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CALLAWAY ENERGY CENTER
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ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

to

THE UNITED STATES NUCLEAR REGULATORY COMMISSION

Part I

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Prepared by

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Submitted by

UNION ELECTRIC CO.
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PREFACE

This Annual Radiological Environmental Operating Report (AREOR) describes the Ameren Missouri Callaway Energy Center Radiological Environmental Monitoring Program (REMP), and the program results for the calendar year 2020. It is submitted in accordance with section 5.6.2 of the Callaway Energy Center Technical Specifications.

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

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

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1.0 INTRODUCTION

This report presents an analysis of the results of the Radiological Environmental Monitoring Program (REMP) conducted during 2020 for the Union Electric Company (dba Ameren Missouri) Callaway Energy Center.

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

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

Tabulation of the individual analyses for the year 2020 is included in Part II of this report.

2.0 SUMMARY

The Radiological Environmental Monitoring Program, as required by the U.S. Nuclear Regulatory Commission (NRC) Technical Specifications for the Callaway Energy Center is described herein. Results for the year 2020 are summarized and discussed.

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

3.0 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

3.1 Program Design and Data Interpretation

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

Sources of environmental radiation can include the following:

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

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

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

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

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

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

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

3.2 Program Description

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

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

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

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

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

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

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

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

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

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

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

3.2 Program Description (continued)

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

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

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

Soil is collected annually from six indicator locations (F2, PR3, F6, PR7, W2, and W5) and two control locations (M9, W1) to monitor the terrestrial environment. The samples are analyzed for gamma-emitting isotopes.

3.3 Program Execution

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

(1) Surface Water:

The upstream river sampler at location S01, 550 feet upstream of the discharge, was out of service for approximately 165 days (45%) during 2020. The majority of that time, 159 days, was a continuation of an out of service condition that began 7/18/2019 due to a clogged sample line resulting from a severe river flooding event. Attempts to desilt the well casing with a water lance and a firehose were unsuccessful. Diving operations to unclog the sample line were deemed unsafe due to the river being projected to be above flood stage for some period of time. Eventually a different means of unclogging the sample line and returning the sampler to service was devised and implemented (CR#201904768). There were additional timeline complications due to the unforeseen staffing circumstances as a result of COVID-19 precautions. The downstream river sampler at location S02, located at the end of the mixing zone in Portland, MO was out of service for approximately 44 days (12%) during 2020. The majority of that time, 29 days, was due to equipment damage from river flooding requiring the replacement of the pump skid (CR#202000732). Daily grab samples were collected during those out of service time periods per Callaway's procedures.

(2) Airborne Particulates and Iodine:

The air sampler station CA-A-008 failed to collect a full week's sample for the period ending 1/30/20. (CR#202000546).

A power loss 5/14/20 at air stations A-8 and A-9 resulted in a loss of collection time for both samplers of 2 hours and 20 minutes. The missing sample time would not have impacted the sample negatively. These samples are not considered missing (CR#202002472).

The air sample station CA-A-001 was found to be missing 2.5 hours of runtime for the period ending 9/10/20. The lost collection time would not have impacted the sample negatively. This sample is not considered missed (CR#202004554).

3.3 Program Execution (continued)

The air sampler at location CA-A-008 was found not running for the period ending 11/12/20 (CR#202006510).

(3) Milk:

Milk sampling was not conducted in 2020 due to a lack of sample providers. Vegetation sampling is sufficient to comply with the requirements of the ODCM.

(4) Leafy Green Vegetables:

No vegetable samples were available 4/14/20 at locations CA-FPL-V9, CA-FPL-V12, CA-FPL-V16 and CA-FPL-V19 (CR#202001918).

No vegetable samples were available 5/12/20 at locations CA-FPL-V9 and CA-FPL-V19 (CR#202002407).

No vegetable samples were available for location CA-VPL-V19 for the 8/18/20 collection event (CR#202004063).

(5) Inedible Crops:

Inedible crops were not available at indicator location CA-FC-1 during 2020 as the field was not planted (CR#202005443).

(6) Drinking Water:

A drinking water sample was unobtainable for the 10/28/20 collection event, at location CA-DWA-008, due to a change in property ownership where the new owner has not enrolled in the sample provider program (CR#202005930 / CR#202007038).

(7) Ground Water:

A well sample was not collected at the location designated “inside Old Blowdown Line” for the 7/17/20 collection event due to a dry well condition.

A well sample was not obtainable at location CA-U1MW-047 for the 10/07/20 collection event (CR202006018).

A well sample was not collected at the locations designated “inside Old Blowdown Line” for the 10/20/20 collection event due to a dry well condition (CR#202006014).

Since the fourth quarter of 2015 through the fourth quarter of 2020 an ODCM required well sample was not taken at location U1MW-017. The omission was discovered during a well sampling program reevaluation (CR#202100825).

(8) Soil/Sediment:

It was discovered during a continuing training cycle that the requirement for sampling each wetlands pond, as required in the 'Shoreline sediments from sludge ponds' section of FSAR-SP Table 16.11-7, was not being met. Prior to 2001, only one pond was designated as a wetlands pond and that pond's shoreline sediment has been sampled routinely. After 2001, the next sludge pond in the series (pond #2) was changed to a wetlands pond. This change was not communicated to Radiation Protection, therefore wetlands pond #2 has not been sampled. Sampling of wetlands pond #2 has been added to the program for 2021.

(8) Soil/Sediment: (continued)

The wetlands and sludge ponds are not accessed by the general public. (CR#202102041).

(9) Direct Radiation:

The third quarter TLD at location CA-IDM-49 was found missing on the day of collection 10/03/20 (CR#202005099).

3.4 Laboratory Procedures

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, 2018). 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 Environmental Dosimetry Company, affiliated with Stanford Dosimetry, LLC.

3.5 Program Modifications

The following changes were made to the REMP sampling locations per Licensing Document Change Notice (LDCN) 20-0008 to eliminate Surface Water samples, selected Groundwater samples and non-food crop samples from FSAR-SP Table 16.11-7. (CR# 202100660-006):

Item 3.b. “Waterborne – Surface (onsite ponds)” was eliminated in its entirety.

Item 3.c. “Waterborne – Groundwater (non-drinking water)” was revised to change the number of shallow wells or groundwater sumps to be sampled in locations suitable to monitor for subsurface leakage from power block structures and components from seven to six. Clarification was also provided by striking the clause “from the alluvial plain” from the description of the five shallow wells.

In addition the following categories were eliminated:

Samples from three shallow wells in locations suitable to monitor for migrations of contaminated groundwater from the powerblock to areas outside the owner controlled area.

Samples from one shallow well located immediately downgradient from the sludge ponds.

3.5 Program Modifications (Continued)

Samples from one deep well near the property boundary located to monitor for migration of contaminated groundwater from the discharge pipeline to the nearest potable water well.

Item 6. “Farm Crops” and its associated footnote (13) were eliminated in their entirety.

The above referenced CR action, (CR#202100660-006), includes a copy of the signed justification for these changes to FSAR-SP Table 16.11-7.

Other changes to the REMP sampling for 2020 include the following:

Location CA-DWA-006 changed ownership from Lindeman to Kuenzel.

Location CA-FPL-V19, R. & A. Dillon Farm, was added to replace location CA-FPL-V11, Hickman Farm.

Location CA-DWA-025, M. Kriete, was added as a drinking water location in 2021.

Location CA-DWA-010 changed ownership from S. Dillon to T. Dillon (CR#202100085).

3.6 Detection and Reporting Limits

Table 5.3 states 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 2020, the field inspection of the sectors was conducted September 2, 2020 within a five mile canvassing radius of the Callaway Energy Center. The area around the plant was divided into 16 meteorological sectors. The locations of the nearest resident, nearest milk animal, and nearest garden of greater than 500 square feet producing broadleaf vegetation were identified.

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. The bearings listed in Table 5.4 were measured from the Callaway Plant to the sample location.

There are no changes to the closest residents or closest broadleaf gardens from 2019. No milking animals were located during the survey.

All residents included in the summary were verified by the Callaway County Assessor’s GIS aerial photography.

The Missouri Department of Natural Resources has not identified any new water wells along the Mud Creek or Logan Creek corridors.

3.7 Land Use Census (continued)

The US Army Corps of Engineers was contacted, and they confirmed that no new drinking water intakes have been located along the Missouri River within ten (10) river miles downstream from the Callaway Plant. In addition, no irrigation uses of the Missouri River were identified between the discharge point and Portland, MO during the survey.

3.8 Errata from previous Annual Radiological Environmental Operating Reports

Missing and/or incorrectly labeled sample locations were identified on the maps showing the Radiological Environmental Monitoring Program (REMP) and Groundwater Protection Initiative (GPI) sample locations for some previous reports. These maps are revised each year to reflect sample location changes. Condition documented in (CR#202101046).

The following errors were identified:

1. Non-potable well: U1MW-016 missing from maps. Affects 2016-2019 reports.
2. Non-potable well: U1MW-019 missing from maps. Affects 2016-2019 reports.
3. Non-potable well: F19 is shown on maps; however, there is no F19. Affects 2016-2019 reports.
4. Direct radiation: 60N missing from maps: Affects 2015-2019.
5. Soil: M9 missing from maps. Affects 2018-2019.
6. Drinking water well: Well 23 missing from 2017 map. Affects 2017 report only.
7. Drinking water well: Well 24 mistakenly shown as well 11. Affects 2017-2019 reports.
8. Drinking water well: PW1 missing from maps. Affects 2017-2019 reports.

The following information was missing from the 2019 report Part I, section "3.3 Program Execution":

Missing information documented in (CR#202101763):

1. Surface Water:
   Due to extensive flooding and unsafe river levels in 2019, the Portland and Intake river samplers have been out-of-service for the duration provided below. Flooding resulted in excess silting of sampling lines and the inability to access the Portland sampler vault to perform repairs. In addition, the river levels have been too high to allow a diver access to the sampling line in the intake structure safely. During those out of service times, daily grab samples are collected per Callaway's procedures.

   - Sampler S01, the upstream sampler located in the plant water intake structure about 550 feet upstream of the discharge, was out of service for approximately 175 days (48%) during 2019.

   - Sampler S02, the downstream sampler located at the end of the mixing zone in Portland, MO, was out of service for approximately 284 days (78%) during 2019.

The following location information was incorrect in the 2017 and 2019 reports, Part I, table 5.1, issue documented in (CR#202102051):

1. Location V-16, which is listed as both a "Leafy Green Vegetable" sampling location "CA-FPL-V16" and as a "Well water – potable" sampling location "CA-DWA-V16", had its direction from the midpoint of the two reactors misstated by 180 degrees from the actual direction for both sampling types in the table listing.

4.0 RESULTS AND DISCUSSION

All collections and analyses were made as scheduled, except for those listed 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 2020 is contained in Part II of the Annual Report on the Radiological Environmental Monitoring Program for the Callaway Energy Center.

4.1 Atmospheric Nuclear Detonations and Nuclear Accidents

The Fukushima Daiichi nuclear accident occurred March 11, 2011. There were no reported accidents involving significant release to the environment at nuclear reactor facilities in 2020. The last reported atmospheric test was conducted on October 16, 1980 by the People's Republic of China. There were no reported atmospheric nuclear tests in 2020.

4.2 Program Findings

Airborne Particulates and Iodine

No gamma-emitting isotopes were identified other than naturally occurring Be-7.
No I-131 activity was detected in any of the charcoal canister samples.

Air sampling for 2020 indicates no radiological effects of plant operation.

Direct Radiation (TLDs)

Forty-four gamma sensitive TLDs were placed in 16 sectors around the Callaway site. Measurements from forty-one indicator locations averaged 15.0 mrem/quarter and the three control locations averaged 14.3 mrem/quarter. Readings ranged from 10.2 to 17.2 mrem /quarter, with the highest quarterly average from the control location CA-IDM-27, averaging 16.7 mrem/quarter. The TLD readings were consistent with the results for the years 2000 through 2019 as detailed in table 5.7.

Five neutron sensitive TLDs were placed in locations at the Site Boundary closest to the Independent Spent Fuel Storage Facility Installation (ISFSI) and at a control location approximately 14 miles from the site. There was no significant measureable neutron dose and there was no effect from the ISFSI in 2020.

Milk

Sampling was discontinued in 2018 since there are not enough sampling locations to fulfill the milk sampling requirement. No milking animals were located during the 2020 Land Use Census. Leafy green (broadleaf) vegetation sampling was performed in lieu of milk sampling.

Broadleaf Vegetation

No I-131 activity was detected in broadleaf vegetation samples. No gamma-emitting isotopes were detected in broadleaf vegetation samples except for naturally occurring beryllium-7 and potassium-40. Vegetation data for 2020 show no radiological effects of plant operation.

4.2 Program Findings (continued)

Non-Food Crops

Seven soybean samples were collected in 2020. No tritium or gamma-emitting isotopes were detected in any of the samples except for naturally occurring beryllium-7 and potassium-40. Non-food crop data for 2020 show no radiological effects of plant operation.

Fish

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

Soil

Cesium-137 activity was detected at all six of the indicator sample locations at an average concentration of 228 pCi/kg dry. One of the two control samples was positive for Cesium-137 with an activity of 126 pCi/kg dry. The cesium-137 activity is consistent with levels observed from 1999 through 2019; these levels are attributable to the deposition of fallout from previous decades.

Surface Water

Low level tritium was detected in six of the twelve samples collected at the downstream location S02 at an average concentration of 282 pCi/L. No tritium was detected in the remaining six samples from S02 nor at the upstream location S01. No gamma-emitting isotopes were detected in any of the samples taken in 2020.

Surface Water, Ponds

Eighteen pond samples were analyzed for 2020. No tritium activity or gamma activity was detected.

Drinking Water Wells (potable water)

Sixty samples from sixteen different locations were analyzed for tritium and gamma-emitting isotopes in 2020. No tritium or gamma-emitting isotopes were detected.

Wells and Ponds (non-potable water)

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

Wells MW-31, MW-34, MW-36, MW-39, MW-47, MW-58, and MW-59 were installed during the 2014 limited site investigation (LSI) (the 2014 LSI is described in detail in the Callaway Energy Center 2014 Annual Radioactive Effluents Release Report). These wells continue to monitor the natural attenuation of tritium which decreased significantly during 2015 and continued to decrease since 2016. Tritium activity was detected in 16 of 28 samples from these wells. The highest concentration was measured in MW-31 which peaked at 420 pCi/L in July. The average concentration among positive results for these wells was 261 pCi/L. this decline has been steady since December of 2016. The contamination is being remediated by monitored natural attenuation. There are no active leaks.

Wells GWS, 936, 937B, 937D, 939R, 940, 941 and IFSFI Sump are located in the Plant Protected Area, adjacent to the power block. Tritium activity in these wells is believed to be the result of washout from gaseous effluents. The low level tritium activity observed in well MW-014 is likely due to residual low level contamination from moisture carryover during normal operation of air

4.2 Program Findings (continued)

Wells and Ponds (non-potable water) (continued)

release valves (ARVs) in manholes 5 and 6B on the now-retired discharge pipeline. The pipeline was replaced in 2008 and there has been no new contamination of this area since then. The existing contamination is being remediated by monitored natural attenuation. There are no active leaks and the results are consistent with 2015 through 2019.

It is believed that the higher level tritium activity observed in the analysis results of the sample and backup sample taken at the groundwater sump (GWS) location for 11/12/2020 was due to precipitation washout that accumulated in the category 1 structural backfill. The groundwater sump was tagged out from 9/18/2020 through 10/04/2020 for some pipe rerouting. This would have allowed any tritium washout from precipitation in the groundwater time to stagnate and then subsequently to be pumped into the sump when it was returned to service, likely causing the elevated readings. (Condition documented in CR#202007110).

Sediments

Four samples of each of both shoreline and bottom sediments were collected in May and October 2020 at both an indicator and a control location and analyzed for gamma-emitting isotopes. Cesium-137 was detected in the May bottom sediment sample collected at the indicator location at a concentration of 43 pCi/kg dry. Cesium-137 was also detected in both the May and October shoreline sediment samples collected at the control location, at an average concentration of 26 pCi/kg dry weight. These results are consistent with results from previous years. There were no other gamma-emitting isotopes detected excepting naturally occurring potassium-40 in any of the sediment samples.

5.0 TABLES

Table 5.1. Sampling Locations. (TLD's)

Location Code	Distance / Direction [1]	Description	Sample Types [2]
1a	10.8 mi. 310° NW	City of Fulton on Hwy Z, 0.65 mi. E of Bus. 54, W of Campus Apartments	IDM
3	1.2 mi. 308° NW	0.1 mi. West of Hwy CC on Gravel Rd., 0.8 mi. South Hwy O	IDM
5	1.3 mi. 79° ENE	Meteorological Tower	IDM
6	2.0 mi. 274° W	Cty Rd. 428, 1.2 mi. West of Hwy CC	IDM
7	1.4 mi. 184° S	Cty Rd. 459, 2.6 mi. North of Hwy 94	IDM
9	3.8 mi. 183° S	NW Side of the Cty Rd. 459 and Hwy 94 Junction	IDM
10	3.9 mi. 159° SSE	Hwy 94, 1.8 mi. East of Cty Rd. 459	IDM
11a	4.7 mi. 139° SE	City of Portland	IDM
14	4.9 mi. 122° ESE	SE Side of Intersection Hwy D and Hwy 94	IDM
17	3.8 mi. 88° E	Cty Rd. 4053, 0.3 mi. E of Hwy 94	IDM
18a	3.7 mi. 67° ENE	East side of Hwy D, 0.5 mi. South of Hwy O	IDM
20	4.7 mi. 46° NE	City of Readsville	IDM
21	3.8 mi. 23° NNE	Cty Rd. 155, 1.9 mi. North of Hwy O	IDM
22a	0.9 mi. 10° NNE	Cty Rd 448, 0.9 mi south of HWY O, co-located with air station A8	IDM
23	6.6 mi. 15° NNE	City of Yucatan	IDM
26 [3]	11.7 mi. 82° E	Town of Americus	IDM
27 [3]	9.3 mi. 114° ESE	Town of Bluffton	IDM
30a	4.4 mi. 206° SSW	City of Steedman, N side of Belgian Dr., 150 ft. East of Hwy CC	IDM
31a	7.8 mi. 224° SW	City of Mokane, Jct. Hwy C and Cty Rd. 400, 0.9 mi. N. of Hwy 94	IDM
32	5.4 mi. 250° WSW	Hwy VV, 0.6 mi. west of Cty Rd. 447	IDM
32a	5.0 mi. 243° WSW	Cty Rd. 447	IDM
33	7.4 mi. 272° W	City of Hams Prairie, SE of Hwy C and Hwy AD Junction	IDM
34	9.5 mi. 292° WNW	NE Side of Hwy C and Cty Rd. 408 Junction	IDM
35	5.8 mi. 340° NNW	City of Toledo	IDM
36	4.9 mi. 7° N	Cty Rd. 155, 0.8 mi. South of Cty Rd. 132	IDM
37	0.5 mi. 195° SSW	Cty Rd. 459, 0.9 mi. South of Hwy CC	IDM
38	4.6 mi. 334° NNW	Cty Rd. 133, 1.5 mi. South of Hwy UU	IDM
39	5.4 mi. 312° NW	Cty Rd. 111	IDM
39a	5.0 mi. 308° NW	Cty Rd. 111	IDM
40	4.2 mi. 292° WNW	NE Side of Cty Rd. 112 and Hwy O Junction	IDM
41	5.2 mi. 277° W	Hwy AD, 2.5 mi. East of Hwy C	IDM
42	4.4 mi. 231° SW	Cty Rd. 447, 2.6 mi. North of Cty Rd. 463	IDM
43	0.5 mi. 223° SW	Cty Rd. 459, 0.7 mi. South of Hwy CC	IDM
44	1.7 mi. 254° WSW	Hwy CC, 1.0 mi. South of Cty Rd. 459	IDM
45	1.0 mi. 285° WNW	Cty Rd. 428, 0.1 mi. West of Hwy CC	IDM
46	1.5 mi. 328° NNW	NE Side of Hwy CC and Cty Rd. 466 Intersection	IDM
47	1.0 mi. 10° N	Cty Rd. 448, 0.9 mi. South of Hwy O	IDM
48	0.4 mi. NE	Cty Rd. 448, 1.5 mi. South of Hwy O, Plant Security Sign Post	IDM
49	1.6 mi. 94° E	Cty Rd. 448, Reform Wildlife Mgmt. Parking Area, Dept. of Consrv. Sign.	IDM
50	0.9 mi. 168° SSE	Cty Rd. 459, 3.3 mi. North of Hwy 94	IDM
51a	0.3 mi. 150° SE	Owner Control Fence, SE of the Water Treatment Plant	IDM
52	0.4 mi. 111° ESE	Light Pole Near the East Plant Security Fence	IDM
60 [3]	13.5 mi. 224° SW	Just past Tebbetts City sign	IDM

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

Location Code	Distance / Direction [1]	Description	Sample Types [2]
60N [3]	13.5 mi 224 ° SW	Co-located with location 60	IDM
61	1.9 mi 334 ° NNW	Community of Reform, Corner of CC and O	IDM
61N	1.9 mi 334 ° NNW	Co-located with location 61	IDM
62N	1.2 mi. 308 ° NW	Co-located with location 3	IDM
63N	0.9 mi. 10 ° NNE	Co-located with air station A8 and location 22a	IDM
64N	1.0 mi. 285 ° WNW	Co-located with location 45	IDM

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

A1	1.3 mi. 79 ° ENE	Meteorological Tower	APT, AIO
A7	9.5 mi. 312 ° NW	C. Bartley Farm, Fulton, MO	APT, AIO
A8	0.9 mi. 10 ° NNE	County Road 448, 0.9 miles South of Hwy O	APT, AIO
A9	1.9 mi. 334 ° NNW	Community of Reform	APT, AIO
A10	0.89 mi 276 ° W	EOF Parking lot	APT, AIO
A11	0.71 mi 166 ° SSE	Sludge lagoons lift pumps area	APT, AIO
3	2.9 mi. 168 ° SSE	Potable water, County Road 448 Ward Residence	DWA
4	2.6 mi. 158 ° SSE	Potable water, County Road 448 Miller Residence	DWA
5	2.5 mi. 153 ° SSE	Potable water, County Road 448 Brucker Brothers Farm	DWA
6 [4]	2.2 mi. 141 ° SE	Potable water, County Road 448 Kuenzel Residence	DWA
7	2.1 mi. 108 ° ESE	Potable water, County Road 448 S. Kriete Residence	DWA
8	3.4 mi. 193 ° SSW	Potable water, County Road 457 Brandt Residence	DWA
9	2.9 mi. 204 ° SSW	Potable water, County Road 457 Clardy Residence	DWA
10	2.7 mi. 208 ° SSW	Potable water, County Road 457 T. Dillon Residence	DWA
12	3.6 mi. 165 ° SSE	Potable water, County Road 464 J. Dillon Residence	DWA
21	2.4 mi. 120 ° ESE	Potable water, County Road 469 Baumgarth Residence	DWA
22	4.8 mi. 140 ° SE	Potable water, State Road 94 Plummer Residence	DWA
23	5.6 mi. 142 ° SE	Potable water, County Road 466 Curdt Residence	DWA
24	2.9 mi. 203 ° SSW	Potable water, County Road 457 Farley Residence	DWA
25	1.89 mi. 79 ° E	Potable water, County Road 448 M. Kriete Residence	DWA
V16	1.64 mi. 255 ° WSW	Potable water, Hwy CC Wallendorf Farm, Steedman, MO	DWA
PW1	Callaway Cafeteria, 0.13 mi. 234 ° SW	Potable water, Unit 1 Construction well #3 open from 400'-1400'	DWA
Pond 01	0.6 mi. 264 ° W	Fishing Pond	SWA
Pond 02	0.7 mi. 232 ° SW	Fishing Pond	SWA
Outfall 010	0.6 mi. 42 ° NE	Stormwater Run-Off Pond	SWA
Outfall 011	1.0 mi. 60 ° ENE	Stormwater Run-Off Pond	SWA
Outfall 012	0.5 mi. 178 ° S	Stormwater Run-Off Pond	SWA
Outfall 013	0.5 mi. 189 ° S	Stormwater Run-Off Pond	SWA
Outfall 014	0.6 mi. 343 ° NNW	Stormwater Run-Off Pond	SWA
Outfall 015	0.7 mi. 4 ° N	Stormwater Run-Off Pond	SWA
Sludge Lagoon	~0.8 mi. 153 ° SSE [5]	In-service Sludge Lagoon	SWA
S01 [3]	4.8 mi. 150 ° SSE	555 feet Upstream of Discharge North Bank	SWA
S02	4.9 mi. 138 ° SE	1.1 River Miles Downstream of Discharge North Bank	SWA

Table 5.1. Sampling Locations, Non-potable Groundwater Wells

Location Code	Distance / Direction [1]	Description	Sample Types [2]
U1MW-936	Plant Peninsula Area, 0.03 mi. 84 ° E	Diesel Fuel Remediation Well, NW of Fuel Bldg.	WWA
U1MW-937B	Plant Peninsula Area, 0.04 mi. 209 ° SSW	Monitoring Well, West of the Turbine Bldg.	WWA
U1MW-937D	Plant Peninsula Area, 0.1 mi. 92 ° E	Monitoring Well, North of Discharge Monitor Tanks	WWA
U1MW-939R	Plant Peninsula Area, 0.05 mi. 109 ° ESE	Monitoring Well, East of the Fuel Bldg.	WWA
U1MW-940	Plant Peninsula Area, 0.05 mi. 78 ° ENE	Monitoring Well, West of the Radwaste Bldg.	WWA
U1MW-941	Plant Peninsula Area, 0.07 mi. 81 ° E	Monitoring Well, West of the Radwaste Bldg.	WWA
U1MW-GWS	Plant Peninsula Area, 0.02 mi. 135 ° SE	Ground Water Sump, West of Reactor Bldg. and Fuel Bldg.	WWA
U1MW-ISFSI	ISFSI sump, 0.08 mi. 21 ° NNE	Near ISFSI pad	WWA
U1MW-001	0.3 mi. 334° NNW	Outside owner controlled area (OCA), Groundwater Monitoring Well	WWA
U1MW-002	0.4 mi. 206 ° SSW	Outside OCA, Groundwater Monitoring Well	WWA
U1MW-004	3.7 mi. 165 ° SSE	South of Dillon residence, Groundwater Monitoring Well	WWA
U1MW-005	3.8 mi. 160 ° SSE	South of Brownlee / Hudson residence, Groundwater Monitoring Well	WWA
U1MW-006	3.0 mi. 171 ° S	South of Ward Residence, Groundwater Monitoring Well	WWA
U1MW-010	3.1 mi. 173 ° S	Old Pipeline Bed, Groundwater Monitoring Well	WWA
U1MW-012	3.0 mi. 172 ° S	South of Ward Residence, Groundwater Monitoring Well	WWA
U1MW-013	0.8 mi. 159 ° SSE	Pipeline Corridor, south of sludge ponds	WWA
U1MW-014	3.7 mi. 171 ° S	Pipeline Corridor, near manhole 6B	WWA
U1MW-015	3.9 mi. 162 ° SSE	Pipeline Corridor, North of HWY 94.	WWA
U1MW-016	4.5 mi. 151 ° SSE	Pipeline Corridor, near heavy haul road at intake structure	WWA
U1MW-018	3.75 mi. 172 ° S	Pipeline Corridor, near manhole 6B	WWA
U1MW-019	3.71 mi.172 ° S	Pipeline Corridor, near manhole 5	WWA
U1MW-020	3.88 mi.164 ° SSE	Pipeline Corridor, near manhole 3B	WWA
U1MW-031	0.18 mi. 78 ° ENE	~1m from manhole 86-2 & 1m from HDPE discharge pipeline	WWA
U1MW-034	0.21 mi. 98 ° E	~130m from manhole 86-2, HDPE discharge line bedding	WWA
U1MW-036	0.26 mi. 122 ° ESE	~300m from MH 86-2, HDPE discharge line bedding at cross connection pipe	WWA
U1MW-039	0.61 mi. 168 ° SSE	~1100m from manhole 86-2, HDPE discharge line bedding outside OCA	WWA
U1MW-047	4.56 mi. 151 ° SSE	Upstream side of HDPE gate valve vault at intake structure inside HDPE pipeline bedding	WWA
U1MW-058	0.31 mi. 132 ° SE	~400m from manhole 86-2, Techite discharge line bedding	WWA
U1MW-059	1.04 mi. 166 ° SSE	~1700m from MH86-2, Techite discharge line bedding outside OCA	WWA
Inside Old BDL	1.81 mi. 177 ° S	Sampled through hole in Techite blowdown line	WWA
U2 MW 2S	1.8 mi. 5 ° N	Located on the periphery of the plateau	WWA
U2 MW 5S	1.1 mi. 261 ° W	Located on the periphery of the plateau	WWA
U2 MW 8	0.4 mi. 12 ° NNE	Located radially outward from central part of the plateau	WWA
U2 MW 10	0.4 mi. 163 ° SSE	Located radially outward from central part of the plateau	WWA
U2 MW 16	2.9 mi. 203 ° SSW	Located along Mud Creek, Farley Property, screened for CJC aquifer	WWA
F05	0.9 mi. 169 ° S	CJC aquifer monitoring well	WWA
F15	0.4 mi. 29 ° NNE	Outside OCA fence in center portion of plateau, screened for CJC aquifer	WWA

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

Location Code	Distance / Direction [1]	Description	Sample Types [2]
F2	1.0 mi. 235 ° SW	Callaway Plant Forest Ecology Plot F2.	SOL
F6	1.6 mi. 51 ° NE	Callaway Plant Forest Ecology Plot F6.	SOL
PR3	0.95 mi. 108 ° ESE	Callaway Plant Forest Ecology Plot PR3.	SOL
PR7	0.46 mi. 320 ° NNW	Callaway Plant Forest Ecology Plot PR7.	SOL
W1 [3]	0.52 mi. 150 ° SE	Callaway Plant Wetlands, High Ground.	SOL
W2	0.52 mi. 149 ° SSE	Callaway Plant Wetlands, Inlet Area.	SOL
W5	~0.8 mi. 153 ° SSE[5]	In-service Sludge Lagoon.	SOL
M9 [3]	13 mi. 228 ° SW	Ferguson Farm, Tebbetts, MO.	SOL
V9	1.9 mi. 294 ° WNW	Meehan Farm, Steedman, MO	FPL
V12 [3]	18.7 mi. 255 ° WSW	Kissock Farm, Holts Summit, MO	FPL
V16	1.64 mi. 255 ° WSW	Wallendorf Farm, Steedman, MO	FPL
V19	3.28 mi. 162 ° SSE	R. and A. Dillon Farm, Portland, MO	FPL
A [3,6]	~4.8 mi. 150 ° SSE	Between 0.6 and 10.0 river miles upstream of the plant intake.	AQF
A [3,]	~4.8 mi. 150 ° SSE	Upstream of the plant intake.	AQS
C [6]	~4.9 mi. 138 ° SE	Downstream of the plant discharge, between the confluence of the Missouri River and Logan Creek and the Portland boat ramp	AQF
C	~4.9 mi. 138 ° SE	Vicinity of Portland – north bank	AQS
FC1	~3.5 mi. 174 ° S	Between discharge pipeline MH-8 and the Katy Trail	FC
FC2	~3.8 mi. 166 ° SSE	Between discharge pipeline MH-5 and MH-3B.	FC
FC3	~4.1 mi. 157 ° SSE	Between Hwy 94 and the barge loading dock access road.	FC
FC4 [3]	~7.8 mi. 229 ° SW	South Callaway High School, Unlikely to be influenced by plant operations.	FC

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

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

[3] Control Location.

