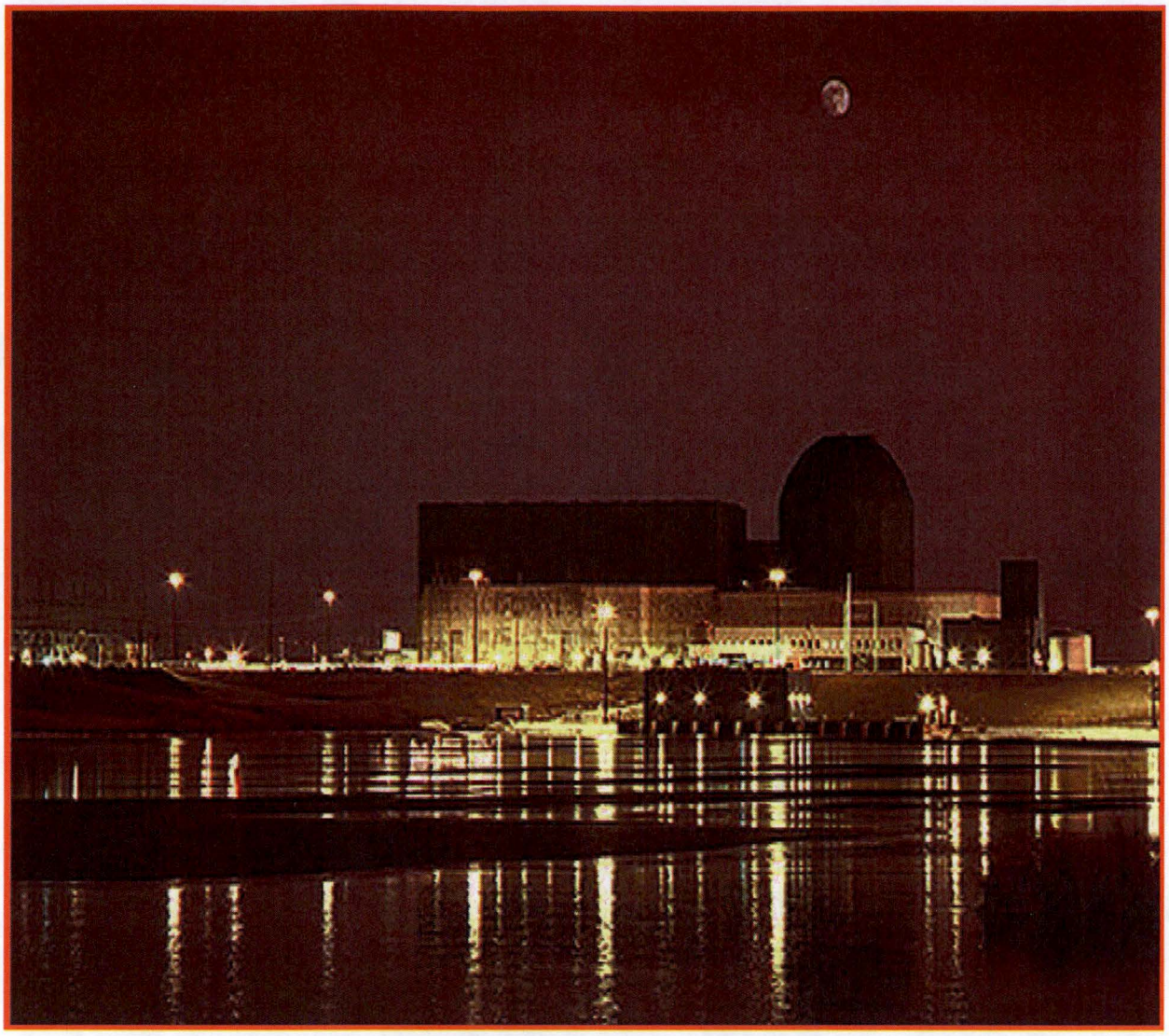

Exelon Generation.

January 01, 2021 – December 31, 2021

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

CLINTON POWER STATION – DOCKET NUMBER 50-461

Prepared by:

Teledyne Brown Engineering Environmental Services
April 2022

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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, 2021, through December 31, 2021. During that time period, 1,556 analyses were performed on 1,430 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 2021. 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 2021 due to the release of gaseous effluents from CPS was 3.37E-02 or 0.0337 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 27, 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, 2021 through December 31, 2021.

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 (EIML) to obtain environmental samples for the CPS REMP in 2021. 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 and quarterly 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, channel catfish, bluegill, carp, white crappie and white bass, 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-07B 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 and quarterly 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 three locations (CL-114, CL-115 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-01, CL-02, CL-08 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 in a vented PVC conduit located a few feet off the ground. 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).

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.

B. Sample Analysis

This section describes the general analytical methodologies used by TBE and Environmental Inc. (Midwest Labs) to analyze and collect

environmental samples for radioactivity for the CPS REMP in 2021. 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, air particulates and vegetables
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

1. Air Particulate/Air Iodine Samples

   a. During weekly ODCM air sampling surveillances, the Environmental, Inc. vendor identified that there was a (possible) power outage for the following dates/locations:

      01/06/21 CL-1, CL-4, CL-6, CL-8, CL-94
      01/27/21 CL-7, CL-7
      02/10/21 CL-4, CL-6, CL-15
      02/17/21 CL-15
      03/24/21 CL-7, CL-8
      04/04/21 CL-3
      04/14/21 CL-15
      06/30/21 CL-1
      08/04/21 CL-2 (sampler ran only 57.7 hours), CL-3
      10/13/21 CL-2, CL-3, CL-4, CL-6

b. During weekly ODCM air sampling surveillances, the Environmental, Inc. vendor identified a broken timer for the CL-3 location on 11/24/21 and the runtime was estimated.

2. OSL Dosimetry Location CL-47

   Sample found missing during the monthly check up on 01/27/21, probably removed accidently during tree-clearing activities in the area.

3. Vegetation Samples (AR 04453759)

   a. July
   Garden CL-115 - only cabbage and Swiss chard were available for sampling; Garden CL-118 - only broccoli and Swiss chard were available for sampling. No differing substitute was available and additional vegetation planted (lettuce and kale).

   b. August
   Garden CL-115 - only cabbage and Swiss chard were available for sampling and soybean leaves were collected as a third substitute; Garden CL-118 - only broccoli and Swiss chard were available for sampling and no differing substitute was available. No additional vegetation available to plant (past planting season).

   c. September
   Gardens CL-114 & CL-115 - only cabbage and Swiss chard were available for sampling; Garden CL-118 - only broccoli and Swiss chard were available for sampling. No differing substitute was available and no further actions taken (end of season).

4. Surface Water Location CL-90

   During the 10/13/21 weekly check, the vendor observed that the compositor had less than the weekly composite volume for the monthly analysis. A supplemental grab sample was obtained from the process stream and added to the monthly collection container. The lower sample volume was due to a power outage (IR 4451945).

5. Water Compositor Location CL-99SL

   This non-ODCM compositor was flooded at some point due to the most recent storms. This location is approximately 3.5 miles upstream from the station and serves as an additional control (background) water sampler to compare against the ODCM Composite Sampler CL-90. It was unlikely that the pump and power were capable of supplying the 20-ml aliquot sample per hour. This would affect the June composite sample. Representative grabs samples were taken instead. (07/07/21)

Throughout 2021, IRs were generated to document program exceptions that were entered into the corrective action program for trending purposes.

Missed Samples

1. AP/AI Location CL-03 (08/04/21)

   The sampler ran only for 56.3 hours - no power at the station. The sample was taken but no volume could be determined.

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 2021.

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. No gross beta was detected in any of the samples.
(Tables C–II.1, Appendix C)

Tritium

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

Iodine-131

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

Gamma Spectrometry

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

3. Well Water

Quarterly grab samples were collected at two locations (CL-07D 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. No tritium was detected in any samples and the required LLD was met. (Table C–III.1, Appendix C)

Gamma Spectrometry

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

4. Fish

Fish samples comprised of largemouth bass, channel catfish, bluegill, carp, white crappie and white 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. No plant-produced radionuclides were detected and all required LLDs were met. (Table C–IV.1, Appendix C)

5. Shoreline Sediment

Aquatic shoreline sediment samples were collected at CL-07B and CL-105 semiannually. The following analysis was performed:

Gamma Spectrometry

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

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 5 to 41 E–3 pCi/m^3 with a mean of 20 E–3 pCi/m^3. The results from the Intermediate Distance location (Group II) ranged from 8 to 35 E–3 pCi/m^3 with a mean of 19 E–3 pCi/m^3. The results from the Control location (Group III) ranged from 8 to 34 E–3 pCi/m^3 with a mean of 20 E–3 pCi/m^3. Comparison of the 2021 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 2021 indicate no notable differences among the three groups.

Gamma Spectrometry

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

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. All results were less than the MDC and the required LLD was met. (Table C-VII.1, Appendix C)

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

Gamma Spectrometry

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

b. Food Products

Broadleaf vegetation samples were collected from three locations (CL-114, CL-115 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. No plant-produced radionuclides were detected and all required LLDs were met.
(Table C–IX.1, Appendix C)

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. No plant-produced radionuclides were detected and all required LLDs were met.
(Table C–IX.2, Appendix C)

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, Appendix C.

A total of 216 OSLD measurements were made in 2021. The average dose from the inner ring was 18.6 mRem/quarter. The average dose from the outer ring was 19.1 mRem/quarter. The average dose from the special

interest group was 19.0 mRem/quarter. The average dose from the supplemental group was 17.6 mRem/quarter. The quarterly measurements ranged from 5.5 to 22.1 mRem/quarter.

The inner ring and outer ring measurements compared well to the Control Station, CL-11, which ranged from 17.0 to 17.7 mRem/quarter with an average measurement of 17.4 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. Independent Spent Fuel Storage Installation (ISFSI)

Ambient gamma radiation levels were measured utilizing DLRs. Fifty-four DLR locations were established around the site, which encompasses the ISFSI pad. ISFSI dose contribution is in the form of direct radiation as no liquid or gas releases are expected to occur. Results of DLR measurements are listed in Table C-X.1, Appendix C.

E. Land Use Survey

The Annual Land Use Survey conducted during the 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 report to CPS was dated October 19, 2021. The purpose of the survey was to document the nearest resident, milk-producing animal and garden of greater than 50 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:

Sector	Distance in Kilometers from the CPS Station HVAC Vent Stack		
	Residence (km)	Garden (km)	Milk Animal (km)
1 N	1.50	1.50	1.50
2 NNE	1.50	4.78	> 8
3 NE	2.07	3.46	> 8
4 ENE	2.86	3.45	> 8
5 E	1.67	3.95	> 8
6 ESE	5.14	> 8	> 8
7 SE	4.44	> 8	> 8
8 SSE	2.90	4.45	> 8
9 S	4.78	> 8	> 8
10 SSW	4.68	> 8	> 8
11 SW	1.17	> 8	> 8
12 WSW	3.62	3.66	4.32
13 W	1.95	3.22	> 8
14 WNW	2.63	2.63	> 8
15 NW	2.65	4.70	> 8
16 NNW	2.05	2.05	2.05

F. Errata Data

There was no errata data for 2021.

G. Summary of Results – Inter-Laboratory Comparison Program

The TBE Laboratory analyzed Performance Evaluation (PE) samples of air particulate, air iodine, milk, soil, vegetation, and water matrices for various analytes. The PE samples supplied by Analytics Inc., Environmental Resource Associates (ERA) and Department of Energy (DOE) Mixed Analyte Performance Evaluation Program (MAPEP), were evaluated against the following pre-set acceptance criteria:

A. 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 evaluates the reported ratios based on internal QC requirements based on the DOE MAPEP criteria.

