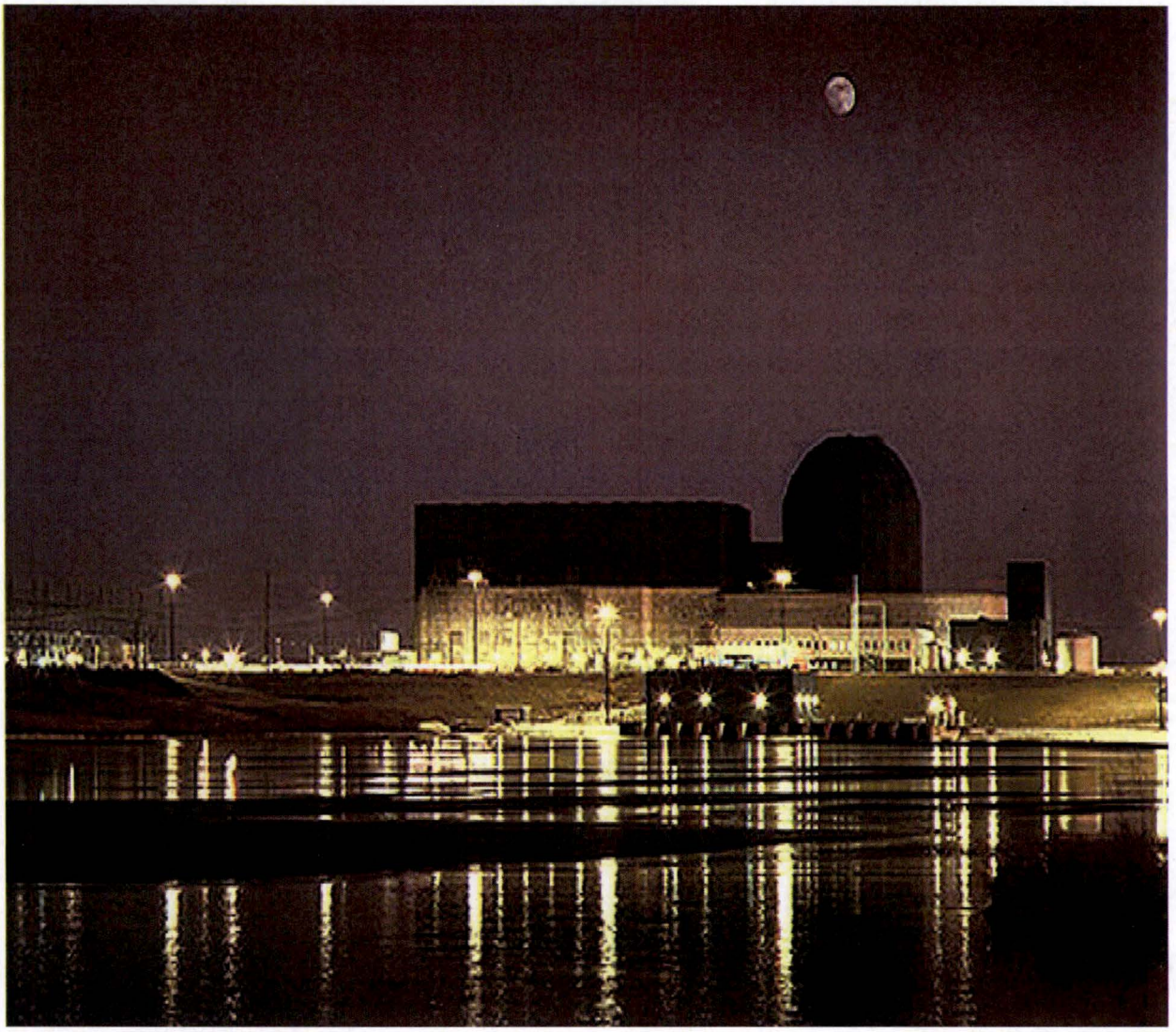

Exelon Generation

January 01, 2016 – December 31, 2016

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

CLINTON POWER STATION – DOCKET NUMBER 50-461

Prepared by:

Teledyne Brown Engineering Environmental Services
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Appendices

I. Summary and Conclusions

This report on the Radiological Environmental Monitoring Program (REMP) conducted for the Clinton Power Station (CPS) by Exelon Generation Company, LLC (Exelon) covers the period January 1, 2016 through December 31, 2016. During that time period, 1,608 analyses were performed on 1,481 samples. In assessing all the data gathered for this report and comparing these results with preoperational data, it was concluded that the operation of CPS had no adverse radiological impact on the environment.

There were zero (0) radioactive liquid releases from CPS during 2016. Releases of gaseous radioactive materials were accurately measured in plant effluents. There were no gaseous effluent releases that approached the limits specified in the CPS Offsite Dose Calculation Manual (ODCM). The highest calculated offsite dose received by a member of the public in 2016 due to the release of gaseous effluents from CPS was 5.66E-02 or 0.0566 mRem.

Surface, drinking, and well water samples were analyzed for concentrations of tritium and gamma-emitting nuclides. Drinking water samples were also analyzed for concentrations of gross beta and Iodine-131 (I-131). No fission or activation products were detected. No tritium or gross beta activity was detected and the required lower limit of detection (LLD) was met.

Fish and shoreline sediment samples were analyzed for concentrations of gamma-emitting nuclides. No fission or activation products were detected in fish or shoreline sediment samples.

Air particulate samples were analyzed for concentrations of gross beta and gamma-emitting nuclides. No fission or activation products were detected.

Iodine-131 analyses were performed on weekly air samples. All results were less than the lower limit of detection for I-131.

High sensitivity I-131 analyses and gamma analyses were performed on cow milk samples. All results were below the required LLDs for I-131. Concentrations of naturally-occurring K-40 were consistent with those detected in previous years. No fission or activation products were found.

Food product samples were analyzed for concentrations of gamma-emitting nuclides. No fission or activation products were detected.

Grass samples were analyzed for concentrations of gamma-emitting nuclides. No fission or activation products were detected.

Environmental gamma radiation measurements were performed quarterly using Dosimeters of Legal Record (DLR). Levels detected were consistent with those observed in previous years.

II. Introduction

The Clinton Power Station (CPS), consisting of one approximately 1,140 MW gross electrical power output boiling water reactor is located in Harp Township, DeWitt County, Illinois. CPS is owned and operated by Exelon and became operational in 1987. Unit No. 1 went critical on February 15, 1987. The site encloses approximately 13,730 acres. This includes the 4,895 acre, man-made cooling lake and about 452 acres of property not owned by Exelon. The plant is situated on approximately 150 acres. The cooling water discharge flume – which discharges to the eastern arm of the lake – occupies an additional 130 acres. Although the nuclear reactor, supporting equipment and associated electrical generation and distribution equipment lie in Harp Township, portions of the aforementioned 13,730 acre plot reside within Wilson, Rutledge, DeWitt, Creek, Nixon and Santa Anna Townships.

A Radiological Environmental Monitoring Program (REMP) for CPS was initiated in 1987. The preoperational period for most media covers the periods May 1980 through February 27, 1987 and was summarized in a separate report. This report covers those analyses performed by Teledyne Brown Engineering (TBE) and Landauer on samples collected during the period January 1, 2016 through December 31, 2016.

A. Objectives of the REMP

The objectives of the REMP are to:

1. Provide data on measurable levels of radiation and radioactive materials in the site environs.

2. Evaluate the relationship between quantities of radioactive material released from the plant and resultant radiation doses to individuals from principal pathways of exposure.

B. Implementation of the Objectives

The implementation of the objectives is accomplished by:

1. Identifying significant exposure pathways.

2. Establishing baseline radiological data of media within those pathways.

3. Continuously monitoring those media before and during Station operation to assess Station radiological effects (if any) on man and the environment.

III. Program Description

A. Sample Collection

This section describes the general collection methods used by Environmental Inc. (Midwest Labs) to obtain environmental samples for the CPS REMP in 2016. Sample locations and descriptions can be found in Tables B–1 and B–2, and Figures B–1 through B–4, Appendix B. The sampling methods used by Environmental Inc. (Midwest Labs) are listed in Table B-2.

Aquatic Environment

The aquatic environment was evaluated by performing radiological analyses on samples of surface water, drinking water, well water, fish, and shoreline sediment. Two gallon water samples were collected monthly from composite samplers located at three surface water locations (CL-90, CL-91 and CL-99) and one drinking water location (CL-14). A monthly grab sample was obtained from one surface water location (CL-13). Quarterly samples were obtained from two well water locations (CL-7D and CL-12). All samples were collected in new unused plastic bottles, which were rinsed at least twice with source water prior to collection. Fish samples comprising the flesh of largemouth bass, crappie, carp, bluegill and channel catfish, the species most commonly harvested from the lakes by sporting fishermen, were collected semiannually at two locations, CL-19 and CL-105. CL-105 was the control location, which is located about 50 miles upwind of the station. Shoreline sediment samples composed of recently deposited substrate were collected at two locations semiannually (CL-7B and CL-105 (control)).

Atmospheric Environment

The atmospheric environment was evaluated by performing radiological analyses on samples of air particulate, airborne iodine, milk, food produce and grass. Airborne iodine and particulate samples were collected and analyzed weekly at ten locations (CL-1, CL-2, CL-3, CL-4, CL-6, CL-7, CL-8, CL-11, CL-15 and CL-94). CL-11 was the control location, which is located 16 miles upwind of the station. Airborne iodine and particulate samples were obtained at each location, using a vacuum pump with charcoal and glass fiber filters attached. The pumps were run continuously and sampled air at the rate of approximately one cubic foot per minute. The filters were replaced weekly and sent to an independent laboratory for analysis.

Milk samples were collected biweekly at one location (CL-116) from May through October to coincide with the grazing season, and monthly from November through April. All samples were collected in new unused plastic bottles from the bulk tank at the dairy farm, preserved with sodium bisulfite and shipped promptly to the laboratory.

Food products were collected once a month from June through September at four locations (CL-114, CL-115, CL-117 and CL-118). The control location was CL-114, which is located 12.5 miles upwind of the station. Various broadleaf vegetable samples were collected and placed in new unused plastic bags, and sent to the laboratory for analysis.

Grass samples were collected biweekly at four locations (CL-1, CL-2, CL-8 and CL-116) from May through October. CL-116 was the control location, which is located 14 miles WSW of the station. All samples were collected in new unused plastic bags and sent to the laboratory for analysis.

Ambient Gamma Radiation

Direct radiation measurements were made using DLRs. Each location consisted of 2 dosimeter sets. The DLRs were exchanged quarterly and sent to Landauer for analysis. The DLR locations were placed around the CPS site as follows:

An inner ring consisting of 16 locations (CL-1, CL-5, CL-22, CL-23, CL-24, CL-34, CL-35, CL-36, CL-42 CL-43, CL-44, CL-45, CL-46, CL-47, CL-48 and CL-63).

An outer ring consisting of 16 locations (CL-51, CL-52, CL-53, CL-54, CL-55, CL-56, CL-57, CL-58, CL-60, CL-61, CL-76, CL-77, CL-78, CL-79, CL-80 and CL-81). CL-58MM was installed as part of a volunteer comparison study extending to approximately 5 miles from the site.

A special interest set consisting of seven locations (CL-37, CL-41, CL-49, CL-64, CL-65, CL-74 and CL-75) representing special interest areas.

A supplemental set consisting of 14 locations (CL-2, CL-3, CL-4, CL-6, CL-7, CL-8, CL-15, CL-33, CL-84, CL-90, CL-91, CL-97, CL-99 and CL-114).

CL-11 represents the control location for all environmental DLRs.

The specific DLR locations were determined by the following criteria:

1. The presence of relatively dense population;

2. Site meteorological data taking into account distance and elevation for each of the sixteen–22 1/2 degree meteorological sectors around the site, where estimated annual dose from CPS, if detected, would be most significant;

3. On hills free from local obstructions and within sight of the HVAC and VG stacks (where practical);

4. And near the closest dwelling to the HVAC and VG stacks in the prevailing downwind direction.

Each location has two DLRs in a vented PVC conduit located approximately three feet above ground level. The DLRs were exchanged quarterly and sent to Landauer for analysis.

B. Sample Analysis

This section describes the general analytical methodologies used by TBE and Environmental Inc. (Midwest Labs) to analyze the environmental samples for radioactivity for the CPS REMP in 2016. The analytical procedures used by the laboratories are listed in Table B-2.

In order to achieve the stated objectives, the current program includes the following analyses:

1. Concentrations of beta emitters in drinking water and air particulates

2. Concentrations of gamma emitters in surface, drinking and well water, air particulates, milk, fish, grass, sediment and vegetables

3. Concentrations of tritium in surface, drinking and well water

4. Concentrations of I-131 in air, milk, drinking water and surface water

5. Ambient gamma radiation levels at various off-site environs

C. Data Interpretation

The radiological and direct radiation data collected prior to CPS becoming operational was used as a baseline with which these operational data were compared. For the purpose of this report, CPS was considered

operational at initial criticality. In addition, data were compared to previous years' operational data for consistency and trending. Several factors were important in the interpretation of the data:

1. Lower Limit of Detection and Minimum Detectable Concentration

The lower limit of detection (LLD) was defined as the smallest concentration of radioactive material in a sample that would yield a net count (above background) that would be detected with only a 5% probability of falsely concluding that a blank observation represents a "real" value. The LLD was intended as a before the fact estimate of a system (including instrumentation, procedure and sample type) and not as an after the fact criteria for the presence of activity. All analyses were designed to achieve the required CPS detection capabilities for environmental sample analysis.

2. Net Activity Calculation and Reporting of Results

Net activity for a sample was calculated by subtracting background activity from the sample activity. Since the REMP measures extremely small changes in radioactivity in the environment, background variations may result in sample activity being lower than the background activity resulting in a negative number. A minimum detectable concentration (MDC) was reported in all cases where positive activity was not detected.

Gamma spectroscopy results for each type of sample were grouped as follows:

For surface water, drinking water, well water, fish, and sediment: 12 nuclides, Mn-54, Co-58, Fe-59, Co-60, Zn-65, Nb-95, Zr-95, Cs-134, Cs-137, Ba-140, La-140 and Ce-144 were reported

For milk: 13 nuclides, K-40, Mn-54, Co-58, Fe-59, Co-60, Zn-65, Nb-95, Zr-95, Cs-134, Cs-137, Ba-140, La-140 and Ce-144 were reported

For grass and vegetation: 13 nuclides, Mn-54, Co-58, Fe-59, Co-60, Zn-65, Nb-95, Zr-95, I-131, Cs-134, Cs-137, Ba-140, La-140 and Ce-144 were reported

For air particulate: 9 nuclides, Co-60, Nb-95, Zr-95, Ru-103, Ru-106, Cs-134, Cs-137, Ce-141 and Ce-144, were reported

The mean and standard deviation of the results were calculated.

The standard deviation represents the variability of measured results for different samples rather than single analysis uncertainty.

D. Program Exceptions

The exceptions (Issue Reports, IRs) described below are those that are considered 'deviations' from the Radiological Environmental Monitoring Program as required by the Station's ODCM. By definition, 'deviations' are permitted as delineated within NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants", October 1978, and within Radiological Assessment Branch Technical Position, Revision 1, November 1979, which states.... "Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of automatic sampling equipment and other legitimate reasons".... The below section addresses the reporting requirements found within Section 6.0 of the Station's ODCM.

Exceptions/Anomalies

January 20, 2016, IR 02614740

At 1154 hours on 01/20/16 while performing the ODCM weekly inspection the upstream non-ODCM Water Compositor Sampler, CL-91, was found with its GFI tripped and observed to have less than the weekly composite sample collection volume for the monthly analysis. A supplemental grab sample from the process stream was collected and added to the monthly collection container. The GFI was reset and CL-91 was returned to service.

April 27, 2016, IR 02661931

During the weekly airborne iodine and particulate surveillance on April 27, 2016, vendor Environmental Inc., Midwest Laboratories (EIML) found ODCM air sampler CL-11 with a failed timer during the collection week. The volume was sufficient for analysis and it appears the sample collections were continuous as required by the ODCM, but there is no documented time range of sample collection due to the timer failing. The timer for CL-11 was replaced and an estimated time was documented with notation.

May 05, 2016, IR 02666057

Discovered all channels for the Primary Met Tower have either

failed downscale or are grossly erratic. The Primary Met Tower is now non-functional. It was discovered that the power surge protector for the power supply had been tripped. The surge protector was reset and MET Tower is now operable.

August 3, 2016, IR 02700253

During the weekly compositor check and sample collection performed on 08/03/16, the sample vendor from Environmental Inc. found that the ODCM-required sampling point CL-90 was without power. A representative grab sample was obtained, and power was restored on 03/03/16 at approximately 13:00.

December 21, 2016, IR 03955958

On December 21, 2016, Environmental Inc. sampling vendor was performing weekly environmental surveillance for airborne radioiodine and particulate monitoring. During the visual inspection of composite water sampler for CL-90, it was observed that it contained approximately 5" of sample. The expected amount should have been closer to 6" (20-ml aliquot taken per hour in a 168 hour week). It was determined that this slight deviation will no effect the monthly composite analysis, so no supplemental "grab" sample was added to the collection container. This discrepancy was determined to be due to a broken spring. The vendor replaced CL-90 compositor spring the compositor is now operable.

Throughout 2016, the following IRs were generated to document Program exceptions that were entered into the corrective action program for trending purposes.

Missed Samples

June 29, 2016, IR 02687265

During the vegetation sampling on 06/29/16, the vendor collector count not obtain enough vegetation samples for the June, 2016 monthly sample at CL-115. Cabbage and kale were the only remaining vegetables at this garden. The collector was only able to obtain two of the required three different kinds of broad leaf vegetation samples per Table 4.6-1 of the ODCM. Earlier in the year, kale, spinach, lettuce, swiss chard and cabbage were planted properly to develop for the sampling months of June, July, August, and September. During a walk down of CL-115, the farmer noted that an animal had begun to eat the vegetables, so he covered

them with a chicken wire-type of material. With the wire over the vegetables and a chain-link fence around the garden, the farmer and OCDM program owner expected no further disturbances to the garden.

August 31, 2016, IR 02710845

During the vegetation sampling on 08/31/16, the vendor collector could not obtain enough vegetation samples for the August, 2016 monthly sample at CL-115 and CL-118. For the CL-118 garden, cabbage and lettuce were the only remaining vegetables and the collector was only able to obtain two of the required three different kinds of broad leaf vegetation samples per Table 4.6-1 of the OCDM. For the CL-115 garden, kale was the only remaining vegetable since replanting lettuce, swiss chard, and kale after IR 2687265 occurred. Nearby soybean leaves and goldenrod weeds were collected as a substitute for the second and third broadleaf vegetation. Since May, 2016, kale, spinach, lettuce, swiss chard, and cabbage were planted approximately five times due to loss in the field. Upon each discovery, a new, unsuccessful tactic was developed to prevent loss at this garden. As the months go on, plants are no longer obtainable since it is no longer planting season. Planning to build raised and enclose vegetation beds for the 2017 sampling year.

September 28, 2016, IR 02721291

During the vegetation sampling on 09/28/16, the vendor collector could not obtain enough vegetation samples for the September, 2016 monthly sample at CL-115 and CL-118. For the CL-118 garden, the collector was only able to obtain one of the required three different kinds of broad leaf vegetation samples. Cabbage was the only remaining vegetable at the garden, but there was not the lab LLD-required 1 kilogram available. There was no nearby green broad leaf vegetation to use as a substitute for the other two samples. For the CL-115 garden, the collector was not able to obtain any of the required three different kinds of broad leaf vegetation samples. Nearby soybean and corn leaves were already harvested, so no substitution of "similar characteristics" vegetation was available. Since Mary, 2016, kale, spinach, lettuce, swiss chard, and cabbage were unsuccessfully planted approximately six time due to loss in field. Since it is no longer planting season, broad leaf vegetation is no longer obtainable.

Program exceptions were reviewed to understand the causes of the

exception and to return to ODCM sample compliance before the next sampling frequency period.

The overall sample recovery rate indicates that the appropriate procedures and equipment are in place to assure reliable program implementation.

E. Program Changes

There were no program changes in 2016.

IV. Results and Discussion

A. Aquatic Environment

1. Surface Water

Composite samples were taken hourly at three locations (CL-90, CL-91 and CL-99) on a monthly schedule and grab samples were taken monthly from one location (CL-13). The following analyses were performed.

Iodine-131

Monthly samples from location CL-90 were analyzed for I-131 activity (Table C-I.1, Appendix C). No I-131 was detected in any samples and the required LLD was met.

Tritium

Monthly samples from all locations were composited quarterly and analyzed for tritium activity (Table C–I.2, Appendix C). No tritium was detected in any samples and the required LLD was met.

Gamma Spectrometry

Samples from all locations were analyzed for gamma-emitting nuclides (Table C–I.3, Appendix C). No plant produced radionuclides were detected and all required LLDs were met.

2. Drinking Water

Monthly composite samples were taken hourly at one location (CL-14). The following analyses were performed:
Gross Beta

Monthly samples were analyzed for concentrations of gross beta (Tables C–II.1, Appendix C). No Gross beta was detected in any of the samples.

Tritium

Monthly samples were composited quarterly and analyzed for tritium activity (Table C–II.2, Appendix C). No tritium was detected in any samples and the required LLD was met.

Iodine-131

Monthly samples from location CL-14 were analyzed for I-131 activity (Table C-II.3, Appendix C). No I-131 was detected in any samples and the required LLD was met.

Gamma Spectrometry

Monthly samples were analyzed for gamma-emitting nuclides (Table C–II.4, Appendix C). No plant-produced radionuclides were detected and all required LLDs were met.

3. Well Water

Quarterly grab samples were collected at two locations (CL-7D and CL-12, consisting of CL-12R [a raw water sample from this well] and CL-12T [same well water, but after treatment and available for consumption]). The following analyses were performed:

Tritium

Samples from all locations were analyzed for tritium activity (Table C–III.1, Appendix C). No tritium was detected in any samples and the required LLD was met.