[4] Property ownership changed from in the fourth quarter of 2020 from Lindeman to Kuenzel.

[5] The coordinates of the in-service sludge lagoon are determined at the time of sampling in accordance with HTP-ZZ-07101-DTI-REMP-SMPL-SCHED.

[6] The expanded collection areas provide sufficient habitat to collect the required number of species, see HTP-ZZ-07101-DTI-REMP-SMPL-SCHED.

Table 5.2. Collection Frequencies and Required Analyses [1] (January 1 through December 31, 2020)

Sample Type	Media Code	Collection Frequency	Required Analyses
Direct radiation	IDM	Quarterly	Gamma dose for each sample. Neutron dose for the samples monitoring ISFSI direct radiation.
Airborne iodine	AIO	Weekly	^{131}I
Air particulate	APT	Weekly	PGE[4] each sample
Surface water (river)	SWA	Monthly composite	PGE and ^{3}H
Surface water (onsite ponds)	SWA	Semiannually	PGE and ^{3}H. If contaminated with gamma emitting nuclides of plant origin, analyze for HTD[5] nuclides.
Groundwater (not potable)	WWA	Quarterly[6]	PGE and ^{3}H. If contaminated with gamma emitting nuclides of plant origin, analyze for HTD nuclides.[7]
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 [2]	AQS	Semiannually	PGE
Sludge pond sediment	SOL	Annually	PGE
Soil	SOL	Annually	PGE
Milk animal	MLK	Semimonthly when animals are on pasture, monthly other times	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] Samples required by ODCM unless specified otherwise.

[2] Required by NPDES permit.

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

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

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

[6] Monthly for locations U1MW-936, U1MW-937B, U1MW-937D, U1MW-939R, U1MW-940, U1MW-941 and U1MW-GWS.

[7] Wells ISFSI Sump, U1MW-18, U1MW-19, U1MW-20, U1MW-31, U1MW-34, U1MW-36, U1MW-39, U1MW-47, U1MW-58, U1MW-59, Old Blowdown Pipeline, U2MW-2S, U2MW-5S, U2MW-8, and U2MW-16 are analyzed for tritium only.

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

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

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

[2] Total activity, parent plus daughter activity.

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

Table 5.4 2020 Land Use Census Results

Closest Receptor in Miles

Sector	Residence	Garden [1, 2]	Milk [1]
N(A)	2.37	NI	NI
NNE(B)	2.16	NI	NI
NE(C)	2.26	NI	NI
ENE(D)	2.86	NI	NI
E(E)	3.51	NI	NI
ESE(F)	2.11	4.47	NI
SE(G)	2.72	NI	NI
SSE(H)	3.11	3.28	NI
S(J)	2.86	NI	NI
SSW(K)	2.38	NI	NI
SW(L)	2.63	2.72	NI
WSW(M)	1.20	1.96	NI
W(N)	1.56	3.55	NI
WNW(P)	1.93	1.93	NI
NW(Q)	2.07	NI	NI
NNW(R)	1.81	NI	NI

[1] NI = None Identified.
[2] Broadleaf Vegetation

Table 5.5. Missed collections and analyses, Callaway Energy Center

Sample Type	Analysis	Location(s)	Collection Date or Period	Comments
APT	Gamma	CA-A-008	01-30-20	Air station failed to collect a full week's sample.
AIO	I-131	CA-A-008	01-30-20	Air station failed to collect a full week's sample.
FPL	Gamma, I-131	CA-FPL-V9	04-14-20	Garden not yet producing.
FPL	Gamma, I-131	CA-FPL-V12	04-14-20	Garden not yet producing.
FPL	Gamma, I-131	CA-FPL-V16	04-14-20	Garden not yet producing.
FPL	Gamma, I-131	CA-FPL-V19	04-14-20	Garden not yet producing.
FPL	Gamma, I-131	CA-FPL-V9	05-12-20	Garden not yet producing.
FPL	Gamma, I-131	CA-FPL-V19	05-12-20	Garden not yet producing.
WWA	H-3	Inside Old Blowdown Line	07-17-20	Location dry; unable to collect water sample.
FPL	Gamma, I-131	CA-FPL-V19	08-18-20	Vegetables not available.
IDM	Gamma	CA-IDM-49	3rd Qtr 2020	TLD missing from station 49.
WWA	H-3	U1MW-047	10-07-20	Unable to collect water at location.
WWA	H-3	Inside Old Blowdown Line	10-20-20	Location dry; unable to collect water sample.
DWA	H-3, Gamma	CA-DWA-08	10-28-20	Drinking water sample unobtainable.
FC	H-3, Gamma	CA-FC-1	10-13-20	Inedible crop sample not planted at location.
APT	Gamma	CA-A-008	11-12-20	Sampler found not running; Data on sampler lost.
AIO	I-131	CA-A-008	11-12-20	Sampler found not running; Data on sampler lost.

Table 5.6 Radiological Environmental Monitoring Program Summary

Sample Type (Units)	Type and Number of Analyses(a)		Req'd LLD(b)	Indicator Locations Mean, Fraction, Range (c)	Location with Highest Annual Mean		Control Locations Mean, Fraction, Range (c)	Number Non-Routine Results(e)
					Location (d)	Mean, Fraction, Range (c)		
Waterborne Pathway								
Surface Water (pCi/L)	H-3	24	3000	282(6/12) (172-510)	CA-SWA-S02 4.9 mi 138° / SE	282 (6/12) (172-510)	ND	0
	GS	24	(b)	ND	-	-	ND	0
Surface Water, Ponds (pCi/L)	H-3	18	3000	ND	-	-	None	0
	GS	18	(b)	ND	-	-	None	0
Potable Wells (pCi/L)	H-3	60	2000	ND	-	-	ND	0
	GS	60	(b)	ND	-	-	ND	0
Wells (non-potable) (pCi/L)	H-3	208	3000	424 (71/208) (159-3222)	CA-WWA-GWS 0.02 mi. 135° / SE	845 (12/13) (248-3222)	None	0
	GS	144	(b)	ND	-	-	None	0
Sediments (pCi/kg) dry	Cs-134	8	150	ND	-	-	ND	0
	Cs-137	8	180	43 (1/4)	CA-AQS-C ~4.9. mi 138° / SE	43 (1/4)	26 (2/4)	0
Airborne Pathway								
Airborne Particulates (pCi/m^3)	GS	310	(b)	ND	-	-	None	0
Airborne Iodine (pCi/m^3)	I-131	310	0.07	ND	-	-	None	0
Soil								
Soil (pCi/kg) dry	Cs-134	8	150	ND	-	-	ND	0
	Cs-137	8	180	228 (6/6) (69-482)	F2 1.0 mi. 235° / SW	482 (1/1)	126 (1/2)	0

Table 5.6 Radiological Environmental Monitoring Program Summary

Sample Type (Units)	Type and Number of Analyses(a)	Req'd LLD(b)	Indicator Locations Mean, Fraction, Range (c)	Location with Highest Annual Mean		Control Locations Mean, Fraction, Range (c)	Number Non-Routine Results(e)
				Location (d)	Mean, Fraction, Range (c)		
Ingestion Pathway							
Food Products Leafy Green Vegetables (pCi/kg wet)	GS 59	(b)	ND	-	-	ND	0
Non- food Products Soybeans (pCi/kg) wet	H-3 (f) 7	3000	ND	-	-	ND	0
	GS 7	(b)	ND	-	-	ND	0
Fish Edible Flesh (pCi/kg) wet	GS 20	(b)	ND	-	-	ND	0
Milk (pCi/L)	I-131 0	1	none	-	-	ND	0
	GS 0	(b)	none	-	-	ND	0
Direct Radiation							
(Quarterly TLDs) (mrem/Qtr)	Gamma 175	-	15.0(163/163) (10.2-17.2)	CA-IDM-27 9.3 mi. 114° / ESE	16.7 (4/4) (16.3-17.1)	14.3 (12/12) (10.6-17.1)	0
	Neutron 20	-	ND	-	-	ND	0

(a) GS = gamma spectroscopy.
(b) LLD = nominal lower limit of detection based on a 4.66 sigma counting error for background sample. LLD's for gamma spectroscopy are in Table 5.3.
(c) Mean and range are based on detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses (F). ND= not detected.
(d) Locations are specified by station code (Table 5.2) and distance (miles) and direction relative to reactor site.
(e) Non-routine results are those which exceed ten times the control station value. If no control station value is available, the result is considered non-routine if it exceeds ten times the preoperational value for the location.
(f) Units: pCi/L.

Table 5.7 Direct Radiation Dose (mrem/90 days) for the Period 2000-2019

Station Code	Mean	3σ	Mean + 3σ	Max
CA-IDM-1A	15.9	2.8	18.7	18.0
CA-IDM-3*	16.9	2.9	19.7	20.0
CA-IDM-5	14.3	2.7	17.0	17.1
CA-IDM-6	16.4	3.4	19.8	19.0
CA-IDM-7	16.1	3.1	19.2	19.0
CA-IDM-9	15.0	2.5	17.5	17.0
CA-IDM-10	17.0	2.6	19.7	19.3
CA-IDM-11A	17.1	2.9	19.9	19.3
CA-IDM-14	15.9	2.7	18.6	18.7
CA-IDM-17	16.0	3.0	19.0	18.3
CA-IDM-18A	16.1	4.6	20.8	18.9
CA-IDM-20	16.5	2.9	19.4	19.3
CA-IDM-21	16.4	3.3	19.7	19.0
CA-IDM-22A*	14.5	5.1	19.6	18.0
CA-IDM-23	16.5	2.7	19.2	19.0
CA-IDM-26(C)	11.4	2.3	13.7	13.1
CA-IDM-27(C)	17.1	2.9	20.0	20.0
CA-IDM-30A	15.7	2.8	18.4	18.2
CA-IDM-31A	17.0	2.6	19.6	19.0
CA-IDM-32	16.7	2.9	19.5	19.0
CA-IDM-32A	16.1	3.9	20.0	20.0
CA-IDM-33	15.9	2.7	18.6	18.0
CA-IDM-34	15.4	2.8	18.2	18.0
CA-IDM-35	14.8	2.6	17.3	17.3
CA-IDM-36	15.4	3.5	18.9	18.7
CA-IDM-37	15.8	2.7	18.5	18.0
CA-IDM-38	11.4	2.2	13.6	13.9
CA-IDM-39	15.8	3.1	18.9	19.0
CA-IDM-39A	16.4	3.1	19.5	19.0
CA-IDM-40	16.9	3.2	20.2	19.2
CA-IDM-41	15.8	3.0	18.8	19.0
CA-IDM-42	13.6	2.5	16.1	15.6
CA-IDM-43	15.9	2.9	18.8	18.7
CA-IDM-44	16.2	3.3	19.5	19.0
CA-IDM-45*	14.8	3.2	18.0	20.0
CA-IDM-46	16.4	2.8	19.2	19.9
CA-IDM-47	15.6	2.8	18.4	18.0
CA-IDM-48	16.5	2.7	19.3	19.0
CA-IDM-49	15.4	3.0	18.4	18.0
CA-IDM-50	16.2	2.9	19.1	20.0
CA-IDM-51A	17.0	2.8	19.8	19.8
CA-IDM-52	16.7	2.6	19.3	19.1
CA-IDM-60(C)*	16.0	2.7	18.7	18.0
CA-IDM-61*	14.4	2.0	16.4	15.7

* ISFSI monitoring
(C) Control location

6.0 REFERENCES

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APPENDIX A

INTERLABORATORY AND INTRALABORATORY COMPARISON PROGRAM RESULTS

NOTE: Appendix A is updated four times a year. The complete appendix is included in March, June, September and December monthly progress reports only.

January, 2020 through December, 2020

Appendix A

Interlaboratory/ Intralaboratory Comparison Program Results

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

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

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

Results in Table A-2 were obtained through participation in the New York Department of Health Environmental Laboratory Approval Program (ELAP) PT.

Table A-3 lists results for thermoluminescent dosimeters (TLDs), via irradiation and evaluation by the University of Wisconsin-Madison Radiation Calibration Laboratory at the University of Wisconsin Medical Radiation Research Center.

Table A-4 lists results of the analyses on intralaboratory "spiked" samples for the past twelve months. All samples are prepared using NIST traceable sources. Data for previous years available upon request.

Table A-5 lists results of the analyses on intralaboratory "blank" samples for the past twelve months. Data for previous years available upon request.

Table A-6 lists analytical results from the intralaboratory "duplicate" program for the past twelve months. Acceptance is based on each result being within 25% of the mean of the two results or the two sigma uncertainties of each result overlap.

The results in Table A-7 were obtained through participation in the Mixed Analyte Performance Evaluation Program.

Results in Table A-8 were obtained through participation in the MRAD PT Study Proficiency Testing Program administered by Environmental Resource Associates, serving as a replacement for studies conducted previously by the Environmental Measurement Laboratory Quality Assessment Program (EML).

Attachment A lists the laboratory acceptance criteria for various analyses.

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

Attachment A

ACCEPTANCE CRITERIA FOR INTRALABORATORY “SPIKED” SAMPLES

Analysis	Ratio of lab result to known value.
Gamma Emitters	0.8 to 1.2
Strontium-89, Strontium-90	0.8 to 1.2
Potassium-40	0.8 to 1.2
Gross alpha	0.5 to 1.5
Gross beta	0.8 to 1.2
Tritium	0.8 to 1.2
Radium-226, Radium-228	0.7 to 1.3
Plutonium	0.8 to 1.2
Iodine-129, Iodine-131	0.8 to 1.2
Nickel-63, Technetium-99, Uranium-238	0.7 to 1.3
Iron-55	0.8 to 1.2
Other Analyses	0.8 to 1.2

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

RAD study

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result	ERA Result	Control Limits	Acceptance
RAD-120 Study						
ERW-49	1/6/2020	Ba-133	60.8 ± 4.4	64.5	53.7 - 71.0	Pass
ERW-49	1/6/2020	Cs-134	22.7 ± 2.8	22.9	17.5 - 25.6	Pass
ERW-49	1/6/2020	Cs-137	225 ± 8	220	198 - 244	Pass
ERW-49	1/6/2020	Co-60	94.6 ± 4.6	91.2	82.1 - 103	Pass
ERW-49	1/6/2020	Zn-65	331 ± 13	298	268 - 348	Pass
ERDW-51	1/6/2020	Gr. Alpha	52.3 ± 2.4	58.9	30.8 - 73.3	Pass
ERDW-51	1/6/2020	Gr. Beta	19.9 ± 1.0	21.0	12.6 - 29.1	Pass
ERDW-53	1/6/2020	Ra-226	12.8 ± 0.5	17.4	12.9 - 19.9	Fail[b]
ERDW-53	1/6/2020	Ra-228	7.13 ± 0.9	7.95	5.06 - 10.1	Pass
ERDW-53	1/6/2020	Uranium	63.8 ± 1.0	68.2	55.7 - 75.0	Pass
ERW-55	1/6/2020	H-3	18,200 ± 408	17,800	15,600 - 19,600	Pass
RAD-121 Study						
ERDW-1034	4/6/2020	Ra-226	17.8 ± 0.5	18.4	13.7 - 21.0	Pass
ERDW-1034	4/6/2020	Ra-228	6.30 ± 0.86	5.81	3.56 - 7.64	Pass
ERDW-1034	4/6/2020	Uranium	18.7 ± 1.3	18.6	14.9 - 20.9	Pass
RAD-122 Study						
ERW-2297	7/6/2020	Ba-133	43.8 ± 3.4	58.6	48.6 - 64.6	Fail[c]
ERW-2297	7/6/2020	Cs-134	19.8 ± 2.4	22.3	17.0 - 25.0	Pass
ERW-2297	7/6/2020	Cs-137	73.2 ± 5.4	73.0	65.7 - 83.0	Pass
ERW-2297	7/6/2020	Co-60	90.0 ± 4.0	86.1	77.5 - 97.0	Pass
ERW-2297	7/6/2020	Zn-65	84.9 ± 7.5	82.9	74.6 - 99.6	Pass
ERDW-2299	7/6/2020	Gr. Alpha	40.3 ± 2.2	52.40	27.30 - 65.6	Pass
ERDW-2299	7/6/2020	Gr. Beta	19.9 ± 1.0	24.3	15.0 - 32.3	Pass
ERDW-2303	7/6/2020	Ra-226	8.91 ± 0.43	10.8	8.08 - 12.5	Pass
ERDW-2303	7/6/2020	Ra-228	4.79 ± 0.80	5.42	3.28 - 7.19	Pass
ERDW-2303	7/6/2020	Uranium	27.7 ± 0.9	29.3	23.7 - 32.5	Pass
ERW-2305	7/6/2020	H-3	21,100 ± 400	20,300	17,800 - 22,300	Pass
ERW-2301	7/6/2020	I-131	27.8 ± 1.2	26.1	21.7 - 30.8	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 Resource Associates (ERA).

[b] Ra-226 was slightly below the lower limit of the study. The reported value was the mean of two results (12.5 & 13.0). The sample was re-run in duplicate and both results, 15.6 and 13.8 pCi/L, were within the acceptance band.

[c] Ba-133 was below the lower acceptable limit of the study. No cause for the failure could be identified. Going forward gamma results will be monitored to see if any trend develops.

TABLE A-2. Interlaboratory Comparison Crosscheck program, New York Department of Health (ELAP)[a].

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result	Assigned Value	Acceptance Limits	Acceptance
			Shipment 437R			
NYW-3307	9/15/2020	H-3	11,500 ± 465	11,208	9760 - 12,300	Pass
NYW-3331	9/15/2020	Gross Alpha	43.7 ± 2.5	64.9	34.0 - 80.4	Pass
NYW-3331	9/15/2020	Gross Beta	11.1 ± 1.1	8.85	3.62 - 17.4	Pass
NYW-3335	9/15/2020	I-131	14.1 ± 1.4	12.6	10.3 - 16.0	Pass
NYW-3333	9/15/2020	Ra-226	2.24 ± 0.27	2.63	2.06 - 3.44	Pass
NYW-3333	9/15/2020	Ra-228	4.91 ± 1.12	5.41	3.27 - 7.18	Pass
NYW-3333	9/15/2020	Uranium	42.8 ± 1.94	37.1	30.1 - 41.0	Fail[b]
NYW-3337	9/15/2020	Co-60	46.4 ± 3.8	42.3	38.1 - 49.2	Pass
NYW-3337	9/15/2020	Zn-65	133 ± 9	116	104 - 138	Pass
NYW-3337	9/15/2020	Ba-133	49.5 ± 4.1	46.4	38.0 - 51.6	Pass
NYW-3337	9/15/2020	Cs-134	32.5 ± 3.1	33.0	26.0 - 36.3	Pass
NYW-3337	9/15/2020	Cs-137	147 ± 7	134	121 - 150	Pass

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the crosscheck program for proficiency testing in drinking water conducted by the New York Department of Health Laboratory Approval Program(NY ELAP).

[b] Lab passed all ERA and MAPEP studies for uranium in 2020.(See tables A-1, A-7 and A-8) Uncertainty overlapped upper acceptance limit. Lab will continue to monitor results going forward for trends.

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TABLE A-4. Intralaboratory "Spiked" Samples

Lab Code[b]	Date	Concentration[a] Analysis	Laboratory results 2s, n=1[c]	Known Activity	Control Limits[d]	Acceptance	Ratio Lab/Known
SPW-481	1/1/2020	Ra-226	10.4 ± 0.3	12.3	8.6 - 16.0	Pass	0.85
SPW-110	1/16/2020	H-3	2,101 ± 154	2,110	1,688 - 2,532	Pass	1.00
W-041620	4/29/2016	Cs-134	35.7 ± 8.8	36.2	29.0 - 43.4	Pass	0.99
W-041620	4/29/2016	Cs-137	75.0 ± 6.6	71.9	57.5 - 86.3	Pass	1.04
W-042020	4/29/2016	Cs-134	40.6 ± 10.2	36.2	29.0 - 43.4	Pass	1.12
W-042020	4/29/2016	Cs-137	71.2 ± 7.0	71.9	57.5 - 86.3	Pass	0.99
SPW-190	1/23/2020	H-3	2,058 ± 153	2,110	1,688 - 2,532	Pass	0.98
SPW-205	1/28/2020	Sr-90	17.6 ± 1.2	17.9	14.3 - 21.5	Pass	0.99
SPW-217	1/31/2020	H-3	2,005 ± 152	2,110	1,688 - 2,532	Pass	0.95
SPW-270	2/7/2020	H-3	2,153 ± 157	2,110	1,688 - 2,532	Pass	1.02
SPW-288	2/11/2020	Ra-228	13.1 ± 1.7	14.9	10.4 - 19.3	Pass	0.88
W-021220	4/29/2016	Cs-134	39.3 ± 18.9	36.2	29.0 - 43.4	Pass	1.09
W-021220	4/29/2016	Cs-137	73.9 ± 15.8	71.9	57.5 - 86.3	Pass	1.03
SPW-396	2/14/2020	H-3	2,298 ± 160	2,110	1,688 - 2,532	Pass	1.09
W-022420	4/29/2016	Cs-134	33.4 ± 10.5	36.2	29.0 - 43.4	Pass	0.92
W-022420	4/29/2016	Cs-137	75.6 ± 7.8	71.9	57.5 - 86.3	Pass	1.05
SPW-716	2/26/2020	Ra-226	11.3 ± 0.4	12.3	8.6 - 16.0	Pass	0.92
W-022820	4/29/2016	Cs-134	34.9 ± 11.6	36.2	29.0 - 43.4	Pass	0.96
W-022820	4/29/2016	Cs-137	82.9 ± 8.5	71.9	57.5 - 86.3	Pass	1.15
SPW-532	2/28/2020	H-3	2,054 ± 153	2,110	1,688 - 2,532	Pass	0.97
W-030420	4/29/2016	Cs-134	29.7 ± 9.6	36.2	29.0 - 43.4	Pass	0.82
W-030420	4/29/2016	Cs-137	74.2 ± 7.3	71.9	57.5 - 86.3	Pass	1.03
W-031020	4/29/2016	Cs-134	41.6 ± 17.8	36.2	29.0 - 43.4	Pass	1.15
W-031020	4/29/2016	Cs-137	78.6 ± 14.3	71.9	57.5 - 86.3	Pass	1.09
SPW-711	3/12/2020	H-3	2,083 ± 154	2,110	1,688 - 2,532	Pass	0.99
SPW-825	3/12/2020	Ra-226	12.4 ± 0.4	12.3	8.6 - 16.0	Pass	1.01
SPW-774	3/18/2020	H-3	2,021 ± 151	2,110	1,688 - 2,532	Pass	0.96
W-031820	4/29/2016	Cs-134	29.7 ± 10.6	36.2	29.0 - 43.4	Pass	0.82
W-031820	4/29/2016	Cs-137	75.5 ± 9.2	71.9	57.5 - 86.3	Pass	1.05
W-032520	4/29/2016	Cs-134	36.4 ± 9.2	36.2	29.0 - 43.4	Pass	1.01
W-032520	4/29/2016	Cs-137	74.9 ± 7.0	71.9	57.5 - 86.3	Pass	1.04
SPW-877	3/31/2020	Ra-228	13.0 ± 2.0	14.9	10.4 - 19.3	Pass	0.88
SPW-925	3/23/2020	Ra-226	10.7 ± 0.4	12.3	8.6 - 16.0	Pass	0.87
SPW-859	3/27/2020	H-3	2,065 ± 153	2,110	1,688 - 2,532	Pass	0.98
W-040320	4/29/2016	Cs-134	38.1 ± 10.3	36.2	29.0 - 43.4	Pass	1.05
W-040320	4/29/2016	Cs-137	78.6 ± 7.5	71.9	57.5 - 86.3	Pass	1.09
SPDW-1009	4/8/2020	Gr. Alpha	11.5 ± 0.9	18.7	9.4 - 28.1	Pass	0.61
SPDW-1009	4/8/2020	Gr. Beta	22.0 ± 1.0	26.1	20.9 - 31.3	Pass	0.84
SPW-1033	4/9/2020	H-3	2,041 ± 153	2,110	1,688 - 2,532	Pass	0.97
W-040920	4/29/2016	Cs-134	34.3 ± 9.4	36.2	29.0 - 43.4	Pass	0.95
W-040920	4/29/2016	Cs-137	77.9 ± 8.0	71.9	57.5 - 86.3	Pass	1.08
SPW-1145	4/15/2020	Ra-228	14.3 ± 2.0	14.9	10.4 - 19.3	Pass	0.96
SPW-1186	4/17/2020	H-3	1,972 ± 151	2,110	1,688 - 2,532	Pass	0.93

[a] Liquid sample results are reported in pCi/Liter, air filters (pCi/m3), charcoal (pCi/charcoal canister), and solid samples (pCi/kg).
[b] Laboratory codes : W & SPW (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] Acceptance criteria are listed in Attachment A of this report.

TABLE A-4. Intralaboratory "Spiked" Samples

Lab Code[b]	Date	Concentration[a] Analysis	Laboratory results 2s, n=1[c]	Known Activity	Control Limits[d]	Acceptance	Ratio Lab/Known
SPW-1284	4/24/2020	H-3	2,015 ± 153	2,110	1,688 - 2,532	Pass	0.95
SPW-1745	4/24/2020	Ra-226	11.9 ± 0.3	12.3	8.6 - 16.0	Pass	0.97
W-042220	4/29/2016	Cs-134	33.7 ± 9.2	36.2	29.0 - 43.4	Pass	0.93
W-042220	4/29/2016	Cs-137	74.9 ± 6.6	71.9	57.5 - 86.3	Pass	1.04
W-042420	4/29/2016	Cs-134	33.3 ± 10.8	36.2	29.0 - 43.4	Pass	0.92
W-042420	4/29/2016	Cs-137	73.7 ± 8.5	71.9	57.5 - 86.3	Pass	1.03
W-043020	4/29/2016	Cs-134	33.7 ± 15.7	36.2	29.0 - 43.4	Pass	0.93
W-043020	4/29/2016	Cs-137	72.5 ± 7.1	71.9	57.5 - 86.3	Pass	1.01
SPW-1327	5/1/2020	H-3	2,071 ± 153	2,110	1,688 - 2,532	Pass	0.98
W-050520	4/29/2016	Cs-134	31.1 ± 11.9	36.2	29.0 - 43.4	Pass	0.86
W-050520	4/29/2016	Cs-137	73.2 ± 8.3	71.9	57.5 - 86.3	Pass	1.02
SPW-1394	5/5/2020	Sr-90	18.1 ± 1.1	17.9	14.3 - 21.5	Pass	1.01
W-050720	4/29/2016	Cs-134	39.9 ± 2.0	36.2	29.0 - 43.4	Pass	1.10
W-050720	4/29/2016	Cs-137	75.2 ± 14.3	71.9	57.5 - 86.3	Pass	1.05
SPW-1500	5/18/2020	Ra-228	13.8 ± 1.9	14.9	10.4 - 19.3	Pass	0.93
W-052020	4/29/2016	Cs-134	33.1 ± 1.2	36.2	29.0 - 43.4	Pass	0.91
W-052020	4/29/2016	Cs-137	80.8 ± 8.3	71.9	57.5 - 86.3	Pass	1.12
SPW-1613	5/22/2020	H-3	1,953 ± 149	2,110	1,688 - 2,532	Pass	0.93
W-052620	4/29/2016	Cs-134	31.0 ± 9.2	36.2	29.0 - 43.4	Pass	0.86
W-052620	4/29/2016	Cs-137	74.6 ± 7.5	71.9	57.5 - 86.3	Pass	1.04
SPW-2061	5/21/2020	Ra-226	10.4 ± 0.3	12.3	8.6 - 16.0	Pass	0.85
W-052620	4/29/2016	Cs-134	33.6 ± 12.8	36.2	29.0 - 43.4	Pass	0.93
W-052620	4/29/2016	Cs-137	69.2 ± 7.7	71.9	57.5 - 86.3	Pass	0.96
SPW-1741	5/27/2020	H-3	1,925 ± 150	2,110	1,688 - 2,532	Pass	0.91
SPW-1824	6/3/2020	H-3	1,971 ± 151	2,110	1,688 - 2,532	Pass	0.93
SPW-1853	6/4/2020	H-3	2,027 ± 153	2,110	1,688 - 2,532	Pass	0.96
W-061120	4/29/2016	Cs-134	39.8 ± 21.0	36.2	29.0 - 43.4	Pass	1.10
W-061120	4/29/2016	Cs-137	79.3 ± 13.5	71.9	57.5 - 86.3	Pass	1.10
SPW-1982	6/12/2020	H-3	2,065 ± 154	2,110	1,688 - 2,532	Pass	0.98
SPW-2038	6/18/2020	H-3	2,012 ± 154	2,110	1,688 - 2,532	Pass	0.95
SPW-2116	6/25/2020	H-3	2,051 ± 159	2,110	1,688 - 2,532	Pass	0.97
SPW-2173	7/1/2020	H-3	2,010 ± 154	2,110	1,688 - 2,532	Pass	0.95
SPW-2328	7/10/2020	H-3	1,924 ± 151	2,110	1,688 - 2,532	Pass	0.91
SPW-2458	7/16/2020	H-3	1,932 ± 151	2,110	1,688 - 2,532	Pass	0.92
SPW-2556	7/27/2020	Sr-90	16.8 ± 1.1	17.9	14.3 - 21.5	Pass	0.94
SPW-2558	7/6/2020	Gr. Alpha	29.9 ± 2.1	58.9	29.5 - 88.4	Pass	0.51
SPW-2558	7/6/2020	Gr. Beta	20.0 ± 1.0	21.0	16.8 - 25.2	Pass	0.95
SPW-2640	7/31/2020	H-3	1,984 ± 154	2,110	1,688 - 2,532	Pass	0.94
SPW-2778	8/7/2020	H-3	1,936 ± 151	2,110	1,688 - 2,532	Pass	0.92
SPW-2797	6/22/2020	Ra-226	10.4 ± 0.3	12.3	8.6 - 16.0	Pass	0.85
SPW-2852	8/11/2020	Ra-228	10.2 ± 1.6	12.5	8.7 - 16.2	Pass	0.82

[a] Liquid sample results are reported in pCi/Liter, air filters (pCi/m3), charcoal (pCi/charcoal canister), and solid samples (pCi/kg).
[b] Laboratory codes : W & SPW (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] Acceptance criteria are listed in Attachment A of this report.

