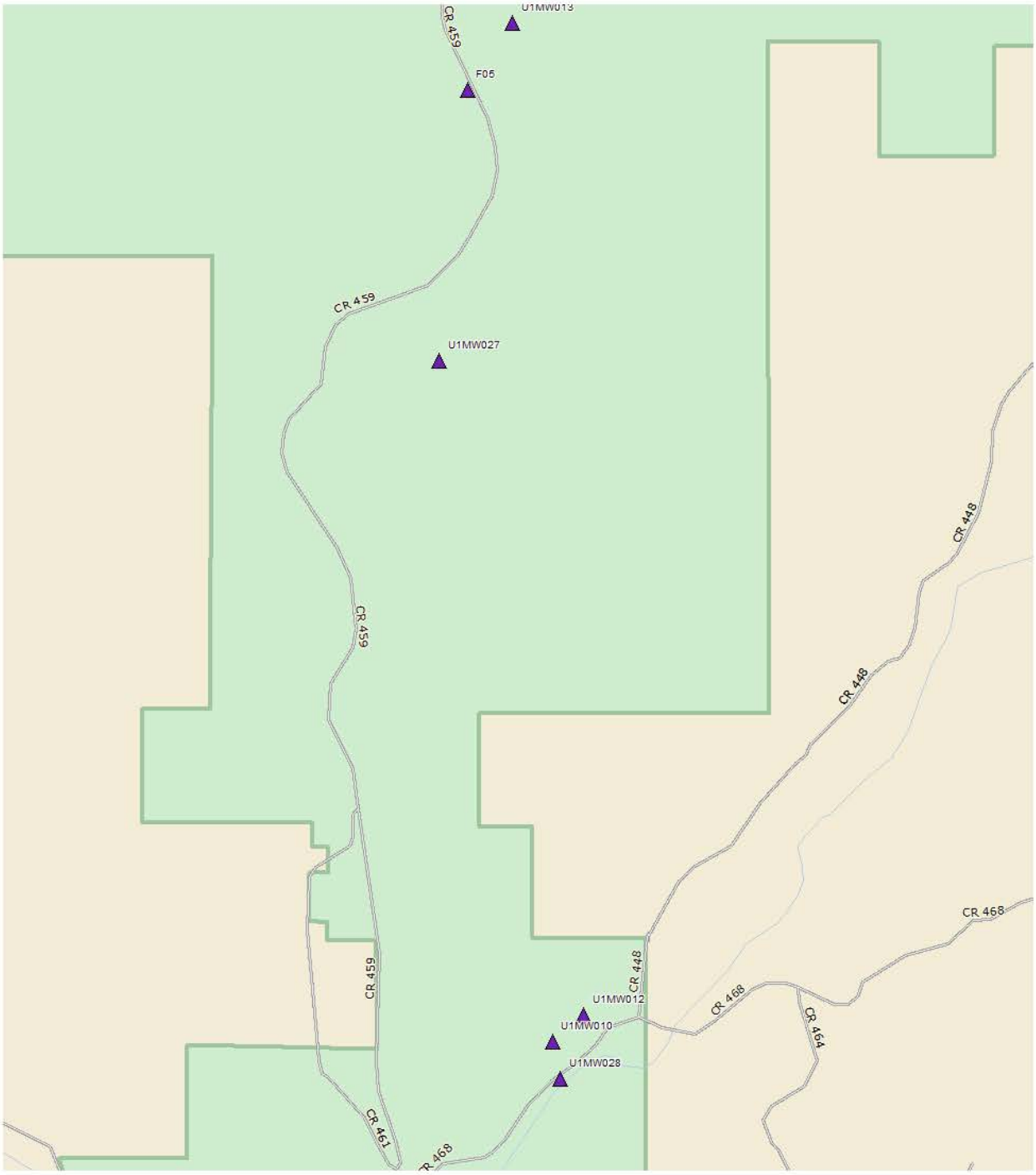


Figure 5.3d. Groundwater Monitoring Wells, Alluvial Area.

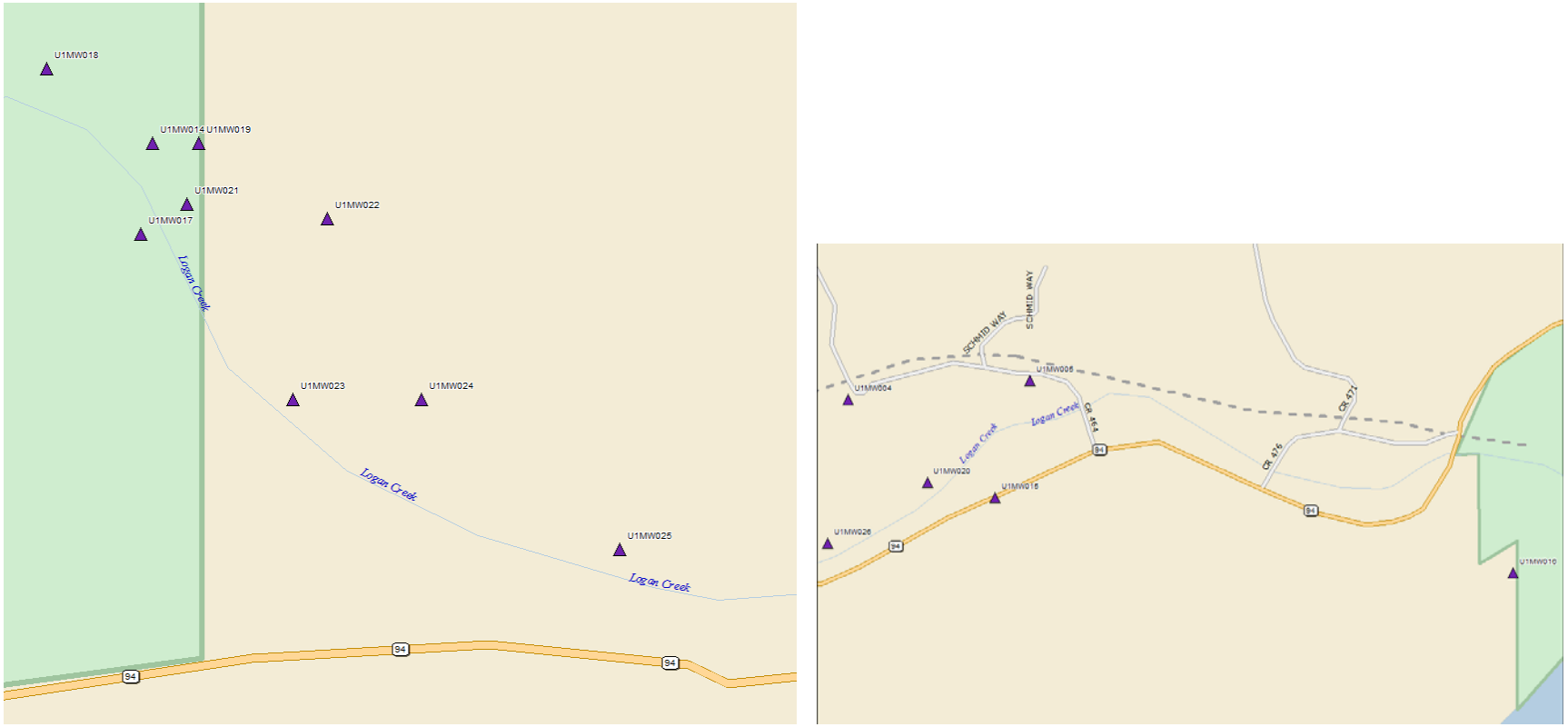


Figure 5.3e. Pond sampling locations

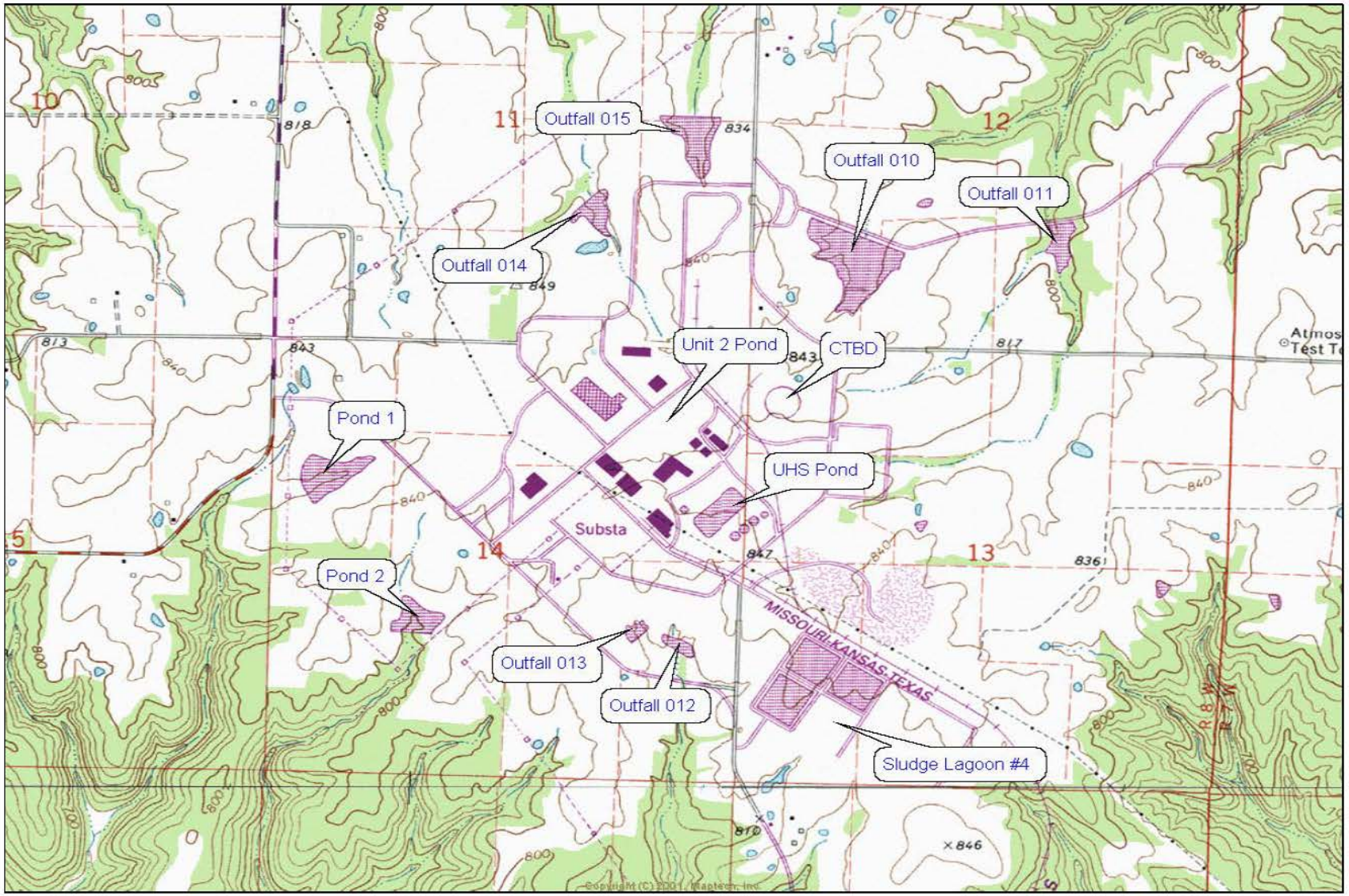


Table 5.2. Collection Frequencies and Required Analyses (January 1 through December 31, 2012)

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 each sample
Surface water (river)	SWA	Monthly composite	PGE and ^{3}H
Surface water (except UHS and Unit 2 ponds)	SWA	Semiannually	PGE and ^{3}H. If contaminated with gamma emitting nuclides of plant origin, analyze for HTD nuclides.
Surface water (UHS and Unit 2 ponds)	SWA	Quarterly	PGE and ^{3}H
Groundwater (not potable)	WWA	Quarterly / Monthly	PGE and ^{3}H. If contaminated with gamma emitting nuclides of plant origin, analyze for HTD nuclides.
Well water-potable	DWA	Quarterly	PGE and ^{3}H. If contaminated with gamma emitting nuclides of plant origin, analyze for HTD nuclides.
Shoreline sediment	AQS	Semiannually	PGE
Bottom sediment [1]	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 [2]	PGE and ^{131}I
Leafy green vegetables	FPL	Monthly when available[3]	PGE and ^{131}I
Inedible crops	FC	At time of harvest	PGE and ^{3}H
Fish	AQF	Semiannually	PGE on edible portion

[1] Required by NPDES permit.

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

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

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)
Gross beta	4	0.01					
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 2012 Land Use Census Results

Closest Receptor in Miles

Sector	Residence	Garden [1, 2]	Milk [1]
N(A)	1.83	NI	NI
NNE(B)	2.16	2.40 **	NI
NE(C)	2.27	2.53	NI
ENE(D)	1.66	2.87	NI
E(E)	3.51	NI	NI
ESE(F)	2.12	4.40	NI
SE(G)	2.22	2.22 *	NI
SSE(H)	2.51	2.53	NI
S(J)	2.68	2.68	NI
SSW(K)	2.38	2.81	NI
SW(L)	2.64	2.64	NI
WSW(M)	1.20	1.64	NI
W(N)	1.56	**2.27 ***	NI
WNW(P)	1.93	1.93	NI
NW(Q)	2.07	3.16	NI
NNW(R)	1.82	**1.82**	NI

Note: Distances in bold type indicate changes from the 2011 census.

[1] NI = None Identified.
[2] Broadleaf Vegetation
* Declined to participate in the program.
* * History as a poor provider; not included in program.

Table 5.5. Missed collections and analyses, Callaway Energy Center.

Sample Type	Analysis	Location(s)	Collection Date or Period	Comments
SWA	H-3, Gamma	CTBD	1/12/12	Not collected, location eliminated from program
WWA	H-3, Gamma	U1MW-28	2nd Qtr, 2012	Insufficient volume for gamma analysis.
WWA	H-3, Gamma	U1MW-28	3rd, 4th Qtrs, 2012	Well dry.
WWA	H-3, Gamma	MW-939,	Feb-July, 2012	Well dry; replaced with new well.
VE	Gamma	V-12	5/8/12	Garden not producing.
VE	Gamma	V-16	5/8/12	Provider out of town; sample unavailable.
VE	Gamma	V-9	8/14/12	Garden not producing due to drought.
VE	Gamma	V-16	9/11/12	Garden not producing due to drought.
VE	Gamma	V-16	10/9/12	Harvested prior to sampling, end of season.
APT, AIO	Gamma, I-131	A-8	9/13/12	Reduced run-time, sampler down for electrical repair.
FC	Gamma	FC-1A, 1B, 1C	9/28/12	Crops not planted.
IDM	Direct Radiation	40	2nd Qtr, 2012	Both TLD and holder missing, vandalism suspected.
IDM	Direct Radiation	21	3rd Qtr, 2012	Both TLD and holder missing, vandalism suspected.
IDM	Direct Radiation	36	3rd Qtr, 2012	Both TLD and holder missing, vandalism suspected.
IDM	Direct Radiation	49	3rd Qtr, 2012	Both TLD and holder missing, vandalism suspected.

Table 5.6 Radiological Environmental Monitoring Program Summary

Sample Type (Units)	Type and Number of Analyses [a]	LLD [b]	Indicator Locations Mean (F) [c] Range [c]	Location with Highest Annual Mean Location [d]	Location with Highest Annual Mean Mean (F) [c] Range [c]	Control Locations Mean (F) [c] Range [c]	Number Non-Routine Results [e]
Waterborne Pathway							
Surface Water (pCi/L)	H-3 24	177	363 (2/12) (292-434)	SW-02 4.9 mi. SE	363 (2/12) (292-434)	< LLD	0
	GS 24						
	Mn-54	15	< LLD	-	-	< LLD	0
	Fe-59	30	< LLD	-	-	< LLD	0
	Co-58	15	< LLD	-	-	< LLD	0
	Co-60	15	< LLD	-	-	< LLD	0
	Zn-65	30	< LLD	-	-	< LLD	0
	Zr-Nb-95	15	< LLD	-	-	< LLD	0
	I-131	1000	< LLD	-	-	< LLD	0
	Cs-134	15	< LLD	-	-	< LLD	0
	Cs-137	18	< LLD	-	-	< LLD	0
	Ba-La-140	15	< LLD	-	-	< LLD	0
Surface Water, Ponds (pCi/L)	H-3 25	154	233 (1/25)	UHS On-site	233 (1/4)	none	0
	GS 25						
	Mn-54	15	< LLD	-	-	< LLD	0
	Fe-59	30	< LLD	-	-	< LLD	0
	Co-58	15	< LLD	-	-	< LLD	0
	Co-60	15	< LLD	-	-	< LLD	0
	Zn-65	30	< LLD	-	-	< LLD	0
	Zr-Nb-95	15	< LLD	-	-	< LLD	0
	Cs-134	15	< LLD	-	-	< LLD	0
	Cs-137	18	< LLD	-	-	< LLD	0
	Ba-La-140	15	< LLD	-	-	< LLD	0
Drinking Water, Wells (pCi/L)	H-3 48	152	< LLD	-	-	< LLD	0
	GS 48						
	Mn-54	15	< LLD	-	-	< LLD	0
	Fe-59	30	< LLD	-	-	< LLD	0
	Co-58	15	< LLD	-	-	< LLD	0
	Co-60	15	< LLD	-	-	< LLD	0
	Zn-65	30	< LLD	-	-	< LLD	0
	Zr-Nb-95	15	< LLD	-	-	< LLD	0
	Cs-134	15	< LLD	-	-	< LLD	0
	Cs-137	18	< LLD	-	-	< LLD	0
	Ba-La-140	15	< LLD	-	-	< LLD	0

Table 5.6 Radiological Environmental Monitoring Program Summary

Sample Type (Units)	Type and Number of Analyses [a]	LLD [b]	Indicator Locations Mean (F) [c] Range [c]	Location with Highest Annual Mean Location [d]	Location with Highest Annual Mean Mean (F) [c] Range [c]	Control Locations Mean (F) [c] Range [c]	Number Non-Routine Results [e]
Waterborne Pathway							
Wells, Ponds (non-potable)	H-3 280	178	366 (36/280) (183-1541)	CA-WWA-GWS, Inside OCA	794 (2/12) (565-1024)	None	0
(pCi/L)	GS 279						
	Mn-54	15	< LLD	-	-	None	0
	Fe-59	30	< LLD	-	-	None	0
	Co-58	15	< LLD	-	-	None	0
	Co-60	15	< LLD	-	-	None	0
	Zn-65	30	< LLD	-	-	None	0
	Zr-Nb-95	15	< LLD	-	-	None	0
	Cs-134	15	< LLD	-	-	None	0
	Cs-137	18	< LLD	-	-	None	0
	Ba-La-140	15	< LLD	-	-	None	0
Sediments	GS 8						
(pCi/kgdry)	K-40	50	13078 (4/4) (12569-13930)	CA-AQS-A 4.9 mi. SSE	13533 (4/4) (12684-13868)	13533 (4/4) (12684-13868)	0
	Mn-54	28.1	< LLD	-	-	< LLD	0
	Fe-59	111.6	< LLD	-	-	< LLD	0
	Co-58	36.6	< LLD	-	-	< LLD	0
	Co-60	26.7	< LLD	-	-	< LLD	0
	Zr-Nb-95	73.3	< LLD	-	-	< LLD	0
	Cs-134	24.4	< LLD	-	-	< LLD	0
	Cs-137	26.9	46.2 (1/4)	CA-AQS-A 4.9 mi. SSE	60.7 (4/4) (42.3-114.1)	60.7 (4/4) (42.3-114.1)	0
	Ba-La-140	358.5	< LLD	-	-	< LLD	0

Table 5.6 Radiological Environmental Monitoring Program Summary

Sample Type (Units)	Type and Number of Analyses [a]	LLD [b]	Indicator Locations Mean (F) [c] Range [c]	Location with Highest Annual Mean Location [d]	Location with Highest Annual Mean Mean (F) [c] Range [c]	Control Locations Mean (F) [c] Range [c]	Number Non-Routine Results [e]
Ingestion Pathway							
Food Products Leafy Green Vegetables (pCi/kg wet)	GS 50						
	K-40	100	4885 (44/44) (1987-8682)	V-16, Farm	6707 (7/7) (4174-8682)	4475 (6/6) (2346-6177)	0
	Mn-54	17.8	< LLD	-	-	< LLD	0
	Co-58	17.4	< LLD	-	-	< LLD	0
	Co-60	20.1	< LLD	-	-	< LLD	0
	I-131	41.4	< LLD	-	-	< LLD	0
	Cs-134	19.1	< LLD	-	-	< LLD	0
	Cs-137	17.6	< LLD	-	-	< LLD	0
Farm Crop (Soybeans, Corn) (pCi/kg wet)	H-3 [f] 8	161	< LLD	-	-	< LLD	0
	GS 8						
	K-40	100	12069 (6/6) (6643-14153)	FC-2, Between MH-5 and MH-3B	12680 (3/3) (12365-13207)	8329 (2/2) (3311-13347)	0
	Mn-54	20.5	< LLD	-	-	< LLD	0
	Co-58	19.9	< LLD	-	-	< LLD	0
	Co-60	22.0	< LLD	-	-	< LLD	0
	Cs-134	20.1	< LLD	-	-	< LLD	0
	Cs-137	21.4	< LLD	-	-	< LLD	0
Fish (Flesh) (pCi/kg wet)	GS 20						
	K-40	100	2908 (10/10) (2556-3361)	CA-AQF-C 4.9 mi. SE	2908 (10/10) (2556-3361)	2897 (10/10) (2421-3270)	0
	Mn-54	- 20.3	< LLD	-	-	< LLD	0
	Fe-59	83.3	< LLD	-	-	< LLD	0
	Co-58	30.7	< LLD	-	-	< LLD	0
	Co-60	19.5	< LLD	-	-	< LLD	0
	Zn-65	49.1	< LLD	-	-	< LLD	0
	Cs-134	19.7	< LLD	-	-	< LLD	0
	Cs-137	24.4	< LLD	-	-	< LLD	0
Milk (pCi/L)	I-131 20	1.0	none	-	-	< LLD	0
	GS 20						
	K-40	100	none	M-9 (C) 18.7 mi. S	1186 (20/20) (977-1447)	1186 (20/20) (977-1447)	0
	Cs-134	15	none	-	-	< LLD	0
	Cs-137	18	none	-	-	< LLD	0
	Ba-140	60	none	-	-	< LLD	0
	La-140	15	none	-	-	< LLD	0

Table 5.6 Radiological Environmental Monitoring Program Summary

Sample Type (Units)	Type and Number of Analyses [a]	LLD [b]	Indicator Locations Mean (F) [c] Range [c]	Location with Highest Annual Mean Location [d]	Location with Highest Annual Mean Mean (F) [c] Range [c]	Control Locations Mean (F) [c] Range [c]	Number Non-Routine Results [e]
Direct Radiation							
(Quarterly TLDs) (mR/90days)	Gamma 168	3.0	16.0 (156/156) (10.6-18.5)	CA-IDM-27, 9.3 mi. ESE	17.7 (4/4) (17.1-18.6)	15.3 (12/12) (11.0-18.6)	0
Airborne Pathway							
Airborne Particulates (pCi/m^3)	GS [g] 264						
	Be-7	0.17	0.23 (106/264) (0.17-0.35)	A-8, Cty. Rd. 448 0.9 mi. NNE	0.25 (21/52) (0.17-0.35)	None	0
	Co-58	0.016	< LLD	-	-	None	0
	Co-60	0.018	< LLD	-	-	None	0
	Zr-Nb-95	0.038	< LLD	-	-	None	0
	Cs-134	0.015	< LLD	-	-	None	0
	Cs-137	0.015	< LLD	-	-	None	0
	Ba-La-140	0.118	< LLD	-	-	None	0
	Ce-144	0.075	< LLD	-	-	None	0
Airborne Iodine (pCi/m3)	I-131 265	0.070	< LLD	-	-	None	0
Soil							
Soil (pCi/kg dry)	GS 18						
	K-40	50.0	11500 (14/14) (9228-15588)	M-009, Farm 13 mi. SW	15357 (2/2) (14624-16090)	13683 (4/4) (11917-16090)	0
	Mn-54	45.6	< LLD	-	-	< LLD	0
	Fe-59	150.8	< LLD	-	-	< LLD	0
	Co-58	62.5	< LLD		-	< LLD	0
	Co-60	44.4	< LLD	-	-	< LLD	0
	Zr-Nb-95	87.1	< LLD	-	-	< LLD	
	Cs-134	42.8	< LLD	-	-	< LLD	0
	Cs-137	29.3	333 (12/14) (75-726)	F-002 1.0 mi. SW	610 (2/2) (494-726)	114 (3/4) (65-171)	0
	Ba-La-140	328.7	< LLD	-	-	< LLD	0

[a] GS = gamma spectroscopy

[b] LLD = nominal lower limit of detection based on a 4.66 sigma counting error for background sample.

[c] Mean and range are based on detectable measurements only (i.e., >LLD) Fraction of detectable measurements at specified locations is indicated in parentheses (F).

[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.

[g] One result (CA-A-008, 09/13/12) eliminated from calculations, due to low volume.

6.0 REFERENCES

Arnold, J. R. and H. A. Al-Salih. 1955. Beryllium-7 Produced by Cosmic Rays. Science 121: 451-453.

Eisenbud, M. 1963. Environmental Radioactivity, McGraw-Hill, New York, New York, pp. 213, 275-276.

Environmental, Inc., Midwest Laboratory. 2001 - 2012. Environmental Radiological Monitoring Program for the Callaway Energy Center, Annual Report - Part II, Data Tabulations and Analyses, January - December, 2000 - 2012.

_____ 2012. Quality Assurance Program Manual, Rev. 3, 14 November 2012.

_____ 2009. Quality Control Procedures Manual, Rev. 2, 08 July 2009.

_____ 2009. Quality Control Program, Rev. 2, 12 November 2009.

Gold, S., H. W. Barkhau, B. Shlein, and B. Kahn, 1964. Measurement of Naturally Occurring Radionuclides in Air, in the Natural Environment, University of Chicago Press, Chicago, Illinois, 369-382.

Hammer, Gregory R.,"Climate of Missouri", monograph available from the National Climatic Data Center (NCDC) of the National Oceanic and Atmospheric Administration (NOAA). January, 2006.

National Center for Radiological Health, 1968. Radiological Health and Data Reports, Vol. 9, Number 12, 730-746.

Teledyne Brown Engineering Environmental Services, Midwest Laboratory. 1999 - 2000. Environmental Radiological Monitoring Program for the Callaway Plant, Annual Report - Part II, Data Tabulations and Analyses, January - December, 1998 - 1999.

U.S. Environmental Protection Agency, 2007. RadNet, formerly Environmental Radiation Ambient Monitoring System, Gross Beta in Air (MO) 1981 – 2006, Gross Beta in Drinking Water (MO) 1982– 2004.

Wilson, D. W., G. M. Ward and J. E. Johnson. 1969. Environmental Contamination by Radioactive Materials, International Atomic Energy Agency. p.125.

ATI Environmental, Inc.
Midwest Laboratory
700 Landwehr Road • Northbrook, IL 60062-2310
phone (847) 564-0700 • fax (847) 564-4517

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, 2012 through December, 2012

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 environmental sample crosscheck 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 International Intercomparison of Environmental Dosimeters, when available, and internal laboratory testing.

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 environmental sample crosscheck 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	± 1σ = $169.85 \times (\text{known})^{0.0933}$ 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].