Gamma Spectrometry

Samples from all locations were analyzed for gamma-emitting nuclides (Table C–III.2, Appendix C). No plant-produced radionuclides were detected and all required LLDs were met.

4. Fish

Fish samples comprised of bluegill, carp, crappie, channel catfish, and largemouth bass were collected at two locations (CL-19 and CL-105) semiannually. The following analysis was performed:

Gamma Spectrometry

The edible portion of fish samples from both locations was analyzed for gamma-emitting nuclides (Table C–IV.1, Appendix C). No plant-produced radionuclides were detected and all required LLDs were met.

5. Shoreline Sediment

Aquatic shoreline sediment samples were collected at CL-7B and CL-105 semiannually. The following analysis was performed:

Gamma Spectrometry

Shoreline sediment samples were analyzed for gamma-emitting nuclides (Table C–V.1, Appendix C). No plant-produced radionuclides were detected and all required LLDs were met.

B. Atmospheric Environment

1. Airborne

a. Air Particulates

Continuous air particulate samples were collected from 10 locations on a weekly basis. The 10 locations were separated into three groups: Group I represents locations within one mile of the CPS site boundary (CL-2, CL-3, CL-4, CL-6, CL-15 and CL-94); Group II represents the locations at an intermediate distance within one to five miles of CPS (CL-1, CL-7 and CL-8); and Group III represents the control location greater than five miles from CPS (CL-11). The following analyses were performed:

Gross Beta

Weekly samples were analyzed for concentrations of beta emitters (Table C–VI.1 and C–VI.2 and Figure C–1, Appendix C).

Detectable gross beta activity was observed at all locations. Comparison of results among the three groups aid in determining the effects, if any, resulting from the operation of CPS. The results from the On-Site locations (Group I) ranged from 7 to 35 E–3 pCi/m^3 with a mean of 17 E–3 pCi/m^3. The results from the Intermediate Distance location (Group II) ranged from 8 to 36 E–3 pCi/m^3 with a mean of 17 E–3 pCi/m^3. The results from the Control locations (Group III) ranged from 10 to 31 E–3 pCi/m^3 with a mean of 18 E–3 pCi/m^3. Comparison of the 2016 air particulate data with previous years' data indicate no measurable impact from the operation of CPS. In addition, a comparison of the weekly mean values for 2016 indicate no notable differences among the three groups.

Gamma Spectrometry

Weekly samples were composited quarterly and analyzed for gamma-emitting nuclides (Table C–VI.3, Appendix C). No plant-produced radionuclides were detected and all required LLDs were met.

b. Airborne Iodine

Continuous air samples were collected from 10 locations (CL-1, CL-2, CL-3, CL-4, CL-6, CL-7, CL-8, CL-11, CL-15 and CL-94) and analyzed weekly for I-131 (Table C-VII.1, Appendix C). All results were less than the MDC and the required LLD was met.

2. Terrestrial

a. Milk

Samples were collected from CL-116 biweekly May through October to coincide with the grazing season, and monthly November through April. The following analyses were performed:

Iodine-131

Milk samples were analyzed for concentrations of I-131 (Table C–VIII.1, Appendix C). Iodine-131 was not detected in any of the samples. The required LLD was met.

Gamma Spectrometry

Each milk sample was analyzed for concentrations of gamma-emitting nuclides (Table C–VIII.2, Appendix C). Naturally-occurring K-40 activity was found in all samples. No plant-produced radionuclides were detected and all required LLDs were met.

b. Food Products

Broadleaf vegetation samples were collected from four locations (CL-114, CL-115, CL-117 and CL-118) monthly June through September to coincide with the harvest season. The following analysis was performed:

Gamma Spectrometry

Each food product sample was analyzed for concentrations of gamma-emitting nuclides (Table C–IX.1, Appendix C). No plant-produced radionuclides were detected and all required LLDs were met.

c. Grass

Samples were collected from four locations (CL-1, CL-2, CL-8, and CL-116) biweekly May through October. The following analysis was performed:

Gamma Spectrometry

Each grass sample was analyzed for concentrations of gamma-emitting nuclides (Table C–IX.2, Appendix C). No plant-produced radionuclides were detected and all required LLDs were met.

C. Ambient Gamma Radiation

Ambient gamma radiation levels were measured utilizing DLRs. Fifty-four DLR locations were established around the site. Results of DLR measurements are listed in Tables C–X.1 to C–X.3, Appendix C.

A total of 216 OSLD measurements were made in 2016. The average dose from the inner ring was 23.9 mRem/quarter. The average dose from the outer ring was 24.4 mRem/quarter. The average dose from the special interest group was 24.1 mRem/quarter. The average dose from the supplemental group was 22.8 mRem/quarter. The quarterly

measurements ranged from 19.2 to 28.0 mRem/quarter.

The inner ring and outer ring measurements compared well to the Control Station, CL-11, which ranged from 21.2 mRem/quarter to 22.8 mRem/quarter with an average measurement of 21.9 mRem/quarter. A comparison of the Inner Ring and Outer Ring data to the Control Location data indicate that the ambient gamma radiation levels from all the locations were comparable. The historical ambient gamma radiation data from the control location were plotted along with similar data from the Inner and Outer Ring Locations (Figure C–2, Appendix C).

D. Land Use Survey

A Land Use Survey conducted during the July through October 2016 growing season around the Clinton Power Station (CPS) was performed by Environmental Inc. (Midwest Labs) for Exelon to comply with Clinton's Offsite Dose Calculation Manual, section 8.0. The purpose of the survey was to document the nearest resident, milk producing animal and garden of greater than 538 m^2 in each of the sixteen 22 ½ degree sectors around the site. The distance and direction of all locations from the CPS Station HVAC vent stack were positioned using Global Positioning System (GPS) technology. There were no changes required to the CPS REMP as a result of the Land Use Survey. The results of this survey are summarized below.

	Distance in Kilometers from the CPS Station HVAC Vent Stack		
Sector	Residence (km)	Garden (km)	Milk Animal (km)
1 N	1.5	1.5	1.5
2 NNE	1.5	4.8	> 8
3 NE	2.1	3.5	> 8
4 ENE	2.9	2.9	> 8
5 E	1.7	1.7	> 8
6 ESE	5.1	7.7	> 8
7 SE	4.4	> 8	> 8
8 SSE	2.9	> 8	> 8
9 S	4.8	> 8	6.6
10 SSW	4.7	> 8	> 8
11 SW	1.2	5.9	> 8
12 WSW	3.6	3.7	5.5
13 W	2.0	3.6	> 8
14 WNW	2.6	2.6	> 8
15 NW	2.7	> 8	> 8
16 NNW	2.1	2.1	2.1

E. Errata Data

There was no errata data for 2016.

F. Summary of Results – Inter-Laboratory Comparison Program

The primary laboratory analyzed Performance Evaluation (PE) samples of air particulate, air iodine, milk, soil, vegetation and water matrices for 25 analytes (Appendix D). The PE samples, supplied by Analytics Inc., Environmental Resource Associates (ERA) and DOE's Mixed Analyte Performance Evaluation Program (MAPEP), were evaluated against the following pre-set acceptance criteria:

1. Analytics Evaluation Criteria

   Analytics' evaluation report provides a ratio of TBE's result and Analytics' known value. Since flag values are not assigned by Analytics, TBE-Environmental Services (TBE-ES) evaluates the reported ratios based on internal QC requirements, which are based on the DOE MAPEP criteria.

2. ERA Evaluation Criteria

   ERA's evaluation report provides an acceptance range for control and warning limits with associated flag values. ERA's acceptance limits are established per the USEPA, NELAC, state specific PT program requirements or ERA's SOP for the Generation of Performance Acceptance Limits, as applicable. The acceptance limits are either determined by a regression equation specific to each analyte or a fixed percentage limit promulgated under the appropriate regulatory document.

3. DOE Evaluation Criteria

   MAPEP's evaluation report provides an acceptance range with associated flag values.

   The MAPEP defines three levels of performance: Acceptable (flag = "A"), Acceptable with Warning (flag = "W"), and Not Acceptable (flag = "N"). Performance is considered acceptable when a mean result for the specified analyte is ± 20% of the reference value. Performance is acceptable with warning when a mean result falls in the range from ± 20% to ± 30% of the reference value (i.e., 20% < bias < 30%). If the bias is greater than 30%, the results are deemed not acceptable.

For the TBE laboratory, 156 out of 160 analyses performed met the specified acceptance criteria. Four analyses (Milk - Sr-90, Vegetation - Sr-90, and Water - H-3 samples) did not meet the specified acceptance criteria for the following reasons and were addressed through the TBE Corrective Action Program.

Note: The Department of Energy (DOE) Mixed Analyte Performance Evaluation Program (MAPEP) samples are created to mimic conditions found at DOE sites which do not resemble typical environmental samples obtained at commercial nuclear power facilities.

1. Teledyne Brown Engineering's MAPEP March 2016 air particulate cross check sample is now being provided to TBE by Analytics. MAPEP's policy is to evaluate as failed non reported nuclides that were reported in the previous study. Since the Sr-90 was reported in the previous MAPEP study but not in this study MAPEP evaluated the Sr-90 for Soil as failed. NCR 16-14

   The MAPEP March 2016 Sr-90 in vegetation was evaluated as failing a false positive test. In reviewing the data that was reported vs the data in LIMS, it was found that the error was incorrectly reported as 0.023 rather than the correct value of 0.230. If the value had been reported with the activity and correct uncertainty of 0.301 ± 0.230, MAPEP would have evaluated the result as acceptable. NCR 16-14

2. Teledyne Brown Engineering's Analytics' March 2016 milk Sr-90 result of 15 ± .125 pCi/L was higher than the known value of 11.4 pCi/L with a ratio of 1.32. The upper ratio of 1.30 (acceptable with warning) was exceeded. After an extensive review of the data it is believed the technician did not rinse the filtering apparatus properly and some cross contamination from one of the internal laboratory spike samples may have been transferred to the analytics sample. We feel the issue is specific to the March 2016 Analytics sample. NCR 16-26

3. Teledyne Brown Engineering's ERA November 2016 sample for H-3 in water was evaluated as failing. A result of 918 pCi/L was reported incorrectly due to a data entry issue. If the correct value of 9180 had been reported, ERA would have evaluated the result as acceptable. NCR 16-34

4. Teledyne Brown Engineering's Analytics' December 2016 milk Sr-90 sample result of 14.7 ± .26 pCi/L was higher than the known value of 10 pCi/L with a ratio of 1.47. The upper ratio of 1.30

(acceptable with warning) was exceeded. The technician entered the wrong aliquot into the LIMS system. To achieve a lower error term TBE uses a larger aliquot of 1.2L (Normally we use .6L for client samples). If the technician had entered an aliquot of 1.2L into the LIMS system, the result would have been 12.2 pCi/L, which would have been considered acceptable. NCR 16-35

For the EIML laboratory, 198 of 203 analyses met the specified acceptance criteria. Five analyses (Water – Ba-133, Co-57; Soil – Ni-63, U-233/234, U-238) did not meet the specified acceptance criteria for the following reasons:

1. The Environmental Inc., Midwest Laboratory's ERA April 2016 water Ba-133 result of 65.2 pCI/L was higher than the known value of 58.8 pCi/L, exceeding the upper control limit of 64.9 pCi/L. The reanalysis result of 57.8 pCI/L fell within acceptance criteria.

2. The Environmental Inc., Midwest Laboratory's MAPEP February 2016 water Co-57 result of 1.38 Bq/L sample was higher than the known value of 0.00 Bq/L sample. This sample is considered a false positive.

3. The Environmental Inc., Midwest Laboratory's MAPEP August 2016 soil Ni-60 result of 648 Bq/kg was lower than the known value of 990 Bq/kg, exceeding the lower control limit of 693 Bq/kg. Reanalysis with a smaller aliquot resulted in acceptable results. An investigation is in process to identify better techniques for analyzing samples with complex matrices.

4. The Environmental Inc., Midwest Laboratory's MAPEP August 2016 soil U-233/234 result of 46.8 Bq/kg was lower than the known value of 122 Bq/kg, exceeding the lower control limit of 85 Bq/kg. MAPEP states that samples contain two fractions of Uranium; one that is soluble in concentrated HNO3 and HCL acid and one that is "fundamentally insoluble in these acids". They also state that HF treatment cannot assure complete dissolution. Results are consistent with measuring the soluble form.

5. The Environmental Inc., Midwest Laboratory's MAPEP August 2016 soil U-238 result of 46.6 Bq/kg was lower than the known value of 121 Bq/kg, exceeding the lower control limit of 85 Bq/kg. MAPEP states that samples contain two fractions of Uranium; one that is soluble in concentrated HNO3 and HCL acid and one that is "fundamentally insoluble in these acids". They also state that HF

treatment cannot assure complete dissolution. Results are consistent with measuring the soluble form.

V. References

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APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT SUMMARY

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TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE CLINTON POWER STATION, 2016

NAME OF FACILITY:	CLINTON POWER STATION			DOCKET NUMBER:	50-461		
LOCATION OF FACILITY:	DEWITT COUNTY IL			REPORTING PERIOD:	2016		

MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) *RANGE*	CONTROL LOCATION MEAN (M) (F) *RANGE*	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) *RANGE*	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER *(PCI/LITER)*	I-131 (LOW LVL)	12	1	<LLD	NA			0
	H-3	16	2000	<LLD	<LLD	-		0
	GAMMA	48						
	MN-54		15	<LLD	<LLD	-		0
	CO-58		15	<LLD	<LLD	-		0
	FE-59		30	<LLD	<LLD	-		0
	CO-60		15	<LLD	<LLD	-		0
	ZN-65		30	<LLD	<LLD	-		0
	NB-95		15	<LLD	<LLD	-		0
	ZR-95		30	<LLD	<LLD	-		0
	CS-134		15	<LLD	<LLD	-		0
	CS-137		18	<LLD	<LLD	-		0
	BA-140		60	<LLD	<LLD	-		0
	LA-140		15	<LLD	<LLD	-		0
	CE-144		NA	<LLD	<LLD	-		0
DRINKING WATER *(PCI/LITER)*	GR-B	12	4	<LLD	*NA*	-		0
	H-3	4	2000	<LLD	*NA*	-		0
	I-131 (LOW LVL)	12	1	<LLD	*NA*	-		0
	GAMMA	12						
	MN-54		15	<LLD	*NA*	-		0
	CO-58		15	<LLD	*NA*	-		0
	FE-59		30	<LLD	*NA*	-		0
	CO-60		15	<LLD	*NA*	-		0
	ZN-65		30	<LLD	*NA*	-		0
	NB-95		15	<LLD	*NA*	-		0
	ZR-95		30	<LLD	*NA*	-		0
	CS-134		15	<LLD	*NA*	-		0
	CS-137		18	<LLD	*NA*	-		0
	BA-140		60	<LLD	*NA*	-		0
	LA-140		15	<LLD	*NA*	-		0
	CE-144		*NA*	<LLD	*NA*	-		0

(M) The Mean Values are calculated using the positive values. (F) Fraction of detectable measurement are indicated in parentheses.

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE CLINTON POWER STATION, 2016

NAME OF FACILITY:	CLINTON POWER STATION	DOCKET NUMBER:	50-461
LOCATION OF FACILITY:	DEWITT COUNTY IL	REPORTING PERIOD:	2016

MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) *RANGE*	CONTROL LOCATION MEAN (M) (F) *RANGE*	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) *RANGE*	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
WELL WATER *(PCI/LITER)*	H-3	12	2000	<LLD	*NA*	-		0
	GAMMA	12						
	MN-54		15	<LLD	*NA*	-		0
	CO-58		15	<LLD	*NA*	-		0
	FE-59		30	<LLD	*NA*	-		0
	CO-60		15	<LLD	*NA*	-		0
	ZN-65		30	<LLD	*NA*	-		0
	NB-95		15	<LLD	*NA*	-		0
	ZR-95		30	<LLD	*NA*	-		0
	CS-134		15	<LLD	*NA*	-		0
	CS-137		18	<LLD	*NA*	-		0
	BA-140		60	<LLD	*NA*	-		0
	LA-140		15	<LLD	*NA*	-		0
	CE-144		*NA*	<LLD	*NA*	-		0
FISH *(PCI/KG WET)*	GAMMA	16						
	MN-54		130	<LLD	<LLD	-		0
	CO-58		130	<LLD	<LLD	-		0
	FE-59		260	<LLD	<LLD	-		0
	CO-60		130	<LLD	<LLD	-		0
	ZN-65		260	<LLD	<LLD	-		0
	NB-95		*NA*	<LLD	<LLD	-		0
	ZR-95		*NA*	<LLD	<LLD	-		0
	CS-134		130	<LLD	<LLD	-		0
	CS-137		150	<LLD	<LLD	-		0
	BA-140		*NA*	<LLD	<LLD	-		0
	LA-140		*NA*	<LLD	<LLD	-		0
	CE-144		*NA*	<LLD	<LLD	-		0

(M) The Mean Values are calculated using the positive values. (F) Fraction of detectable measurement are indicated in parentheses.

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE CLINTON POWER STATION, 2016

NAME OF FACILITY:	CLINTON POWER STATION	DOCKET NUMBER:	50-461
LOCATION OF FACILITY:	DEWITT COUNTY IL	REPORTING PERIOD:	2016

MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) *RANGE*	CONTROL LOCATION MEAN (M) (F) *RANGE*	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) *RANGE*	LOCATION WITH HIGHEST ANNUAL MEAN (M) STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SEDIMENT	GAMMA	4						
(PCI/KG DRY)	*MN-54*		*NA*	<LLD	<LLD	-		0
	CO-58		*NA*	<LLD	<LLD	-		0
	FE-59		*NA*	<LLD	<LLD	-		0
	CO-60		*NA*	<LLD	<LLD	-		0
	ZN-65		*NA*	<LLD	<LLD	-		0
	NB-95		*NA*	<LLD	<LLD	-		0
	ZR-95		*NA*	<LLD	<LLD	-		0
	CS-134		**150**	<LLD	<LLD	-		0
	CS-137		**180**	<LLD	<LLD	-		0
	BA-140		*NA*	<LLD	<LLD	-		0
	LA-140		*NA*	<LLD	<LLD	-		0
	CE-144		*NA*	<LLD	<LLD	-		0
AIR PARTICULATE	GR-B	530	**10**	17 (477/477) *7 - 36*	18 (53/53) *10 - 31*	18 (53/53) *9 - 36*	CL-8 INDICATOR DEWITT CEMETERY 2.2 MILES E OF SITE	0
	GAMMA	40						
	CO-60		*NA*	<LLD	<LLD	-		0
	NB-95		*NA*	<LLD	<LLD	-		0
	ZR-95		*NA*	<LLD	<LLD	-		0
	RU-103		*NA*	<LLD	<LLD	-		0
	RU-106		*NA*	<LLD	<LLD	-		0
	CS-134		**50**	<LLD	<LLD	-		0
	CS-137		**60**	<LLD	<LLD	-		0
	CE-141		*NA*	<LLD	<LLD	-		0
	CE-144		*NA*	<LLD	<LLD	-		0
AIR IODINE	GAMMA	530						
(E-3 PCI/CU.METER)	*I-131*		**70**	<LLD	<LLD	-		0

(M) The Mean Values are calculated using the positive values. (F) Fraction of detectable measurement are indicated in parentheses.

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE CLINTON POWER STATION, 2016

NAME OF FACILITY:	CLINTON POWER STATION			DOCKET NUMBER:	50-461		
LOCATION OF FACILITY:	DEWITT COUNTY IL			REPORTING PERIOD:	2016		

MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) *RANGE*	CONTROL LOCATION MEAN (M) (F) *RANGE*	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) *RANGE*	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
MILK	**I-131 (LOW LVL)**	19	**1**	*NA*	<LLD	-		0
(PCI/LITER)								
	GAMMA	19						
	MN-54		*NA*	*NA*	<LLD	-		0
	CO-58		*NA*	*NA*	<LLD	-		0
	FE-59		*NA*	*NA*	<LLD	-		0
	CO-60		*NA*	*NA*	<LLD	-		0
	ZN-65		*NA*	*NA*	<LLD	-		0
	NB-95		*NA*	*NA*	<LLD	-		0
	ZR-95		*NA*	*NA*	<LLD	-		0
	CS-134		**15**	*NA*	<LLD	-		0
	CS-137		**18**	*NA*	<LLD	-		0
	BA-140		**60**	*NA*	<LLD	-		0
	LA-140		**15**	*NA*	<LLD	-		0
	CE-144		*NA*	*NA*	<LLD	-		0
VEGETATION	**GAMMA**	42						
(PCI/KG WET)	*MN-54*		*NA*	<LLD	<LLD	-		0
	CO-58		*NA*	<LLD	<LLD	-		0
	FE-59		*NA*	<LLD	<LLD	-		0
	CO-60		*NA*	<LLD	<LLD	-		0
	ZN-65		*NA*	<LLD	<LLD	-		0
	NB-95		*NA*	<LLD	<LLD	-		0
	ZR-95		*NA*	<LLD	<LLD	-		0
	I-131		**60**	<LLD	<LLD	-		0
	CS-134		**60**	<LLD	<LLD	-		0
	CS-137		**80**	<LLD	<LLD	-		0
	BA-140		*NA*	<LLD	<LLD	-		0
	LA-140		*NA*	<LLD	<LLD	-		0
	CE-144		*NA*	<LLD	<LLD	-		0

(M) The Mean Values are calculated using the positive values. (F) Fraction of detectable measurement are indicated in parentheses.