TABLE A-4. Intralaboratory "Spiked" Samples

Lab Code[b]	Date	Concentration[a] Analysis	Laboratory results 2s, n=1[c]	Known Activity	Control Limits[d]	Acceptance	Ratio Lab/Known
SPW-2854	8/14/2020	H-3	1,927 ± 153	2,110	1,688 - 2,532	Pass	0.91
SPW-2890	8/4/2020	Ra-226	11.6 ± 0.4	12.3	8.6 - 16.0	Pass	0.95
SPW-3013	8/24/2020	H-3	2,005 ± 153	2,110	1,688 - 2,532	Pass	0.95
SPW-3053	8/28/2020	H-3	1,904 ± 149	2,110	1,688 - 2,532	Pass	0.90
SPW-3123	8/19/2020	Ra-226	10.4 ± 0.3	12.3	8.6 - 16.0	Pass	0.85
SPW-3447	9/3/2020	Ra-226	9.8 ± 0.3	12.3	8.6 - 16.0	Pass	0.80
SPW-3241	9/11/2020	H-3	1,952 ± 154	2,110	1,688 - 2,532	Pass	0.93
SPW-3425	9/23/2020	Ra-228	10.7 ± 1.6	12.3	8.6 - 16.0	Pass	0.87
SPW-3412	9/25/2020	H-3	2,099 ± 155	2,110	1,688 - 2,532	Pass	0.99
SPW-4131	9/30/2020	Ra-226	13.2 ± 0.4	12.3	8.6 - 16.0	Pass	1.07
SPW-3482	10/2/2020	H-3	1,984 ± 154	2,110	1,688 - 2,532	Pass	0.94
SPW-3624	10/9/2020	H-3	1,924 ± 152	2,110	1,688 - 2,532	Pass	0.91
SPW-3794	10/16/2020	H-3	2,109 ± 156	2,110	1,688 - 2,532	Pass	1.00
SPW-3836	10/20/2020	Sr-90	16.8 ± 1.1	17.9	14.3 - 21.5	Pass	0.94
SPW-4043	10/23/2020	H-3	1893.4 ± 148.8	2,110	1,688 - 2,532	Pass	0.90
SPW-4179	10/28/2020	Ra-228	15.4 ± 2.4	12.1	8.5 - 15.7	Pass	1.27
SPW-4422	10/30/2020	Ra-226	12.3 ± 0.3	12.3	8.6 - 16.0	Pass	1.00
SPW-4234	11/11/2020	H-3	2,008 ± 154	2,110	1,688 - 2,532	Pass	0.95
SPW-4634	11/23/2020	Ra-226	11.4 ± 0.3	12.3	8.6 - 16.0	Pass	0.93
SPW-4509	12/4/2020	H-3	1,873 ± 149	2,110	1,688 - 2,532	Pass	0.89
SPW-4625	12/18/2020	H-3	1,940 ± 152	2,110	1,688 - 2,532	Pass	0.92
SPW-4741	12/18/2020	Ra-226	12.5 ± 0.4	12.3	8.6 - 16.0	Pass	1.02

[a] Liquid sample results are reported in pCi/Liter, air filters (pCi/m3), charcoal (pCi/charcoal canister), and solid samples (pCi/kg).
[b] Laboratory codes : W & SPW (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] Acceptance criteria are listed in Attachment A of this report.

TABLE A-5. Intralaboratory "Blank" Samples

Lab Code[b]	Sample Type	Date	Analysis[c]	Concentration[a]		
				Laboratory results (4.66σ)		Acceptance
				LLD	Activity[d]	Criteria (4.66 σ)
SPW-480	Water	1/1/2020	Ra-226	0.03	0.12 ± 0.02	2
SPW-93	Water	1/7/2020	Gr. Alpha	0.35	0.47 ± 0.29	2
SPW-93	Water	1/7/2020	Gr. Beta	0.74	0.18 ± 0.53	4
SPW-109	Water	1/16/2020	H-3	157	-6 ± 73	200
SPW-154	Water	1/16/2020	I-131	0.47	-0.22 ± 0.21	1
SPW-189	Water	1/23/2020	H-3	158	0 ± 73	200
SPW-204	Water	1/28/2020	Sr-89	0.64	-0.16 ± 0.50	5
SPW-204	Water	1/28/2020	Sr-90	0.54	0.11 ± 0.27	1
SPW-216	Water	1/31/2020	H-3	156	86 ± 78	200
SPW-269	Water	2/7/2020	H-3	153	79 ± 80	200
SPW-287	Water	2/11/2020	Ra-228	0.81	1.49 ± 0.53	2
SPW-395	Water	2/14/2020	H-3	154	46 ± 75	200
SPW-463	Water	2/25/2020	I-131	0.16	0.02 ± 0.09	1
SPW-715	Water	2/26/2020	Ra-226	0.01	0.17 ± 0.01	2
SPW-531	Water	2/28/2020	H-3	156	44 ± 75	200
SPW-710	Water	3/12/2020	H-3	157	-16 ± 72	200
SPW-824	Water	3/12/2020	Ra-226	0.03	0.15 ± 0.03	2
SPW-773	Water	3/18/2020	H-3	151	76 ± 76	200
SPW-876	Water	3/31/2020	Ra-228	0.88	0.57 ± 0.47	2
SPW-924	Water	3/23/2020	Ra-226	0.04	0.18 ± 0.03	2
SPW-1032	Water	4/9/2020	H-3	157	68 ± 77	200
SPW-1144	Water	4/15/2020	Ra-228	0.89	0.03 ± 0.42	2
SPW-1185	Water	4/17/2020	H-3	158	8 ± 74	200
SPW-1283	Water	4/24/2020	H-3	156	10 ± 75	200
SPW-1744	Water	4/24/2020	Ra-226	0.03	-0.01 ± 0.03	2
SPW-1326	Water	5/1/2020	H-3	153	67 ± 75	200
SPW-1393	Water	5/5/2020	Sr-89	0.66	0.11 ± 0.44	5
SPW-1393	Water	5/5/2020	Sr-90	0.63	-0.27 ± 0.26	1
SPW-1499	Water	5/18/2020	Ra-228	0.88	0.03 ± 0.41	2
SPW-1541	Water	5/19/2020	I-131	0.20	0.00 ± 0.11	1
SPW-2060	Water	5/21/2020	Ra-226	0.03	-0.01 ± 0.02	2
SPW-1612	Water	5/22/2020	H-3	153	91 ± 76	200
SPW-1740	Water	5/27/2020	H-3	158	-26 ± 71	200
SPW-1823	Water	6/3/2020	H-3	157	18 ± 74	200
SPW-1852	Water	6/4/2020	H-3	159	33 ± 76	200
SPW-1981	Water	6/12/2020	H-3	149	52 ± 77	200
SPW-2037	Water	6/18/2020	H-3	156	101 ± 81	200
SPW-2115	Water	6/25/2020	H-3	158	56 ± 86	200

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

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

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

[d] Activity reported is a net activity result.

TABLE A-5. Intralaboratory "Blank" Samples

Lab Code[b]	Sample Type	Date	Analysis[c]	Concentration[a]		
				Laboratory results (4.66σ)		Acceptance
				LLD	Activity[d]	Criteria (4.66 σ)
SPW-2172	Water	7/1/2020	H-3	159	-15 ± 75	200
SPW-2327	Water	7/10/2020	H-3	158	50 ± 77	200
SPW-2457	Water	7/16/2020	H-3	159	-46 ± 71	200
SPW-2555	Water	7/27/2020	Sr-89	0.48	0.18 ± 0.40	5
SPW-2555	Water	7/27/2020	Sr-90	0.54	0.03 ± 0.25	1
SPW-2557	Water	7/6/2020	Gr. Alpha	0.37	0.25 ± 0.28	2
SPW-2557	Water	7/6/2020	Gr. Beta	0.75	-0.23 ± 0.52	4
SPW-2639	Water	7/31/2020	H-3	158	80 ± 81	200
SPW-2777	Water	8/7/2020	H-3	157	0 ± 74	200
SPW-2796	Water	6/22/2020	Ra-226	0.03	-0.02 ± 0.03	2
SPW-2851	Water	8/11/2020	Ra-228	0.85	0.44 ± 0.45	2
SPW-2853	Water	8/14/2020	H-3	158	18 ± 77	200
SPW-2880	Water	8/18/2020	I-131	0.42	-0.04 ± 0.22	1
SPW-2889	Water	8/4/2020	Ra-228	0.05	0.13 ± 0.11	2
SPW-3012	Water	8/24/2020	H-3	159	59 ± 77	200
SPW-3052	Water	8/28/2020	H-3	155	46 ± 75	200
SPW-3122	Water	9/3/2020	Ra-226	0.03	0.20 ± 0.03	2
SPW-3240	Water	9/11/2020	H-3	161	3 ± 78	200
SPW-3446	Water	9/3/2020	Ra-226	0.01	0.12 ± 0.02	2
SPW-3424	Water	9/23/2020	Ra-228	0.85	0.81 ± 0.48	2
SPW-3411	Water	9/25/2020	H-3	158	82 ± 78	200
SPW-4130	Water	9/30/2020	Ra-226	0.04	0.01 ± 0.04	2
SPW-3481	Water	10/2/2020	H-3	154	63 ± 80	200
SPW-3623	Water	10/9/2020	H-3	156	57 ± 81	200
SPW-3793	Water	10/16/2020	H-3	157	3 ± 73	200
SPW-3835	Water	10/20/2020	Sr-89	0.55	-0.10 ± 0.43	5
SPW-3835	Water	10/20/2020	Sr-90	0.59	0.09 ± 0.28	1
SPW-4042	Water	10/23/2020	H-3	155	-6 ± 72	200
SPW-4178	Water	10/28/2020	Ra-228	1.04	0.33 ± 0.52	2
SPW-4421	Water	10/30/2020	Ra-226	0.03	0.07 ± 0.03	2
SPW-4233	Water	11/11/2020	H-3	155	78 ± 79	200
SPW-4356	Water	11/20/2020	H-3	157	52 ± 76	200
SPW-4633	Water	11/23/2020	Ra-226	0.05	0.04 ± 0.11	2
SPW-4508	Water	12/4/2020	H-3	159	-68 ± 69	200
SPW-4624	Water	12/18/2020	H-3	160	8 ± 77	200
SPW-4740	Water	12/18/2020	Ra-226	0.04	0.02 ± 0.03	2

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

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

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

[d] Activity reported is a net activity result.

TABLE A-6. Intralaboratory "Duplicate" Samples

			Concentration[a]			
Lab Code[b]	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
SG-20,21	1/2/2020	Pb-214	2.23 ± 0.12	1.61 ± 0.09	1.92 ± 0.08	Pass
SG-20,21	1/2/2020	Ac-228	1.49 ± 0.20	1.42 ± 0.18	1.46 ± 0.13	Pass
AP-5060,5061	1/3/2020	Be-7	0.052 ± 0.014	0.063 ± 0.012	0.057 ± 0.009	Pass
AP-010720A,B	1/7/2020	Gr. Beta	0.023 ± 0.004	0.022 ± 0.004	0.022 ± 0.003	Pass
WW-72,73	1/7/2020	H-3	547 ± 101	478 ± 98	513 ± 70	Pass
WW-184,185	1/21/2020	H-3	265 ± 88	311 ± 90	288 ± 63	Pass
SWU-253,254	1/28/2020	Gr. Beta	1.73 ± 0.58	2.10 ± 0.62	1.92 ± 0.42	Pass
DW-20014,20015	1/29/2020	Ra-228	3.34 ± 0.74	2.25 ± 0.70	2.80 ± 0.51	Pass
DW-20014,20015	1/29/2020	Ra-226	1.05 ± 0.15	0.64 ± 0.24	0.85 ± 0.14	Pass
S-209,210	1/31/2020	K-40	8.28 ± 0.20	7.95 ± 0.42	8.12 ± 0.23	Pass
LW-383,384	1/31/2020	Gr. Beta	1.67 ± 0.58	0.77 ± 0.52	1.22 ± 0.39	Pass
AP-020320A,B	2/3/2020	Gr. Beta	0.021 ± 0.004	0.024 ± 0.004	0.023 ± 0.003	Pass
S-362,363	2/7/2020	Pb-214	2.39 ± 0.11	2.25 ± 0.10	2.32 ± 0.07	Pass
S-362,363	2/7/2020	Ac-228	1.84 ± 0.18	1.95 ± 0.17	1.90 ± 0.12	Pass
DW-20018,20019	2/7/2020	Gr. Alpha	0.23 ± 0.86	0.37 ± 0.88	0.30 ± 0.62	Pass
DW-20018,20019	2/7/2020	Gr. Beta	0.50 ± 0.56	1.19 ± 0.63	0.85 ± 0.42	Pass
DW-20026,20027	2/7/2020	Ra-226	2.40 ± 0.21	2.11 ± 0.15	2.26 ± 0.13	Pass
DW-20026,20027	2/7/2020	Ra-228	2.60 ± 0.68	1.81 ± 0.57	2.21 ± 0.44	Pass
WW-452,453	2/17/2020	H-3	583 ± 102	678 ± 106	630 ± 74	Pass
DW-20031,20032	2/25/2020	Gr. Alpha	1.02 ± 0.77	0.80 ± 0.81	0.91 ± 0.56	Pass
DW-20031,20032	2/25/2020	Gr. Beta	1.11 ± 0.59	1.19 ± 0.58	1.15 ± 0.41	Pass
DW-20038,20039	3/3/2020	Ra-226	8.39 ± 0.43	8.78 ± 0.49	8.59 ± 0.33	Pass
DW-20038,20039	3/3/2020	Ra-228	2.81 ± 1.00	2.31 ± 0.86	2.56 ± 0.66	Pass
WW-752,753	3/13/2020	H-3	435 ± 94	393 ± 92	414 ± 66	Pass
S-868,869	3/13/2020	Pb-214	0.97 ± 0.10	0.99 ± 0.09	0.98 ± 0.07	Pass
S-868,869	3/13/2020	Ac-228	0.93 ± 0.18	1.01 ± 0.23	0.97 ± 0.15	Pass
LW-977,978	3/25/2020	Gr. Beta	0.98 ± 0.53	0.92 ± 0.51	0.95 ± 0.37	Pass
AP-1220,1221	3/31/2020	Be-7	0.063 ± 0.011	0.062 ± 0.013	0.063 ± 0.009	Pass
SWT-912,913	3/31/2020	Gr. Beta	0.79 ± 0.53	0.49 ± 0.50	0.64 ± 0.37	Pass
AP-956,957	4/2/2020	Be-7	0.189 ± 0.097	0.256 ± 0.130	0.222 ± 0.081	Pass
AP-1110,1111	4/3/2020	Be-7	0.069 ± 0.012	0.072 ± 0.013	0.071 ± 0.009	Pass
WW-1047,1048	4/7/2020	H-3	438 ± 96	478 ± 98	458 ± 69	Pass
VE-1022,1023	4/8/2020	Be-7	9.28 ± 0.57	8.00 ± 0.62	8.64 ± 0.42	Pass
VE-1022,1023	4/8/2020	K-40	3.89 ± 0.67	3.94 ± 0.73	3.92 ± 0.49	Pass
S-1199,1200	4/12/2020	Pb-214	0.77 ± 0.07	0.98 ± 0.08	0.88 ± 0.05	Pass
S-1199,1200	4/12/2020	Ac-228	1.09 ± 0.15	1.18 ± 0.17	1.14 ± 0.11	Pass
SS-1419,1420	4/14/2020	K-40	10.8 ± 0.6	9.4 ± 0.4	10.1 ± 0.4	Pass
AP-1241,1242	4/16/2020	Be-7	0.203 ± 0.113	0.245 ± 0.145	0.224 ± 0.092	Pass
DW-20051,20052	4/23/2020	Ra-228	3.50 ± 0.85	4.60 ± 0.89	4.05 ± 0.62	Pass
DW-20051,20052	4/23/2020	Ra-226	0.80 ± 0.10	0.60 ± 0.10	0.70 ± 0.07	Pass
SS-1310,1311	4/23/2020	K-40	7,827 ± 492	8,157 ± 505	7,992 ± 352	Pass
LW-1375,1376	4/29/2020	Gr. Beta	1.62 ± 0.59	1.61 ± 0.58	1.62 ± 0.41	Pass

TABLE A-6. Intralaboratory "Duplicate" Samples

			Concentration[a]			
Lab Code[b]	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
F-1828,1829	4/29/2020	K-40	1.35 ± 0.41	0.98 ± 0.33	1.16 ± 0.27	Pass
SG-1398,1399	5/5/2020	Pb-214	7.51 ± 0.19	8.62 ± 0.17	8.07 ± 0.13	Pass
SG-1398,1399	5/5/2020	Ac-228	6.80 ± 0.31	6.77 ± 0.27	6.79 ± 0.21	Pass
SW-1461,1462	5/7/2020	H-3	315 ± 88	320 ± 89	317 ± 63	Pass
AP-1610,1611	5/14/2020	Be-7	0.179 ± 0.101	0.172 ± 0.086	0.176 ± 0.066	Pass
DW-20062,20063	5/19/2020	Gr. Alpha	6.20 ± 1.30	5.00 ± 1.30	5.60 ± 0.92	Pass
DW-20062,20063	5/19/2020	Gr. Beta	6.09 ± 0.77	5.51 ± 0.72	5.80 ± 0.53	Pass
W-1805,1806	5/25/2020	Ra-226	0.42 ± 0.16	0.24 ± 0.17	0.33 ± 0.12	Pass
F-1763,1764	5/26/2020	K-40	2.82 ± 0.47	3.01 ± 0.45	2.92 ± 0.33	Pass
AP-052620A,B	5/26/2020	Gr. Beta	0.014 ± 0.003	0.016 ± 0.003	0.015 ± 0.002	Pass
DW-20066,20067	6/1/2020	Ra-226	0.21 ± 0.09	0.33 ± 0.12	0.27 ± 0.08	Pass
DW-20066,20067	6/1/2020	Ra-228	0.05 ± 0.43	0.03 ± 0.39	0.04 ± 0.29	Pass
P-1849,1850	6/1/2020	H-3	547 ± 102	700 ± 108	624 ± 74	Pass
AP-1893,1894	6/4/2020	Be-7	0.164 ± 0.080	0.251 ± 0.140	0.208 ± 0.081	Pass
SW-1872,1873	6/4/2020	H-3	385 ± 94	400 ± 95	393 ± 67	Pass
AP-052620A,B	6/8/2020	Gr. Beta	0.024 ± 0.004	0.025 ± 0.005	0.024 ± 0.003	Pass
WW-2025,2026	6/16/2020	H-3	318 ± 92	320 ± 92	319 ± 65	Pass
AP-061620A,B	6/16/2020	Gr. Beta	0.017 ± 0.003	0.019 ± 0.003	0.018 ± 0.002	Pass
DW-20078,20079	6/17/2020	Ra-226	0.53 ± 0.11	0.50 ± 0.10	0.52 ± 0.07	Pass
DW-20078,20079	6/17/2020	Ra-228	1.10 ± 0.50	1.11 ± 0.50	1.11 ± 0.35	Pass
AP-2048,2049	6/18/2020	Be-7	0.222 ± 0.087	0.221 ± 0.092	0.221 ± 0.063	Pass
SW-2157,2158	6/23/2020	H-3	175 ± 86	235 ± 89	205 ± 62	Pass
AP-062320A,B	6/23/2020	Gr. Beta	0.021 ± 0.003	0.023 ± 0.004	0.022 ± 0.003	Pass
AP-2136,2137	6/25/2020	Be-7	0.242 ± 0.099	0.343 ± 0.115	0.292 ± 0.076	Pass
AP-2366,2367	6/30/2020	Be-7	0.144 ± 0.018	0.177 ± 0.019	0.161 ± 0.013	Pass
SWU-2180,2181	6/30/2020	H-3	105 ± 82	199 ± 87	152 ± 60	Pass
AP-2473,2474	7/1/2020	Be-7	0.079 ± 0.011	0.089 ± 0.012	0.084 ± 0.008	Pass
AP-2473,2474	7/1/2020	K-40	0.010 ± 0.006	0.015 ± 0.009	0.013 ± 0.005	Pass
AP-2408,2409	7/2/2020	Be-7	0.084 ± 0.016	0.085 ± 0.014	0.085 ± 0.011	Pass
P-2264,2265	7/6/2020	H-3	149 ± 83	144 ± 83	147 ± 59	Pass
DW-20091,20092	7/10/2020	Ra-226	0.77 ± 0.17	0.69 ± 0.24	0.73 ± 0.15	Pass
DW-20091,20092	7/10/2020	Ra-228	0.61 ± 0.56	0.59 ± 0.55	0.60 ± 0.39	Pass
SW-2450,2451	7/14/2020	H-3	410 ± 96	487 ± 99	448 ± 69	Pass
VE-2494,2495	7/16/2020	K-40	1.68 ± 0.25	2.08 ± 0.26	1.88 ± 0.18	Pass
DW-20102,20103	7/17/2020	Gr. Alpha	1.98 ± 0.82	2.65 ± 0.82	2.32 ± 0.58	Pass
DW-20102,20103	7/17/2020	Ra-226	0.84 ± 0.20	0.89 ± 0.20	0.87 ± 0.14	Pass
DW-20102,20103	7/17/2020	Ra-228	1.24 ± 0.67	1.57 ± 0.70	1.41 ± 0.48	Pass
WW-2604,2605	7/20/2020	H-3	35,989 ± 576	36,039 ± 577	36,014 ± 408	Pass
SWU-2669,2670	7/28/2020	H-3	103 ± 80	101 ± 80	102 ± 57	Pass
SWU-2669,2670	7/28/2020	Gr. Beta	1.49 ± 0.56	1.05 ± 0.51	1.27 ± 0.38	Pass
S-2711,2712	7/29/2020	K-40	17.4 ± 0.9	19.6 ± 1.0	18.5 ± 0.7	Pass

TABLE A-6. Intralaboratory "Duplicate" Samples

			Concentration[a]			
Lab Code[b]	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
WW-2799,2800	8/4/2020	H-3	471 ± 100	437 ± 99	454 ± 70	Pass
WW-2933,2934	8/4/2020	H-3	316 ± 91	300 ± 90	308 ± 64	Pass
S-2774,2775	8/4/2020	K-40	5.9 ± 0.9	6.1 ± 0.8	6.0 ± 0.6	Pass
WW-2912,2913	8/5/2020	H-3	176 ± 84	226 ± 87	201 ± 60	Pass
F-3040,3041	8/7/2020	Gr. Beta	4.55 ± 0.12	4.63 ± 0.12	4.59 ± 0.09	Pass
F-3040,3041	8/7/2020	K-40	3.58 ± 0.42	3.32 ± 0.41	3.45 ± 0.29	Pass
WW-2867,2868	8/12/2020	H-3	169 ± 85	219 ± 86	194 ± 61	Pass
VE-2842,2843	8/12/2020	K-40	3.18 ± 0.30	3.14 ± 0.37	3.16 ± 0.24	Pass
F-2891,2892	8/14/2020	K-40	2.98 ± 0.39	2.82 ± 0.35	2.90 ± 0.26	Pass
VE-2954,2955	8/20/2020	Be-7	0.222 ± 0.106	0.283 ± 0.166	0.252 ± 0.099	Pass
VE-2954,2955	8/20/2020	K-40	4.09 ± 0.37	3.75 ± 0.38	3.92 ± 0.27	Pass
DW-20126,20127	8/25/2020	Ra-226	0.90 ± 0.14	0.73 ± 0.12	0.82 ± 0.09	Pass
DW-20126,20127	8/25/2020	Ra-228	1.55 ± 0.52	2.30 ± 0.58	1.93 ± 0.39	Pass
LW-3154,3155	8/26/2020	Gr. Beta	1.43 ± 0.60	1.33 ± 0.55	1.38 ± 0.41	Pass
VE-3084,3085	8/28/2020	Be-7	0.52 ± 0.12	0.48 ± 0.07	0.50 ± 0.07	Pass
VE-3084,3085	8/28/2020	K-40	3.87 ± 0.16	3.36 ± 0.31	3.62 ± 0.17	Pass
SWU-3133,3134	9/1/2020	H-3	107 ± 84	116 ± 84	111 ± 59	Pass
VE-3208,3209	9/8/2020	K-40	5.99 ± 0.43	5.85 ± 0.35	5.92 ± 0.28	Pass
VE-3187,3188	9/8/2020	Be-7	0.50 ± 0.17	0.61 ± 0.23	0.55 ± 0.14	Pass
VE-3187,3188	9/8/2020	K-40	4.64 ± 0.54	4.97 ± 0.45	4.81 ± 0.35	Pass
WW-3427,3428	9/10/2020	H-3	2,321 ± 163	2,323 ± 164	2,322 ± 116	Pass
DW-21033,21034	9/14/2020	Gr. Alpha	1.27 ± 0.79	0.94 ± 0.75	1.11 ± 0.54	Pass
DW-21033,21034	9/14/2020	Gr. Beta	1.02 ± 0.60	1.01 ± 0.59	1.02 ± 0.42	Pass
SG-3265,3266	9/14/2020	Pb-214	11.8 ± 0.49	10.4 ± 0.57	11.1 ± 0.38	Pass
SG-3265,3266	9/14/2020	Ac-228	18.8 ± 1.27	17.3 ± 1.36	18.0 ± 0.93	Pass
SG-3265,3266	9/14/2020	Gr. Alpha	28.0 ± 4.6	33.5 ± 4.9	30.8 ± 3.4	Pass
SG-3265,3266	9/14/2020	Gr. Beta	42.1 ± 2.8	44.5 ± 3.0	43.3 ± 2.1	Pass
VE-3315,3316	9/15/2020	Be-7	0.25 ± 0.10	0.28 ± 0.16	0.27 ± 0.09	Pass
VE-3315,3316	9/15/2020	K-40	5.48 ± 0.34	5.16 ± 0.36	5.32 ± 0.25	Pass
WW-3339,3340	9/16/2020	H-3	196 ± 85	199 ± 85	198 ± 60	Pass
CF-3381,3382	9/21/2020	Be-7	0.20 ± 0.10	0.19 ± 0.11	0.20 ± 0.07	Pass
CF-3381,3382	9/21/2020	K-40	5.94 ± 0.30	5.72 ± 0.29	5.83 ± 0.21	Pass
AP-092120A,B	9/21/2020	Gr. Beta	0.043 ± 0.005	0.041 ± 0.005	0.042 ± 0.004	Pass
F-3706,3707	9/26/2020	K-40	1.86 ± 0.35	1.83 ± 0.39	1.84 ± 0.26	Pass
AP-092820A,B	9/28/2020	Gr. Beta	0.021 ± 0.004	0.023 ± 0.004	0.022 ± 0.003	Pass
XW-3620,3621	9/30/2020	Sr-89	11,760 ± 140	12,487 ± 133	12,124 ± 97	Pass
XW-3620,3621	9/30/2020	Sr-90	2,287 ± 45	2,831 ± 50	2,559 ± 34	Pass
XW-3620,3621	9/30/2020	Fe-55	1,623 ± 462	1,833 ± 474	1,728 ± 331	Pass

TABLE A-6. Intralaboratory "Duplicate" Samples

			Concentration[a]			
Lab Code[b]	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
SW-3515,3516	10/1/2020	H-3	154 ± 86	111 ± 84	133 ± 60	Pass
DW-20141,20142	10/1/2020	Ra-226	1.34 ± 0.16	1.39 ± 0.16	1.37 ± 0.11	Pass
DW-20141,20142	10/1/2020	Ra-228	1.74 ± 0.62	2.09 ± 0.64	1.92 ± 0.45	Pass
SW-3536,3537	10/5/2020	H-3	376 ± 97	378 ± 97	377 ± 68	Pass
WW-3727,3728	10/8/2020	H-3	152 ± 82	190 ± 84	171 ± 59	Pass
VE-3748,3749	10/12/2020	K-40	3.07 ± 0.25	2.88 ± 0.26	2.98 ± 0.18	Pass
VE-3769,3770	10/12/2020	Be-7	0.80 ± 0.31	0.51 ± 0.15	0.66 ± 0.17	Pass
VE-3769,3770	10/12/2020	K-40	5.69 ± 0.61	5.79 ± 0.39	5.74 ± 0.36	Pass
WW-4092,4093	10/13/2020	H-3	6,484 ± 252	6,275 ± 248	6,380 ± 177	Pass
WW-3838,3839	10/14/2020	H-3	313 ± 90	263 ± 88	288 ± 63	Pass
WW-4394,4395	11/3/2020	H-3	161 ± 83	199 ± 85	180 ± 60	Pass
WW-4587,4588	11/4/2020	H-3	6,468 ± 252	6,638 ± 255	6,553 ± 179	Pass
WW-4524,4525	11/5/2020	H-3	160 ± 86	131 ± 84	145 ± 60	Pass
VE-4415,4416	11/24/2020	Be-7	0.28 ± 0.08	0.22 ± 0.07	0.25 ± 0.05	Pass
VE-4415,4416	11/24/2020	K-40	2.25 ± 0.21	2.20 ± 0.19	2.23 ± 0.14	Pass
AP-4845,4846	12/31/2020	Be-7	0.07 ± 0.01	0.06 ± 0.02	0.06 ± 0.01	Pass

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

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

[b] AP (Air Particulate), AV (Aquatic Vegetation), BS (Bottom Sediment), CF (Cattle Feed), CH (Charcoal Canister), DW (Drinking Water), E (Egg), F (Fish), G (Grass), LW (Lake Water), MI (Milk), P (Precipitation), PM (Powdered Milk), S (Solid), SG (Sludge), SO (Soil), SS (Shoreline Sediment), SW (Surface Water), SWT (Surface Water Treated), SWU (Surface Water Untreated), VE (Vegetation), W (Water), WW (Well Water).

TABLE A-7. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP).

			Concentration[a]			
Lab Code [b]	Reference Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
MAAP-664	2/1/2020	Gross Alpha	2.26 ± 0.14	1.24	0.37 - 2.11	Fail [d]
MAAP-664	2/1/2020	Gross Beta	2.40 ± 0.07	2.00	1.00 - 3.00	Pass
MAW-536	2/1/2020	Gross Alpha	0.86 ± 0.06	1.03	0.31 - 1.75	Pass
MAW-536	2/1/2020	Gross Beta	3.79 ± 0.07	4.24	2.12 - 6.36	Pass
MASO-662	2/1/2020	Cs-134	955 ± 9	1114	780 - 1448	Pass
MASO-662	2/1/2020	Cs-137	1089 ± 12	1020	714 - 1326	Pass
MASO-662	2/1/2020	Co-57	1106 ± 8	1071	750 - 1392	Pass
MASO-662	2/1/2020	Co-60	0.33 ± 1.26	0	NA [c]	Pass
MASO-662	2/1/2020	Mn-54	1022 ± 27	945	662 - 1229	Pass
MASO-662	2/1/2020	Zn-65	842 ± 17	751	526 - 976	Pass
MASO-662	2/1/2020	K-40	710 ± 42	625	438 - 813	Pass
MAW-534	2/1/2020	I-129	0.81 ± 0.09	1.001	0.701 - 1.301	Pass
MAW-599	2/1/2020	H-3	202 ± 9	196	137 - 255	Pass
MAW-599	2/1/2020	Am-241	0.41 ± 0.09	0.547	0.383 - 0.711	Pass
MAW-599	2/1/2020	Cs-134	16.1 ± 0.3	18.5	13.0 - 24.1	Pass
MAW-599	2/1/2020	Cs-137	11.5 ± 0.4	11.3	7.9 - 14.7	Pass
MAW-599	2/1/2020	Co-57	20.0 ± 0.30	19.7	13.8 - 25.6	Pass
MAW-599	2/1/2020	Co-60	10.6 ± 0.2	10.6	7.4 - 13.8	Pass
MAW-599	2/1/2020	Mn-54	20.5 ± 0.4	19.6	13.7 - 25.5	Pass
MAW-599	2/1/2020	Zn-65	24.1 ± 0.70	22.2	15.5 - 28.9	Pass
MAW-599	2/1/2020	K-40	0.57 ± 1.54	0	NA [c]	Pass
MAW-599	2/1/2020	Fe-55	13.3 ± 12.2	17.8	12.5 - 23.1	Pass
MAW-599	2/1/2020	Ni-63	9.72 ± 0.43	11.1	7.8 - 14.4	Pass
MAW-599	2/1/2020	Sr-90	0.07 ± 0.18	0	NA [c]	Pass
MAW-599	2/1/2020	Tc-99	3.41 ± 0.31	3.63	2.54 - 4.72	Pass
MAW-599	2/1/2020	Ra-226	0.56 ± 0.06	0.365	0.256 - 0.475	Fail [e]
MAW-599	2/1/2020	Pu-238	0.69 ± 0.08	0.94	0.66 - 1.22	Pass
MAW-599	2/1/2020	Pu-239/240	0.48 ± 0.07	0.737	0.516 - 0.958	Fail [f]
MAW-599	2/1/2020	U-234	1.04 ± 0.08	0.97	0.68 - 1.26	Pass
MAW-599	2/1/2020	U-238	1.02 ± 0.08	0.95	0.67 - 1.24	Pass

TABLE A-7. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP).