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result [b]	ERA Result [c]	Control Limits	Acceptance
ERW-1783	04/09/12	Sr-89	62.2 ± 6.0	58.5	46.9 - 66.3	Pass
ERW-1783	04/09/12	Sr-90	33.7 ± 2.1	37.4	27.4 - 43.1	Pass
ERW-1786	04/09/12	Ba-133	75.7 ± 4.1	82.3	69.1 - 90.5	Pass
ERW-1786	04/09/12	Co-60	71.9 ± 4.0	72.9	65.6 - 82.6	Pass
ERW-1786	04/09/12	Cs-134	70.0 ± 4.3	74.2	60.6 - 81.6	Pass
ERW-1786	04/09/12	Cs-137	151.5 ± 6.1	155.0	140.0 - 172.0	Pass
ERW-1786	04/09/12	Zn-65	108.3 ± 89.0	105.0	94.5 - 125.0	Pass
ERW-1789	04/09/12	Gr. Alpha	55.0 ± 2.4	62.9	33.0 - 78.0	Pass
ERW-1789 [d]	04/09/12	Gr. Beta	76.2 ± 1.8	44.2	29.6 - 51.5	Fail
ERW-1795	04/09/12	Ra-226	6.4 ± 0.4	5.7	4.3 - 6.9	Pass
ERW-1795	04/09/12	Ra-228	5.4 ± 1.2	4.6	2.7 - 6.3	Pass
ERW-1795	04/09/12	Uranium	56.2 ± 2.6	61.5	50.0 - 68.2	Pass
ERW-1798	04/09/12	H-3	16023 ± 355	15800	13800 - 17400	Pass
ERW-6283	10/05/12	Sr-89	41.5 ± 4.1	39.1	29.7 - 46.1	Pass
ERW-6283	10/05/12	Sr-90	19.7 ± 1.6	20.1	14.4 - 23.8	Pass
ERW-6286	10/05/12	Ba-133	82.7 ± 4.4	84.8	71.3 - 93.3	Pass
ERW-6286	10/05/12	Co-60	77.2 ± 3.7	78.3	70.5 - 88.5	Pass
ERW-6286	10/05/12	Cs-134	74.4 ± 1.5	76.6	62.6 - 84.3	Pass
ERW-6286	10/05/12	Cs-137	183.0 ± 6.2	183.0	165.0 - 203.0	Pass
ERW-6286	10/05/12	Zn-65	211.0 ± 9.9	204.0	184.0 - 240.0	Pass
ERW-6288	10/05/12	Gr. Alpha	47.0 ± 2.3	58.6	30.6 - 72.9	Pass
ERW-6288	10/05/12	Gr. Beta	33.4 ± 1.2	39.2	26.0 - 46.7	Pass
ERW-6290	10/05/12	I-131	23.3 ± 1.0	24.8	20.6 - 29.4	Pass
ERW-6295 [e]	10/05/12	Ra-226	17.5 ± 0.7	15.0	11.2 - 17.2	Fail
ERW-6295 [e]	10/05/12	Ra-228	7.4 ± 1.5	4.6	2.7 - 6.2	Fail
ERW-6295	10/05/12	Uranium	61.2 ± 1.8	62.5	50.8 - 69.3	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] Unless otherwise indicated, the laboratory result is given as the mean ± standard deviation for three determinations.

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

[d] Result of reanalysis: 38.3 ± 1.3 pCi/L. Sample dilution problem suspected. A new dilution was prepared.

[e] Results of reanalyses, original submission (pCi/L): Ra-226, 16.5 ± 0.7 Ra-228, 4.9 ± 1.1
A new test was ordered from Environmental Resources Associates, results will be updated for first quarter, 2013.

TABLE A-2. Table has been intentionally omitted.

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

Lab Code [b]	Date	Analysis	Concentration (pCi/L)[a] Laboratory results 2s, n=1 [c]	Known Activity	Control Limits [d]	Acceptance
SPW-41824	2/15/2012	Ra-228	24.85 ± 2.14	28.75	20.13 - 37.38	Pass
W-22712	2/27/2012	Gr. Alpha	14.59 ± 0.34	20.00	10.00 - 30.00	Pass
W-22712	2/27/2012	Gr. Alpha	43.57 ± 0.40	41.70	20.85 - 62.55	Pass
SPAP-1032	3/5/2012	Cs-134	7.06 ± 1.71	5.26	0.00 - 15.26	Pass
SPAP-1032	3/5/2012	Cs-137	102.63 ± 3.13	104.24	93.82 - 114.66	Pass
SPAP-1034	3/5/2012	Gr. Beta	44.30 ± 0.11	46.88	28.13 - 65.63	Pass
SPW-1036	3/5/2012	Cs-134	43.23 ± 3.84	39.42	29.42 - 49.42	Pass
SPW-1036	3/5/2012	Cs-137	57.44 ± 4.60	52.12	42.12 - 62.12	Pass
SPW-1036	3/5/2012	Sr-90	60.51 ± 1.93	61.52	49.22 - 73.82	Pass
SPMI-1038	3/5/2012	Cs-134	37.79 ± 4.06	39.42	29.42 - 49.42	Pass
SPMI-1038	3/5/2012	Cs-137	54.75 ± 5.09	52.12	42.12 - 62.12	Pass
SPW-1045	3/5/2012	H-3	68022 ± 746	69048	55238 - 82858	Pass
SPW-1047	3/5/2012	Ni-63	217.10 ± 3.64	206.64	144.65 - 268.63	Pass
SPW-1049	3/5/2012	C-14	3858.90 ± 12.79	4738.80	2843.28 - 6634.32	Pass
W-31412	3/14/2012	Ra-226	13.13 ± 0.36	16.70	11.69 - 21.71	Pass
SPW-1520	3/23/2012	U-238	45.67 ± 2.02	41.70	29.19 - 54.21	Pass
SPW-41825	4/10/2012	Ra-228	28.48 ± 2.51	28.35	19.85 - 36.86	Pass
WW-1547	4/16/2012	Ba-133	18.99 ± 4.67	26.70	16.70 - 36.70	Pass
WW-1547	4/16/2012	Cs-134	9.28 ± 2.82	8.68	0.00 - 18.68	Pass
WW-1547	4/16/2012	Cs-137	27.77 ± 4.49	29.70	19.70 - 39.70	Pass
W-51712	5/17/2012	Ra-226	17.29 ± 0.43	16.70	11.69 - 21.71	Pass
W-61112	6/11/2012	Gr. Alpha	22.16 ± 0.45	20.00	10.00 - 30.00	Pass
W-61112	6/11/2012	Gr. Beta	43.57 ± 0.40	45.20	35.20 - 55.20	Pass
SPAP-4418	7/25/2012	Gr. Beta	43.74 ± 0.11	46.50	27.90 - 65.10	Pass
SPAP-4420	7/25/2012	Cs-134	4.54 ± 0.73	4.60	2.76 - 6.44	Pass
SPAP-4420	7/25/2012	Cs-137	104.70 ± 2.77	103.30	92.97 - 113.63	Pass
SPMI-4422	7/25/2012	Co-60	31.43 ± 2.12	31.62	21.62 - 41.62	Pass
SPMI-4422	7/25/2012	Cs-134	16.50 ± 1.17	16.15	6.15 - 26.15	Pass
SPMI-4422	7/25/2012	Cs-137	29.60 ± 2.61	26.64	16.64 - 36.64	Pass
SPMI-4422	7/25/2012	Sr-90	31.60 ± 1.35	30.47	24.38 - 36.56	Pass
SPW-4424	7/25/2012	Co-60	38.52 ± 1.76	37.95	27.95 - 47.95	Pass
SPW-4424	7/25/2012	Cs-137	33.23 ± 2.27	32.01	22.01 - 42.01	Pass
SPW-4424	7/25/2012	Sr-90	36.56 ± 1.58	40.60	32.48 - 48.72	Pass
SPF-4426	7/25/2012	Cs-134	947.50 ± 42.50	1025.00	922.50 - 1127.50	Pass
SPF-4426	7/25/2012	Cs-137	2692.00 ± 62.40	2480.00	2232.00 - 2728.00	Pass
SPW-4428	7/25/2012	C-14	4325.70 ± 15.80	4738.80	2843.28 - 6634.32	Pass
SPW-4430	7/25/2012	H-3	70119.40 ± 773.40	67570.00	54056.00 - 81084.00	Pass
SPW-4432	7/25/2012	Ni-63	187.20 ± 3.85	206.80	144.76 - 268.84	Pass
W-81712	8/17/2012	Ra-226	14.94 ± 0.40	16.70	11.69 - 21.71	Pass
SPW-5407	8/29/2012	U-238	42.95 ± 0.11	41.70	29.19 - 54.21	Pass
SPW-18022	9/10/2012	Ra-228	29.03 ± 2.80	28.21	19.75 - 36.67	Pass

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

Lab Code [b]	Date	Concentration (pCi/L)[a] Analysis	Laboratory results 2s, n=1 [c]	Known Activity	Control Limits [d]	Acceptance
W-91012	9/10/2012	Gr. Alpha	19.95 ± 0.42	20.00	10.00 - 30.00	Pass
W-91012	9/10/2012	Gr. Beta	43.47 ± 0.40	45.20	35.20 - 55.20	Pass
W-100312	10/3/2012	Gr. Alpha	19.95 ± 0.41	20.00	10.00 - 30.00	Pass
W-100312	10/3/2012	Gr. Beta	44.21 ± 0.40	45.20	35.20 - 55.20	Pass
W-101812	10/18/2012	Ra-226	18.80 ± 0.43	16.70	11.69 - 21.71	Pass
ESO-7235	12/6/2012	Sr-90	138.79 ± 2.67	161.05	128.84 - 193.26	Pass
SPW-7753	12/6/2012	U-238	45.55 ± 5.05	41.70	29.19 - 54.21	Pass
SPW-18023	12/18/2012	Ra-228	31.59 ± 2.99	25.98	18.19 - 33.77	Pass

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

[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 ± 2 σ.

NOTE: For fish, Jello 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 (pCi/L)[a]		
				Laboratory results (4.66σ)		Acceptance
				LLD	Activity[c]	Criteria (4.66 σ)
SPW-41814	Water	2/15/2012	Ra-228	0.65	0.49 ± 0.36	2
W-22712	Water	2/27/2012	Gr. Alpha	0.42	-0.04 ± 0.29	1
W-22712	Water	2/27/2012	Gr. Beta	0.74	-0.54 ± 0.50	3.2
SPAP-1031	Air Filter	3/5/2012	Cs-134	1.89	-	100
SPAP-1031	Air Filter	3/5/2012	Cs-137	1.16	-	100
SPAP-1033	Air Filter	3/5/2012	Gr. Beta	0.003	0.013 ± 0.003	0.01
SPW-1035	Water	3/5/2012	Cs-134	2.40	-	10
SPW-1035	Water	3/5/2012	Cs-137	2.88	-	10
SPW-1035	Water	3/5/2012	I-131(G)	2.35	-	20
SPW-1035	Water	3/5/2012	Sr-90	0.60	-0.11 ± 0.26	1
SPMI-1037	Milk	3/5/2012	Cs-134	2.85	-	10
SPMI-1037	Milk	3/5/2012	Cs-137	3.73	-	10
SPMI-1037	Milk	3/5/2012	I-131(G)	3.24	-	20
SPW-1044	Water	3/5/2012	H-3	146.10	37.10 ± 74.40	200
SPW-1046	Water	3/5/2012	Ni-63	19.07	8.30 ± 11.79	20
SPW-1048	Water	3/5/2012	C-14	5.70	2.99 ± 3.04	200
SPW-1166	water	3/9/2012	C-14	6.79	1.11	200
W-31412	Water	3/14/2012	Ra-226	0.034	0.043 ± 0.027	1
SPW-1521	Water	3/23/2012	U-238	0.10	0.09 ± 0.11	1
W-51712	Water	4/24/2012	Ra-226	0.04	0.04 ± 0.03	1
W-61112	Water	6/11/2012	Gr. Alpha	0.47	-0.14 ± 0.32	1
W-61112	Water	6/11/2012	Gr. Beta	0.71	0.29 ± 0.51	3.2
SPW-41815	Water	7/7/2011	Ra-228	0.77	0.52 ± 0.42	2
SPAP-4417	Air Filter	7/25/2012	Gr. Beta	0.001	0.021 ± 0.003	0.01
SPMI-4421	Milk	7/25/2012	Co-60	4.29	-	10
SPMI-4421	Milk	7/25/2012	Cs-134	3.58	-	10
SPMI-4421	Milk	7/25/2012	Cs-137	4.60	-	10
SPMI-4421	Milk	7/25/2012	Sr-90	0.45	0.53 ± 0.27	1
SPW-4423	Water	7/25/2012	Co-60	1.88	-	10
SPW-4423	Water	7/25/2012	Cs-134	2.38	-	10
SPW-4423	Water	7/25/2012	Cs-137	2.80	-	10
SPW-4423	water	7/25/2012	Sr-90	0.45	0.08 ± 0.22	1
SPF-4425	Fish	7/25/2012	Co-60	6.74	-	100
SPF-4425	Fish	7/25/2012	Cs-134	7.47	-	100
SPF-4425	Fish	7/25/2012	Cs-137	9.62	-	100
SPW-4427	Water	7/25/2012	C-14	10.93	3.54 ± 5.84	200
SPW-4431	Water	7/25/2012	Ni-63	19.00	5.50 ± 11.70	20
W-81712	Water	8/17/2012	Ra-226	0.038	0.035 ± 0.030	1
SPW-5408	Water	8/29/2012	U-238	0.039	0.015 ± 0.057	1

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

Lab Code	Sample Type	Date	Analysis[b]	Concentration (pCi/L)[a]		
				Laboratory results (4.66 σ)		Acceptance
				LLD	Activity[c]	Criteria (4.66 σ)
SPW-18032	Water	9/10/2012	Ra-228	0.78	0.85 ± 0.46	2
W-91012	Water	9/10/2012	Gr. Alpha	0.42	0.027 ± 0.29	1
W-91012	Water	9/10/2012	Gr. Beta	0.75	-0.13 ± 0.52	3.2
W-100312	Water	10/3/2012	Gr. Beta	0.77	-0.32 ± 0.53	3.2
W-100312	Water	10/3/2012	Gr. Beta	0.43	0.06 ± 0.30	3.2
W-101812	Water	10/18/2012	Ra-226	0.04	0.038 ± 0.031	1
SPW-7754	Water	12/6/2012	U-238	0.10	0.022 ± 0.075	1
SPW-18033	Water	12/18/2012	Ra-228	0.98	0.43 ± 0.50	2

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

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

[c] Activity reported is a net activity result. For gamma spectroscopic analysis, activity detected below the LLD value is not reported.

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result	Acceptance
CF-20, 21	1/3/2012	Gr. Beta	14.50 ± 0.29	15.02 ± 0.30	14.76 ± 0.21	Pass
CF-20, 21	1/3/2012	K-40	12.88 ± 0.55	12.40 ± 0.53	12.64 ± 0.38	Pass
CF-20, 21	1/3/2012	Sr-90	0.01 ± 0.01	0.01 ± 0.01	0.01 ± 0.00	Pass
P-9133, 9134	1/3/2012	H-3	108.86 ± 83.03	206.60 ± 86.38	157.73 ± 59.91	Pass
U-302, 303	1/17/2012	Beta (-K40)	6.84 ± 2.91	5.24 ± 2.56	6.04 ± 1.94	Pass
S-386, 387	1/23/2012	Ac-228	0.77 ± 0.11	0.79 ± 0.14	0.78 ± 0.09	Pass
S-386, 387	1/23/2012	Bi-214	0.80 ± 0.07	0.73 ± 0.11	0.77 ± 0.07	Pass
S-386, 387	1/23/2012	Pb-214	0.74 ± 0.06	0.75 ± 0.11	0.75 ± 0.06	Pass
S-386, 387	1/23/2012	Tl-208	0.21 ± 0.02	0.21 ± 0.04	0.21 ± 0.02	Pass
S-386, 387	1/23/2012	U-235	0.05 ± 0.02	0.12 ± 0.05	0.09 ± 0.03	Pass
WW-619, 620	1/31/2012	H-3	257.20 ± 86.00	305.80 ± 88.30	281.50 ± 61.63	Pass
MI-702, 703	2/6/2012	K-40	1337.00 ± 123.00	1460.40 ± 102.00	1398.70 ± 79.90	Pass
WW-892, 893	2/17/2012	Gr. Beta	3.46 ± 0.56	3.77 ± 0.59	3.61 ± 0.41	Pass
S-850, 851	2/22/2012	Cs-134	0.14 ± 0.02	0.13 ± 0.02	0.14 ± 0.01	Pass
S-850, 851	2/22/2012	Cs-137	0.21 ± 0.03	0.22 ± 0.03	0.22 ± 0.02	Pass
W-1251, 1252	3/6/2012	Gr. Alpha	1.20 ± 0.62	1.27 ± 0.92	1.24 ± 0.55	Pass
W-1251, 1252	3/6/2012	Gr. Beta	16.86 ± 1.43	15.14 ± 1.34	16.00 ± 0.98	Pass
W-1251, 1252	3/6/2012	H-3	5235.52 ± 230.91	4893.24 ± 224.55	5064.38 ± 161.05	Pass
W-1251, 1252	3/6/2012	Tc-99	19.67 ± 3.60	14.46 ± 3.51	17.07 ± 2.51	Pass
AP-1209, 1210	3/8/2012	Be-7	0.24 ± 0.12	0.20 ± 0.11	0.22 ± 0.08	Pass
XWW-1564, 1565	3/14/2012	H-3	308.00 ± 88.00	293.00 ± 87.00	300.50 ± 61.87	Pass
SG-1438, 1439	3/19/2012	Ac-228	6.01 ± 0.30	6.23 ± 0.31	6.12 ± 0.22	Pass
SG-1438, 1439	3/19/2012	Pb-214	4.69 ± 0.49	5.20 ± 0.54	4.95 ± 0.36	Pass
WW-1585, 1586	3/19/2012	H-3	3124.50 ± 176.96	2982.38 ± 173.62	3053.44 ± 123.96	Pass
AP-2103, 2104	3/28/2012	Be-7	0.080 ± 0.016	0.076 ± 0.013	0.078 ± 0.010	Pass
AP-2166, 2167	3/28/2012	Be-7	0.061 ± 0.020	0.071 ± 0.016	0.066 ± 0.013	Pass
AP-1632, 1633	3/29/2012	Be-7	0.26 ± 0.12	0.24 ± 0.12	0.25 ± 0.08	Pass
E-1653, 1654	4/2/2012	Gr. Beta	1.53 ± 0.05	1.55 ± 0.04	1.54 ± 0.03	Pass
E-1653, 1654	4/2/2012	K-40	1.34 ± 0.13	1.36 ± 0.14	1.35 ± 0.10	Pass
SG-1677, 1678	4/2/2012	Ac-228	6.63 ± 0.37	6.49 ± 0.33	6.56 ± 0.25	Pass
SG-1677, 1678	4/2/2012	Pb-214	4.77 ± 0.16	5.07 ± 0.14	4.92 ± 0.11	Pass
SWU-1719, 1720	4/3/2012	Gr. Beta	1.16 ± 0.41	1.53 ± 0.44	1.35 ± 0.30	Pass
W-1698, 1699	4/5/2012	Gr. Beta	10.86 ± 1.49	9.42 ± 1.32	10.14 ± 1.00	Pass
W-1698, 1699	4/5/2012	Ra-226	0.41 ± 0.15	0.67 ± 0.18	0.54 ± 0.12	Pass
W-1698, 1699	4/5/2012	Ra-228	1.46 ± 0.76	1.48 ± 0.74	1.47 ± 0.53	Pass
SG-1761, 1762	4/10/2012	Ac-228	16.26 ± 0.53	16.55 ± 0.44	16.41 ± 0.34	Pass
SG-1761, 1762	4/10/2012	Pb-214	14.16 ± 1.44	15.40 ± 1.56	14.78 ± 1.06	Pass
AP-2019, 2020	4/12/2012	Be-7	0.17 ± 0.10	0.17 ± 0.08	0.17 ± 0.07	Pass
DW-2272, 2273	4/20/2012	I-131	0.52 ± 0.24	0.49 ± 0.27	0.51 ± 0.18	Pass
DW-2356, 2357	4/24/2012	Gr. Beta	12.82 ± 2.01	9.47 ± 1.74	11.14 ± 1.33	Pass

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result	Acceptance
G-2403, 2404	5/1/2012	Be-7	1.77 ± 0.21	1.55 ± 0.33	1.66 ± 0.20	Pass
G-2403, 2404	5/1/2012	K-40	6.38 ± 0.50	6.93 ± 0.72	6.66 ± 0.44	Pass
BS-2445, 2446	5/1/2012	Gr. Beta	8.92 ± 1.52	9.29 ± 1.63	9.11 ± 1.11	Pass
BS-2445, 2446	5/1/2012	K-40	5.86 ± 0.38	6.22 ± 0.48	6.04 ± 0.31	Pass
SWU-2550, 2551	5/1/2012	Gr. Beta	2.07 ± 0.65	1.59 ± 0.62	1.83 ± 0.45	Pass
WW-2614, 2615	5/1/2012	Gr. Beta	2.03 ± 1.04	2.36 ± 1.14	2.20 ± 0.77	Pass
WW-2614, 2615	5/1/2012	H-3	750.60 ± 106.20	653.20 ± 102.30	701.90 ± 73.73	Pass
BS-2656, 2657	5/2/2012	Cs-137	0.13 ± 0.07	0.07 ± 0.04	0.10 ± 0.04	Pass
BS-2656, 2657	5/2/2012	K-40	10.15 ± 0.97	11.13 ± 0.90	10.64 ± 0.66	Pass
SO-2635, 2636	5/3/2012	Cs-137	0.046 ± 0.024	0.050 ± 0.027	0.048 ± 0.018	Pass
SO-2635, 2636	5/3/2012	K-40	13.20 ± 0.74	14.01 ± 0.67	13.61 ± 0.50	Pass
MI-2677, 2678	5/7/2012	K-40	1415.30 ± 131.40	1348.10 ± 109.00	1381.70 ± 85.36	Pass
VE-2719, 2720	5/7/2012	K-40	4.15 ± 0.36	4.19 ± 0.38	4.17 ± 0.26	Pass
SWU-3221, 3222	5/8/2012	Gr. Beta	1.67 ± 0.47	1.39 ± 0.45	1.53 ± 0.33	Pass
SWU-3221, 3222	5/8/2012	H-3	236.90 ± 101.90	281.90 ± 103.70	259.40 ± 72.69	Pass
WW-3073, 3074	5/14/2012	H-3	339.12 ± 145.45	337.23 ± 98.19	338.18 ± 87.74	Pass
AP-2968, 2969	5/17/2012	Be-7	0.25 ± 0.12	0.21 ± 0.09	0.23 ± 0.07	Pass
F-3031, 3032	5/22/2012	H-3	11291.00 ± 372.80	11167.00 ± 315.00	11229.00 ± 244.03	Pass
F-3031, 3032	5/22/2012	K-40	3528.90 ± 372.80	3677.20 ± 392.40	3603.05 ± 270.63	Pass
G-3094, 3095	5/23/2012	Gr. Beta	7.89 ± 0.16	8.01 ± 0.16	7.95 ± 0.11	Pass
F-3412, 3413	5/23/2012	Gr. Beta	3.46 ± 0.10	3.33 ± 0.10	3.40 ± 0.07	Pass
F-3412, 3413	5/23/2012	K-40	2.40 ± 0.38	2.55 ± 0.43	2.48 ± 0.29	Pass
MI-3067, 3068	5/24/2012	K-40	1267.20 ± 105.00	1305.70 ± 109.80	1286.45 ± 75.96	Pass
SO-3305, 3306	5/30/2012	Cs-137	0.024 ± 0.013	0.030 ± 0.015	0.027 ± 0.010	Pass
SO-3305, 3306	5/30/2012	Gr. Beta	10.95 ± 0.89	10.86 ± 0.89	10.91 ± 0.63	Pass
SO-3305, 3306	5/30/2012	Tl-208	0.068 ± 0.018	0.062 ± 0.017	0.065 ± 0.012	Pass
LW-3454, 3455	5/31/2012	Gr. Beta	2.12 ± 0.86	2.27 ± 0.77	2.20 ± 0.58	Pass
BS-3697, 3698	6/14/2012	Be-7	2.05 ± 0.19	2.27 ± 0.38	2.16 ± 0.21	Pass
BS-3697, 3698	6/14/2012	Cs-137	2.32 ± 0.39	2.26 ± 0.66	2.29 ± 0.38	Pass
BS-3697, 3698	6/14/2012	K-40	6.67 ± 0.28	6.64 ± 0.42	6.66 ± 0.25	Pass
VE-3798, 3799	6/20/2012	K-40	5.93 ± 0.38	6.03 ± 0.37	5.98 ± 0.26	Pass
WW-4790, 4791	6/20/2012	H-3	251.33 ± 86.51	372.48 ± 92.27	311.90 ± 63.24	Pass
DW-30103, 30104	6/27/2012	Ra-226	0.30 ± 0.08	0.42 ± 0.09	0.36 ± 0.06	Pass
DW-30103, 30104	6/27/2012	Ra-228	0.76 ± 0.54	0.78 ± 0.54	0.77 ± 0.38	Pass
LW-3970, 3971	6/28/2012	Gr. Beta	1.49 ± 1.06	0.72 ± 0.53	1.11 ± 0.59	Pass
DW-3949, 3950	6/29/2012	I-131	0.54 ± 0.26	0.25 ± 0.26	0.40 ± 0.18	Pass
SG-4075, 4076	7/2/2012	Ac-228	0.33 ± 0.09	0.34 ± 0.06	0.34 ± 0.05	Pass
SG-4075, 4076	7/2/2012	K-40	6.71 ± 0.58	7.20 ± 0.32	6.96 ± 0.33	Pass
SG-4075, 4076	7/2/2012	Pb-214	0.46 ± 0.05	0.49 ± 0.03	0.48 ± 0.03	Pass
AP-4390, 4391	7/3/2012	Be-7	0.09 ± 0.02	0.09 ± 0.01	0.09 ± 0.01	Pass
AP-4390, 4391	7/3/2012	Be-7	0.11 ± 0.02	0.10 ± 0.01	0.11 ± 0.01	Pass
AP-4012, 4013	7/5/2012	Be-7	0.27 ± 0.09	0.29 ± 0.16	0.28 ± 0.09	Pass
SW-4033, 4034	7/5/2012	H-3	614.99 ± 107.99	512.31 ± 103.83	563.65 ± 74.91	Pass

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result	Acceptance
VE-4054, 4055	7/9/2012	K-40	7.28 ± 0.56	7.42 ± 0.63	7.35 ± 0.42	Pass
VE-4222, 4223	7/13/2012	Be-7	0.16 ± 0.08	0.22 ± 0.09	0.19 ± 0.06	Pass
VE-4222, 4223	7/13/2012	K-40	7.20 ± 0.30	6.60 ± 0.30	6.90 ± 0.21	Pass
DW-30113, 30114	7/13/2012	Ra-228	1.93 ± 0.66	1.03 ± 0.53	1.48 ± 0.42	Pass
DW-30115, 30116	7/13/2012	Gr. Alpha	7.46 ± 1.21	7.02 ± 1.14	7.24 ± 0.83	Pass
DW-30124, 30125	7/13/2012	Ra-226	1.16 ± 0.15	0.90 ± 0.12	1.03 ± 0.10	Pass
DW-30124, 30125	7/13/2012	Ra-228	1.38 ± 0.56	1.72 ± 0.60	1.55 ± 0.41	Pass
DW-30126, 30127	7/13/2012	Gr. Alpha	6.23 ± 1.16	6.75 ± 1.29	6.49 ± 0.87	Pass
AP-4433, 4434	7/19/2012	Be-7	0.17 ± 0.09	0.21 ± 0.10	0.19 ± 0.07	Pass
SG-4475, 4476	7/19/2012	Gr. Alpha	17.03 ± 4.17	15.56 ± 3.96	16.30 ± 2.88	Pass
SG-4475, 4476	7/19/2012	Gr. Beta	13.23 ± 2.61	14.36 ± 2.47	13.80 ± 1.80	Pass
WW-4685, 4686	7/24/2012	H-3	289.00 ± 99.00	375.00 ± 103.00	332.00 ± 71.43	Pass
AP-4706, 4707	7/26/2012	Be-7	0.28 ± 0.14	0.24 ± 0.14	0.26 ± 0.10	Pass
SO-4748, 4749	7/26/2012	Gr. Beta	20.45 ± 1.04	19.22 ± 0.94	19.84 ± 0.70	Pass
SO-4748, 4749	7/26/2012	Gr. Beta	20.45 ± 1.04	19.22 ± 0.94	19.84 ± 0.70	Pass
SO-4748, 4749	7/26/2012	U-233/4	0.11 ± 0.02	0.10 ± 0.01	0.11 ± 0.01	Pass
SO-4748, 4749	7/26/2012	U-238	0.12 ± 0.02	0.11 ± 0.01	0.12 ± 0.01	Pass
VE-4832, 4833	8/1/2012	K-40	4.06 ± 0.22	4.08 ± 0.24	4.07 ± 0.16	Pass
DW-30149, 30150	8/1/2012	Ra-226	2.69 ± 0.22	2.79 ± 0.22	2.74 ± 0.16	Pass
DW-30149, 30150	8/1/2012	Ra-228	2.77 ± 0.75	1.61 ± 0.57	2.19 ± 0.47	Pass
SG-4916, 4917	8/3/2012	Ac-228	11.03 ± 0.33	11.08 ± 0.44	11.06 ± 0.28	Pass
SG-4916, 4917	8/3/2012	K-40	6.39 ± 0.80	6.98 ± 0.88	6.69 ± 0.59	Pass
F-5313, 5314	8/9/2012	Cs-137	0.05 ± 0.02	0.05 ± 0.02	0.05 ± 0.01	Pass
F-5313, 5314	8/9/2012	Gr. Beta	4.12 ± 0.08	4.10 ± 0.08	4.11 ± 0.06	Pass
F-5313, 5314	8/9/2012	K-40	3.07 ± 0.42	3.14 ± 0.40	3.11 ± 0.29	Pass
VE-5166, 5167	8/15/2012	K-40	4.26 ± 0.28	3.66 ± 0.47	3.96 ± 0.27	Pass
VE-5376, 5377	8/22/2012	Gr. Beta	7.72 ± 0.17	7.61 ± 0.16	7.67 ± 0.12	Pass
VE-5334, 5335	8/27/2012	K-40	1.65 ± 0.17	1.72 ± 0.15	1.68 ± 0.12	Pass
VE-5481, 5482	8/28/2012	Be-7	2.52 ± 0.19	2.65 ± 0.21	2.59 ± 0.14	Pass
VE-5481, 5482	8/28/2012	K-40	5.05 ± 0.37	4.79 ± 0.39	4.92 ± 0.27	Pass
VE-5481, 5482	8/28/2012	Sr-90	0.01 ± 0.00	0.01 ± 0.01	0.01 ± 0.00	Pass
DW-30164, 30165	8/30/2012	Ra-226	1.33 ± 0.15	1.59 ± 0.17	1.46 ± 0.11	Pass
DW-30164, 30165	8/30/2012	Ra-228	2.76 ± 0.66	1.54 ± 0.56	2.15 ± 0.43	Pass
VE-5166, 5167	9/4/2012	K-40	2.05 ± 0.32	2.53 ± 0.36	2.29 ± 0.24	Pass
ME-5607, 5608	9/4/2012	Gr. Beta	2.92 ± 0.08	2.89 ± 0.08	2.90 ± 0.06	Pass
ME-5607, 5608	9/4/2012	K-40	2.06 ± 0.32	2.53 ± 0.36	2.29 ± 0.24	Pass
SW-5901, 5902	9/17/2012	H-3	10909.00 ± 311.00	10817.00 ± 310.00	10863.00 ± 219.56	Pass
BS-6048, 6049	9/24/2012	K-40	1.24 ± 0.20	1.18 ± 0.21	1.21 ± 0.14	Pass
AP-6482, 6483	9/27/2012	Be-7	0.09 ± 0.02	0.09 ± 0.03	0.09 ± 0.02	Pass