B. 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, National Environmental Laboratory Accreditation Conference (NELAC), state-specific Performance Testing (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.

C. DOE Evaluation Criteria

MAPEP's evaluation report provides an acceptance range with associated flag values. MAPEP defines three levels of performance:

- Acceptable (flag = "A") - result within ± 20% of the reference value
- Acceptable with Warning (flag = "W") - result falls in the ± 20% to ± 30% of the reference value
- Not Acceptable (flag = "N") – bias is greater than 30% of the reference value

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.

For the TBE laboratory, 146 out of 154 analyses performed met the specified acceptance criteria. Seven analyses did not meet the specified acceptance criteria for the following reasons and were addressed through the TBE Corrective Action Program. A summary is found below:

1. The ERA MRAD March 2021 Water Fe-55 result was evaluated as *Not Acceptable*. The reported value for Fe-55 was 579 pCi/L and the known result was 275 pCi/L (acceptance range 162 - 400). When reviewing the original sample data, it was found that the carrier yield was 52.6% (lower than typical water samples). Looking at the etched plate that was counted, it appeared that some loss of sample could have occurred. The sample was logged for reanalysis and used as the workgroup duplicate. The results were acceptable at 197 and 221 respectively. Yields were 97.4% and 105.7% and the plated samples were centered with no apparent loss of sample. The loss of sample during plating resulted in a low yield which produced an artificially high sample result. (NCR 21-01)

2. The MAPEP February 2021 AP Gross Alpha result was evaluated as *Not Acceptable*. The reported value was 0.371 Bq/sample and the known result was 1.77 Bq/sample (acceptance range 0.53 - 3.01). A similar failure had occurred several years prior due to the filter being placed with the wrong side up on the detector. At that time, a small dot was placed on the top of the filter prior to removal from the package to indicate the correct side for counting. The current sample was still in the detector when the result was received (dot side facing the detector). The sample was recounted with a similar result and was flipped and recounted. The flipped result was 0.661 Bq/sample, within the acceptable range. Because TBE cannot rely on receiving correct packaging from the provider, MAPEP AP cross-checks will be counted on both sides going forward. *NOTE: The August sample had the same packaging issue (upside down).* (NCR 21-02)

3. The MAPEP February 2021 soil Ni-63 was evaluated as *Not Acceptable.* The reported value was 310 Bq/kg and the known result was 689 (acceptance range 482 - 896). All workgroup QC was reviewed with no anomalies. The analytical procedure had been revised prior to this analysis to eliminate added interferences. The sample yield was >100%, indicative of incomplete separation from interferences, leading to a lower result. The procedure was again revised after acceptable results were obtained. (NCR 21-03)

4. The ERA October 2021 water Gross Beta result was evaluated as *Not Acceptable*. The reported value was 63.0 pCi/L and the known was 55.7 (acceptance range 38.1 - 62.6) or 113% of the known. The 2-sigma error was 6.8, placing the reported result well within the acceptable range. All QA was reviewed with no anomalies. A follow-up Quick Response cross-check was analyzed with a 120% ratio (see item 7). (NCR 21-10)

5. The ERA October 2021 water Tritium result was evaluated as *Not Acceptable.* The reported value was 13,800 pCi/L and the known was 17,200 (acceptance range 15,000 - 18,900). The 2-sigma error was 1,430, placing the result within the acceptable range. TBE's internal QC acceptance is 70% - 130%, while ERA's for this sample was 87% - 110%. All QA was reviewed with no anomalies. A Quick Response follow-up cross-check was analyzed with a result of 17,500 pCi/L (known 17,800 pCi/L). (NCR 21-11)

6. The MAPEP August 2021 soil Ni-63 result was evaluated as *Not Acceptable.* The reported value was 546 Bq/kg and the known result was 1,280 Bq/kg (acceptance range 896 - 1,664). All QC was reviewed and no anomalies found. The procedure revision to remove added MAPAP interferences was ineffective for this sample. No client soil matrix samples were analyzed for Ni-63 in 2020 or 2021. The root cause investigation is still ongoing at this time. (NCR 21-13)

7. The ERA December 2021 Quick Response water Gross Beta result was evaluated as *Not Acceptable.* The reported value was 47.6 pCi/L and the known was 39.8 pCi/L or 120% of the known (acceptance range of 26.4 - 47.3). The 2-sigma error was 6.1, placing the reported result well within the acceptable range. All QA was reviewed with no anomalies. The original sample was recounted on a different detector with a result of 40.3 ± 6.27 pCi/L. The "failure" of this sample and the RAD-127 was due to the narrow upper acceptance ranges assigned (119% and 112%) (NCR 21-14)

The Inter-Laboratory Comparison Program provides evidence of "in control" counting systems and methods, and that the laboratories are producing accurate and reliable data.

V. References

1. American National Standards Institute, Inc., "Performance, Testing and Procedural Specifications for Thermoluminescent Dosimetry," ANSI N545-1975.
2. Code of Federal Regulations, Title 10, Part 20 (Nuclear Regulatory Commission).
3. CPS 2014 Annual Radioactive Effluent Release Report.
4. "Environmental Radioactivity," M. Eisenbud, 1987 (E187).
5. "Natural Radon Exposure in the United States," Donald T. Oakley, U.S. Environmental Protection Agency. ORP/SID 72-1, June 1972.
6. Federal Radiation Council Report No. 1, "Background Material for the Development of Radiation Protection Standards," May 13, 1960.
7. International Commission on Radiation Protection, Publication 2, "Report of Committee II on Permissible Dose for Internal Radiation," (1959) with 1962 Supplement issued in ICRP Publication 6; Publication 9, "Recommendations on Radiation Exposure," (1965); ICRP Publication 7 (1965), amplifying specific recommendations of Publication 26 (1977).
8. International Commission on Radiation Protection, Publication No. 39 (1984), "Principles of Limiting Exposure to the Public to Natural Sources of Radiation".
9. "Radioactivity in the Environment: Sources, Distribution and Surveillance," Ronald L. Kathren, 1984.
10. National Council on Radiation Protection and Measurements, Report No. 22, "Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and Water for Occupational Exposure," (Published as National Bureau of Standards Handbook 69, issued June 1959, superseding Handbook 52).
11. National Council on Radiation Protection and Measurements, Report No. 39, "Basic Radiation Protection Criteria," January 1971.
12. National Council on Radiation Protection and Measurements, Report No. 44, "Krypton-85 in the Atmosphere – Accumulation, Biological Significance, and Control Technology," July 1975.
13. National Council on Radiation Protection and Measurements, Report No. 91, "Recommendations on Limits for Exposure to Ionizing Radiation," June 1987.
14. National Council on Radiation Protection and Measurements, Report No. 93, "Ionizing Radiation Exposure of the Population of the United States," September 1987.
15. National Research Council, 1990, Committee on Biological Effects of Ionizing Radiation (BEIR V), Board on Radiation Effects Research on Life

Sciences, "The Effects of Exposure to Low Levels of Ionizing Radiation".

16. United States Nuclear Regulatory Commission, Regulatory Guide 4.1, "Programs for Monitoring Radioactivity in the Environs of Nuclear Power Plants," Revision 1, April 1975.

17. United States Nuclear Regulatory Commission, Regulatory Guide 4.13, "Performance, Testing and Procedural Specifications for Thermoluminescence Dosimetry: Environmental Applications, "Revision 1, July 1977.

18. United States Nuclear Regulatory Commission, Regulatory Guide 1.109, "Calculation of Annual Dose to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR Part 50, Appendix I, "Revision 1, October 1977.

19. United States Nuclear Regulatory Commission Branch Technical Position, "An Acceptable Radiological Environmental Monitoring Program," Revision 1, November 1979.

20. United States Nuclear Regulatory Commission, Regulatory Guide 4.15, "Quality Assurance for Radiological Monitoring Programs (Norm Operations) – Effluent Streams and the Environment," Revision 1, February 1979.

21. Technical Specifications, Clinton Power Station, Unit No. 1, Docket No. 50-461, Office of Nuclear Reactor Regulation, 1986. Facility Operating License Number NPF-62.

22. Clinton Power Station, Updated Safety Analysis Report.

23. Clinton Power Station, Unit 1, Off-Site Dose Calculation Manual.

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, 2021

NAME OF FACILITY:	CLINTON POWER STATION			DOCKET NUMBER:	50-461		
LOCATION OF FACILITY:	DEWITT COUNTY IL			REPORTING PERIOD:	2021		

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, 2021

NAME OF FACILITY:	CLINTON POWER STATION			DOCKET NUMBER:	50-461		
LOCATION OF FACILITY:	DEWITT COUNTY IL			REPORTING PERIOD:	2021		

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, 2021

NAME OF FACILITY:	CLINTON POWER STATION			DOCKET NUMBER:	50-461			
LOCATION OF FACILITY:	DEWITT COUNTY IL			REPORTING PERIOD:	2021			
				INDICATOR LOCATIONS	CONTROL LOCATION	LOCATION WITH HIGHEST ANNUAL MEAN (M)		
MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	MEAN (M) (F) *RANGE*	MEAN (M) (F) *RANGE*	MEAN (M) (F) *RANGE*	**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**	519	**10**	19	20	21	CL-94 INDICATOR	0
(E-3 PCI/CU.METER)				(467/467)	(52/52)	(52/52)	OLD CLINTON ROAD	
				5 - 41	*8 - 34*	*7 - 40*	0.6 MILES E OF SITE	
	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**	519						
(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, 2021

NAME OF FACILITY:	CLINTON POWER STATION			DOCKET NUMBER:	50-461		
LOCATION OF FACILITY:	DEWITT COUNTY IL			REPORTING PERIOD:	2021		

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						
	K-40		*NA*	*NA*	1110 (19/19) *818 - 1311*	1110 (19/19) *818 - 1311*	CL-116 CONTROL DEMENT DAIRY 14 MILES WSW OF SITE	0
	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**	36						
(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, 2021

NAME OF FACILITY:	CLINTON POWER STATION			DOCKET NUMBER:	50-461			
LOCATION OF FACILITY:	DEWITT COUNTY IL			REPORTING PERIOD:	2021			
				INDICATOR LOCATIONS	CONTROL LOCATION	LOCATION WITH HIGHEST ANNUAL MEAN (M)		
MEDIUM OR PATHWAY SAMPLED *(UNIT OF MEASUREMENT)*	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	MEAN (M) (F) *RANGE*	MEAN (M) (F) *RANGE*	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*	18.5	17.4	20.7	CL-55 INDICATOR	0
(MILLI-ROENTGEN/QTR.)				(216/216)	(4/4)	(4/4)		
				5.5 - 22.1	*17.0 - 17.7.*	*20.1 - 21.4*	4.1 MILES SE	

(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, 2021

Location	Location Description	Distance & Direction From Site
A. Surface Water		
CL-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 (ontrol)	50 miles S
H. Food Products		
CL-114	Residence SSE of Site (Control)	12.5 miles SSE
CL-115	Site's Secondary Access Road	0.7 miles NE
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, 2021

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, 2021

Location	Location Description	Distance & Direction From Site
J.	Environmental Dosimetry - DLR (cont'd)	
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, 2021

Sample Medium	Analysis	Sampling Method	Analytical Procedure Number
Surface Water	Gamma Spectroscopy	Monthly grab and; 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	Monthly composite from a continuous water compositor	TBE, TBE-2012 Radioiodine in Various Matrices 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., SPM-1 Sampling Procedure Manual
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
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	Thermo-Luminescence Dosimetry	Quarterly DLRs comprised of two Al_2O_3:C Landauer Incorporated elements	Landauer Incorporated