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE CLINTON POWER STATION, 2016

NAME OF FACILITY:	CLINTON POWER STATION			DOCKET NUMBER:	50-461		
LOCATION OF FACILITY:	DEWITT COUNTY IL			REPORTING PERIOD:	2016		

MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) *RANGE*	CONTROL LOCATION MEAN (M) (F) *RANGE*	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) *RANGE*	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
GRASS	**GAMMA**	52						
(PCI/KG WET)	*MN-54*		*NA*	<LLD	<LLD	-		0
	CO-58		*NA*	<LLD	<LLD	-		0
	FE-59		*NA*	<LLD	<LLD	-		0
	CO-60		*NA*	<LLD	<LLD	-		0
	ZN-65		*NA*	<LLD	<LLD	-		0
	NB-95		*NA*	<LLD	<LLD	-		0
	ZR-95		*NA*	<LLD	<LLD	-		0
	I-131		**60**	<LLD	<LLD	-		0
	CS-134		**60**	<LLD	<LLD	-		0
	CS-137		**80**	<LLD	<LLD	-		0
	BA-140		*NA*	<LLD	<LLD	-		0
	LA-140		*NA*	<LLD	<LLD	-		0
	CE-144		*NA*	<LLD	<LLD	-		0
DIRECT RADIATION	**OSLD-QUARTERLY**	216	*NA*	23.8	21.9	25.4	CL-23 INDICATOR	0
(MILLI-ROENTGEN/QTR.)				(212/212)	(4/4)	(4/4)		
				19.2 - 28	*21.2 - 22.8*	*24.3 - 26.4*	0.5 MILES ENE	

(M) The Mean Values are calculated using the positive values. (F) Fraction of detectable measurement are indicated in parentheses.

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APPENDIX B

LOCATION DESIGNATION, DISTANCE & DIRECTION, AND SAMPLE COLLECTION & ANALYTICAL METHODS

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TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction
Clinton Power Station, 2016

Location	Location Description	Distance & Direction From Site
A. Surface Water		
CI-13	Salt Creek Bridge on Rt. 10 (indicator)	3.6 miles SW
CL-90	Discharge Flume (indicator)	0.4 miles SE
CL-91	Parnell Boat Access (control)	6.1 miles ENE
CL-99	North Fork Access (control)	3.5 miles NNE
B. Drinking (Potable) Water		
CL-14	Station Plant Service Bldg (indicator)	Onsite
C. Well Water		
CL-7D	Mascoutin Recreation Area (indicator)	2.3 miles ESE
CL-12T	DeWitt Pump House (indicator)	1.6 miles E
CL-12R	DeWitt Pump House (indicator)	1.6 miles E
D. Milk - bi-weekly / monthly		
CL-116	Dement Dairy (control)	14 miles WSW
E. Air Particulates / Air Iodine		
CL-1	Camp Quest	1.8 miles W
CL-2	Clinton's Main Access Road	0.7 miles NNE
CL-3	Clinton's Secondary Access Road	0.7 miles NE
CL-4	Residence Near Recreation Area	0.8 miles SW
CL-6	Clinton's Recreation Area	0.7 miles WSW
CL-7	Mascoutin Recreation Area	2.3 miles SE
CL-8	DeWitt Cemetery	2.2 miles E
CL-11	Illinois Power Substation (control)	16 miles S
CL-15	Rt. 900N Residence	0.9 miles N
CL-94	Old Clinton Road	0.6 miles E
F. Fish		
CL-19	End of Discharge Flume (indicator)	3.4 miles E
CL-105	Lake Shelbyville (control)	50 miles S
G. Shoreline Sediment		
CL-7B	Clinton Lake (indicator)	2.1 miles SE
CL-105	Lake Shelbyville (control)	50 miles S
H. Food Products		
CL-114	Cisco (Control)	12.5 miles SSE
CL-115	Site's Secondary Access Road	0.7 miles NE
CL-117	Residence North of Site	0.9 miles N
CL-118	Site's Main Access Road	0.7 miles NNE
I. Grass		
CL-1	Camp Quest	1.8 miles W
CL-2	Clinton's Main Access Road	0.7 miles NNE
CL-8	DeWitt Cemetery	2.2 miles E
CL-116	Pasture in Rural Kenney (control)	14 miles WSW

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction
Clinton Power Station, 2016

Location	Location Description	Distance & Direction From Site
J.	Environmental Dosimetry - DLR	
Inner Ring		
CL-1		1.8 miles W
CL-5		0.7 miles NNE
CL-22		0.6 miles NE
CL-23		0.5 miles ENE
CL-24		0.5 miles E
CL-34		0.8 miles WNW
CL-35		0.7 miles NW
CL-36		0.6 miles N
CL-42		2.8 miles ESE
CL-43		2.8 miles SE
CL-44		2.3 miles SSE
CL-45		2.8 miles S
CL-46		2.8 miles SSW
CL-47		3.3 miles SW
CL-48		2.3 miles WSW
CL-63		1.3 miles NNW
Outer Ring		
CL-51		4.4 miles NW
CL-52		4.3 miles NNW
CL-53		4.3 miles E
CL-54		4.6 miles ESE
CL-55		4.1 miles SE
CL-56		4.1 miles SSE
CL-57		4.6 miles S
CL-58		4.3 miles SSW
CL-60		4.5 miles SW
CL-61		4.5 miles WSW
CL-76		4.6 miles N
CL-77		4.5 miles NNE
CL-78		4.8 miles NE
CL-79		4.5 miles ENE
CL-80		4.1 miles W
CL-81		4.5 miles WNW
Special Interest		
CL-37		3.4 miles N
CL-41		2.4 miles E
CL-49		3.5 miles W
CL-64		2.1 miles WNW
CL-65		2.6 miles ENE
CL-74		1.9 miles W
CL-75		0.9 miles N

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction
Clinton Power Station, 2016

Location	Location Description	Distance & Direction From Site
J.	Environmental Dosimetry – DLR (cont.)	
Supplemental		
CL-2		0.7 miles NNE
CL-3		0.7 miles NE
CL-4		0.8 miles SW
CL-6		0.8 miles WSW
CL-7		2.3 miles SE
CL-8		2.2 miles E
CL-15		0.9 miles N
CL-33		11.7 miles SW
CL-84		0.6 miles E
CL-90		0.4 miles SE
CL-91		6.1 miles ENE
CL-97		10.3 miles SW
CL-99		3.5 miles NNE
CL-114		12.5 miles SE
Control		
CL-11		16 miles S

TABLE B-2: Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Clinton Power Station, 2016

Sample Medium	Analysis	Sampling Method	Analytical Procedure Number
Surface Water	Gamma Spectroscopy	Monthly composite from a continuous water compositor.	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., SPM-1 Sampling Procedure Manual
Surface Water	Tritium	Quarterly composite from a continuous water compositor.	TBE, TBE-2011 Tritium analysis in drinking water by liquid scintillation Env. Inc., SPM-1 Sampling Procedure Manual
Surface Water	I-131	Monthly composite from a continuous water compositor.	TBE, TBE-2012 Radioiodine in various matrices Env. Inc., SPM-1 Sampling Procedure Manual
Drinking Water	Gross Beta	Monthly composite from a continuous water compositor.	TBE, TBE-2008 Gross Alpha and/or gross beta activity in various matrices Env. Inc., SPM-1 Sampling Procedure Manual
Drinking Water	Gamma Spectroscopy	Monthly composite from a continuous water compositor.	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., SPM-1 Sampling Procedure Manual
Drinking Water	Tritium	Quarterly composite from a continuous water compositor.	TBE, TBE-2011 Tritium analysis in drinking water by liquid scintillation Env. Inc., SPM-1 Sampling Procedure Manual
Drinking Water	I-131	Monthlly composite from a continuous water compositor.	TBE, TBE-2031 Radioactive Iodine in Drinking Water Env. Inc., SPM-1 Sampling Procedure Manual
Well Water	Gamma Spectroscopy	Quarterly composite from a continuous water compositor.	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., SPM-1 Sampling Procedure Manual
Well Water	Tritium	Quarterly composite from a continuous water compositor.	TBE, TBE-2011 Tritium analysis in drinking water by liquid scintillation Env. Inc., SPM-1 Sampling Procedure Manual
Fish	Gamma Spectroscopy	Semi-annual samples collected via electroshocking or other techniques	TBE-2007 Gamma emitting radioisotope analysis Env. Inc., SPM-1 Sampling Procedure Manual
Sediment	Gamma Spectroscopy	Semi-annual grab samples	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Air Particulates	Gross Beta	One-week composite of continuous air sampling through glass fiber filter paper	TBE, TBE-2008 Gross Alpha and/or gross beta activity in various matrices Env. Inc., SPM-1 Sampling Procedure Manual
Air Particulates	Gamma Spectroscopy	Quarterly composite of each station	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., SPM-1 Sampling Procedure Manual
Air Iodine	Gamma Spectroscopy	One-week composite of continuous air sampling through charcoal filter	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., SPM-1 Sampling Procedure Manual
Milk	I-131	Bi-weekly grab sample when cows are on pasture. Monthly all other times	TBE, TBE-2012 Radioiodine in various matrices Env. Inc., SPM-1 Sampling Procedure Manual

TABLE B-2: Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Clinton Power Station, 2016

Sample Medium	Analysis	Sampling Method	Analytical Procedure Number
Milk	Gamma Spectroscopy	Bi-weekly grab sample when cows are on pasture. Monthly all other times	TBE-2007 Gamma emitting radioisotope analysis Env. Inc., SPM-1 Sampling Procedure Manual
Food Products	Gross Beta	Monthly grab June through September	TBE, TBE-2008 Gross Alpha and/or gross beta activity in various matrices Env. Inc., SPM-1 Sampling Procedure Manual
Food Products	Gamma Spectroscopy	Monthly grab June through September	TBE, TBE-2007 Gamma emitting radioisotopes analysis Env. Inc., SPM-1 Sampling Procedure Manual
Grass	Gamma Spectroscopy	Biweekly May through October	TBE, TBE-2007 Gamma emitting radioisotopes analysis Env. Inc., SPM-1 Sampling Procedure Manual
DLR	Optically Stimulated Luminescence Dosimetry	Quarterly DLRs comprised of two Al_2O_3:C Landauer Incorporated elements.	Landauer Incorporated

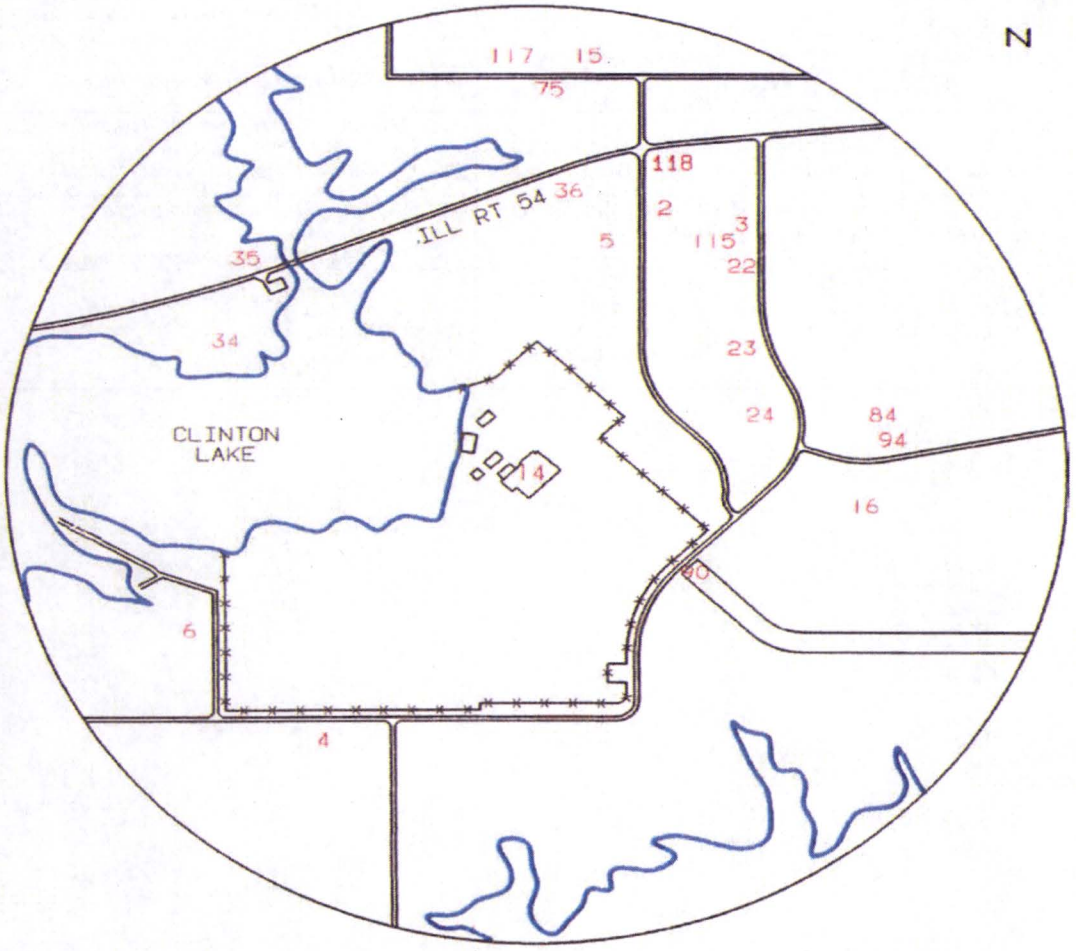

Figure B-1
Environmental Sampling Locations Within One
Mile of the Clinton Power Station, 2016

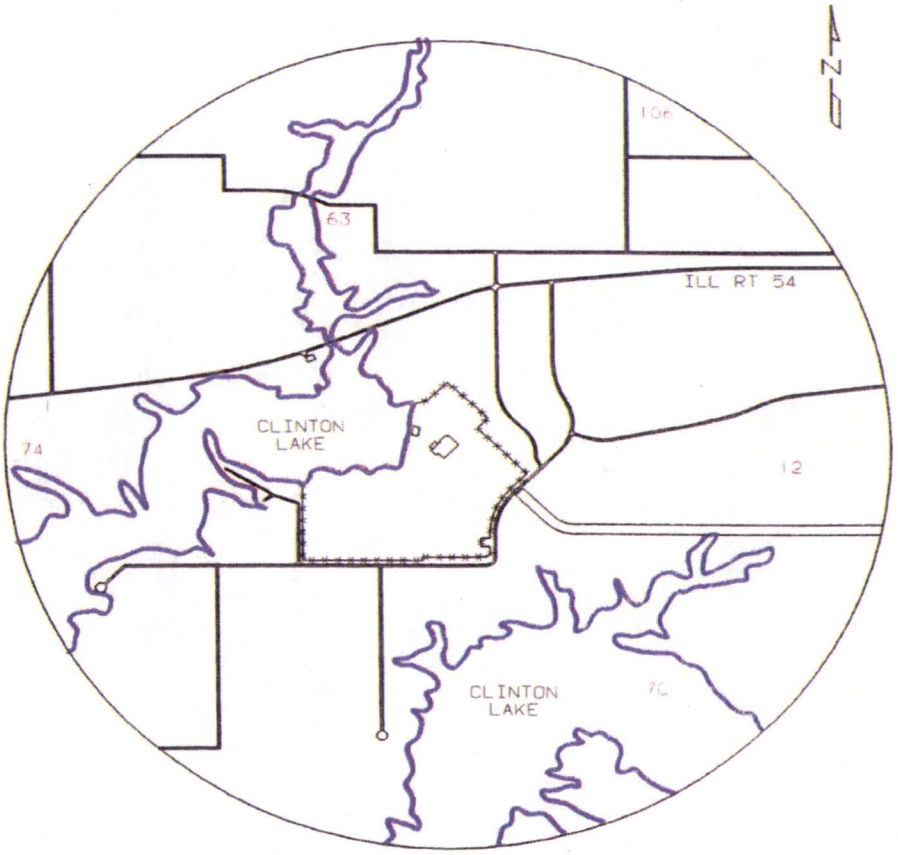

Figure B-2
Environmental Sampling Locations Between One and Two
Miles of the Clinton Power Station, 2016

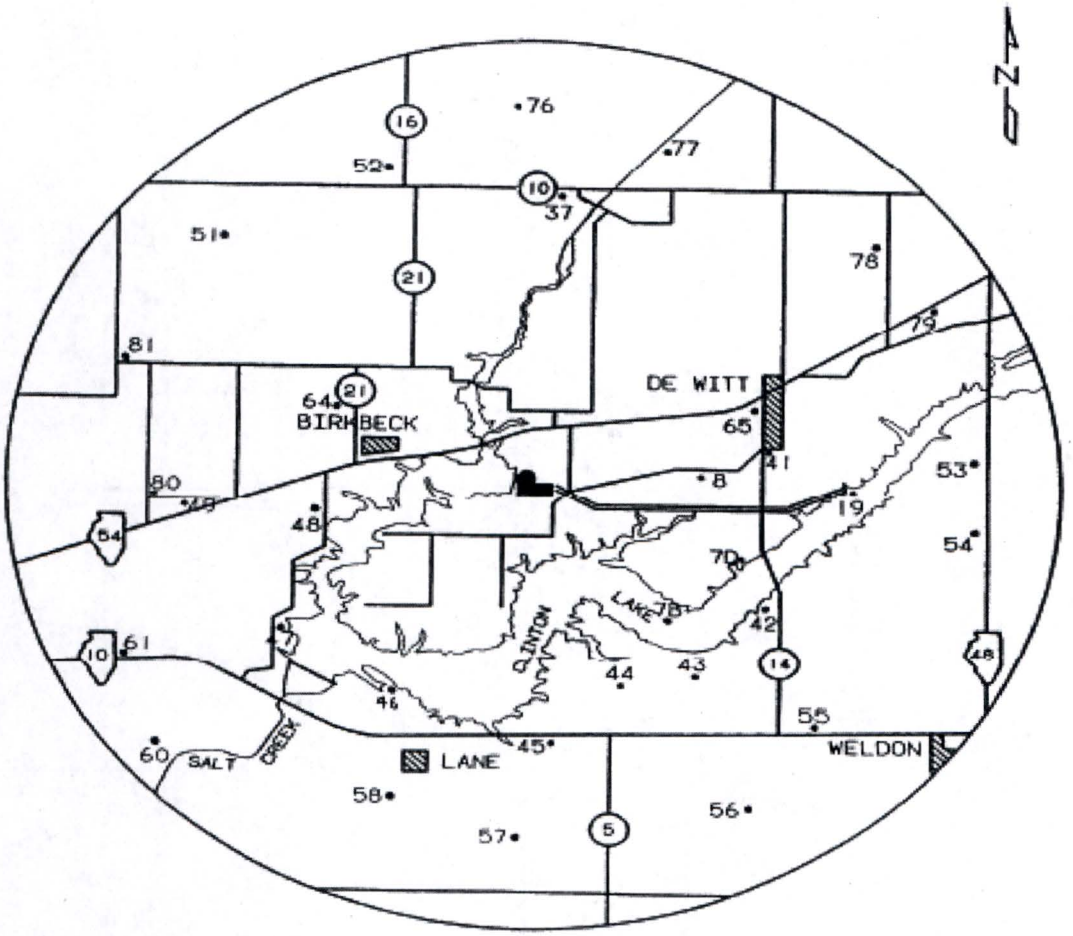

Figure B-3
Environmental Sampling Locations between Two and Five Miles from the Clinton Power Station, 2016

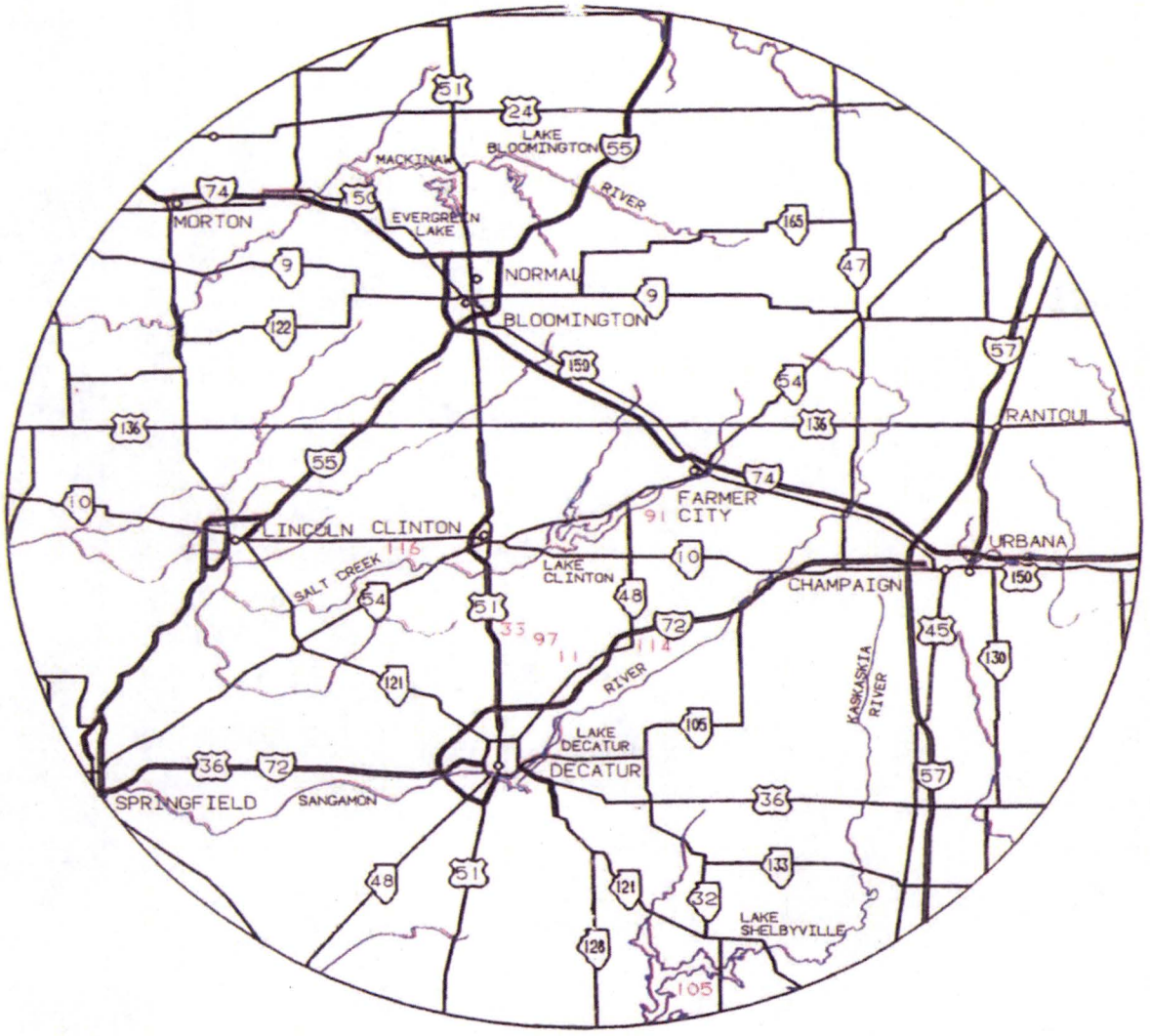

Figure B-4
Environmental Sampling Locations Greater Than Five Miles of the Clinton Power Station, 2016