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result	Acceptance
G-6090, 6091	10/1/2012	Be-7	3.74 ± 0.33	3.54 ± 0.30	3.64 ± 0.22	Pass
G-6090, 6091	10/1/2012	Gr. Beta	10.81 ± 0.34	10.72 ± 0.33	10.77 ± 0.24	Pass
G-6090, 6091	10/1/2012	K-40	5.99 ± 0.47	5.45 ± 0.44	5.72 ± 0.32	Pass
SO-6111, 6112	10/1/2012	Cs-137	0.06 ± 0.03	0.04 ± 0.02	0.05 ± 0.02	Pass
SO-6111, 6112	10/1/2012	K-40	19.66 ± 0.84	20.09 ± 0.80	19.88 ± 0.58	Pass
W-6795, 6796	10/1/2012	H-3	215.20 ± 88.00	292.80 ± 91.60	254.00 ± 63.51	Pass
AP-6461, 6462	10/2/2012	Be-7	0.07 ± 0.01	0.07 ± 0.02	0.07 ± 0.01	Pass
WW-6279, 6280	10/3/2012	Gr. Beta	1.54 ± 0.68	1.67 ± 0.75	1.61 ± 0.51	Pass
W-6346, 6347	10/3/2012	Ra-226	0.30 ± 0.10	0.36 ± 0.10	0.33 ± 0.07	Pass
VE-6503, 6504	10/9/2012	K-40	5.23 ± 0.83	6.00 ± 0.45	5.04 ± 0.27	Pass
WW-6606, 6607	10/10/2012	Gr. Beta	3.18 ± 1.31	2.42 ± 1.27	2.80 ± 0.91	Pass
WW-6606, 6607	10/10/2012	H-3	273.10 ± 85.70	219.80 ± 83.10	246.45 ± 59.69	Pass
WW-7237, 7238	10/12/2012	H-3	175.44 ± 99.84	180.75 ± 100.03	178.10 ± 70.66	Pass
F-6627, 6628	10/15/2012	K-40	3.05 ± 0.39	3.23 ± 0.37	3.14 ± 0.27	Pass
VE-6669, 6670	10/16/2012	Be-7	0.48 ± 0.26	0.50 ± 0.13	0.49 ± 0.15	Pass
VE-6669, 6670	10/16/2012	K-40	4.06 ± 0.28	3.68 ± 0.26	3.87 ± 0.19	Pass
SS-6711, 6712	10/16/2012	Ac-228	0.16 ± 0.05	0.17 ± 0.06	0.17 ± 0.04	Pass
SS-6711, 6712	10/16/2012	Bi-214	0.13 ± 0.03	0.16 ± 0.03	0.14 ± 0.02	Pass
SS-6711, 6712	10/16/2012	Gr. Beta	14.20 ± 0.89	12.67 ± 0.88	13.44 ± 0.63	Pass
SS-6711, 6712	10/16/2012	Pb-212	0.15 ± 0.06	0.13 ± 0.02	0.14 ± 0.03	Pass
SS-6711, 6712	10/16/2012	Tl-208	0.06 ± 0.02	0.04 ± 0.02	0.05 ± 0.01	Pass
WW-7258, 7259	10/22/2012	H-3	214.69 ± 85.42	314.60 ± 90.25	264.65 ± 62.13	Pass
WW-7655, 7656	10/25/2012	H-3	159.00 ± 86.10	159.00 ± 86.10	159.00 ± 60.88	Pass
WW-7747, 7748	10/25/2012	H-3	156.50 ± 84.70	170.20 ± 85.30	163.35 ± 60.10	Pass
MI-6963, 6964	10/28/2012	K-40	1384.60 ± 111.70	1421.60 ± 107.60	1403.10 ± 77.55	Pass
MI-7174, 7175	11/5/2012	K-40	1283.60 ± 97.45	1293.20 ± 91.37	1288.40 ± 66.79	Pass
SG-7221, 7222	11/9/2012	Pb-214	31.49 ± 0.70	30.11 ± 0.80	30.80 ± 0.53	Pass
DW-30216, 30217	11/9/2012	Gr. Alpha	2.23 ± 0.86	2.31 ± 0.92	2.27 ± 0.63	Pass
DW-30216, 30217	11/9/2012	Ra-226	0.72 ± 0.12	0.82 ± 0.14	0.77 ± 0.09	Pass
DW-30216, 30217	11/9/2012	Ra-228	0.92 ± 0.52	1.26 ± 0.53	1.09 ± 0.37	Pass
MI-7363, 7364	11/13/2012	K-40	1304.40 ± 103.30	1496.10 ± 121.30	1400.25 ± 79.66	Pass
CF-7384, 7385	11/13/2012	K-40	11.75 ± 0.52	10.94 ± 0.59	11.35 ± 0.39	Pass
VE-7489, 7490	11/16/2012	K-40	2.22 ± 0.23	1.91 ± 0.22	2.06 ± 0.16	Pass
AP-7531, 7532	11/21/2012	Be-7	0.19 ± 0.10	0.29 ± 0.17	0.24 ± 0.10	Pass
BS-7573, 7574	11/24/2012	K-40	7.21 ± 0.41	7.57 ± 0.39	7.39 ± 0.28	Pass
LW-7865, 7866	12/5/2012	Gr. Beta	2.16 ± 0.56	1.64 ± 0.62	1.90 ± 0.42	Pass
SG-8095, 8096	12/19/2012	Ac-228	25.15 ± 0.73	25.47 ± 0.54	25.31 ± 0.45	Pass
SG-8095, 8096	12/19/2012	Gamma	26.98 ± 2.72	28.68 ± 2.89	27.83 ± 1.98	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), food products, vegetation, soil, sediment (pCi/g).

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

			Concentration [a]			
Lab Code [b]	Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
STW-1670	02/01/12	I-129	9.31 ± 0.31	12.29	8.60 - 15.98	Pass
STSO-1766 [d]	02/01/12	Am-241	88.50 ± 8.30	159.00	111.00 - 207.00	Fail
STSO-1766	02/01/12	Co-57	1352.10 ± 4.00	1179.00	825.00 - 1533.00	Pass
STSO-1766	02/01/12	Co-60	1.70 ± 0.70	1.56	1.00 - 2.00	Pass
STSO-1766	02/01/12	Cs-134	842.20 ± 4.30	828.00	580.00 - 1076.00	Pass
STSO-1766	02/01/12	Cs-137	0.40 ± 0.90	0.00	0.00 - 1.00	Pass
STSO-1766	02/01/12	K-40	1729.60 ± 22.20	1491.00	1044.00 - 1938.00	Pass
STSO-1766	02/01/12	Mn-54	647.60 ± 4.20	558.00	391.00 - 725.00	Pass
STSO-1766	02/01/12	Ni-63	781.50 ± 9.70	862.00	603.00 - 1121.00	Pass
STSO-1766	02/01/12	Pu-238	142.40 ± 9.70	136.00	97.00 - 177.00	Pass
STSO-1766	02/01/12	Pu-239/40	66.10 ± 6.40	65.80	46.10 - 85.50	Pass
STSO-1766	02/01/12	Sr-90	383.20 ± 15.30	392.00	274.00 - 510.00	Pass
STSO-1766	02/01/12	Tc-99	289.60 ± 10.90	374.00	262.00 - 486.00	Pass
STSO-1766	02/01/12	U-233/4	63.20 ± 5.40	68.10	47.70 - 88.50	Pass
STSO-1766	02/01/12	U-238	310.80 ± 12.10	329.00	230.00 - 428.00	Pass
STSO-1766	02/01/12	Zn-65	766.70 ± 6.70	642.00	449.00 - 835.00	Pass
STAP-1772	02/01/12	Am-241	0.062 ± 0.02	0.073	0.051 - 0.10	Pass
STAP-1772	02/01/12	Co-57	0.010 ± 0.01	0.00	0.000 - 1.00	Pass
STAP-1772	02/01/12	Co-60	2.40 ± 0.08	2.18	1.53 - 2.84	Pass
STAP-1772	02/01/12	Cs-134	2.33 ± 0.13	2.38	1.67 - 3.09	Pass
STAP-1772	02/01/12	Cs-137	2.07 ± 0.10	1.79	1.25 - 2.33	Pass
STAP-1772	02/01/12	Mn-54	3.77 ± 0.14	3.24	2.27 - 4.21	Pass
STAP-1772	02/01/12	Pu-238	0.003 ± 0.004	0.002	0.000 - 0.10	Pass
STAP-1772	02/01/12	Pu-239/40	0.098 ± 0.017	0.097	0.07 - 0.13	Pass
STAP-1772	02/01/12	Sr-90	-0.010 ± 0.060	0.000	-0.10 - 0.13	Pass
STAP-1772 [e]	02/01/12	U-233/4	0.016 ± 0.006	0.019	0.013 - 0.024	Pass
STAP-1772	02/01/12	U-238	0.11 ± 0.02	0.12	0.09 - 0.16	Pass
STAP-1772	02/01/12	Zn-65	3.67 ± 0.20	2.99	2.09 - 3.89	Pass
STAP-1773	02/01/12	Gr. Alpha	0.51 ± 0.05	1.20	0.40 - 2.00	Pass
STAP-1773	02/01/12	Gr. Beta	2.75 ± 0.10	2.40	1.20 - 3.60	Pass
STVE-1776	02/01/12	Co-57	14.57 ± 0.28	12.00	8.40 - 15.60	Pass
STVE-1776	02/01/12	Co-60	6.45 ± 0.23	6.05	4.24 - 7.87	Pass
STVE-1776	02/01/12	Cs-134	8.39 ± 0.29	8.43	5.90 - 10.96	Pass
STVE-1776	02/01/12	Cs-137	0.01 ± 0.09	0.00	0.00 - 0.10	Pass
STVE-1776	02/01/12	Mn-54	0.03 ± 0.08	0.00	0.00 - 0.10	Pass
STVE-1776	02/01/12	Zn-65	10.31 ± 0.67	8.90	6.23 - 11.57	Pass
STW-1960	02/01/12	Gr. Alpha	1.68 ± 0.09	2.14	0.64 - 3.64	Pass
STW-1960	02/01/12	Gr. Beta	6.33 ± 0.10	6.36	3.18 - 9.54	Pass

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

			Concentration [a]			
Lab Code [b]	Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
STW-1964	02/01/12	Am-241	1.28 ± 0.12	1.63	1.14 - 2.12	Pass
STW-1964	02/01/12	Co-57	33.30 ± 0.40	32.90	23.00 - 42.80	Pass
STW-1964	02/01/12	Co-60	23.20 ± 0.40	23.72	16.60 - 30.84	Pass
STW-1964	02/01/12	Cs-134	0.30 ± 3.00	0.00	0.00 - 1.00	Pass
STW-1964	02/01/12	Cs-137	40.10 ± 0.60	39.90	27.90 - 51.90	Pass
STW-1964 [f]	02/01/12	Fe-55	65.10 ± 9.50	81.90	57.30 - 106.50	Pass
STW-1964	02/01/12	H-3	460.00 ± 12.10	437.00	306.00 - 568.00	Pass
STW-1964	02/01/12	K-40	153.00 ± 4.20	142.00	99.00 - 185.00	Pass
STW-1964	02/01/12	Mn-54	32.70 ± 0.60	31.80	22.30 - 41.30	Pass
STW-1964	02/01/12	Ni-63	49.80 ± 2.90	60.00	42.00 - 78.00	Pass
STW-1964	02/01/12	Pu-238	0.58 ± 0.06	0.63	0.44 - 0.82	Pass
STW-1964	02/01/12	Pu-239/40	1.30 ± 0.15	1.34	0.94 - 1.74	Pass
STW-1964	02/01/12	Sr-90	0.10 ± 0.20	0.00	0.00 - 1.00	Pass
STW-1964	02/01/12	Tc-99	23.70 ± 0.80	27.90	19.50 - 36.30	Pass
STW-1964	02/01/12	U-233/4	0.40 ± 0.05	0.39	0.27 - 0.51	Pass
STW-1964	02/01/12	U-238	2.67 ± 0.13	2.76	1.93 - 3.59	Pass
STW-1964	02/01/12	Zn-65	0.01 ± 0.20	0.00	0.00 - 1.00	Pass
STW-5391	08/01/12	I-129	5.73 ± 0.28	6.82	4.77 - 8.87	Pass
STSO-5392	08/01/12	Am-241	129.30 ± 12.70	111.00	78.00 - 144.00	Pass
STSO-5392	08/01/12	Ni-63	376.20 ± 20.60	406.00	284.00 - 528.00	Pass
STSO-5392	08/01/12	Pu-238	118.70 ± 9.30	105.80	74.10 - 137.50	Pass
STSO-5392	08/01/12	Pu-239/40	140.70 ± 9.90	134.00	94.00 - 174.00	Pass
STSO-5392	08/01/12	Sr-90	483.52 ± 16.47	508.00	356.00 - 660.00	Pass
STSO-5392	08/01/12	Tc-99	432.50 ± 23.10	469.00	328.00 - 610.00	Pass
STSO-5394	08/01/12	Co-57	1528.00 ± 4.10	1316.00	921.00 - 1711.00	Pass
STSO-5394	08/01/12	Co-60	592.00 ± 3.20	531.00	372.00 - 690.00	Pass
STSO-5394	08/01/12	Cs-134	933.60 ± 5.82	939.00	657.00 - 1221.00	Pass
STSO-5394	08/01/12	Cs-137	1319.80 ± 5.50	1150.00	805.00 - 1495.00	Pass
STSO-5394	08/01/12	K-40	737.30 ± 17.70	632.00	442.00 - 822.00	Pass
STSO-5394	08/01/12	Mn-54	1083.20 ± 5.20	920.00	644.00 - 1196.00	Pass
STSO-5394	08/01/12	U-233/4	55.80 ± 4.20	60.30	42.20 - 78.40	Pass
STSO-5394	08/01/12	U-238	231.20 ± 8.60	263.00	184.00 - 342.00	Pass
STSO-5394	08/01/12	Zn-65	696.10 ± 7.00	606.00	424.00 - 788.00	Pass

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

		Concentration [a]				
Lab Code [b]	Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
STVE-5395 [g]	08/01/12	Co-57	7.44 ± 0.17	5.66	3.96 - 7.36	Fail
STVE-5395	08/01/12	Co-60	5.90 ± 0.15	5.12	3.58 - 6.66	Pass
STVE-5395	08/01/12	Cs-134	7.40 ± 0.31	6.51	4.56 - 8.46	Pass
STVE-5395	08/01/12	Cs-137	5.45 ± 0.18	4.38	3.07 - 5.69	Pass
STVE-5395	08/01/12	Mn-54	4.06 ± 0.21	3.27	2.29 - 4.25	Pass
STAP-5398	08/01/12	Gr. Alpha	0.41 ± 0.05	0.97	0.29 - 1.65	Pass
STAP-5398	08/01/12	Gr. Beta	2.11 ± 0.09	1.92	0.96 - 2.88	Pass
STAP-5401 [h]	08/01/12	Am-241	0.12 ± 0.02	0.08	0.05 - 0.10	Fail
STAP-5403	08/01/12	Co-57	1.96 ± 0.05	1.91	1.34 - 2.48	Pass
STAP-5403	08/01/12	Co-60	1.76 ± 0.07	1.73	1.21 - 2.25	Pass
STAP-5403	08/01/12	Cs-134	2.74 ± 0.18	2.74	1.92 - 3.56	Pass
STAP-5403	08/01/12	Cs-137	0.00 ± 0.03	0.00	-0.01 - 0.01	Pass
STAP-5403	08/01/12	Mn-54	2.52 ± 0.10	2.36	1.65 - 3.07	Pass
STAP-5403	08/01/12	Pu-238	0.050 ± 0.015	0.063	0.044 - 0.081	Pass
STAP-5403	08/01/12	Pu-239/40	0.001 ± 0.004	0.00081	0.000 - 0.010	Pass
STAP-5403 [i]	08/01/12	U-233/4	0.009 ± 0.011	0.014	0.010 - 0.018	Fail
STAP-5403	08/01/12	U-238	0.08 ± 0.02	0.10	0.070 - 0.130	Pass
STAP-5403	08/01/12	Zn-65	0.01 ± 0.06	0.00	-0.010 - 0.010	Pass
STW-5445	08/01/12	Fe-55	79.80 ± 4.10	89.30	62.50 - 116.10	Pass
STW-5445	08/01/12	Ni-63	74.30 ± 3.40	66.30	46.40 - 86.20	Pass
STW-5445	08/01/12	U-233/4	0.46 ± 0.05	0.45	0.32 - 0.59	Pass
STW-5445	08/01/12	U-238	3.14 ± 0.14	3.33	2.33 - 4.33	Pass
STW-5445 [j]	08/01/12	Am-241	0.64 ± 0.04	1.06	0.74 - 1.38	Fail

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

[b] Laboratory codes as follows: STW (water), STAP (air filter), STSO (soil), STVE (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] Investigation was inconclusive, there was not enough sample for reanalysis. ERA results (A-7) for the same matrix were acceptable.

[e] No errors found in calculation or procedure, original analysis result; 0.010 ± 0.010 Bq/filter.

[f] Reanalysis results were within limits, but low. ERA results (A-7) for the same matrix were acceptable. The efficiency factor was recalculated for the second round of MAPEP testing. Original analysis results 55.8 ± 12.6 Bq/L.

[g] Result of reanalysis; 6.74 ± 0.15 Bq/sample. Gamma emitters for the vegetation matrix exhibited a high bias, only Co-57 exceeded acceptance limits. Recounted using a geometry more closely matched to the MAPEP sample size.

[h] Result of reanalysis; 0.070 ± 0.013 Bq/filter.

[i] Result of reanalysis; 0.013 ± 0.005 pCi/filter. A larger sample size was used to reduce the counting error.

[j] Result of reanalysis 1.07 ± 0.06 pCi/L. The analyses of the MAPEP sample matrix resulted in recovery factors greater than 100%. A correction was made using recovery based on analysis of blank samples. A new tracer solution is on order, future samples for MAPEP testing will include batch spike and blank samples.

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

Lab Code [b]	Date	Analysis	Concentration (pCi/L) [b] Laboratory Result [c]	ERA Result [d]	Control Limits	Acceptance
ERAP-1393	03/19/12	Co-60	917.5 ± 7.0	880.0	681.0 - 1100.0	Pass
ERAP-1393	03/19/12	Cs-134	586.6 ± 7.4	656.0	417.0 - 814.0	Pass
ERAP-1393	03/19/12	Cs-137	1255.9 ± 9.4	1130.0	849.0 - 1480.0	Pass
ERAP-1393	03/19/12	Mn-54	< 3.4	0.0	-	Pass
ERAP-1393	03/19/12	Zn-65	1085.2 ± 18.0	897.0	642.0 - 1240.0	Pass
ERAP-1394	03/19/12	Am-241	86.9 ± 2.9	68.8	42.4 - 93.1	Pass
ERAP-1394	03/19/12	Pu-238	70.2 ± 3.6	63.2	43.3 - 83.1	Pass
ERAP-1394	03/19/12	Pu-239/40	66.0 ± 1.0	63.0	45.6 - 82.4	Pass
ERAP-1394	03/19/12	Sr-90	112.5 ± 15.4	89.6	43.8 - 134.0	Pass
ERAP-1394	03/19/12	U-233/4	43.4 ± 0.8	47.5	29.4 - 71.6	Pass
ERAP-1394	03/19/12	U-238	44.0 ± 1.2	47.1	30.4 - 65.1	Pass
ERAP-1394	03/19/12	Uranium	89.1 ± 2.2	96.7	53.5 - 147.0	Pass
ERAP-1396	03/19/12	Gr. Alpha	81.1 ± 1.5	77.8	26.1 - 121.0	Pass
ERAP-1396	03/19/12	Gr. Beta	68.4 ± 0.7	52.5	33.2 - 76.5	Pass
ERSO-1397	03/19/12	Ac-228	1303.4 ± 89.3	1570.0	1010.0 - 2180.0	Pass
ERSO-1397	03/19/12	Am-241	856.0 ± 123.7	938.0	549.0 - 1220.0	Pass
ERSO-1397	03/19/12	Bi-212	1379.2 ± 247.2	1550.0	413.0 - 2280.0	Pass
ERSO-1397	03/19/12	Bi-214	965.2 ± 38.4	1100.0	665.0 - 1590.0	Pass
ERSO-1397	03/19/12	Co-60	3693.6 ± 32.1	3500.0	2370.0 - 4820.0	Pass
ERSO-1397	03/19/12	Cs-134	2257.3 ± 45.4	2180.0	1420.0 - 2620.0	Pass
ERSO-1397	03/19/12	Cs-137	9444.5 ± 58.4	8770.0	6720.0 - 11300.0	Pass
ERSO-1397	03/19/12	K-40	11277.0 ± 275.1	11600.0	8470.0 - 15600.0	Pass
ERSO-1397	03/19/12	Mn-54	< 21.0	0.0	-	Pass
ERSO-1397	03/19/12	Pb-212	1208.4 ± 26.3	1510.0	992.0 - 2110.0	Pass
ERSO-1397	03/19/12	Pb-214	1041.6 ± 46.9	1110.0	647.0 - 1650.0	Pass
ERSO-1397	03/19/12	Pu-238	921.0 ± 112.6	984.0	592.0 - 1360.0	Pass
ERSO-1397	03/19/12	Pu-239/40	1028.0 ± 112.6	879.0	575.0 - 1210.0	Pass
ERSO-1397	03/19/12	Sr-90	8128.0 ± 329.0	8800.0	3360.0 - 13900.0	Pass
ERSO-1397	03/19/12	Th-234	2711.3 ± 253.6	2000.0	632.0 - 3760.0	Pass
ERSO-1397	03/19/12	U-233/4	1859.3 ± 126.6	1960.0	1200.0 - 2510.0	Pass
ERSO-1397	03/19/12	U-238	2003.3 ± 130.3	2000.0	1240.0 - 2540.0	Pass
ERSO-1397	03/19/12	Uranium	3939.5 ± 283.8	4030.0	2190.0 - 5320.0	Pass
ERSO-1397	03/19/12	Zn-65	4200.4 ± 65.9	3650.0	2910.0 - 4850.0	Pass

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

Lab Code [b]	Concentration (pCi/L) [b]					
	Date	Analysis	Laboratory Result [c]	ERA Result [d]	Control Limits	Acceptance
ERVE-1400	03/19/12	Am-241	4194.8 ± 199.5	4540.0	2780.0 - 6040.0	Pass
ERVE-1400	03/19/12	Cm-244	1471.2 ± 113.1	1590.0	779.0 - 2480.0	Pass
ERVE-1400	03/19/12	Co-60	2347.8 ± 47.9	2210.0	1520.0 - 3090.0	Pass
ERVE-1400	03/19/12	Cs-134	2847.5 ± 64.0	2920.0	1880.0 - 3790.0	Pass
ERVE-1400	03/19/12	Cs-137	1503.5 ± 52.5	1340.0	972.0 - 1860.0	Pass
ERVE-1400	03/19/12	K-40	34105.7 ± 745.3	28600.0	20700.0 - 40100.0	Pass
ERVE-1400	03/19/12	Mn-54	< 26.8	0.0	-	Pass
ERVE-1400	03/19/12	Pu-238	2509.0 ± 213.6	2350.0	1400.0 - 3220.0	Pass
ERVE-1400	03/19/12	Pu-239/40	2690.4 ± 208.9	2570.0	1580.0 - 3540.0	Pass
ERVE-1400	03/19/12	Sr-90	7881.5 ± 470.8	8520.0	4860.0 - 11300.0	Pass
ERVE-1400	03/19/12	U-233/4	3149.6 ± 165.2	3610.0	2370.0 - 4640.0	Pass
ERVE-1400	03/19/12	U-238	3203.6 ± 166.5	3580.0	2390.0 - 4550.0	Pass
ERVE-1400	03/19/12	Uranium	6463.7 ± 363.2	7350.0	4980.0 - 9150.0	Pass
ERVE-1400	03/19/12	Zn-65	2701.9 ± 105.5	2310.0	1670.0 - 3240.0	Pass
ERW-1403	03/19/12	Am-241	119.9 ± 3.2	135.0	91.0 - 181.0	Pass
ERW-1403	03/19/12	Fe-55	713.7 ± 127.4	863.0	514.0 - 1170.0	Pass
ERW-1403	03/19/12	Pu-238	131.9 ± 6.4	135.0	99.9 - 168.0	Pass
ERW-1403	03/19/12	Pu-239/40	108.9 ± 10.2	112.0	86.9 - 141.0	Pass
ERW-1403	03/19/12	U-233/4	93.1 ± 7.9	105.0	78.9 - 135.0	Pass
ERW-1403	03/19/12	U-238	96.9 ± 5.5	104.0	79.3 - 128.0	Pass
ERW-1403	03/19/12	Uranium	190.0 ± 13.8	214.0	157.0 - 277.0	Pass
ERW-1405	03/19/12	Co-60	858.7 ± 5.6	875.0	760.0 - 1020.0	Pass
ERW-1405	03/19/12	Cs-134	560.4 ± 4.4	609.0	447.0 - 700.0	Pass
ERW-1405	03/19/12	Cs-137	1239.9 ± 7.4	1250.0	1060.0 - 1500.0	Pass
ERW-1405	03/19/12	Mn-54	< 7.4	0.0	-	Pass
ERW-1405	03/19/12	Sr-90	944.3 ± 26.2	989.0	644.0 - 1310.0	Pass
ERW-1405	03/19/12	Zn-65	786.9 ± 20.6	749.0	624.0 - 945.0	Pass
ERW-1406	03/19/12	Gr. Alpha	85.9 ± 3.0	103.0	36.6 - 160.0	Pass
ERW-1406	03/19/12	Gr. Beta	45.7 ± 1.6	43.7	25.0 - 64.7	Pass
ERW-1409	03/19/12	H-3	9045.0 ± 284.0	9150.0	6130.0 - 13000.0	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: STW (water), STAP (air filter), STSO (soil), STVE (vegetation). Results are reported in units of pCi/L, except for air filters (pCi/Filter), vegetation and soil (pCi/kg).

[c] Unless otherwise indicated, the laboratory result is given as the mean ± standard deviation for three determinations.

[d] Results are presented as the known values, expected laboratory precision (1 sigma, 1 determination) and control limits as provided by ERA. A known value of "zero" indicates an analysis was included in the testing series as a "false positive". Control limits are not provided.

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 $\bar{x}$ and standard deviation "s" of a set of n numbers $x_1, x_2 \ldots x_n$ are defined as follows:

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

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

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

This report describes the conduct of the EPP for the Callaway Energy Center during 2012.