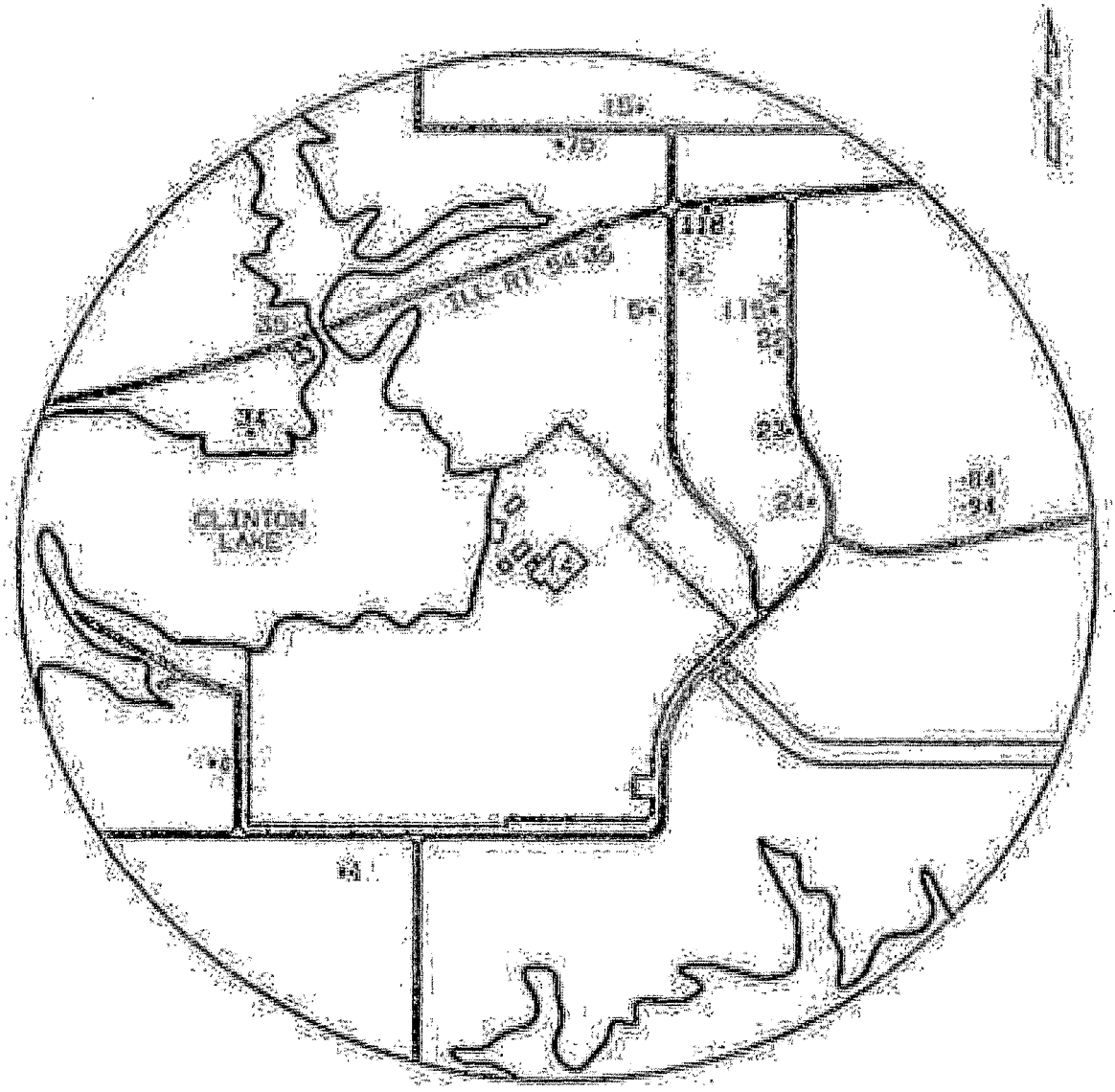

Figure B-1
Environmental Sampling Locations Within One
Mile of the Clinton Power Station, 2021

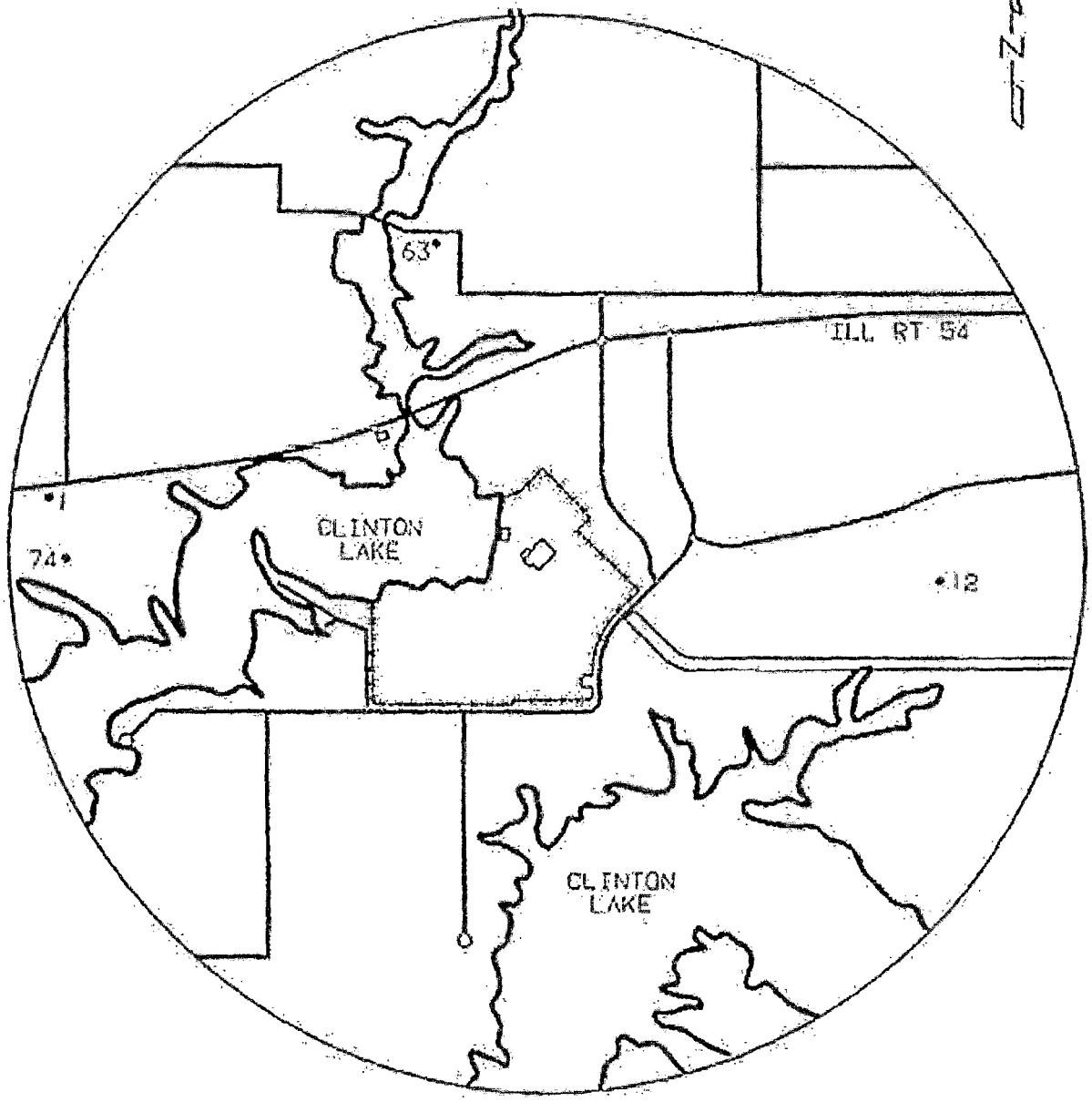

Figure B-2
Environmental Sampling Locations Between One and Two
Miles of the Clinton Power Station, 2021

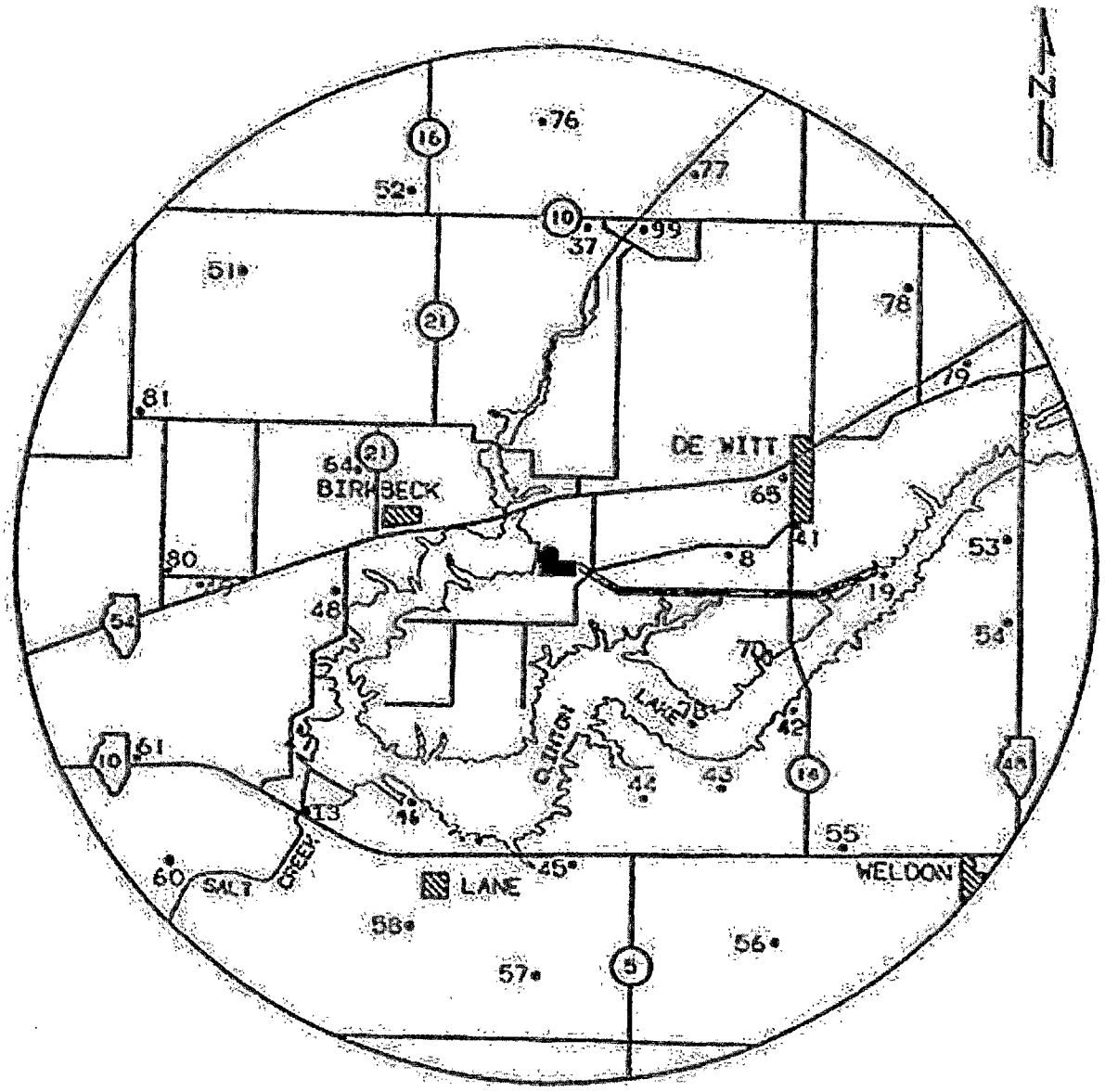

Figure B-3
Environmental Sampling Locations between Two and Five
Miles of the Clinton Power Station, 2021