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APPENDIX C

DATA TABLES AND FIGURES – PRIMARY LABORATORY

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Table C-I.1 **CONCENTRATIONS OF I-131 IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-90
12/30/15 - 01/27/16	< 0.4
01/27/16 - 02/24/16	< 0.6
02/24/16 - 03/30/16	< 0.5
03/30/16 - 04/27/16	< 0.6
04/27/16 - 05/25/16	< 0.6
05/25/16 - 06/29/16	< 0.6
06/29/16 - 07/27/16	< 0.5
07/27/16 - 08/31/16	< 0.5
08/31/16 - 09/28/16	< 0.9
09/28/16 - 10/26/16	< 0.9
10/26/16 - 11/30/16	< 0.6
11/30/16 - 12/28/16	< 0.6
MEAN	-

Table C-I.2 **CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-13	CL-90	CL-91	CL-99
12/30/15 - 03/30/16	< 188	< 192	< 189	< 169
03/30/16 - 06/29/16	< 172	< 177	< 172	< 169
06/29/16 - 09/28/16	< 191	< 192	< 192	< 193
09/28/16 - 12/28/16	< 198	< 199	< 198	< 198
MEAN		-	-	-

Table C-I.3

CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140	Ce-144
CL-13	01/27/16 - 01/27/16	< 6	< 6	< 12	< 5	< 12	< 5	< 8	< 5	< 5	< 23	< 13	< 44
	02/24/16 - 02/24/16	< 4	< 4	< 8	< 5	< 7	< 5	< 7	< 4	< 5	< 19	< 8	< 29
	03/30/16 - 03/30/16	< 6	< 6	< 14	< 7	< 13	< 7	< 11	< 7	< 6	< 35	< 11	< 53
	04/27/16 - 04/27/16	< 5	< 4	< 10	< 4	< 9	< 4	< 9	< 5	< 5	< 25	< 7	< 43
	05/25/16 - 05/25/16	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 17	< 6	< 14
	06/29/16 - 06/29/16	< 6	< 7	< 17	< 7	< 18	< 8	< 13	< 7	< 8	< 36	< 10	< 40
	07/27/16 - 07/27/16	< 6	< 6	< 12	< 4	< 13	< 5	< 13	< 6	< 7	< 35	< 13	< 42
	08/31/16 - 08/31/16	< 6	< 8	< 12	< 7	< 12	< 9	< 12	< 8	< 7	< 32	< 11	< 57
	09/28/16 - 09/28/16	< 7	< 8	< 13	< 7	< 15	< 7	< 14	< 8	< 7	< 35	< 12	< 62
	10/26/16 - 10/26/16	< 5	< 6	< 13	< 6	< 13	< 6	< 9	< 5	< 5	< 39	< 11	< 45
	11/30/16 - 11/30/16	< 7	< 7	< 14	< 7	< 10	< 8	< 12	< 7	< 6	< 31	< 8	< 50
	12/28/16 - 12/28/16	< 5	< 4	< 16	< 7	< 12	< 7	< 11	< 5	< 5	< 28	< 9	< 42
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
CL-90	12/30/15 - 01/27/16	< 9	< 7	< 17	< 7	< 17	< 8	< 12	< 9	< 9	< 44	< 13	< 69
	01/27/16 - 02/24/16	< 5	< 5	< 10	< 4	< 10	< 5	< 8	< 4	< 5	< 28	< 8	< 41
	02/24/16 - 03/30/16	< 10	< 8	< 23	< 8	< 18	< 9	< 15	< 6	< 10	< 34	< 14	< 51
	03/30/16 - 04/27/16	< 6	< 5	< 12	< 5	< 9	< 5	< 9	< 6	< 5	< 21	< 9	< 47
	04/27/16 - 05/25/16	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 1	< 2	< 14	< 4	< 12
	05/25/16 - 06/29/16	< 6	< 5	< 11	< 5	< 11	< 7	< 11	< 5	< 6	< 30	< 10	< 44
	06/29/16 - 07/27/16	< 4	< 5	< 12	< 5	< 9	< 5	< 9	< 5	< 5	< 27	< 11	< 38
	07/27/16 - 08/31/16	< 5	< 6	< 12	< 6	< 14	< 5	< 11	< 5	< 8	< 32	< 10	< 47
	08/31/16 - 09/28/16	< 8	< 9	< 15	< 7	< 16	< 8	< 12	< 8	< 8	< 39	< 10	< 61
	09/28/16 - 10/26/16	< 5	< 5	< 12	< 5	< 11	< 6	< 7	< 5	< 5	< 29	< 10	< 32
	10/26/16 - 11/30/16	< 10	< 8	< 17	< 7	< 23	< 9	< 18	< 10	< 10	< 40	< 15	< 58
	11/30/16 - 12/28/16	< 5	< 5	< 12	< 5	< 11	< 6	< 10	< 5	< 6	< 27	< 8	< 37
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-I.3

CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140	Ce-144
CL-91	12/30/15 - 01/27/16	< 6	< 6	< 15	< 7	< 11	< 7	< 12	< 6	< 6	< 29	< 12	< 45
	01/27/16 - 02/24/16	< 5	< 4	< 7	< 7	< 10	< 5	< 10	< 5	< 7	< 28	< 11	< 42
	02/24/16 - 03/30/16	< 6	< 8	< 15	< 7	< 12	< 5	< 13	< 6	< 5	< 39	< 13	< 56
	03/30/16 - 04/27/16	< 7	< 5	< 12	< 7	< 11	< 7	< 13	< 6	< 6	< 29	< 8	< 51
	04/27/16 - 05/25/16	< 1	< 1	< 3	< 1	< 2	< 1	< 2	< 1	< 1	< 11	< 3	< 10
	05/25/16 - 06/29/16	< 7	< 7	< 17	< 5	< 13	< 8	< 13	< 8	< 6	< 27	< 14	< 47
	06/29/16 - 07/27/16	< 5	< 4	< 10	< 5	< 8	< 5	< 7	< 4	< 5	< 27	< 7	< 35
	07/27/16 - 08/31/16	< 7	< 8	< 15	< 8	< 14	< 9	< 13	< 6	< 8	< 45	< 9	< 55
	08/31/16 - 09/28/16	< 6	< 6	< 12	< 6	< 10	< 8	< 14	< 6	< 6	< 32	< 13	< 49
	09/28/16 - 10/26/16	< 7	< 7	< 13	< 7	< 13	< 7	< 11	< 6	< 6	< 36	< 11	< 45
	10/26/16 - 11/30/16	< 6	< 6	< 12	< 7	< 12	< 8	< 13	< 6	< 7	< 29	< 11	< 54
	11/30/16 - 12/28/16	< 4	< 5	< 9	< 6	< 9	< 5	< 9	< 5	< 4	< 24	< 7	< 35
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
CL-99	12/30/15 - 01/27/16	< 6	< 6	< 7	< 7	< 14	< 7	< 11	< 6	< 6	< 38	< 11	< 42
	01/27/16 - 02/24/16	< 6	< 6	< 11	< 6	< 12	< 6	< 10	< 5	< 5	< 24	< 7	< 46
	02/24/16 - 03/30/16	< 5	< 5	< 11	< 5	< 9	< 5	< 9	< 5	< 5	< 30	< 8	< 47
	03/30/16 - 04/27/16	< 6	< 5	< 11	< 7	< 12	< 6	< 11	< 5	< 7	< 25	< 8	< 38
	04/27/16 - 05/25/16	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 18	< 5	< 16
	05/25/16 - 06/29/16	< 6	< 6	< 14	< 7	< 13	< 6	< 10	< 7	< 6	< 38	< 10	< 56
	06/29/16 - 07/27/16	< 4	< 5	< 9	< 4	< 7	< 5	< 9	< 5	< 5	< 32	< 8	< 45
	07/27/16 - 08/31/16	< 10	< 9	< 20	< 7	< 18	< 10	< 16	< 8	< 9	< 39	< 14	< 75
	08/31/16 - 09/28/16	< 8	< 7	< 14	< 8	< 17	< 8	< 15	< 9	< 9	< 40	< 10	< 76
	09/28/16 - 10/26/16	< 5	< 4	< 11	< 4	< 8	< 4	< 8	< 5	< 4	< 29	< 11	< 38
	10/26/16 - 11/30/16	< 4	< 5	< 11	< 6	< 12	< 4	< 9	< 5	< 5	< 24	< 8	< 34
	11/30/16 - 12/28/16	< 8	< 8	< 13	< 7	< 15	< 7	< 14	< 8	< 8	< 31	< 11	< 60
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-II.1 **CONCENTRATIONS OF GROSS BETA IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-14
12/30/15 - 01/27/16	< 1.7
01/27/16 - 02/24/16	< 1.5
02/24/16 - 03/30/16	< 1.4
03/30/16 - 04/27/16	< 1.7
04/27/16 - 05/25/16	< 1.5
05/25/16 - 06/29/16	< 1.6
06/29/16 - 07/27/16	< 1.4
07/27/16 - 08/31/16	< 1.3
08/31/16 - 09/28/16	< 1.5
09/28/16 - 10/26/16	< 1.5
10/26/16 - 11/30/16	< 1.5
11/30/16 - 12/28/16	< 1.5
MEAN	-

Table C-II.2 **CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-14
12/30/15 - 03/30/16	< 171
03/30/16 - 06/29/16	< 170
06/29/16 - 09/28/16	< 197
09/28/16 - 12/28/16	< 200
MEAN	-

Table C-II.3 **CONCENTRATIONS OF I-131 IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-14
12/30/15 - 01/27/16	< 0.4
01/27/16 - 02/24/16	< 0.5
02/24/16 - 03/30/16	< 0.5
03/30/16 - 04/27/16	< 0.5
04/27/16 - 05/25/16	< 0.5
05/25/16 - 06/29/16	< 0.5
06/29/16 - 07/27/16	< 0.8
07/27/16 - 08/31/16	< 0.4
08/31/16 - 09/28/16	< 0.8
09/28/16 - 10/26/16	< 0.8
10/26/16 - 11/30/16	< 0.8
11/30/16 - 12/28/16	< 0.6
MEAN	-

Table C-II.4

CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140	Ce-144
CL-14	12/30/15 - 01/27/16	< 7	< 9	< 19	< 9	< 13	< 8	< 13	< 7	< 7	< 38	< 10	< 62
	01/27/16 - 02/24/16	< 4	< 5	< 10	< 5	< 9	< 5	< 8	< 5	< 5	< 25	< 10	< 41
	02/24/16 - 03/30/16	< 6	< 6	< 13	< 7	< 13	< 7	< 12	< 7	< 7	< 29	< 11	< 40
	03/30/16 - 04/27/16	< 7	< 7	< 9	< 7	< 9	< 5	< 10	< 7	< 7	< 29	< 10	< 49
	04/27/16 - 05/25/16	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 16	< 6	< 13
	05/25/16 - 06/29/16	< 7	< 7	< 13	< 7	< 14	< 7	< 10	< 6	< 6	< 34	< 13	< 45
	06/29/16 - 07/27/16	< 5	< 5	< 12	< 4	< 11	< 5	< 9	< 5	< 5	< 33	< 12	< 42
	07/27/16 - 08/31/16	< 7	< 7	< 16	< 7	< 14	< 9	< 13	< 7	< 8	< 37	< 13	< 56
	08/31/16 - 09/28/16	< 5	< 8	< 15	< 8	< 15	< 8	< 12	< 6	< 8	< 36	< 15	< 54
	09/28/16 - 10/26/16	< 5	< 5	< 13	< 5	< 10	< 7	< 12	< 4	< 5	< 37	< 12	< 40
	10/26/16 - 11/30/16	< 8	< 7	< 16	< 9	< 16	< 8	< 14	< 9	< 8	< 37	< 13	< 60
	11/30/16 - 12/28/16	< 6	< 6	< 12	< 6	< 13	< 7	< 10	< 6	< 6	< 31	< 10	< 48
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-III.1

CONCENTRATIONS OF TRITIUM IN WELL WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-07D	CL-12R	CL-12T
03/30/16 - 03/30/16	< 192	< 190	< 193
06/29/16 - 06/29/16	< 164	< 162	< 164
09/28/16 - 09/28/16	< 183	< 180	< 180
12/28/16 - 12/28/16	< 189	< 189	< 190
MEAN	-	-	-

Table C-III.2

CONCENTRATIONS OF GAMMA EMITTERS IN WELL WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF PCI/LITER + 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140	Ce-144
CL-07D	03/30/16	< 3	< 4	< 9	< 4	< 10	< 5	< 5	< 5	< 4	< 24	< 8	< 47
	06/29/16	< 6	< 7	< 13	< 7	< 14	< 8	< 14	< 5	< 7	< 30	< 13	< 44
	09/28/16	< 7	< 6	< 14	< 7	< 14	< 8	< 10	< 6	< 6	< 27	< 12	< 44
	12/28/16	< 5	< 5	< 10	< 5	< 8	< 6	< 9	< 5	< 5	< 26	< 8	< 40
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
CL-12R	03/30/16	< 1	< 1	< 3	< 1	< 3	< 1	< 2	< 1	< 1	< 9	< 3	< 9
	06/29/16	< 6	< 7	< 13	< 6	< 14	< 7	< 11	< 8	< 7	< 32	< 9	< 64
	09/28/16	< 6	< 6	< 11	< 6	< 12	< 7	< 11	< 8	< 6	< 29	< 8	< 58
	12/28/16	< 4	< 4	< 8	< 4	< 8	< 5	< 8	< 4	< 4	< 23	< 6	< 30
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
CL-12T	03/30/16	< 5	< 7	< 11	< 8	< 14	< 6	< 11	< 6	< 7	< 23	< 9	< 48
	06/29/16	< 7	< 6	< 17	< 8	< 17	< 7	< 16	< 8	< 8	< 42	< 12	< 60
	09/28/16	< 7	< 8	< 14	< 8	< 14	< 9	< 14	< 6	< 8	< 33	< 12	< 61
	12/28/16	< 5	< 5	< 11	< 4	< 11	< 5	< 9	< 5	< 5	< 23	< 7	< 41
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-IV.1

CONCENTRATIONS OF GAMMA EMITTERS IN FISH SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140	Ce-144
CL-19													
Bluegill	04/19/16	< 62	< 63	< 152	< 82	< 105	< 84	< 153	< 71	< 92	< 382	< 111	< 354
Carp	04/19/16	< 62	< 62	< 127	< 62	< 136	< 77	< 94	< 65	< 76	< 321	< 97	< 406
Channel Catfish	04/19/16	< 49	< 43	< 135	< 53	< 109	< 50	< 95	< 46	< 60	< 332	< 52	< 297
Largemouth Bass	04/19/16	< 48	< 39	< 69	< 48	< 98	< 45	< 69	< 49	< 41	< 239	< 69	< 285
Bluegill	10/03/16	< 56	< 46	< 119	< 60	< 98	< 61	< 86	< 52	< 56	< 172	< 71	< 275
Carp	10/03/16	< 55	< 50	< 109	< 51	< 118	< 62	< 110	< 65	< 55	< 246	< 68	< 392
Channel Catfish	10/03/16	< 50	< 63	< 105	< 61	< 140	< 67	< 97	< 54	< 64	< 255	< 93	< 329
Largemouth Bass	10/03/16	< 42	< 39	< 89	< 42	< 95	< 39	< 59	< 42	< 44	< 202	< 35	< 243
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
CL-105													
Bluegill	04/19/16	< 55	< 41	< 184	< 54	< 115	< 52	< 114	< 37	< 41	< 265	< 74	< 277
Carp	04/19/16	< 84	< 71	< 251	< 73	< 203	< 74	< 181	< 78	< 73	< 322	< 186	< 477
Crappie	04/19/16	< 75	< 71	< 114	< 51	< 169	< 86	< 129	< 78	< 66	< 367	< 95	< 442
Largemouth Bass	04/19/16	< 72	< 72	< 117	< 63	< 119	< 56	< 121	< 55	< 63	< 293	< 68	< 405
Bluegill	10/03/16	< 52	< 59	< 124	< 65	< 102	< 42	< 96	< 65	< 58	< 179	< 49	< 304
Carp	10/03/16	< 65	< 51	< 104	< 53	< 144	< 60	< 101	< 63	< 65	< 254	< 66	< 392
Crappie/White bass	10/03/16	< 52	< 50	< 94	< 62	< 102	< 55	< 75	< 43	< 48	< 214	< 68	< 301
Largemouth Bass	10/03/16	< 39	< 39	< 73	< 49	< 87	< 45	< 70	< 38	< 36	< 191	< 46	< 244
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-V.1

CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF PCI/KG DRY + 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140	Ce-144
CL-07B	04/19/16	< 50	< 58	< 117	< 35	< 116	< 52	< 71	< 49	< 43	< 268	< 68	< 358
	10/03/16	< 35	< 39	< 95	< 52	< 79	< 41	< 68	< 34	< 37	< 178	< 43	< 228
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
CL-105	04/19/16	< 73	< 75	< 161	< 87	< 134	< 70	< 121	< 49	< 57	< 366	< 83	< 332
	10/03/16	< 45	< 41	< 89	< 34	< 104	< 51	< 78	< 56	< 46	< 185	< 39	< 295
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-VI.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

COLLECTION PERIOD	GROUP I					
	CL-2	CL-3	CL-4	CL-6	CL-15	CL-94
12/30/15 - 01/06/16	20 ± 4	20 ± 5	19 ± 4	19 ± 4	21 ± 5	17 ± 4
01/06/16 - 01/13/16	16 ± 4	16 ± 4	16 ± 4	17 ± 4	17 ± 4	17 ± 4
01/13/16 - 01/20/16	22 ± 5	20 ± 4	25 ± 5	23 ± 5	22 ± 5	23 ± 5
01/20/16 - 01/27/16	17 ± 4	19 ± 4	19 ± 4	23 ± 4	18 ± 4	18 ± 4
01/27/16 - 02/03/16	20 ± 4	23 ± 5	21 ± 5	17 ± 4	18 ± 4	24 ± 5
02/03/16 - 02/10/16	18 ± 4	24 ± 5	21 ± 5	14 ± 4	17 ± 4	18 ± 4
02/10/16 - 02/17/16	12 ± 4	17 ± 4	18 ± 4	15 ± 4	20 ± 5	16 ± 4
02/17/16 - 02/25/16	14 ± 4	15 ± 4	17 ± 4	14 ± 3	12 ± 3	14 ± 4
02/24/16 - 03/02/16	13 ± 4	14 ± 4	13 ± 4	15 ± 4	13 ± 4	14 ± 4
03/02/16 - 03/09/16	17 ± 4	15 ± 4	18 ± 4	15 ± 4	17 ± 4	19 ± 4
03/09/16 - 03/16/16	14 ± 4	15 ± 4	16 ± 4	18 ± 4	15 ± 4	15 ± 4
03/16/16 - 03/23/16	10 ± 4	8 ± 3	12 ± 4	9 ± 3	11 ± 4	8 ± 3
03/23/16 - 03/30/16	13 ± 4	12 ± 4	12 ± 4	13 ± 4	9 ± 3	11 ± 3
03/30/16 - 04/06/16	16 ± 4	16 ± 4	12 ± 4	13 ± 4	13 ± 4	10 ± 4
04/06/16 - 04/13/16	8 ± 4	8 ± 4	11 ± 4	10 ± 4	10 ± 4	12 ± 4
04/13/16 - 04/20/16	17 ± 4	23 ± 4	21 ± 4	18 ± 4	17 ± 4	23 ± 4
04/20/16 - 04/27/16	17 ± 4	16 ± 4	20 ± 4	17 ± 4	20 ± 4	19 ± 4
04/27/16 - 05/04/16	9 ± 3	10 ± 4	11 ± 4	8 ± 3	8 ± 3	10 ± 3
05/04/16 - 05/11/16	10 ± 4	11 ± 4	13 ± 4	14 ± 4	11 ± 4	11 ± 4
05/11/16 - 05/18/16	10 ± 4	13 ± 4	10 ± 4	9 ± 4	10 ± 4	9 ± 4
05/18/16 - 05/25/16	19 ± 4	15 ± 4	16 ± 4	19 ± 4	17 ± 4	17 ± 4
05/25/16 - 06/01/16	14 ± 4	16 ± 4	12 ± 4	18 ± 4	18 ± 4	18 ± 4
06/01/16 - 06/08/16	13 ± 4	11 ± 4	12 ± 4	9 ± 4	13 ± 4	9 ± 4
06/08/16 - 06/15/16	23 ± 4	23 ± 4	25 ± 5	22 ± 4	22 ± 4	23 ± 4
06/15/16 - 06/22/16	18 ± 4	16 ± 4	19 ± 4	16 ± 4	17 ± 4	12 ± 4
06/22/16 - 06/29/16	15 ± 4	18 ± 4	19 ± 4	16 ± 4	17 ± 4	18 ± 4
06/29/16 - 07/06/16	17 ± 4	13 ± 4	16 ± 4	12 ± 4	13 ± 4	14 ± 4
07/06/16 - 07/13/16	14 ± 4	14 ± 4	14 ± 4	15 ± 4	15 ± 4	15 ± 4
07/13/16 - 07/20/16	11 ± 4	15 ± 4	14 ± 4	14 ± 4	12 ± 4	9 ± 4
07/20/16 - 07/27/16	14 ± 4	15 ± 4	17 ± 4	16 ± 4	12 ± 4	18 ± 4
07/27/16 - 08/03/16	19 ± 4	17 ± 4	25 ± 5	21 ± 4	20 ± 4	20 ± 4
08/03/16 - 08/10/16	20 ± 4	19 ± 4	21 ± 4	21 ± 4	20 ± 4	19 ± 4
08/10/16 - 08/17/16	16 ± 4	16 ± 4	7 ± 3	15 ± 4	16 ± 4	16 ± 4
08/17/16 - 08/24/16	16 ± 4	15 ± 4	16 ± 4	15 ± 4	16 ± 4	20 ± 4
08/24/16 - 08/31/16	14 ± 4	14 ± 4	18 ± 4	17 ± 4	13 ± 4	19 ± 4
08/31/16 - 09/07/16	14 ± 4	10 ± 4	8 ± 4	14 ± 4	13 ± 4	10 ± 4
09/07/16 - 09/14/16	13 ± 4	15 ± 4	16 ± 4	15 ± 4	14 ± 4	19 ± 4
09/14/16 - 09/21/16	23 ± 4	19 ± 4	25 ± 5	16 ± 4	20 ± 4	22 ± 4
09/21/16 - 09/28/16	27 ± 5	34 ± 6	33 ± 6	32 ± 5	34 ± 6	35 ± 6
09/28/16 - 10/05/16	8 ± 3	9 ± 4	8 ± 4	13 ± 4	10 ± 4	11 ± 4
10/05/16 - 10/12/16	22 ± 5	27 ± 5	23 ± 5	30 ± 5	19 ± 4	22 ± 5
10/12/16 - 10/19/16	13 ± 4	18 ± 4	15 ± 4	18 ± 4	12 ± 4	15 ± 4
10/19/16 - 10/26/16	17 ± 4	19 ± 4	22 ± 4	20 ± 4	15 ± 4	20 ± 4
10/26/16 - 11/02/16	27 ± 5	25 ± 5	26 ± 5	29 ± 6	24 ± 5	25 ± 5
11/02/16 - 11/09/16	25 ± 5	24 ± 5	23 ± 5	26 ± 5	23 ± 5	24 ± 5
11/09/16 - 11/16/16	23 ± 5	26 ± 5	23 ± 5	28 ± 5	29 ± 5	20 ± 4
11/16/16 - 11/23/16	23 ± 5	22 ± 4	27 ± 5	22 ± 4	24 ± 5	21 ± 4
11/23/16 - 11/30/16	29 ± 5	24 ± 4	28 ± 5	29 ± 5	28 ± 5	23 ± 4
11/30/16 - 12/07/16	15 ± 4	16 ± 4	13 ± 4	16 ± 4	12 ± 4	17 ± 4
12/07/16 - 12/14/16	22 ± 4	17 ± 4	21 ± 4	19 ± 4	18 ± 4	22 ± 4
12/14/16 - 12/21/16	23 ± 5	28 ± 5	26 ± 5	26 ± 5	23 ± 5	24 ± 5
12/21/16 - 12/28/16	23 ± 4	24 ± 5	22 ± 4	24 ± 5	20 ± 4	19 ± 4
12/28/16 - 01/04/17	13 ± 3	17 ± 4	16 ± 4	14 ± 4	17 ± 4	16 ± 4
MEAN ± 2 STD DEV	17 ± 10	17 ± 11	18 ± 12	18 ± 11	17 ± 11	17 ± 11