2.0. Unusual or Important Events

No unusual or important events reportable under the EPP Section 4.1 were identified during 2012.

3.0. EPP Non-compliances

During 2012, 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 2012.

5.0. Plant Design and Operation Environmental Evaluations

This section lists all changes in the plant design, operation, tests or experiments installed during 2012, which could have involved a potentially significant unreviewed environmental question in accordance with section 3.1 of Appendix B.

During 2012, one plant change 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 11-0004 - Ultimate Heat Sink Temperature Issue Solution

Description of Modification:

Modification MP 11-0004 approved operational changes and minor equipment variations to address a temperature issue with the Ultimate Heat Sink (UHS). This modification allows the UHS level to be maintained at a maximum level of 18 feet as was originally designed with the spillway at 18'6". The normal UHS operating band was reset at 17' and 17'10". This provides a 2" band (for instrument error) before reaching the pond level alarm set at 18' (alarm provides indication in the control room). In addition to the pond level changes, the UHS fan speed indication will be modified to ensure fan speed can be determined in the control room. The UHS Cooling Tower fan and bypass valve control circuitry will be modified to operate off of the essential service water (ESW) return line temperature at the onset of a Design Basis Accident (DBA) and to operate off of the ESW supply line temperature four hours into a DBA. The swap-over will be manually performed from the Control Room.

Evaluation of Change:

Callaway's NPDES Permit MO-0098001 does not allow discharges from the UHS spillway. Outfall 017 (the Ultimate Heat Sink) is identified as a no discharge outfall. If the UHS overflowed it would discharge to stormwater Pond Outfall #011 and would be identified as a noncompliance of the NPDES Permit. Operation at the maximum level of 18' was evaluated and determined that it would take a sustained wind of 40 mph from the true southwest to produce waves of 8.4" which would be required to push a small quantity of water over the spillway. Winds from other directions would have much less risk of overflow or no risk of overflow. The highest sustained winds recorded during the past two years at Callaway were approximately 30 mph. Therefore, it was determined

that any risk of overflow from the UHS operating at a maximum level of 18' is extremely small.

5.0. Plant Design and Operation Environmental Evaluations

Evaluation of Change (continued):

As part of the Final Environmental Evaluation, both the ER and FES-OL were reviewed for any previously evaluated adverse environmental impacts and any adverse environmental impacts not previously evaluated. No environmental impacts were identified as the modification changes would return the UHS pond to its original operating design. The only possible impact is to the NPDES Permit due to a slightly higher risk for a discharge from the UHS to stormwater pond Outfall #011. This would result in a noncompliance of the Callaway NPDES Permit; however, the risk of any overflow or spillage from the UHS is extremely small as described above.

The evaluation concluded that operational changes and minor equipment variations to address a temperature issue with the UHS does not involve an un-reviewed environmental question.

ATI Environmental, Inc.
Midwest Laboratory
700 Landwehr Road • Northbrook, IL 60062-2310
phone (847) 564-0700 • fax (847) 564-4517

AMEREN UE,
CALLAWAY ENERGY CENTER
FULTON, MISSOURI
DOCKET NO. 50-483

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM (REMP)

ANNUAL REPORT - PART II
DATA TABULATIONS AND ANALYSES

January 1 to December 31, 2012

Prepared by

ENVIRONMENTAL, Inc.
Midwest Laboratory

Submitted by

Union Electric Co.
dba AmerenUE Corp.

Project No. 8036

Approved : _____

Bronia Grob, M.S.
Laboratory Manager

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 AmerenUE, Callaway Energy Center, Fulton, Missouri in 2012. 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

CALLAWAY

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.								
01-05-12	286	0.21 ± 0.11	< 0.008	< 0.007	< 0.012	< 0.010	< 0.006	< 0.028	< 0.045
01-12-12	290	< 0.09	< 0.006	< 0.007	< 0.012	< 0.005	< 0.005	< 0.024	< 0.044
01-19-12	287	0.23 ± 0.11	< 0.006	< 0.008	< 0.014	< 0.008	< 0.005	< 0.017	< 0.041
01-26-12	292	< 0.10	< 0.006	< 0.008	< 0.011	< 0.008	< 0.006	< 0.008	< 0.047
02-02-12	298	< 0.09	< 0.005	< 0.007	< 0.008	< 0.005	< 0.005	< 0.012	< 0.045
02-09-12	300	0.13 ± 0.07	< 0.005	< 0.009	< 0.009	< 0.004	< 0.004	< 0.019	< 0.044
02-16-12	292	< 0.07	< 0.005	< 0.007	< 0.010	< 0.004	< 0.010	< 0.009	< 0.045
02-23-12	299	0.19 ± 0.11	< 0.008	< 0.008	< 0.015	< 0.007	< 0.008	< 0.009	< 0.046
03-01-12	288	0.16 ± 0.08	< 0.007	< 0.005	< 0.016	< 0.007	< 0.005	< 0.005	< 0.030
03-08-12	289	< 0.12	< 0.005	< 0.007	< 0.005	< 0.004	< 0.006	< 0.013	< 0.040
03-15-12	287	0.19 ± 0.08	< 0.007	< 0.004	< 0.017	< 0.005	< 0.007	< 0.009	< 0.049
03-22-12	287	0.16 ± 0.09	< 0.007	< 0.008	< 0.009	< 0.008	< 0.008	< 0.010	< 0.041
03-29-12	286	0.28 ± 0.12	< 0.010	< 0.005	< 0.010	< 0.007	< 0.006	< 0.008	< 0.056
04-05-12	284	0.21 ± 0.10	< 0.006	< 0.003	< 0.010	< 0.005	< 0.007	< 0.006	< 0.026
04-12-12	289	< 0.10	< 0.006	< 0.007	< 0.010	< 0.007	< 0.006	< 0.017	< 0.035
04-19-12	294	< 0.09	< 0.005	< 0.006	< 0.016	< 0.006	< 0.006	< 0.010	< 0.021
04-16-12	291	0.22 ± 0.12	< 0.007	< 0.004	< 0.016	< 0.006	< 0.009	< 0.009	< 0.041
05-03-12	285	0.25 ± 0.12	< 0.009	< 0.006	< 0.008	< 0.010	< 0.006	< 0.008	< 0.032
05-10-12	290	0.12 ± 0.06	< 0.006	< 0.010	< 0.010	< 0.007	< 0.010	< 0.007	< 0.042
05-17-12	293	0.18 ± 0.10	< 0.009	< 0.004	< 0.015	< 0.006	< 0.007	< 0.008	< 0.037
05-24-12	289	0.24 ± 0.08	< 0.007	< 0.007	< 0.017	< 0.007	< 0.010	< 0.008	< 0.035
05-31-12	291	0.22 ± 0.08	< 0.006	< 0.005	< 0.010	< 0.005	< 0.007	< 0.009	< 0.036
06-07-12	289	0.20 ± 0.09	< 0.010	< 0.007	< 0.014	< 0.007	< 0.006	< 0.007	< 0.038
06-14-12	291	0.25 ± 0.09	< 0.008	< 0.006	< 0.014	< 0.007	< 0.008	< 0.009	< 0.027
06-21-12	291	< 0.15	< 0.004	< 0.004	< 0.012	< 0.005	< 0.007	< 0.010	< 0.043
06-28-12	286	0.27 ± 0.12	< 0.005	< 0.009	< 0.005	< 0.006	< 0.005	< 0.008	< 0.039
07-05-12	286	0.27 ± 0.09	< 0.006	< 0.004	< 0.013	< 0.006	< 0.005	< 0.006	< 0.044
07-12-12	286	0.31 ± 0.11	< 0.009	< 0.006	< 0.014	< 0.008	< 0.005	< 0.013	< 0.038
07-19-12	258	0.17 ± 0.09	< 0.004	< 0.005	< 0.007	< 0.007	< 0.009	< 0.016	< 0.035
07-26-12	256	0.26 ± 0.11	< 0.006	< 0.005	< 0.016	< 0.005	< 0.006	< 0.014	< 0.049
08-02-12	257	0.21 ± 0.10	< 0.007	< 0.005	< 0.013	< 0.005	< 0.009	< 0.010	< 0.053
08-09-12	260	0.20 ± 0.11	< 0.007	< 0.006	< 0.011	< 0.009	< 0.007	< 0.013	< 0.051
08-16-12	265	< 0.11	< 0.004	< 0.007	< 0.010	< 0.008	< 0.006	< 0.010	< 0.035
08-23-12	266	0.18 ± 0.10	< 0.008	< 0.005	< 0.020	< 0.008	< 0.009	< 0.013	< 0.062
08-30-12	287	0.19 ± 0.10	< 0.006	< 0.006	< 0.015	< 0.007	< 0.009	< 0.012	< 0.030
09-06-12	264	< 0.10	< 0.009	< 0.008	< 0.020	< 0.007	< 0.010	< 0.023	< 0.041
09-13-12	271	< 0.12	< 0.008	< 0.009	< 0.021	< 0.010	< 0.006	< 0.021	< 0.043
09-20-12	275	0.22 ± 0.13	< 0.009	< 0.008	< 0.012	< 0.008	< 0.008	< 0.020	< 0.038
09-27-12	273	< 0.12	< 0.011	< 0.008	< 0.017	< 0.008	< 0.008	< 0.024	< 0.036

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

CALLAWAY

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.								
10-04-12	276	< 0.11	< 0.010	< 0.008	< 0.012	< 0.004	< 0.009	< 0.017	< 0.039
10-12-12	322	0.19 ± 0.09	< 0.006	< 0.008	< 0.014	< 0.006	< 0.004	< 0.011	< 0.041
10-18-12	237	0.22 ± 0.11	< 0.011	< 0.009	< 0.012	< 0.005	< 0.013	< 0.017	< 0.039
10-25-12	276	< 0.12	< 0.007	< 0.008	< 0.012	< 0.009	< 0.008	< 0.033	< 0.060
11-01-12	289	< 0.09	< 0.005	< 0.013	< 0.018	< 0.005	< 0.006	< 0.014	< 0.042
11-08-12	283	< 0.14	< 0.006	< 0.013	< 0.015	< 0.009	< 0.008	< 0.026	< 0.051
11-15-12	289	< 0.11	< 0.008	< 0.011	< 0.006	< 0.009	< 0.004	< 0.019	< 0.044
11-21-12	252	0.19 ± 0.10	< 0.012	< 0.009	< 0.027	< 0.007	< 0.012	< 0.030	< 0.036
11-29-12	344	0.15 ± 0.07	< 0.005	< 0.009	< 0.009	< 0.005	< 0.007	< 0.012	< 0.035
12-07-12	346	0.19 ± 0.07	< 0.004	< 0.006	< 0.013	< 0.004	< 0.005	< 0.024	< 0.044
12-12-12	222	< 0.13	< 0.009	< 0.009	< 0.023	< 0.006	< 0.009	< 0.046	< 0.049
12-20-12	368	< 0.07	< 0.005	< 0.006	< 0.004	< 0.005	< 0.004	< 0.019	< 0.036
12-27-12	325	< 0.08	< 0.004	< 0.007	< 0.011	< 0.003	< 0.004	< 0.020	< 0.044
01-03-13	296	< 0.08	< 0.008	< 0.007	< 0.010	< 0.007	< 0.006	< 0.014	< 0.034

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

CALLAWAY

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.								
01-05-12	276	< 0.13	< 0.006	< 0.008	< 0.015	< 0.007	< 0.008	< 0.018	< 0.059
01-12-12	276	< 0.12	< 0.010	< 0.007	< 0.011	< 0.006	< 0.008	< 0.026	< 0.045
01-19-12	269	0.21 ± 0.09	< 0.009	< 0.008	< 0.008	< 0.004	< 0.006	< 0.018	< 0.050
01-26-12	279	< 0.11	< 0.007	< 0.009	< 0.008	< 0.006	< 0.011	< 0.009	< 0.035
02-02-12	273	< 0.12	< 0.009	< 0.005	< 0.016	< 0.008	< 0.009	< 0.009	< 0.052
02-09-12	278	< 0.12	< 0.007	< 0.009	< 0.012	< 0.006	< 0.008	< 0.028	< 0.039
02-16-12	276	< 0.08	< 0.007	< 0.009	< 0.005	< 0.007	< 0.008	< 0.011	< 0.026
02-23-12	275	0.22 ± 0.10	< 0.006	< 0.007	< 0.008	< 0.008	< 0.008	< 0.009	< 0.038
03-01-12	271	< 0.09	< 0.006	< 0.009	< 0.008	< 0.006	< 0.010	< 0.015	< 0.055
03-08-12	276	0.24 ± 0.12	< 0.006	< 0.007	< 0.020	< 0.008	< 0.008	< 0.014	< 0.048
03-15-12	265	0.21 ± 0.09	< 0.006	< 0.005	< 0.007	< 0.007	< 0.005	< 0.011	< 0.032
03-22-12	271	0.15 ± 0.07	< 0.004	< 0.005	< 0.013	< 0.006	< 0.006	< 0.010	< 0.038
03-29-12	263	< 0.11	< 0.006	< 0.007	< 0.018	< 0.006	< 0.008	< 0.011	< 0.052
04-05-12	262	< 0.11	< 0.005	< 0.009	< 0.008	< 0.008	< 0.008	< 0.013	< 0.036
04-12-12	263	< 0.11	< 0.008	< 0.010	< 0.016	< 0.007	< 0.006	< 0.015	< 0.051
04-19-12	272	< 0.09	< 0.006	< 0.004	< 0.021	< 0.006	< 0.009	< 0.011	< 0.052
04-16-12	258	0.19 ± 0.09	< 0.008	< 0.010	< 0.019	< 0.008	< 0.010	< 0.014	< 0.040
05-03-12	261	< 0.13	< 0.009	< 0.012	< 0.016	< 0.009	< 0.008	< 0.016	< 0.052
05-10-12	262	< 0.10	< 0.011	< 0.009	< 0.011	< 0.007	< 0.008	< 0.008	< 0.036
05-17-12	258	0.21 ± 0.11	< 0.007	< 0.007	< 0.021	< 0.010	< 0.008	< 0.009	< 0.049
05-24-12	262	0.24 ± 0.12	< 0.009	< 0.007	< 0.019	< 0.006	< 0.011	< 0.018	< 0.030
05-31-12	258	0.26 ± 0.12	< 0.008	< 0.005	< 0.009	< 0.009	< 0.009	< 0.024	< 0.035
06-07-12	255	< 0.11	< 0.010	< 0.007	< 0.010	< 0.010	< 0.008	< 0.010	< 0.047
06-14-12	255	0.26 ± 0.13	< 0.006	< 0.011	< 0.020	< 0.008	< 0.007	< 0.011	< 0.043
06-21-12	256	0.22 ± 0.10	< 0.009	< 0.005	< 0.006	< 0.007	< 0.009	< 0.011	< 0.050
06-28-12	250	0.32 ± 0.11	< 0.003	< 0.005	< 0.008	< 0.005	< 0.007	< 0.010	< 0.041
07-05-12	251	0.19 ± 0.10	< 0.007	< 0.008	< 0.017	< 0.009	< 0.008	< 0.012	< 0.043
07-12-12	286	0.23 ± 0.13	< 0.006	< 0.004	< 0.011	< 0.008	< 0.005	< 0.020	< 0.037
07-19-12	250	< 0.11	< 0.006	< 0.008	< 0.012	< 0.008	< 0.005	< 0.021	< 0.052
07-26-12	243	0.28 ± 0.14	< 0.006	< 0.005	< 0.021	< 0.006	< 0.007	< 0.014	< 0.063
08-02-12	249	< 0.09	< 0.006	< 0.006	< 0.011	< 0.010	< 0.007	< 0.010	< 0.037
08-09-12	240	0.28 ± 0.15	< 0.005	< 0.006	< 0.019	< 0.008	< 0.006	< 0.010	< 0.051
08-16-12	238	< 0.13	< 0.006	< 0.005	< 0.018	< 0.011	< 0.007	< 0.017	< 0.060
08-23-12	235	< 0.11	< 0.006	< 0.010	< 0.015	< 0.009	< 0.008	< 0.020	< 0.059
08-30-12	232	< 0.16	< 0.009	< 0.011	< 0.017	< 0.010	< 0.012	< 0.041	< 0.059
09-06-12	282	< 0.11	< 0.006	< 0.008	< 0.020	< 0.009	< 0.008	< 0.017	< 0.049
09-13-12	275	< 0.11	< 0.009	< 0.014	< 0.019	< 0.007	< 0.007	< 0.024	< 0.045
09-20-12	269	< 0.10	< 0.006	< 0.009	< 0.011	< 0.009	< 0.007	< 0.024	< 0.048
09-27-12	259	0.30 ± 0.14	< 0.008	< 0.013	< 0.018	< 0.010	< 0.007	< 0.018	< 0.048

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

CALLAWAY

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.								
10-04-12	263	< 0.13	< 0.011	< 0.010	< 0.022	< 0.011	< 0.006	< 0.044	< 0.054
10-12-12	284	< 0.13	< 0.016	< 0.018	< 0.026	< 0.015	< 0.012	< 0.032	< 0.038
10-18-12	219	0.21 ± 0.10	< 0.007	< 0.009	< 0.020	< 0.007	< 0.011	< 0.035	< 0.049
10-25-12	251	< 0.13	< 0.009	< 0.011	< 0.016	< 0.008	< 0.009	< 0.022	< 0.063
11-01-12	251	< 0.11	< 0.010	< 0.007	< 0.016	< 0.008	< 0.007	< 0.024	< 0.046
11-08-12	239	< 0.13	< 0.007	< 0.009	< 0.018	< 0.007	< 0.011	< 0.038	< 0.044
11-15-12	247	0.25 ± 0.13	< 0.011	< 0.013	< 0.016	< 0.009	< 0.006	< 0.023	< 0.040
11-21-12	203	0.27 ± 0.15	< 0.015	< 0.016	< 0.022	< 0.010	< 0.012	< 0.024	< 0.042
11-29-12	276	0.21 ± 0.11	< 0.007	< 0.012	< 0.018	< 0.004	< 0.006	< 0.015	< 0.039
12-07-12	279	< 0.11	< 0.009	< 0.008	< 0.027	< 0.007	< 0.007	< 0.042	< 0.051
12-12-12	169	< 0.14	< 0.011	< 0.009	< 0.028	< 0.012	< 0.015	< 0.030	< 0.069
12-20-12	268	< 0.08	< 0.008	< 0.008	< 0.011	< 0.006	< 0.007	< 0.025	< 0.029
12-27-12	312	< 0.08	< 0.004	< 0.007	< 0.010	< 0.008	< 0.005	< 0.018	< 0.025
01-03-13	313	0.18 ± 0.09	< 0.006	< 0.007	< 0.015	< 0.006	< 0.006	< 0.013	< 0.048

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

CALLAWAY

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.								
01-05-12	258	< 0.11	< 0.011	< 0.007	< 0.015	< 0.011	< 0.008	< 0.029	< 0.043
01-12-12	258	< 0.14	< 0.009	< 0.008	< 0.038	< 0.007	< 0.007	< 0.028	< 0.043
01-19-12	270	< 0.10	< 0.007	< 0.008	< 0.011	< 0.007	< 0.008	< 0.018	< 0.027
01-26-12	275	< 0.10	< 0.010	< 0.004	< 0.008	< 0.006	< 0.007	< 0.009	< 0.053
02-02-12	279	< 0.12	< 0.008	< 0.011	< 0.015	< 0.009	< 0.007	< 0.018	< 0.051
02-09-12	280	< 0.09	< 0.011	< 0.007	< 0.012	< 0.006	< 0.007	< 0.025	< 0.043
02-16-12	271	< 0.08	< 0.007	< 0.008	< 0.018	< 0.004	< 0.007	< 0.010	< 0.039
02-23-12	281	0.14 ± 0.06	< 0.006	< 0.008	< 0.014	< 0.007	< 0.009	< 0.012	< 0.039
03-01-12	268	< 0.08	< 0.010	< 0.008	< 0.013	< 0.009	< 0.004	< 0.011	< 0.044
03-08-12	271	0.24 ± 0.11	< 0.006	< 0.008	< 0.016	< 0.005	< 0.007	< 0.012	< 0.022
03-15-12	264	0.15 ± 0.08	< 0.005	< 0.007	< 0.012	< 0.006	< 0.009	< 0.011	< 0.030
03-22-12	267	0.15 ± 0.09	< 0.008	< 0.007	< 0.004	< 0.006	< 0.006	< 0.007	< 0.031
03-29-12	267	0.26 ± 0.12	< 0.005	< 0.004	< 0.014	< 0.007	< 0.009	< 0.009	< 0.037
04-05-12	263	0.23 ± 0.11	< 0.013	< 0.005	< 0.014	< 0.009	< 0.010	< 0.006	< 0.048
04-12-12	267	0.17 ± 0.08	< 0.005	< 0.006	< 0.012	< 0.006	< 0.005	< 0.011	< 0.031
04-19-12	267	0.20 ± 0.08	< 0.005	< 0.004	< 0.020	< 0.003	< 0.006	< 0.009	< 0.037
04-16-12	263	< 0.10	< 0.007	< 0.006	< 0.013	< 0.009	< 0.011	< 0.013	< 0.051
05-03-12	247	0.27 ± 0.14	< 0.010	< 0.008	< 0.017	< 0.009	< 0.014	< 0.010	< 0.052
05-10-12	244	< 0.13	< 0.007	< 0.012	< 0.009	< 0.007	< 0.008	< 0.017	< 0.047
05-17-12	249	0.25 ± 0.12	< 0.005	< 0.005	< 0.019	< 0.004	< 0.006	< 0.012	< 0.054
05-24-12	241	0.29 ± 0.10	< 0.005	< 0.010	< 0.015	< 0.007	< 0.007	< 0.009	< 0.041
05-31-12	251	0.32 ± 0.12	< 0.006	< 0.007	< 0.021	< 0.010	< 0.010	< 0.011	< 0.049
06-07-12	251	0.16 ± 0.08	< 0.010	< 0.010	< 0.021	< 0.008	< 0.007	< 0.011	< 0.039
06-14-12	253	0.24 ± 0.13	< 0.012	< 0.007	< 0.016	< 0.008	< 0.009	< 0.020	< 0.056
06-21-12	251	0.22 ± 0.09	< 0.004	< 0.005	< 0.006	< 0.005	< 0.007	< 0.011	< 0.028
06-28-12	248	0.29 ± 0.10	< 0.005	< 0.009	< 0.013	< 0.006	< 0.006	< 0.010	< 0.053
07-05-12	252	< 0.15	< 0.013	< 0.007	< 0.024	< 0.012	< 0.014	< 0.016	< 0.057
07-12-12	249	0.34 ± 0.13	< 0.009	< 0.009	< 0.020	< 0.011	< 0.006	< 0.023	< 0.035
07-19-12	249	< 0.13	< 0.004	< 0.007	< 0.018	< 0.009	< 0.011	< 0.020	< 0.033
07-26-12	242	0.25 ± 0.12	< 0.007	< 0.005	< 0.009	< 0.009	< 0.005	< 0.015	< 0.063
08-02-12	235	0.35 ± 0.18	< 0.010	< 0.010	< 0.014	< 0.008	< 0.010	< 0.012	< 0.033
08-09-12	230	0.28 ± 0.14	< 0.010	< 0.009	< 0.013	< 0.005	< 0.012	< 0.017	< 0.033
08-16-12	264	< 0.10	< 0.009	< 0.007	< 0.019	< 0.006	< 0.009	< 0.020	< 0.036
08-23-12	273	< 0.14	< 0.005	< 0.011	< 0.023	< 0.007	< 0.010	< 0.014	< 0.030
08-30-12	263	0.19 ± 0.10	< 0.006	< 0.007	< 0.021	< 0.007	< 0.007	< 0.029	< 0.042
09-06-12	272	< 0.14	< 0.006	< 0.009	< 0.020	< 0.010	< 0.011	< 0.023	< 0.033
09-13-12	115	< 0.24	< 0.025	< 0.016	< 0.047	< 0.016	< 0.010	< 0.040	< 0.094 [b]
09-20-12	277	< 0.12	< 0.008	< 0.012	< 0.022	< 0.009	< 0.007	< 0.021	< 0.052
09-27-12	277	< 0.12	< 0.008	< 0.012	< 0.012	< 0.007	< 0.008	< 0.017	< 0.050

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

[b] Low volume; air station pump off from 9-6-12 to 9-10-12 due to electrical safety concern.

CALLAWAY

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.								
10-04-12	282	0.27 ± 0.16	< 0.009	< 0.008	< 0.017	< 0.011	< 0.009	< 0.037	< 0.038
10-12-12	323	0.23 ± 0.09	< 0.008	< 0.009	< 0.016	< 0.010	< 0.009	< 0.023	< 0.044
10-18-12	243	< 0.14	< 0.013	< 0.009	< 0.020	< 0.011	< 0.009	< 0.032	< 0.055
10-25-12	288	< 0.09	< 0.009	< 0.010	< 0.019	< 0.006	< 0.008	< 0.011	< 0.038
11-01-12	291	< 0.09	< 0.010	< 0.011	< 0.016	< 0.007	< 0.008	< 0.013	< 0.052
11-08-12	288	< 0.12	< 0.011	< 0.008	< 0.023	< 0.006	< 0.010	< 0.030	< 0.043
11-15-12	295	0.18 ± 0.09	< 0.008	< 0.012	< 0.012	< 0.004	< 0.004	< 0.019	< 0.025
11-21-12	251	< 0.13	< 0.014	< 0.008	< 0.021	< 0.005	< 0.009	< 0.029	< 0.053
11-29-12	326	0.19 ± 0.11	< 0.006	< 0.010	< 0.011	< 0.008	< 0.005	< 0.020	< 0.036
12-07-12	336	< 0.09	< 0.004	< 0.006	< 0.012	< 0.004	< 0.004	< 0.026	< 0.040
12-12-12	198	< 0.13	< 0.012	< 0.008	< 0.031	< 0.009	< 0.011	< 0.064	< 0.044
12-20-12	329	< 0.10	< 0.009	< 0.006	< 0.011	< 0.004	< 0.004	< 0.021	< 0.029
12-27-12	221	< 0.11	< 0.007	< 0.010	< 0.018	< 0.009	< 0.006	< 0.031	< 0.058
01-03-13	227	< 0.10	< 0.005	< 0.009	< 0.014	< 0.008	< 0.009	< 0.018	< 0.049