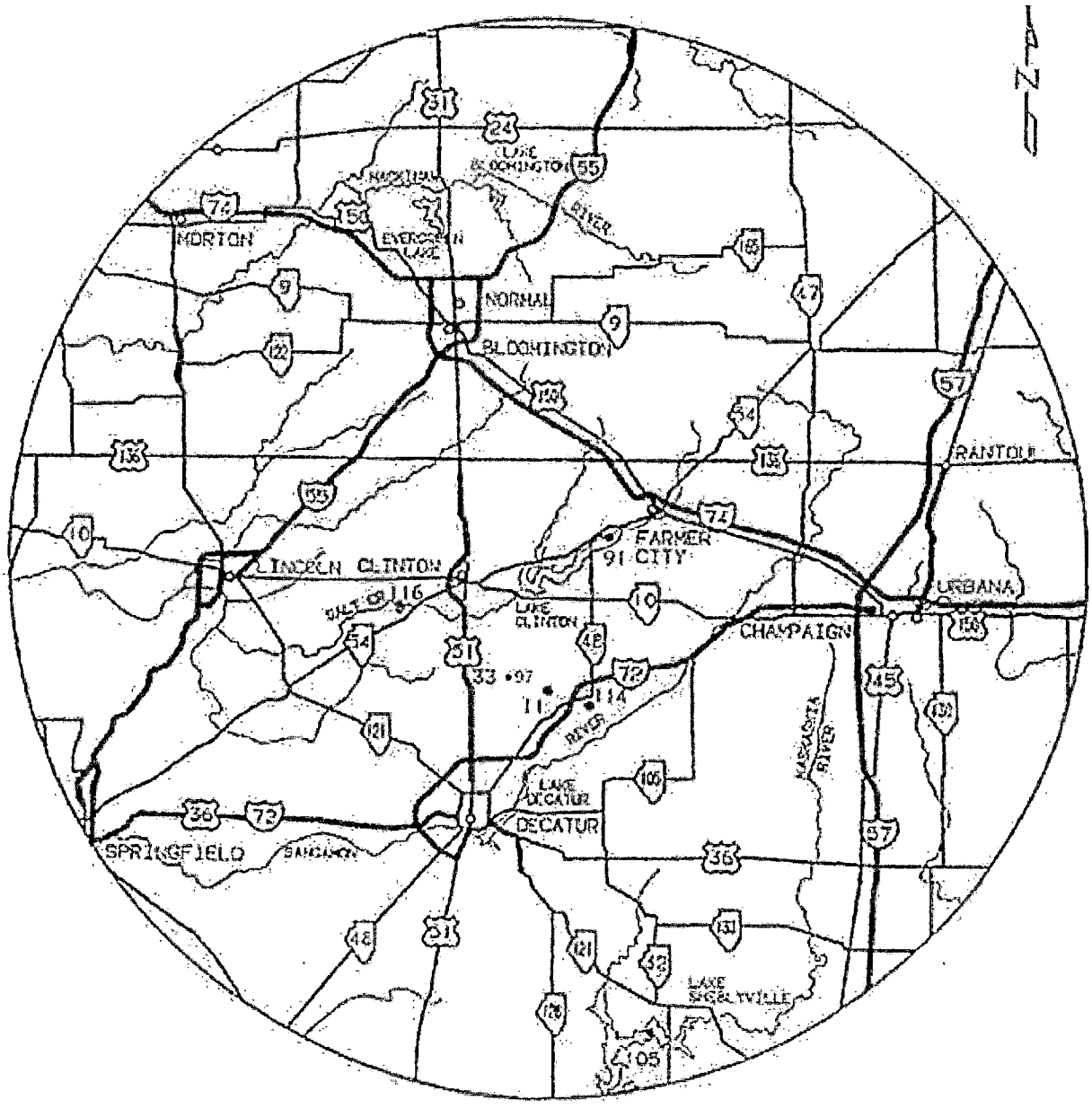

Figure B-4
Environmental Sampling Locations Greater Than Five
Miles of the Clinton Power Station, 2021

APPENDIX C

DATA TABLES AND FIGURES

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Table C-I.1 **CONCENTRATIONS OF I-131 IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-90
12/30/20 - 01/27/21	< 0.6
01/27/21 - 02/24/21	< 0.8
02/24/21 - 03/31/21	< 0.7
03/31/21 - 04/28/21	< 0.9
04/28/21 - 05/26/21	< 0.7
05/26/21 - 06/30/21	< 0.6
06/30/21 - 07/28/21	< 0.9
07/28/21 - 08/25/21	< 0.7
08/25/21 - 09/29/21	< 0.9
09/29/21 - 10/27/21	< 0.8
10/27/21 - 11/24/21	< 0.8
11/24/21 - 12/29/21	< 0.7
MEAN	-

Table C-I.2 **CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-90	CL-13	CL-91	CL-99
01/27/21 - 03/31/21	< 184	< 179	< 184	< 184
04/28/21 - 06/30/21	< 177	< 178	< 178	< 182
07/28/21 - 09/29/21	< 196	< 192	< 193	< 194
10/27/21 - 12/29/21	< 180	< 194	< 198	< 196
MEAN	-	-	-	-

Table C-I.3

CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

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	01/27/21 - 01/27/21	< 7	< 8	< 12	< 6	< 12	< 8	< 14	< 10	< 7	< 31	< 9	< 52
	02/24/21 - 02/24/21	< 6	< 8	< 14	< 9	< 14	< 8	< 13	< 9	< 9	< 27	< 11	< 55
	03/31/21 - 03/31/21	< 5	< 6	< 11	< 8	< 9	< 8	< 10	< 8	< 6	< 27	< 5	< 49
	04/28/21 - 04/28/21	< 7	< 7	< 14	< 5	< 14	< 5	< 12	< 7	< 7	< 35	< 10	< 45
	05/26/21 - 05/26/21	< 7	< 7	< 15	< 8	< 15	< 9	< 14	< 7	< 8	< 26	< 10	< 57
	06/30/21 - 06/30/21	< 8	< 11	< 18	< 7	< 22	< 12	< 18	< 11	< 11	< 36	< 12	< 63
	07/28/21 - 07/28/21	< 6	< 7	< 14	< 8	< 10	< 5	< 14	< 7	< 7	< 27	< 12	< 43
	08/25/21 - 08/25/21	< 6	< 5	< 11	< 7	< 10	< 7	< 12	< 8	< 6	< 23	< 6	< 47
	09/29/21 - 09/29/21	< 7	< 5	< 13	< 5	< 12	< 7	< 11	< 7	< 6	< 29	< 12	< 47
	10/27/21 - 10/27/21	< 5	< 5	< 12	< 6	< 10	< 6	< 8	< 6	< 6	< 21	< 9	< 33
	11/24/21 - 11/24/21	< 4	< 4	< 9	< 4	< 8	< 4	< 7	< 5	< 3	< 17	< 8	< 24
	12/29/21 - 12/29/21	< 6	< 6	< 13	< 5	< 12	< 6	< 10	< 7	< 6	< 32	< 9	< 45
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
CL-90	12/30/20 - 01/27/21	< 6	< 6	< 11	< 6	< 12	< 5	< 9	< 6	< 5	< 19	< 8	< 41
	01/27/21 - 02/24/21	< 8	< 7	< 14	< 9	< 18	< 9	< 16	< 7	< 8	< 34	< 14	< 48
	02/24/21 - 03/31/21	< 6	< 9	< 15	< 8	< 13	< 7	< 12	< 7	< 7	< 32	< 12	< 52
	03/31/21 - 04/28/21	< 6	< 6	< 12	< 4	< 9	< 6	< 12	< 7	< 7	< 26	< 9	< 47
	04/28/21 - 05/26/21	< 8	< 6	< 13	< 7	< 13	< 5	< 9	< 8	< 8	< 27	< 8	< 48
	05/26/21 - 06/30/21	< 7	< 6	< 15	< 6	< 12	< 5	< 9	< 6	< 5	< 19	< 8	< 39
	06/30/21 - 07/28/21	< 6	< 6	< 11	< 8	< 17	< 5	< 14	< 7	< 7	< 28	< 8	< 44
	07/28/21 - 08/25/21	< 4	< 4	< 10	< 5	< 8	< 4	< 8	< 5	< 5	< 20	< 7	< 27
	08/25/21 - 09/29/21	< 6	< 5	< 12	< 5	< 11	< 5	< 11	< 6	< 6	< 28	< 7	< 45
	09/29/21 - 10/27/21	< 5	< 5	< 12	< 4	< 10	< 3	< 9	< 6	< 5	< 19	< 6	< 32
	10/27/21 - 11/24/21	< 5	< 5	< 13	< 5	< 10	< 5	< 8	< 6	< 4	< 27	< 7	< 42
	11/24/21 - 12/29/21	< 8	< 7	< 17	< 5	< 17	< 8	< 14	< 10	< 8	< 36	< 10	< 59
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-I.3

CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

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	12/30/20 - 01/27/21	< 4	< 5	< 9	< 9	< 13	< 5	< 9	< 5	< 5	< 20	< 8	< 34
	01/27/21 - 02/24/21	< 7	< 7	< 18	< 6	< 8	< 8	< 14	< 8	< 7	< 36	< 10	< 54
	02/24/21 - 03/31/21	< 6	< 7	< 13	< 8	< 9	< 8	< 12	< 8	< 8	< 31	< 12	< 49
	03/31/21 - 04/28/21	< 6	< 6	< 14	< 7	< 13	< 6	< 10	< 7	< 7	< 26	< 10	< 35
	04/28/21 - 05/26/21	< 7	< 8	< 18	< 6	< 13	< 7	< 14	< 8	< 7	< 32	< 10	< 40
	05/26/21 - 06/30/21	< 7	< 5	< 13	< 6	< 14	< 7	< 10	< 7	< 6	< 24	< 8	< 45
	06/30/21 - 07/28/21	< 7	< 7	< 13	< 6	< 13	< 5	< 11	< 7	< 8	< 29	< 9	< 37
	07/28/21 - 08/25/21	< 6	< 5	< 13	< 7	< 13	< 6	< 10	< 6	< 6	< 24	< 6	< 46
	08/25/21 - 09/29/21	< 5	< 7	< 11	< 5	< 12	< 6	< 11	< 7	< 6	< 26	< 8	< 46
	09/29/21 - 10/27/21	< 6	< 6	< 14	< 8	< 11	< 7	< 12	< 8	< 8	< 24	< 11	< 38
	10/27/21 - 11/24/21	< 6	< 5	< 13	< 5	< 11	< 5	< 10	< 6	< 7	< 28	< 8	< 40
	11/24/21 - 12/29/21	< 7	< 4	< 9	< 7	< 12	< 6	< 12	< 7	< 6	< 27	< 9	< 47
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
CL-99	12/30/20 - 01/27/21	< 5	< 4	< 10	< 6	< 9	< 5	< 9	< 5	< 5	< 18	< 5	< 36
	01/27/21 - 02/24/21	< 5	< 5	< 10	< 5	< 11	< 6	< 9	< 6	< 7	< 26	< 7	< 43
	02/24/21 - 03/31/21	< 7	< 6	< 15	< 9	< 15	< 7	< 14	< 5	< 7	< 35	< 7	< 44
	03/31/21 - 04/28/21	< 5	< 7	< 9	< 6	< 10	< 6	< 10	< 5	< 6	< 24	< 6	< 43
	04/28/21 - 05/26/21	< 7	< 4	< 14	< 7	< 15	< 7	< 13	< 5	< 6	< 21	< 12	< 40
	05/26/21 - 06/30/21	< 7	< 6	< 14	< 8	< 12	< 7	< 11	< 8	< 8	< 23	< 10	< 51
	06/30/21 - 07/28/21	< 9	< 6	< 12	< 7	< 16	< 8	< 13	< 8	< 8	< 28	< 10	< 55
	07/28/21 - 08/25/21	< 8	< 7	< 14	< 7	< 14	< 8	< 13	< 8	< 9	< 32	< 8	< 60
	08/25/21 - 09/29/21	< 6	< 6	< 15	< 8	< 10	< 7	< 10	< 8	< 8	< 38	< 12	< 59
	09/29/21 - 10/27/21	< 4	< 5	< 9	< 6	< 9	< 5	< 8	< 5	< 5	< 22	< 5	< 35
	10/27/21 - 11/24/21	< 6	< 7	< 15	< 6	< 13	< 7	< 12	< 6	< 7	< 27	< 12	< 38
	11/24/21 - 12/29/21	< 6	< 7	< 16	< 7	< 13	< 7	< 12	< 8	< 6	< 30	< 13	< 46
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-II.1 **CONCENTRATIONS OF GROSS BETA IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-14
12/30/20 - 01/27/21	< 1.7
01/27/21 - 02/24/21	< 1.3
02/24/21 - 03/31/21	< 1.6
03/31/21 - 04/28/21	< 1.5
04/28/21 - 05/26/21	< 1.8
05/26/21 - 06/30/21	< 1.9
06/30/21 - 07/28/21	< 1.7
07/28/21 - 08/25/21	< 1.9
08/25/21 - 09/29/21	< 1.7
09/29/21 - 10/27/21	< 1.5
10/27/21 - 11/24/21	< 1.5
11/24/21 - 12/29/21	< 1.6
MEAN	-