			Concentration[a]			
Lab Code [b]	Reference Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
MAVE-668	2/1/2020	Cs-134	3.51 ± 0.22	3.82	2.67 - 4.97	Pass
MAVE-668	2/1/2020	Cs-137	3.04 ± 0.18	2.77	1.94 - 3.60	Pass
MAVE-668	2/1/2020	Co-57	0.02 ± 0.03	0	NA [c]	Pass
MAVE-668	2/1/2020	Co-60	2.92 ± 0.08	2.79	1.95 - 3.63	Pass
MAVE-668	2/1/2020	Mn-54	5.16 ± 0.14	4.58	3.21 - 5.95	Pass
MAVE-668	2/1/2020	Zn-65	4.36 ± 0.16	3.79	2.65 - 4.93	Pass
MAW-689	2/1/2020	Ra-226	172 ± 1	189	132 - 246	Pass
MAW-689	2/1/2020	Ra-228	65 ± 1	75	53 - 98	Pass
MAAP-3181	8/1/2020	Gross Alpha	0.45 ± 0.06	0.528	0.158 - 0.898	Pass
MAAP-3181	8/1/2020	Gross Beta	0.97 ± 0.04	0.915	0.458 - 1.373	Pass
MADW-3101	8/1/2020	Gross Alpha	0.57 ± 0.04	0.62	0.19 - 1.05	Pass
MADW-3101	8/1/2020	Gross Beta	0.75 ± 0.04	0.83	0.42 - 1.25	Pass
MASO-3179	8/1/2020	Cs-134	599 ± 7	710	497 - 923	Pass
MASO-3179	8/1/2020	Cs-137	3.33 ± 4.81	0	NA [c]	Pass
MASO-3179	8/1/2020	Co-57	1145 ± 8	1100	770 - 1430	Pass
MASO-3179	8/1/2020	Co-60	965 ± 9	1000	700 - 1300	Pass
MASO-3179	8/1/2020	Mn-54	651 ± 11	610	427 - 793	Pass
MASO-3179	8/1/2020	Zn-65	524 ± 14	470	329 - 611	Pass
MASO-3179	8/1/2020	K-40	684 ± 58	622	435 - 809	Pass
MAW-3175	8/1/2020	Cs-134	13.9 ± 0.3	15.2	10.6 - 19.8	Pass
MAW-3175	8/1/2020	Cs-137	15.4 ± 0.4	14.3	10.0 - 18.6	Pass
MAW-3175	8/1/2020	Co-57	0.10 ± 0.16	0	NA [c]	Pass
MAW-3175	8/1/2020	Co-60	12.5 ± 0.3	12.2	8.5 - 15.9	Pass
MAW-3175	8/1/2020	Mn-54	0.07 ± 0.17	0	NA [c]	Pass
MAW-3175	8/1/2020	Zn-65	18.3 ± 0.6	16.9	11.8 - 22.0	Pass
MAW-3175	8/1/2020	K-40	1.06 ± 1.65	0	NA [c]	Pass

TABLE A-7. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP).

			Concentration[a]			
Lab Code [b]	Reference Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
MAAP-3177	8/1/2020	Cs-134	1.28 ± 0.05	1.83	1.28 - 2.38	Fail[g]
MAAP-3177	8/1/2020	Cs-137	0.981 ± 0.068	0.996	0.697 - 1.295	Pass
MAAP-3177	8/1/2020	Co-57	0.020 ± 0.027	0	NA [c]	Pass
MAAP-3177	8/1/2020	Co-60	1.57 ± 0.06	1.73	1.21 - 2.25	Pass
MAAP-3177	8/1/2020	Mn-54	0.751 ± 0.077	1.400	0.98 - 1.82	Fail[h]
MAAP-3177	8/1/2020	Zn-65	2.07 ± 0.15	2.00	1.40 - 2.60	Pass
MAVE-3185	8/1/2020	Cs-134	4.73 ± 0.10	4.94	3.46 - 6.42	Pass
MAVE-3185	8/1/2020	Cs-137	0.03 ± 0.06	0	NA [c]	Pass
MAVE-3185	8/1/2020	Co-57	7.83 ± 0.12	6.67	4.67 - 8.67	Pass
MAVE-3185	8/1/2020	Co-60	4.41 ± 0.10	4.13	2.89 - 5.37	Pass
MAVE-3185	8/1/2020	Mn-54	6.52 ± 0.18	5.84	4.09 - 7.59	Pass
MAVE-3185	8/1/2020	Zn-65	7.26 ± 0.19	6.38	4.47 - 8.29	Pass

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

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

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

[d] The lab utilized a MAPEP specific gross alpha/beta filter calibration as discussed in the MAPEP test instructions for MAAP-664. Using the MAPEP specific calibration for MAAP-664 caused the bias to shift from low to high. The subsequent MAPEP study result was acceptable. See Lab code MAAP-3101 (reference date 8/1/2020).

[e] An investigation of the Radium-226 failure was inconclusive. Subsequent Ra-226 PT analyses were satisfactory. See ERA RAD-121 and RAD-122 studies Table A-1 and NY ELAP shipment 437R Table A-2.

[f] Analysis was repeated in duplicate with acceptable results: Pu-238 (0.97 & 1.10 Bq/Kg); Pu-239 (0.83 & 0.83 Bq/Kg). The cause of the failure could not be determined.

[g] Analysis was run in duplicate. Results were (1.18 Bq/sample and 1.37 Bq/sample). The submitted result was the mean of the two results (1.28 ± 0.05 Bq/sample).

[h] A data transcription error resulted in an erroneous reported value. The actual result (1.36 ± 0.08 Bq/L) passes.

TABLE A-8. Interlaboratory Comparison Crosscheck Program, Environmental Resource Associates (ERA)[a].

MRAD-30 Study

Lab Code [b]	Concentration [a]					
	Date	Analysis	Laboratory Result	ERA Value [c]	Control Limits [d]	Acceptance
ERAP-769	3/16/2020	Am-241	71.0	74.7	53.3 - 99.6	Pass
ERAP-769	3/16/2020	Cs-134	1210	1390	902 - 1700	Pass
ERAP-769	3/16/2020	Cs-137	393	351	288 - 460	Pass
ERAP-769	3/16/2020	Co-60	450.0	422.0	359.0 - 536	Pass
ERAP-769	3/16/2020	Fe-55	1200	1260	460 - 2010	Pass
ERAP-769	3/16/2020	Mn-54	< 2.4	< 50.0	0.00 - 50.0	Pass
ERAP-769	3/16/2020	Zn-65	856	694	569 - 1060	Pass
ERAP-769	3/16/2020	Pu-238	31.4	28.0	21.1 - 34.4	Pass
ERAP-769	3/16/2020	Pu-239	43.9	40.1	30.0 - 48.4	Pass
ERAP-769	3/16/2020	Sr-90	190	175	111 - 238	Pass
ERAP-769	3/16/2020	U-234	56.7	56.2	41.7 - 65.9	Pass
ERAP-769	3/16/2020	U-238	57.0	55.7	42.1 - 66.5	Pass
ERAP-771	3/16/2020	Gross Alpha	33.4	29.3	15.3 - 48.3	Pass
ERAP-771	3/16/2020	Gross Beta	68.3	66.4	40.3 - 100	Pass

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

[b] Laboratory code ERAP (air filter). Results are reported in units of (pCi/Filter).

[c] The ERA Assigned values for the air filter standards are equal to 100% of the parameter present in the standard as determined by the gravimetric and/or volumetric measurements made during standard preparation as applicable.

[d] The acceptance limits are established per the guidelines contained in the Department of Energy (DOE) report EML-564, Analysis of Environmental Measurements Laboratory (EML) Quality Assessment Program (QAP) Data Determination of Operational Criteria and Control Limits for Performance Evaluation Purposes or ERA's SOP for the generation of Performance Acceptance Limits.

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Appendix B

Data Reporting Conventions

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

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

This report describes the conduct of the EPP for the Callaway Plant during 2020.

2.0. Unusual or Important Events

No unusual or important events reportable under the EPP Section 4.1 were identified during 2020.

3.0. EPP Non-compliances

During 2020, there was one non-compliance with the EPP.

Data used to calculate the Total Dissolved Solids (TDS) value for the February 24, 2020 Cooling CTBD) sample was entered incorrectly in the computer program which resulted in missing a sample required by Callaway's National Pollutant Discharge Elimination System (NPDES) permit. The error was discovered while reviewing data for the monthly NPDES Discharge Monitoring Report (DMR). Based on this the sample results were invalidated. When the analytical error was discovered, February had already ended which means there was no chance to resample. Therefore this was reported to the Missouri Department of Natural Resources as a missed sample.

Callaway's NPDES permit classifies the missed sample as an "Other Non- Compliance" According to the "Standard Conditions for NPDES Permits Issued by the Missouri Department of Natural Resources Missouri Clean Water Commission, Revised August 1, 2014", Part 1, Section B, Item 5. Based on this, a note was added to the February 2020 Discharge Monitoring Report explaining the missing sample. This is the only reporting required.

4.0. Nonroutine Reports

There were no nonroutine reports submitted in accordance with the EPP, Section 5.4.2 in 2017.

5.0. Plant Design and Operation Environmental Evaluations.

This section lists all changes in the plant design, operation, tests or experiments installed during 2020, which could have involved a potentially significant unreviewed environmental question in accordance with section 3.1 of Appendix B.

During 2020, no major plant changes were completed that could have involved a potentially significant unreviewed environmental question.

APPENDIX D

Sampling Location Maps

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

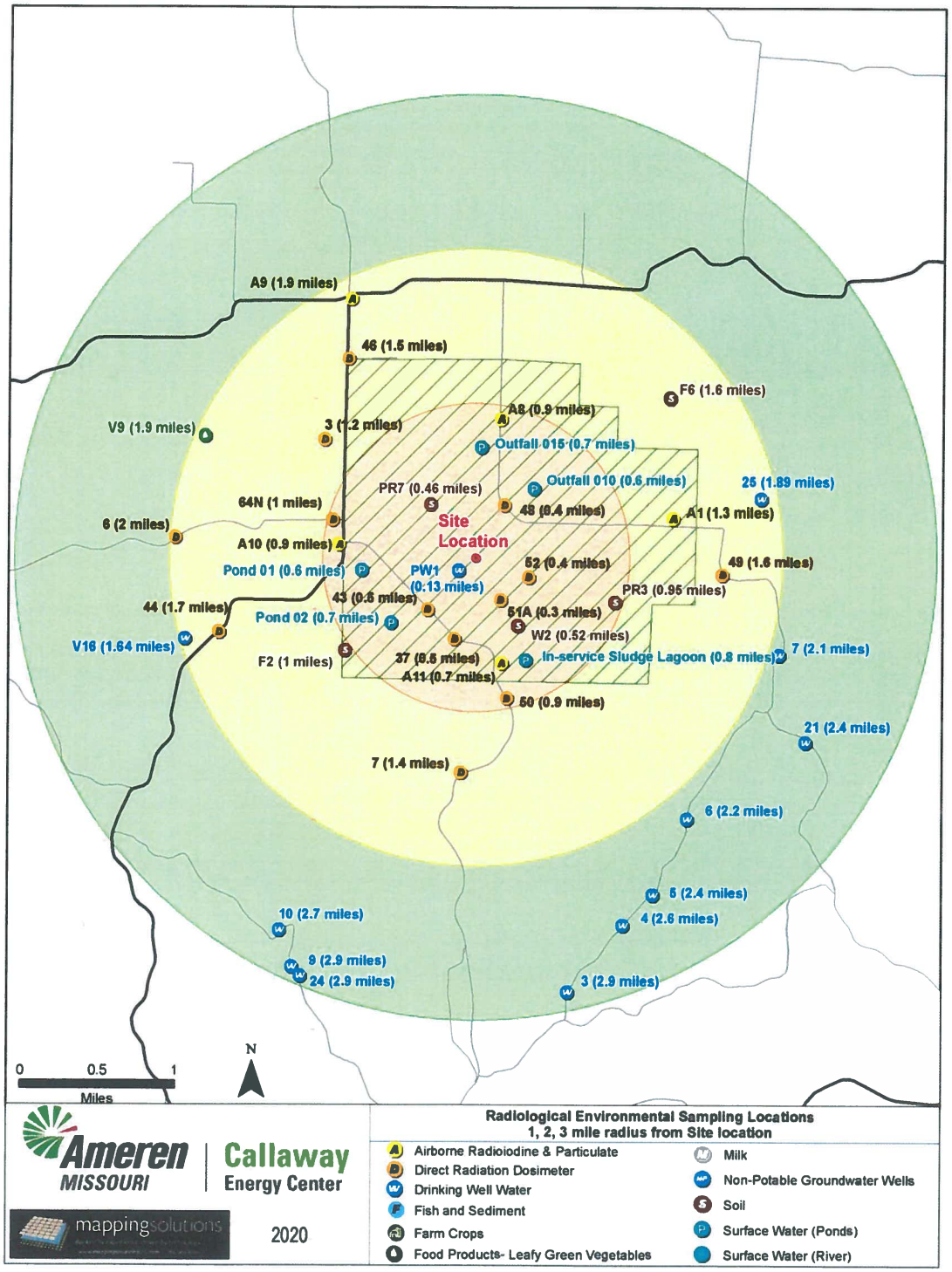


Figure D-2. Radiological Environmental Sampling Locations 3, 4, 5, 6 mile radius from site location.

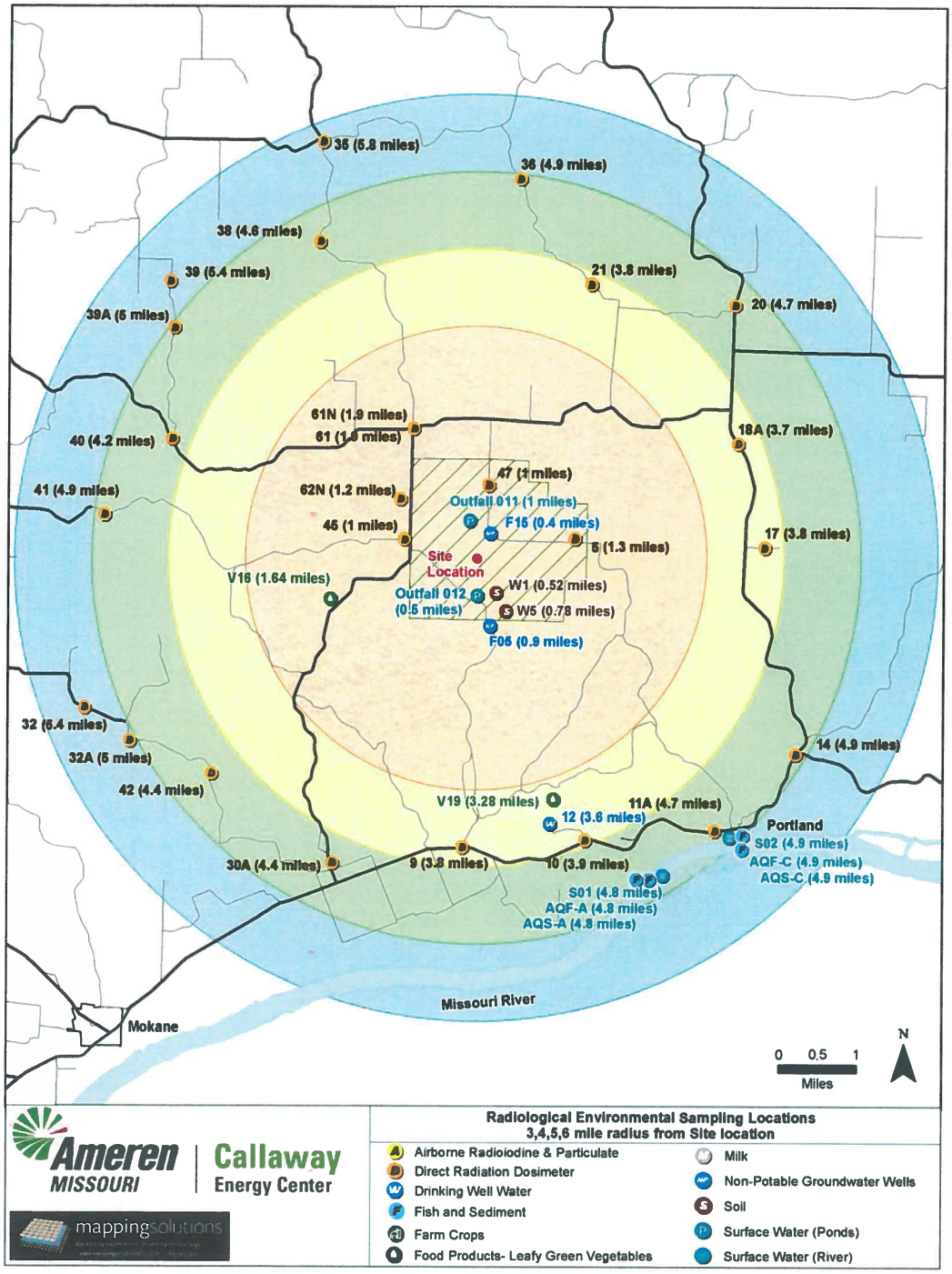


Figure D-3. Radiological Environmental Sampling Locations 5, 10, 15 mile radius from site location.

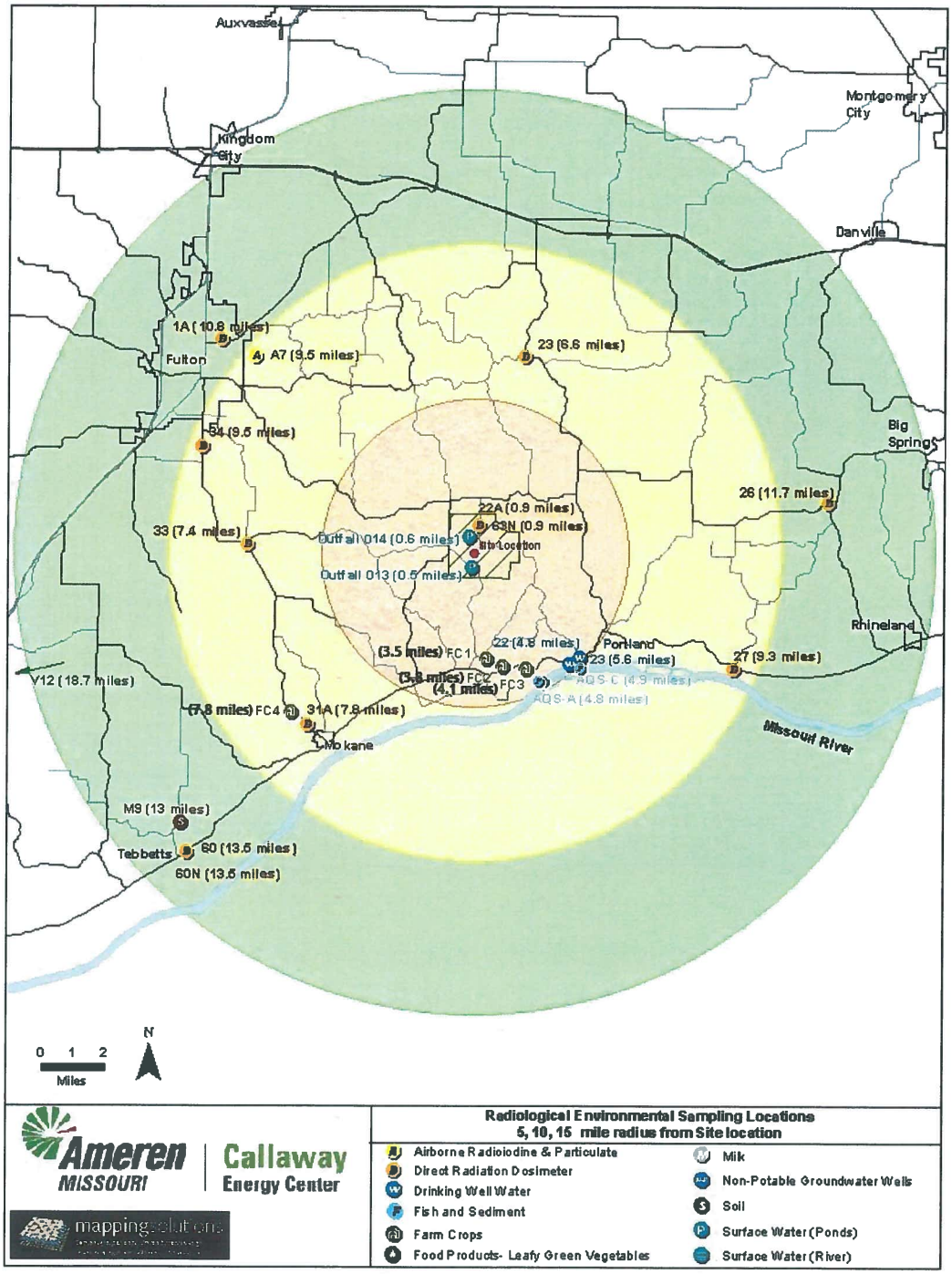


Figure D-4. Non-Potable Groundwater Monitoring Wells, 600 ft radius from Site.

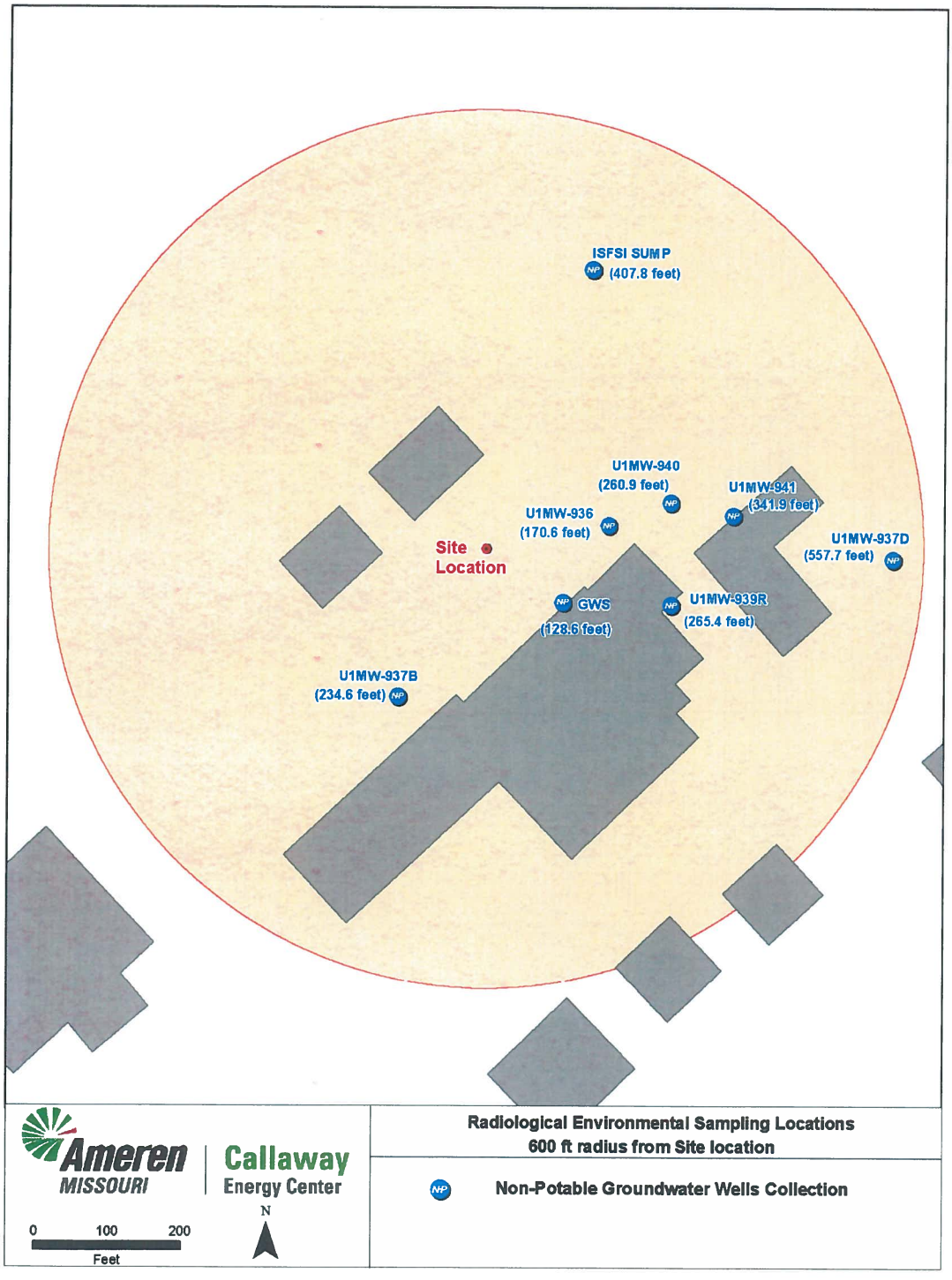
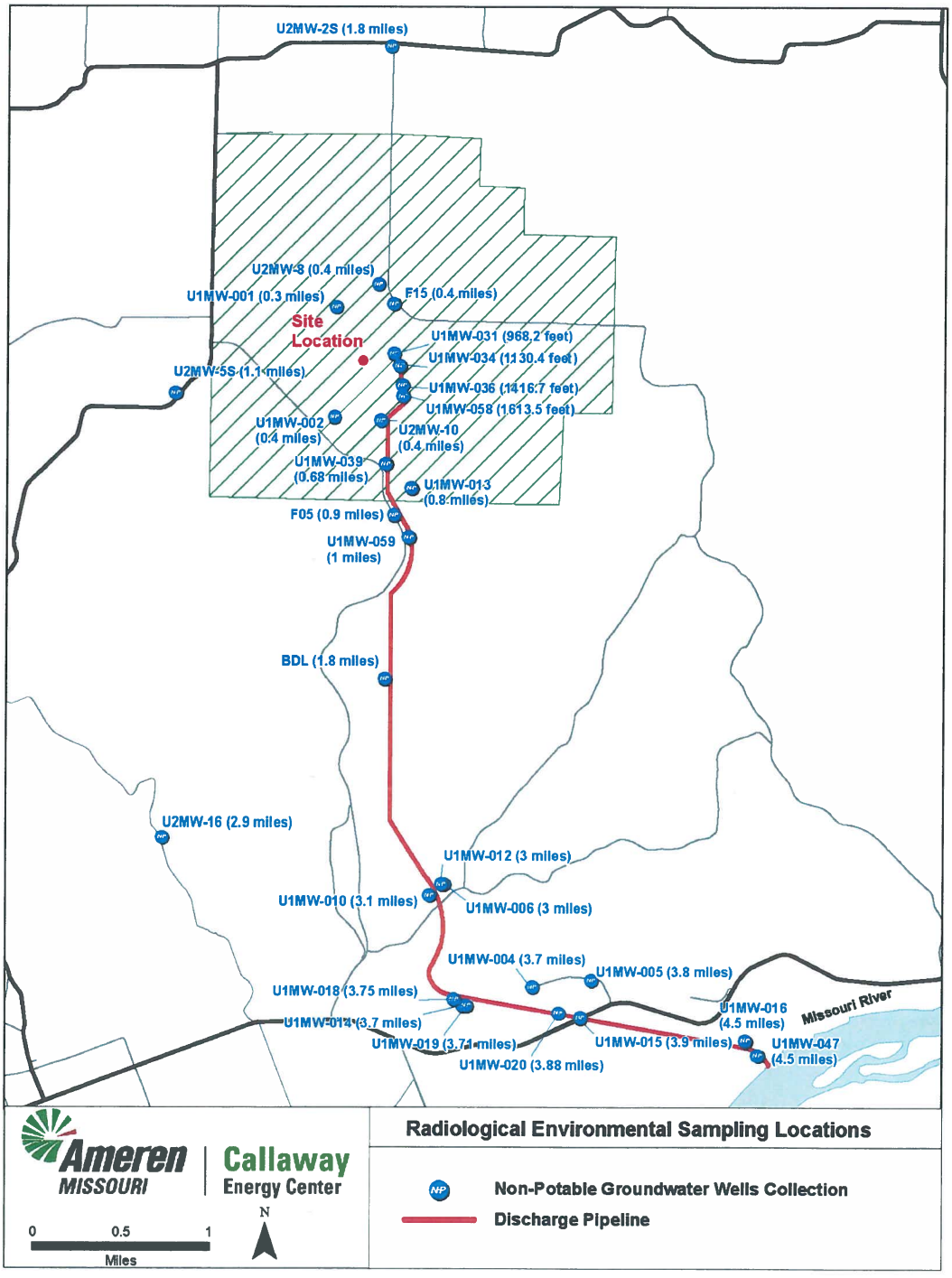


Figure D-5. Non-Potable Groundwater Monitoring Wells Collection.



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AMEREN MISSOURI,
CALLAWAY ENERGY CENTER
FULTON, MISSOURI

Docket Numbers 50-483 and 72-1045

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

to

THE UNITED STATES NUCLEAR REGULATORY COMMISSION

Part II

DATA TABULATIONS AND ANALYSES

January 1 to December 31, 2020

Prepared by

ENVIRONMENTAL, Inc.
Midwest Laboratory

Submitted by

Union Electric Co.
dba Ameren Missouri

Project No. 8036

Approved : _____

Ashok Banavali,Ph.D.
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 Ameren Missouri, Callaway Energy Center, Fulton, Missouri in 2020. 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 the figures in Appendix D.