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

CALLAWAY

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.								
01-05-12	280	< 0.12	< 0.008	< 0.005	< 0.019	< 0.004	< 0.009	< 0.051	< 0.041
01-12-12	280	< 0.11	< 0.008	< 0.007	< 0.012	< 0.007	< 0.007	< 0.025	< 0.046
01-19-12	269	0.18 ± 0.11	< 0.006	< 0.008	< 0.010	< 0.009	< 0.009	< 0.019	< 0.043
01-26-12	282	< 0.10	< 0.006	< 0.005	< 0.015	< 0.005	< 0.009	< 0.009	< 0.036
02-02-12	294	< 0.09	< 0.006	< 0.007	< 0.007	< 0.006	< 0.007	< 0.012	< 0.023
02-09-12	298	< 0.09	< 0.007	< 0.007	< 0.017	< 0.006	< 0.010	< 0.024	< 0.044
02-16-12	287	< 0.08	< 0.006	< 0.008	< 0.014	< 0.007	< 0.006	< 0.011	< 0.041
02-23-12	305	< 0.10	< 0.006	< 0.006	< 0.013	< 0.006	< 0.007	< 0.008	< 0.026
03-01-12	299	< 0.10	< 0.010	< 0.006	< 0.010	< 0.008	< 0.005	< 0.009	< 0.045
03-08-12	287	0.19 ± 0.10	< 0.006	< 0.007	< 0.011	< 0.008	< 0.006	< 0.015	< 0.038
03-15-12	299	0.20 ± 0.10	< 0.007	< 0.007	< 0.014	< 0.007	< 0.006	< 0.008	< 0.047
03-22-12	303	0.17 ± 0.07	< 0.005	< 0.010	< 0.007	< 0.006	< 0.004	< 0.005	< 0.029
03-29-12	304	0.21 ± 0.12	< 0.004	< 0.005	< 0.010	< 0.005	< 0.006	< 0.008	< 0.042
04-05-12	298	0.11 ± 0.06	< 0.007	< 0.007	< 0.012	< 0.007	< 0.005	< 0.010	< 0.027
04-12-12	295	< 0.11	< 0.007	< 0.007	< 0.011	< 0.008	< 0.007	< 0.013	< 0.040
04-19-12	309	0.17 ± 0.08	< 0.006	< 0.004	< 0.009	< 0.003	< 0.006	< 0.008	< 0.023
04-16-12	302	< 0.11	< 0.008	< 0.006	< 0.017	< 0.006	< 0.010	< 0.009	< 0.036
05-03-12	292	0.21 ± 0.09	< 0.007	< 0.003	< 0.009	< 0.006	< 0.005	< 0.008	< 0.038
05-10-12	302	< 0.09	< 0.009	< 0.004	< 0.011	< 0.008	< 0.010	< 0.013	< 0.029
05-17-12	305	< 0.10	< 0.005	< 0.007	< 0.006	< 0.004	< 0.008	< 0.016	< 0.041
05-24-12	296	0.27 ± 0.09	< 0.011	< 0.007	< 0.012	< 0.008	< 0.010	< 0.012	< 0.040
05-31-12	297	0.30 ± 0.12	< 0.008	< 0.008	< 0.014	< 0.007	< 0.011	< 0.009	< 0.040
06-07-12	297	< 0.12	< 0.006	< 0.007	< 0.009	< 0.005	< 0.009	< 0.010	< 0.050
06-14-12	293	0.27 ± 0.14	< 0.004	< 0.005	< 0.013	< 0.005	< 0.005	< 0.014	< 0.028
06-21-12	292	0.28 ± 0.11	< 0.005	< 0.004	< 0.008	< 0.007	< 0.007	< 0.011	< 0.026
06-28-12	291	0.24 ± 0.09	< 0.008	< 0.008	< 0.007	< 0.007	< 0.007	< 0.014	< 0.028
07-05-12	300	0.21 ± 0.11	< 0.008	< 0.005	< 0.017	< 0.007	< 0.008	< 0.010	< 0.039
07-12-12	297	< 0.14	< 0.009	< 0.005	< 0.011	< 0.008	< 0.008	< 0.028	< 0.031
07-19-12	302	0.19 ± 0.11	< 0.008	< 0.006	< 0.017	< 0.007	< 0.007	< 0.022	< 0.043
07-26-12	299	0.19 ± 0.11	< 0.009	< 0.005	< 0.012	< 0.009	< 0.010	< 0.013	< 0.040
08-02-12	296	0.20 ± 0.10	< 0.008	< 0.006	< 0.015	< 0.006	< 0.007	< 0.024	< 0.041
08-09-12	246	0.21 ± 0.11	< 0.005	< 0.008	< 0.008	< 0.009	< 0.009	< 0.010	< 0.032
08-16-12	246	< 0.11	< 0.007	< 0.005	< 0.009	< 0.010	< 0.006	< 0.015	< 0.039
08-23-12	249	< 0.14	< 0.010	< 0.012	< 0.011	< 0.005	< 0.008	< 0.061	< 0.032
08-30-12	238	< 0.17	< 0.011	< 0.008	< 0.020	< 0.010	< 0.006	< 0.046	< 0.035
09-06-12	247	< 0.14	< 0.007	< 0.011	< 0.026	< 0.009	< 0.011	< 0.062	< 0.061
09-13-12	257	< 0.13	< 0.009	< 0.008	< 0.018	< 0.006	< 0.010	< 0.028	< 0.051
09-20-12	256	< 0.14	< 0.010	< 0.013	< 0.019	< 0.008	< 0.005	< 0.023	< 0.047
09-27-12	259	0.16 ± 0.08	< 0.010	< 0.013	< 0.011	< 0.005	< 0.008	< 0.018	< 0.028

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

CALLAWAY

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.								
10-04-12	253	0.19 ± 0.11	< 0.011	< 0.007	< 0.016	< 0.007	< 0.011	< 0.022	< 0.057
10-12-12	300	< 0.09	< 0.007	< 0.007	< 0.019	< 0.007	< 0.009	< 0.011	< 0.026
10-18-12	218	< 0.13	< 0.007	< 0.007	< 0.021	< 0.008	< 0.013	< 0.036	< 0.045
10-25-12	263	< 0.09	< 0.010	< 0.007	< 0.015	< 0.007	< 0.005	< 0.019	< 0.043
11-01-12	271	< 0.10	< 0.007	< 0.012	< 0.011	< 0.004	< 0.005	< 0.016	< 0.028
11-08-12	263	< 0.13	< 0.013	< 0.012	< 0.014	< 0.010	< 0.009	< 0.031	< 0.044
11-15-12	271	< 0.11	< 0.008	< 0.012	< 0.013	< 0.008	< 0.004	< 0.028	< 0.055
11-21-12	225	< 0.13	< 0.008	< 0.014	< 0.023	< 0.004	< 0.011	< 0.027	< 0.075
11-29-12	326	< 0.10	< 0.008	< 0.009	< 0.010	< 0.006	< 0.005	< 0.018	< 0.031
12-07-12	310	< 0.11	< 0.008	< 0.007	< 0.017	< 0.004	< 0.006	< 0.034	< 0.020
12-12-12	189	< 0.17	< 0.012	< 0.012	< 0.031	< 0.008	< 0.008	< 0.099	< 0.056
12-20-12	306	0.16 ± 0.09	< 0.006	< 0.007	< 0.010	< 0.008	< 0.007	< 0.030	< 0.047
12-27-12	268	0.15 ± 0.08	< 0.007	< 0.008	< 0.014	< 0.006	< 0.004	< 0.032	< 0.053
01-03-13	273	< 0.08	< 0.006	< 0.008	< 0.017	< 0.006	< 0.006	< 0.018	< 0.038

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

CALLAWAY

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.								
01-05-12	314	< 0.11	< 0.006	< 0.004	< 0.016	< 0.007	< 0.009	< 0.019	< 0.056
01-12-12	318	< 0.09	< 0.007	< 0.007	< 0.009	< 0.004	< 0.007	< 0.023	< 0.040
01-19-12	324	< 0.11	< 0.005	< 0.007	< 0.011	< 0.004	< 0.007	< 0.015	< 0.045
01-26-12	321	< 0.07	< 0.008	< 0.006	< 0.014	< 0.006	< 0.005	< 0.012	< 0.038
02-02-12	317	0.11 ± 0.06	< 0.006	< 0.008	< 0.010	< 0.006	< 0.005	< 0.013	< 0.035
02-09-12	319	< 0.09	< 0.007	< 0.006	< 0.008	< 0.008	< 0.007	< 0.019	< 0.040
02-16-12	283	< 0.09	< 0.006	< 0.009	< 0.015	< 0.005	< 0.007	< 0.012	< 0.038
02-23-12	280	< 0.08	< 0.008	< 0.006	< 0.010	< 0.007	< 0.007	< 0.010	< 0.034
03-01-12	282	< 0.08	< 0.008	< 0.010	< 0.008	< 0.007	< 0.011	< 0.018	< 0.042
03-08-12	283	0.21 ± 0.12	< 0.006	< 0.011	< 0.007	< 0.006	< 0.005	< 0.011	< 0.050
03-15-12	277	0.16 ± 0.08	< 0.011	< 0.008	< 0.009	< 0.006	< 0.008	< 0.019	< 0.048
03-22-12	274	0.19 ± 0.09	< 0.008	< 0.005	< 0.009	< 0.007	< 0.007	< 0.008	< 0.046
03-29-12	277	0.21 ± 0.10	< 0.010	< 0.006	< 0.010	< 0.007	< 0.006	< 0.008	< 0.047
04-05-12	274	0.22 ± 0.09	< 0.008	< 0.007	< 0.009	< 0.005	< 0.006	< 0.005	< 0.029
04-12-12	291	0.17 ± 0.10	< 0.008	< 0.007	< 0.013	< 0.004	< 0.009	< 0.012	< 0.048
04-19-12	307	0.15 ± 0.09	< 0.006	< 0.003	< 0.013	< 0.010	< 0.004	< 0.012	< 0.048
04-16-12	316	0.22 ± 0.11	< 0.004	< 0.006	< 0.014	< 0.008	< 0.005	< 0.015	< 0.037
05-03-12	309	0.22 ± 0.10	< 0.005	< 0.004	< 0.013	< 0.005	< 0.007	< 0.008	< 0.035
05-10-12	312	< 0.08	< 0.006	< 0.006	< 0.010	< 0.008	< 0.005	< 0.016	< 0.041
05-17-12	327	0.20 ± 0.07	< 0.003	< 0.003	< 0.007	< 0.007	< 0.004	< 0.007	< 0.028
05-24-12	327	0.30 ± 0.09	< 0.005	< 0.003	< 0.016	< 0.003	< 0.005	< 0.008	< 0.029
05-31-12	268	0.23 ± 0.13	< 0.005	< 0.009	< 0.009	< 0.008	< 0.011	< 0.015	< 0.036
06-07-12	277	0.28 ± 0.13	< 0.010	< 0.007	< 0.019	< 0.005	< 0.011	< 0.012	< 0.047
06-14-12	283	0.27 ± 0.09	< 0.008	< 0.005	< 0.012	< 0.005	< 0.008	< 0.014	< 0.049
06-21-12	288	0.22 ± 0.10	< 0.006	< 0.003	< 0.016	< 0.006	< 0.007	< 0.009	< 0.030
06-28-12	297	0.21 ± 0.09	< 0.008	< 0.007	< 0.015	< 0.007	< 0.007	< 0.009	< 0.029
07-05-12	307	0.23 ± 0.08	< 0.007	< 0.004	< 0.008	< 0.007	< 0.007	< 0.017	< 0.026
07-12-12	314	0.33 ± 0.14	< 0.008	< 0.004	< 0.009	< 0.007	< 0.006	< 0.020	< 0.052
07-19-12	328	0.16 ± 0.08	< 0.008	< 0.003	< 0.013	< 0.004	< 0.008	< 0.028	< 0.035
07-26-12	330	0.27 ± 0.13	< 0.009	< 0.004	< 0.016	< 0.009	< 0.006	< 0.022	< 0.044
08-02-12	274	< 0.11	< 0.011	< 0.007	< 0.011	< 0.007	< 0.006	< 0.011	< 0.055
08-09-12	280	0.20 ± 0.11	< 0.006	< 0.006	< 0.010	< 0.008	< 0.008	< 0.008	< 0.044
08-16-12	287	< 0.11	< 0.008	< 0.006	< 0.009	< 0.006	< 0.008	< 0.016	< 0.037
08-23-12	292	0.29 ± 0.14	< 0.010	< 0.004	< 0.016	< 0.008	< 0.010	< 0.052	< 0.035
08-30-12	287	< 0.14	< 0.008	< 0.005	< 0.016	< 0.004	< 0.009	< 0.026	< 0.036
09-06-12	292	< 0.12	< 0.007	< 0.010	< 0.019	< 0.009	< 0.009	< 0.027	< 0.032
09-13-12	287	0.30 ± 0.12	< 0.007	< 0.007	< 0.018	< 0.005	< 0.005	< 0.030	< 0.039
09-20-12	292	< 0.11	< 0.009	< 0.011	< 0.013	< 0.007	< 0.005	< 0.023	< 0.039
09-27-12	288	< 0.10	< 0.007	< 0.011	< 0.009	< 0.004	< 0.005	< 0.017	< 0.035

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

CALLAWAY

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.								
10-04-12	284	0.20 ± 0.10	< 0.005	< 0.006	< 0.018	< 0.008	< 0.007	< 0.024	< 0.037
10-12-12	325	< 0.09	< 0.008	< 0.007	< 0.013	< 0.008	< 0.008	< 0.029	< 0.045
10-18-12	266	< 0.10	< 0.010	< 0.010	< 0.017	< 0.007	< 0.005	< 0.028	< 0.048
10-25-12	326	< 0.10	< 0.006	< 0.010	< 0.005	< 0.009	< 0.005	< 0.014	< 0.040
11-01-12	329	< 0.09	< 0.007	< 0.010	< 0.008	< 0.007	< 0.006	< 0.016	< 0.044
11-08-12	332	< 0.10	< 0.010	< 0.010	< 0.013	< 0.006	< 0.003	< 0.025	< 0.033
11-15-12	333	0.16 ± 0.09	< 0.005	< 0.010	< 0.010	< 0.005	< 0.007	< 0.017	< 0.038
11-21-12	282	0.24 ± 0.11	< 0.007	< 0.013	< 0.018	< 0.007	< 0.005	< 0.023	< 0.031
11-29-12	374	0.17 ± 0.08	< 0.009	< 0.007	< 0.010	< 0.005	< 0.007	< 0.019	< 0.041
12-07-12	338	0.17 ± 0.10	< 0.006	< 0.006	< 0.013	< 0.006	< 0.005	< 0.038	< 0.045
12-12-12	205	< 0.15	< 0.011	< 0.012	< 0.028	< 0.011	< 0.010	< 0.118	< 0.048
12-20-12	309	0.17 ± 0.09	< 0.005	< 0.007	< 0.012	< 0.004	< 0.005	< 0.023	< 0.026
12-27-12	270	< 0.10	< 0.005	< 0.011	< 0.015	< 0.008	< 0.003	< 0.026	< 0.045
01-03-13	274	< 0.07	< 0.006	< 0.008	< 0.009	< 0.006	< 0.004	< 0.015	< 0.041

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

CALLAWAY

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
01-09-12	CAMI -156	< 0.4	1103 ± 108	< 7.1	< 2.4	< 3.7	< 4.3
02-13-12	CAMI -760	< 0.4	977 ± 88	< 3.7	< 2.2	< 3.0	< 1.8
03-12-12	CAMI -1219	< 0.3	1101 ± 106	< 6.0	< 3.4	< 3.5	< 2.0
04-09-12	CAMI -1781	< 0.3	1018 ± 89	< 7.3	< 3.0	< 3.5	< 2.1
04-23-12	CAMI -2276	< 0.2	1298 ± 123	< 7.9	< 3.5	< 2.6	< 1.8
05-08-12	CAMI -2685	< 0.4	1093 ± 101	< 4.9	< 2.9	< 3.5	< 1.2
05-21-12	CAMI -3083	< 0.2	1162 ± 103	< 5.3	< 3.1	< 3.3	< 3.4
06-11-12	CAMI -3584	< 0.2	1287 ± 112	< 4.7	< 2.5	< 3.6	< 1.9
06-25-12	CAMI -3875	< 0.3	1112 ± 109	< 6.1	< 3.1	< 3.4	< 1.6
07-09-12	CAMI -4041	< 0.2	1060 ± 77	< 5.6	< 2.3	< 2.4	< 1.6
07-23-12	CAMI -4465	< 0.2	1039 ± 104	< 4.7	< 3.2	< 3.3	< 3.4
08-13-12	CAMI -5086	< 0.2	1291 ± 114	< 4.8	< 3.4	< 4.4	< 2.7
08-28-12	CAMI -5431	< 0.3	1410 ± 96	< 5.9	< 3.0	< 3.9	< 2.4
09-10-12	CAMI -5720	< 0.5	1227 ± 92	< 7.1	< 2.6	< 3.6	< 3.5
09-24-12	CAMI -6002	< 0.3	1447 ± 150	< 16.5	< 5.4	< 5.1	< 5.2
10-09-12	CAMI -6499	< 0.4	1188 ± 98	< 6.6	< 3.4	< 5.0	< 2.2
10-22-12	CAMI -6869	< 0.2	1233 ± 89	< 4.2	< 2.6	< 2.3	< 2.0
11-12-12	CAMI -7370	< 0.3	1200 ± 97	< 4.3	< 2.6	< 3.0	< 1.6
11-26-12	CAMI -7711	< 0.4	1357 ± 123	< 2.5	< 3.5	< 4.8	< 3.3
12-10-12	CAMI -8021	< 0.3	1124 ± 84	< 3.9	< 2.1	< 3.1	< 1.7

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						
CAVE- 2714	5/8/2012	Mustard	2442 ± 230	< 7.9	< 6.9	< 5.5	< 9.3	< 5.2	< 7.8
CAVE- 2715	5/8/2012	Beets	5677 ± 380	< 8.8	< 9.5	< 6.4	< 24.8	< 10.6	< 10.4
CAVE- 2716	5/8/2012	Cabbage	3145 ± 302	< 6.8	< 5.0	< 11.0	< 21.6	< 8.4	< 6.5
CAVE- 2717	5/8/2012	Swiss Chard	5091 ± 331	< 8.4	< 8.8	< 5.7	< 9.9	< 9.1	< 8.8
CAVE- 2718	5/8/2012	Lettuce	3992 ± 256	< 4.0	< 5.6	< 6.9	< 9.5	< 7.3	< 4.4
CAVE- 3604	6/12/2012	Cabbage	4442 ± 288	< 6.5	< 5.1	< 4.9	< 14.9	< 8.0	< 9.1
CAVE- 3605	6/12/2012	Swiss Chard	5488 ± 341	< 7.7	< 8.9	< 5.6	< 16.7	< 7.0	< 9.5
CAVE- 3606	6/12/2012	Lettuce	5632 ± 309	< 6.4	< 4.3	< 4.7	< 12.2	< 7.2	< 4.6
CAVE- 3607	6/12/2012	Collards	3925 ± 310	< 8.9	< 9.4	< 6.0	< 13.9	< 7.1	< 10.1
CAVE- 4045	7/9/2012	Cabbage	4468 ± 231	< 4.6	< 3.8	< 5.9	< 12.3	< 4.7	< 7.1
CAVE- 4046	7/9/2012	Collards	4765 ± 301	< 6.6	< 7.7	< 8.3	< 19.2	< 6.0	< 8.7
CAVE- 4047	7/9/2012	Swiss Chard	5702 ± 326	< 8.6	< 4.9	< 8.7	< 16.2	< 6.8	< 9.7
	8/14/2012 [a]	ND[a]							
CAVE- 5726	9/11/2012	Collard Greens	3308 ± 241	< 7.8	< 7.0	< 4.9	< 16.3	< 6.4	< 7.6
CAVE- 6500	10/9/2012	Swiss Chard	4496 ± 238	< 3.4	< 3.9	< 5.2	< 14.1	< 5.5	< 7.2
CAVE- 6501	10/9/2012	Collards	3644 ± 234	< 7.0	< 5.5	< 6.9	< 15.0	< 4.8	< 6.5
CAVE- 6502	10/9/2012	Lettuce	4100 ± 257	< 4.3	< 7.1	< 7.4	< 13.3	< 5.8	< 7.6
CAVE- 6503	10/9/2012	Cabbage	4076 ± 279	< 10.4	< 4.7	< 9.0	< 18.5	< 5.5	< 6.7
CAVE- 6505	10/9/2012	Turnips	4446 ± 267	< 4.0	< 7.5	< 4.7	< 16.0	< 4.4	< 6.3
CAVE- 6506	10/9/2012	Mustard	4524 ± 265	< 6.1	< 7.1	< 8.3	< 14.2	< 5.6	< 7.2
CAVE- 7374	11/12/2012	Turnip Greens	4731 ± 268	< 6.2	< 7.2	< 5.6	< 30.4	< 7.9	< 6.7
CAVE- 7375	11/12/2012	Swiss Chard	6475 ± 350	< 7.8	< 6.3	< 7.6	< 33.3	< 6.0	< 7.0
CAVE- 7376	11/12/2012	Beets	6722 ± 370	< 9.5	< 6.5	< 6.7	< 36.4	< 9.2	< 9.8
CAVE- 7377	11/12/2012	Mustard Greens	4110 ± 270	< 9.5	< 7.5	< 6.6	< 33.1	< 7.5	< 10.0
CAVE- 7378	11/12/2012	Collard Greens	3408 ± 305	< 9.5	< 10.1	< 6.3	< 28.5	< 7.6	< 8.7
CAVE- 7379	11/12/2012	Lettuce	3406 ± 281	< 10.4	< 12.1	< 7.0	< 26.5	< 8.6	< 8.6
CAVE- 7380	11/12/2012	Toy Choy	3135 ± 209	< 6.2	< 4.5	< 3.9	< 14.9	< 4.5	< 6.2
			Location: CA-FPL-V11						
CAVE- 2719	5/7/2012	Spinach	4153 ± 356	< 10.3	< 8.7	< 8.2	< 22.3	< 11.9	< 11.5
CAVE- 2721	5/7/2012	Swiss Chard	1987 ± 212	< 4.9	< 7.4	< 10.2	< 12.8	< 6.1	< 9.1
CAVE- 2722	5/7/2012	Lettuce	4456 ± 315	< 8.1	< 7.3	< 6.3	< 16.7	< 6.8	< 9.5
CAVE- 3608	6/12/2012	Lettuce	4147 ± 413	< 17.4	< 10.3	< 10.7	< 25.6	< 12.0	< 17.3
CAVE- 3609	6/12/2012	Swiss Chard	2157 ± 295	< 10.5	< 7.7	< 8.8	< 21.5	< 13.5	< 16.0
CAVE- 4048	7/10/2012	Cabbage	3241 ± 267	< 8.0	< 9.3	< 5.3	< 12.6	< 8.8	< 9.7
CAVE- 4049	7/10/2012	Kale	3972 ± 254	< 9.8	< 5.9	< 5.3	< 11.9	< 6.9	< 7.3
CAVE- 5087	8/13/2012	Cabbage	4798 ± 422	< 8.7	< 5.4	< 5.5	< 21.7	< 9.5	< 8.8
CAVE- 5727	9/11/2012	Cabbage	2658 ± 184	< 4.6	< 6.8	< 6.8	< 18.5	< 5.5	< 6.7
CAVE- 6507	10/9/2012	Swiss Chard	3729 ± 235	< 6.8	< 7.0	< 6.4	< 18.8	< 5.7	< 6.1
CAVE- 6508	10/9/2012	Cabbage	3326 ± 204	< 5.4	< 6.8	< 5.1	< 18.2	< 6.0	< 6.5

[a] ND = No data; 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- 3610	6/11/2012	Lettuce	5478 ± 377	< 9.8	< 6.3	< 8.4	< 15.0	< 11.3	< 10.0
CAVE- 4050	7/10/2012	Cabbage	3619 ± 250	< 7.8	< 6.7	< 6.5	< 10.3	< 6.5	< 7.3
CAVE- 5088	8/13/2012	Cabbage	2346 ± 301	< 11.9	< 8.6	< 3.6	< 19.6	< 11.3	< 11.6
CAVE- 5728	9/10/2012	Cabbage	3847 ± 335	< 10.9	< 9.8	< 9.0	< 30.0	< 8.0	< 11.7
CAVE- 6509	10/9/2012	Swiss Chard	5383 ± 300	< 4.9	< 8.6	< 7.6	< 16.1	< 5.7	< 10.2
CAVE- 7381	11/13/2012	Swiss Chard	6177 ± 381	< 11.1	< 11.9	< 9.8	< 23.2	< 8.0	< 12.6
			Location: CA-FPL-V16						
CAVE- 3611	6/11/2012	Turnips	4174 ± 273	< 6.5	< 10.0	< 6.2	< 10.1	< 6.8	< 6.7
CAVE- 4051	7/9/2012	Cabbage	8534 ± 591	< 11.7	< 17.4	< 16.1	< 28.0	< 17.6	< 16.9
CAVE- 4052	7/9/2012	Lettuce	8682 ± 530	< 17.8	< 9.1	< 20.1	< 38.7	< 15.1	< 16.6
CAVE- 4053	7/9/2012	Turnip greens	5731 ± 430	< 12.0	< 8.6	< 15.7	< 27.8	< 13.1	< 17.3
CAVE- 4054	7/9/2012	Mustard greens	7284 ± 560	< 13.8	< 15.7	< 14.4	< 41.4	< 19.1	< 17.6
CAVE- 5089	8/13/2012	Lettuce	7678 ± 533	< 13.5	< 10.6	< 8.0	< 10.1	< 10.9	< 12.1
CAVE- 5090	8/13/2012	Turnip greens	4870 ± 463	< 9.4	< 9.5	< 8.9	< 19.6	< 9.0	< 11.7
	9/11/2012 [a]			ND[a]					

[a] ND = No data; refer to Part I, Table 5.5, Missed Collections and Analyses.

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					
	1A	9/28/2012			ND[a]				
	1B	9/28/2012			ND				
	1C	9/28/2012			ND				
				Location: CA-FC-2					
CAVE- 6739	2A-Soybeans	9/28/2012	< 156	13207 ± 621	< 13.4	< 15.7	< 17.6	< 12.4	< 12.9
CAVE- 6740	2B-Soybeans	9/28/2012	< 156	12365 ± 717	< 20.5	< 13.7	< 22.0	< 20.1	< 21.4
CAVE- 6741	2C-Soybeans	9/28/2012	< 156	12469 ± 532	< 12.7	< 19.2	< 11.0	< 11.0	< 12.6
				Location: CA-FC-3					
CAVE- 6742	3A-Soybeans	9/28/2012	< 156	14153 ± 611	< 13.1	< 19.9	< 13.0	< 15.7	< 18.0
CAVE- 6743	3B-Soybeans	9/28/2012	< 156	13577 ± 564	< 9.7	< 17.8	< 9.6	< 11.9	< 13.6
CAVE- 6744	3C-Soybeans	9/28/2012	< 156	6643 ± 373	< 11.3	< 18.4	< 13.5	< 8.9	< 9.7
				Location: CA-FC-4 (C)					
CAVE- 6745	Soybeans	10/16/2012	< 161	13347 ± 362	< 8.6	< 9.0	< 5.6	< 6.8	< 8.9
CAVE- 6746	Corn	10/16/2012	< 161	3311 ± 201	< 3.9	< 5.0	< 6.3	< 4.6	< 6.0

[a] ND = No data; 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- 7902	11/28/2012	12322 ± 749	< 29.9	< 35.4	< 26.7	< 10.5	< 22.9	< 21.3	494 ± 55	< 157.4
CASO- 7903	11/28/2012	11769 ± 739	< 25.0	< 64.0	< 32.2	< 14.6	< 29.8	< 25.3	726 ± 61	< 175.7
Location: SOL-F-006										
CASO- 7904	11/30/2012	10796 ± 691	< 31.0	< 63.4	< 27.5	< 20.9	< 41.5	< 24.4	647 ± 45	< 122.6
CASO- 7905	11/30/2012	11021 ± 603	< 27.9	< 81.9	< 25.6	< 20.4	< 62.4	< 17.4	561 ± 44	< 50.0
Location: SOL-PR-003										
CASO- 7906	11/28/2012	10457 ± 674	< 27.7	< 71.8	< 27.2	< 7.8	< 32.5	< 22.8	333 ± 45	< 112.3
CASO- 7907	11/28/2012	10029 ± 695	< 28.9	< 86.8	< 14.2	< 20.1	< 58.3	< 19.5	358 ± 42	< 138.1
Location: SOL-PR-007										
CASO- 7909	11/28/2012	10248 ± 665	< 27.6	< 69.5	< 11.7	< 20.6	< 29.0	< 20.2	267 ± 40	< 200.3
CASO- 7910	11/28/2012	10580 ± 664	< 26.6	< 103.2	< 32.0	< 20.2	< 65.8	< 22.8	252 ± 31	< 188.2
Location: SOL-M-009										
CASO- 7911	11/28/2012	16090 ± 750	< 20.4	< 72.7	< 34.9	< 21.2	< 62.9	< 21.3	154 ± 33	< 216.2
CASO- 7912	11/28/2012	14624 ± 755	< 27.1	< 89.7	< 35.5	< 17.3	< 56.7	< 22.0	171 ± 26	< 220.9
Location: SOL-W-001										
CASO- 7913	11/30/2012	12100 ± 678	< 25.4	< 33.5	< 28.6	< 14.7	< 39.5	< 18.9	< 16	< 131.5
CASO- 7914	11/30/2012	11917 ± 802	< 36.6	< 64.7	< 17.9	< 19.3	< 47.2	< 19.4	65 ± 32	< 162.7
Location: SOL-W-002										
CASO- 7915	11/30/2012	13737 ± 760	< 26.7	< 45.3	< 25.7	< 20.8	< 30.2	< 17.9	75 ± 26	< 66.3
CASO- 7916	11/30/2012	15588 ± 863	< 32.8	< 122.2	< 39.4	< 25.0	< 87.1	< 22.1	114 ± 36	< 137.1
Location: SOL-W-003										
CASO- 7917	11/30/2012	11656 ± 675	< 28.9	< 61.6	< 35.3	< 12.3	< 50.5	< 19.7	80 ± 30	< 63.8
CASO- 7918	11/30/2012	9228 ± 956	< 42.6	< 83.5	< 48.8	< 31.6	< 80.1	< 34.5	< 49	< 290.2
Location: SOL-W-004										
CASO- 7919	11/30/2012	11981 ± 1079	< 45.6	< 150.8	< 62.5	< 44.4	< 77.0	< 42.8	< 59	< 208.0
CASO- 7920	11/30/2012	11590 ± 627	< 27.5	< 74.5	< 29.0	< 10.0	< 64.1	< 20.7	86 ± 27	< 328.7