Table C-II.2 **CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-14
12/30/20 - 03/31/21	< 180
03/31/21 - 06/30/21	< 182
06/30/21 - 09/29/21	< 191
09/29/21 - 12/29/21	< 188
MEAN	-

Table C-II.3 **CONCENTRATIONS OF I-131 IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-14
12/30/20 - 01/27/21	< 0.7
01/27/21 - 02/24/21	< 0.9
02/24/21 - 03/31/21	< 0.8
03/31/21 - 04/28/21	< 0.9
04/28/21 - 05/26/21	< 0.9
05/26/21 - 06/30/21	< 0.7
06/30/21 - 07/28/21	< 0.8
07/28/21 - 08/25/21	< 0.7
08/25/21 - 09/29/21	< 0.9
09/29/21 - 10/27/21	< 0.8
10/27/21 - 11/24/21	< 0.8
11/24/21 - 12/29/21	< 0.6
MEAN	-

Table C-II.4

CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

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	12/30/20 - 01/27/21	< 8	< 7	< 13	< 7	< 12	< 7	< 9	< 7	< 6	< 21	< 6	< 41
	01/27/21 - 02/24/21	< 5	< 6	< 16	< 8	< 14	< 7	< 11	< 6	< 7	< 32	< 10	< 44
	02/24/21 - 03/31/21	< 7	< 7	< 13	< 7	< 12	< 7	< 12	< 6	< 7	< 31	< 12	< 46
	03/31/21 - 04/28/21	< 5	< 5	< 12	< 7	< 13	< 3	< 8	< 4	< 5	< 18	< 6	< 34
	04/28/21 - 05/26/21	< 7	< 7	< 12	< 6	< 12	< 8	< 13	< 7	< 8	< 29	< 8	< 53
	05/26/21 - 06/30/21	< 6	< 6	< 14	< 6	< 10	< 5	< 10	< 6	< 7	< 20	< 8	< 42
	06/30/21 - 07/28/21	< 6	< 6	< 12	< 6	< 12	< 6	< 11	< 7	< 7	< 24	< 10	< 38
	07/28/21 - 08/25/21	< 4	< 7	< 13	< 7	< 14	< 6	< 9	< 7	< 7	< 25	< 9	< 55
	08/25/21 - 09/29/21	< 7	< 4	< 15	< 7	< 12	< 6	< 11	< 7	< 7	< 27	< 9	< 47
	09/29/21 - 10/27/21	< 7	< 7	< 10	< 5	< 11	< 6	< 10	< 7	< 7	< 26	< 7	< 45
	10/27/21 - 11/24/21	< 5	< 4	< 11	< 6	< 12	< 5	< 8	< 7	< 6	< 26	< 11	< 35
	11/24/21 - 12/29/21	< 3	< 5	< 9	< 5	< 7	< 6	< 9	< 5	< 5	< 26	< 7	< 33
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-III.1

CONCENTRATIONS OF TRITIUM IN WELL WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-07D	CL-12R	CL-12T
03/31/21 - 03/31/21	< 167	< 167	< 168
06/30/21 - 06/30/21	< 192	< 188	< 192
09/29/21 - 09/29/21	< 186	< 186	< 187
12/29/21 - 12/29/21	< 178	< 173	< 184
MEAN	-	-	-

Table C-III.2

CONCENTRATIONS OF GAMMA EMITTERS IN WELL WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

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	03/31/21	< 6	< 8	< 15	< 8	< 13	< 7	< 11	< 8	< 6	< 28	< 10	< 48
	06/30/21	< 7	< 6	< 14	< 8	< 19	< 8	< 12	< 9	< 9	< 33	< 9	< 57
	09/29/21	< 6	< 5	< 15	< 9	< 14	< 6	< 12	< 8	< 5	< 29	< 9	< 35
	12/29/21	< 5	< 7	< 13	< 7	< 11	< 7	< 11	< 7	< 7	< 30	< 8	< 44
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
CL-12R	03/31/21	< 5	< 7	< 10	< 6	< 12	< 7	< 10	< 5	< 6	< 31	< 11	< 52
	06/30/21	< 8	< 8	< 14	< 10	< 15	< 8	< 15	< 10	< 8	< 34	< 13	< 55
	09/29/21	< 8	< 6	< 15	< 8	< 16	< 8	< 15	< 7	< 7	< 33	< 10	< 49
	12/29/21	< 6	< 6	< 11	< 6	< 12	< 7	< 11	< 6	< 7	< 23	< 9	< 47
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
CL-12T	03/31/21	< 6	< 6	< 11	< 7	< 15	< 7	< 11	< 7	< 8	< 26	< 8	< 44
	06/30/21	< 4	< 4	< 10	< 6	< 12	< 4	< 9	< 5	< 7	< 25	< 11	< 31
	09/29/21	< 8	< 6	< 15	< 8	< 15	< 8	< 13	< 8	< 7	< 35	< 12	< 41
	12/29/21	< 6	< 5	< 15	< 7	< 14	< 7	< 10	< 5	< 5	< 26	< 8	< 37
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-IV.1

CONCENTRATIONS OF GAMMA EMITTERS IN FISH SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

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													
Largemouth Bass	04/30/21	< 68	< 46	< 141	< 59	< 96	< 59	< 110	< 42	< 57	< 197	< 78	< 239
Channel Catfish	04/30/21	< 77	< 70	< 124	< 25	< 134	< 81	< 118	< 89	< 72	< 291	< 101	< 391
Bluegill	04/30/21	< 66	< 64	< 131	< 59	< 83	< 55	< 102	< 62	< 51	< 191	< 71	< 277
Carp	04/30/21	< 52	< 38	< 109	< 53	< 154	< 54	< 85	< 33	< 57	< 271	< 48	< 212
Largemouth Bass	10/12/21	< 81	< 83	< 145	< 59	< 112	< 80	< 132	< 90	< 69	< 344	< 92	< 403
Channel Catfish	10/12/21	< 70	< 60	< 139	< 66	< 179	< 79	< 125	< 78	< 70	< 335	< 94	< 387
Bluegill	10/12/21	< 59	< 55	< 119	< 52	< 90	< 50	< 94	< 63	< 61	< 268	< 82	< 276
Carp	10/12/21	< 54	< 63	< 145	< 59	< 79	< 74	< 122	< 58	< 60	< 285	< 44	< 310
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
CL-105													
Largemouth Bass	04/30/21	< 67	< 69	< 139	< 84	< 122	< 74	< 134	< 75	< 71	< 291	< 49	< 357
White Crappie	04/30/21	< 50	< 44	< 92	< 56	< 92	< 53	< 105	< 65	< 57	< 225	< 66	< 238
Bluegill	04/30/21	< 50	< 43	< 112	< 52	< 113	< 46	< 76	< 52	< 47	< 202	< 77	< 215
Carp	04/30/21	< 72	< 81	< 151	< 62	< 184	< 79	< 135	< 99	< 72	< 354	< 110	< 372
Largemouth Bass	10/12/21	< 50	< 58	< 120	< 73	< 106	< 65	< 98	< 58	< 69	< 292	< 136	< 271
White Crappie/White Bass	10/12/21	< 83	< 76	< 161	< 87	< 130	< 78	< 122	< 87	< 92	< 243	< 114	< 341
Bluegill	10/12/21	< 50	< 54	< 102	< 58	< 152	< 51	< 71	< 57	< 46	< 264	< 88	< 259
Carp	10/12/21	< 64	< 80	< 156	< 69	< 133	< 67	< 136	< 90	< 85	< 319	< 88	< 428
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-V.1

CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

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-07B	04/30/21	< 37	< 40	< 84	< 34	< 98	< 46	< 73	< 51	< 37	< 191	< 58	< 253
	10/12/21	< 59	< 59	< 122	< 65	< 128	< 61	< 114	< 62	< 47	< 261	< 63	< 317
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
CL-105	04/30/21	< 53	< 52	< 123	< 48	< 112	< 50	< 89	< 42	< 61	< 223	< 75	< 323
	10/12/21	< 55	< 62	< 168	< 81	< 162	< 62	< 120	< 74	< 64	< 265	< 97	< 277
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