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

2.0 DATA TABLES

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

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-A-001							
		^{7}Be	^{58}Co	^{60}Co	^{95}Zr	^{134}Cs	^{137}Cs	$^{140}BaLa$	^{144}Ce
Required LLDs		-	-	-	-	0.050	0.060	-	-
Date Collected	Vol.								
01-09-20	265	< 0.14	< 0.007	< 0.007	< 0.011	< 0.012	< 0.011	< 0.031	< 0.048
01-16-20	264	< 0.10	< 0.008	< 0.005	< 0.013	< 0.008	< 0.009	< 0.011	< 0.052
01-22-20	236	< 0.12	< 0.006	< 0.004	< 0.011	< 0.009	< 0.008	< 0.027	< 0.055
01-30-20	302	< 0.07	< 0.007	< 0.005	< 0.011	< 0.009	< 0.008	< 0.005	< 0.054
02-06-20	267	0.20 ± 0.12	< 0.007	< 0.004	< 0.015	< 0.011	< 0.008	< 0.026	< 0.043
02-13-20	269	< 0.12	< 0.013	< 0.005	< 0.020	< 0.015	< 0.009	< 0.025	< 0.063
02-20-20	268	< 0.15	< 0.013	< 0.009	< 0.029	< 0.017	< 0.018	< 0.012	< 0.057
02-27-20	271	< 0.13	< 0.008	< 0.005	< 0.015	< 0.014	< 0.010	< 0.027	< 0.070
03-05-20	266	< 0.15	< 0.013	< 0.013	< 0.016	< 0.015	< 0.013	< 0.025	< 0.065
03-12-20	267	0.33 ± 0.15	< 0.016	< 0.016	< 0.020	< 0.015	< 0.015	< 0.019	< 0.055
03-19-20	271	< 0.07	< 0.006	< 0.006	< 0.018	< 0.010	< 0.008	< 0.013	< 0.042
03-26-20	264	< 0.11	< 0.004	< 0.008	< 0.011	< 0.010	< 0.008	< 0.009	< 0.038
04-02-20	262	0.23 ± 0.11	< 0.011	< 0.019	< 0.020	< 0.015	< 0.013	< 0.012	< 0.055
04-09-20	256	< 0.12	< 0.014	< 0.018	< 0.015	< 0.017	< 0.012	< 0.015	< 0.064
04-16-20	253	0.22 ± 0.12	< 0.007	< 0.007	< 0.020	< 0.010	< 0.009	< 0.010	< 0.061
04-23-20	257	< 0.13	< 0.011	< 0.010	< 0.027	< 0.014	< 0.015	< 0.021	< 0.072
04-30-20	251	0.17 ± 0.08	< 0.010	< 0.005	< 0.012	< 0.011	< 0.006	< 0.011	< 0.060
05-07-20	256	0.24 ± 0.14	< 0.012	< 0.004	< 0.023	< 0.014	< 0.008	< 0.046	< 0.045
05-14-20	253	< 0.11	< 0.010	< 0.006	< 0.015	< 0.009	< 0.011	< 0.021	< 0.035
05-21-20	254	< 0.11	< 0.014	< 0.008	< 0.022	< 0.011	< 0.006	< 0.017	< 0.053
05-27-20	236	< 0.12	< 0.009	< 0.004	< 0.017	< 0.013	< 0.012	< 0.019	< 0.063
06-04-20	326	< 0.09	< 0.010	< 0.006	< 0.013	< 0.011	< 0.009	< 0.014	< 0.053
06-11-20	281	< 0.11	< 0.006	< 0.004	< 0.012	< 0.009	< 0.005	< 0.014	< 0.041
06-18-20	295	0.29 ± 0.10	< 0.005	< 0.010	< 0.012	< 0.009	< 0.005	< 0.014	< 0.050
06-25-20	280	0.21 ± 0.09	< 0.005	< 0.010	< 0.017	< 0.011	< 0.007	< 0.014	< 0.041
07-02-20	273	0.21 ± 0.09	< 0.009	< 0.012	< 0.018	< 0.010	< 0.005	< 0.011	< 0.056
07-09-20	281	0.26 ± 0.11	< 0.005	< 0.012	< 0.012	< 0.008	< 0.007	< 0.025	< 0.060
07-16-20	293	0.28 ± 0.10	< 0.007	< 0.009	< 0.010	< 0.009	< 0.007	< 0.020	< 0.029
07-23-20	273	< 0.14	< 0.011	< 0.013	< 0.022	< 0.011	< 0.010	< 0.052	< 0.055
07-29-20	241	0.26 ± 0.14	< 0.007	< 0.011	< 0.016	< 0.012	< 0.010	< 0.024	< 0.059
08-06-20	324	< 0.13	< 0.015	< 0.008	< 0.023	< 0.012	< 0.014	< 0.021	< 0.054
08-13-20	298	0.21 ± 0.12	< 0.009	< 0.010	< 0.010	< 0.010	< 0.010	< 0.014	< 0.044
08-20-20	285	0.17 ± 0.10	< 0.010	< 0.009	< 0.019	< 0.012	< 0.011	< 0.016	< 0.030
08-27-20	269	0.26 ± 0.13	< 0.008	< 0.010	< 0.020	< 0.009	< 0.007	< 0.015	< 0.042
09-03-20	285	< 0.13	< 0.006	< 0.007	< 0.015	< 0.009	< 0.009	< 0.012	< 0.037
09-10-20	279[b]	0.15 ± 0.08	< 0.011	< 0.010	< 0.007	< 0.010	< 0.009	< 0.022	< 0.046
09-17-20	290	0.27 ± 0.10	< 0.011	< 0.008	< 0.020	< 0.011	< 0.006	< 0.016	< 0.027
09-24-20	288	0.30 ± 0.12	< 0.012	< 0.009	< 0.009	< 0.010	< 0.009	< 0.017	< 0.035
10-01-20	289	0.28 ± 0.11	< 0.006	< 0.009	< 0.015	< 0.009	< 0.010	< 0.012	< 0.043
10-08-20	291	< 0.12	< 0.010	< 0.014	< 0.017	< 0.013	< 0.008	< 0.014	< 0.049
10-15-20	287	< 0.14	< 0.009	< 0.009	< 0.021	< 0.010	< 0.010	< 0.031	< 0.032

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

[b] 2.5 hrs loss of flow. This missing sample time would not have impacted the sample negatively (CR#202004554).

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.								
10-22-20	299	< 0.13	< 0.011	< 0.011	< 0.018	< 0.012	< 0.011	< 0.034	< 0.050
10-29-20	295	< 0.08	< 0.011	< 0.009	< 0.009	< 0.010	< 0.007	< 0.015	< 0.054
11-05-20	301	< 0.12	< 0.015	< 0.011	< 0.018	< 0.011	< 0.006	< 0.014	< 0.040
11-12-20	288	0.20 ± 0.11	< 0.011	< 0.019	< 0.018	< 0.020	< 0.011	< 0.031	< 0.075
11-19-20	297	< 0.16	< 0.015	< 0.010	< 0.017	< 0.014	< 0.013	< 0.045	< 0.062
11-25-20	250	0.20 ± 0.11	< 0.014	< 0.009	< 0.023	< 0.011	< 0.011	< 0.023	< 0.064
12-03-20	343	< 0.11	< 0.012	< 0.007	< 0.017	< 0.011	< 0.006	< 0.019	< 0.030
12-10-20	295	< 0.12	< 0.007	< 0.008	< 0.019	< 0.010	< 0.010	< 0.011	< 0.063
12-17-20	297	< 0.09	< 0.008	< 0.008	< 0.019	< 0.012	< 0.008	< 0.016	< 0.052
12-23-20	245	< 0.14	< 0.019	< 0.021	< 0.032	< 0.020	< 0.020	< 0.057	< 0.076
12-30-20	291	< 0.12	< 0.012	< 0.010	< 0.017	< 0.015	< 0.008	< 0.023	< 0.062

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

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

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-A-007							
		^{7}Be	^{58}Co	^{60}Co	^{95}Zr	^{134}Cs	^{137}Cs	$^{140}BaLa$	^{144}Ce
Required LLDs		-	-	-	-	0.050	0.060	-	-
Date Collected	Vol.								
01-09-20	284	< 0.12	< 0.006	< 0.005	< 0.010	< 0.010	< 0.011	< 0.046	< 0.039
01-16-20	287	0.15 ± 0.08	< 0.005	< 0.003	< 0.011	< 0.009	< 0.008	< 0.007	< 0.027
01-22-20	250	< 0.13	< 0.011	< 0.006	< 0.017	< 0.012	< 0.006	< 0.032	< 0.058
01-30-20	324	< 0.10	< 0.005	< 0.013	< 0.020	< 0.012	< 0.007	< 0.019	< 0.038
02-06-20	285	< 0.09	< 0.006	< 0.005	< 0.016	< 0.010	< 0.006	< 0.023	< 0.040
02-13-20	284	< 0.11	< 0.008	< 0.008	< 0.018	< 0.011	< 0.006	< 0.022	< 0.045
02-20-20	282	< 0.13	< 0.010	< 0.010	< 0.008	< 0.014	< 0.010	< 0.027	< 0.060
02-27-20	278	< 0.15	< 0.014	< 0.017	< 0.026	< 0.019	< 0.012	< 0.031	< 0.072
03-05-20	271	< 0.11	< 0.011	< 0.016	< 0.020	< 0.014	< 0.009	< 0.017	< 0.060
03-12-20	283	< 0.12	< 0.009	< 0.013	< 0.015	< 0.013	< 0.012	< 0.016	< 0.070
03-19-20	288	< 0.09	< 0.007	< 0.008	< 0.010	< 0.010	< 0.008	< 0.011	< 0.051
03-26-20	282	< 0.11	< 0.006	< 0.008	< 0.022	< 0.013	< 0.012	< 0.011	< 0.045
04-02-20	277	< 0.10	< 0.008	< 0.006	< 0.018	< 0.010	< 0.010	< 0.013	< 0.047
04-09-20	286	< 0.11	< 0.010	< 0.010	< 0.015	< 0.010	< 0.010	< 0.005	< 0.036
04-16-20	281	0.20 ± 0.09	< 0.006	< 0.008	< 0.015	< 0.009	< 0.009	< 0.010	< 0.042
04-23-20	284	< 0.10	< 0.006	< 0.008	< 0.011	< 0.010	< 0.008	< 0.013	< 0.053
04-30-20	277	0.18 ± 0.11	< 0.005	< 0.005	< 0.011	< 0.009	< 0.008	< 0.010	< 0.047
05-07-20	281	< 0.13	< 0.010	< 0.010	< 0.014	< 0.011	< 0.009	< 0.022	< 0.055
05-14-20	283	< 0.12	< 0.013	< 0.010	< 0.018	< 0.012	< 0.011	< 0.029	< 0.053
05-21-20	282	< 0.12	< 0.013	< 0.005	< 0.016	< 0.012	< 0.009	< 0.016	< 0.052
05-27-20	235	< 0.14	< 0.009	< 0.006	< 0.021	< 0.014	< 0.013	< 0.018	< 0.039
06-04-20	322	0.15 ± 0.08	< 0.004	< 0.006	< 0.012	< 0.008	< 0.007	< 0.014	< 0.049
06-11-20	275	0.14 ± 0.08	< 0.008	< 0.014	< 0.013	< 0.012	< 0.006	< 0.024	< 0.048
06-18-20	287	0.22 ± 0.09	< 0.010	< 0.007	< 0.011	< 0.009	< 0.011	< 0.005	< 0.051
06-25-20	272	< 0.13	< 0.005	< 0.015	< 0.012	< 0.012	< 0.007	< 0.016	< 0.049
07-02-20	262	< 0.10	< 0.011	< 0.009	< 0.013	< 0.010	< 0.008	< 0.018	< 0.052
07-09-20	270	0.22 ± 0.13	< 0.007	< 0.014	< 0.018	< 0.011	< 0.013	< 0.020	< 0.035
07-16-20	280	0.29 ± 0.14	< 0.012	< 0.010	< 0.018	< 0.009	< 0.009	< 0.022	< 0.042
07-23-20	261	0.32 ± 0.15	< 0.012	< 0.011	< 0.013	< 0.010	< 0.009	< 0.031	< 0.048
07-29-20	227	< 0.16	< 0.015	< 0.020	< 0.024	< 0.014	< 0.011	< 0.033	< 0.064
08-06-20	301	< 0.11	< 0.009	< 0.012	< 0.011	< 0.010	< 0.006	< 0.013	< 0.046
08-13-20	278	< 0.12	< 0.007	< 0.009	< 0.017	< 0.012	< 0.008	< 0.019	< 0.060
08-20-20	259	< 0.10	< 0.006	< 0.011	< 0.010	< 0.010	< 0.006	< 0.012	< 0.046
08-27-20	249	< 0.11	< 0.010	< 0.010	< 0.009	< 0.009	< 0.013	< 0.028	< 0.040
09-03-20	263	< 0.10	< 0.008	< 0.008	< 0.016	< 0.010	< 0.009	< 0.015	< 0.050
09-10-20	261	< 0.09	< 0.008	< 0.010	< 0.010	< 0.012	< 0.008	< 0.014	< 0.040
09-17-20	268	0.18 ± 0.09	< 0.013	< 0.007	< 0.019	< 0.011	< 0.011	< 0.016	< 0.056
09-24-20	264	0.24 ± 0.10	< 0.009	< 0.010	< 0.015	< 0.011	< 0.006	< 0.009	< 0.051
10-01-20	263	< 0.14	< 0.009	< 0.010	< 0.022	< 0.016	< 0.007	< 0.023	< 0.050
10-08-20	263	< 0.10	< 0.009	< 0.009	< 0.012	< 0.010	< 0.011	< 0.017	< 0.064
10-15-20	258	0.36 ± 0.16	< 0.012	< 0.013	< 0.010	< 0.011	< 0.014	< 0.032	< 0.040

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

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

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-A-007 (cont.)							
		^{7}Be	^{58}Co	^{60}Co	^{95}Zr	^{134}Cs	^{137}Cs	$^{140}BaLa$	^{144}Ce
Required LLDs		-	-	-	-	0.050	0.060	-	-
Date Collected	Vol.								
10-22-20	264	0.22 ± 0.10	< 0.010	< 0.008	< 0.018	< 0.010	< 0.008	< 0.032	< 0.058
10-29-20	259	< 0.11	< 0.010	< 0.008	< 0.009	< 0.011	< 0.010	< 0.033	< 0.055
11-05-20	266	0.23 ± 0.13	< 0.011	< 0.009	< 0.019	< 0.010	< 0.011	< 0.015	< 0.047
11-12-20	255	0.20 ± 0.11	< 0.008	< 0.010	< 0.008	< 0.011	< 0.014	< 0.012	< 0.047
11-19-20	258	0.14 ± 0.08	< 0.005	< 0.009	< 0.018	< 0.011	< 0.006	< 0.020	< 0.036
11-25-20	219	< 0.10	< 0.015	< 0.009	< 0.015	< 0.012	< 0.008	< 0.024	< 0.053
12-03-20	299	0.21 ± 0.10	< 0.009	< 0.008	< 0.015	< 0.010	< 0.009	< 0.016	< 0.044
12-10-20	257	0.30 ± 0.12	< 0.008	< 0.010	< 0.009	< 0.010	< 0.007	< 0.015	< 0.054
12-17-20	256	< 0.13	< 0.006	< 0.014	< 0.016	< 0.011	< 0.010	< 0.015	< 0.048
12-23-20	219	< 0.14	< 0.014	< 0.009	< 0.026	< 0.013	< 0.012	< 0.018	< 0.061
12-30-20	256	< 0.10	< 0.006	< 0.007	< 0.018	< 0.009	< 0.012	< 0.007	< 0.055

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

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

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-A-008							
		^{7}Be	^{58}Co	^{60}Co	^{95}Zr	^{134}Cs	^{137}Cs	$^{140}BaLa$	^{144}Ce
Required LLDs		-	-	-	-	0.050	0.060	-	-
Date Collected	Vol.								
01-09-20	251	< 0.15	< 0.011	< 0.009	< 0.016	< 0.010	< 0.010	< 0.019	< 0.063
01-16-20	244	< 0.13	< 0.007	< 0.007	< 0.016	< 0.010	< 0.008	< 0.038	< 0.052
01-22-20	214	< 0.16	< 0.017	< 0.015	< 0.021	< 0.017	< 0.017	< 0.022	< 0.086
01-30-20	215[b]	< 0.12	< 0.014	< 0.017	< 0.017	< 0.016	< 0.013	< 0.020	< 0.088
02-06-20	283	< 0.15	< 0.014	< 0.012	< 0.023	< 0.015	< 0.012	< 0.036	< 0.039
02-13-20	291	< 0.12	< 0.008	< 0.009	< 0.021	< 0.011	< 0.008	< 0.026	< 0.060
02-20-20	293	< 0.13	< 0.017	< 0.017	< 0.025	< 0.016	< 0.014	< 0.018	< 0.057
02-27-20	296	0.21 ± 0.09	< 0.009	< 0.004	< 0.007	< 0.010	< 0.009	< 0.023	< 0.043
03-05-20	289	< 0.12	< 0.010	< 0.011	< 0.019	< 0.011	< 0.013	< 0.018	< 0.045
03-12-20	291	< 0.14	< 0.007	< 0.013	< 0.026	< 0.017	< 0.014	< 0.015	< 0.056
03-19-20	295	< 0.08	< 0.006	< 0.008	< 0.017	< 0.009	< 0.008	< 0.010	< 0.039
03-26-20	287	< 0.10	< 0.009	< 0.007	< 0.016	< 0.013	< 0.013	< 0.014	< 0.049
04-02-20	285	0.20 ± 0.09	< 0.007	< 0.005	< 0.013	< 0.009	< 0.009	< 0.011	< 0.041
04-09-20	274	< 0.10	< 0.003	< 0.008	< 0.008	< 0.010	< 0.010	< 0.009	< 0.031
04-16-20	266	0.19 ± 0.10	< 0.010	< 0.008	< 0.022	< 0.010	< 0.009	< 0.011	< 0.068
04-23-20	273	0.21 ± 0.11	< 0.006	< 0.005	< 0.015	< 0.011	< 0.014	< 0.007	< 0.049
04-30-20	272	< 0.10	< 0.009	< 0.006	< 0.012	< 0.009	< 0.010	< 0.012	< 0.044
05-07-20	278	0.30 ± 0.15	< 0.011	< 0.010	< 0.013	< 0.012	< 0.008	< 0.031	< 0.052
05-14-20	268[c]	0.17 ± 0.09	< 0.010	< 0.008	< 0.016	< 0.010	< 0.009	< 0.013	< 0.041
05-21-20	278	< 0.10	< 0.006	< 0.005	< 0.013	< 0.009	< 0.009	< 0.016	< 0.045
05-27-20	239	< 0.10	< 0.005	< 0.004	< 0.018	< 0.011	< 0.012	< 0.016	< 0.036
06-04-20	326	< 0.08	< 0.003	< 0.003	< 0.009	< 0.008	< 0.008	< 0.017	< 0.042
06-11-20	282	0.20 ± 0.10	< 0.005	< 0.004	< 0.012	< 0.010	< 0.007	< 0.011	< 0.035
06-18-20	294	0.33 ± 0.11	< 0.004	< 0.008	< 0.017	< 0.010	< 0.011	< 0.015	< 0.059
06-25-20	277	0.26 ± 0.09	< 0.008	< 0.011	< 0.017	< 0.010	< 0.006	< 0.011	< 0.032
07-02-20	268	< 0.12	< 0.011	< 0.012	< 0.022	< 0.013	< 0.013	< 0.016	< 0.060
07-09-20	284	< 0.18	< 0.016	< 0.012	< 0.014	< 0.013	< 0.007	< 0.044	< 0.043
07-16-20	289	0.27 ± 0.12	< 0.008	< 0.010	< 0.020	< 0.010	< 0.009	< 0.019	< 0.048
07-23-20	269	0.21 ± 0.12	< 0.004	< 0.011	< 0.011	< 0.012	< 0.010	< 0.023	< 0.032
07-29-20	239	< 0.16	< 0.016	< 0.009	< 0.020	< 0.013	< 0.013	< 0.034	< 0.046
08-06-20	311	< 0.12	< 0.009	< 0.008	< 0.015	< 0.009	< 0.009	< 0.018	< 0.035
08-13-20	287	0.23 ± 0.09	< 0.007	< 0.008	< 0.019	< 0.011	< 0.009	< 0.017	< 0.041
08-20-20	274	0.20 ± 0.11	< 0.006	< 0.008	< 0.017	< 0.010	< 0.006	< 0.012	< 0.038
08-27-20	261	< 0.14	< 0.011	< 0.012	< 0.018	< 0.014	< 0.013	< 0.020	< 0.045
09-03-20	272	< 0.14	< 0.009	< 0.009	< 0.013	< 0.011	< 0.011	< 0.025	< 0.033
09-10-20	266	< 0.14	< 0.008	< 0.010	< 0.013	< 0.014	< 0.009	< 0.021	< 0.039
09-17-20	270	< 0.16	< 0.016	< 0.017	< 0.037	< 0.019	< 0.016	< 0.056	< 0.071
09-24-20	263	0.29 ± 0.10	< 0.005	< 0.009	< 0.010	< 0.011	< 0.011	< 0.013	< 0.043
10-01-20	282	0.20 ± 0.08	< 0.006	< 0.007	< 0.008	< 0.011	< 0.011	< 0.012	< 0.029
10-08-20	284	< 0.12	< 0.009	< 0.008	< 0.013	< 0.011	< 0.007	< 0.026	< 0.055
10-15-20	279	0.20 ± 0.11	< 0.011	< 0.009	< 0.016	< 0.010	< 0.009	< 0.020	< 0.048

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

[b] Lower volume possibly caused by a pump failure. I-131 < 0.026 pCi/m^3 (CR#202000546).

[c] 2 hours 20 minutes of lost sample time. The lost sample time would not have impacted the sample negatively (CR#202002472). See the narrative in Part I for details.

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.								
10-22-20	291	0.22 ± 0.13	< 0.010	< 0.008	< 0.016	< 0.008	< 0.004	< 0.017	< 0.044
10-29-20	289	< 0.12	< 0.008	< 0.009	< 0.016	< 0.010	< 0.005	< 0.020	< 0.050
11-05-20	295	0.16 ± 0.09	< 0.008	< 0.008	< 0.009	< 0.008	< 0.006	< 0.021	< 0.046
11-12-20					NS[b]				
11-19-20	255	< 0.13	< 0.011	< 0.011	< 0.015	< 0.012	< 0.005	< 0.022	< 0.048
11-25-20	233	< 0.14	< 0.008	< 0.011	< 0.026	< 0.012	< 0.009	< 0.037	< 0.073
12-03-20	314	< 0.10	< 0.006	< 0.014	< 0.014	< 0.011	< 0.009	< 0.016	< 0.066
12-10-20	275	< 0.17	< 0.014	< 0.014	< 0.014	< 0.016	< 0.008	< 0.034	< 0.058
12-17-20	267	< 0.11	< 0.009	< 0.009	< 0.011	< 0.011	< 0.010	< 0.012	< 0.063
12-23-20	239	< 0.17	< 0.010	< 0.013	< 0.028	< 0.012	< 0.008	< 0.043	< 0.057
12-30-20	281	< 0.11	< 0.008	< 0.010	< 0.020	< 0.011	< 0.012	< 0.023	< 0.059

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

[b] "NS" = No sample; see Part I Table 5.5, Listing of Missed Samples.

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.								
01-09-20	272	< 0.11	< 0.011	< 0.005	< 0.012	< 0.011	< 0.007	< 0.046	< 0.045
01-16-20	267	< 0.10	< 0.007	< 0.010	< 0.011	< 0.010	< 0.012	< 0.014	< 0.049
01-22-20	238	< 0.11	< 0.011	< 0.005	< 0.016	< 0.012	< 0.009	< 0.030	< 0.052
01-30-20	307	< 0.09	< 0.009	< 0.006	< 0.017	< 0.010	< 0.009	< 0.015	< 0.042
02-06-20	261	< 0.16	< 0.010	< 0.015	< 0.034	< 0.016	< 0.018	< 0.026	< 0.055
02-13-20	266	< 0.11	< 0.011	< 0.004	< 0.010	< 0.011	< 0.009	< 0.026	< 0.036
02-20-20	264	< 0.14	< 0.013	< 0.015	< 0.023	< 0.016	< 0.012	< 0.031	< 0.045
02-27-20	281	0.25 ± 0.14	< 0.010	< 0.005	< 0.021	< 0.011	< 0.009	< 0.031	< 0.061
03-05-20	274	< 0.12	< 0.010	< 0.006	< 0.011	< 0.010	< 0.007	< 0.011	< 0.052
03-12-20	274	< 0.12	< 0.011	< 0.011	< 0.019	< 0.013	< 0.013	< 0.012	< 0.067
03-19-20	276	< 0.09	< 0.010	< 0.008	< 0.017	< 0.011	< 0.011	< 0.015	< 0.048
03-26-20	272	< 0.09	< 0.010	< 0.010	< 0.010	< 0.009	< 0.009	< 0.011	< 0.045
04-02-20	270	0.26 ± 0.13	< 0.008	< 0.010	< 0.013	< 0.011	< 0.013	< 0.014	< 0.061
04-09-20	273	< 0.13	< 0.011	< 0.011	< 0.023	< 0.014	< 0.014	< 0.021	< 0.046
04-16-20	274	< 0.12	< 0.007	< 0.009	< 0.013	< 0.011	< 0.008	< 0.014	< 0.028
04-23-20	275	0.21 ± 0.11	< 0.008	< 0.008	< 0.021	< 0.011	< 0.009	< 0.010	< 0.043
04-30-20	268	< 0.10	< 0.008	< 0.008	< 0.013	< 0.010	< 0.010	< 0.007	< 0.054
05-07-20	272	0.23 ± 0.10	< 0.009	< 0.009	< 0.014	< 0.010	< 0.009	< 0.022	< 0.046
05-14-20	269[b]	0.35 ± 0.13	< 0.007	< 0.009	< 0.020	< 0.010	< 0.009	< 0.024	< 0.032
05-21-20	270	< 0.09	< 0.011	< 0.005	< 0.020	< 0.012	< 0.010	< 0.017	< 0.034
05-27-20	227	< 0.14	< 0.009	< 0.012	< 0.027	< 0.015	< 0.013	< 0.040	< 0.054
06-04-20	312	< 0.11	< 0.008	< 0.005	< 0.015	< 0.011	< 0.007	< 0.012	< 0.051
06-11-20	266	0.18 ± 0.10	< 0.010	< 0.009	< 0.017	< 0.012	< 0.008	< 0.006	< 0.046
06-18-20	279	0.27 ± 0.13	< 0.006	< 0.015	< 0.024	< 0.015	< 0.012	< 0.014	< 0.040
06-25-20	264	0.41 ± 0.12	< 0.005	< 0.014	< 0.015	< 0.011	< 0.009	< 0.018	< 0.040
07-02-20	258	< 0.11	< 0.010	< 0.007	< 0.024	< 0.010	< 0.009	< 0.025	< 0.050
07-09-20	267	0.35 ± 0.15	< 0.006	< 0.003	< 0.014	< 0.010	< 0.008	< 0.023	< 0.047
07-16-20	276	0.26 ± 0.12	< 0.007	< 0.010	< 0.014	< 0.008	< 0.010	< 0.018	< 0.043
07-23-20	257	< 0.16	< 0.013	< 0.011	< 0.021	< 0.015	< 0.010	< 0.089	< 0.056
07-29-20	227	< 0.17	< 0.012	< 0.011	< 0.027	< 0.015	< 0.009	< 0.044	< 0.044
08-06-20	304	< 0.10	< 0.006	< 0.013	< 0.019	< 0.010	< 0.008	< 0.017	< 0.036
08-13-20	278	0.20 ± 0.09	< 0.009	< 0.011	< 0.016	< 0.009	< 0.010	< 0.014	< 0.042
08-20-20	268	0.21 ± 0.12	< 0.010	< 0.007	< 0.017	< 0.012	< 0.011	< 0.017	< 0.053
08-27-20	253	< 0.17	< 0.016	< 0.015	< 0.026	< 0.018	< 0.011	< 0.023	< 0.052
09-03-20	268	< 0.13	< 0.006	< 0.008	< 0.007	< 0.010	< 0.008	< 0.027	< 0.054
09-10-20	264	< 0.16	< 0.015	< 0.019	< 0.014	< 0.016	< 0.013	< 0.024	< 0.065
09-17-20	271	< 0.11	< 0.006	< 0.007	< 0.018	< 0.012	< 0.014	< 0.016	< 0.051
09-24-20	267	0.35 ± 0.15	< 0.007	< 0.012	< 0.007	< 0.009	< 0.005	< 0.013	< 0.052
10-01-20	267	< 0.15	< 0.010	< 0.014	< 0.020	< 0.015	< 0.007	< 0.019	< 0.072
10-08-20	269	< 0.14	< 0.005	< 0.009	< 0.013	< 0.010	< 0.010	< 0.029	< 0.057
10-15-20	267	< 0.15	< 0.011	< 0.009	< 0.012	< 0.011	< 0.008	< 0.031	< 0.051

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

[b] 2 hours 20 minutes of lost sample time. The lost sample time would not have impacted the sample negatively (CR#202002472). See the narrative in Part I for details.