CALLAWAY

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

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

Lab Code Date Collected	Required LLD	CASW- 592 01-31-12	CASW- 1008 02-28-12	CASW- 1535 03-26-12	CASW- 2314 04-24-12
H-3	3000	< 139	< 143	< 152	< 153
Mn-54	15	< 4.1	< 3.7	< 5.3	< 3.5
Fe-59	30	< 7.7	< 8.4	< 7.2	< 9.1
Co-58	15	< 4.9	< 3.4	< 4.9	< 3.7
Co-60	15	< 4.1	< 2.6	< 3.3	< 2.5
Zn-65	30	< 9.8	< 4.5	< 7.6	< 5.8
Zr-Nb-95	15	< 5.3	< 5.6	< 3.9	< 2.2
I-131	1000	< 6.8	< 7.5	< 6.1	< 5.4
Cs-134	15	< 4.7	< 2.4	< 4.0	< 3.8
Cs-137	18	< 4.3	< 5.6	< 4.4	< 3.8
Ba-La-140	15	< 4.5	< 4.6	< 5.5	< 2.6

Lab Code Date Collected	Required LLD	CASW- 3190 05-29-12	CASW- 3876 06-26-12	CASW- 4811 07-27-12	CASW- 5504 08-28-12
H-3	3000	< 162	< 148	< 152	< 151
Mn-54	15	< 3.3	< 2.5	< 4.4	< 3.8
Fe-59	30	< 7.2	< 5.1	< 10.2	< 4.9
Co-58	15	< 3.6	< 2.2	< 5.6	< 2.9
Co-60	15	< 2.6	< 2.4	< 5.2	< 3.6
Zn-65	30	< 7.5	< 3.5	< 6.8	< 4.2
Zr-Nb-95	15	< 3.8	< 3.4	< 4.9	< 3.0
I-131	1000	< 7.7	< 12.0	< 6.3	< 6.5
Cs-134	15	< 3.6	< 2.1	< 5.2	< 2.8
Cs-137	18	< 3.0	< 2.8	< 3.6	< 5.3
Ba-La-140	15	< 2.4	< 3.4	< 7.0	< 4.2

Lab Code Date Collected	Required LLD	CASW- 6003 09-25-12	CASW- 7060 11-01-12	CASW- 7882 11-27-12	CASW- 8227 12-26-12
H-3	3000	< 157	< 153	< 150	< 144
Mn-54	15	< 3.5	< 3.7	< 2.8	< 2.6
Fe-59	30	< 3.5	< 7.7	< 4.9	< 4.7
Co-58	15	< 2.8	< 3.6	< 3.7	< 1.4
Co-60	15	< 2.6	< 3.7	< 3.8	< 2.1
Zn-65	30	< 3.6	< 4.0	< 6.2	< 3.4
Zr-Nb-95	15	< 3.6	< 3.8	< 4.0	< 3.4
I-131	1000	< 3.0	< 11.1	< 13.4	< 9.5
Cs-134	15	< 3.1	< 3.1	< 2.9	< 1.9
Cs-137	18	< 3.8	< 3.8	< 3.3	< 2.3
Ba-La-140	15	< 4.8	< 5.0	< 14.8	< 2.7

CALLAWAY

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- 593 01-31-12	CASW- 1009 02-28-12	CASW- 1536 03-26-12	CASW- 2316 04-24-12
H-3	3000	< 139	< 143	< 152	< 153
Mn-54	15	< 2.2	< 2.2	< 3.2	< 4.7
Fe-59	30	< 5.7	< 3.8	< 8.2	< 6.1
Co-58	15	< 2.9	< 1.7	< 4.7	< 2.5
Co-60	15	< 2.2	< 1.5	< 3.6	< 5.4
Zn-65	30	< 4.5	< 3.4	< 7.6	< 4.6
Zr-Nb-95	15	< 2.0	< 1.6	< 4.3	< 3.0
I-131	1000	< 6.6	< 3.6	< 8.2	< 5.4
Cs-134	15	< 2.7	< 2.7	< 3.7	< 4.1
Cs-137	18	< 3.1	< 2.7	< 3.3	< 4.3
Ba-La-140	15	< 6.4	< 3.0	< 3.9	< 2.6

Lab Code Date Collected	Required LLD	CASW- 3191 05-29-12	CASW- 3877 06-26-12	CASW- 4813 07-27-12	CASW- 5505 08-28-12
H-3	3000	< 162	< 148	< 152	< 151
Mn-54	15	< 2.7	< 1.0	< 6.8	< 2.4
Fe-59	30	< 4.5	< 2.9	< 6.4	< 4.9
Co-58	15	< 2.2	< 1.3	< 3.8	< 2.4
Co-60	15	< 2.5	< 1.2	< 4.0	< 2.1
Zn-65	30	< 4.6	< 2.4	< 6.8	< 3.4
Zr-Nb-95	15	< 2.8	< 1.5	< 4.3	< 4.4
I-131	1000	< 7.3	< 4.5	< 8.0	< 7.9
Cs-134	15	< 3.0	< 1.2	< 4.9	< 3.1
Cs-137	18	< 3.5	< 1.4	< 3.1	< 4.3
Ba-La-140	15	< 2.1	< 2.6	< 5.5	< 4.4

Lab Code Date Collected	Required LLD	CASW- 6004 09-25-12	CASW- 7061 11-01-12	CASW- 7883 11-27-12	CASW- 8228 12-26-12
H-3	3000	166 ± 90	< 177 [a]	434 ± 98	292 ± 89 [b]
Mn-54	15	< 2.9	< 3.1	< 5.5	< 2.0
Fe-59	30	< 4.7	< 3.9	< 18.3	< 1.7
Co-58	15	< 1.6	< 3.2	< 7.5	< 2.0
Co-60	15	< 2.1	< 4.2	< 2.2	< 1.7
Zn-65	30	< 2.2	< 6.2	< 6.0	< 3.1
Zr-Nb-95	15	< 2.3	< 4.7	< 8.9	< 2.6
I-131	1000	< 3.4	< 11.5	< 26.4	< 8.4
Cs-134	15	< 2.7	< 2.9	< 5.6	< 1.7
Cs-137	18	< 2.9	< 3.7	< 7.6	< 2.0
Ba-La-140	15	< 2.2	< 3.0	< 10.7	< 3.3

[a] Sample recounted to confirm activity; 208 ± 90 pCi/L.
[b] Analysis was repeated; result of reanalysis, 378 ± 92 pCi/L.

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-CTBD						
	01/12/12					ND[a]					
					Location: CA-SWA-UHS						
CASW- 369	01/12/12	233 ± 88	< 2.0	< 3.8	< 2.6	< 2.4	< 4.8	< 2.7	< 1.8	< 2.1	< 7.8
CASW- 2604	04/26/12	< 153	< 3.7	< 7.1	< 2.5	< 3.1	< 3.7	< 2.5	< 3.2	< 4.7	< 3.0
CASW- 4569	07/10/12	< 152	< 2.3	< 5.6	< 1.4	< 1.8	< 4.0	< 3.1	< 2.4	< 2.6	< 5.6
CASW- 7277	10/23/12	< 154	< 2.5	< 6.3	< 3.8	< 3.0	< 2.5	< 4.2	< 3.2	< 2.4	< 11.8
					Location: CA-SWA-UNIT 2						
CASW- 370	01/11/12	< 146	< 1.9	< 2.8	< 1.5	< 1.5	< 3.0	< 2.2	< 1.5	< 1.8	< 5.1
CASW- 2605	04/27/12	< 148	< 5.1	< 5.9	< 4.0	< 5.7	< 5.8	< 3.7	< 5.4	< 6.4	< 5.3
CASW- 4570	07/18/12	< 152	< 4.6	< 5.7	< 4.5	< 3.9	< 2.4	< 5.5	< 3.7	< 4.1	< 11.0
	10/31/12					ND[a]					
					Location: CA-SWA-POND 01						
CASW- 1124	02/29/12	< 143	< 4.8	< 8.0	< 3.8	< 4.7	< 3.9	< 5.3	< 3.2	< 4.1	< 5.1
CASW- 5613	09/04/12	< 151	< 5.2	< 4.9	< 5.4	< 4.7	< 4.2	< 5.5	< 4.4	< 6.2	< 8.5
					Location: CA-SWA-POND 02						
CASW- 1126	02/29/12	< 143	< 2.5	< 4.7	< 1.5	< 2.2	< 3.1	< 3.7	< 1.8	< 2.5	< 2.5
CASW- 5614	09/04/12	< 151	< 4.9	< 8.0	< 2.5	< 4.2	< 5.7	< 5.9	< 3.9	< 4.5	< 5.9
					Location: CA-SWA-SLUDGE LAGOON #4						
CASW- 1133	03/02/12	< 143	< 2.2	< 3.6	< 2.0	< 1.2	< 3.9	< 3.1	< 2.2	< 2.3	< 5.2
CASW- 5621	09/04/12	< 151	< 1.7	< 5.9	< 2.0	< 3.0	< 2.4	< 4.5	< 2.4	< 2.8	< 10.5

[a] ND = No data; refer to Part I, Table 5.5, Missed Collections and Analyses.

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- 1127	03/02/12	< 143	< 2.2	< 4.6	< 2.1	< 1.7	< 4.3	< 3.6	< 1.9	< 2.2	< 4.9
CASW- 5615	09/04/12	< 151	< 2.3	< 7.6	< 3.4	< 4.1	< 2.8	< 4.7	< 3.6	< 4.1	< 5.4
					Location: CA-SWA-OUTFALL 011						
CASW- 1128	03/02/12	< 143	< 2.1	< 4.9	< 1.6	< 1.8	< 2.5	< 1.6	< 2.4	< 2.4	< 3.5
CASW- 5616	09/04/12	< 151	< 2.5	< 6.5	< 2.7	< 1.4	< 2.4	< 2.7	< 2.0	< 2.5	< 9.4
					Location: CA-SWA-OUTFALL 012						
CASW- 1129	02/29/12	< 143	< 2.0	< 4.6	< 2.0	< 1.2	< 3.9	< 2.2	< 2.1	< 2.7	< 5.1
CASW- 5617	09/04/12	< 151	< 2.5	< 5.2	< 2.1	< 2.7	< 2.2	< 2.4	< 2.0	< 2.7	< 7.9
					Location: CA-SWA-OUTFALL 013						
CASW- 1130	02/29/12	< 143	< 1.8	< 4.5	< 1.6	< 1.6	< 2.6	< 1.8	< 1.9	< 2.0	< 2.0
CASW- 5618	09/04/12	< 151	< 2.6	< 3.9	< 3.3	< 2.4	< 3.5	< 3.9	< 2.4	< 2.2	< 10.9
					Location: CA-SWA-OUTFALL 014						
CASW- 1131	03/02/12	< 143	< 2.8	< 5.3	< 3.5	< 4.3	< 6.7	< 3.0	< 2.9	< 3.2	< 6.6
CASW- 5619	09/04/12	< 151	< 3.5	< 7.1	< 4.4	< 2.6	< 6.0	< 4.5	< 3.6	< 2.6	< 6.1
					Location: CA-SWA-OUTFALL 015						
CASW- 1132	03/02/12	< 143	< 2.5	< 4.6	< 1.3	< 1.3	< 2.0	< 2.1	< 2.5	< 1.8	< 3.0
CASW- 5620	09/04/12	< 151	< 5.6	< 8.4	< 3.8	< 4.1	< 7.7	< 4.9	< 5.3	< 7.3	< 6.1

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- 993	2/22/2012	< 141	< 3.3	< 11.4	< 3.3	< 5.0	< 4.4	< 4.3	< 4.2	< 5.2	< 4.9
CADW- 3192	5/23/2012	< 152	< 5.4	< 12.2	< 2.1	< 6.3	< 7.3	< 3.7	< 5.3	< 4.5	< 7.9
CADW- 4839	7/25/2012	< 150	< 3.7	< 5.9	< 2.6	< 3.0	< 5.5	< 4.3	< 3.7	< 4.5	< 6.2
CADW- 7870	11/26/2012	< 149	< 2.1	< 4.8	< 1.3	< 2.6	< 1.3	< 3.7	< 2.2	< 2.1	< 4.5
						CA-DWA-004 (Miller)					
CADW- 994	2/24/2012	< 141	< 2.4	< 3.7	< 2.0	< 1.7	< 4.7	< 2.2	< 2.7	< 2.8	< 2.3
CADW- 3193	5/23/2012	< 152	< 2.0	< 3.6	< 2.6	< 1.9	< 4.2	< 2.6	< 2.8	< 2.0	< 5.3
CADW- 4840	7/26/2012	< 150	< 3.2	< 5.6	< 2.3	< 3.5	< 6.1	< 2.8	< 4.4	< 4.6	< 8.3
CADW- 7871	11/27/2012	< 149	< 2.8	< 3.7	< 1.9	< 2.8	< 5.1	< 3.5	< 3.0	< 2.7	< 6.4
						CA-DWA-005 (Hux)					
CADW- 995	2/27/2012	< 141	< 3.6	< 5.2	< 4.1	< 5.0	< 6.7	< 4.3	< 3.8	< 2.8	< 5.7
CADW- 3194	5/23/2012	< 152	< 5.0	< 5.3	< 2.6	< 3.2	< 4.4	< 4.0	< 4.2	< 3.6	< 3.3
CADW- 4841	7/25/2012	< 150	< 2.4	< 5.0	< 2.9	< 2.9	< 4.6	< 3.5	< 3.0	< 4.1	< 7.3
CADW- 7872	11/26/2012	< 149	< 3.9	< 4.5	< 1.8	< 2.5	< 5.9	< 5.0	< 3.5	< 3.7	< 4.3
						CA-DWA-006 (Lindeman)					
CADW- 996	2/22/2012	< 144	< 2.1	< 4.7	< 2.5	< 2.5	< 3.8	< 4.2	< 2.9	< 2.8	< 2.8
CADW- 3195	5/23/2012	< 152	< 2.4	< 4.3	< 4.3	< 4.2	< 4.8	< 3.1	< 3.2	< 4.9	< 3.9
CADW- 4842	7/25/2012	< 150	< 1.9	< 5.1	< 3.4	< 2.4	< 6.5	< 3.9	< 2.3	< 2.6	< 5.7
CADW- 7873	11/26/2012	< 149	< 3.2	< 8.8	< 3.1	< 5.0	< 4.9	< 4.0	< 3.7	< 4.4	< 5.1
						CA-DWA-007 (Kriete)					
CADW- 997	2/22/2012	< 144	< 6.2	< 5.7	< 3.6	< 4.1	< 6.5	< 5.5	< 2.5	< 4.2	< 8.7
CADW- 3196	5/23/2012	< 152	< 4.8	< 7.6	< 4.4	< 6.9	< 7.9	< 4.7	< 3.9	< 6.0	< 4.2
CADW- 4843	7/25/2012	< 150	< 3.0	< 7.5	< 4.2	< 4.4	< 3.8	< 4.9	< 3.1	< 4.0	< 8.6
CADW- 7874	11/26/2012	< 149	< 2.3	< 5.7	< 1.6	< 2.5	< 3.6	< 2.7	< 2.0	< 2.8	< 4.7
						CA-DWA-008 (Brandt)					
CADW- 999	2/22/2012	< 144	< 2.8	< 4.6	< 1.8	< 2.1	< 2.5	< 1.9	< 2.6	< 2.6	< 1.6
CADW- 3197	5/25/2012	< 152	< 5.6	< 7.3	< 4.1	< 5.5	< 6.8	< 4.9	< 4.1	< 6.5	< 3.2
CADW- 4844	7/25/2012	< 150	< 2.5	< 6.6	< 3.6	< 2.5	< 5.5	< 4.6	< 3.1	< 2.0	< 6.2
CADW- 7875	11/26/2012	< 149	< 2.2	< 3.6	< 3.3	< 3.4	< 3.7	< 3.9	< 3.5	< 3.7	< 5.3

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- 1000	2/22/2012	< 144	< 2.7	< 5.1	< 2.9	< 1.9	< 4.0	< 2.3	< 2.5	< 2.4	< 4.5
CADW- 3198	5/25/2012	< 152	< 2.6	< 6.3	< 3.2	< 2.8	< 3.2	< 3.5	< 2.9	< 4.0	< 4.2
CASW- 4845	7/25/2012	< 150	< 2.3	< 8.0	< 3.6	< 1.9	< 5.6	< 2.7	< 2.4	< 3.5	< 6.1
CASW- 7876	11/26/2012	< 149	< 3.4	< 7.3	< 2.6	< 3.5	< 7.8	< 3.6	< 2.7	< 4.2	< 6.7
						CA-DWA-010 (Dillon, Susan)					
CADW- 1001	2/22/2012	< 144	< 2.2	< 5.0	< 2.3	< 1.6	< 4.1	< 3.1	< 3.2	< 2.8	< 4.3
CADW- 3199	5/25/2012	< 152	< 5.6	< 11.7	< 2.7	< 6.6	< 8.0	< 5.9	< 4.7	< 5.4	< 3.6
CASW- 4846	7/25/2012	< 150	< 2.1	< 8.2	< 3.7	< 2.2	< 5.4	< 3.0	< 2.9	< 3.9	< 8.0
CASW- 7877	11/26/2012	< 150	< 2.8	< 3.9	< 2.9	< 2.5	< 4.1	< 3.4	< 2.2	< 2.5	< 5.7
						CA-DWA-012 (Dillon, Joe)					
CADW- 1002	2/22/2012	< 144	< 3.0	< 4.5	< 3.4	< 2.0	< 6.3	< 2.3	< 2.7	< 3.2	< 3.3
CADW- 3201	5/25/2012	< 152	< 3.4	< 6.2	< 2.2	< 3.1	< 6.2	< 4.1	< 3.4	< 2.7	< 6.2
CADW- 4847	7/25/2012	< 150	< 3.8	< 6.4	< 3.1	< 2.0	< 6.2	< 3.1	< 3.8	< 3.4	< 8.2
CADW- 7878	11/26/2012	< 150	< 2.6	< 4.9	< 2.4	< 2.0	< 4.0	< 3.8	< 2.5	< 2.8	< 6.8
						CA-DWA-022 (Plummer)					
CADW- 1003	2/22/2012	< 144	< 4.9	< 10.0	< 5.7	< 3.5	< 9.5	< 4.2	< 3.6	< 6.5	< 8.4
CADW- 3202	5/25/2012	< 152	< 3.0	< 4.3	< 2.9	< 0.8	< 3.5	< 2.9	< 2.7	< 3.7	< 3.0
CADW- 4848	7/25/2012	< 150	< 2.9	< 7.1	< 4.0	< 2.2	< 2.2	< 3.3	< 4.2	< 3.0	< 9.5
CADW- 7879	11/26/2012	< 150	< 1.5	< 3.7	< 2.4	< 2.2	< 3.5	< 3.0	< 2.2	< 2.7	< 4.4
						CA-DWA-D01 (Portland Bar/Grill)					
CADW- 1004	2/22/2012	< 144	< 2.5	< 4.1	< 2.5	< 1.5	< 4.1	< 2.2	< 2.4	< 2.6	< 2.4
CADW- 3203	5/25/2012	< 152	< 3.1	< 7.9	< 2.7	< 2.2	< 2.8	< 3.2	< 3.5	< 4.0	< 2.8
CADW- 4849	7/27/2012	< 150	< 3.4	< 9.2	< 3.9	< 3.3	< 6.3	< 5.3	< 2.5	< 3.7	< 9.4
CADW- 7880	11/26/2012	< 150	< 2.2	< 4.5	< 2.1	< 2.3	< 4.4	< 3.2	< 1.9	< 2.4	< 5.4
						CA-DWA-PW1 (Plant Cafeteria)					
CADW- 1005	2/27/2012	< 143	< 2.3	< 5.3	< 2.7	< 2.7	< 5.4	< 4.0	< 2.4	< 3.2	< 1.5
CADW- 3204	5/25/2012	< 152	< 5.0	< 9.5	< 2.9	< 6.3	< 3.6	< 7.4	< 6.5	< 7.2	< 6.7
CADW- 4850	7/25/2012	< 150	< 1.9	< 4.5	< 3.3	< 2.4	< 5.4	< 2.2	< 2.2	< 3.0	< 8.1
CADW- 7881	11/27/2012	< 150	< 1.9	< 8.3	< 3.2	< 2.3	< 3.6	< 2.5	< 2.9	< 2.6	< 4.2

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- 320	1/13/2012	1541 ± 137	< 3.2	< 8.8	< 2.4	< 2.5	< 3.0	< 2.7	< 2.5	< 2.3	< 8.1
CAWW- 937	2/15/2012	435 ± 102	< 5.1	< 6.0	< 4.8	< 3.2	< 6.8	< 4.5	< 4.2	< 4.2	< 6.0
CAWW- 1371	3/13/2012	< 145	< 2.1	< 2.0	< 2.5	< 2.8	< 5.2	< 2.7	< 2.9	< 3.2	< 5.2
CAWW- 2557	4/17/2012	< 158	< 2.6	< 7.1	< 2.5	< 1.8	< 6.0	< 3.7	< 2.3	< 3.3	< 6.3
CAWW- 2932	5/15/2012	< 147	< 7.2	< 11.1	< 5.0	< 5.1	< 3.7	< 5.0	< 3.0	< 6.5	< 2.9
CAWW- 3771	6/18/2012	< 147	< 2.9	< 3.0	< 3.5	< 3.0	< 2.8	< 2.7	< 2.9	< 5.1	< 3.1
CAWW- 4523	7/12/2012	< 158	< 1.7	< 5.1	< 2.0	< 1.4	< 2.4	< 3.7	< 1.7	< 1.4	< 5.4
CAWW- 5265	8/16/2012	246 ± 91	< 3.5	< 6.3	< 2.1	< 2.0	< 2.8	< 3.1	< 3.0	< 3.9	< 6.0
CAWW- 5879	9/7/2012	386 ± 95	< 2.0	< 7.2	< 2.2	< 2.2	< 5.8	< 5.1	< 2.6	< 2.9	< 7.3
CAWW- 7230	10/12/2012	< 178	< 2.3	< 7.2	< 2.3	< 2.0	< 5.0	< 4.9	< 2.2	< 3.0	< 12.8
CAWW- 7513	11/14/2012	< 155	< 2.1	< 6.2	< 1.9	< 2.3	< 6.2	< 4.1	< 2.9	< 1.8	< 3.4
CAWW- 7884	12/4/2012	< 150	< 2.4	< 8.7	< 4.9	< 4.1	< 4.1	< 4.8	< 3.6	< 3.3	< 4.4
					Location: CA-WWA-937A						
CAWW- 321	1/16/2012	< 149	< 3.0	< 10.3	< 5.5	< 1.9	< 9.2	< 3.7	< 3.8	< 5.4	< 4.5
CAWW- 938	2/16/2012	< 163	< 3.5	< 4.9	< 3.1	< 2.5	< 2.2	< 4.4	< 3.2	< 3.1	< 4.2
CAWW- 1372	3/15/2012	< 143	< 3.9	< 6.6	< 2.1	< 3.5	< 7.9	< 3.4	< 3.7	< 4.1	< 5.4
CAWW- 2558	4/19/2012	< 157	< 3.4	< 4.7	< 2.8	< 1.9	< 3.7	< 3.0	< 2.2	< 2.1	< 4.4
CAWW- 2933	5/17/2012	< 145	< 3.6	< 2.7	< 3.6	< 2.9	< 5.3	< 3.9	< 4.7	< 2.7	< 3.1
CAWW- 3772	6/18/2012	< 147	< 2.4	< 7.0	< 3.6	< 2.5	< 5.0	< 4.3	< 2.7	< 4.0	< 3.3
CAWW- 4524	7/12/2012	< 158	< 1.8	< 3.0	< 1.6	< 1.4	< 3.4	< 3.3	< 1.6	< 2.2	< 3.5
CAWW- 5266	8/16/2012	< 150	< 2.7	< 4.5	< 4.1	< 3.0	< 3.3	< 5.1	< 3.9	< 3.6	< 7.3
CAWW- 5880	9/14/2012	< 154	< 1.7	< 5.7	< 3.3	< 2.5	< 1.8	< 3.4	< 2.5	< 3.2	< 8.2
CAWW- 7231	10/12/2012	< 178	< 1.5	< 5.2	< 1.0	< 1.4	< 2.9	< 3.1	< 1.3	< 1.6	< 7.7
CAWW- 7514	11/15/2012	< 155	< 2.3	< 5.6	< 2.3	< 2.7	< 5.9	< 4.5	< 2.8	< 2.2	< 10.9
CAWW- 7885	12/4/2012	< 150	< 2.4	< 5.8	< 2.7	< 2.3	< 5.5	< 4.4	< 2.4	< 2.0	< 11.5
					Location: CA-WWA-937B						
CAWW- 322	1/16/2012	162 ± 86	< 3.2	< 7.3	< 4.1	< 3.5	< 7.3	< 2.6	< 4.5	< 2.9	< 8.3
CAWW- 939	2/14/2012	191 ± 91	< 3.5	< 7.6	< 3.3	< 3.3	< 3.0	< 3.3	< 3.1	< 4.6	< 7.3
CAWW- 1373	3/13/2012	< 143	< 2.6	< 4.3	< 2.3	< 3.0	< 4.7	< 3.7	< 2.6	< 2.7	< 2.7
CAWW- 2559	4/17/2012	< 158	< 1.5	< 4.3	< 2.4	< 2.0	< 4.9	< 4.6	< 1.7	< 2.2	< 4.3
CAWW- 2934	5/15/2012	< 145	< 2.9	< 4.5	< 3.0	< 2.4	< 6.8	< 2.6	< 3.6	< 4.5	< 2.2
CAWW- 3773	6/18/2012	< 147	< 2.8	< 5.1	< 3.1	< 3.3	< 5.8	< 4.2	< 2.7	< 2.1	< 4.2
CAWW- 4525	7/10/2012	< 158	< 2.4	< 4.8	< 2.7	< 3.1	< 4.0	< 2.6	< 3.4	< 3.1	< 5.6
CAWW- 5267	8/16/2012	< 150	< 2.0	< 5.0	< 2.7	< 2.3	< 3.8	< 2.6	< 2.0	< 2.6	< 3.7
CAWW- 5882	9/7/2012	< 154	< 1.9	< 7.5	< 3.0	< 3.0	< 2.7	< 3.9	< 2.1	< 2.9	< 6.2
CAWW- 7232	10/11/2012	< 178	< 2.4	< 6.3	< 2.4	< 3.3	< 5.6	< 5.0	< 2.2	< 2.6	< 11.3
CAWW- 7515	11/14/2012	< 155	< 2.7	< 4.4	< 2.2	< 2.8	< 3.8	< 2.7	< 2.2	< 2.6	< 10.5
CAWW- 7886	12/4/2012	< 150	< 2.6	< 3.5	< 3.8	< 2.9	< 5.7	< 3.9	< 2.7	< 3.4	< 7.2