Table C-VI.1 **CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021**

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
12/30/20 - 01/06/21	24 ± 5	18 ± 4	23 ± 5	21 ± 5	24 ± 5	28 ± 8
01/06/21 - 01/13/21	16 ± 4	19 ± 4	16 ± 4	17 ± 4	17 ± 4	16 ± 4
01/13/21 - 01/20/21	17 ± 4	18 ± 5	20 ± 5	16 ± 4	22 ± 5	20 ± 5
01/20/21 - 01/27/21	14 ± 4	12 ± 4	14 ± 4	16 ± 4	15 ± 4	14 ± 4
01/27/21 - 02/03/21	20 ± 4	16 ± 4	20 ± 5	17 ± 4	22 ± 5	23 ± 5
02/03/21 - 02/10/21	35 ± 5	36 ± 5	32 ± 6	26 ± 5	33 ± 6	33 ± 5
02/10/21 - 02/17/21	18 ± 4	21 ± 5	19 ± 5	20 ± 5	26 ± 6	21 ± 4
02/17/21 - 02/24/21	23 ± 5	21 ± 5	20 ± 4	21 ± 5	27 ± 5	24 ± 5
02/24/21 - 03/03/21	14 ± 4	14 ± 4	16 ± 4	17 ± 4	14 ± 4	19 ± 5
03/03/21 - 03/10/21	17 ± 4	18 ± 4	21 ± 4	17 ± 4	15 ± 4	17 ± 4
03/10/21 - 03/17/21	13 ± 4	14 ± 4	15 ± 4	15 ± 4	15 ± 4	12 ± 4
03/17/21 - 03/24/21	13 ± 4	14 ± 4	11 ± 4	13 ± 4	19 ± 5	18 ± 4
03/24/21 - 03/31/21	12 ± 4	10 ± 4	14 ± 4	15 ± 4	15 ± 4	12 ± 4
03/31/21 - 04/07/21	20 ± 5	20 ± 5	20 ± 5	17 ± 4	18 ± 4	23 ± 5
04/07/21 - 04/14/21	13 ± 4	13 ± 4	11 ± 3	13 ± 4	16 ± 4	13 ± 4
04/14/21 - 04/21/21	13 ± 4	11 ± 4	12 ± 4	9 ± 4	14 ± 4	14 ± 4
04/21/21 - 04/28/21	21 ± 5	23 ± 5	21 ± 5	17 ± 4	18 ± 4	20 ± 5
04/28/21 - 05/05/21	17 ± 4	17 ± 4	5 ± 3	16 ± 4	14 ± 4	18 ± 4
05/05/21 - 05/12/21	8 ± 3	12 ± 4	8 ± 3	8 ± 4	6 ± 3	7 ± 3
05/12/21 - 05/19/21	22 ± 5	20 ± 5	22 ± 5	17 ± 4	15 ± 4	16 ± 4
05/19/21 - 05/26/21	21 ± 5	20 ± 5	17 ± 4	19 ± 5	20 ± 5	20 ± 4
05/26/21 - 06/02/21	16 ± 4	17 ± 4	19 ± 4	14 ± 4	14 ± 4	23 ± 5
06/02/21 - 06/09/21	15 ± 4	13 ± 4	17 ± 4	15 ± 4	15 ± 4	16 ± 4
06/09/21 - 06/16/21	14 ± 4	17 ± 4	13 ± 4	15 ± 4	14 ± 4	16 ± 4
06/16/21 - 06/23/21	20 ± 4	21 ± 4	20 ± 4	19 ± 4	21 ± 4	25 ± 5
06/23/21 - 06/30/21	11 ± 4	14 ± 4	8 ± 4	12 ± 4	13 ± 4	11 ± 4
06/30/21 - 07/07/21	13 ± 4	15 ± 4	17 ± 4	11 ± 4	15 ± 4	14 ± 4
07/07/21 - 07/14/21	16 ± 4	15 ± 4	15 ± 4	16 ± 4	13 ± 4	17 ± 4
07/14/21 - 07/21/21	19 ± 4	17 ± 4	16 ± 4	15 ± 4	16 ± 4	17 ± 4
07/21/21 - 07/28/21	28 ± 5	28 ± 5	5 ± 3	25 ± 5	29 ± 5	30 ± 5
07/28/21 - 08/04/21	25 ± 11	*(1)*	22 ± 5	15 ± 4	22 ± 5	23 ± 5
08/04/21 - 08/11/21	21 ± 5	25 ± 6	20 ± 5	16 ± 4	19 ± 5	22 ± 5
08/11/21 - 08/18/21	16 ± 4	23 ± 4	22 ± 4	19 ± 4	17 ± 4	21 ± 4
08/18/21 - 08/25/21	28 ± 5	27 ± 5	30 ± 5	25 ± 5	30 ± 5	27 ± 5
08/25/21 - 09/01/21	15 ± 4	16 ± 4	15 ± 4	13 ± 4	18 ± 4	16 ± 4
09/01/21 - 09/08/21	25 ± 5	26 ± 5	6 ± 3	19 ± 4	25 ± 5	25 ± 5
09/08/21 - 09/15/21	18 ± 5	18 ± 5	21 ± 5	18 ± 5	17 ± 5	20 ± 5
09/15/21 - 09/22/21	19 ± 5	20 ± 5	21 ± 5	22 ± 5	25 ± 5	23 ± 5
09/22/21 - 09/29/21	23 ± 5	25 ± 5	24 ± 5	21 ± 5	27 ± 5	32 ± 5
09/29/21 - 10/06/21	26 ± 5	32 ± 5	32 ± 5	24 ± 5	30 ± 5	31 ± 5
10/06/21 - 10/13/21	30 ± 5	33 ± 5	26 ± 5	24 ± 5	29 ± 5	29 ± 5
10/13/21 - 10/20/21	21 ± 5	25 ± 5	24 ± 5	23 ± 5	24 ± 5	26 ± 5
10/20/21 - 10/27/21	14 ± 4	15 ± 4	18 ± 4	15 ± 4	15 ± 4	15 ± 4
10/27/21 - 11/03/21	14 ± 4	16 ± 4	15 ± 4	18 ± 4	16 ± 4	16 ± 4
11/03/21 - 11/10/21	30 ± 5	33 ± 5	34 ± 5	34 ± 5	35 ± 5	40 ± 6
11/10/21 - 11/17/21	17 ± 5	16 ± 5	15 ± 5	14 ± 4	15 ± 4	16 ± 5
11/17/21 - 11/24/21	15 ± 4	16 ± 4	19 ± 4	17 ± 4	16 ± 4	13 ± 4
11/24/21 - 12/01/21	25 ± 5	29 ± 5	32 ± 5	25 ± 5	27 ± 5	28 ± 5
12/01/21 - 12/08/21	21 ± 4	18 ± 4	22 ± 4	22 ± 4	19 ± 4	20 ± 4
12/08/21 - 12/15/21	18 ± 5	22 ± 5	21 ± 5	19 ± 5	23 ± 5	22 ± 5
12/15/21 - 12/22/21	20 ± 4	23 ± 5	23 ± 5	23 ± 5	28 ± 5	24 ± 5
12/22/21 - 12/29/21	34 ± 5	37 ± 6	41 ± 6	38 ± 6	39 ± 6	38 ± 6
MEAN ± 2 STD DEV	19 ± 12	20 ± 13	19 ± 15	18 ± 11	20 ± 13	21 ± 14

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

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-VI.1 **CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021**

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

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, 2021

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
12/30/20 - 02/03/21	12	28	18 ± 7	12/30/20 - 02/03/21	9	25	18 ± 7	12/30/20 - 02/03/21	13	22	17 ± 7
02/03/21 - 03/03/21	14	36	23 ± 14	02/03/21 - 03/03/21	13	35	23 ± 15	02/03/21 - 03/03/21	16	32	23 ± 14
03/03/21 - 03/31/21	10	21	15 ± 5	03/03/21 - 03/31/21	10	19	14 ± 5	03/03/21 - 03/31/21	14	16	15 ± 2
03/31/21 - 04/28/21	9	23	16 ± 8	03/31/21 - 04/28/21	8	19	14 ± 8	03/31/21 - 04/28/21	8	23	16 ± 13
04/28/21 - 06/02/21	5	23	16 ± 10	04/28/21 - 06/02/21	8	19	15 ± 8	04/28/21 - 06/02/21	10	22	15 ± 10
06/02/21 - 06/30/21	8	25	16 ± 8	06/02/21 - 06/30/21	8	20	15 ± 8	06/02/21 - 06/30/21	10	19	16 ± 9
06/30/21 - 08/04/21	5	30	18 ± 12	06/30/21 - 08/04/21	12	29	19 ± 11	06/30/21 - 08/04/21	14	28	20 ± 11
08/04/21 - 09/01/21	13	30	21 ± 10	08/04/21 - 09/01/21	10	30	20 ± 12	08/04/21 - 09/01/21	15	28	21 ± 11
09/01/21 - 09/29/21	6	32	22 ± 10	09/01/21 - 09/29/21	18	30	24 ± 8	09/01/21 - 09/29/21	19	28	24 ± 8
09/29/21 - 11/03/21	14	33	23 ± 13	09/29/21 - 11/03/21	11	31	22 ± 12	09/29/21 - 11/03/21	18	31	24 ± 10
11/03/21 - 12/01/21	13	40	23 ± 17	11/03/21 - 12/01/21	10	33	21 ± 18	11/03/21 - 12/01/21	17	31	24 ± 15
12/01/21 - 12/29/21	18	41	26 ± 15	12/01/21 - 12/29/21	19	35	23 ± 9	12/01/21 - 12/29/21	20	34	25 ± 13
12/30/20 - 12/29/21	5	41	20 ± 13	12/30/20 - 12/29/21	8	35	19 ± 12	12/30/20 - 12/29/21	8	34	20 ± 12

Table C-VI.3 CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

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	12/30/20 - 03/31/21	< 1	< 2	< 4	< 2	< 18	< 2	< 2	< 2	< 8
	03/31/21 - 06/30/21	< 3	< 2	< 3	< 2	< 15	< 2	< 2	< 2	< 6
	06/30/21 - 09/29/21	< 3	< 3	< 5	< 3	< 24	< 2	< 3	< 3	< 11
	09/29/21 - 12/29/21	< 4	< 3	< 6	< 4	< 32	< 4	< 4	< 4	< 12
	MEAN	-	-	-	-	-	-	-	-	-
CL-2	12/30/20 - 03/31/21	< 2	< 2	< 4	< 3	< 23	< 3	< 2	< 3	< 10
	03/31/21 - 06/30/21	< 2	< 2	< 4	< 1	< 11	< 1	< 1	< 2	< 6
	06/30/21 - 09/29/21	< 2	< 2	< 3	< 2	< 14	< 2	< 2	< 2	< 7
	09/29/21 - 12/29/21	< 2	< 2	< 3	< 2	< 15	< 3	< 2	< 2	< 9
	MEAN	-	-	-	-	-	-	-	-	-
CL-3	12/30/20 - 03/31/21	< 2	< 2	< 3	< 2	< 15	< 2	< 2	< 2	< 7
	03/31/21 - 06/30/21	< 2	< 1	< 2	< 1	< 13	< 1	< 1	< 2	< 6
	06/30/21 - 09/29/21	< 3	< 3	< 5	< 3	< 23	< 3	< 3	< 3	< 11
	09/29/21 - 12/29/21	< 2	< 3	< 5	< 4	< 31	< 3	< 3	< 4	< 13
	MEAN	-	-	-	-	-	-	-	-	-
CL-4	12/30/20 - 03/31/21	< 3	< 3	< 5	< 2	< 22	< 3	< 3	< 3	< 11
	03/31/21 - 06/30/21	< 2	< 2	< 4	< 2	< 18	< 2	< 2	< 2	< 6
	06/30/21 - 09/29/21	< 2	< 2	< 3	< 2	< 17	< 2	< 2	< 2	< 7
	09/29/21 - 12/29/21	< 1	< 3	< 3	< 2	< 16	< 2	< 2	< 3	< 9
	MEAN	-	-	-	-	-	-	-	-	-
CL-6	12/30/20 - 03/31/21	< 2	< 2	< 3	< 2	< 20	< 2	< 1	< 2	< 8
	03/31/21 - 06/30/21	< 3	< 3	< 6	< 4	< 28	< 3	< 3	< 4	< 15
	06/30/21 - 09/29/21	< 3	< 4	< 5	< 4	< 25	< 4	< 3	< 3	< 12
	09/29/21 - 12/29/21	< 2	< 2	< 4	< 2	< 15	< 2	< 2	< 3	< 8
	MEAN	-	-	-	-	-	-	-	-	-