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

Table C-VI.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

COLLECTION PERIOD	GROUP II			GROUP III
	CL-1	CL-7	CL-8	CL-11
12/30/15 - 01/06/16	20 ± 4	17 ± 4	18 ± 4	18 ± 4
01/06/16 - 01/13/16	21 ± 5	16 ± 4	22 ± 5	17 ± 4
01/13/16 - 01/20/16	21 ± 4	25 ± 5	22 ± 5	25 ± 5
01/20/16 - 01/27/16	22 ± 4	25 ± 5	24 ± 5	25 ± 5
01/27/16 - 02/03/16	18 ± 4	20 ± 4	17 ± 4	19 ± 4
02/03/16 - 02/10/16	17 ± 4	22 ± 5	21 ± 5	21 ± 5
02/10/16 - 02/17/16	14 ± 4	15 ± 4	16 ± 4	14 ± 4
02/17/16 - 02/25/16	15 ± 4	12 ± 3	12 ± 3	13 ± 3
02/24/16 - 03/02/16	12 ± 4	14 ± 4	15 ± 4	18 ± 5
03/02/16 - 03/09/16	16 ± 4	18 ± 4	17 ± 4	16 ± 4
03/09/16 - 03/16/16	16 ± 4	16 ± 4	16 ± 4	14 ± 4
03/16/16 - 03/23/16	10 ± 4	10 ± 4	9 ± 3	12 ± 4
03/23/16 - 03/30/16	12 ± 4	12 ± 4	11 ± 3	12 ± 4
03/30/16 - 04/06/16	13 ± 4	15 ± 4	12 ± 4	14 ± 4
04/06/16 - 04/13/16	13 ± 4	9 ± 4	10 ± 4	10 ± 4
04/13/16 - 04/20/16	18 ± 4	21 ± 4	20 ± 4	20 ± 4
04/20/16 - 04/27/16	20 ± 4	18 ± 4	20 ± 4	19 ± 4
04/27/16 - 05/04/16	10 ± 3	8 ± 3	9 ± 3	11 ± 4
05/04/16 - 05/11/16	12 ± 4	11 ± 4	11 ± 4	11 ± 4
05/11/16 - 05/18/16	9 ± 4	13 ± 4	12 ± 4	14 ± 4
05/18/16 - 05/25/16	15 ± 4	14 ± 4	17 ± 4	21 ± 4
05/25/16 - 06/01/16	14 ± 4	15 ± 4	20 ± 4	16 ± 4
06/01/16 - 06/08/16	12 ± 4	10 ± 4	13 ± 4	16 ± 4
06/08/16 - 06/15/16	22 ± 4	19 ± 4	21 ± 4	23 ± 4
06/15/16 - 06/22/16	16 ± 4	16 ± 4	17 ± 4	16 ± 4
06/22/16 - 06/29/16	16 ± 4	17 ± 4	16 ± 4	19 ± 4
06/29/16 - 07/06/16	16 ± 4	13 ± 4	15 ± 4	14 ± 4
07/06/16 - 07/13/16	16 ± 4	15 ± 4	14 ± 4	12 ± 4
07/13/16 - 07/20/16	12 ± 4	12 ± 4	14 ± 4	13 ± 4
07/20/16 - 07/27/16	11 ± 4	13 ± 4	17 ± 4	13 ± 4
07/27/16 - 08/03/16	18 ± 4	25 ± 5	22 ± 5	16 ± 4
08/03/16 - 08/10/16	22 ± 4	19 ± 4	19 ± 4	22 ± 4
08/10/16 - 08/17/16	17 ± 4	15 ± 4	18 ± 4	17 ± 4
08/17/16 - 08/24/16	18 ± 4	16 ± 4	14 ± 4	16 ± 4
08/24/16 - 08/31/16	14 ± 4	16 ± 4	15 ± 4	15 ± 4
08/31/16 - 09/07/16	14 ± 4	13 ± 4	11 ± 4	13 ± 4
09/07/16 - 09/14/16	18 ± 4	10 ± 4	17 ± 4	21 ± 4
09/14/16 - 09/21/16	21 ± 4	20 ± 4	24 ± 5	21 ± 4
09/21/16 - 09/28/16	32 ± 5	33 ± 5	36 ± 6	31 ± 5
09/28/16 - 10/05/16	12 ± 4	8 ± 3	9 ± 4	10 ± 4
10/05/16 - 10/12/16	27 ± 5	23 ± 5	27 ± 5	24 ± 5
10/12/16 - 10/19/16	16 ± 4	19 ± 4	17 ± 4	16 ± 4
10/19/16 - 10/26/16	18 ± 4	20 ± 4	17 ± 4	15 ± 4
10/26/16 - 11/02/16	27 ± 5	24 ± 5	24 ± 5	21 ± 5
11/02/16 - 11/09/16	25 ± 5	22 ± 5	28 ± 5	26 ± 5
11/09/16 - 11/16/16	25 ± 5	27 ± 5	29 ± 5	31 ± 5
11/16/16 - 11/23/16	23 ± 5	26 ± 5	28 ± 5	17 ± 4
11/23/16 - 11/30/16	25 ± 4	23 ± 4	30 ± 5	28 ± 5
11/30/16 - 12/07/16	17 ± 4	13 ± 4	17 ± 4	17 ± 4
12/07/16 - 12/14/16	15 ± 4	18 ± 4	20 ± 4	18 ± 4
12/14/16 - 12/21/16	23 ± 5	24 ± 5	24 ± 5	29 ± 5
12/21/16 - 12/28/16	19 ± 4	17 ± 4	19 ± 4	24 ± 4
12/28/16 - 01/04/17	16 ± 4	14 ± 4	19 ± 4	16 ± 4
MEAN ± 2 STD DEV	17 ± 10	17 ± 11	18 ± 12	18 ± 11

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

Table C-VI.2 **MONTHLY AND YEARLY MEAN VALUES OF GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016**

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

GROUP I - ON-SITE LOCATIONS				GROUP II - INTERMEDIATE DISTANCE LOCATIONS				GROUP III - CONTROL LOCATIONS			
COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD
12/30/15 - 02/03/16	16	25	20 ± 5	12/30/15 - 02/03/16	16	25	20 ± 6	12/30/15 - 02/03/16	17	25	21 ± 7
02/03/16 - 03/02/16	12	24	16 ± 6	02/03/16 - 03/02/16	12	22	15 ± 7	02/03/16 - 03/02/16	13	21	17 ± 7
03/02/16 - 03/30/16	8	19	13 ± 6	03/02/16 - 03/30/16	9	18	13 ± 6	03/02/16 - 03/30/16	12	16	14 ± 4
03/30/16 - 05/04/16	8	23	14 ± 9	03/30/16 - 05/04/16	8	21	14 ± 9	03/30/16 - 05/04/16	10	20	15 ± 9
05/04/16 - 06/01/16	9	19	14 ± 7	05/04/16 - 06/01/16	9	20	14 ± 6	05/04/16 - 06/01/16	11	21	15 ± 8
06/01/16 - 06/29/16	9	25	17 ± 9	06/01/16 - 06/29/16	10	22	16 ± 7	06/01/16 - 06/29/16	16	23	18 ± 6
06/29/16 - 08/03/16	9	25	15 ± 7	06/29/16 - 08/03/16	11	25	16 ± 8	06/29/16 - 08/03/16	12	16	14 ± 3
08/03/16 - 08/31/16	7	21	17 ± 6	08/03/16 - 08/31/16	14	22	17 ± 5	08/03/16 - 08/31/16	15	22	17 ± 6
08/31/16 - 09/28/16	8	35	20 ± 17	08/31/16 - 09/28/16	10	36	21 ± 18	08/31/16 - 09/28/16	13	31	22 ± 15
09/28/16 - 11/02/16	8	30	19 ± 13	09/28/16 - 11/02/16	8	27	19 ± 13	09/28/16 - 11/02/16	10	24	17 ± 11
11/02/16 - 11/30/16	20	29	25 ± 6	11/02/16 - 11/30/16	22	30	26 ± 5	11/02/16 - 11/30/16	17	31	25 ± 12
11/30/16 - 01/04/17	12	28	19 ± 9	11/30/16 - 01/04/17	13	24	18 ± 7	11/30/16 - 01/04/17	16	29	21 ± 11
12/30/15 - 01/04/17	7	35	17 ± 11	12/30/15 - 01/04/17	8	36	17 ± 11	12/30/15 - 01/04/17	10	31	18 ± 11

Table C-VI.3 CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

SITE	COLLECTION PERIOD	Co-60	Nb-95	Zr-95	Ru-103	Ru-106	Cs-134	Cs-137	Ce-141	Ce-144
CL-1	12/30/15 - 03/30/16	< 5	< 6	< 11	< 6	< 38	< 4	< 4	< 8	< 16
	03/30/16 - 06/29/16	< 2	< 3	< 4	< 3	< 21	< 2	< 3	< 4	< 10
	06/29/16 - 09/28/16	< 3	< 2	< 4	< 2	< 15	< 3	< 2	< 3	< 9
	09/28/16 - 01/04/17	< 1	< 3	< 4	< 2	< 15	< 2	< 2	< 2	< 8
	MEAN	-	-	-	-	-	-	-	-	-
CL-2	12/30/15 - 03/30/16	< 3	< 3	< 6	< 4	< 20	< 3	< 3	< 7	< 13
	03/30/16 - 06/29/16	< 2	< 3	< 4	< 2	< 17	< 2	< 2	< 3	< 9
	06/29/16 - 09/28/16	< 2	< 2	< 3	< 2	< 16	< 2	< 2	< 2	< 9
	09/28/16 - 01/04/17	< 2	< 2	< 3	< 2	< 17	< 2	< 2	< 3	< 9
	MEAN	-	-	-	-	-	-	-	-	-
CL-3	12/30/15 - 03/30/16	< 2	< 3	< 5	< 3	< 18	< 2	< 2	< 5	< 8
	03/30/16 - 06/29/16	< 3	< 3	< 6	< 3	< 23	< 2	< 3	< 4	< 10
	06/29/16 - 09/28/16	< 4	< 3	< 7	< 4	< 32	< 3	< 4	< 4	< 12
	09/28/16 - 01/04/17	< 4	< 4	< 7	< 3	< 29	< 3	< 3	< 3	< 11
	MEAN	-	-	-	-	-	-	-	-	-
CL-4	12/30/15 - 03/30/16	< 3	< 3	< 5	< 5	< 21	< 3	< 2	< 5	< 12
	03/30/16 - 06/29/16	< 2	< 5	< 6	< 4	< 29	< 3	< 3	< 7	< 15
	06/29/16 - 09/28/16	< 2	< 2	< 3	< 2	< 17	< 2	< 2	< 3	< 10
	09/28/16 - 01/04/17	< 2	< 2	< 3	< 2	< 19	< 2	< 2	< 3	< 10
	MEAN	-	-	-	-	-	-	-	-	-
CL-6	12/30/15 - 03/30/16	< 2	< 3	< 6	< 3	< 18	< 2	< 2	< 5	< 9
	03/30/16 - 06/29/16	< 2	< 3	< 5	< 3	< 18	< 2	< 2	< 4	< 10
	06/29/16 - 09/28/16	< 4	< 3	< 4	< 3	< 28	< 3	< 3	< 4	< 14
	09/28/16 - 01/04/17	< 3	< 2	< 4	< 3	< 21	< 2	< 2	< 3	< 10
	MEAN	-	-	-	-	-	-	-	-	-

Table C-VI.3 CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

SITE	COLLECTION PERIOD	Co-60	Nb-95	Zr-95	Ru-103	Ru-106	Cs-134	Cs-137	Ce-141	Ce-144
CL-7	12/30/15 - 03/30/16	< 3	< 3	< 4	< 4	< 17	< 2	< 2	< 5	< 9
	03/30/16 - 06/29/16	< 2	< 2	< 4	< 2	< 18	< 2	< 2	< 4	< 8
	06/29/16 - 09/28/16	< 3	< 2	< 4	< 2	< 20	< 2	< 2	< 2	< 9
	09/28/16 - 01/04/17	< 2	< 3	< 6	< 4	< 28	< 3	< 3	< 5	< 14
	MEAN	-	-	-	-	-	-	-	-	-
CL-8	12/30/15 - 03/30/16	< 2	< 2	< 6	< 4	< 22	< 2	< 2	< 5	< 8
	03/30/16 - 06/29/16	< 2	< 3	< 5	< 3	< 22	< 2	< 2	< 4	< 10
	06/29/16 - 09/28/16	< 2	< 3	< 5	< 3	< 15	< 3	< 2	< 3	< 10
	09/28/16 - 01/04/17	< 3	< 2	< 4	< 2	< 20	< 2	< 2	< 3	< 9
	MEAN	-	-	-	-	-	-	-	-	-
CL-11	12/30/15 - 03/30/16	< 3	< 4	< 7	< 4	< 24	< 2	< 2	< 5	< 12
	03/30/16 - 06/29/16	< 2	< 2	< 5	< 2	< 19	< 2	< 2	< 4	< 8
	06/29/16 - 09/28/16	< 3	< 2	< 4	< 2	< 18	< 2	< 2	< 3	< 8
	09/28/16 - 01/04/17	< 2	< 3	< 4	< 2	< 27	< 2	< 3	< 3	< 12
	MEAN	-	-	-	-	-	-	-	-	-
CL-15	12/30/15 - 03/30/16	< 2	< 3	< 6	< 4	< 21	< 3	< 3	< 6	< 10
	03/30/16 - 06/29/16	< 3	< 4	< 7	< 4	< 27	< 3	< 3	< 6	< 15
	06/29/16 - 09/28/16	< 4	< 3	< 4	< 3	< 24	< 4	< 3	< 4	< 13
	09/28/16 - 01/04/17	< 3	< 2	< 4	< 3	< 20	< 2	< 2	< 3	< 13
	MEAN	-	-	-	-	-	-	-	-	-
CL-94	12/30/15 - 03/30/16	< 4	< 5	< 7	< 7	< 38	< 4	< 4	< 8	< 16
	03/30/16 - 06/29/16	< 3	< 3	< 6	< 4	< 26	< 3	< 2	< 4	< 11
	06/29/16 - 09/28/16	< 2	< 2	< 4	< 2	< 20	< 2	< 3	< 2	< 9
	09/28/16 - 01/04/17	< 3	< 2	< 4	< 2	< 19	< 2	< 2	< 4	< 13
	MEAN	-	-	-	-	-	-	-	-	-

Table C-VII.1 CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

COLLECTION PERIOD	GROUP I					
	CL-2	CL-3	CL-4	CL-6	CL-15	CL-94
12/30/15 - 01/06/16	< 68	< 70	< 69	< 69	< 18	< 53
01/06/16 - 01/13/16	< 20	< 20	< 20	< 20	< 23	< 23
01/13/16 - 01/20/16	< 57	< 57	< 56	< 61	< 61	< 62
01/20/16 - 01/27/16	< 49	< 49	< 19	< 49	< 65	< 64
01/27/16 - 02/03/16	< 66	< 68	< 69	< 65	< 48	< 48
02/03/16 - 02/10/16	< 26	< 47	< 47	< 47	< 25	< 61
02/10/16 - 02/17/16	< 29	< 30	< 30	< 16	< 14	< 34
02/17/16 - 02/25/16	< 25	< 64	< 64	< 63	< 52	< 52
02/24/16 - 03/02/16	< 45	< 45	< 46	< 45	< 47	< 46
03/02/16 - 03/09/16	< 68	< 68	< 69	< 69	< 27	< 54
03/09/16 - 03/16/16	< 28	< 28	< 28	< 12	< 26	< 10
03/16/16 - 03/23/16	< 58	< 21	< 21	< 21	< 65	< 65
03/23/16 - 03/30/16	< 51	< 53	< 52	< 52	< 61	< 60
03/30/16 - 04/06/16	< 17	< 40	< 40	< 40	< 38	< 38
04/06/16 - 04/13/16	< 18	< 18	< 18	< 18	< 23	< 23
04/13/16 - 04/20/16	< 56	< 56	< 57	< 30	< 62	< 61
04/20/16 - 04/27/16	< 47	< 46	< 46	< 24	< 61	< 61
04/27/16 - 05/04/16	< 34	< 34	< 34	< 35	< 40	< 39
05/04/16 - 05/11/16	< 53	< 52	< 52	< 22	< 32	< 12
05/11/16 - 05/18/16	< 62	< 62	< 62	< 62	< 69	< 68
05/18/16 - 05/25/16	< 57	< 58	< 57	< 56	< 61	< 63
05/25/16 - 06/01/16	< 33	< 34	< 34	< 33	< 49	< 47
06/01/16 - 06/08/16	< 63	< 61	< 61	< 23	< 67	< 66
06/08/16 - 06/15/16	< 67	< 68	< 68	< 68	< 66	< 67
06/15/16 - 06/22/16	< 52	< 51	< 51	< 53	< 26	< 51
06/22/16 - 06/29/16	< 63	< 64	< 63	< 28	< 70	< 66
06/29/16 - 07/06/16	< 49	< 50	< 51	< 51	< 63	< 63
07/06/16 - 07/13/16	< 56	< 57	< 56	< 56	< 23	< 58
07/13/16 - 07/20/16	< 43	< 43	< 43	< 24	< 63	< 25
07/20/16 - 07/27/16	< 66	< 66	< 25	< 66	< 67	< 65
07/27/16 - 08/03/16	< 49	< 49	< 49	< 48	< 62	< 62
08/03/16 - 08/10/16	< 44	< 44	< 44	< 44	< 46	< 44
08/10/16 - 08/17/16	< 46	< 47	< 25	< 46	< 56	< 56
08/17/16 - 08/24/16	< 55	< 54	< 54	< 54	< 43	< 43
08/24/16 - 08/31/16	< 61	< 62	< 61	< 61	< 60	< 59
08/31/16 - 09/07/16	< 49	< 49	< 49	< 49	< 66	< 66
09/07/16 - 09/14/16	< 63	< 62	< 62	< 62	< 44	< 44
09/14/16 - 09/21/16	< 52	< 55	< 54	< 55	< 40	< 39
09/21/16 - 09/28/16	< 47	< 48	< 49	< 19	< 44	< 17
09/28/16 - 10/05/16	< 59	< 61	< 60	< 60	< 56	< 57
10/05/16 - 10/12/16	< 42	< 43	< 43	< 43	< 34	< 13
10/12/16 - 10/19/16	< 54	< 53	< 54	< 54	< 47	< 47
10/19/16 - 10/26/16	< 62	< 63	< 63	< 26	< 61	< 61
10/26/16 - 11/02/16	< 60	< 61	< 60	< 21	< 68	< 68
11/02/16 - 11/09/16	< 45	< 45	< 45	< 19	< 40	< 40
11/09/16 - 11/16/16	< 25	< 25	< 25	< 10	< 29	< 13
11/16/16 - 11/23/16	< 59	< 61	< 61	< 60	< 47	< 47
11/23/16 - 11/30/16	< 43	< 43	< 43	< 18	< 45	< 45
11/30/16 - 12/07/16	< 17	< 40	< 41	< 40	< 38	< 38
12/07/16 - 12/14/16	< 44	< 18	< 45	< 45	< 46	< 45
12/14/16 - 12/21/16	< 49	< 22	< 49	< 50	< 69	< 34
12/21/16 - 12/28/16	< 38	< 39	< 38	< 38	< 36	< 35
12/28/16 - 01/04/17	< 37	< 36	< 37	< 37	< 45	< 43
MEAN	-	-	-	-	-	-