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-937C						
CAWW- 323	1/13/2012	< 149	< 2.0	< 6.3	< 2.2	< 2.0	< 2.7	< 2.3	< 2.4	< 2.6	< 3.8
CAWW- 940	2/14/2012	< 163	< 3.3	< 4.9	< 2.4	< 3.1	< 5.6	< 3.9	< 3.0	< 3.0	< 2.6
CAWW- 1374	3/13/2012	168 ± 84	< 2.8	< 5.0	< 1.7	< 1.7	< 5.2	< 2.2	< 2.0	< 2.1	< 1.5
CAWW- 2560	4/17/2012	< 158	< 5.8	< 13.0	< 3.7	< 5.0	< 6.7	< 6.2	< 4.6	< 5.3	< 9.2
CAWW- 2935	5/15/2012	< 145	< 3.7	< 4.6	< 4.7	< 2.9	< 3.8	< 4.2	< 4.0	< 4.1	< 2.7
CAWW- 3774	6/18/2012	< 147	< 3.5	< 8.2	< 4.8	< 2.4	< 4.5	< 2.8	< 3.9	< 4.5	< 7.9
CAWW- 4526	7/12/2012	< 158	< 1.8	< 7.3	< 2.2	< 2.1	< 4.1	< 2.7	< 2.5	< 2.0	< 7.6
CAWW- 5268	8/16/2012	< 150	< 2.2	< 4.5	< 1.7	< 2.1	< 3.4	< 2.7	< 2.3	< 2.6	< 4.5
CAWW- 5883	9/7/2012	< 154	< 2.8	< 4.3	< 2.5	< 2.3	< 5.4	< 5.2	< 2.8	< 2.7	< 4.4
CAWW- 7233	10/12/2012	< 178	< 1.6	< 5.1	< 1.6	< 2.3	< 3.4	< 5.0	< 2.3	< 2.2	< 9.7
CAWW- 7516	11/14/2012	< 155	< 3.5	< 2.1	< 2.6	< 1.8	< 5.1	< 4.0	< 2.4	< 2.8	< 7.1
CAWW- 7888	12/4/2012	< 150	< 3.6	< 4.3	< 3.1	< 3.1	< 7.0	< 4.7	< 2.6	< 4.0	< 5.3
					Location: CA-WWA-937D						
CAWW- 325	1/16/2012	< 149	< 2.9	< 6.1	< 2.9	< 2.9	< 2.8	< 3.6	< 3.9	< 2.2	< 9.5
CAWW- 941	2/14/2012	213 ± 92	< 4.1	< 6.3	< 3.2	< 3.7	< 3.5	< 2.7	< 3.3	< 2.0	< 6.5
CAWW- 1375	3/13/2012	< 143	< 2.5	< 3.6	< 1.9	< 1.6	< 2.7	< 3.4	< 2.2	< 2.6	< 4.6
CAWW- 2561	4/17/2012	< 149	< 3.0	< 8.2	< 1.9	< 3.4	< 5.4	< 4.4	< 3.2	< 3.9	< 4.7
CAWW- 2936	5/15/2012	< 145	< 2.8	< 6.1	< 2.5	< 2.2	< 2.8	< 2.5	< 2.3	< 2.5	< 5.0
CAWW- 3775	6/18/2012	< 147	< 2.0	< 4.2	< 2.4	< 1.2	< 4.5	< 3.0	< 2.3	< 2.3	< 1.5
CAWW- 4527	7/18/2012	< 158	< 3.9	< 5.6	< 4.8	< 7.2	< 7.5	< 6.1	< 5.0	< 3.0	< 8.2
CAWW- 5269	8/16/2012	< 150	< 2.8	< 3.9	< 3.4	< 3.2	< 3.9	< 3.7	< 2.5	< 3.5	< 5.1
CAWW- 5884	9/7/2012	< 154	< 2.2	< 6.9	< 2.0	< 1.4	< 2.0	< 3.4	< 2.0	< 2.4	< 8.8
CAWW- 7234	10/11/2012	< 178	< 1.9	< 7.6	< 3.0	< 2.2	< 2.7	< 4.6	< 2.3	< 3.1	< 11.0
CAWW- 7517	11/14/2012	< 155	< 5.8	< 8.5	< 4.1	< 5.4	< 7.9	< 7.4	< 6.2	< 6.3	< 4.7
CAWW- 7889	12/4/2012	< 150	< 1.3	< 2.2	< 1.5	< 1.3	< 2.0	< 1.6	< 0.9	< 1.0	< 4.1
					Location: CA-WWA-937E						
CAWW- 326	1/17/2011	195 ± 88	< 3.8	< 8.2	< 1.9	< 2.0	< 2.8	< 3.8	< 3.6	< 2.9	< 7.1
CAWW- 942	2/14/2012	183 ± 83	< 1.4	< 4.3	< 2.7	< 1.6	< 3.0	< 2.8	< 1.7	< 3.3	< 5.6
CAWW- 1376	3/13/2012	< 143	< 2.2	< 4.3	< 1.9	< 1.6	< 3.2	< 1.7	< 2.5	< 2.5	< 2.7
CAWW- 2562	4/17/2012	< 149	< 2.1	< 4.5	< 1.9	< 1.9	< 5.9	< 3.5	< 2.4	< 2.2	< 5.0
CAWW- 2937	5/15/2012	< 145	< 2.5	< 4.1	< 2.5	< 2.8	< 7.6	< 6.7	< 4.6	< 4.0	< 2.8
CAWW- 3776	6/18/2012	< 108	< 2.4	< 3.2	< 3.1	< 2.5	< 4.9	< 3.7	< 1.6	< 2.8	< 3.2
CAWW- 4528	7/12/2012	< 158	< 3.1	< 5.9	< 3.9	< 2.4	< 6.4	< 2.8	< 2.5	< 2.9	< 7.2
CAWW- 5270	8/16/2012	< 150	< 3.0	< 4.7	< 3.2	< 2.2	< 5.3	< 2.5	< 2.3	< 2.9	< 4.3
CAWW- 5885	9/7/2012	< 154	< 3.2	< 10.4	< 4.1	< 2.7	< 4.6	< 5.6	< 2.9	< 3.1	< 13.8
CAWW- 7235	10/12/2012	< 178	< 2.4	< 4.6	< 1.6	< 2.5	< 3.1	< 3.3	< 2.1	< 2.4	< 10.3
CAWW- 7518	11/14/2012	< 155	< 3.0	< 5.3	< 1.9	< 3.6	< 3.6	< 4.8	< 3.0	< 3.8	< 3.9
CAWW- 7890	12/4/2012	< 150	< 3.8	< 5.6	< 2.5	< 3.1	< 6.0	< 3.2	< 2.2	< 2.9	< 6.0

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-937F					
CAWW- 327	1/17/2011	< 145	< 3.1	< 5.3	< 2.8	< 2.8	< 3.7	< 3.7	< 3.8	< 2.3	< 6.9
CAWW- 943	2/14/2012	< 149	< 2.6	< 4.5	< 2.9	< 1.6	< 3.0	< 3.5	< 2.9	< 3.0	< 3.4
CAWW- 1377	3/13/2012	< 143	< 2.6	< 5.2	< 3.3	< 3.5	< 4.6	< 3.9	< 2.4	< 2.8	< 4.7
CAWW- 2563	4/17/2012	< 149	< 2.7	< 4.8	< 2.4	< 1.8	< 2.3	< 4.7	< 2.3	< 3.9	< 5.1
CAWW- 2938	5/17/2012	< 145	< 3.9	< 7.4	< 4.0	< 2.7	< 6.8	< 3.6	< 2.5	< 4.7	< 3.3
CAWW- 3777	6/18/2012	< 130	< 4.2	< 3.9	< 2.6	< 4.0	< 5.2	< 2.4	< 4.2	< 3.1	< 3.6
CAWW- 4529	7/10/2012	< 158	< 2.6	< 3.8	< 2.5	< 2.7	< 4.0	< 2.5	< 2.2	< 3.2	< 5.2
CAWW- 5271	8/16/2012	< 150	< 4.2	< 6.6	< 2.5	< 2.8	< 4.7	< 3.6	< 3.7	< 4.4	< 5.2
CAWW- 5886	9/7/2012	< 154	< 2.5	< 7.7	< 3.5	< 2.4	< 4.6	< 7.4	< 2.7	< 2.4	< 12.1
CAWW- 7236	10/11/2012	< 178	< 1.9	< 3.4	< 3.1	< 2.1	< 3.9	< 4.6	< 1.9	< 2.2	< 12.5
CAWW- 7519	11/14/2012	< 155	< 4.0	< 7.6	< 4.4	< 3.6	< 7.1	< 3.1	< 3.0	< 5.1	< 5.4
CAWW- 7891	12/4/2012	< 150	< 2.8	< 9.1	< 4.1	< 4.7	< 4.6	< 4.6	< 2.7	< 4.8	< 5.2
						Location: CA-WWA-938					
CAWW- 329	1/16/2012	169 ± 96	< 3.3	< 5.6	< 3.7	< 3.5	< 6.2	< 2.6	< 3.9	< 2.6	< 6.9
CAWW- 945	2/14/2012	230 ± 85	< 2.8	< 5.0	< 2.8	< 1.5	< 5.4	< 2.5	< 1.7	< 1.6	< 2.5
CAWW- 1380	3/13/2012	< 143	< 2.9	< 7.1	< 1.7	< 2.5	< 7.2	< 3.9	< 3.2	< 2.7	< 3.3
CAWW- 2565	4/17/2012	< 149	< 2.6	< 5.6	< 2.3	< 1.4	< 6.1	< 3.9	< 1.9	< 3.0	< 6.9
CAWW- 2940	5/15/2012	< 147	< 3.8	< 7.6	< 4.7	< 3.3	< 4.8	< 4.6	< 2.9	< 3.6	< 4.0
CAWW- 3780	6/18/2012	< 153	< 2.0	< 5.8	< 2.0	< 1.3	< 5.1	< 4.0	< 2.5	< 2.9	< 5.5
CAWW- 4531	7/10/2012	< 158	< 2.6	< 6.7	< 1.6	< 1.9	< 3.1	< 4.8	< 2.2	< 2.3	< 7.3
CAWW- 5274	8/16/2012	< 150	< 2.5	< 7.2	< 2.5	< 1.9	< 4.4	< 3.2	< 2.7	< 3.0	< 6.9
CAWW- 5888	9/7/2012	< 154	< 3.4	< 8.1	< 2.6	< 3.3	< 3.6	< 5.3	< 3.1	< 2.5	< 8.2
CAWW- 7239	10/11/2012	< 178	< 2.7	< 4.9	< 3.3	< 2.5	< 2.5	< 5.1	< 2.0	< 2.0	< 10.1
CAWW- 7521	11/14/2012	< 155	< 2.9	< 5.2	< 3.7	< 3.6	< 4.7	< 2.3	< 3.3	< 3.4	< 8.1
CAWW- 7893	12/4/2012	< 150	< 1.2	< 3.8	< 1.2	< 1.1	< 1.9	< 2.0	< 1.2	< 1.0	< 5.6
						Location: CA-WWA-939					
CAWW- 330	1/16/2012	1009 ± 120	< 5.6	< 10.1	< 6.2	< 5.9	< 9.1	< 6.6	< 5.6	< 6.1	< 9.3
	2/14/2012					ND [a]					
	3/13/2012					ND [a]					
	4/17/2012					ND [a]					
	5/15/2012					ND [a]					
	6/18/2012					ND [a]					
	7/10/2012					ND [a]					
						Location: CA-WWA-939R [b]					
CAWW- 5275	8/16/2012	< 150	< 2.3	< 5.9	< 2.0	< 2.6	< 3.0	< 3.3	< 2.2	< 2.7	< 3.2
CAWW- 5889	9/7/2012	208 ± 87	< 3.1	< 7.9	< 4.1	< 2.5	< 4.2	< 5.7	< 3.0	< 1.8	< 12.8
CAWW- 7240	10/12/2012	< 178	< 1.3	< 3.4	< 1.2	< 1.1	< 2.5	< 2.5	< 1.0	< 1.2	< 8.3
CAWW- 7522	11/14/2012	190 ± 90	< 2.2	< 5.7	< 2.4	< 2.3	< 5.9	< 2.9	< 3.2	< 2.0	< 4.6
CAWW- 7894	12/4/2012	184 ± 87	< 1.3	< 1.6	< 1.5	< 1.3	< 2.7	< 1.6	< 0.9	< 1.3	< 3.6

[a] ND = No data; refer to Part I, Table 5.5, Missed Collections and Analyses.

[b] New well as of August 2012; replaces CA-WWA-939.

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-940						
CAWW- 331	1/16/2012	< 145	< 2.4	< 6.7	< 3.3	< 2.6	< 2.9	< 4.4	< 3.3	< 4.3	< 5.7
CAWW- 946	2/15/2012	< 148	< 2.2	< 5.0	< 1.9	< 2.0	< 1.0	< 2.1	< 2.4	< 1.9	< 3.3
CAWW- 1381	3/13/2012	< 143	< 2.8	< 3.7	< 1.9	< 2.3	< 4.9	< 2.8	< 2.6	< 2.1	< 3.5
CAWW- 2566	4/17/2012	< 149	< 2.3	< 5.5	< 1.8	< 2.1	< 4.2	< 4.2	< 2.1	< 2.7	< 5.2
CAWW- 2941	5/15/2012	< 145	< 1.9	< 5.2	< 2.7	< 2.1	< 2.8	< 3.3	< 2.7	< 3.2	< 2.8
CAWW- 3781	6/18/2012	< 153	< 1.9	< 5.5	< 2.0	< 1.6	< 2.7	< 4.1	< 2.2	< 2.9	< 7.2
CAWW- 4532	7/18/2012	< 158	< 1.8	< 3.7	< 2.7	< 2.3	< 4.3	< 4.3	< 2.0	< 2.1	< 6.4
CAWW- 5276	8/16/2012	< 150	< 2.0	< 4.2	< 2.0	< 2.6	< 1.8	< 2.2	< 2.1	< 2.6	< 6.2
CAWW- 5890	9/7/2012	< 154	< 1.0	< 2.9	< 1.4	< 1.1	< 2.0	< 2.3	< 1.0	< 1.3	< 4.8
CAWW- 7241	10/11/2012	< 178	< 1.1	< 4.1	< 1.3	< 0.8	< 2.2	< 2.7	< 1.0	< 1.1	< 6.3
CAWW- 7523	11/14/2012	< 155	< 2.8	< 3.6	< 3.1	< 2.6	< 6.3	< 4.8	< 2.8	< 2.7	< 5.9
CAWW- 7895	12/4/2012	< 150	< 5.0	< 3.8	< 4.2	< 3.5	< 4.1	< 6.4	< 4.4	< 3.4	< 6.8
					Location: CA-WWA-941						
CAWW- 332	1/16/2012	< 145	< 2.4	< 5.1	< 2.6	< 2.0	< 3.8	< 2.3	< 3.0	< 3.6	< 4.4
CAWW- 947	2/15/2012	< 148	< 2.3	< 5.4	< 1.9	< 2.1	< 3.6	< 3.1	< 1.6	< 2.3	< 4.8
CAWW- 1382	3/13/2012	< 143	< 2.4	< 4.4	< 2.1	< 1.7	< 5.8	< 4.0	< 2.4	< 2.7	< 3.6
CAWW- 2567	4/17/2012	< 149	< 2.2	< 6.1	< 3.3	< 2.1	< 3.1	< 3.2	< 2.7	< 2.6	< 5.3
CAWW- 2942	5/15/2012	< 145	< 2.4	< 5.6	< 3.3	< 1.0	< 2.1	< 1.9	< 2.8	< 3.1	< 2.1
CAWW- 3782	6/18/2012	< 161	< 1.7	< 3.5	< 2.0	< 1.4	< 3.8	< 3.8	< 2.0	< 1.7	< 4.8
CAWW- 4533	7/10/2012	< 149	< 1.7	< 6.5	< 1.4	< 2.9	< 2.8	< 3.7	< 2.6	< 3.1	< 7.5
CAWW- 5277	8/16/2012	< 150	< 4.3	< 10.6	< 3.6	< 4.1	< 5.8	< 3.5	< 4.3	< 3.2	< 5.8
CAWW- 5891	9/7/2012	< 154	< 2.6	< 6.5	< 3.4	< 2.0	< 4.4	< 3.9	< 2.5	< 2.7	< 5.9
CAWW- 7242	10/11/2012	< 149	< 1.2	< 1.6	< 1.3	< 1.4	< 1.0	< 2.0	< 1.1	< 1.0	< 5.3
CAWW- 7524	11/14/2012	< 155	< 1.6	< 3.1	< 2.6	< 2.0	< 4.4	< 3.4	< 2.1	< 2.6	< 5.8
CAWW- 7896	12/4/2012	< 150	< 1.1	< 2.3	< 1.2	< 1.3	< 2.3	< 2.5	< 1.0	< 1.1	< 4.6
					Location: CA-WWA-GWS						
CAWW- 328	1/13/2012	< 147	< 3.0	< 3.5	< 2.6	< 1.7	< 6.6	< 3.2	< 3.3	< 1.8	< 6.8
CAWW- 944	2/15/2012	< 148	< 2.4	< 2.7	< 1.6	< 2.2	< 2.2	< 2.6	< 1.9	< 2.8	< 5.0
CAWW- 1379	3/13/2012	< 143	< 3.1	< 4.9	< 2.6	< 1.9	< 3.5	< 2.8	< 2.9	< 3.1	< 4.1
CAWW- 2564	4/17/2012	< 149	< 1.9	< 4.4	< 2.8	< 1.0	< 3.8	< 2.3	< 2.4	< 3.0	< 5.0
CAWW- 2939	5/15/2012	163 ± 96	< 3.4	< 3.9	< 3.8	< 3.0	< 2.7	< 4.1	< 2.9	< 3.7	< 3.0
CAWW- 3779	6/18/2012	< 153	< 2.5	< 4.9	< 2.5	< 1.5	< 3.8	< 3.3	< 2.4	< 2.6	< 2.5
CAWW- 4530	7/12/2012	< 158	< 2.5	< 5.3	< 2.4	< 1.9	< 3.1	< 3.1	< 2.3	< 2.9	< 8.9
CAWW- 5273	8/16/2012	< 150	< 2.8	< 5.1	< 1.8	< 2.1	< 5.2	< 3.2	< 2.7	< 2.1	< 4.1
CAWW- 5887	9/7/2012	< 154	< 3.5	< 6.9	< 2.5	< 3.5	< 4.0	< 5.4	< 3.1	< 2.9	< 11.1
CAWW- 7237	10/12/2012	< 178	< 1.1	< 3.1	< 1.1	< 1.2	< 2.2	< 1.4	< 1.1	< 1.3	< 7.2
CAWW- 7520	11/14/2012	1024 ± 122 [a]	< 2.4	< 3.8	< 2.1	< 2.8	< 3.2	< 3.0	< 1.9	< 1.9	< 3.6
CAWW- 7892	12/4/2012	565 ± 103 [b]	< 0.9	< 2.7	< 1.0	< 1.1	< 2.0	< 1.7	< 1.1	< 1.0	< 6.2

[a] Analysis was repeated; result of reanalysis, 1149 ± 122 pCi/L.

[b] Analysis was repeated; result of reanalysis, 544 ± 99 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-OW-4						
CAWW- 333	1/13/2012	293 ± 101	< 2.9	< 5.1	< 3.1	< 1.6	< 3.4	< 3.7	< 2.1	< 3.0	< 5.4
CAWW- 2568	4/26/2012	283 ± 85	< 3.6	< 7.4	< 3.0	< 3.0	< 6.3	< 3.0	< 3.9	< 3.2	< 6.3
CAWW- 4534	7/12/2012	317 ± 94	< 1.9	< 7.0	< 3.2	< 2.7	< 3.6	< 2.6	< 3.5	< 2.5	< 9.7
CAWW- 7243	10/25/2012	266 ± 88	< 1.5	< 3.5	< 1.0	< 1.1	< 1.9	< 2.2	< 1.1	< 1.4	< 10.4
					Location: CA-WWA-OW-5						
CAWW- 334	1/13/2012	368 ± 104	< 1.5	< 3.2	< 0.9	< 1.3	< 2.8	< 2.0	< 1.1	< 0.8	< 1.9
CAWW- 2569	4/26/2012	326 ± 87	< 3.3	< 6.5	< 4.4	< 3.2	< 5.1	< 2.1	< 4.1	< 3.8	< 5.7
CAWW- 4535	7/18/2012	328 ± 95	< 3.8	< 8.3	< 4.3	< 3.4	< 5.7	< 4.1	< 4.3	< 5.1	< 6.5
CAWW- 7244	10/24/2012	421 ± 95	< 1.1	< 1.8	< 1.1	< 1.1	< 2.4	< 2.5	< 1.4	< 1.4	< 5.3
					Location: CA-WWA-U1MW-001						
CAWW- 335	1/10/2012	< 145	< 1.7	< 2.4	< 1.7	< 1.2	< 3.8	< 2.1	< 1.9	< 1.9	< 7.7
CAWW- 2570	4/24/2012	< 148	< 1.9	< 5.9	< 3.2	< 2.2	< 3.2	< 4.2	< 2.3	< 2.3	< 3.6
CAWW- 4536	7/17/2012	< 149	< 2.7	< 6.2	< 4.9	< 3.3	< 4.1	< 3.2	< 2.8	< 3.0	< 5.9
CAWW- 7245	10/23/2012	< 149	< 1.2	< 3.2	< 1.6	< 1.4	< 2.8	< 2.0	< 0.9	< 1.4	< 7.3
					Location: CA-WWA-U1MW-002						
CAWW- 336	1/5/2012	< 145	< 1.7	< 3.9	< 2.8	< 1.1	< 2.8	< 2.2	< 1.9	< 2.0	< 7.8
CAWW- 2571	4/26/2012	< 148	< 6.1	< 7.4	< 5.9	< 6.4	< 4.9	< 6.3	< 6.4	< 5.5	< 4.8
CAWW- 4537	7/17/2012	< 149	< 1.8	< 4.4	< 2.0	< 1.6	< 5.2	< 4.4	< 2.6	< 3.1	< 7.0
CAWW- 7246	10/29/2012	< 149	< 1.8	< 5.8	< 2.4	< 2.7	< 5.5	< 4.4	< 2.4	< 2.0	< 8.0
					Location: CA-WWA-U1MW-004						
CAWW- 337	1/5/2012	< 145	< 3.8	< 7.1	< 1.8	< 2.2	< 4.9	< 4.0	< 3.0	< 2.9	< 9.0
CAWW- 2573	4/20/2012	< 149	< 2.4	< 4.1	< 2.7	< 2.4	< 4.1	< 5.9	< 2.4	< 3.7	< 4.8
CAWW- 4538	7/11/2012	< 149	< 2.3	< 7.7	< 2.9	< 2.0	< 4.2	< 3.4	< 1.7	< 1.9	< 9.2
CAWW- 7247	10/29/2012	< 149	< 1.5	< 4.5	< 2.3	< 2.0	< 5.3	< 3.1	< 2.1	< 2.6	< 5.7
					Location: CA-WWA-U1MW-005						
CAWW- 338	1/5/2012	< 145	< 2.6	< 2.9	< 2.3	< 1.7	< 3.9	< 2.9	< 1.7	< 2.8	< 6.7
CAWW- 2574	4/20/2012	< 149	< 2.5	< 6.7	< 2.7	< 1.7	< 4.4	< 4.2	< 2.5	< 1.9	< 5.2
CAWW- 4540	7/17/2012	< 168	< 2.0	< 7.7	< 3.0	< 2.5	< 3.6	< 3.3	< 2.9	< 3.0	< 5.9
CAWW- 7248	10/19/2012	< 149	< 1.1	< 4.4	< 1.9	< 1.7	< 3.0	< 3.2	< 1.3	< 1.9	< 4.4
					Location: CA-WWA-U1MW-006						
CAWW- 339	1/10/2012	< 145	< 1.6	< 4.8	< 1.3	< 1.1	< 4.3	< 2.2	< 1.5	< 2.1	< 5.1
CAWW- 2575	4/27/2012	< 148	< 7.0	< 6.9	< 3.3	< 5.1	< 6.4	< 5.4	< 4.8	< 4.7	< 3.8
CAWW- 4541	7/2/2012	< 168	< 1.0	< 2.3	< 1.3	< 0.7	< 2.5	< 2.7	< 1.1	< 1.0	< 6.1
CAWW- 7249	10/23/2012	< 149	< 0.9	< 3.8	< 0.9	< 1.4	< 2.6	< 2.7	< 1.1	< 1.2	< 5.7

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-010						
CAWW- 340	1/5/2012	< 145	< 2.8	< 4.6	< 2.5	< 1.6	< 3.5	< 3.1	< 2.1	< 3.0	< 6.1
CAWW- 2576	4/27/2012	< 148	< 5.0	< 6.6	< 3.5	< 5.9	< 9.5	< 5.5	< 3.6	< 4.0	< 4.4
CAWW- 4542	7/2/2012	< 168	< 3.3	< 8.1	< 3.1	< 2.8	< 4.3	< 5.0	< 4.0	< 5.2	< 11.8
CAWW- 7250	10/25/2012	< 149	< 3.5	< 5.5	< 2.2	< 2.4	< 2.7	< 3.6	< 3.1	< 3.2	< 12.4
					Location: CA-WWA-U1MW-012						
CAWW- 341	1/10/2012	< 145	< 3.0	< 5.1	< 1.8	< 2.6	< 2.7	< 2.5	< 2.0	< 2.4	< 5.5
CAWW- 2577	4/27/2012	< 148	< 6.4	< 7.9	< 5.4	< 6.3	< 4.8	< 6.3	< 4.4	< 5.9	< 5.4
CAWW- 4543	7/3/2012	< 168	< 2.5	< 4.8	< 3.0	< 2.9	< 6.1	< 2.7	< 2.3	< 2.6	< 5.7
CAWW- 7251	10/23/2012	< 149	< 1.4	< 2.0	< 1.4	< 1.3	< 2.4	< 2.2	< 1.1	< 1.3	< 6.8
					Location: CA-WWA-U1MW-013						
CAWW- 342	1/11/2012	< 145	< 3.0	< 6.3	< 2.1	< 1.2	< 6.1	< 4.6	< 2.2	< 2.1	< 6.3
CAWW- 2578	4/26/2012	< 148	< 2.6	< 5.5	< 2.8	< 2.1	< 3.9	< 3.0	< 1.9	< 2.7	< 3.4
CAWW- 4544	7/18/2012	< 168	< 2.9	< 5.9	< 2.9	< 3.5	< 4.6	< 4.1	< 2.7	< 2.4	< 7.0
CAWW- 7252	10/24/2012	< 149	< 1.5	< 5.5	< 2.4	< 1.4	< 1.6	< 3.0	< 1.2	< 1.5	< 7.8
					Location: CA-WWA-U1MW-014						
CAWW- 343	1/4/2012	220 ± 98	< 1.5	< 3.7	< 1.7	< 1.8	< 2.5	< 2.5	< 2.2	< 2.5	< 9.0
CAWW- 2579	4/24/2012	210 ± 81	< 2.9	< 6.5	< 2.6	< 2.0	< 6.5	< 2.7	< 3.0	< 2.4	< 6.4
CAWW- 4545	7/5/2012	394 ± 105	< 2.2	< 8.1	< 2.2	< 1.3	< 3.9	< 4.1	< 2.9	< 2.7	< 6.2
CAWW- 7253	10/22/2012	410 ± 95	< 2.1	< 7.0	< 2.7	< 1.8	< 4.3	< 3.5	< 1.9	< 2.2	< 6.8
					Location: CA-WWA-U1MW-015						
CAWW- 344	1/4/2012	< 145	< 1.5	< 3.0	< 1.8	< 1.3	< 2.8	< 2.6	< 2.0	< 2.6	< 8.6
CAWW- 2580	4/27/2012	< 148	< 2.0	< 3.5	< 2.8	< 1.7	< 2.2	< 3.5	< 2.4	< 2.8	< 2.2
CAWW- 4546	7/3/2012	< 168	< 2.4	< 4.1	< 3.4	< 1.8	< 4.3	< 3.9	< 3.0	< 3.0	< 10.2
CAWW- 7254	10/22/2012	< 149	< 1.5	< 3.9	< 2.2	< 2.3	< 1.8	< 2.8	< 1.7	< 1.7	< 6.0
					Location: CA-WWA-U1MW-016						
CAWW- 346	1/3/2012	< 145	< 1.5	< 3.7	< 1.3	< 1.7	< 1.9	< 1.9	< 1.8	< 2.0	< 6.8
CAWW- 2581	4/27/2012	< 148	< 2.3	< 3.6	< 2.7	< 0.8	< 4.1	< 3.2	< 2.0	< 3.0	< 3.4
CAWW- 4547	7/2/2012	< 168	< 3.3	< 5.0	< 3.1	< 2.1	< 4.2	< 4.7	< 2.9	< 3.0	< 9.8
CAWW- 7255	10/19/2012	< 149	< 1.4	< 1.7	< 1.6	< 0.9	< 2.4	< 2.0	< 1.0	< 1.0	< 6.6
					Location: CA-WWA-U1MW-017						
CAWW- 347	1/4/2012	234 ± 98	< 2.2	< 4.7	< 2.0	< 1.7	< 3.1	< 3.1	< 1.5	< 1.8	< 6.2
CAWW- 2582	4/24/2012	< 148	< 1.9	< 4.1	< 2.0	< 1.0	< 3.8	< 3.0	< 2.6	< 3.3	< 5.4
CAWW- 4548	7/3/2012	< 168	< 1.7	< 5.1	< 3.0	< 2.0	< 4.4	< 4.2	< 2.3	< 2.8	< 8.0
CAWW- 7256	10/22/2012	< 149	< 1.4	< 7.3	< 2.4	< 1.9	< 4.0	< 4.3	< 2.0	< 2.6	< 11.5
					Location: CA-WWA-U1MW-18						
CAWW- 348	1/4/2012	423 ± 97	< 3.2	< 6.9	< 2.3	< 2.0	< 3.9	< 4.3	< 3.0	< 2.4	< 6.2
CAWW- 2583	4/24/2012	308 ± 86	< 3.0	< 4.9	< 1.9	< 1.9	< 4.2	< 2.9	< 2.3	< 2.9	< 6.5
CAWW- 4549	7/5/2012	256 ± 100	< 2.4	< 8.4	< 2.0	< 1.5	< 5.4	< 3.5	< 2.7	< 3.3	< 5.0
CAWW- 7257	10/22/2012	206 ± 85	< 2.6	< 6.6	< 2.2	< 2.3	< 4.2	< 4.1	< 2.0	< 2.9	< 7.6