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.								
10-22-20	272	0.29 ± 0.14	< 0.007	< 0.009	< 0.012	< 0.012	< 0.010	< 0.025	< 0.053
10-29-20	268	< 0.13	< 0.011	< 0.011	< 0.016	< 0.014	< 0.009	< 0.032	< 0.036
11-05-20	275	< 0.13	< 0.011	< 0.009	< 0.017	< 0.012	< 0.005	< 0.018	< 0.051
11-12-20	263	0.20 ± 0.11	< 0.006	< 0.008	< 0.011	< 0.009	< 0.008	< 0.010	< 0.048
11-19-20	269	< 0.11	< 0.008	< 0.009	< 0.009	< 0.010	< 0.009	< 0.027	< 0.054
11-25-20	228	< 0.15	< 0.012	< 0.014	< 0.013	< 0.013	< 0.007	< 0.026	< 0.042
12-03-20	308	< 0.09	< 0.006	< 0.007	< 0.007	< 0.009	< 0.009	< 0.014	< 0.031
12-10-20	269	< 0.12	< 0.006	< 0.011	< 0.011	< 0.010	< 0.012	< 0.016	< 0.055
12-17-20	265	< 0.12	< 0.007	< 0.009	< 0.018	< 0.010	< 0.009	< 0.015	< 0.051
12-23-20	228	< 0.13	< 0.011	< 0.011	< 0.016	< 0.012	< 0.009	< 0.022	< 0.066
12-30-20	268	0.23 ± 0.11	< 0.007	< 0.009	< 0.018	< 0.010	< 0.005	< 0.013	< 0.054

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

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

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-A-010							
		^{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.								
01-09-20	286	< 0.11	< 0.009	< 0.009	< 0.019	< 0.010	< 0.007	< 0.052	< 0.045
01-16-20	286	< 0.09	< 0.007	< 0.004	< 0.009	< 0.008	< 0.007	< 0.008	< 0.047
01-22-20	254	< 0.11	< 0.013	< 0.013	< 0.017	< 0.012	< 0.010	< 0.011	< 0.052
01-30-20	323	< 0.09	< 0.006	< 0.009	< 0.012	< 0.009	< 0.005	< 0.007	< 0.044
02-06-20	286	< 0.10	< 0.004	< 0.004	< 0.014	< 0.011	< 0.005	< 0.033	< 0.043
02-13-20	286	< 0.10	< 0.006	< 0.011	< 0.017	< 0.010	< 0.008	< 0.027	< 0.046
02-20-20	284	< 0.13	< 0.015	< 0.015	< 0.027	< 0.018	< 0.014	< 0.029	< 0.073
02-27-20	289	< 0.10	< 0.008	< 0.006	< 0.009	< 0.010	< 0.007	< 0.013	< 0.040
03-05-20	284	< 0.10	< 0.009	< 0.006	< 0.012	< 0.010	< 0.009	< 0.012	< 0.048
03-12-20	287	0.15 ± 0.08	< 0.009	< 0.006	< 0.013	< 0.011	< 0.007	< 0.015	< 0.029
03-19-20	296	< 0.10	< 0.006	< 0.012	< 0.014	< 0.012	< 0.008	< 0.020	< 0.033
03-26-20	295	< 0.09	< 0.005	< 0.006	< 0.013	< 0.009	< 0.009	< 0.005	< 0.047
04-02-20	291	< 0.13	< 0.014	< 0.014	< 0.025	< 0.016	< 0.015	< 0.032	< 0.036
04-09-20	296	< 0.12	< 0.006	< 0.008	< 0.021	< 0.013	< 0.011	< 0.017	< 0.047
04-16-20	295	0.21 ± 0.11	< 0.005	< 0.009	< 0.009	< 0.009	< 0.008	< 0.012	< 0.046
04-23-20	300	0.17 ± 0.10	< 0.012	< 0.010	< 0.012	< 0.011	< 0.006	< 0.009	< 0.035
04-30-20	268	0.18 ± 0.10	< 0.007	< 0.011	< 0.010	< 0.009	< 0.011	< 0.009	< 0.062
05-07-20	279	< 0.14	< 0.009	< 0.009	< 0.022	< 0.010	< 0.010	< 0.012	< 0.051
05-14-20	278	< 0.14	< 0.011	< 0.011	< 0.019	< 0.012	< 0.012	< 0.025	< 0.060
05-21-20	282	0.15 ± 0.09	< 0.010	< 0.012	< 0.018	< 0.012	< 0.006	< 0.017	< 0.052
05-27-20	241	< 0.13	< 0.011	< 0.005	< 0.022	< 0.011	< 0.009	< 0.025	< 0.037
06-04-20	331	0.25 ± 0.14	< 0.013	< 0.011	< 0.029	< 0.014	< 0.011	< 0.029	< 0.048
06-11-20	294	< 0.14	< 0.009	< 0.008	< 0.022	< 0.016	< 0.012	< 0.022	< 0.046
06-18-20	308	0.31 ± 0.11	< 0.005	< 0.009	< 0.016	< 0.009	< 0.005	< 0.012	< 0.041
06-25-20	297	0.22 ± 0.07	< 0.008	< 0.010	< 0.011	< 0.009	< 0.007	< 0.012	< 0.029
07-02-20	287	< 0.10	< 0.009	< 0.007	< 0.023	< 0.011	< 0.006	< 0.022	< 0.053
07-09-20	304	0.19 ± 0.10	< 0.009	< 0.008	< 0.012	< 0.010	< 0.008	< 0.029	< 0.030
07-16-20	318	0.24 ± 0.13	< 0.004	< 0.008	< 0.022	< 0.009	< 0.007	< 0.031	< 0.047
07-23-20	298	0.16 ± 0.09	< 0.007	< 0.009	< 0.015	< 0.009	< 0.007	< 0.027	< 0.037
07-29-20	268	0.22 ± 0.12	< 0.012	< 0.009	< 0.019	< 0.011	< 0.009	< 0.041	< 0.068
08-06-20	352	0.23 ± 0.10	< 0.004	< 0.008	< 0.008	< 0.009	< 0.007	< 0.021	< 0.028
08-13-20	327	0.20 ± 0.10	< 0.010	< 0.007	< 0.009	< 0.007	< 0.008	< 0.010	< 0.035
08-20-20	309	0.26 ± 0.10	< 0.005	< 0.007	< 0.014	< 0.011	< 0.007	< 0.013	< 0.048
08-27-20	300	0.19 ± 0.10	< 0.007	< 0.006	< 0.012	< 0.009	< 0.007	< 0.020	< 0.047
09-03-20	313	< 0.17	< 0.012	< 0.010	< 0.027	< 0.016	< 0.015	< 0.049	< 0.061
09-10-20	310	0.18 ± 0.08	< 0.005	< 0.008	< 0.017	< 0.010	< 0.007	< 0.015	< 0.055
09-17-20	315	< 0.11	< 0.007	< 0.008	< 0.010	< 0.010	< 0.010	< 0.021	< 0.043
09-24-20	310	0.25 ± 0.10	< 0.007	< 0.007	< 0.017	< 0.009	< 0.009	< 0.010	< 0.026
10-01-20	307	0.26 ± 0.11	< 0.004	< 0.010	< 0.017	< 0.010	< 0.006	< 0.012	< 0.031
10-08-20	306	< 0.12	< 0.013	< 0.011	< 0.017	< 0.012	< 0.012	< 0.042	< 0.044
10-15-20	306	0.26 ± 0.13	< 0.004	< 0.008	< 0.012	< 0.009	< 0.004	< 0.022	< 0.033

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

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

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-A-010 (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.								
10-22-20	303	< 0.10	< 0.006	< 0.009	< 0.010	< 0.010	< 0.007	< 0.021	< 0.051
10-29-20	291	< 0.09	< 0.009	< 0.009	< 0.006	< 0.010	< 0.004	< 0.017	< 0.030
11-05-20	308	0.21 ± 0.11	< 0.005	< 0.008	< 0.019	< 0.010	< 0.007	< 0.017	< 0.056
11-12-20	297	0.22 ± 0.10	< 0.008	< 0.009	< 0.010	< 0.010	< 0.008	< 0.012	< 0.041
11-19-20	294	0.16 ± 0.09	< 0.008	< 0.008	< 0.012	< 0.011	< 0.006	< 0.018	< 0.037
11-25-20	250	< 0.12	< 0.007	< 0.008	< 0.020	< 0.010	< 0.005	< 0.027	< 0.069
12-03-20	333	< 0.12	< 0.008	< 0.008	< 0.013	< 0.009	< 0.009	< 0.009	< 0.044
12-10-20	293	0.22 ± 0.13	< 0.005	< 0.007	< 0.013	< 0.009	< 0.007	< 0.017	< 0.032
12-17-20	279	< 0.16	< 0.018	< 0.012	< 0.020	< 0.020	< 0.021	< 0.036	< 0.060
12-23-20	271	< 0.10	< 0.008	< 0.007	< 0.015	< 0.010	< 0.010	< 0.012	< 0.032
12-30-20	316	< 0.12	< 0.007	< 0.009	< 0.011	< 0.009	< 0.009	< 0.040	< 0.033

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

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

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-A-011							
		^{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.								
01-09-20	269	< 0.15	< 0.007	< 0.011	< 0.024	< 0.012	< 0.010	< 0.038	< 0.059
01-16-20	264	< 0.11	< 0.006	< 0.006	< 0.014	< 0.009	< 0.005	< 0.008	< 0.044
01-22-20	219	< 0.12	< 0.009	< 0.010	< 0.021	< 0.013	< 0.013	< 0.038	< 0.045
01-30-20	295	< 0.09	< 0.018	< 0.018	< 0.011	< 0.016	< 0.014	< 0.027	< 0.068
02-06-20	265	< 0.11	< 0.007	< 0.005	< 0.019	< 0.011	< 0.007	< 0.021	< 0.037
02-13-20	262	< 0.12	< 0.006	< 0.008	< 0.014	< 0.010	< 0.007	< 0.013	< 0.038
02-20-20	265	< 0.12	< 0.009	< 0.006	< 0.012	< 0.009	< 0.009	< 0.007	< 0.057
02-27-20	272	0.18 ± 0.09	< 0.012	< 0.015	< 0.014	< 0.012	< 0.016	< 0.014	< 0.068
03-05-20	267	< 0.12	< 0.010	< 0.007	< 0.019	< 0.010	< 0.006	< 0.010	< 0.064
03-12-20	269	0.19 ± 0.10	< 0.009	< 0.008	< 0.023	< 0.010	< 0.008	< 0.014	< 0.054
03-19-20	272	< 0.11	< 0.009	< 0.006	< 0.013	< 0.012	< 0.009	< 0.018	< 0.059
03-26-20	267	0.19 ± 0.09	< 0.007	< 0.009	< 0.017	< 0.010	< 0.011	< 0.012	< 0.035
04-02-20	267	0.30 ± 0.10	< 0.011	< 0.008	< 0.009	< 0.011	< 0.010	< 0.014	< 0.046
04-09-20	265	< 0.09	< 0.005	< 0.008	< 0.013	< 0.011	< 0.009	< 0.014	< 0.062
04-16-20	259	0.24 ± 0.14	< 0.007	< 0.008	< 0.014	< 0.011	< 0.010	< 0.015	< 0.077
04-23-20	268	0.24 ± 0.11	< 0.006	< 0.007	< 0.012	< 0.009	< 0.011	< 0.021	< 0.041
04-30-20	263	< 0.12	< 0.005	< 0.008	< 0.024	< 0.011	< 0.011	< 0.020	< 0.043
05-07-20	268	< 0.14	< 0.011	< 0.015	< 0.019	< 0.012	< 0.005	< 0.029	< 0.054
05-14-20	265	0.17 ± 0.09	< 0.006	< 0.006	< 0.012	< 0.009	< 0.005	< 0.010	< 0.039
05-21-20	269	< 0.10	< 0.006	< 0.006	< 0.011	< 0.010	< 0.010	< 0.016	< 0.048
05-27-20	227	< 0.15	< 0.013	< 0.013	< 0.022	< 0.012	< 0.013	< 0.020	< 0.044
06-04-20	308	0.20 ± 0.10	< 0.005	< 0.003	< 0.018	< 0.010	< 0.007	< 0.016	< 0.044
06-11-20	266	0.29 ± 0.13	< 0.010	< 0.012	< 0.021	< 0.015	< 0.011	< 0.021	< 0.061
06-18-20	277	0.21 ± 0.10	< 0.006	< 0.010	< 0.016	< 0.010	< 0.007	< 0.012	< 0.030
06-25-20	263	0.34 ± 0.15	< 0.007	< 0.011	< 0.013	< 0.009	< 0.006	< 0.012	< 0.053
07-02-20	253	< 0.13	< 0.010	< 0.011	< 0.018	< 0.013	< 0.007	< 0.028	< 0.058
07-09-20	264	0.33 ± 0.18	< 0.010	< 0.010	< 0.021	< 0.009	< 0.006	< 0.039	< 0.036
07-16-20	272	0.28 ± 0.14	< 0.007	< 0.011	< 0.017	< 0.010	< 0.007	< 0.032	< 0.044
07-23-20	253	< 0.13	< 0.010	< 0.010	< 0.017	< 0.012	< 0.009	< 0.034	< 0.057
07-29-20	223	< 0.16	< 0.007	< 0.013	< 0.018	< 0.014	< 0.009	< 0.036	< 0.039
08-06-20	299	0.23 ± 0.13	< 0.015	< 0.010	< 0.024	< 0.012	< 0.007	< 0.038	< 0.057
08-13-20	274	0.18 ± 0.10	< 0.006	< 0.011	< 0.011	< 0.009	< 0.005	< 0.012	< 0.049
08-20-20	260	< 0.12	< 0.010	< 0.011	< 0.016	< 0.011	< 0.010	< 0.017	< 0.059
08-27-20	249	< 0.15	< 0.010	< 0.012	< 0.019	< 0.013	< 0.011	< 0.039	< 0.053
09-03-20	262	< 0.14	< 0.012	< 0.010	< 0.016	< 0.013	< 0.008	< 0.035	< 0.032
09-10-20	259	< 0.12	< 0.008	< 0.010	< 0.011	< 0.012	< 0.010	< 0.015	< 0.056
09-17-20	262	< 0.11	< 0.008	< 0.008	< 0.015	< 0.011	< 0.011	< 0.009	< 0.068
09-24-20	284	0.30 ± 0.13	< 0.013	< 0.012	< 0.021	< 0.014	< 0.009	< 0.030	< 0.041
10-01-20	281	< 0.13	< 0.006	< 0.010	< 0.014	< 0.011	< 0.005	< 0.012	< 0.040
10-08-20	279	< 0.15	< 0.008	< 0.010	< 0.014	< 0.009	< 0.008	< 0.036	< 0.042
10-15-20	278	< 0.14	< 0.011	< 0.009	< 0.025	< 0.014	< 0.008	< 0.037	< 0.052

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

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

Collection: Continuous, weekly exchange.

Units: pCi/m^3

Location		CA-A-011 (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.								
10-22-20	286	< 0.11	< 0.009	< 0.007	< 0.020	< 0.009	< 0.009	< 0.022	< 0.060
10-29-20	280	< 0.13	< 0.009	< 0.009	< 0.022	< 0.012	< 0.009	< 0.022	< 0.048
11-05-20	292	0.23 ± 0.08	< 0.006	< 0.007	< 0.006	< 0.009	< 0.011	< 0.018	< 0.050
11-12-20	280	0.18 ± 0.09	< 0.008	< 0.013	< 0.010	< 0.009	< 0.005	< 0.012	< 0.058
11-19-20	284	< 0.15	< 0.013	< 0.010	< 0.028	< 0.015	< 0.013	< 0.045	< 0.058
11-25-20	241	< 0.18	< 0.018	< 0.010	< 0.027	< 0.016	< 0.008	< 0.042	< 0.044
12-03-20	326	0.21 ± 0.08	< 0.005	< 0.007	< 0.011	< 0.008	< 0.007	< 0.018	< 0.047
12-10-20	285	< 0.13	< 0.009	< 0.012	< 0.014	< 0.013	< 0.012	< 0.019	< 0.044
12-17-20	277	< 0.10	< 0.005	< 0.011	< 0.026	< 0.011	< 0.008	< 0.023	< 0.052
12-23-20	238	< 0.13	< 0.013	< 0.009	< 0.024	< 0.012	< 0.009	< 0.024	< 0.065
12-30-20	281	< 0.12	< 0.010	< 0.009	< 0.015	< 0.011	< 0.010	< 0.015	< 0.054

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

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

Collection: Semimonthly during grazing season, monthly otherwise.

Units: pCi/L

Location		CA-MLK-M9					
Date	Lab	Concentration (pCi/L)					
Collected	Code	I-131	K-40	Zn-65	Cs-134	Cs-137	Ba-La-140
Required LLDs		1	-	-	15	18	15
		Collection discontinued.[a]					

[a] Milk sampling discontined in 2018.

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

Collection: Monthly, during growing season

Units: pCi/kg wet

Lab Code	Collection Date	Sample Type	Concentration (pCi/kg wet) ^{40}K	^{54}Mn	^{58}Co	^{60}Co	^{131}I	^{134}Cs	^{137}Cs
			Location: CA-FPL-V9						
	5/12/2020		NS[a]						
CAVE- 1962	6/9/2020	Beet Greens	5354 ± 395	< 13.4	< 7.5	< 15.7	< 16.4	< 13.5	< 11.9
CAVE- 1963	6/9/2020	Turnip Greens	3066 ± 253	< 7.3	< 8.2	< 8.5	< 9.1	< 7.9	< 5.1
CAVE- 1964	6/9/2020	Lettuce	3203 ± 291	< 8.8	< 10.1	< 5.4	< 9.3	< 9.9	< 8.1
CAVE- 1965	6/9/2020	Mustard Greens	3647 ± 352	< 7.0	< 13.2	< 8.7	< 18.7	< 11.6	< 6.9
CAVE- 1966	6/9/2020	Collard Greens	3557 ± 287	< 9.8	< 6.3	< 6.0	< 14.2	< 9.4	< 6.2
CAVE- 1967	6/9/2020	Swiss Chard	4156 ± 293	< 9.6	< 6.0	< 8.4	< 14.6	< 8.8	< 6.9
CAVE- 2389	7/14/2020	Swiss Chard	5003 ± 322	< 5.0	< 7.7	< 8.3	< 7.9	< 8.6	< 7.7
CAVE- 2390	7/14/2020	Collard Greens	3226 ± 280	< 7.8	< 5.7	< 7.6	< 9.5	< 8.6	< 7.6
CAVE- 2960	8/19/2020	Turnip greens	3642 ± 281	< 7.1	< 5.7	< 8.2	< 20.4	< 9.1	< 6.2
CAVE- 2961	8/19/2020	Collard Greens	3851 ± 326	< 8.4	< 8.7	< 11.1	< 22.2	< 12.3	< 12.5
CAVE- 3207	9/8/2020	Lettuce	6140 ± 375	< 10.2	< 8.7	< 8.9	< 43.4	< 9.7	< 12.1
CAVE- 3208	9/8/2020	Mustard	5851 ± 347	< 8.8	< 7.1	< 4.8	< 56.9	< 11.4	< 6.1
CAVE- 3210	9/8/2020	Turnip greens	4371 ± 331	< 6.7	< 6.0	< 6.4	< 34.2	< 12.5	< 9.3
CAVE- 3211	9/8/2020	Swiss Chard	5889 ± 383	< 10.9	< 12.9	< 7.5	< 31.0	< 11.9	< 7.4
CAVE- 3212	9/8/2020	Collard Greens	3375 ± 334	< 9.2	< 12.8	< 8.3	< 41.8	< 13.3	< 12.8
CAVE- 3771	10/13/2020	Beet	6485 ± 440	< 11.8	< 11.0	< 8.5	< 58.5	< 13.1	< 13.2
CAVE- 3772	10/13/2020	Collard	3360 ± 234	< 5.8	< 10.2	< 5.3	< 44.4	< 8.1	< 4.6
CAVE- 3773	10/13/2020	Mustard	4010 ± 247	< 5.0	< 7.6	< 5.8	< 50.7	< 7.4	< 8.8
CAVE- 3774	10/13/2020	Turnip	4410 ± 248	< 4.2	< 9.8	< 5.4	< 42.0	< 7.5	< 3.6
CAVE- 3775	10/13/2020	Swiss Chard	5915 ± 304	< 7.4	< 5.7	< 6.6	< 43.0	< 8.6	< 9.0
CAVE- 3776	10/13/2020	Kale	4470 ± 282	< 7.3	< 7.9	< 5.6	< 59.4	< 10.0	< 8.3
CAVE- 3777	10/13/2020	Lettuce	6372 ± 361	< 11.7	< 14.4	< 10.3	< 53.0	< 10.4	< 10.5

[a] "NS" = No sample; see Part I Table 5.5, Listing of Missed Samples.

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- 1473	5/11/2020	Collard Greens	4943 ± 331	< 9.0	< 5.4	< 9.5	< 8.2	< 9.1	< 10.9
CAVE- 1474	5/11/2020	Spinach/ Mustard	4110 ± 309	< 11.0	< 10.7	< 6.4	< 8.1	< 8.9	< 8.2
CAVE- 1475	5/11/2020	Swiss Chard	6891 ± 439	< 10.2	< 6.1	< 6.6	< 12.2	< 12.1	< 15.5
CAVE- 1968	6/8/2020	Cabbage	3414 ± 305	< 9.9	< 8.8	< 7.6	< 22.9	< 11.2	< 11.4
CAVE- 1969	6/8/2020	Spinach/ Mustards	3935 ± 356	< 10.6	< 5.1	< 8.3	< 17.5	< 11.0	< 12.2
CAVE- 1970	6/8/2020	Collard Greens	5404 ± 383	< 10.6	< 8.6	< 8.5	< 26.4	< 14.4	< 9.0
CAVE- 1971	6/8/2020	Swiss Chard	5513 ± 382	< 11.6	< 13.7	< 12.6	< 10.9	< 13.0	< 12.6
CAVE- 2391	7/13/2020	Cabbage	3449 ± 305	< 9.5	< 8.7	< 8.1	< 12.4	< 10.6	< 9.8
CAVE- 2392	7/13/2020	Collard Greens	3993 ± 337	< 12.1	< 8.0	< 10.8	< 22.4	< 11.4	< 11.4
CAVE- 2393	7/13/2020	Swiss Chard	7773 ± 420	< 11.3	< 6.8	< 10.8	< 13.8	< 11.2	< 9.2
CAVE- 2964	8/18/2020	Cabbage	3374 ± 283	< 8.5	< 9.3	< 7.9	< 23.9	< 12.0	< 12.2
CAVE- 2965	8/18/2020	Swiss Chard	9690 ± 586	< 14.7	< 15.5	< 14.0	< 30.2	< 16.3	< 15.6
CAVE- 3213	9/7/2020	Spinach/ Mustard	4600 ± 463	< 8.7	< 12.3	< 14.7	< 53.3	< 17.7	< 17.0
CAVE- 3214	9/7/2020	Collard Greens	5883 ± 431	< 15.6	< 9.5	< 9.9	< 57.4	< 13.1	< 11.1
CAVE- 3215	9/7/2020	Lettuce	4016 ± 422	< 10.5	< 10.0	< 14.1	< 25.5	< 16.2	< 11.2
CAVE- 3780	10/12/2020	Collard	5154 ± 147	< 3.4	< 6.2	< 3.9	< 34.5	< 4.8	< 3.2
CAVE- 3781	10/12/2020	Swiss Chard	7208 ± 627	< 17.7	< 19.8	< 16.6	< 53.4	< 22.8	< 18.4
CAVE- 3782	10/12/2020	Mix Salad Greens	4928 ± 163	< 4.7	< 4.2	< 5.5	< 49.4	< 5.8	< 5.9
			Location: CA-FPL-V16						
CAVE- 1476	5/11/2020	Broccoli	3034 ± 427	< 15.8	< 9.0	< 15.7	< 17.6	< 16.4	< 22.4
CAVE- 1477	5/11/2020	Swiss Chard	9008 ± 623	< 14.7	< 8.4	< 10.1	< 14.5	< 17.4	< 15.1
CAVE- 1478	5/11/2020	Cabbage	2932 ± 414	< 17.0	< 18.8	< 17.0	< 15.0	< 16.8	< 15.8
CAVE- 1972	6/8/2020	Cabbage	4176 ± 409	< 14.1	< 13.7	< 13.0	< 23.5	< 14.7	< 15.0
CAVE- 1973	6/8/2020	Swiss Chard	4964 ± 337	< 7.2	< 6.2	< 7.2	< 17.1	< 8.6	< 5.7
CAVE- 1974	6/8/2020	Red Romaine Lettuce	4700 ± 423	< 11.0	< 13.9	< 8.0	< 30.0	< 14.2	< 6.6
CAVE- 1975	6/8/2020	Cauliflower Greens	4901 ± 403	< 10.1	< 6.7	< 13.1	< 23.1	< 13.9	< 8.3
CAVE- 2394	7/13/2020	Cabbage	4456 ± 390	< 17.6	< 8.2	< 11.0	< 12.8	< 13.8	< 13.7
CAVE- 2395	7/13/2020	Swiss Chard	8241 ± 513	< 11.7	< 9.4	< 11.0	< 10.9	< 11.9	< 11.4
CAVE- 2962	8/18/2020	Cabbage	4254 ± 474	< 16.0	< 9.8	< 10.1	< 43.9	< 18.6	< 9.7
CAVE- 2963	8/18/2020	Swiss Chard	10908 ± 809	< 17.0	< 15.3	< 26.1	< 35.9	< 26.3	< 21.8
CAVE- 3216	9/7/2020	Spinach/ Mustard	4768 ± 315	< 8.1	< 6.8	< 10.6	< 13.9	< 7.9	< 7.1
CAVE- 3217	9/7/2020	Turnip greens	5092 ± 331	< 8.0	< 7.6	< 13.4	< 13.3	< 11.4	< 7.5
CAVE- 3778	10/12/2020	Mustard	5751 ± 145	< 4.6	< 5.5	< 4.7	< 32.3	< 4.3	< 3.7
CAVE- 3779	10/12/2020	Turnip	6978 ± 323	< 7.9	< 8.4	< 5.1	< 45.6	< 9.0	< 10.1
			Location: CA-FPL-V19						
	5/12/2020			NS[a]					
CAVE- 1976	6/8/2020	Lettuce	3567 ± 295	< 11.3	< 7.1	< 10.5	< 20.2	< 9.9	< 10.3
CAVE- 2396	7/13/2020	Cabbage	2342 ± 225	< 6.1	< 6.8	< 5.2	< 12.7	< 9.1	< 11.9
	8/18/2020			NS[a]					
CAVE- 3218	9/7/2020	Kale	3706 ± 367	< 10.6	< 11.4	< 11.2	< 33.5	< 14.0	< 11.4
CAVE- 3769	10/12/2020	Kale	5786 ± 393	< 13.4	< 15.5	< 6.9	< 49.1	< 12.6	< 13.9

[a] "NS" = No sample; see Part I Table 5.5, Listing of Missed Samples.

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-2A					
CAVE- 3763	Soybeans	10/12/2020	< 303	9864 ± 245	< 5.9	< 8.4	< 7.7	< 7.0	< 7.1
				Location: CA-FC-2B					
CAVE- 3764	Soybeans	10/12/2020	< 156	13051 ± 270	< 9.4	< 6.6	< 7.0	< 8.4	< 7.6
				Location: CA-FC-2C					
CAVE- 3765	Soybeans	10/12/2020	< 156	12719 ± 556	< 18.2	< 15.7	< 13.5	< 17.0	< 16.9
				Location: CA-FC-3A					
CAVE- 3766	Soybeans	10/13/2020	< 169	17103 ± 319	< 7.4	< 10.5	< 6.1	< 7.9	< 9.0
				Location: CA-FC-3B					
CAVE- 3767	Soybeans	10/13/2020	< 303	11754 ± 263	< 8.2	< 7.1	< 10.7	< 7.0	< 5.7
				Location: CA-FC-3C					
CAVE- 3768	Soybeans	10/12/2020	< 394	15610 ± 327	< 9.4	< 8.7	< 4.9	< 9.9	< 9.3
				Location: CA-FC-4(C)					
CAVE- 3762	Soybeans	10/2/2020	< 303	9273 ± 408	< 14.1	< 16.8	< 10.0	< 13.3	< 14.3

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- 4598	12/8/2020	12635 ± 850	< 43.9	< 74.8	< 52.1	< 14.8	< 101.5	< 33.8	482 ± 53	< 310.9
Location: SOL-F-006										
CASO- 4599	12/8/2020	11587 ± 1090	< 44.7	< 113.9	< 73.2	< 40.6	< 65.5	< 63.4	370 ± 60	< 261.4
Location: SOL-PR-003										
CASO- 4597	12/8/2020	9871 ± 758	< 17.4	< 81.9	< 31.1	< 14.6	< 77.5	< 21.0	170 ± 37	< 171.5
Location: SOL-PR-007										
CASO- 4600	12/9/2020	9794 ± 720	< 34.3	< 59.8	< 31.9	< 16.0	< 45.3	< 25.3	159 ± 39	< 173.2
Location: SOL-M-009										
CASO- 4596	12/8/2020	14147 ± 822	< 30.2	< 95.9	< 39.3	< 14.1	< 88.1	< 28.5	126 ± 40	< 127.8
Location: SOL-W-001										
CASO- 4601	12/9/2020	13273 ± 781	< 27.7	< 47.4	< 36.1	< 12.7	< 69.9	< 27.6	< 29	< 101.6
Location: SOL-W-002										
CASO- 4602	12/9/2020	13509 ± 893	< 37.4	< 84.2	< 36.3	< 18.6	< 40.1	< 26.8	115 ± 42	< 140.9
Location: SOL-W-005										
CASO- 4603	12/9/2020	16028 ± 805	< 32.9	< 69.7	< 31.4	< 23.1	< 76.6	< 25.7	69 ± 31	< 216.1

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- 239 01-28-20	CASW- 529 02-25-20	CASW- 908 03-31-20	CASW- 1328 04-28-20
H-3	3000	< 153	< 157	< 157	< 153
Mn-54	15	< 1.8	< 2.1	< 0.9	< 2.6
Fe-59	30	< 5.1	< 3.6	< 4.3	< 4.9
Co-58	15	< 2.5	< 3.7	< 0.8	< 2.9
Co-60	15	< 2.0	< 2.7	< 1.9	< 1.6
Zn-65	30	< 2.2	< 5.8	< 3.4	< 3.7
Zr-Nb-95	15	< 2.5	< 5.5	< 2.4	< 1.3
I-131	1000	< 7.3	< 6.0	< 6.9	< 4.3
Cs-134	15	< 4.0	< 3.7	< 2.2	< 3.5
Cs-137	18	< 2.6	< 2.5	< 2.3	< 2.7
Ba-La-140	15	< 4.1	< 3.1	< 2.0	< 3.6

Lab Code Date Collected	Required LLD	CASW- 1783 05-26-20	CASW- 2212 06-30-20	CASW- 2645 07-28-20	CASW- 3059 08-25-20
H-3	3000	< 160	< 159	< 158	< 155
Mn-54	15	< 4.0	< 1.7	< 4.1	< 2.4
Fe-59	30	< 7.6	< 7.0	< 7.4	< 7.0
Co-58	15	< 2.7	< 3.2	< 4.6	< 3.0
Co-60	15	< 1.7	< 2.4	< 1.2	< 1.5
Zn-65	30	< 1.8	< 4.9	< 8.1	< 7.9
Zr-Nb-95	15	< 2.5	< 2.9	< 6.6	< 8.3
I-131	1000	< 11.6	< 6.5	< 42.1	< 51.8
Cs-134	15	< 3.3	< 3.2	< 4.8	< 4.0
Cs-137	18	< 3.4	< 3.3	< 2.6	< 3.6
Ba-La-140	15	< 8.5	< 4.0	< 5.9	< 14.6

Lab Code Date Collected	Required LLD	CASW- 3517 09-30-20	CASW- 4134 10-28-20	CASW- 4438 11-24-20	CASW- 4737 12-29-20
H-3	3000	< 156	< 155	< 159	< 153
Mn-54	15	< 4.4	< 2.2	< 1.6	< 3.0
Fe-59	30	< 12.4	< 5.0	< 3.4	< 3.6
Co-58	15	< 5.7	< 3.1	< 3.2	< 2.7
Co-60	15	< 6.5	< 1.9	< 2.0	< 2.2
Zn-65	30	< 10.2	< 6.2	< 4.5	< 4.1
Zr-Nb-95	15	< 8.7	< 5.0	< 3.3	< 2.8
I-131	1000	< 34.0	< 49.2	< 23.4	< 11.2
Cs-134	15	< 5.3	< 4.6	< 3.1	< 3.3
Cs-137	18	< 2.8	< 2.7	< 3.5	< 3.6
Ba-La-140	15	< 14.8	< 7.5	< 6.4	< 5.4

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- 240 01-28-20	CASW- 530 02-25-20	CASW- 909 03-31-20	CASW- 1329 04-28-20
H-3	3000	172 ± 85	< 157	< 157	< 162
Mn-54	15	< 2.6	< 1.1	< 1.7	< 2.7
Fe-59	30	< 3.0	< 5.5	< 7.3	< 3.5
Co-58	15	< 1.1	< 1.8	< 3.1	< 2.2
Co-60	15	< 1.2	< 1.8	< 2.2	< 1.8
Zn-65	30	< 2.7	< 3.9	< 4.6	< 3.3
Zr-Nb-95	15	< 2.4	< 3.1	< 3.7	< 2.8
I-131	1000	< 2.8	< 8.1	< 13.9	< 4.7
Cs-134	15	< 2.5	< 2.4	< 3.4	< 3.1
Cs-137	18	< 1.9	< 2.1	< 3.0	< 2.3
Ba-La-140	15	< 2.2	< 3.9	< 5.9	< 3.2

Lab Code Date Collected	Required LLD	CASW- 1784 05-26-20	CASW- 2213 06-30-20	CASW- 2646 07-28-20	CASW- 3060 08-25-20
H-3	3000	247 ± 88 [a]	< 159	259 ± 88	298 ± 89
Mn-54	15	< 2.9	< 2.0	< 2.8	< 2.9
Fe-59	30	< 6.4	< 3.2	< 7.2	< 4.1
Co-58	15	< 2.2	< 1.8	< 3.5	< 4.3
Co-60	15	< 1.4	< 2.0	< 3.1	< 3.0
Zn-65	30	< 4.1	< 3.2	< 5.4	< 6.5
Zr-Nb-95	15	< 4.8	< 1.6	< 3.0	< 4.2
I-131	1000	< 15.8	< 2.7	< 33.1	< 48.8
Cs-134	15	< 3.4	< 2.4	< 3.7	< 4.1
Cs-137	18	< 3.5	< 2.1	< 2.2	< 2.5
Ba-La-140	15	< 7.5	< 1.3	< 11.1	< 13.0

Lab Code Date Collected	Required LLD	CASW- 3518 09-30-20	CASW- 4135 10-28-20	CASW- 4440 11-24-20	CASW- 4738 12-29-20
H-3	3000	203 ± 88	510 ± 101 [b]	< 159	< 153
Mn-54	15	< 3.8	< 3.7	< 3.0	< 3.4
Fe-59	30	< 6.2	< 11.5	< 4.5	< 4.4
Co-58	15	< 4.2	< 5.7	< 2.0	< 2.3
Co-60	15	< 4.0	< 3.9	< 1.8	< 2.6
Zn-65	30	< 4.4	< 11.1	< 3.6	< 4.1
Zr-Nb-95	15	< 3.0	< 11.1	< 5.4	< 4.9
I-131	1000	< 34.3	< 44.0	< 25.9	< 10.1
Cs-134	15	< 4.7	< 4.7	< 3.8	< 3.6
Cs-137	18	< 4.6	< 4.1	< 3.7	< 1.7
Ba-La-140	15	< 5.0	< 12.8	< 6.7	< 8.5

[a] Laboratory duplicate result <160 pCi/L.