Table C-VII.1 CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF E-3 PCI/CU METER ± 2 SIGMA

COLLECTION PERIOD	GROUP II			GROUP III
	CL-1	CL-7	CL-8	CL-11
12/30/15 - 01/06/16	< 30	< 53	< 54	< 54
01/06/16 - 01/13/16	< 8	< 10	< 23	< 22
01/13/16 - 01/20/16	< 57	< 61	< 60	< 60
01/20/16 - 01/27/16	< 49	< 66	< 66	< 27
01/27/16 - 02/03/16	< 35	< 26	< 48	< 48
02/03/16 - 02/10/16	< 48	< 61	< 61	< 61
02/10/16 - 02/17/16	< 30	< 34	< 34	< 34
02/17/16 - 02/25/16	< 64	< 52	< 52	< 17
02/24/16 - 03/02/16	< 24	< 46	< 25	< 55
03/02/16 - 03/09/16	< 29	< 54	< 54	< 54
03/09/16 - 03/16/16	< 29	< 27	< 27	< 27
03/16/16 - 03/23/16	< 8	< 65	< 65	< 27
03/23/16 - 03/30/16	< 29	< 32	< 60	< 60
03/30/16 - 04/06/16	< 40	< 21	< 38	< 38
04/06/16 - 04/13/16	< 7	< 23	< 9	< 23
04/13/16 - 04/20/16	< 56	< 60	< 26	< 60
04/20/16 - 04/27/16	< 46	< 62	< 62	< 33
04/27/16 - 05/04/16	< 15	< 20	< 40	< 39
05/04/16 - 05/11/16	< 52	< 31	< 32	< 32
05/11/16 - 05/18/16	< 25	< 28	< 68	< 68
05/18/16 - 05/25/16	< 32	< 25	< 63	< 64
05/25/16 - 06/01/16	< 13	< 47	< 47	< 19
06/01/16 - 06/08/16	< 62	< 65	< 35	< 65
06/08/16 - 06/15/16	< 37	< 24	< 67	< 67
06/15/16 - 06/22/16	< 28	< 51	< 51	< 50
06/22/16 - 06/29/16	< 27	< 67	< 62	< 67
06/29/16 - 07/06/16	< 19	< 64	< 25	< 66
07/06/16 - 07/13/16	< 22	< 59	< 59	< 61
07/13/16 - 07/20/16	< 43	< 63	< 63	< 63
07/20/16 - 07/27/16	< 67	< 65	< 27	< 64
07/27/16 - 08/03/16	< 19	< 34	< 61	< 61
08/03/16 - 08/10/16	< 24	< 20	< 44	< 44
08/10/16 - 08/17/16	< 47	< 56	< 60	< 60
08/17/16 - 08/24/16	< 23	< 17	< 44	< 43
08/24/16 - 08/31/16	< 26	< 27	< 59	< 60
08/31/16 - 09/07/16	< 20	< 26	< 66	< 66
09/07/16 - 09/14/16	< 27	< 17	< 44	< 44
09/14/16 - 09/21/16	< 23	< 39	< 17	< 39
09/21/16 - 09/28/16	< 47	< 43	< 44	< 43
09/28/16 - 10/05/16	< 21	< 25	< 57	< 57
10/05/16 - 10/12/16	< 18	< 34	< 34	< 34
10/12/16 - 10/19/16	< 23	< 18	< 47	< 47
10/19/16 - 10/26/16	< 63	< 23	< 61	< 60
10/26/16 - 11/02/16	< 60	< 34	< 68	< 67
11/02/16 - 11/09/16	< 45	< 41	< 16	< 40
11/09/16 - 11/16/16	< 25	< 29	< 29	< 29
11/16/16 - 11/23/16	< 21	< 46	< 21	< 48
11/23/16 - 11/30/16	< 44	< 17	< 45	< 44
11/30/16 - 12/07/16	< 41	< 38	< 38	< 15
12/07/16 - 12/14/16	< 44	< 17	< 45	< 45
12/14/16 - 12/21/16	< 49	< 68	< 68	< 66
12/21/16 - 12/28/16	< 16	< 34	< 34	< 13
12/28/16 - 01/04/17	< 13	< 20	< 44	< 44
MEAN	-	-	-	-

Table C-VIII.1 CONCENTRATIONS OF I-131 IN MILK SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CONTROL FARM CL-116
01/27/16	< 0.8
02/24/16	< 0.6
03/30/16	< 0.6
04/27/16	< 0.7
05/11/16	< 0.5
05/25/16	< 1.0
06/08/16	< 0.7
06/22/16	< 0.6
07/06/16	< 0.7
07/20/16	< 1.0
08/03/16	< 0.7
08/17/16	< 0.4
08/31/16	< 0.7
09/14/16	< 0.9
09/28/16	< 0.9
10/12/16	< 0.8
10/26/16	< 0.7
11/30/16	< 0.7
12/28/16	< 0.8
MEAN	-

Table C-VIII.2

CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140	Ce-144
CL-116	01/27/16	1241 ± 191	< 10	< 8	< 18	< 6	< 19	< 9	< 14	< 7	< 8	< 43	< 14	< 74
	02/24/16	1332 ± 205	< 11	< 10	< 20	< 11	< 21	< 9	< 13	< 9	< 11	< 38	< 15	< 66
	03/30/16	1270 ± 180	< 10	< 9	< 19	< 8	< 23	< 9	< 15	< 9	< 8	< 47	< 14	< 63
	04/27/16	1099 ± 183	< 9	< 11	< 15	< 9	< 15	< 10	< 13	< 6	< 8	< 32	< 14	< 57
	05/11/16	1172 ± 149	< 7	< 7	< 16	< 8	< 16	< 7	< 13	< 6	< 6	< 40	< 10	< 51
	05/25/16	984 ± 89	< 3	< 4	< 8	< 4	< 7	< 4	< 7	< 3	< 4	< 19	< 5	< 27
	06/08/16	887 ± 121	< 6	< 6	< 13	< 6	< 12	< 6	< 9	< 5	< 6	< 33	< 9	< 43
	06/22/16	1345 ± 191	< 6	< 8	< 14	< 6	< 13	< 7	< 12	< 7	< 6	< 33	< 10	< 50
	07/06/16	1074 ± 216	< 11	< 9	< 22	< 10	< 20	< 9	< 16	< 10	< 10	< 41	< 10	< 56
	07/20/16	1105 ± 157	< 9	< 10	< 22	< 10	< 22	< 12	< 15	< 12	< 11	< 47	< 13	< 95
	08/03/16	1351 ± 178	< 7	< 8	< 23	< 6	< 16	< 8	< 17	< 8	< 8	< 41	< 13	< 63
	08/17/16	1210 ± 167	< 6	< 6	< 17	< 6	< 16	< 7	< 12	< 6	< 7	< 34	< 9	< 55
	08/31/16	1363 ± 204	< 9	< 8	< 16	< 8	< 21	< 11	< 14	< 6	< 8	< 42	< 12	< 51
	09/14/16	1132 ± 146	< 6	< 5	< 14	< 6	< 13	< 6	< 9	< 5	< 4	< 25	< 5	< 47
	09/28/16	1053 ± 139	< 6	< 6	< 13	< 6	< 13	< 6	< 9	< 6	< 7	< 26	< 7	< 42
	10/12/16	1148 ± 158	< 9	< 9	< 18	< 10	< 21	< 10	< 14	< 12	< 12	< 41	< 13	< 92
	10/26/16	1100 ± 164	< 7	< 8	< 18	< 9	< 18	< 10	< 14	< 7	< 7	< 44	< 14	< 47
	11/30/16	1195 ± 157	< 7	< 7	< 13	< 7	< 13	< 6	< 12	< 7	< 7	< 30	< 7	< 48
	12/28/16	1043 ± 161	< 5	< 7	< 14	< 7	< 13	< 7	< 12	< 6	< 7	< 27	< 10	< 49
	MEAN ± 2 STD DEV	1163 ± 264	-	-	-	-	-	-	-	-	-	-	-	

THE MEAN AND TWO STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

Table C-IX.1

CONCENTRATIONS OF GAMMA EMITTERS IN VEGETATION SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140	Ce-144
CL-114														
Cabbage	06/29/16	< 16	< 23	< 45	< 19	< 42	< 19	< 35	< 55	< 20	< 17	< 133	< 42	< 122
Lettuce	06/29/16	< 18	< 19	< 48	< 23	< 49	< 19	< 34	< 60	< 17	< 19	< 124	< 36	< 124
Swiss Chard	06/29/16	< 20	< 21	< 55	< 19	< 47	< 22	< 38	< 59	< 20	< 22	< 137	< 25	< 167
Cabbage	07/27/16	< 19	< 17	< 47	< 15	< 40	< 17	< 34	< 57	< 18	< 19	< 126	< 27	< 116
Lettuce	07/27/16	< 16	< 17	< 45	< 17	< 39	< 19	< 29	< 49	< 14	< 16	< 106	< 29	< 98
Swiss Chard	07/27/16	< 14	< 14	< 35	< 17	< 39	< 15	< 30	< 47	< 14	< 15	< 90	< 24	< 104
Cabbage	08/31/16	< 23	< 34	< 60	< 32	< 63	< 36	< 55	< 58	< 32	< 34	< 196	< 44	< 154
Kale	08/31/16	< 21	< 20	< 49	< 26	< 56	< 17	< 38	< 41	< 22	< 26	< 116	< 39	< 133
Swiss Chard	08/31/16	< 15	< 16	< 39	< 20	< 43	< 17	< 31	< 32	< 17	< 20	< 93	< 18	< 122
Cabbage	09/28/16	< 23	< 27	< 57	< 24	< 56	< 24	< 40	< 40	< 24	< 26	< 123	< 34	< 162
Kale	09/28/16	< 24	< 26	< 54	< 33	< 63	< 39	< 46	< 45	< 28	< 28	< 114	< 43	< 196
Swiss Chard	09/28/16	< 28	< 25	< 51	< 32	< 55	< 39	< 51	< 47	< 29	< 31	< 136	< 32	< 230
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-115														
Cabbage	06/29/16	< 26	< 26	< 58	< 25	< 51	< 26	< 45	< 57	< 22	< 23	< 166	< 49	< 151
Kale	06/29/16	< 17	< 19	< 51	< 18	< 48	< 25	< 34	< 58	< 19	< 20	< 120	< 37	< 119
Cabbage	07/27/16	< 12	< 12	< 29	< 12	< 24	< 13	< 23	< 42	< 12	< 14	< 89	< 25	< 76
Lettuce/Kale	07/27/16	< 16	< 18	< 42	< 17	< 38	< 18	< 30	< 54	< 15	< 18	< 115	< 34	< 104
Swiss Chard	07/27/16	< 21	< 22	< 58	< 21	< 52	< 24	< 40	< 59	< 18	< 21	< 146	< 39	< 101
Golden Rod	08/31/16	< 28	< 34	< 60	< 36	< 71	< 30	< 55	< 60	< 28	< 28	< 137	< 46	< 197
Kale	08/31/16	< 27	< 36	< 58	< 33	< 47	< 29	< 42	< 51	< 24	< 30	< 119	< 31	< 182
Soybeans	08/31/16	< 28	< 32	< 63	< 30	< 70	< 27	< 48	< 60	< 28	< 26	< 137	< 41	< 207
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-117														
Cabbage	06/29/16	< 18	< 19	< 40	< 17	< 42	< 18	< 27	< 45	< 14	< 18	< 103	< 31	< 107
Lettuce	06/29/16	< 22	< 31	< 61	< 32	< 73	< 32	< 51	< 57	< 25	< 29	< 193	< 52	< 167
Swiss Chard	06/29/16	< 17	< 15	< 43	< 20	< 43	< 17	< 31	< 60	< 16	< 18	< 123	< 37	< 119
Cabbage	07/27/16	< 13	< 15	< 38	< 17	< 38	< 15	< 26	< 42	< 14	< 15	< 92	< 29	< 88
Lettuce	07/27/16	< 13	< 14	< 32	< 13	< 34	< 15	< 24	< 45	< 12	< 13	< 89	< 29	< 81
Swiss Chard	07/27/16	< 14	< 13	< 39	< 14	< 28	< 14	< 25	< 44	< 12	< 14	< 93	< 28	< 100
Cabbage	08/31/16	< 17	< 17	< 34	< 20	< 36	< 20	< 27	< 37	< 16	< 20	< 88	< 18	< 103
Kale	08/31/16	< 29	< 30	< 62	< 26	< 54	< 26	< 40	< 50	< 25	< 24	< 138	< 35	< 171
Swiss Chard	08/31/16	< 19	< 20	< 45	< 27	< 52	< 23	< 37	< 42	< 17	< 21	< 93	< 31	< 123
Cabbage	09/28/16	< 37	< 31	< 69	< 29	< 82	< 41	< 57	< 59	< 35	< 35	< 167	< 44	< 228
Kale	09/28/16	< 40	< 31	< 80	< 37	< 89	< 34	< 62	< 51	< 37	< 34	< 151	< 51	< 202
Swiss Chard	09/28/16	< 24	< 25	< 56	< 25	< 56	< 37	< 46	< 41	< 24	< 26	< 116	< 31	< 185
CL-118	*MEAN*	-	-	-	-	-	-	-	-	-	-	-	-	-
Cabbage	06/29/16	< 19	< 20	< 48	< 15	< 49	< 22	< 32	< 59	< 19	< 20	< 130	< 38	< 125
Lettuce	06/29/16	< 20	< 21	< 47	< 24	< 45	< 21	< 41	< 56	< 21	< 22	< 141	< 30	< 127
Swiss Chard	06/29/16	< 18	< 16	< 42	< 20	< 42	< 18	< 32	< 59	< 14	< 19	< 109	< 31	< 120
Cabbage	07/27/16	< 8	< 9	< 21	< 8	< 20	< 9	< 15	< 28	< 8	< 8	< 63	< 18	< 51
Lettuce	07/27/16	< 15	< 18	< 37	< 17	< 44	< 18	< 33	< 55	< 15	< 16	< 115	< 30	< 114
iss Chard/lettuce	07/27/16	< 16	< 16	< 35	< 14	< 37	< 18	< 29	< 57	< 18	< 16	< 128	< 29	< 135
Cabbage	08/31/16	< 12	< 13	< 27	< 13	< 28	< 14	< 24	< 26	< 12	< 14	< 73	< 18	< 81
Flowers/lettuce	08/31/16	< 32	< 22	< 68	< 33	< 61	< 34	< 53	< 57	< 26	< 34	< 161	< 27	< 178
Lettuce	08/31/16	< 21	< 21	< 50	< 19	< 48	< 21	< 37	< 49	< 19	< 21	< 121	< 32	< 93
Cabbage	09/28/16	< 35	< 38	< 81	< 39	< 89	< 44	< 73	< 59	< 35	< 46	< 167	< 62	< 219
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C-IX.2

CONCENTRATIONS OF GAMMA EMITTERS IN GRASS SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140	Ce-144
CL-01	05/11/16	< 24	< 25	< 60	< 24	< 59	< 24	< 49	< 39	< 25	< 26	< 130	< 39	< 168
	05/25/16	< 4	< 5	< 12	< 5	< 11	< 5	< 8	< 22	< 4	< 4	< 42	< 10	< 31
	06/08/16	< 30	< 34	< 55	< 30	< 69	< 30	< 61	< 56	< 30	< 27	< 144	< 41	< 203
	06/22/16	< 24	< 24	< 56	< 24	< 49	< 31	< 44	< 48	< 22	< 26	< 104	< 42	< 158
	07/06/16	< 37	< 35	< 74	< 32	< 95	< 46	< 64	< 52	< 39	< 42	< 159	< 65	< 231
	07/20/16	< 38	< 39	< 87	< 46	< 112	< 39	< 63	< 55	< 35	< 49	< 176	< 58	< 311
	08/03/16	< 19	< 19	< 44	< 16	< 45	< 20	< 32	< 51	< 17	< 20	< 109	< 31	< 89
	08/17/16	< 6	< 5	< 14	< 7	< 14	< 6	< 10	< 9	< 6	< 6	< 26	< 7	< 40
	08/31/16	< 30	< 39	< 76	< 35	< 82	< 45	< 64	< 53	< 32	< 33	< 146	< 46	< 227
	09/14/16	< 33	< 31	< 64	< 38	< 76	< 37	< 55	< 60	< 38	< 34	< 188	< 47	< 227
	09/28/16	< 24	< 29	< 52	< 28	< 61	< 39	< 49	< 46	< 24	< 26	< 137	< 37	< 196
	10/12/16	< 34	< 33	< 77	< 26	< 79	< 35	< 60	< 47	< 33	< 38	< 121	< 48	< 156
	10/26/16	< 20	< 22	< 45	< 22	< 46	< 21	< 42	< 58	< 19	< 21	< 143	< 44	< 129
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-02	05/11/16	< 24	< 21	< 55	< 25	< 51	< 27	< 47	< 40	< 26	< 28	< 121	< 33	< 180
	05/25/16	< 7	< 7	< 16	< 6	< 15	< 7	< 13	< 32	< 6	< 7	< 61	< 16	< 47
	06/08/16	< 26	< 30	< 65	< 26	< 83	< 32	< 47	< 54	< 30	< 27	< 145	< 33	< 184
	06/22/16	< 19	< 22	< 39	< 23	< 45	< 23	< 31	< 39	< 21	< 22	< 119	< 29	< 164
	07/06/16	< 34	< 44	< 77	< 48	< 118	< 41	< 76	< 57	< 43	< 33	< 142	< 73	< 228
	07/20/16	< 32	< 32	< 66	< 29	< 66	< 33	< 55	< 54	< 34	< 38	< 140	< 40	< 218
	08/03/16	< 16	< 20	< 47	< 17	< 42	< 20	< 30	< 43	< 17	< 18	< 112	< 28	< 81
	08/17/16	< 11	< 12	< 24	< 13	< 26	< 12	< 21	< 17	< 11	< 12	< 52	< 14	< 55
	08/31/16	< 33	< 35	< 88	< 36	< 82	< 39	< 64	< 57	< 34	< 35	< 166	< 47	< 169
	09/14/16	< 34	< 38	< 93	< 45	< 85	< 41	< 66	< 55	< 41	< 41	< 185	< 47	< 180
	09/28/16	< 37	< 34	< 79	< 40	< 85	< 40	< 58	< 58	< 35	< 36	< 168	< 54	< 218
	10/12/16	< 27	< 28	< 60	< 30	< 58	< 28	< 41	< 35	< 26	< 29	< 110	< 38	< 175
	10/26/16	< 20	< 20	< 45	< 16	< 43	< 23	< 36	< 60	< 18	< 20	< 133	< 34	< 204
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C-IX.2

CONCENTRATIONS OF GAMMA EMITTERS IN GRASS SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2016

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

SITE	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140	Ce-144
CL-08	05/11/16	< 27	< 27	< 56	< 30	< 54	< 25	< 45	< 45	< 27	< 26	< 127	< 36	< 172
	05/25/16	< 8	< 9	< 23	< 8	< 20	< 9	< 16	< 38	< 7	< 8	< 70	< 20	< 40
	06/08/16	< 29	< 26	< 55	< 25	< 57	< 28	< 43	< 60	< 21	< 27	< 128	< 41	< 187
	06/22/16	< 27	< 32	< 75	< 38	< 63	< 37	< 45	< 49	< 28	< 33	< 144	< 47	< 195
	07/06/16	< 34	< 32	< 77	< 36	< 82	< 39	< 65	< 56	< 32	< 38	< 179	< 51	< 166
	07/20/16	< 35	< 33	< 62	< 26	< 82	< 31	< 51	< 52	< 25	< 31	< 109	< 30	< 175
	08/03/16	< 18	< 19	< 43	< 16	< 41	< 20	< 34	< 58	< 19	< 19	< 125	< 26	< 156
	08/17/16	< 9	< 8	< 19	< 9	< 21	< 9	< 15	< 14	< 8	< 9	< 39	< 9	< 62
	08/31/16	< 31	< 32	< 65	< 31	< 65	< 36	< 53	< 58	< 30	< 30	< 149	< 38	< 229
	09/14/16	< 35	< 32	< 73	< 31	< 80	< 34	< 61	< 49	< 36	< 33	< 156	< 29	< 234
	09/28/16	< 30	< 30	< 68	< 32	< 62	< 38	< 57	< 48	< 33	< 31	< 146	< 47	< 216
	10/12/16	< 37	< 42	< 75	< 35	< 89	< 47	< 70	< 59	< 38	< 37	< 165	< 39	< 251
	10/26/16	< 19	< 19	< 47	< 20	< 47	< 24	< 38	< 60	< 20	< 21	< 132	< 38	< 127
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-116	05/11/16	< 30	< 34	< 74	< 23	< 65	< 30	< 51	< 51	< 33	< 39	< 175	< 32	< 226
	05/25/16	< 7	< 8	< 18	< 7	< 16	< 8	< 15	< 40	< 7	< 8	< 75	< 18	< 57
	06/08/16	< 25	< 31	< 67	< 26	< 65	< 30	< 58	< 60	< 26	< 29	< 155	< 42	< 217
	06/22/16	< 30	< 27	< 59	< 27	< 62	< 25	< 45	< 43	< 24	< 25	< 149	< 36	< 186
	07/06/16	< 26	< 20	< 46	< 33	< 55	< 26	< 44	< 44	< 23	< 28	< 138	< 41	< 194
	07/20/16	< 33	< 35	< 85	< 38	< 59	< 31	< 73	< 60	< 36	< 44	< 170	< 48	< 234
	08/03/16	< 14	< 15	< 35	< 14	< 32	< 15	< 26	< 44	< 14	< 15	< 93	< 26	< 105
	08/17/16	< 5	< 6	< 13	< 6	< 13	< 6	< 10	< 8	< 5	< 6	< 25	< 7	< 34
	08/31/16	< 29	< 29	< 65	< 36	< 67	< 33	< 49	< 58	< 26	< 32	< 142	< 41	< 182
	09/14/16	< 32	< 30	< 73	< 32	< 77	< 38	< 55	< 57	< 37	< 39	< 151	< 52	< 245
	09/28/16	< 30	< 36	< 79	< 30	< 70	< 33	< 59	< 53	< 34	< 30	< 143	< 39	< 200
	10/12/16	< 30	< 29	< 62	< 34	< 56	< 30	< 49	< 38	< 24	< 29	< 115	< 33	< 169
	10/26/16	< 19	< 21	< 45	< 20	< 47	< 24	< 37	< 54	< 18	< 21	< 126	< 36	< 135
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C-X.1 QUARTERLY DLR RESULTS FOR CLINTON POWER STATION, 2016