Table C-VI.3 CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

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	12/30/20 - 03/31/21	< 2	< 3	< 5	< 2	< 22	< 2	< 3	< 3	< 10
	03/31/21 - 06/30/21	< 2	< 2	< 4	< 2	< 20	< 2	< 2	< 2	< 6
	06/30/21 - 09/29/21	< 2	< 2	< 3	< 2	< 18	< 2	< 2	< 2	< 9
	09/29/21 - 12/29/21	< 3	< 2	< 3	< 2	< 20	< 2	< 2	< 3	< 8
	MEAN	-	-	-	-	-	-	-	-	-
CL-8	12/30/20 - 03/31/21	< 3	< 2	< 3	< 2	< 14	< 2	< 2	< 2	< 7
	03/31/21 - 06/30/21	< 2	< 1	< 3	< 2	< 13	< 2	< 2	< 2	< 6
	06/30/21 - 09/29/21	< 1	< 2	< 3	< 2	< 16	< 2	< 2	< 3	< 9
	09/29/21 - 12/29/21	< 3	< 2	< 3	< 2	< 12	< 2	< 2	< 2	< 6
	MEAN	-	-	-	-	-	-	-	-	-
CL-11	12/30/20 - 03/31/21	< 4	< 3	< 5	< 4	< 28	< 3	< 3	< 4	< 12
	03/31/21 - 06/30/21	< 2	< 2	< 3	< 1	< 14	< 2	< 1	< 2	< 7
	06/30/21 - 09/29/21	< 4	< 3	< 4	< 3	< 20	< 3	< 2	< 3	< 10
	09/29/21 - 12/29/21	< 2	< 2	< 4	< 1	< 18	< 2	< 2	< 2	< 6
	MEAN	-	-	-	-	-	-	-	-	-
CL-15	12/30/20 - 03/31/21	< 3	< 2	< 2	< 2	< 11	< 2	< 1	< 2	< 7
	03/31/21 - 06/30/21	< 2	< 1	< 2	< 1	< 14	< 1	< 1	< 2	< 6
	06/30/21 - 09/29/21	< 3	< 3	< 5	< 3	< 23	< 3	< 3	< 4	< 13
	09/29/21 - 12/29/21	< 4	< 3	< 6	< 3	< 24	< 3	< 3	< 4	< 12
	MEAN	-	-	-	-	-	-	-	-	-
CL-94	12/30/20 - 03/31/21	< 1	< 2	< 4	< 2	< 20	< 2	< 2	< 2	< 7
	03/31/21 - 06/30/21	< 4	< 3	< 5	< 3	< 22	< 3	< 3	< 3	< 12
	06/30/21 - 09/29/21	< 2	< 2	< 3	< 2	< 12	< 1	< 2	< 2	< 6
	09/29/21 - 12/29/21	< 3	< 2	< 3	< 2	< 18	< 2	< 2	< 3	< 8
	MEAN	-	-	-	-	-	-	-	-	-

Table C-VII.1 **CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021**

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
12/30/20 - 01/06/21	< 33	< 34	< 16	< 35	< 37	< 32
01/06/21 - 01/13/21	< 30	< 30	< 15	< 31	< 36	< 24
01/13/21 - 01/20/21	< 51	< 52	< 22	< 51	< 35	< 35
01/20/21 - 01/27/21	< 41	< 41	< 17	< 42	< 37	< 15
01/27/21 - 02/03/21	< 25	< 25	< 25	< 25	< 34	< 35
02/03/21 - 02/10/21	< 37	< 37	< 35	< 39	< 66	< 25
02/10/21 - 02/17/21	< 55	< 55	< 24	< 56	< 24	< 45
02/17/21 - 02/24/21	< 20	< 46	< 45	< 46	< 21	< 49
02/24/21 - 03/03/21	< 38	< 18	< 39	< 39	< 51	< 51
03/03/21 - 03/10/21	< 51	< 52	< 52	< 52	< 19	< 19
03/10/21 - 03/17/21	< 46	< 46	< 20	< 47	< 41	< 42
03/17/21 - 03/24/21	< 56	< 58	< 57	< 25	< 36	< 35
03/24/21 - 03/31/21	< 44	< 44	< 44	< 36	< 57	< 57
03/31/21 - 04/07/21	< 33	< 33	< 28	< 33	< 47	< 22
04/07/21 - 04/14/21	< 21	< 50	< 50	< 50	< 15	< 31
04/14/21 - 04/21/21	< 26	< 26	< 26	< 11	< 9	< 20
04/21/21 - 04/28/21	< 30	< 26	< 31	< 30	< 18	< 41
04/28/21 - 05/05/21	< 28	< 34	< 33	< 33	< 46	< 45
05/05/21 - 05/12/21	< 31	< 31	< 31	< 32	< 43	< 43
05/12/21 - 05/19/21	< 49	< 48	< 20	< 49	< 33	< 27
05/19/21 - 05/26/21	< 28	< 24	< 28	< 28	< 22	< 22
05/26/21 - 06/02/21	< 21	< 49	< 49	< 49	< 31	< 31
06/02/21 - 06/09/21	< 23	< 23	< 23	< 23	< 25	< 24
06/09/21 - 06/16/21	< 19	< 46	< 46	< 46	< 35	< 35
06/16/21 - 06/23/21	< 34	< 34	< 34	< 34	< 37	< 36
06/23/21 - 06/30/21	< 52	< 53	< 52	< 52	< 49	< 48
06/30/21 - 07/07/21	< 22	< 22	< 11	< 22	< 25	< 25
07/07/21 - 07/14/21	< 18	< 44	< 44	< 44	< 44	< 43
07/14/21 - 07/21/21	< 32	< 32	< 32	< 32	< 33	< 32
07/21/21 - 07/28/21	< 50	< 21	< 50	< 50	< 43	< 18
07/28/21 - 08/04/21	< 40	*(1)*	< 33	< 33	< 41	< 41
08/04/21 - 08/11/21	< 42	< 25	< 42	< 43	< 47	< 47
08/11/21 - 08/18/21	< 40	< 40	< 40	< 17	< 51	< 51
08/18/21 - 08/25/21	< 16	< 15	< 16	< 15	< 21	< 17
08/25/21 - 09/01/21	< 20	< 46	< 47	< 47	< 45	< 19
09/01/21 - 09/08/21	< 43	< 18	< 44	< 44	< 42	< 42
09/08/21 - 09/15/21	< 41	< 41	< 21	< 41	< 31	< 37
09/15/21 - 09/22/21	< 28	< 28	< 28	< 28	< 25	< 25
09/22/21 - 09/29/21	< 59	< 59	< 59	< 59	< 53	< 52
09/29/21 - 10/06/21	< 48	< 48	< 48	< 20	< 50	< 50
10/06/21 - 10/13/21	< 23	< 11	< 23	< 23	< 19	< 19
10/13/21 - 10/20/21	< 48	< 49	< 49	< 20	< 43	< 43
10/20/21 - 10/27/21	< 48	< 48	< 48	< 19	< 54	< 53
10/27/21 - 11/03/21	< 20	< 24	< 23	< 23	< 32	< 14
11/03/21 - 11/10/21	< 40	< 41	< 41	< 39	< 44	< 44
11/10/21 - 11/17/21	< 17	< 40	< 40	< 39	< 25	< 24
11/17/21 - 11/24/21	< 63	< 64	< 63	< 26	< 34	< 34
11/24/21 - 12/01/21	< 22	< 53	< 53	< 53	< 36	< 37
12/01/21 - 12/08/21	< 37	< 16	< 38	< 38	< 24	< 21
12/08/21 - 12/15/21	< 37	< 37	< 37	< 25	< 56	< 57
12/15/21 - 12/22/21	< 23	< 55	< 55	< 54	< 37	< 24
12/22/21 - 12/29/21	< 45	< 46	< 46	< 20	< 45	< 46
MEAN	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

Table C-VII.1 **CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021**

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
12/30/20 - 01/06/21	< 35	< 38	< 38	< 38
01/06/21 - 01/13/21	< 30	< 36	< 35	< 36
01/13/21 - 01/20/21	< 52	< 35	< 31	< 35
01/20/21 - 01/27/21	< 41	< 38	< 38	< 36
01/27/21 - 02/03/21	< 21	< 35	< 34	< 15
02/03/21 - 02/10/21	< 38	< 61	< 60	< 61
02/10/21 - 02/17/21	< 56	< 47	< 46	< 47
02/17/21 - 02/24/21	< 46	< 49	< 50	< 49
02/24/21 - 03/03/21	< 39	< 52	< 53	< 22
03/03/21 - 03/10/21	< 22	< 20	< 20	< 20
03/10/21 - 03/17/21	< 46	< 41	< 18	< 41
03/17/21 - 03/24/21	< 57	< 37	< 18	< 36
03/24/21 - 03/31/21	< 44	< 48	< 57	< 56
03/31/21 - 04/07/21	< 33	< 47	< 46	< 47
04/07/21 - 04/14/21	< 50	< 32	< 31	< 31
04/14/21 - 04/21/21	< 27	< 20	< 20	< 20
04/21/21 - 04/28/21	< 30	< 41	< 41	< 41
04/28/21 - 05/05/21	< 33	< 47	< 46	< 20
05/05/21 - 05/12/21	< 13	< 44	< 18	< 44
05/12/21 - 05/19/21	< 48	< 33	< 33	< 33
05/19/21 - 05/26/21	< 28	< 11	< 22	< 22
05/26/21 - 06/02/21	< 49	< 16	< 32	< 31
06/02/21 - 06/09/21	< 11	< 25	< 13	< 25
06/09/21 - 06/16/21	< 46	< 30	< 34	< 35
06/16/21 - 06/23/21	< 29	< 37	< 18	< 37
06/23/21 - 06/30/21	< 23	< 49	< 21	< 49
06/30/21 - 07/07/21	< 22	< 25	< 25	< 17
07/07/21 - 07/14/21	< 44	< 43	< 19	< 43
07/14/21 - 07/21/21	< 13	< 33	< 16	< 33
07/21/21 - 07/28/21	< 51	< 43	< 43	< 42
07/28/21 - 08/04/21	< 33	< 17	< 40	< 41
08/04/21 - 08/11/21	< 42	< 47	< 20	< 47
08/11/21 - 08/18/21	< 40	< 22	< 50	< 51
08/18/21 - 08/25/21	< 7	< 21	< 21	< 21
08/25/21 - 09/01/21	< 47	< 44	< 45	< 44
09/01/21 - 09/08/21	< 44	< 43	< 18	< 43
09/08/21 - 09/15/21	< 42	< 37	< 37	< 36
09/15/21 - 09/22/21	< 12	< 25	< 25	< 12
09/22/21 - 09/29/21	< 25	< 52	< 53	< 22
09/29/21 - 10/06/21	< 49	< 50	< 34	< 50
10/06/21 - 10/13/21	< 23	< 19	< 16	< 19
10/13/21 - 10/20/21	< 49	< 43	< 18	< 43
10/20/21 - 10/27/21	< 49	< 52	< 23	< 52
10/27/21 - 11/03/21	< 24	< 33	< 33	< 33
11/03/21 - 11/10/21	< 17	< 43	< 19	< 44
11/10/21 - 11/17/21	< 39	< 24	< 21	< 24
11/17/21 - 11/24/21	< 64	< 34	< 23	< 34
11/24/21 - 12/01/21	< 53	< 36	< 16	< 37
12/01/21 - 12/08/21	< 38	< 25	< 25	< 24
12/08/21 - 12/15/21	< 37	< 23	< 57	< 56
12/15/21 - 12/22/21	< 54	< 36	< 36	< 36
12/22/21 - 12/29/21	< 47	< 45	< 20	< 46
MEAN	-	-	-	-

Table C-VIII.1 CONCENTRATIONS OF I-131 IN MILK SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CONTROL FARM CL-116
01/27/21	< 0.8
02/24/21	< 0.9
03/31/21	< 0.7
04/28/21	< 0.9
05/12/21	< 0.9
05/26/21	< 0.3
06/09/21	< 0.5
06/23/21	< 0.7
07/07/21	< 0.9
07/21/21	< 0.7
08/04/21	< 0.8
08/18/21	< 0.7
09/01/21	< 0.9
09/15/21	< 0.9
09/29/21	< 0.9
10/13/21	< 1.0
10/27/21	< 0.9
11/24/21	< 0.9
12/29/21	< 0.8
MEAN	-