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-19						
CAWW- 349	1/4/2012	278 ± 91	< 2.6	< 7.1	< 4.3	< 2.8	< 4.7	< 2.6	< 2.6	< 3.4	< 8.1
CAWW- 2584	4/24/2012	297 ± 86	< 2.2	< 4.2	< 1.5	< 2.8	< 4.0	< 3.2	< 3.3	< 2.5	< 5.2
CAWW- 4550	7/11/2012	327 ± 103	< 1.9	< 6.6	< 2.7	< 2.9	< 4.8	< 3.3	< 2.3	< 3.0	< 4.9
CAWW- 7258	10/22/2012	215 ± 85	< 1.7	< 6.5	< 2.8	< 2.1	< 3.7	< 4.1	< 2.3	< 2.7	< 6.8
					Location: CA-WWA-U1MW-20						
CAWW- 350	1/5/2012	< 147	< 2.6	< 3.3	< 3.1	< 1.9	< 5.0	< 4.7	< 2.2	< 3.2	< 12.2
CAWW- 2585	4/24/2012	< 148	< 3.4	< 6.8	< 3.5	< 3.8	< 6.7	< 6.1	< 3.3	< 3.5	< 3.7
CAWW- 4551	7/17/2012	< 168	< 2.9	< 4.2	< 3.0	< 2.1	< 4.0	< 4.7	< 2.4	< 3.6	< 6.0
CAWW- 7260	10/22/2012	< 177	< 1.7	< 3.8	< 2.0	< 2.3	< 3.6	< 3.2	< 2.1	< 1.5	< 11.0
					Location: CA-WWA-U1MW-021						
CAWW- 351	1/4/2012	< 147	< 1.7	< 5.0	< 2.6	< 1.9	< 3.2	< 3.5	< 1.8	< 1.9	< 4.0
CAWW- 2586	4/24/2012	< 148	< 3.0	< 5.3	< 2.2	< 2.3	< 6.9	< 2.8	< 2.8	< 3.5	< 3.7
CAWW- 4552	7/11/2012	< 168	< 2.3	< 5.2	< 2.3	< 1.5	< 3.5	< 2.6	< 2.4	< 3.2	< 8.7
CAWW- 7261	10/22/2012	< 177	< 1.5	< 6.8	< 2.0	< 2.8	< 5.2	< 3.3	< 1.5	< 2.6	< 14.1
					Location: CA-WWA-U1MW-022						
CAWW- 352	1/4/2012	< 147	< 2.5	< 4.3	< 1.7	< 1.0	< 2.7	< 2.9	< 1.9	< 2.2	< 3.8
CAWW- 2587	4/24/2012	< 148	< 3.2	< 8.1	< 2.1	< 3.4	< 5.9	< 4.6	< 2.5	< 2.6	< 3.6
CAWW- 4553	7/11/2012	< 168	< 1.7	< 4.6	< 1.9	< 2.6	< 3.8	< 3.8	< 1.9	< 2.0	< 3.9
CAWW- 7262	10/22/2012	< 177	< 1.3	< 3.5	< 0.9	< 1.0	< 2.0	< 2.7	< 0.9	< 1.2	< 9.1
					Location: CA-WWA-U1MW-023						
CAWW- 353	1/5/2012	< 147	< 1.8	< 5.7	< 1.6	< 0.9	< 3.9	< 3.9	< 1.6	< 1.5	< 5.9
CAWW- 2588	4/24/2012	< 148	< 2.7	< 3.1	< 2.7	< 2.5	< 4.0	< 3.9	< 2.6	< 3.0	< 3.9
CAWW- 4554	7/17/2012	< 168	< 3.1	< 4.8	< 2.6	< 3.0	< 2.6	< 5.6	< 3.4	< 3.0	< 6.0
CAWW- 7263	10/22/2012	< 177	< 1.6	< 6.3	< 1.9	< 1.8	< 5.0	< 4.2	< 1.7	< 2.5	< 7.6
					Location: CA-WWA-U1MW-024						
CAWW- 354	1/3/2012	< 147	< 1.7	< 3.8	< 1.8	< 1.2	< 1.7	< 1.7	< 1.9	< 2.2	< 4.4
CAWW- 2589	4/24/2012	< 148	< 2.2	< 4.3	< 2.4	< 1.9	< 4.7	< 3.3	< 2.5	< 3.6	< 2.4
CAWW- 4555	7/17/2012	< 168	< 2.7	< 7.7	< 2.6	< 3.4	< 5.1	< 3.2	< 3.9	< 3.8	< 6.6
CAWW- 7264	10/22/2012	< 177	< 2.2	< 3.8	< 2.5	< 1.9	< 3.1	< 3.0	< 1.5	< 2.5	< 7.3
					Location: CA-WWA-U1MW-025						
CAWW- 355	1/5/2012	< 147	< 1.5	< 4.5	< 3.2	< 2.5	< 4.1	< 3.1	< 2.3	< 2.4	< 8.2
CAWW- 2590	4/24/2012	< 148	< 2.8	< 3.4	< 3.3	< 1.5	< 4.7	< 2.7	< 2.3	< 2.6	< 4.2
CAWW- 4556	7/17/2012	< 168	< 3.7	< 8.4	< 3.4	< 2.7	< 6.1	< 3.3	< 3.3	< 3.8	< 7.0
CAWW- 7265	10/22/2012	< 177	< 1.8	< 2.6	< 1.4	< 1.8	< 3.2	< 2.3	< 1.5	< 1.8	< 6.2

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-26					
CAWW- 356	1/5/2012	< 147	< 2.5	< 6.4	< 2.7	< 1.5	< 2.0	< 4.2	< 2.2	< 2.5	< 5.1
CAWW- 2591	4/24/2012	< 148	< 3.2	< 7.5	< 3.4	< 2.5	< 3.6	< 2.6	< 2.2	< 2.8	< 3.2
CAWW- 4557	7/5/2012	< 168	< 2.7	< 5.4	< 2.0	< 1.9	< 5.8	< 4.2	< 2.6	< 3.0	< 11.3
CAWW- 7266	10/22/2012	< 177	< 1.6	< 4.9	< 1.8	< 1.9	< 2.5	< 2.6	< 1.3	< 1.8	< 7.4
						Location: CA-WWA-U1MW-27					
CAWW- 357	1/5/2012	< 147	< 2.1	< 3.5	< 2.3	< 2.7	< 4.4	< 2.9	< 1.9	< 2.2	< 7.2
CAWW- 2592	4/27/2012	< 148	< 3.5	< 11.0	< 3.4	< 3.9	< 6.8	< 5.4	< 4.1	< 2.9	< 2.9
CAWW- 4558	7/2/2012	< 168	< 2.5	< 7.4	< 2.0	< 2.8	< 3.1	< 5.1	< 2.2	< 2.3	< 13.9
CAWW- 7267	10/19/2012	< 154	< 1.5	< 4.2	< 1.6	< 1.8	< 2.8	< 2.1	< 1.6	< 1.3	< 7.9
						Location: CA-WWA-U1MW-28					
CAWW- 358 [a]	1/10/2012	< 149	< 19.9	< 38.6	< 20.7	< 16.8	< 34.2	< 26.0	< 14.4	< 19.6	< 34.4
CAWW- 2594 [b]	4/24/2012	< 148					-				
						Location: CA-WWA-U1MW-29					
CAWW- 359	1/11/2012	< 147	< 1.9	< 5.4	< 2.5	< 2.1	< 3.5	< 3.4	< 3.2	< 2.3	< 4.7
CAWW- 2595	4/20/2012	< 149	< 3.1	< 5.8	< 1.8	< 3.2	< 6.6	< 3.5	< 2.3	< 3.3	< 3.6
CAWW- 4559	7/19/2012	< 168	< 5.9	< 3.7	< 3.1	< 3.9	< 5.8	< 5.0	< 5.1	< 5.3	< 9.4
CAWW- 7268	10/29/2012	< 154	< 3.2	< 6.0	< 2.2	< 3.6	< 3.4	< 4.0	< 3.0	< 3.9	< 5.2
						Location: CA-WWA-U1MW-30					
CAWW- 360	1/11/2012	< 147	< 1.7	< 4.0	< 1.6	< 1.8	< 4.4	< 4.1	< 1.9	< 3.5	< 3.3
CAWW- 2596	4/20/2012	< 149	< 2.7	< 3.1	< 2.1	< 3.0	< 3.8	< 3.2	< 3.0	< 1.9	< 6.2
CAWW- 4561	7/18/2012	< 149	< 4.5	< 6.2	< 3.2	< 3.3	< 3.7	< 4.9	< 1.9	< 3.6	< 7.0
CAWW- 7269	10/30/2012	< 154	< 2.4	< 6.8	< 4.0	< 3.4	< 4.2	< 4.1	< 2.7	< 3.5	< 6.2
						Location: CA-WWA-U2MW-2S					
CAWW- 361	1/10/2012	< 147	< 2.5	< 5.7	< 3.4	< 1.7	< 3.5	< 3.0	< 2.4	< 3.1	< 2.7
CAWW- 2597	4/24/2012	< 148	< 1.3	< 6.0	< 1.6	< 1.3	< 5.7	< 3.9	< 2.4	< 3.9	< 4.3
CAWW- 4562	7/17/2012	< 149	< 3.3	< 5.3	< 2.4	< 2.0	< 5.6	< 3.9	< 3.4	< 3.1	< 8.4
CAWW- 7270	10/26/2012	< 154	< 3.3	< 6.9	< 3.2	< 2.9	< 4.8	< 3.4	< 2.5	< 1.9	< 10.9
						Location: CA-WWA-U2MW-5S					
CAWW- 362	1/10/2012	< 147	< 2.4	< 4.1	< 1.8	< 2.7	< 4.2	< 3.8	< 2.5	< 2.2	< 8.5
CAWW- 2598	4/20/2012	< 149	< 2.1	< 6.0	< 3.1	< 2.9	< 3.2	< 4.0	< 1.5	< 2.4	< 4.8
CAWW- 4563	7/3/2012	< 165	< 2.6	< 7.0	< 2.3	< 2.0	< 6.0	< 6.5	< 2.5	< 3.3	< 14.9
CAWW- 7271	10/26/2012	< 154	< 1.8	< 5.0	< 1.2	< 1.5	< 4.5	< 3.1	< 1.3	< 1.7	< 9.3
						Location: CA-WWA-U2MW-8					
CAWW- 363	1/11/2012	< 146	< 2.7	< 4.8	< 2.2	< 1.6	< 5.3	< 2.9	< 2.8	< 2.9	< 7.7
CAWW- 2599	4/19/2012	< 149	< 1.9	< 7.5	< 1.8	< 2.4	< 4.2	< 4.5	< 2.5	< 3.2	< 2.9
CAWW- 4564	7/19/2012	< 164	< 2.7	< 7.0	< 1.8	< 3.5	< 4.5	< 2.8	< 2.6	< 2.1	< 2.5
CAWW- 7272	10/29/2012	< 154	< 3.6	< 5.4	< 4.9	< 4.0	< 6.3	< 7.0	< 4.4	< 5.5	< 4.9

[a] Detection limits not reached due to small sample size; 100 ml. counted for 60,000 sec.

[b] 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-U2MW-9						
CAWW- 364	1/11/2012	< 146	< 2.4	< 7.0	< 3.9	< 2.3	< 6.4	< 3.4	< 3.2	< 3.2	< 6.1
CAWW- 2600	4/20/2012	< 149	< 1.9	< 5.4	< 2.5	< 1.9	< 5.2	< 3.9	< 2.4	< 2.7	< 4.0
CAWW- 4565	7/19/2012	< 164	< 6.9	< 6.6	< 4.8	< 4.4	< 9.6	< 5.0	< 6.0	< 5.4	< 9.3
CAWW- 7273	10/29/2012	< 154	< 2.4	< 3.4	< 3.0	< 1.9	< 1.9	< 3.1	< 2.2	< 2.0	< 10.1
					Location: CA-WWA-U2MW-10						
CAWW- 365	1/11/2012	< 146	< 3.5	< 4.8	< 3.1	< 2.7	< 5.7	< 4.8	< 3.9	< 4.6	< 12.3
CAWW- 2601	4/26/2012	< 148	< 3.1	< 4.4	< 3.9	< 3.7	< 5.4	< 4.1	< 3.6	< 3.1	< 3.9
CAWW- 4566	7/18/2012	< 164	< 4.2	< 5.1	< 3.8	< 2.1	< 4.1	< 3.4	< 3.5	< 3.2	< 6.2
CAWW- 7274	10/25/2012	< 154	< 2.3	< 5.7	< 2.7	< 2.1	< 2.8	< 4.6	< 2.4	< 1.9	< 12.3
					Location: CA-WWA-U2MW-12						
CAWW- 367	1/11/2012	< 146	< 2.0	< 3.7	< 1.9	< 1.5	< 2.9	< 1.6	< 1.5	< 1.9	< 6.3
CAWW- 2602	4/24/2012	< 148	< 3.2	< 3.4	< 2.6	< 1.4	< 2.5	< 3.5	< 2.4	< 3.3	< 4.9
CAWW- 4567	7/19/2012	< 164	< 2.2	< 4.7	< 3.1	< 3.4	< 4.8	< 3.7	< 3.7	< 3.8	< 6.0
CAWW- 7275	10/24/2012	< 154	< 1.5	< 4.3	< 1.5	< 1.5	< 1.5	< 2.8	< 0.9	< 1.1	< 8.0
					Location: CA-WWA-U2MW-16						
CAWW- 368	1/4/2012	< 146	< 2.9	< 8.6	< 3.1	< 2.2	< 3.9	< 3.6	< 2.3	< 2.7	< 4.1
CAWW- 2603	4/20/2012	< 149	< 2.6	< 4.6	< 2.5	< 2.5	< 1.9	< 3.3	< 2.5	< 3.2	< 6.0
CAWW- 4568	7/3/2012	< 165	< 2.6	< 5.0	< 2.0	< 1.6	< 2.0	< 3.0	< 2.2	< 3.0	< 9.2
CAWW- 7276	10/25/2012	< 154	< 1.9	< 3.0	< 1.5	< 1.7	< 3.4	< 4.9	< 1.8	< 2.0	< 14.2
					Location: CA-WWA-F-005						
CAWW- 293	1/17/2012	< 145	< 2.6	< 4.4	< 2.3	< 1.5	< 2.7	< 3.9	< 2.4	< 3.1	< 7.3
CAWW- 1754	4/2/2012	< 144	< 4.8	< 10.6	< 3.6	< 3.4	< 9.3	< 6.6	< 5.3	< 5.0	< 4.6
CAWW- 4042	7/6/2012	< 152	< 2.8	< 5.2	< 2.7	< 2.0	< 3.7	< 2.7	< 2.4	< 3.1	< 3.4
CAWW- 6303	10/3/2012	< 177	< 2.7	< 5.9	< 1.6	< 2.1	< 4.1	< 3.2	< 2.3	< 2.6	< 6.1
					Location: CA-WWA-F-015						
CAWW- 294	1/17/2012	< 145	< 5.5	< 11.9	< 2.6	< 3.7	< 8.7	< 7.1	< 4.5	< 2.5	< 11.4
CAWW- 1755	4/2/2012	< 144	< 5.9	< 6.2	< 5.4	< 5.8	< 4.3	< 4.7	< 5.6	< 4.7	< 4.4
CAWW- 4043	7/6/2012	< 152	< 2.2	< 5.2	< 2.5	< 1.5	< 2.4	< 3.1	< 2.6	< 3.2	< 5.6
CAWW- 6304	10/3/2012	< 177	< 2.2	< 7.0	< 1.3	< 2.0	< 3.9	< 4.2	< 1.9	< 3.0	< 7.9

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

Collection: Semiannually
Units: pCi/kg dry

Location		CA-AQS-A	
Lab Code	Req. LLD	CABS- 2634	CABS- 6636
Date Collected	-	05-03-12	10-15-12
K-40	-	12684 ± 802	13743 ± 720
Mn-54	-	< 23.3	< 26.4
Fe-59	-	< 53.3	< 62.4
Co-58	-	< 30.0	< 23.8
Co-60	-	< 14.2	< 19.6
Zr-Nb-95	-	< 53.1	< 71.3
Cs-134	150	< 23.8	< 18.1
Cs-137	180	114.1 ± 38.9	42.3 ± 25.0
Ba-La-140	-	< 56.0	< 358.5

Location		CA-AQS-C	
Lab Code	Req. LLD	CABS- 2635	CABS- 6638
Date Collected	-	05-03-12	10-15-12
K-40	-	13197 ± 739	12617 ± 700
Mn-54	-	< 24.4	< 25.7
Fe-59	-	< 53.9	< 52.1
Co-58	-	< 27.7	< 31.9
Co-60	-	< 12.2	< 17.6
Zr-Nb-95	-	< 44.7	< 60.8
Cs-134	150	< 17.9	< 20.1
Cs-137	180	46.2 ± 23.9	< 26.0
Ba-La-140	-	< 56.7	< 121.6

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

Collection: Semiannually

Units: pCi/kg dry

Location		CA-AQS-A	
Lab Code	Req. LLD	CASS- 2632	CASS- 6635
Date Collected	-	05-03-12	10-15-12
K-40	-	13868 ± 691	13837 ± 713
Mn-54	-	< 25.5	< 28.1
Fe-59	-	< 56.4	< 54.4
Co-58	-	< 22.5	< 36.6
Co-60	-	< 16.6	< 20.6
Zr-Nb-95	-	< 23.2	< 65.6
Cs-134	150	< 14.2	< 19.0
Cs-137	180	42.9 ± 18.7	43.5 ± 22.3
Ba-La-140	-	< 66.0	< 144.1

Location		CA-AQS-C	
Lab Code	Req. LLD	CASS- 2633	CASS- 6637
Date Collected	-	05-03-12	10-15-12
K-40	-	13930 ± 688	12569 ± 827
Mn-54	-	< 18.1	< 27.9
Fe-59	-	< 36.6	< 111.6
Co-58	-	< 24.2	< 33.1
Co-60	-	< 13.7	< 26.7
Zr-Nb-95	-	< 33.7	< 73.3
Cs-134	150	< 14.2	< 24.4
Cs-137	180	< 18.2	< 26.9
Ba-La-140	-	< 55.1	< 161.4

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

Location		CA-AQF-A				
Lab Code	Req. LLD	CAF- 2622	CAF- 2623	CAF- 2624	CAF- 2625	CAF- 2626
Date Collected		05-03-12	05-03-12	05-03-12	05-03-12	05-03-12
Sample Type		Bigmouth Buffalo	Common Carp	Blue Catfish	River Carpsucker	Silver Carp
K-40	-	3014 ± 457	2958 ± 436	3095 ± 439	2746 ± 425	3270 ± 388
Mn-54	130	< 10.5	< 20.3	< 12.7	< 17.4	< 10.4
Fe-59	260	< 33.4	< 83.3	< 50.5	< 46.1	< 55.1
Co-58	130	< 7.6	< 23.9	< 30.7	< 13.4	< 13.0
Co-60	130	< 11.9	< 12.0	< 10.0	< 10.7	< 11.3
Zn-65	260	< 10.0	< 37.8	< 19.6	< 13.0	< 17.6
Cs-134	130	< 12.3	< 14.8	< 19.7	< 9.0	< 14.8
Cs-137	150	< 12.8	< 22.2	< 24.4	< 9.2	< 14.5

Lab Code	Req. LLD	CAF- 6624	CAF- 6625	CAF- 6626	CAF- 6627	CAF- 6629
Date Collected		10-15-12	10-15-12	10-15-12	10-15-12	10-15-12
Sample Type		Silver Carp	Freshwater Drum	River Carpsucker	Channel Catfish	Common Carp
K-40	-	3219 ± 343	2694 ± 402	2508 ± 375	3046 ± 390	2421 ± 348
Mn-54	130	< 11.5	< 10.1	< 9.2	< 11.2	< 11.4
Fe-59	260	< 26.3	< 28.9	< 11.2	< 18.7	< 26.1
Co-58	130	< 11.5	< 18.3	< 10.4	< 10.5	< 10.2
Co-60	130	< 15.1	< 19.5	< 17.7	< 15.2	< 16.7
Zn-65	260	< 28.6	< 19.5	< 15.4	< 7.9	< 14.7
Cs-134	130	< 8.0	< 8.6	< 12.1	< 11.5	< 11.6
Cs-137	150	< 14.6	< 12.8	< 11.3	< 12.2	< 11.5

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

Location		CA-AQF-C				
Lab Code	Req. LLD	CAF- 2627	CAF- 2628	CAF- 2629	CAF- 2630	CAF- 2631
Date Collected		05-03-12	05-03-12	05-03-12	05-03-12	05-03-12
Sample Type		Bigmouth Buffalo	Common Carp	Blue Catfish	River Carpsucker	Silver Carp
K-40	-	2685 ± 410	3179 ± 400	3139 ± 434	2806 ± 398	2889 ± 389
Mn-54	130	< 11.2	< 10.0	< 17.3	< 12.3	< 10.5
Fe-59	260	< 40.2	< 29.5	< 61.3	< 51.7	< 61.0
Co-58	130	< 6.4	< 14.3	< 15.5	< 13.1	< 24.3
Co-60	130	< 7.4	< 5.0	< 11.0	< 9.6	< 11.7
Zn-65	260	< 9.8	< 16.7	< 30.0	< 28.5	< 26.8
Cs-134	130	< 11.2	< 12.2	< 8.8	< 8.5	< 15.6
Cs-137	150	< 13.7	< 8.4	< 17.4	< 11.5	< 17.3

Lab Code	Req. LLD	CAF- 6630	CAF- 6631	CAF- 6632	CAF- 6633	CAF- 6634
Date Collected		10-15-12	10-15-12	10-15-12	10-15-12	10-15-12
Sample Type		Silver Carp	Freshwater Drum	River Carpsucker	Channel Catfish	Common Carp
K-40	-	3361 ± 455	2631 ± 431	2556 ± 372	2843 ± 395	2994 ± 373
Mn-54	130	< 19.9	< 18.5	< 18.1	< 11.2	< 7.2
Fe-59	260	< 32.2	< 50.5	< 26.3	< 13.5	< 9.8
Co-58	130	< 11.2	< 12.9	< 8.2	< 14.9	< 12.4
Co-60	130	< 16.0	< 14.9	< 15.0	< 15.9	< 17.9
Zn-65	260	< 23.9	< 49.1	< 15.3	< 22.1	< 21.9
Cs-134	130	< 11.2	< 13.3	< 17.4	< 8.8	< 5.9
Cs-137	150	< 15.3	< 19.9	< 17.1	< 12.2	< 14.9

Table 12. Direct Radiation (quarterly exposure)

Location	Gamma Dose (mrem/90 days)			
	QTR 1	QTR 2	QTR 3	QTR 4
CA-IDM-1A	16.21	16.17	16.82	17.42
CA-IDM-3	17.56	16.84	18.25	17.79
CA-IDM-5	14.36	14.18	14.62	15.02
CA-IDM-6	16.59	16.32	18.46	17.10
CA-IDM-7	17.13	15.55	16.65	16.66
CA-IDM-9	14.49	14.70	15.11	15.53
CA-IDM-10	17.66	16.67	16.45	18.18
CA-IDM-11A	17.27	17.30	17.12	17.37
CA-IDM-14	15.61	15.60	15.40	16.79
CA-IDM-17	16.13	15.84	15.72	17.02
CA-IDM-18A	16.44	16.19	16.20	17.08
CA-IDM-20	16.28	16.01	16.30	17.56
CA-IDM-21	16.32	15.58	ND [a]	15.59
CA-IDM-22A	13.01	12.72	12.96	14.12
CA-IDM-23	16.90	16.92	16.58	17.37
CA-IDM-26 (C)	11.49	11.69	11.00	11.97
CA-IDM-27 (C)	17.12	17.33	17.90	18.58
CA-IDM-30A	15.08	15.12	15.83	15.44
CA-IDM-31A	17.20	17.24	16.35	17.39
CA-IDM-32	16.33	16.40	17.18	16.99
CA-IDM-32A	14.97	15.09	16.03	16.00
CA-IDM-33	15.95	16.25	16.28	16.19
CA-IDM-34	14.68	14.11	15.67	16.09
CA-IDM-35	14.94	14.74	14.41	14.85
CA-IDM-36	15.74	15.20	ND [a]	15.92
CA-IDM-37	15.58	16.19	15.63	16.19
CA-IDM-38	11.21	10.64	11.39	11.45
CA-IDM-39	16.16	15.66	15.41	15.78
CA-IDM-39A	16.47	16.29	16.43	16.57
CA-IDM-40	17.14	ND [a]	17.59	17.76
CA-IDM-41	15.14	15.48	15.65	16.71
CA-IDM-42	13.35	13.79	13.65	14.17
CA-IDM-43	15.76	15.89	16.27	16.88
CA-IDM-44	15.49	16.51	17.12	16.50
CA-IDM-45	15.09	13.72	15.35	14.12
CA-IDM-46	16.83	15.73	16.54	16.52
CA-IDM-47	14.85	15.09	15.79	16.24
CA-IDM-48	17.16	16.58	16.73	17.44
CA-IDM-49	15.29	15.67	ND [a]	16.43
CA-IDM-50	16.76	15.76	16.42	16.82
CA-IDM-51A	17.61	15.94	17.43	17.51
CA-IDM-52	17.52	16.26	17.64	17.82
CA-IDM-60	16.24	16.02	17.16	16.69

[a] TLD and holder missing from assigned location.

Appendix A

Supplemental Analyses

A-1. Supplemental Analyses

Surface/ Ground water, analyses for tritium and strontium-90.

Lab Code	Collection Date	Location	Concentration (pCi/L) ^{3}H	^{90}Sr
CASW- 7419	10/25/11	CA-SWA-S-002	NA [a]	< 0.6
CAWW- 7706	10/25/11	UNIT 2, MW-2S	NA [a]	< 0.5
CASW- 7715	10/26/11	UNIT 2 POND	NA [a]	< 0.5
CASW- 8346	11/28/11	CA-SWA-S-002	NA [a]	< 0.4
CAWW- 361	01/10/12	UNIT2, MW-2S	< 147	< 0.4
CASW- 370	01/11/12	UNIT2 POND	< 146	< 0.5
CASW- 1124	02/29/12	CA-POND1	< 143	< 0.5
CASW- 1126	02/29/12	CA-POND2	< 143	< 0.5
CASW- 1129	02/29/12	CA-OUTFALL 012	< 143	< 0.6
CASW- 1130	02/29/12	CA-OUTFALL 013	< 143	< 0.5
CASW- 1127	03/02/12	CA-OUTFALL 010	< 143	< 0.6
CASW- 1128	03/02/12	CA-OUTFALL 011	< 143	< 0.5
CASW- 1131	03/02/12	CA-OUTFALL 014	< 143	< 0.4
CASW- 1132	03/02/12	CA-OUTFALL 015	< 143	< 0.4
CAWW- 4563	07/03/12	UNIT2, MW-5S	< 165	< 0.4
CAWW- 4562	07/17/12	UNIT2, MW-2S	< 149	< 0.5
CAWW- 4567	07/19/12	UNIT2, MW-12	< 164	< 0.4
CASW- 4811	07/27/12	CA-SWA-S-001	< 152	< 0.5
CASW- 4813	07/27/12	CA-SWA-S-002	< 152	< 0.5
CASW- 5853	09/14/12	RIZZO PG-1	< 154	< 0.5

Surface, ground water, analyses for gamma emitting isotopes.

Lab Code	Collection Date	Location	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	^{95}Zr-Nb	^{134}Cs	^{137}Cs	^{140}Ba-La
CASW- 5853	09/14/12	RIZZO PG-1	< 2.0	< 5.8	< 3.0	< 1.6	< 3.5	< 4.4	< 2.1	< 3.7	< 12.4

Site Evaluations, analyses for tritium.

Lab Code	Collection Date	Location	Concentration ^{3}H (pCi/L)
CAS- 3675	06/12/12	Concrete / RW Yard	267 ± 90
CASO- 3709	06/13/12	Soil / RW Yard	< 150
CASO- 6351	10/08/12	Soil / VKC 1055	< 147

Site Evaluations, analyses for gamma emitting isotopes.

Lab Code	Collection Date	Location	^{40}K	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	^{95}Zr-Nb	^{134}Cs	^{137}Cs	^{140}Ba-La
CAS- 3675	06/12/12	Concrete / RW Yard	5559 ± 189	< 4.9	< 12.7	< 2.9	< 2.6	< 11.5	< 7.2	< 4.7	< 5.0	< 6.1
CASO- 3709	06/13/12	Soil / RW Yard	2593 ± 296	< 15.8	< 24.3	< 12.1	< 4.3	< 20.3	< 12.4	< 8.9	< 10.0	< 15.4
CASO- 6351	10/08/12	Soil / VKC 1055	5053 ± 290	< 9.0	< 18.7	< 8.0	< 10.9	< 23.6	< 13.9	< 6.8	< 10.3	< 14.3

[a] NA, Not analyzed, analysis not requested.