[b] Recount 476 ± 99 pCi/L; Reanalysis 431 ± 97 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-POND 01						
CASW- 806	03/17/20	< 159	< 2.7	< 4.5	< 2.1	< 1.5	< 4.2	< 1.2	< 3.6	< 3.2	< 6.0
CASW- 3243	09/09/20	< 159	< 3.6	< 7.2	< 4.5	< 2.0	< 6.4	< 7.7	< 3.4	< 3.1	< 7.1
					Location: CA-SWA-POND 02						
CASW- 807	03/17/20	< 159	< 3.0	< 4.1	< 3.6	< 2.5	< 4.1	< 3.1	< 3.7	< 2.8	< 2.9
CASW- 3244	09/09/20	< 159	< 3.7	< 5.8	< 4.7	< 1.5	< 7.2	< 7.2	< 4.3	< 1.5	< 9.7
					Location: CA-SWA-OUTFALL 010						
CASW- 808	03/16/20	< 159	< 1.1	< 2.3	< 1.8	< 1.6	< 1.3	< 2.0	< 2.1	< 1.9	< 2.6
CASW- 3245	09/09/20	< 159	< 3.7	< 6.3	< 4.8	< 3.7	< 3.8	< 5.5	< 3.9	< 3.1	< 9.4
					Location: CA-SWA-OUTFALL 011						
CASW- 809	03/16/20	< 159	< 2.1	< 5.8	< 2.6	< 2.0	< 5.3	< 4.0	< 3.7	< 3.6	< 4.2
CASW- 3246	09/09/20	< 159	< 1.6	< 2.5	< 3.9	< 1.3	< 6.6	< 4.8	< 3.0	< 2.8	< 4.8
					Location: CA-SWA-OUTFALL 012						
CASW- 810	03/17/20	< 159	< 2.2	< 6.7	< 1.9	< 1.3	< 3.3	< 4.2	< 3.4	< 2.1	< 2.8
CASW- 3247	09/09/20	< 159	< 3.0	< 8.4	< 3.2	< 2.7	< 3.6	< 3.8	< 4.2	< 2.2	< 10.1
					Location: CA-SWA-OUTFALL 013						
CASW- 811	03/17/20	< 159	< 1.6	< 3.4	< 0.8	< 2.1	< 4.1	< 2.4	< 2.3	< 2.6	< 2.0
CASW- 3248	09/09/20	< 159	< 2.5	< 4.9	< 2.9	< 2.7	< 6.0	< 4.1	< 3.7	< 1.4	< 13.6
					Location: CA-SWA-OUTFALL 014						
CASW- 812	03/17/20	< 159	< 3.2	< 5.8	< 3.3	< 2.7	< 3.7	< 3.5	< 4.5	< 3.1	< 5.0
CASW- 3249	09/09/20	< 159	< 2.5	< 4.0	< 2.1	< 1.3	< 4.3	< 3.9	< 3.3	< 3.1	< 7.7
					Location: CA-SWA-OUTFALL 015						
CASW- 813	03/16/20	< 159	< 2.5	< 7.0	< 2.8	< 2.2	< 6.2	< 3.3	< 3.7	< 4.3	< 5.6
CASW- 3250	09/09/20	< 159	< 2.8	< 6.8	< 3.1	< 1.7	< 3.3	< 3.8	< 3.1	< 3.4	< 4.6
					Location: CA-SWA-SLUDGE LAGOON #6						
CASW- 814	03/16/20	< 159	< 1.0	< 2.4	< 1.4	< 1.7	< 1.3	< 2.9	< 1.8	< 1.5	< 5.4
CASW- 3251	09/09/20	< 159	< 2.8	< 6.5	< 4.5	< 3.0	< 2.1	< 5.5	< 3.7	< 2.6	< 14.4

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- 330	2/4/2020	< 155	< 2.5	< 10.8	< 3.0	< 2.5	< 5.5	< 3.3	< 3.8	< 2.7	< 4.4
CADW- 1330	4/27/2020	< 153	< 2.3	< 4.0	< 2.3	< 1.8	< 1.8	< 1.7	< 2.4	< 2.1	< 1.5
CADW- 2647	7/27/2020	< 158	< 3.9	< 6.3	< 2.2	< 1.6	< 3.4	< 5.9	< 4.4	< 2.7	< 12.9
CADW- 4143	10/26/2020	< 155	< 3.3	< 3.9	< 3.1	< 1.1	< 2.7	< 5.3	< 4.0	< 3.4	< 5.2
					CA-DWA-004 (Miller)						
CADW- 331	2/4/2020	< 155	< 3.1	< 5.3	< 3.1	< 2.2	< 5.2	< 4.6	< 3.3	< 3.3	< 5.5
CADW- 1331	4/27/2020	< 153	< 1.6	< 2.4	< 2.1	< 1.6	< 3.3	< 1.6	< 2.3	< 2.1	< 1.2
CADW- 2648	7/27/2020	< 158	< 3.2	< 3.4	< 2.3	< 2.2	< 5.6	< 4.7	< 3.7	< 3.2	< 12.7
CADW- 4144	10/28/2020	< 155	< 2.6	< 6.2	< 2.7	< 3.4	< 5.1	< 7.4	< 3.7	< 3.6	< 8.4
					CA-DWA-005 (Brucker Bros.)						
CADW- 332	2/4/2020	< 155	< 1.7	< 3.3	< 1.3	< 1.9	< 4.1	< 1.7	< 2.1	< 1.9	< 4.0
CADW- 1332	4/21/2020	< 153	< 3.7	< 3.8	< 3.0	< 1.3	< 2.9	< 4.4	< 3.5	< 2.5	< 6.0
CADW- 2650	7/27/2020	< 158	< 4.8	< 8.1	< 3.2	< 2.6	< 7.2	< 4.1	< 4.4	< 2.4	< 8.3
CADW- 4145	10/26/2020	< 155	< 3.0	< 2.5	< 2.3	< 3.5	< 3.0	< 5.8	< 3.9	< 1.7	< 7.5
					CA-DWA-006 (Kuenzel [a])						
CADW- 333	2/4/2020	< 155	< 2.4	< 3.5	< 1.9	< 2.8	< 5.0	< 5.1	< 3.2	< 3.5	< 5.7
CADW- 1333	4/27/2020	< 153	< 3.2	< 6.0	< 3.3	< 2.7	< 3.5	< 3.3	< 3.7	< 3.6	< 4.5
CADW- 2651	7/27/2020	< 158	< 3.4	< 7.7	< 4.7	< 4.0	< 9.3	< 6.7	< 4.4	< 4.1	< 4.3
CADW- 4146	10/26/2020	< 155	< 1.4	< 3.4	< 1.8	< 1.6	< 2.9	< 1.8	< 1.7	< 2.0	< 1.8
					CA-DWA-007 (Kriete, Stan)						
CADW- 334	2/4/2020	< 155	< 3.2	< 6.8	< 2.2	< 2.7	< 3.0	< 5.3	< 3.9	< 2.5	< 3.3
CADW- 1335	4/27/2020	< 153	< 2.6	< 4.1	< 1.6	< 1.3	< 2.5	< 3.3	< 4.1	< 2.8	< 5.1
CADW- 2652	7/27/2020	< 158	< 2.5	< 5.4	< 1.3	< 2.6	< 3.4	< 3.2	< 4.1	< 3.0	< 10.6
CADW- 4147	10/26/2020	< 155	< 2.4	< 7.3	< 2.9	< 1.3	< 2.9	< 3.7	< 4.5	< 3.8	< 10.9

[a] Owner change in 4th Qtr.;Previous owner Lindeman.

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-008 (Brandt)					
CADW- 335	2/4/2020	< 155	< 2.9	< 6.1	< 2.9	< 3.2	< 3.1	< 2.6	< 4.0	< 1.4	< 3.1
CADW- 1336	4/27/2020	< 153	< 2.8	< 7.1	< 3.0	< 2.1	< 3.6	< 3.3	< 3.3	< 3.0	< 4.5
CADW- 2653	7/27/2020	< 158	< 4.2	< 6.1	< 3.9	< 3.0	< 3.2	< 6.2	< 3.6	< 2.5	< 5.6
	10/28/2020					NS[a]					
						CA-DWA-009 (Clardy)					
CADW- 336	2/4/2020	< 155	< 1.6	< 3.2	< 1.2	< 1.4	< 2.6	< 1.8	< 2.2	< 2.2	< 5.8
CADW- 1337	4/27/2020	< 153	< 1.2	< 3.9	< 2.0	< 1.7	< 4.2	< 2.8	< 2.5	< 2.5	< 2.6
CADW- 2654	7/27/2020	< 158	< 4.1	< 7.0	< 4.0	< 2.4	< 2.5	< 3.1	< 3.6	< 2.6	< 12.2
CADW- 4148	10/26/2020	< 155	< 2.2	< 1.8	< 3.1	< 1.6	< 5.3	< 2.8	< 3.6	< 2.2	< 3.5
						CA-DWA-010 (Dillon, Tom) [b]					
CADW- 337	2/4/2020	< 155	< 2.4	< 5.4	< 3.7	< 1.7	< 6.3	< 2.9	< 3.4	< 3.1	< 5.6
CADW- 1338	4/27/2020	< 153	< 1.8	< 3.6	< 1.2	< 1.6	< 4.4	< 2.6	< 2.2	< 1.9	< 1.5
CADW- 2655	7/27/2020	< 158	< 3.3	< 6.8	< 2.4	< 1.2	< 3.7	< 4.4	< 4.0	< 3.1	< 10.1
CADW- 4149	10/26/2020	< 155	< 2.9	< 8.2	< 3.9	< 3.3	< 3.8	< 3.7	< 4.0	< 3.4	< 7.5
						CA-DWA-012 (Dillon, Joe)					
CADW- 338	2/4/2020	< 155	< 3.4	< 5.8	< 3.1	< 1.7	< 2.6	< 3.4	< 3.8	< 2.3	< 4.8
CADW- 1339	4/27/2020	< 153	< 2.3	< 4.3	< 2.4	< 2.6	< 8.8	< 3.1	< 3.0	< 3.4	< 4.7
CADW- 2656	7/27/2020	< 158	< 3.3	< 6.2	< 3.9	< 2.0	< 5.0	< 5.0	< 3.0	< 2.5	< 14.1
CADW- 4150	10/26/2020	< 155	< 2.1	< 5.2	< 4.2	< 2.9	< 5.9	< 3.6	< 3.6	< 3.6	< 13.1
						CA-DWA-21 (Baumgarth)					
CADW- 339	2/4/2020	< 155	< 4.4	< 7.6	< 2.8	< 2.9	< 6.0	< 5.6	< 4.1	< 2.8	< 6.5
CADW- 1340	4/27/2020	< 153	< 1.7	< 3.3	< 1.9	< 1.9	< 1.2	< 1.5	< 2.4	< 2.4	< 2.6
CADW- 2657	7/27/2020	< 158	< 3.5	< 5.2	< 2.7	< 2.9	< 4.5	< 4.8	< 3.4	< 2.5	< 5.7
CADW- 4151	10/26/2020	< 155	< 3.1	< 5.6	< 3.0	< 1.6	< 7.0	< 6.7	< 3.8	< 1.9	< 4.4

[a] "NS" = No sample; see Part I Table 5.5, Listing of Missed Samples.

[b] Tom Dillon property previously owned by Susan Dillon (CR#202100085).

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-022 (Plummer)						
CADW- 340	2/7/2020	< 154	< 3.0	< 7.0	< 2.7	< 1.4	< 6.0	< 2.8	< 4.0	< 2.3	< 3.4
CADW- 1341	4/27/2020	< 153	< 1.6	< 2.6	< 1.5	< 2.1	< 2.5	< 1.5	< 2.2	< 2.4	< 1.8
CADW- 2658	7/27/2020	< 158	< 2.1	< 6.0	< 2.4	< 2.4	< 3.4	< 4.2	< 3.3	< 2.3	< 4.7
CADW- 4152	10/26/2020	< 155	< 2.1	< 7.1	< 2.2	< 1.3	< 2.8	< 3.7	< 4.3	< 3.2	< 8.2
					CA-DWA-D23 (Curdt)						
CADW- 341	2/7/2020	< 154	< 2.7	< 3.8	< 4.0	< 3.0	< 6.3	< 3.7	< 3.8	< 2.8	< 6.6
CADW- 1342	4/27/2020	< 153	< 3.3	< 4.3	< 1.7	< 1.7	< 4.2	< 3.6	< 3.5	< 2.8	< 5.2
CADW- 2659	7/27/2020	< 158	< 1.9	< 5.2	< 2.9	< 2.4	< 5.2	< 3.3	< 2.9	< 2.2	< 6.0
CADW- 4153	10/26/2020	< 155	< 2.8	< 4.2	< 2.4	< 3.7	< 6.0	< 4.4	< 3.6	< 2.5	< 14.2
					CA-DWA-024 (Farley)						
CADW- 343	2/7/2020	< 154	< 1.4	< 3.9	< 1.9	< 1.4	< 3.6	< 2.2	< 2.4	< 2.2	< 5.5
CADW- 1343	4/27/2020	< 153	< 2.3	< 3.0	< 2.1	< 1.9	< 5.2	< 2.3	< 3.7	< 2.9	< 4.4
CADW- 2660	7/27/2020	< 158	< 1.5	< 9.4	< 2.7	< 1.8	< 5.0	< 3.9	< 3.8	< 2.3	< 11.8
CADW- 4154	10/26/2020	< 155	< 2.0	< 3.8	< 1.8	< 1.7	< 3.2	< 2.5	< 1.6	< 1.8	< 4.5
					CA-DWA-025 (Kriete, Mario) [a]						
CADW- 2689	7/27/2020	< 158	< 2.8	< 7.1	< 3.0	< 2.2	< 8.2	< 5.8	< 4.1	< 3.3	< 14.0
					CA-DWA-V16 (Wallendorf Farm)						
CADW- 344	2/7/2020	< 154	< 3.6	< 6.7	< 3.4	< 1.9	< 3.7	< 4.9	< 3.5	< 2.5	< 3.8
CADW- 1344	4/27/2020	< 153	< 1.3	< 3.4	< 1.4	< 1.4	< 1.9	< 2.3	< 2.3	< 1.7	< 2.9
CADW- 2661	7/27/2020	< 158	< 3.9	< 6.9	< 2.5	< 2.0	< 5.9	< 3.2	< 3.4	< 3.2	< 10.0
CADW- 4155	10/27/2020	< 155	< 2.4	< 9.4	< 3.9	< 2.1	< 7.5	< 7.1	< 3.4	< 3.6	< 4.9
					CA-DWA-PW1 (Plant Cafeteria)						
CADW- 345	2/7/2020	< 154	< 1.1	< 6.4	< 3.9	< 2.5	< 6.7	< 3.1	< 3.2	< 2.6	< 4.5
CADW- 1345	4/24/2020	< 153	< 2.5	< 5.8	< 4.5	< 1.8	< 5.7	< 4.5	< 4.2	< 1.9	< 5.1
CADW- 2662	7/28/2020	< 158	< 1.7	< 8.2	< 1.9	< 2.9	< 5.3	< 4.2	< 3.3	< 2.5	< 13.0
CADW- 4156	10/27/2020	< 155	< 4.0	< 6.6	< 3.3	< 2.5	< 3.1	< 6.7	< 4.2	< 4.9	< 8.0

[a] Special sampling. Property owner officially enrolled in sampling program for 2021.

Table 9. Wells (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- 83	1/9/2020	164 ± 83	< 2.2	< 3.9	< 1.6	< 1.2	< 2.6	< 3.1	< 2.7	< 1.6	< 7.3
CAWW- 368	2/11/2020	278 ± 88	< 3.2	< 4.6	< 2.9	< 2.5	< 7.0	< 3.9	< 4.2	< 1.6	< 5.3
CAWW- 752	3/13/2020	393 ± 92	< 0.7	< 3.8	< 1.7	< 2.2	< 3.9	< 2.8	< 2.6	< 2.6	< 5.1
CAWW- 930	4/3/2020	364 ± 92	< 2.4	< 2.3	< 1.7	< 1.7	< 3.7	< 3.3	< 2.7	< 2.6	< 3.7
CAWW- 1515	5/11/2020	286 ± 87	< 3.0	< 5.0	< 3.4	< 2.5	< 4.6	< 4.0	< 3.3	< 2.7	< 9.5
CAWW- 2004	6/11/2020	484 ± 100	< 4.1	< 7.0	< 2.8	< 3.8	< 6.2	< 4.1	< 4.8	< 2.9	< 4.4
CAWW- 2433	7/14/2020	292 ± 90	< 2.6	< 4.7	< 2.6	< 1.6	< 4.5	< 3.7	< 3.4	< 2.7	< 5.1
CAWW- 2867	8/12/2020	219 ± 86	< 2.0	< 3.6	< 2.6	< 0.9	< 3.1	< 3.1	< 1.9	< 1.6	< 5.8
CAWW- 3300	9/14/2020	< 159	< 3.0	< 2.8	< 1.3	< 2.2	< 2.8	< 3.9	< 2.9	< 3.7	< 12.5
CAWW- 3840	10/14/2020	223 ± 85	< 2.1	< 8.4	< 2.8	< 2.0	< 5.1	< 5.8	< 3.3	< 3.2	< 9.6
CAWW- 4286	11/12/2020	284 ± 89	< 2.1	< 3.9	< 2.1	< 3.3	< 4.5	< 4.1	< 4.3	< 3.3	< 6.5
CAWW- 4580	12/11/2020	336 ± 102	< 3.6	< 3.0	< 1.9	< 2.8	< 6.1	< 2.9	< 4.6	< 3.1	< 1.9
					Location: CA-WWA-937B						
CAWW- 84	1/9/2020	< 158	< 1.9	< 2.3	< 2.0	< 1.3	< 3.7	< 2.6	< 2.5	< 2.2	< 6.0
CAWW- 369	2/11/2020	229 ± 85	< 3.9	< 10.2	< 5.2	< 2.8	< 8.1	< 5.9	< 5.3	< 3.9	< 6.4
CAWW- 754	3/13/2020	306 ± 88	< 4.5	< 9.7	< 3.0	< 3.0	< 6.1	< 4.2	< 4.1	< 4.1	< 9.2
CAWW- 931	4/3/2020	324 ± 90	< 3.3	< 7.2	< 2.8	< 4.7	< 7.4	< 4.4	< 3.6	< 4.1	< 7.9
CAWW- 1513	5/11/2020	246 ± 85	< 4.6	< 8.8	< 2.7	< 2.7	< 5.2	< 4.4	< 3.7	< 3.5	< 14.8
CAWW- 2005	6/11/2020	< 156	< 1.4	< 2.0	< 1.5	< 1.7	< 2.8	< 2.9	< 2.6	< 1.9	< 2.8
CAWW- 2534	7/21/2020 [a]	< 159	< 2.0	< 3.8	< 2.4	< 2.7	< 3.9	< 3.5	< 3.7	< 2.7	< 9.1
CAWW- 3054	7/10/2020 [b]	< 156	< 1.9	< 7.0	< 1.5	< 1.3	< 3.3	< 4.9	< 1.6	< 1.5	< 13.5
CAWW- 2869	8/12/2020	< 159	< 3.5	< 6.1	< 2.8	< 1.3	< 2.8	< 5.0	< 3.2	< 3.5	< 9.6
CAWW- 3301	9/14/2020	< 159	< 2.3	< 3.9	< 1.9	< 1.7	< 3.6	< 3.9	< 2.9	< 2.6	< 6.2
CAWW- 3968	10/14/2020 [c]	< 155	< 2.5	< 7.1	< 4.2	< 2.7	< 6.0	< 3.3	< 4.2	< 3.3	< 13.4
CAWW- 4287	11/12/2020	< 157	< 2.5	< 9.4	< 2.2	< 3.2	< 2.8	< 3.6	< 4.4	< 3.6	< 8.9
CAWW- 4581	12/11/2020	< 163	< 3.5	< 3.7	< 3.4	< 4.6	< 6.6	< 3.0	< 4.5	< 3.1	< 4.8

[a] Original sample broke during shipment; backup sample lost by the carrier; sample recollected.

[b] Backup sample previously thought to have been lost was subsequently found. (see footnote "a")

[c] Backup sample. Original sample damaged during shipment.

Table 9. Wells (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-937D						
CAWW- 85	1/9/2020	< 158	< 2.7	< 4.1	< 3.5	< 4.0	< 8.4	< 1.7	< 3.5	< 3.5	< 6.1
CAWW- 370	2/11/2020	< 154	< 3.2	< 4.1	< 2.9	< 3.2	< 5.9	< 3.8	< 4.1	< 3.1	< 3.4
CAWW- 755	3/10/2020	< 151	< 3.6	< 11.9	< 4.5	< 3.3	< 7.8	< 4.9	< 4.7	< 5.8	< 4.7
CAWW- 932	4/3/2020	172 ± 83	< 1.8	< 3.3	< 1.1	< 1.7	< 2.2	< 4.3	< 2.3	< 2.6	< 3.6
CAWW- 1510	5/11/2020	< 153	< 3.9	< 11.0	< 3.0	< 1.4	< 6.1	< 4.8	< 3.9	< 2.9	< 11.3
CAWW- 2006	6/11/2020	< 156	< 4.5	< 6.9	< 2.2	< 4.8	< 8.9	< 3.0	< 5.0	< 4.3	< 6.3
CAWW- 2435	7/10/2020	< 160	< 2.8	< 4.4	< 1.5	< 1.9	< 4.4	< 4.1	< 3.5	< 2.2	< 7.1
CAWW- 2870	8/12/2020	187 ± 85	< 1.8	< 4.1	< 2.0	< 2.0	< 1.7	< 3.6	< 2.0	< 1.5	< 6.4
CAWW- 3302	9/14/2020	203 ± 85	< 2.7	< 5.8	< 3.2	< 2.6	< 4.3	< 6.4	< 3.0	< 1.6	< 5.6
CAWW- 3842	10/14/2020	< 157	< 2.5	< 3.7	< 3.7	< 1.5	< 6.3	< 3.7	< 3.9	< 2.1	< 8.7
CAWW- 4289	11/12/2020	206 ± 85	< 1.9	< 7.5	< 2.6	< 2.2	< 4.6	< 3.9	< 3.2	< 2.5	< 5.6
CAWW- 4582	12/11/2020	< 163	< 3.9	< 5.3	< 1.7	< 2.1	< 6.8	< 3.9	< 3.9	< 3.1	< 1.5
					Location: CA-WWA-939R						
CAWW- 86	1/9/2020	270 ± 88	< 1.9	< 2.6	< 2.2	< 1.3	< 3.5	< 3.0	< 2.3	< 1.3	< 5.0
CAWW- 371	2/11/2020	645 ± 105	< 2.1	< 5.3	< 2.0	< 1.9	< 2.6	< 2.4	< 2.6	< 2.5	< 4.4
CAWW- 756	3/13/2020	987 ± 117	< 2.3	< 4.5	< 3.8	< 1.4	< 5.2	< 2.6	< 3.9	< 3.7	< 6.4
CAWW- 933	4/3/2020	779 ± 110	< 2.3	< 4.1	< 1.6	< 2.1	< 2.8	< 3.6	< 2.8	< 2.7	< 6.7
CAWW- 1514	5/11/2020	825 ± 111	< 1.9	< 5.7	< 2.2	< 2.3	< 3.4	< 3.0	< 2.3	< 1.9	< 6.5
CAWW- 2007	6/11/2020	889 ± 116	< 3.7	< 6.5	< 2.4	< 2.6	< 7.7	< 5.9	< 3.6	< 3.1	< 6.6
CAWW- 2436	7/14/2020	722 ± 109	< 2.8	< 6.7	< 3.3	< 1.7	< 5.5	< 3.1	< 2.9	< 2.8	< 2.2
CAWW- 2871	8/12/2020	701 ± 109	< 2.8	< 7.3	< 2.5	< 3.3	< 4.7	< 3.3	< 2.7	< 2.2	< 9.9
CAWW- 3303	9/14/2020	647 ± 106	< 3.7	< 4.7	< 4.7	< 1.4	< 5.1	< 5.9	< 4.5	< 3.6	< 9.7
CAWW- 3843	10/14/2020	578 ± 102	< 2.5	< 6.7	< 2.1	< 3.3	< 7.1	< 4.9	< 4.3	< 3.0	< 12.9
CAWW- 4290	11/12/2020	608 ± 104	< 4.3	< 6.7	< 4.3	< 2.4	< 9.4	< 4.9	< 4.8	< 4.9	< 14.0
CAWW- 4607	12/14/2020	551 ± 112	< 8.2	< 1.2	< 7.3	< 7.3	< 17.0	< 9.9	< 8.0	< 8.4	< 9.9
					Location: CA-WWA-940						
CAWW- 87	1/9/2020	< 158	< 1.4	< 1.7	< 1.7	< 1.5	< 3.6	< 3.8	< 2.8	< 2.3	< 5.9
CAWW- 372	2/11/2020	161 ± 82	< 4.9	< 6.7	< 4.5	< 3.5	< 9.1	< 4.6	< 4.8	< 3.8	< 7.7
CAWW- 757	3/10/2020	258 ± 86	< 1.7	< 5.0	< 3.7	< 2.9	< 7.0	< 2.9	< 4.0	< 3.9	< 3.4
CAWW- 934	4/3/2020	< 157	< 2.8	< 8.1	< 3.1	< 2.2	< 6.4	< 4.5	< 3.6	< 3.5	< 4.6
CAWW- 1512	5/11/2020	202 ± 83	< 4.1	< 7.4	< 4.2	< 2.2	< 7.0	< 4.7	< 4.8	< 1.5	< 10.0
CAWW- 2008	6/11/2020	159 ± 84	< 4.2	< 8.6	< 4.8	< 2.5	< 5.1	< 5.3	< 4.7	< 4.9	< 7.2
CAWW- 2437	7/10/2020	< 160	< 2.3	< 6.1	< 3.1	< 2.3	< 4.7	< 2.5	< 2.8	< 2.4	< 7.2
CAWW- 2872	8/12/2020	< 159	< 3.5	< 5.1	< 2.1	< 3.2	< 3.2	< 4.2	< 3.8	< 3.3	< 13.5
CAWW- 3304	9/14/2020	< 159	< 2.1	< 2.8	< 2.6	< 3.5	< 2.7	< 5.4	< 4.6	< 3.8	< 13.1
CAWW- 3844	10/14/2020	< 157	< 3.9	< 4.2	< 2.4	< 2.8	< 4.2	< 3.9	< 3.8	< 3.6	< 5.8
CAWW- 4291	11/12/2020	< 157	< 5.3	< 6.7	< 4.9	< 4.9	< 12.3	< 11.0	< 5.8	< 4.4	< 13.6
CAWW- 4605	12/14/2020	< 166	< 3.4	< 5.5	< 4.2	< 3.2	< 5.7	< 4.0	< 4.6	< 4.4	< 4.2

Table 9. Wells (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-941						
CAWW- 88	1/9/2020	< 158	< 1.6	< 3.8	< 2.1	< 3.3	< 6.7	< 2.9	< 3.8	< 3.1	< 7.0
CAWW- 373	2/11/2020	161 ± 82	< 2.9	< 3.9	< 2.8	< 3.8	< 7.1	< 2.9	< 3.9	< 3.5	< 4.3
CAWW- 758	3/10/2020	193 ± 82	< 2.3	< 5.1	< 2.9	< 2.2	< 6.0	< 3.3	< 2.7	< 3.1	< 2.1
CAWW- 935	4/3/2020	< 157	< 3.8	< 3.9	< 3.8	< 2.0	< 6.6	< 4.1	< 4.0	< 4.7	< 6.1
CAWW- 1511	5/11/2020	< 153	< 4.2	< 5.6	< 3.1	< 2.6	< 4.6	< 3.5	< 3.8	< 3.4	< 9.0
CAWW- 2009	6/11/2020	206 ± 86	< 2.2	< 4.9	< 1.9	< 2.4	< 4.8	< 2.9	< 2.8	< 1.5	< 2.1
CAWW- 2438	7/10/2020	< 160	< 2.7	< 5.3	< 2.8	< 1.8	< 3.9	< 2.8	< 2.5	< 2.9	< 3.1
CAWW- 2873	8/12/2020	< 159	< 2.5	< 6.9	< 3.5	< 1.2	< 4.5	< 5.6	< 2.9	< 2.8	< 7.1
CAWW- 3305	9/14/2020	< 159	< 2.5	< 7.9	< 3.2	< 2.5	< 7.0	< 4.5	< 4.2	< 3.6	< 10.8
CAWW- 3845	10/14/2020	< 157	< 3.2	< 2.2	< 3.3	< 0.9	< 3.4	< 5.2	< 3.3	< 2.3	< 10.3
CAWW- 4292	11/12/2020	< 157	< 3.7	< 11.2	< 3.6	< 4.1	< 6.3	< 7.7	< 3.8	< 4.1	< 8.7
CAWW- 4606	12/14/2020	< 166	< 3.9	< 7.0	< 2.3	< 2.9	< 8.4	< 5.2	< 4.5	< 3.6	< 1.6
					Location: CA-WWA-GWS						
CAWW- 82	1/9/2020	< 158	< 2.8	< 5.1	< 3.3	< 3.1	< 7.4	< 2.8	< 3.7	< 4.8	< 8.7
CAWW- 367	2/11/2020	271 ± 88	< 3.5	< 5.2	< 4.2	< 2.4	< 6.3	< 6.7	< 4.5	< 3.2	< 7.5
CAWW- 751	3/13/2020	304 ± 88	< 2.5	< 6.2	< 2.4	< 3.2	< 3.4	< 3.0	< 4.2	< 4.1	< 5.0
CAWW- 929	4/3/2020	366 ± 92	< 2.4	< 4.9	< 3.5	< 3.2	< 3.1	< 4.9	< 4.1	< 3.8	< 8.0
CAWW- 1516	5/11/2020	282 ± 87	< 3.5	< 7.8	< 2.9	< 1.4	< 5.0	< 3.3	< 3.6	< 3.0	< 9.6
CAWW- 2003	6/11/2020	385 ± 95	< 2.2	< 3.6	< 2.0	< 2.2	< 2.2	< 2.2	< 2.3	< 2.3	< 2.5
CAWW- 2432	7/14/2020	466 ± 98	< 2.0	< 5.1	< 3.6	< 3.3	< 5.9	< 3.5	< 3.5	< 2.5	< 6.0
CAWW- 2866	8/12/2020	248 ± 88	< 2.2	< 7.2	< 4.0	< 3.0	< 3.5	< 3.7	< 3.5	< 3.1	< 6.1
CAWW- 3299	9/14/2020	549 ± 102	< 2.3	< 4.2	< 2.4	< 3.7	< 7.5	< 5.4	< 5.0	< 4.5	< 10.7
CAWW- 3838	10/14/2020	263 ± 88	< 3.0	< 8.0	< 2.9	< 1.6	< 4.9	< 4.0	< 3.4	< 3.1	< 6.2
CAWW- 4285	11/12/2020	2989 ± 179 [a]	< 3.3	< 3.3	< 2.2	< 1.2	< 5.5	< 4.5	< 3.5	< 3.9	< 5.5
CAWW- 4563	11/12/2020	3222 ± 185 [b]	< 1.9	< 3.9	< 2.6	< 1.2	< 2.0	< 3.6	< 2.1	< 1.6	< 4.6
CAWW- 4579	12/11/2020	794 ± 121	< 2.3	< 3.4	< 3.0	< 2.2	< 4.2	< 1.8	< 3.4	< 3.7	< 2.7

[a] Recount 3077 ± 182 pCi/L; reanalysis 2889 ± 192 pCi/L. (CR#202007110). See Part I sect. 4.2 for discussion of elevated results.