RESULTS IN UNITS OF MILLIREM/QUARTER ± 2 STANDARD DEVIATIONS

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC
CL-01	23.5 ± 2.8	22.9	24.2	21.8	25.0
CL-02	24.2 ± 3.4	23.5	24.2	22.6	26.6
CL-03	23.1 ± 2.9	21.5	23.7	22.5	24.8
CL-04	22.6 ± 3.2	21.0	24.6	23.0	21.7
CL-05	24.4 ± 1.1	24.2	24.6	23.7	25.0
CL-06	21.4 ± 2.2	20.0	21.2	21.8	22.6
CL-07	22.4 ± 2.5	21.1	21.7	22.7	24.0
CL-08	23.5 ± 2.5	22.4	24.2	22.4	24.9
CL-11	21.9 ± 1.5	21.2	22.8	21.4	22.1
CL-15	21.3 ± 0.7	21.0	21.3	21.1	21.8
CL-22	24.2 ± 2.2	23.1	25.1	23.3	25.1
CL-23	25.4 ± 2.0	24.3	26.1	24.8	26.4
CL-24	24.9 ± 2.5	24.0	24.0	24.9	26.6
CL-33	25.1 ± 3.7	23.9	23.6	25.1	27.7
CL-34	23.2 ± 2.8	25.1	22.9	21.8	23.0
CL-35	22.7 ± 2.4	21.3	22.7	22.4	24.2
CL-36	23.6 ± 1.9	22.5	23.3	23.9	24.7
CL-37	23.6 ± 2.9	22.1	24.5	22.5	25.1
CL-41	25.3 ± 3.2	23.6	25.2	24.8	27.4
CL-42	23.4 ± 1.6	22.6	23.5	23.0	24.5
CL-43	24.2 ± 2.4	23.3	24.0	23.6	26.0
CL-44	23.7 ± 2.8	22.2	24.2	22.9	25.4
CL-45	25.1 ± 4.0	23.5	24.6	24.2	28.0
CL-46	23.1 ± 2.6	21.7	22.5	23.2	24.8
CL-47	25.3 ± 1.5	24.5	25.4	25.1	26.3
CL-48	23.8 ± 4.0	21.2	24.9	23.4	25.7
CL-49	25.0 ± 3.0	23.7	24.6	24.4	27.1
CL-51	25.2 ± 2.7	24.8	25.5	23.7	26.9
CL-52	25.0 ± 2.6	23.6	24.5	25.2	26.7
CL-53	23.2 ± 2.6	21.3	23.8	23.8	24.0
CL-54	24.6 ± 2.9	23.3	25.5	23.4	26.1
CL-55	24.5 ± 4.0	22.0	25.5	23.9	26.6
CL-56	24.9 ± 1.4	24.1	25.3	24.6	25.7
CL-57	25.0 ± 2.3	23.9	24.9	24.4	26.6
CL-58	24.8 ± 2.1	23.4	25.6	24.6	25.7
CL-60	25.1 ± 1.8	23.9	25.4	25.2	26.0
CL-61	25.1 ± 3.6	23.9	25.1	23.8	27.7
CL-63	21.4 ± 2.1	20.6	21.0	21.1	23.0
CL-64	23.8 ± 3.4	22.2	26.2	23.3	23.3
CL-65	25.3 ± 2.2	24.7	25.4	24.2	26.7
CL-74	22.0 ± 1.5	21.4	22.4	21.2	22.8
CL-75	23.8 ± 3.1	22.1	24.6	23.0	25.6
CL-76	25.0 ± 2.3	24.5	25.4	23.8	26.4
CL-77	23.7 ± 3.8	22.2	25.5	21.9	25.1
CL-78	22.8 ± 2.2	22.1	22.4	22.1	24.4
CL-79	24.1 ± 3.0	22.0	24.2	24.4	25.6
CL-80	23.4 ± 2.6	23.7	22.1	22.6	25.0
CL-81	24.6 ± 2.9	23.3	25.4	23.4	26.2
CL-84	24.4 ± 2.7	22.7	24.8	24.0	25.9
CL-90	20.5 ± 1.5	19.7	21.0	20.0	21.3
CL-91	21.9 ± 2.9	19.9	22.3	22.1	23.3
CL-97	24.8 ± 3.0	23.6	24.7	23.9	26.9
CL-99	20.3 ± 2.8	19.2	20.5	19.3	22.2
CL-114	23.4 ± 3.4	21.8	24.3	22.2	25.3

TABLE C-X.2 MEAN QUARTLY DLR RESULTS FOR THE INNER RING, OUTER RING, SPECIAL INTEREST SUPPLEMENTAL AND CONTROL LOCATIONS FOR CLINTON POWER STATION, 2016

RESULTS IN UNITS OF MILLIREM/QUARTER ± 2 STANDARD DEVIATIONS OF THE STATION DATA

COLLECTION PERIOD	INNER RING ± 2 S.D.	OUTER RING	SPECIAL INTEREST	SUPPLEMENTAL	CONTROL
JAN-MAR	22.9 ± 2.6	23.3 ± 2.0	22.8 ± 2.4	21.5 ± 3.1	21.2 ± 0.0
APR-JUN	23.9 ± 2.5	24.8 ± 2.2	24.7 ± 2.4	23.0 ± 3.2	22.8 ± 0.0
JUL-SEP	23.3 ± 2.3	23.8 ± 1.9	23.3 ± 2.5	22.3 ± 3.0	21.4 ± 0.0
OCT-DEC	25.2 ± 2.6	25.9 ± 1.9	25.4 ± 3.6	24.2 ± 4.2	22.1 ± 0.0

TABLE C-X.3 SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR CLINTON POWER STATION, 2016

RESULTS IN UNITS OF MILLIREM/QUARTER ± 2 STANDARD DEVIATION

LOCATION	SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 S.D.	PRE-OP MEAN ± 2 S.D, ALL LOCATIONS
INNER RING	64	20.6	28.0	23.9 ± 3.0	
OUTER RING	64	21.3	27.7	24.4 ± 2.8	18.0 ± 2.4
SPECIAL INTEREST	28	21.2	27.4	24.1 ± 3.4	
SUPPLEMENTAL	56	19.2	27.7	22.8 ± 3.9	
CONTROL	4	21.2	22.8	21.9 ± 1.5	

INNER RING STATIONS - CL-01, CL-05, CL-22, CL-23, CL-24, CL-34, CL-35, CL-36, CL-42, CL-43, CL-44, CL-45, CL-46, CL-47, CL-48, CL-63

OUTER RING STATIONS - CL-51, CL-52, CL-53, CL-54, CL-55, CL-56, CL-57, CL-58, CL-60, CL-61, CL-76, CL-77, CL-78, CL-79, CL-80, CL-81

SPECIAL INTEREST STATIONS - CL-37, CL-41, CL-49, CL-64, CL-65, CL-74, CL-75

SUPPLEMENTAL STATIONS - CL-02, CL-03, CL-04, CL-06, CL-07, CL-08, CL-114, CL-15, CL-33, CL-84, CL-90, CL-91, CL-97, CL-99

CONTROL STATIONS - CL-11

FIGURE C-1
MEAN MONTHLY GROSS BETA CONCENTRATION IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CPS, 2016

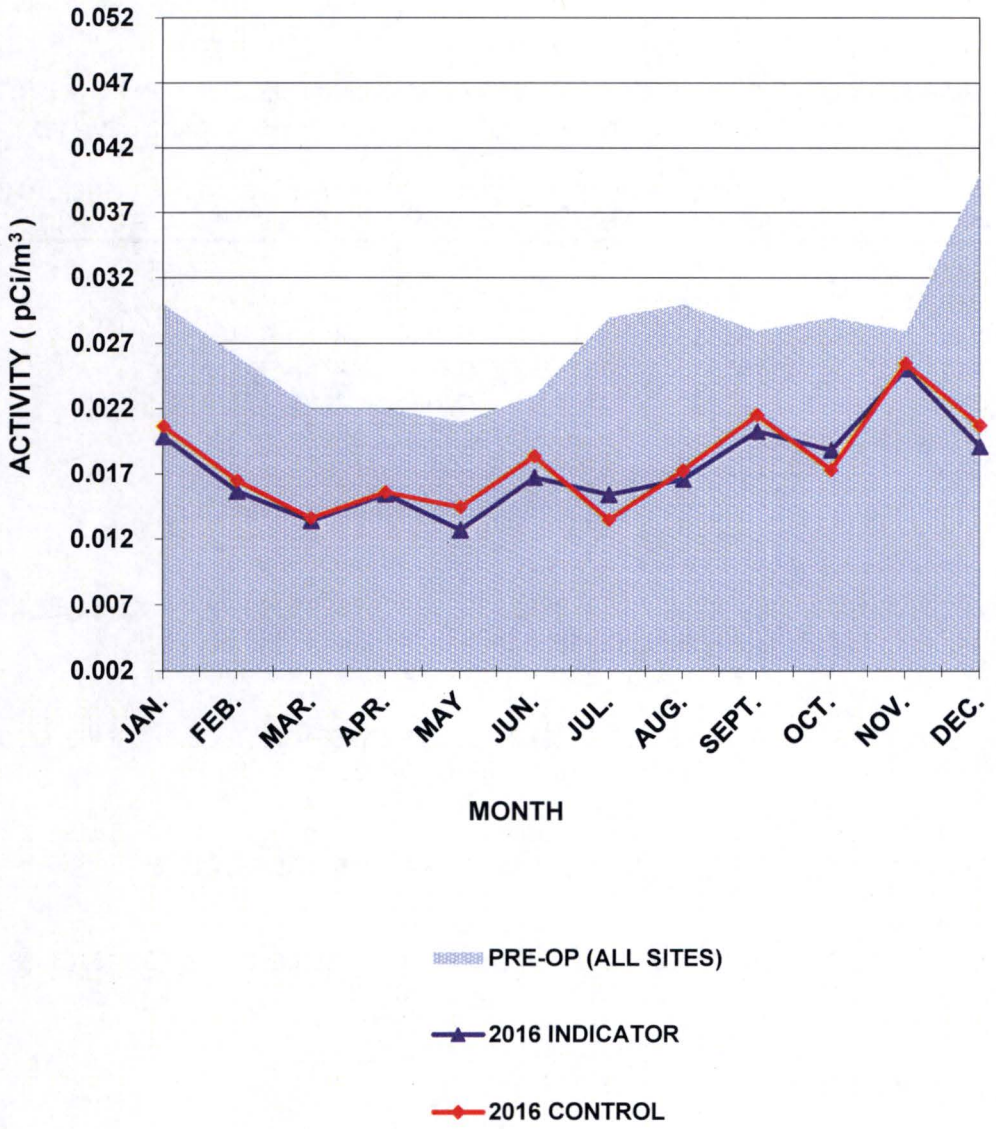
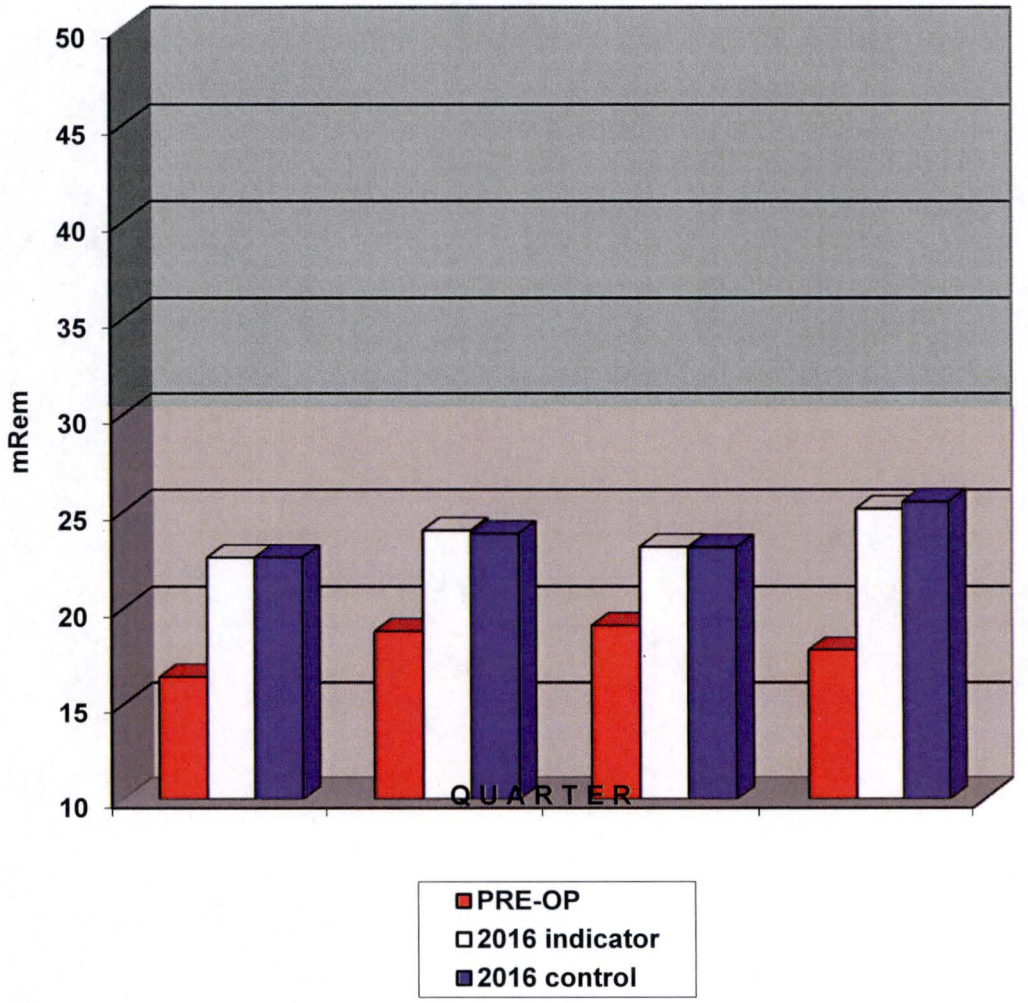


FIGURE C-2
MEAN QUARTERLY AMBIENT GAMMA RADIATION LEVELS (DLR) IN THE VICINITY OF CPS, 2016



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APPENDIX D

INTER-LABORATORY COMPARISON PROGRAM

TABLE D-1

ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES
(PAGE 1 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
March 2016	E11476	Milk	Sr-89	pCi/L	97	86.7	1.12	A
			Sr-90	pCi/L	15	11.4	1.32	N(2)
	E11477	Milk	I-131	pCi/L	85.9	82.2	1.05	A
			Ce-141	pCi/L	106	98.4	1.08	A
			Cr-51	pCi/L	255	243	1.05	A
			Cs-134	pCi/L	134	130	1.03	A
			Cs-137	pCi/L	174	161	1.08	A
			Co-58	pCi/L	123	117	1.05	A
			Mn-54	pCi/L	141	117	1.21	W
			Fe-59	pCi/L	152	131	1.16	A
			Zn-65	pCi/L	193	179	1.08	A
			Co-60	pCi/L	259	244	1.06	A
	E11479	AP	Ce-141	pCi	69	81.1	0.85	A
			Cr-51	pCi	242	201	1.20	W
			Cs-134	pCi	98.1	107.0	0.92	A
			Cs-137	pCi	136	133	1.02	A
			Co-58	pCi	91.9	97	0.95	A
			Mn-54	pCi	98.6	96.2	1.02	A
			Fe-59	pCi	98.8	108	0.91	A
			Zn-65	pCi	131	147	0.89	A
			Co-60	pCi	209	201	1.04	A
	E11478	Charcoal	I-131	pCi	85.3	88.3	0.97	A
	E11480	Water	Fe-55	pCi/L	1800	1666	1.08	A
June 2016	E11537	Milk	Sr-89	pCi/L	94.4	94.4	1.00	A
			Sr-90	pCi/L	13.4	15.4	0.87	A
	E11538	Milk	I-131	pCi/L	96.8	94.5	1.02	A
			Ce-141	pCi/L	129	139	0.93	A
			Cr-51	pCi/L	240	276	0.87	A
			Cs-134	pCi/L	157	174	0.90	A
			Cs-137	pCi/L	117	120	0.98	A
			Co-58	pCi/L	131	142	0.92	A
			Mn-54	pCi/L	128	125	1.02	A
			Fe-59	pCi/L	132	122	1.08	A
			Zn-65	pCi/L	235	235	1.00	A
			Co-60	pCi/L	169	173	0.98	A
June 2016	E11539	Charcoal	I-131	pCi	86.1	89.4	0.96	A
	E11540	AP	Ce-141	pCi	105	99.8	1.05	A
			Cr-51	pCi	216	198.0	1.09	A
			Cs-134	pCi	113	125	0.90	A
			Cs-137	pCi	94.5	86.6	1.09	A
			Co-58	pCi	101	102	0.99	A
			Mn-54	pCi	88.8	90.2	0.98	A
			Fe-59	pCi	82	87.5	0.94	A
			Zn-65	pCi	174	169	1.03	A
			Co-60	pCi	143	124	1.15	A
	E11541	Water	Fe-55	pCi/L	164	186	0.88	A

TABLE D-1 **ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM**
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES
(PAGE 2 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
September 2016	E11609	Milk	Sr-89	pCi/L	90	90.9	0.99	A
			Sr-90	pCi/L	13.3	13.7	0.97	A
	E11610	Milk	I-131	pCi/L	80.4	71.9	1.12	A
			Ce-141	pCi/L	81.3	93	0.87	A
			Cr-51	pCi/L	198	236	0.84	A
			Cs-134	pCi/L	122	136	0.90	A
			Cs-137	pCi/L	119	119	1.00	A
			Co-58	pCi/L	92.2	97.4	0.95	A
			Mn-54	pCi/L	156	152	1.03	A
			Fe-59	pCi/L	97.5	90.6	1.08	A
			Zn-65	pCi/L	189	179	1.06	A
			Co-60	pCi/L	131	135	0.97	A
	E11611	Charcoal	I-131	pCi	52.4	59.9	0.87	A
	E11612	AP	Ce-141	pCi	67.5	63.6	1.06	A
			Cr-51	pCi	192	161.0	1.19	A
			Cs-134	pCi	91.4	92.6	0.99	A
			Cs-137	pCi	93.9	80.8	1.16	A
			Co-58	pCi	66	66.4	0.99	A
			Mn-54	pCi	104	104	1.00	A
			Fe-59	pCi	60.5	61.8	0.98	A
			Zn-65	pCi	140	122	1.15	A
			Co-60	pCi	119	91.9	1.29	W
	E11613	Water	Fe-55	pCi/L	1990	1670	1.19	A
	E11614	Soil	Ce-141	pCi/g	0.153	0.175	0.87	A
			Cr-51	pCi/g	0.482	0.441	1.09	A
			Cs-134	pCi/g	0.270	0.254	1.06	A
			Cs-137	pCi/g	0.313	0.299	1.05	A
			Co-58	pCi/g	0.177	0.182	0.97	A
			Mn-54	pCi/g	0.340	0.285	1.19	A
			Fe-59	pCi/g	0.206	0.17	1.21	W
			Zn-65	pCi/g	0.388	0.335	1.16	A
			Co-60	pCi/g	0.284	0.252	1.13	A
December 2016	E11699	Milk	Sr-89	pCi/L	95	74.2	1.28	W
			Sr-90	pCi/L	14.7	10	1.47	N(3)
	E11700	Milk	I-131	pCi/L	97.5	97.4	1.00	A
			Ce-141	pCi/L	136	143	0.95	A
			Cr-51	pCi/L	247	280	0.88	A
			Cs-134	pCi/L	164	178	0.92	A
			Cs-137	pCi/L	120	126	0.95	A
			Co-58	pCi/L	139	146	0.95	A
			Mn-54	pCi/L	126	129	0.98	A
			Fe-59	pCi/L	114	125	0.91	A
			Zn-65	pCi/L	237	244	0.97	A
			Co-60	pCi/L	168	178	0.94	A
	E11701	Charcoal	I-131	pCi	95.6	98	0.98	A

TABLE D-1 **ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM**
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES
(PAGE 3 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
December 2016	E11702	AP	Ce-141	pCi	91.7	97.7	0.94	A
			Cr-51	pCi	210	192.0	1.09	A
			Cs-134	pCi	122	122	1.00	A
			Cs-137	pCi	93.9	86.4	1.09	A
			Co-58	pCi	92	100	0.92	A
			Mn-54	pCi	93.7	88.5	1.06	A
			Fe-59	pCi	84.9	84.5	1.00	A
			Zn-65	pCi	176	167	1.05	A
			Co-60	pCi	151	122	1.24	W
	E11702	AP	Sr-89	pCi	79.1	92	0.86	A
			Sr-90	pCi	10	12.5	0.80	A
	E11703	Water	Fe-55	pCi/L	2180	1800	1.21	W

(a) Teledyne Brown Engineering reported result.

(b) The Analytics known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

(c) Ratio of Teledyne Brown Engineering to Analytics results.

(d) Analytics evaluation based on TBE internal QC limits: A= Acceptable, reported result falls within ratio limits of 0.80-1.20. W= Acceptable with warning, reported result falls within 0.70-0.80 or 1.20-1.30. N = Not Acceptable, reported result falls outside the ratio limits of < 0.70 and > 1.30.