[b] Backup sample. (CR#202007110). See Part I Section 4.2 for discussion of elevated results.

Table 9. Wells (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	$^{140}BaLa$
					ISFSI Sump						
CAWW- 81	1/9/2020	< 158				NR[a]					
CAWW- 946	4/3/2020	< 157				NR[a]					
CAWW- 2421	7/11/2020	< 160				NR[a]					
CAWW- 3837	10/14/2020	< 157				NR[a]					
					Location: CA-WWA-U1MW-001						
CAWW- 173	1/14/2020	< 156	< 2.7	< 5.2	< 1.6	< 3.1	< 3.3	< 5.0	< 3.4	< 3.5	< 5.9
CAWW- 1174	4/15/2020	< 158	< 1.7	< 3.1	< 2.1	< 2.5	< 4.3	< 3.1	< 2.8	< 2.8	< 2.5
CAWW- 2429	7/8/2020	< 160	< 2.4	< 5.8	< 1.9	< 1.3	< 2.1	< 2.8	< 2.8	< 2.3	< 2.7
CAWW- 3716	10/6/2020	< 158	< 4.9	< 5.7	< 5.2	< 4.5	< 2.4	< 4.8	< 5.5	< 3.5	< 13.5
					Location: CA-WWA-U1MW-002						
CAWW- 186	1/21/2020	< 156	< 3.2	< 6.1	< 2.6	< 2.9	< 3.6	< 3.7	< 4.0	< 3.8	< 5.5
CAWW- 1243	4/20/2020	< 156	< 4.2	< 5.0	< 3.8	< 1.5	< 2.7	< 4.8	< 4.8	< 5.0	< 5.5
CAWW- 2422	7/9/2020	< 160	< 4.0	< 10.1	< 2.6	< 2.8	< 9.0	< 3.7	< 4.7	< 3.9	< 3.0
CAWW- 3714	10/7/2020	< 158	< 1.7	< 6.7	< 4.4	< 2.3	< 6.9	< 4.5	< 3.2	< 3.2	< 11.1
					Location: CA-WWA-U1MW-004						
CAWW- 78	1/7/2020	< 158	< 2.2	< 2.5	< 3.1	< 2.4	< 2.9	< 3.8	< 2.0	< 2.4	< 5.0
CAWW- 937	4/2/2020	< 157	< 2.4	< 6.7	< 3.4	< 2.3	< 8.0	< 5.8	< 3.9	< 3.7	< 5.2
CAWW- 2427	7/9/2020	< 160	< 2.6	< 5.0	< 1.8	< 2.2	< 5.0	< 4.1	< 3.1	< 2.7	< 5.8
CAWW- 3730	10/1/2020	< 157	< 2.9	< 5.8	< 2.8	< 2.2	< 4.4	< 4.4	< 4.2	< 3.1	< 9.4
					Location: CA-WWA-U1MW-005						
CAWW- 79	1/7/2020	< 158	< 1.5	< 3.5	< 2.3	< 3.0	< 2.6	< 3.5	< 2.5	< 2.8	< 6.5
CAWW- 938	4/2/2020	< 157	< 2.3	< 5.2	< 2.7	< 1.9	< 6.0	< 2.7	< 2.8	< 3.7	< 3.6
CAWW- 2424	7/9/2020	< 160	< 1.7	< 3.3	< 2.3	< 2.7	< 2.4	< 1.8	< 3.0	< 2.1	< 6.8
CAWW- 3731	10/1/2020	< 157	< 2.6	< 4.4	< 2.0	< 3.2	< 4.4	< 4.7	< 3.3	< 3.6	< 9.9
					Location: CA-WWA-U1MW-006						
CAWW- 76	1/6/2020	< 158	< 2.8	< 6.5	< 2.7	< 2.1	< 6.5	< 4.7	< 3.0	< 3.2	< 6.1
CAWW- 1075	4/14/2020	< 158	< 1.7	< 5.0	< 1.4	< 2.3	< 5.3	< 3.5	< 3.1	< 2.9	< 2.3
CAWW- 2419	7/6/2020	< 160	< 4.3	< 7.9	< 3.7	< 3.0	< 4.7	< 3.8	< 4.1	< 3.5	< 8.1
CAWW- 3970	10/19/2020	< 155	< 2.5	< 4.0	< 3.4	< 2.8	< 7.5	< 4.9	< 4.2	< 2.8	< 10.0

[a] "NR" = Not required. Analyses for gamma-emitting isotopes not required by the ODCM.

Table 9. Wells (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- 202	1/27/2020	< 156	< 3.2	< 3.3	< 3.1	< 2.8	< 6.8	< 2.0	< 3.4	< 4.2	< 1.8
CAWW- 1063	4/13/2020	< 158	< 2.9	< 3.2	< 4.6	< 3.4	< 8.7	< 6.6	< 4.2	< 3.2	< 3.1
CAWW- 2528	7/17/2020	< 159	< 3.0	< 5.8	< 3.3	< 1.7	< 3.3	< 4.1	< 3.2	< 3.7	< 4.7
CAWW- 3729	10/8/2020	< 157	< 8.3	< 16.8	< 9.8	< 7.5	< 17.9	< 14.0	< 8.6	< 7.4	< 14.1
					Location: CA-WWA-U1MW-012						
CAWW- 77	1/6/2020	< 158	< 3.8	< 5.2	< 3.3	< 3.4	< 5.6	< 3.6	< 3.9	< 3.6	< 6.1
CAWW- 1074	4/14/2020	< 158	< 3.0	< 6.1	< 2.0	< 2.2	< 7.4	< 5.7	< 3.9	< 2.4	< 5.3
CAWW- 2418	7/6/2020	< 160	< 3.4	< 5.9	< 2.5	< 3.0	< 3.1	< 2.8	< 3.2	< 3.4	< 4.2
CAWW- 3969	10/19/2020	< 155	< 1.7	< 5.8	< 3.1	< 1.0	< 5.5	< 3.3	< 2.8	< 3.1	< 6.1
					Location: CA-WWA-U1MW-013						
CAWW- 179	1/21/2020	< 156	< 2.1	< 4.7	< 2.1	< 3.5	< 6.8	< 5.5	< 3.8	< 3.0	< 2.0
CAWW- 1178	4/15/2020	< 158	< 3.1	< 5.1	< 4.9	< 1.6	< 7.6	< 6.8	< 4.5	< 5.5	< 4.8
CAWW- 2431	7/8/2020	< 160	< 3.3	< 2.3	< 1.9	< 2.2	< 1.9	< 2.3	< 2.7	< 2.9	< 3.7
CAWW- 3971	10/19/2020	< 155	< 3.1	< 7.7	< 3.0	< 3.8	< 6.9	< 5.5	< 3.1	< 2.8	< 14.9
					Location: CA-WWA-U1MW-014						
CAWW- 184	1/21/2020	311 ± 90	< 4.7	< 9.1	< 4.6	< 3.4	< 4.6	< 3.9	< 5.5	< 4.0	< 6.3
CAWW- 1038	4/10/2020	179 ± 83	< 2.5	< 3.7	< 1.9	< 1.7	< 4.0	< 2.7	< 2.7	< 2.9	< 3.6
CAWW- 2416	7/7/2020	205 ± 86	< 2.0	< 2.0	< 1.7	< 1.9	< 2.5	< 2.8	< 3.0	< 3.1	< 2.6
CAWW- 3712	10/7/2020	176 ± 83	< 3.1	< 6.0	< 5.8	< 2.3	< 5.0	< 4.8	< 4.2	< 3.1	< 14.7
					Location: CA-WWA-U1MW-015						
CAWW- 80	1/7/2020	< 158	< 3.3	< 1.7	< 1.9	< 1.1	< 3.9	< 2.7	< 2.3	< 2.2	< 8.6
CAWW- 939	4/2/2020	< 157	< 2.1	< 4.5	< 2.4	< 2.1	< 5.2	< 2.3	< 2.6	< 2.5	< 2.8
CAWW- 2425	7/9/2020	< 160	< 3.1	< 6.0	< 2.6	< 1.5	< 6.3	< 4.6	< 2.9	< 2.7	< 4.1
CAWW- 3722	10/5/2020	< 158	< 3.3	< 3.8	< 3.6	< 3.3	< 5.2	< 4.5	< 3.3	< 3.2	< 5.7
					Location: CA-WWA-U1MW-016						
CAWW- 180	1/20/2020	< 156	< 2.5	< 1.6	< 1.9	< 1.8	< 3.7	< 2.9	< 2.3	< 2.0	< 2.5
CAWW- 1065	4/13/2020	< 158	< 3.0	< 6.3	< 2.5	< 3.5	< 5.0	< 4.6	< 3.8	< 4.9	< 5.2
CAWW- 2525	7/17/2020	< 159	< 3.3	< 7.5	< 1.5	< 2.3	< 5.7	< 3.5	< 2.7	< 1.5	< 6.6
CAWW- 3719	10/5/2020	< 158	< 2.2	< 2.5	< 3.0	< 2.7	< 3.4	< 3.6	< 2.6	< 1.9	< 11.0

Table 9. Wells (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-18									
CAWW- 183	1/21/2020	< 156	NR[a]								
CAWW- 1039	4/10/2020	< 158	NR[a]								
CAWW- 2417	7/7/2020	< 160	NR[a]								
CAWW- 3711	10/7/2020	< 158	NR[a]								
		Location: CA-WWA-U1MW-19									
CAWW- 181	1/21/2020	< 156	NR[a]								
CAWW- 1040	4/10/2020	< 158	NR[a]								
CAWW- 2420	7/7/2020	< 160	NR[a]								
CAWW- 3709	10/7/2020	< 158	NR[a]								
		Location: CA-WWA-U1MW-20									
CAWW- 182	1/21/2020	< 156	NR[a]								
CAWW- 1041	4/10/2020	< 158	NR[a]								
CAWW- 2426	7/9/2020	< 160	NR[a]								
CAWW- 3710	10/7/2020	< 158	NR[a]								
		Location: CA-WWA-U1MW-31									
CAWW- 175	1/16/2020	325 ± 91	NR[a]								
CAWW- 940	4/1/2020	233 ± 86	NR[a]								
CAWW- 2524	7/16/2020	420 ± 98	NR[a]								
CAWW- 3726	10/8/2020	257 ± 87	NR[a]								
CAWW- 4583	12/11/2020	< 163	< 3.6	< 9.6	< 4.7	< 3.6	< 6.1	< 2.7	< 5.0	< 4.3	< 4.8
		Location: CA-WWA-U1MW-34									
CAWW- 176	1/16/2020	188 ± 84	NR[a]								
CAWW- 941	4/1/2020	200 ± 84	NR[a]								
CAWW- 2523	7/16/2020	230 ± 89	NR[a]								
CAWW- 3727	10/8/2020	190 ± 84	NR[a]								
		Location: CA-WWA-U1MW-36									
CAWW- 177	1/16/2020	311 ± 90	NR[a]								
CAWW- 942	4/1/2020	260 ± 87	NR[a]								
CAWW- 2522	7/16/2020	279 ± 91	NR[a]								
CAWW- 3724	10/8/2020	278 ± 89	NR[a]								

[a] "NR" = Not required. Analyses for gamma-emitting isotopes not required by the ODCM.

Table 9. Wells (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-39									
CAWW- 178	1/16/2020	< 156				NR[a]					
CAWW- 1077	4/14/2020	< 158				NR[a]					
CAWW- 2423	7/9/2020	< 160				NR[a]					
CAWW- 3720	10/5/2020	< 158				NR[a]					
		Location: CA-WWA-U1MW-47									
CAWW- 172	1/14/2020	183 ± 84				NR[a]					
CAWW- 1064	4/13/2020	< 158				NR[a]					
CAWW- 2526	7/17/2020	< 159				NR[a]					
	10/7/2020					NS[a]					
		Location: CA-WWA-U1MW-58									
CAWW- 167	1/13/2020	331 ± 91				NR[a]					
CAWW- 943	4/1/2020	273 ± 88				NR[a]					
CAWW- 2521	7/16/2020	214 ± 88				NR[a]					
CAWW- 3725	10/8/2020	< 158				NR[a]					
		Location: CA-WWA-U1MW-59									
CAWW- 171	1/14/2020	< 156				NR[a]					
CAWW- 1076	4/14/2020	< 158				NR[a]					
CAWW- 2527	7/17/2020	< 159				NR[a]					
CAWW- 3713	10/7/2020	< 158				NR[a]					
		Inside Old Blowdown Pipeline									
CAWW- 187	1/22/2020	< 156				NR[a]					
CAWW- 1177	4/15/2020	194 ± 84				NR[a]					
CAWW- 2529	7/17/2020					NS[b]					
	10/20/2020					NS[b]					

[a] "NR" = Not required. Analyses for gamma-emitting isotopes not required by the ODCM.

[b] "NS" = No data; see Part I Table 5.5, Listing of Missed Samples.

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

Lab Code	Collection Date	Concentration (pCi/L) ^{3}H	^{54}Mn	^{59}Fe	^{58}Co	^{60}Co	^{65}Zn	$^{95}ZrNb$	^{134}Cs	^{137}Cs	$^{140}BaLa$
		Location: CA-WWA-U2MW-2S									
CAWW- 169	1/13/2020	< 156	NR[a]								
CAWW- 1180	4/16/2020	< 158	NR[a]								
CAWW- 2533	7/15/2020 [b]	< 159	NR[a]								
CAWW- 3058	7/15/2020 [c]	< 156	NR[a]								
CAWW- 3715	10/6/2020	< 158	NR[a]								
		Location: CA-WWA-U2MW-5S									
CAWW- 174	1/14/2020	< 156	NR[a]								
CAWW- 1175	4/16/2020	< 158	NR[a]								
CAWW- 2532	7/15/2020 [b]	< 159	NR[a]								
CAWW- 3057	7/15/2020 [c]	< 156	NR[a]								
CAWW- 3717	10/6/2020	< 156	NR[a]								
		Location: CA-WWA-U2MW-8									
CAWW- 168	1/13/2020	< 156	NR[a]								
CAWW- 944	4/1/2020	< 157	NR[a]								
CAWW- 2530	7/15/2020 [b]	< 159	NR[a]								
CAWW- 3055	7/15/2020 [c]	< 156	NR[a]								
CAWW- 3721	10/5/2020	< 158	NR[a]								
		Location: CA-WWA-U2MW-10									
CAWW- 170	1/14/2020	< 156	< 2.8	< 8.0	< 4.3	< 3.1	< 8.8	< 4.6	< 4.2	< 3.0	< 5.4
CAWW- 1179	4/16/2020	< 158	< 3.4	< 6.3	< 3.8	< 3.9	< 9.3	< 3.8	< 4.9	< 2.1	< 6.2
CAWW- 2531	7/15/2020 [b]	< 159	< 2.9	< 7.2	< 3.8	< 2.4	< 6.7	< 6.8	< 4.2	< 2.8	< 13.6
CAWW- 3056	7/15/2020 [c]	< 156	< 1.5	< 3.5	< 2.1	< 1.2	< 2.9	< 2.8	< 1.4	< 1.4	< 13.0
CAWW- 3723	10/1/2020	< 158	< 1.8	< 6.7	< 3.9	< 3.3	< 7.0	< 3.8	< 3.6	< 1.7	< 14.8
		Location: CA-WWA-U2MW-16									
CAWW- 166	1/13/2020	< 156	NR[a]								
CAWW- 945	4/2/2020	< 157	NR[a]								
CAWW- 2428	7/8/2020	< 160	NR[a]								
CAWW- 3718	10/6/2020	< 158	NR[a]								

[a] "NR" = Not required. Analyses for gamma-emitting isotopes not required by the ODCM.

[b] Duplicate sample; primary sample misplaced by the shipping company.

[c] Backup sample previously thought to have been lost was subsequently found. (see footnote "a")

Table 9. Wells (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-F-005						
CAWW- 45	1/3/2020	< 158	< 3.6	< 3.5	< 3.3	< 1.9	< 1.5	< 2.5	< 3.0	< 2.8	< 6.3
CAWW- 973	4/2/2020	< 157	< 1.5	< 3.3	< 2.1	< 1.6	< 2.8	< 2.5	< 2.3	< 1.8	< 2.3
CAWW- 2362	7/8/2020	< 160	< 2.6	< 7.3	< 2.1	< 2.8	< 3.9	< 2.8	< 3.0	< 3.2	< 1.6
CAWW- 3680	10/8/2020	< 158	< 4.0	< 4.3	< 2.4	< 1.8	< 6.3	< 4.3	< 3.8	< 3.5	< 10.6
					Location: CA-WWA-F-015						
CAWW- 46	1/3/2020	< 158	< 2.1	< 7.5	< 2.0	< 2.6	< 7.2	< 4.9	< 2.8	< 1.5	< 6.5
CAWW- 974	4/2/2020	< 157	< 1.1	< 3.1	< 2.0	< 1.7	< 2.4	< 3.1	< 2.1	< 2.3	< 2.4
CAWW- 2363	7/8/2020	< 160	< 2.1	< 2.2	< 1.3	< 2.3	< 2.0	< 2.0	< 2.6	< 2.5	< 2.1
CAWW- 3681	10/8/2020	< 158	< 2.4	< 3.0	< 3.6	< 1.9	< 5.3	< 3.3	< 2.5	< 1.9	< 4.9

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

Collection: Semiannually
Units: pCi/kg dry

Location		CA-AQS-A	
Lab Code	Req. LLD	CABS- 1773	CABS- 3671
Date Collected	-	05-26-20	10-06-20
K-40	-	13345 ± 572	13693 ± 761
Mn-54	-	< 25.9	< 29.1
Fe-59	-	< 41.5	< 99.7
Co-58	-	< 26.0	< 39.7
Co-60	-	< 18.3	< 18.0
Zr-Nb-95	-	< 40.4	< 49.6
Cs-134	150	< 13.9	< 20.1
Cs-137	180	< 25.2	< 29.0
Ba-La-140	-	< 99.3	< 394.6

Location		CA-AQS-C	
Lab Code	Req. LLD	CABS- 1774	CABS- 3672
Date Collected	-	05-26-20	10-06-20
K-40	-	14653 ± 655	11778 ± 558
Mn-54	-	< 24.8	< 20.1
Fe-59	-	< 65.9	< 61.8
Co-58	-	< 26.0	< 30.0
Co-60	-	< 14.8	< 14.5
Zr-Nb-95	-	< 41.9	< 81.8
Cs-134	150	< 17.5	< 13.1
Cs-137	180	42.6 ± 20.4	< 21.6
Ba-La-140	-	< 108.8	< 230.2

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

Collection: Semiannually
Units: pCi/kg dry

Location		CA-AQS-A	
Lab Code	Req. LLD	CASS- 1771	CASS- 3669
Date Collected	-	05-26-20	10-06-20
K-40	-	12695 ± 587	13308 ± 616
Mn-54	-	< 19.9	< 25.3
Fe-59	-	< 47.2	< 86.5
Co-58	-	< 17.7	< 34.8
Co-60	-	< 17.1	< 23.1
Zr-Nb-95	-	< 33.7	< 87.9
Cs-134	150	< 12.3	< 17.4
Cs-137	180	28.0 ± 14.9	23.7 ± 14.2
Ba-La-140	-	< 83.7	< 498.0

Location		CA-AQS-C	
Lab Code	Req. LLD	CASS- 1772	CASS- 3670
Date Collected	-	05-26-20	10-06-20
K-40	-	13303 ± 661	12260 ± 640
Mn-54	-	< 24.3	< 32.5
Fe-59	-	< 54.5	< 122.1
Co-58	-	< 27.3	< 41.5
Co-60	-	< 20.4	< 17.8
Zr-Nb-95	-	< 41.6	< 82.8
Cs-134	150	< 20.5	< 19.6
Cs-137	180	< 27.8	< 23.8
Ba-La-140	-	< 80.5	< 435.8

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

Location		CA-AQF-A				
Lab Code	Req. LLD	CAF- 1760	CAF- 1761	CAF- 1762	CAF- 1763	CAF- 1765
Date Collected		05-26-20	05-26-20	05-26-20	05-26-20	05-26-20
Sample Type		Common Carp [CC]	River Carpsucker [RC]	Smallmouth Buffalo [SB]	Freshwater Drum [FD]	Silver Carp [SC]
K-40	-	2757 ± 380	3148 ± 428	2879 ± 415	3012 ± 454	3085 ± 525
Mn-54	130	< 13.6	< 19.0	< 13.3	< 13.5	< 15.8
Fe-59	260	< 21.2	< 62.2	< 37.3	< 43.4	< 41.6
Co-58	130	< 12.8	< 16.7	< 19.6	< 12.9	< 20.6
Co-60	130	< 13.9	< 6.6	< 13.1	< 9.4	< 22.7
Zn-65	260	< 28.2	< 37.6	< 35.6	< 26.5	< 62.8
Cs-134	130	< 13.1	< 15.6	< 17.2	< 18.4	< 24.4
Cs-137	150	< 13.4	< 13.5	< 14.4	< 12.1	< 24.5
Lab Code		CAF- 3658	CAF- 3659	CAF- 3660	CAF- 3661	CAF- 3662
Date Collected		10-06-20	10-06-20	10-06-20	10-06-20	10-06-20
Sample Type		Common Carp (CC)	River Carpsucker (RC)	Smallmouth Buffalo (SB)	Freshwater Drum (FD)	Silver Carp (SC)
K-40	-	2921 ± 393	2797 ± 487	2701 ± 417	3361 ± 428	2489 ± 402
Mn-54	130	< 12.4	< 25.7	< 15.6	< 22.7	< 25.8
Fe-59	260	< 85.6	< 71.0	< 41.8	< 70.0	< 98.0
Co-58	130	< 18.5	< 32.4	< 19.0	< 32.9	< 27.6
Co-60	130	< 18.6	< 17.8	< 10.5	< 14.3	< 19.4
Zn-65	260	< 46.1	< 43.7	< 26.7	< 30.7	< 54.9
Cs-134	130	< 21.5	< 23.3	< 15.5	< 20.0	< 22.7
Cs-137	150	< 18.8	< 22.1	< 9.3	< 14.3	< 23.4

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

Location		CA-AQF-C				
Lab Code	Req. LLD	CAF- 1766	CAF- 1767	CAF- 1768	CAF- 1769	CAF- 1770
Date Collected		05-26-20	05-26-20	05-26-20	05-26-20	05-26-20
Sample Type		Common Carp [CC]	River CarpSucker [RC]	Smallmouth Buffalo [SB]	Freshwater Drum [FD]	Silver Carp [SC]
K-40	-	3576 ± 438	2535 ± 365	2759 ± 429	3253 ± 440	3315 ± 491
Mn-54	130	< 17.2	< 18.2	< 13.3	< 8.7	< 19.1
Fe-59	260	< 38.6	< 38.2	< 44.9	< 50.9	< 74.1
Co-58	130	< 12.7	< 19.0	< 13.6	< 16.0	< 20.7
Co-60	130	< 13.3	< 14.0	< 15.4	< 20.4	< 9.0
Zn-65	260	< 42.4	< 50.2	< 34.2	< 42.2	< 22.7
Cs-134	130	< 15.1	< 15.6	< 16.9	< 20.3	< 22.5
Cs-137	150	< 12.2	< 17.3	< 17.7	< 14.4	< 18.8
Lab Code		CAF- 3663	CAF- 3664	CAF- 3666	CAF- 3667	CAF- 3668
Date Collected		10-06-20	10-06-20	10-06-20	10-06-20	10-06-20
Sample Type		Common Carp (SC)	River Carpsucker (RC)	Smallmouth Buffalo (SB)	Freshwater Drum (FD)	Silver Carp (SC)
K-40	-	2647 ± 427	2775 ± 384	3563 ± 448	2715 ± 410	3241 ± 563
Mn-54	130	< 12.7	< 13.8	< 21.3	< 18.4	< 24.1
Fe-59	260	< 70.0	< 35.7	< 61.5	< 53.3	< 99.4
Co-58	130	< 24.8	< 21.1	< 27.0	< 22.4	< 53.5
Co-60	130	< 12.7	< 11.4	< 11.4	< 15.3	< 17.1
Zn-65	260	< 30.2	< 14.5	< 28.7	< 32.0	< 81.6
Cs-134	130	< 17.1	< 15.3	< 19.4	< 13.4	< 30.9
Cs-137	150	< 17.6	< 15.9	< 19.2	< 14.4	< 19.8

Table 12a. Direct Radiation (quarterly exposure)

Location	Gamma Dose (mrem/90 days)			
	QTR 1	QTR 2	QTR 3	QTR 4
CA-IDM-1A	14.46	14.60	15.57	15.52
CA-IDM-3	15.68	16.13	16.13	16.79
CA-IDM-5	12.79	13.67	13.36	13.93
CA-IDM-6	15.10	14.81	14.98	15.67
CA-IDM-7	15.12	14.75	15.04	15.85
CA-IDM-9	14.39	13.77	14.75	14.79
CA-IDM-10	16.27	16.22	17.17	16.57
CA-IDM-11A	15.83	15.37	16.29	16.39
CA-IDM-14	15.10	14.57	15.14	15.68
CA-IDM-17	15.03	15.01	15.61	15.14
CA-IDM-18A	15.13	15.41	15.84	15.60
CA-IDM-20	15.56	15.22	16.74	16.56
CA-IDM-21	15.20	14.76	15.10	15.34
CA-IDM-22A	12.15	12.57	12.05	12.20
CA-IDM-23	15.68	16.17	16.01	16.23
CA-IDM-26 (C)	11.26	10.75	10.59	11.00
CA-IDM-27 (C)	16.74	16.31	16.45	17.13
CA-IDM-30A	15.29	14.69	15.55	15.46
CA-IDM-31A	16.43	15.53	15.82	16.08
CA-IDM-32	16.84	15.71	16.15	16.31
CA-IDM-32A	14.82	14.82	14.53	15.01
CA-IDM-33	15.29	15.02	15.42	15.82
CA-IDM-34	14.49	14.50	15.17	14.36
CA-IDM-35	13.96	14.15	14.07	14.47
CA-IDM-36	14.04	14.76	13.57	14.27
CA-IDM-37	14.81	14.72	15.58	14.63
CA-IDM-38	10.75	10.19	11.01	11.13
CA-IDM-39	14.47	13.96	15.34	15.27
CA-IDM-39A	14.38	14.99	15.05	15.83
CA-IDM-40	15.50	14.72	16.70	15.40
CA-IDM-41	16.21	13.50	14.53	15.19
CA-IDM-42	13.28	13.33	13.21	14.57
CA-IDM-43	16.11	14.87	15.00	15.82
CA-IDM-44	16.02	14.57	15.00	15.62
CA-IDM-45	13.71	13.62	13.60	14.27
CA-IDM-46	15.31	15.69	15.72	16.31
CA-IDM-47	14.53	14.81	15.05	15.75
CA-IDM-48	15.69	16.03	15.46	16.98
CA-IDM-49	14.46	13.29	NS[a]	13.78
CA-IDM-50	15.21	14.44	15.66	15.70
CA-IDM-51A	16.34	16.23	16.20	16.69
CA-IDM-52	15.73	14.79	15.61	16.49
CA-IDM-60 (C)	15.20	15.13	14.91	16.08
CA-IDM-61	13.73	14.07	14.05	15.03

[a] "NS" = No sample; see Part I Table 5.5, Listing of Missed Samples.
(C) Control

Table 12b. Direct Radiation Neutron Dose (quarterly exposure)

Location	Neutron Dose (mrem/90 days)			
	QTR 1	QTR 2	QTR 3	QTR 4
CA-IDM-60N (C)	0.0 ± 1.5	0.0 ± 0.9	0.0 ± 1.4	0.0 ± 2.1
CA-IDM-61N	0.0 ± 1.4	0.0 ± 1.8	0.0 ± 1.6	0.0 ± 1.1
CA-IDM-62N	0.0 ± 2.0	0.0 ± 1.1	0.0 ± 1.8	0.0 ± 0.8
CA-IDM-63N	0.0 ± 1.4	0.0 ± 0.9	0.0 ± 1.8	0.0 ± 0.9
CA-IDM-64N	0.0 ± 0.7	0.0 ± 0.8	0.0 ± 1.5	0.0 ± 1.1

(C) Control