(2) NCR 16-26 was initiated

(3) NCR 16-35 was initiated

TABLE D-2 **DOE's MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)**
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES
(PAGE 1 OF 1)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
March 2016	16-MaW34	Water	Am-241	Bq/L	0.008		(1)	A
			Ni-63	Bq/L	12.4	12.3	8.6-16.0	A
			Pu-238	Bq/L	1.4900	1.2440	0.871-1.617	A
			Pu-239/240	Bq/L	0.729	0.641	0.449-0.833	A
	16-MaS34	Soil	Ni-63	Bq/kg	1140	1250.0	875-1625	A
			Sr-90	Bq/kg	8.15		(1)	A
	16-RdF34	AP	U-234/233	Bq/sample	0.1620	0.1650	0.116-0.215	A
			U-238	Bq/sample	0.163	0.172	0.120-0.224	A
	16-GrF34	AP	Gr-A	Bq/sample	0.608	1.20	0.36-2.04	A
			Gr-B	Bq/sample	0.8060	0.79	0.40-1.19	A
	16-RdV34	Vegetation	Cs-134	Bq/sample	10.10	10.62	7.43-13.81	A
			Cs-137	Bq/sample	6.0	5.62	3.93-7.31	A
			Co-57	Bq/sample	13.3000	11.8	8.3-15.3	A
			Co-60	Bq/sample	0.013		(1)	A
			Mn-54	Bq/sample	0.0150		(1)	A
			Sr-90	Bq/sample	0.301		(1)	N(4)
			Zn-65	Bq/sample	10.500	9.6	6.7-12.5	A
September 2016	16-MaW35	Water	Am-241	Bq/L	0.626	0.814	.570-1058	W
			Ni-63	Bq/L	12.4	17.2	12.0-22.4	A
			Pu-238	Bq/L	1.23	1.13	0.79-1.47	W
			Pu-239/240	Bq/L	0.0318	0.013	(1)	A
	16-MaS35	Soil	Ni-63	Bq/kg	724	990	693-1287	A
			Sr-90	Bq/kg	747	894	626-1162	A
	16-RdF35	AP	U-234/233	Bq/sample	0.160	0.15	0.105-0.195	A
			U-238	Bq/sample	0.157	0.156	0.109-0.203	A
	16-RdV35	Vegetation	Cs-134	Bq/sample	-0.103		(1)	A
			Cs-137	Bq/sample	5.64	5.54	3.88-7.20	A
			Co-57	Bq/sample	7.38	6.81	4.77-8.85	A
			Co-60	Bq/sample	4.81	4.86	3.40-6.32	A
			Mn-54	Bq/sample	7.4	7.27	5.09-9.45	A
			Sr-90	Bq/sample	0.774	0.80	0.56-1.04	A
			Zn-65	Bq/sample	5.46	5.4	3.78-7.02	A

(1) False positive test.

(a) Teledyne Brown Engineering reported result.

(b) The MAPEP known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

(c) DOE/MAPEP evaluation: A=acceptable, W=acceptable with warning, N=not acceptable.

(4)NCR 16-14 was initiated

TABLE D-3

ERA ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES
(PAGE 1 OF 1)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Limits	Evaluation (c)
May 2016	RAD-105	Water	Sr-89	pCi/L	48.9	48.2	37.8 - 55.6	A
			Sr-90	pCi/L	25.0	28.5	20.7 - 33.1	A
			Ba-133	pCi/L	53.1	58.8	48.7 - 64.9	A
			Cs-134	pCi/L	40.9	43.3	34.6 - 47.6	A
			Cs-137	pCi/L	84.8	78.4	70.6 - 88.9	A
			Co-60	pCi/L	108	102	91.8 - 114	A
			Zn-65	pCi/L	226	214	193 - 251	A
			Gr-A	pCi/L	38.9	62.7	32.9 - 77.8	A
			Gr-B	pCi/L	41.9	39.2	26.0 - 46.7	A
			I-131	pCi/L	24.1	26.6	22.1 - 31.3	A
			U-Nat	pCi/L	4.68	4.64	3.39 - 5.68	A
			H-3	pCi/L	7720	7840	6790 - 8620	A
November 2016	RAD-107	Water	Sr-89	pCi/L	43.0	43.3	33.4-50.5	A
			Sr-90	pCi/L	30.0	33.6	24.6-38.8	A
			Ba-133	pCi/L	47.8	54.9	45.4-60.7	A
			Cs-134	pCi/L	72.9	81.8	67.0-90.0	A
			Cs-137	pCi/L	189	210	189-233	A
			Co-60	pCi/L	58.4	64.5	58.0-73.4	A
			Zn-65	pCi/L	243	245	220-287	A
			Gr-A	pCi/L	37.2	68.4	35.9-84.5	A
			Gr-B	pCi/L	35.1	33.9	22.1-41.6	A
			I-131	pCi/L	23.5	26.3	21.9-31.0	A
			U-Nat	pCi/L	49.2	51.2	41.6-56.9	A
			H-3	pCi/L	918	9820	8540-10800	N(5)
	MRAD-25	AP	Gr-A	pCi/Filter	56.8	71.2	23.9-111	A

(a) Teledyne Brown Engineering reported result.

(b) The ERA known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

(c) ERA evaluation: A=acceptable. Reported result falls within the Warning Limits. N=not acceptable. Reported result falls outside of the Control Limits. CE=check for Error. Reported result falls within the Control Limits and outside of the Warning Limit.

(5) NCR 16-34 was initiated

TABLE D-4 **ERA STATISTICAL SUMMARY PROFICIENCY TESTING PROGRAM[a]**

MRAD Study, ENVIRONMENTAL, INC., 2016

			Concentration [a]			
Lab Code [b]	Date	Analysis	Laboratory Result	ERA Result	Control Limits	Acceptance
ERAP-1101	3/14/2016	Am-241	37.3	45.9	28.3 - 62.1	Pass
ERAP-1101	3/14/2016	Co-60	637	623	482 - 778	Pass
ERAP-1101	3/14/2016	Cs-134	251	304	193 - 377	Pass
ERAP-1101	3/14/2016	Cs-137	1,273	1,150	864 - 1,510	Pass
ERAP-1101	3/14/2016	Fe-55	< 162	126	39.1 - 246	Pass
ERAP-1101	3/14/2016	Mn-54	< 2.64	< 50.0	0.00 - 50.0	Pass
ERAP-1101	3/14/2016	Pu-238	68.0	70.5	48.3 - 92.7	Pass
ERAP-1101	3/14/2016	Pu-239/240	54.1	54.8	39.70 - 71.60	Pass
ERAP-1101	3/14/2016	Sr-90	139	150	73.3 - 225.0	Pass
ERAP-1101	3/14/2016	U-233/234	59.3	64.8	40.2 - 97.7	Pass
ERAP-1101	3/14/2016	U-238	55.5	64.2	41.5 - 88.8	Pass
ERAP-1101	3/14/2016	Zn-65	428	356	255 - 492	Pass
ERAP-1101	3/14/2016	Gr. Alpha	98.0	70.1	23.5 - 109	Pass
ERAP-1101	3/14/2016	Gr. Beta	78.6	54.4	34.4 - 79.3	Pass
ERSO-1105	3/14/2016	Am-241	1,030	1,360	796 - 1,770	Pass
ERSO-1105	3/14/2016	Ac-228	1,540	1,240	795 - 1,720	Pass
ERSO-1105	3/14/2016	Bi-212	1,550	1,240	330 - 1,820	Pass
ERSO-1105	3/14/2016	Bi-214	3,100	3,530	2,130 - 5,080	Pass
ERSO-1105	3/14/2016	Co-60	5,600	5,490	3,710 - 7,560	Pass
ERSO-1105	3/14/2016	Cs-134	3,030	3,450	2,260 - 4,140	Pass
ERSO-1105	3/14/2016	Cs-137	4,440	4,310	3,300 - 5,550	Pass
ERSO-1105	3/14/2016	K-40	10,300	10,600	7,740 - 14,200	Pass
ERSO-1105	3/14/2016	Mn-54	< 50.8	< 1000	0.0 - 1,000	Pass
ERSO-1105	3/14/2016	Pb-212	1,140	1,240	812 - 1,730	Pass
ERSO-1105	3/14/2016	Pb-214	3,190	3,710	2,170 - 5,530	Pass
ERSO-1105	3/14/2016	Pu-238	680	658	396 - 908	Pass
ERSO-1105	3/14/2016	Pu-239/240	460	496	324 - 0,685	Pass
ERSO-1105	3/14/2016	Sr-90	7,740	8,560	3,260 - 13,500	Pass
ERSO-1105	3/14/2016	Th-234	3,630	3,430	1,080 - 6,450	Pass
ERSO-1105	3/14/2016	U-233/234	3,090	3,460	2,110 - 4,430	Pass
ERSO-1105	3/14/2016	U-238	3,280	3,430	2,120 - 4,350	Pass
ERSO-1105	3/14/2016	Zn-65	2,940	2,450	1,950 - 3,260	Pass
ERW-1115	3/14/2016	Gr. Alpha	105.0	117.0	41.5 - 181.0	Pass
ERW-1115	3/14/2016	Gr. Beta	76.2	75.5	43.2 - 112.0	Pass
ERW-1117	3/14/2016	H-3	8,870	8,650	5,800 - 12,300	Pass
ERVE-1108	3/14/2016	Am-241	1,930	2,120	1,300 - 2,820	Pass
ERVE-1108	3/14/2016	Cm-244	1,294	1,560	764 - 2,430	Pass
ERVE-1108	3/14/2016	Co-60	1,164	1,100	759 - 1,540	Pass
ERVE-1108	3/14/2016	Cs-134	1,056	1,070	687 - 1,390	Pass
ERVE-1108	3/14/2016	Cs-137	930	838	608 - 1,170	Pass
ERVE-1108	3/14/2016	K-40	32,200	31,000	22,400 - 43,500	Pass
ERVE-1108	3/14/2016	Mn-54	< 24.5	< 300	0.00 - 300	Pass
ERVE-1108	3/14/2016	Zn-65	3,320	2,820	2,030 - 3,960	Pass

TABLE D-4 **ERA STATISTICAL SUMMARY PROFICIENCY TESTING PROGRAM[a]**

MRAD Study, ENVIRONMENTAL, INC., 2016

			Concentration [a]			
Lab Code [b]	Date	Analysis	Laboratory Result	ERA Result	Control Limits	Acceptance
ERVE-1108	3/14/2016	Pu-238	3,410	2,810	1,680 - 3,850	Pass
ERVE-1108	3/14/2016	Pu-239/240	4,120	3,640	2,230 - 5,010	Pass
ERVE-1108	3/14/2016	Sr-90	8,120	8,710	4,960 - 11,500	Pass
ERVE-1108	3/14/2016	U-233/234	4,350	4,160	2,740 - 5,340	Pass
ERVE-1108	3/14/2016	U-238	4,220	4,120	2,750 - 5,230	Pass
ERW-1111	3/14/2016	Am-241	113	121	81.5 - 162	Pass
ERW-1111	3/14/2016	Co-60	1,120	1,050	912 - 1,230	Pass
ERW-1111	3/14/2016	Cs-134	806	842	618 - 968	Pass
ERW-1111	3/14/2016	Cs-137	1,190	1,100	934 - 1,320	Pass
ERW-1111	3/14/2016	Mn-54	< 5.89	< 100	0.00 - 100	Pass
ERW-1111	3/14/2016	Pu-238	159	138	102 - 172	Pass
ERW-1111	3/14/2016	Pu-239/240	113	98.7	76.6 - 124	Pass
ERW-1111	3/14/2016	U-233/234	46.9	52.7	39.6 - 68.0	Pass
ERW-1111	3/14/2016	U-238	50.4	52.3	39.9 - 64.2	Pass
ERW-1111	3/14/2016	Zn-65	1,160	1,010	842 - 1,270	Pass
ERW-1111	3/14/2016	Fe-55	1,600	1,650	984 - 2,240	Pass
ERW-1111	3/14/2016	Sr-90	430	434	283 - 574	Pass

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

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

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

TABLE D-5 **DOE's Mixed Analyte Performance Evaluation Program (MAPEP)**
ENVIRONMENTAL, INC., 2016

			Concentration [a]			
Lab Code [b]	Reference Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
MASO-1053	2/1/2016	Ni-63	1,206 ± 20	1250	875 - 1625	Pass
MASO-1053	2/1/2016	Sr-90	0.65 ± 1.27	0.00	NA [c]	Pass
MASO-1053	2/1/2016	Tc-99	0.1 ± 5.5	0.0	NA [c]	Pass
MASO-1053	2/1/2016	Cs-134	908 ± 26	1030	721 - 1339	Pass
MASO-1053	2/1/2016	Cs-137	0.10 ± 6.20	0.00	NA [c]	Pass
MASO-1053	2/1/2016	Co-57	1058 ± 26	992	694 - 1290	Pass
MASO-1053	2/1/2016	Co-60	1229 ± 28	1190	833 - 1547	Pass
MASO-1053	2/1/2016	Mn-54	1235 ± 43	1160	812 - 1508	Pass
MASO-1053	2/1/2016	Zn-65	753 ± 64	692	484 - 900	Pass
MASO-1053	2/1/2016	K-40	753 ± 140	607	425 - 789	Pass
MASO-1053	2/1/2016	Am-241	79 ± 6	103	72 - 134	Pass
MASO-1053	2/1/2016	Pu-238	73.9 ± 9.2	63.6	44.5 - 82.7	Pass
MASO-1053	2/1/2016	Pu-239/240	0.76 ± 1.34	0.21	NA [d]	Pass
MASO-1053	2/1/2016	U-234/233	45.0 ± 5.1	45.9	32.1 - 59.7	Pass
MASO-1053	2/1/2016	U-238	129 ± 9	146	102 - 190	Pass
MAW-989	2/1/2016	Am-241	0.018 ± 0.015	0.00	NA [c]	Pass
MAW-989	2/1/2016	H-3	0.2 ± 2.8	0.0	NA [c]	Pass
MAW-989	2/1/2016	Ni-63	12.8 ± 2.7	12.3	8.6 - 16.0	Pass
MAW-989	2/1/2016	Sr-90	8.70 ± 1.20	8.74	6.12 - 11.36	Pass
MAW-989	2/1/2016	Tc-99	-1.1 ± 0.6	0.0	NA [c]	Pass
MAW-989	2/1/2016	Cs-134	15.5 ± 0.3	16.1	11.3 ± 20.9	Pass
MAW-989	2/1/2016	Cs-137	23.7 ± 0.5	21.2	14.8 - 27.6	Pass
MAW-989[e]	2/1/2016	Co-57	1.38 ± 0.12	0.00	NA [c]	Fail
MAW-989	2/1/2016	Co-60	12.5 ± 0.3	11.8	8.3 - 15.3	Pass
MAW-989	2/1/2016	Mn-54	12.2 ± 0.4	11.1	7.8 - 14.4	Pass
MAW-989	2/1/2016	Zn-65	15.7 ± 0.7	13.6	9.5 - 17.7	Pass
MAW-989	2/1/2016	K-40	288 ± 5	251	176 - 326	Pass
MAW-989	2/1/2016	Fe-55	17.3 ± 7.0	16.2	11.3 - 21.1	Pass
MAW-989	2/1/2016	Ra-226	0.710 ± 0.070	0.718	0.503 - 0.933	Pass
MAW-989	2/1/2016	Pu-238	1.280 ± 0.110	1.244	0.871 ± 1.617	Pass
MAW-989	2/1/2016	Pu-239/240	0.640 ± 0.080	0.641	0.449 - 0.833	Pass
MAW-989	2/1/2016	U-234/233	1.39 ± 0.12	1.48	1.04 - 1.92	Pass
MAW-989	2/1/2016	U-238	1.43 ± 0.12	1.53	1.07 - 1.99	Pass
MAW-893	2/1/2016	Gross Alpha	0.600 ± 0.050	0.673	0.202 - 1.144	Pass
MAW-893	2/1/2016	Gross Beta	2.10 ± 0.06	2.15	1.08 - 3.23	Pass
MAW-896	2/1/2016	I-129	3.67 ± 0.20	3.85	2.70 - 5.01	Pass
MAAP-1056	2/1/2016	Gross Alpha	0.39 ± 0.05	1.20	0.36 - 2.04	Pass
MAAP-1056	2/1/2016	Gross Beta	1.03 ± 0.07	0.79	0.40 - 1.19	Pass
MAAP-1057	2/1/2016	Sr-90	1.34 ± 0.15	1.38	0.97 ± 1.79	Pass
MAAP-1057	2/1/2016	Cs-134	-0.01 ± 0.03	0.00	NA [c]	Pass
MAAP-1057	2/1/2016	Cs-137	2.57 ± 0.10	2.30	1.61 - 2.99	Pass

TABLE D-5 **DOE's Mixed Analyte Performance Evaluation Program (MAPEP)**
ENVIRONMENTAL, INC., 2016

			Concentration [a]			
Lab Code [b]	Reference Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
MAAP-1057	2/1/2016	Co-57	3.01 ± 0.06	2.94	2.06 - 3.82	Pass
MAAP-1057	2/1/2016	Co-60	4.28 ± 0.10	4.02	2.81 - 5.23	Pass
MAAP-1057	2/1/2016	Mn-54	4.90 ± 0.13	4.53	3.17 - 5.89	Pass
MAAP-1057	2/1/2016	Zn-65	4.09 ± 0.18	3.57	2.50 - 4.64	Pass
MAAP-1057	2/1/2016	Am-241	0.059 ± 0.015	0.0805	0.0564 - 0.1047	Pass
MAAP-1057	2/1/2016	Pu-238	0.066 ± 0.020	0.0637	0.0446 - 0.0828	Pass
MAAP-1057	2/1/2016	Pu-239/240	0.074 ± 0.020	0.099	NA [d]	Pass
MAAP-1057	2/1/2016	U-234/233	0.151 ± 0.026	0.165	0.116 - 0.215	Pass
MAAP-1057	2/1/2016	U-238	0.160 ± 0.026	0.172	0.120 - 0.224	Pass
MAVE-1050	2/1/2016	Cs-134	9.83 ± 0.19	10.62	7.43 - 13.81	Pass
MAVE-1050	2/1/2016	Cs-137	6.06 ± 0.19	5.62	3.93 - 7.31	Pass
MAVE-1050	2/1/2016	Co-57	13.8 ± 0.2	11.8	8.3 - 15.3	Pass
MAVE-1050	2/1/2016	Co-60	0.022 ± 0.040	0.00	NA [c]	Pass
MAVE-1050	2/1/2016	Mn-54	0.009 ± 0.044	0.000	NA [c]	Pass
MAVE-1050	2/1/2016	Zn-65	10.67 ± 0.39	9.60	6.70 - 12.50	Pass
MASO-4780[f]	8/1/2016	Ni-63	648 ± 14	990	693 - 1287	Fail
MASO-4780[g]	8/1/2016	Ni-63	902 ± 46	990	693 - 1287	Pass
MASO-4780	8/1/2016	Sr-90	757 ± 16	894	626 - 1162	Pass
MASO-4780	8/1/2016	Tc-99	559 ± 12	556	389 - 723	Pass
MASO-4780	8/1/2016	Cs-134	0.93 ± 2.92	0.00	NA [c]	Pass
MASO-4780	8/1/2016	Cs-137	1061 ± 12	1067	747 - 1387	Pass
MASO-4780	8/1/2016	Co-57	1178 ± 8	1190	833 - 1547	Pass
MASO-4780	8/1/2016	Co-60	841 ± 9	851	596 - 1106	Pass
MASO-4780	8/1/2016	Mn-54	0.69 ± 2.53	0.00	NA [c]	Pass
MASO-4780	8/1/2016	Zn-65	724 ± 19	695	487 - 904	Pass
MASO-4780	8/1/2016	K-40	566 ± 52	588	412 - 764	Pass
MASO-4780	8/1/2016	Am-241	0.494 ± 0.698	0.000	NA [c]	Pass
MASO-4780	8/1/2016	Pu-238	69.7 ± 7.4	70.4	49.3 - 91.5	Pass
MASO-4780	8/1/2016	Pu-239/240	53.9 ± 6.3	53.8	37.7 - 69.9	Pass
MASO-4780[h]	8/1/2016	U-233/234	46.8 ± 3.9	122	85 - 159	Fail
MASO-4780[h]	8/1/2016	U-238	46.6 ± 3.9	121	85 - 157	Fail
MAW-4776	8/1/2016	I-129	4.40 ± 0.20	4.54	3.18 - 5.90	Pass
MAVE-4782	8/1/2016	Cs-134	-0.01 ± 0.05	0.00	NA [c]	Pass
MAVE-4782	8/1/2016	Cs-137	6.18 ± 0.20	5.54	3.88 - 7.20	Pass
MAVE-4782	8/1/2016	Co-57	8.13 ± 0.16	6.81	4.77 - 8.85	Pass
MAVE-4782	8/1/2016	Co-60	5.30 ± 0.15	4.86	3.40 - 6.32	Pass
MAVE-4782	8/1/2016	Mn-54	8.08 ± 0.24	7.27	5.09 - 9.45	Pass
MAVE-4782	8/1/2016	Zn-65	6.24 ± 0.36	5.40	3.78 - 7.02	Pass
MAAP-4784	8/1/2016	Sr-90	1.18 ± 0.10	1.03	0.72 - 1.34	Pass
MAAP-4784	8/1/2016	Cs-134	1.58 ± 0.08	2.04	1.43 - 2.65	Pass

TABLE D-5 **DOE's Mixed Analyte Performance Evaluation Program (MAPEP)**
ENVIRONMENTAL, INC., 2016

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

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

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

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

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

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

[f] Original analysis for Ni-63 failed.

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

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

TABLE D-6 Interlaboratory Comparison Crosscheck Program, Environmental Resource Associates (ERA)[a]
RAD Study, ENVIRONMENTAL, INC., 2016

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

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

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

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

APPENDIX E

ERRATA DATA

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There is no errata data for the 2016 AREOR.

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APPENDIX F

ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

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