Table C-VIII.2

CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

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	01/27/21	912 ± 164	< 7	< 7	< 15	< 10	< 16	< 7	< 14	< 8	< 10	< 27	< 8	< 54
	02/24/21	1122 ± 179	< 10	< 7	< 18	< 10	< 15	< 8	< 14	< 9	< 10	< 38	< 11	< 60
	03/31/21	1159 ± 197	< 7	< 9	< 23	< 6	< 18	< 8	< 16	< 9	< 8	< 36	< 12	< 63
	04/28/21	1010 ± 158	< 9	< 10	< 19	< 10	< 18	< 9	< 15	< 10	< 9	< 32	< 8	< 58
	05/12/21	1204 ± 186	< 8	< 8	< 16	< 9	< 20	< 7	< 16	< 9	< 8	< 26	< 6	< 63
	05/26/21	1120 ± 186	< 8	< 8	< 19	< 7	< 19	< 7	< 12	< 10	< 9	< 38	< 9	< 58
	06/09/21	1230 ± 162	< 7	< 8	< 17	< 9	< 19	< 7	< 14	< 9	< 7	< 26	< 10	< 40
	06/23/21	1116 ± 175	< 9	< 8	< 17	< 9	< 18	< 8	< 16	< 9	< 7	< 30	< 7	< 56
	07/07/21	1039 ± 133	< 6	< 7	< 15	< 6	< 16	< 8	< 12	< 7	< 8	< 22	< 7	< 51
	07/21/21	1062 ± 171	< 7	< 9	< 12	< 10	< 17	< 8	< 12	< 11	< 9	< 33	< 9	< 57
	08/04/21	723 ± 151	< 8	< 7	< 20	< 8	< 16	< 9	< 12	< 8	< 8	< 30	< 8	< 68
	08/18/21	1024 ± 175	< 9	< 9	< 21	< 9	< 14	< 9	< 15	< 10	< 8	< 39	< 11	< 63
	09/01/21	1011 ± 121	< 5	< 5	< 13	< 7	< 13	< 6	< 11	< 6	< 6	< 28	< 8	< 41
	09/15/21	997 ± 119	< 5	< 5	< 12	< 5	< 11	< 5	< 8	< 6	< 6	< 22	< 8	< 37
	09/29/21	1447 ± 189	< 7	< 9	< 18	< 7	< 16	< 8	< 11	< 8	< 8	< 43	< 11	< 60
	10/13/21	891 ± 162	< 8	< 9	< 16	< 9	< 20	< 8	< 16	< 10	< 9	< 36	< 12	< 61
	10/27/21	1182 ± 176	< 7	< 7	< 14	< 5	< 15	< 8	< 12	< 7	< 9	< 32	< 8	< 61
	11/24/21	1083 ± 149	< 6	< 7	< 16	< 7	< 15	< 8	< 10	< 7	< 8	< 33	< 11	< 55
	12/29/21	1083 ± 160	< 7	< 7	< 15	< 8	< 16	< 7	< 10	< 8	< 8	< 29	< 9	< 44
	MEAN ± 2 STD DEV	1074 ± 301	-	-	-	-	-	-	-	-	-	-	-	-

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, 2021

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	06/30/21	< 30	< 30	< 57	< 33	< 70	< 32	< 47	< 46	< 34	< 31	< 151	< 43	< 159
Lettuce	06/30/21	< 24	< 25	< 66	< 35	< 62	< 34	< 39	< 47	< 32	< 28	< 116	< 42	< 198
Swiss Chard	06/30/21	< 28	< 31	< 69	< 32	< 75	< 36	< 60	< 53	< 41	< 36	< 133	< 59	< 190
Cabbage	07/28/21	< 17	< 23	< 50	< 32	< 61	< 29	< 40	< 28	< 27	< 26	< 92	< 17	< 173
Lettuce	07/28/21	< 26	< 28	< 74	< 24	< 70	< 24	< 58	< 34	< 34	< 25	< 107	< 31	< 139
Swiss Chard	07/28/21	< 32	< 28	< 66	< 32	< 75	< 29	< 60	< 33	< 36	< 28	< 121	< 21	< 193
Cabbage	08/25/21	< 28	< 28	< 49	< 38	< 60	< 30	< 51	< 33	< 32	< 29	< 101	< 23	< 176
Lettuce	08/25/21	< 23	< 29	< 56	< 33	< 71	< 30	< 42	< 32	< 29	< 26	< 82	< 28	< 153
Swiss Chard	08/25/21	< 22	< 21	< 51	< 33	< 57	< 28	< 37	< 27	< 32	< 24	< 102	< 24	< 127
Cabbage	09/29/21	< 21	< 22	< 49	< 25	< 50	< 25	< 34	< 31	< 24	< 23	< 92	< 28	< 119
Cabbage	09/29/21	< 25	< 23	< 49	< 24	< 56	< 27	< 42	< 37	< 31	< 24	< 108	< 19	< 137
Swiss Chard	09/29/21	< 27	< 27	< 76	< 31	< 77	< 28	< 52	< 45	< 29	< 33	< 134	< 38	< 155
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-115														
Cabbage	06/30/21	< 29	< 22	< 49	< 25	< 40	< 24	< 37	< 46	< 26	< 27	< 121	< 23	< 144
Lettuce	06/30/21	< 28	< 21	< 45	< 35	< 50	< 21	< 36	< 35	< 24	< 28	< 116	< 34	< 132
Swiss Chard	06/30/21	< 23	< 26	< 60	< 28	< 71	< 26	< 47	< 40	< 36	< 29	< 116	< 32	< 158
Cabbage	07/28/21	< 26	< 30	< 76	< 34	< 53	< 28	< 50	< 38	< 31	< 35	< 137	< 37	< 193
Swiss Chard	07/28/21	< 23	< 31	< 48	< 31	< 81	< 30	< 47	< 28	< 31	< 31	< 105	< 35	< 152
Swiss Chard	07/28/21	< 26	< 26	< 68	< 28	< 73	< 31	< 51	< 36	< 32	< 32	< 114	< 32	< 179
Cabbage	08/25/21	< 27	< 29	< 51	< 29	< 69	< 32	< 49	< 34	< 30	< 27	< 97	< 35	< 170
Swiss Chard	08/25/21	< 23	< 32	< 53	< 35	< 72	< 33	< 45	< 28	< 29	< 27	< 114	< 30	< 169
Soy Beans	08/25/21	< 20	< 23	< 47	< 22	< 61	< 22	< 42	< 26	< 25	< 30	< 90	< 33	< 117
Cabbage	09/29/21	< 28	< 36	< 68	< 37	< 73	< 33	< 52	< 50	< 42	< 32	< 97	< 48	< 160
Swiss Chard	09/29/21	< 26	< 22	< 50	< 28	< 52	< 22	< 42	< 33	< 24	< 25	< 102	< 31	< 116
Swiss Chard	09/29/21	< 26	< 29	< 59	< 26	< 69	< 31	< 42	< 37	< 34	< 28	< 111	< 26	< 154
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-118														
Cabbage	06/30/21	< 31	< 27	< 76	< 37	< 78	< 37	< 73	< 50	< 40	< 37	< 152	< 36	< 207
Kale	06/30/21	< 26	< 25	< 62	< 23	< 70	< 33	< 54	< 46	< 33	< 31	< 131	< 33	< 177
Swiss Chard	06/30/21	< 31	< 29	< 53	< 23	< 63	< 29	< 45	< 39	< 32	< 28	< 138	< 35	< 167
Broccoli	07/28/21	< 28	< 30	< 44	< 42	< 90	< 31	< 64	< 31	< 30	< 36	< 133	< 29	< 168
Broccoli	07/28/21	< 32	< 30	< 56	< 33	< 73	< 29	< 47	< 33	< 35	< 30	< 110	< 31	< 161
Swiss Chard	07/28/21	< 36	< 34	< 76	< 39	< 63	< 39	< 64	< 37	< 34	< 34	< 103	< 28	< 208
Broccoli	08/25/21	< 32	< 30	< 62	< 28	< 87	< 27	< 46	< 37	< 41	< 28	< 111	< 44	< 162
Broccoli/Swiss Chard	08/25/21	< 37	< 35	< 82	< 40	< 74	< 34	< 56	< 42	< 37	< 38	< 125	< 32	< 242
Swiss Chard	08/25/21	< 36	< 30	< 93	< 41	< 95	< 41	< 52	< 43	< 44	< 39	< 151	< 36	< 221
Broccoli	09/29/21	< 31	< 28	< 68	< 28	< 61	< 31	< 53	< 46	< 32	< 30	< 133	< 42	< 202
Broccoli	09/29/21	< 36	< 34	< 54	< 39	< 76	< 29	< 60	< 55	< 39	< 39	< 138	< 40	< 168
Swiss Chard	09/29/21	< 50	< 42	< 104	< 63	< 106	< 53	< 96	< 57	< 55	< 47	< 240	< 24	< 232
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C-IX.2

CONCENTRATIONS OF GAMMA EMITTERS IN GRASS SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

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	05/12/21	< 28	< 29	< 61	< 25	< 74	< 28	< 41	< 31	< 34	< 30	< 93	< 24	< 180
	05/26/21	< 36	< 28	< 73	< 29	< 50	< 26	< 44	< 31	< 30	< 29	< 106	< 29	< 177
	06/09/21	< 28	< 31	< 52	< 22	< 72	< 30	< 45	< 35	< 26	< 28	< 93	< 25	< 179
	06/23/21	< 30	< 37	< 55	< 28	< 56	< 30	< 47	< 41	< 36	< 29	< 96	< 21	< 176
	07/07/21	< 27	< 25	< 50	< 16	< 65	< 25	< 36	< 25	< 24	< 27	< 91	< 24	< 149
	07/21/21	< 29	< 25	< 60	< 33	< 67	< 35	< 47	< 31	< 31	< 29	< 110	< 30	< 190
	08/04/21	< 25	< 32	< 54	< 27	< 62	< 31	< 48	< 26	< 24	< 21	< 109	< 30	< 166
	08/18/21	< 34	< 30	< 99	< 29	< 75	< 31	< 67	< 39	< 42	< 36	< 129	< 39	< 210
	09/01/21	< 13	< 14	< 39	< 17	< 36	< 15	< 27	< 23	< 15	< 16	< 67	< 19	< 78
	09/15/21	< 33	< 35	< 65	< 37	< 76	< 40	< 52	< 48	< 40	< 33	< 132	< 42	< 183
	09/29/21	< 33	< 31	< 60	< 27	< 74	< 37	< 56	< 53	< 32	< 32	< 132	< 48	< 209
	10/13/21	< 14	< 17	< 31	< 19	< 36	< 17	< 26	< 22	< 16	< 15	< 67	< 24	< 98
	10/27/21	< 21	< 20	< 44	< 25	< 49	< 24	< 40	< 35	< 21	< 22	< 86	< 31	< 163
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-02	05/12/21	< 19	< 24	< 41	< 28	< 52	< 16	< 34	< 28	< 18	< 23	< 77	< 26	< 125
	05/26/21	< 30	< 23	< 71	< 40	< 80	< 33	< 46	< 30	< 34	< 30	< 110	< 34	< 174
	06/09/21	< 22	< 23	< 53	< 22	< 63	< 23	< 41	< 27	< 28	< 22	< 97	< 32	< 157
	06/23/21	< 30	< 30	< 88	< 30	< 88	< 36	< 57	< 41	< 40	< 34	< 120	< 34	< 159
	07/07/21	< 34	< 31	< 76	< 32	< 76	< 31	< 47	< 38	< 32	< 35	< 114	< 32	< 209
	07/21/21	< 28	< 25	< 73	< 28	< 79	< 28	< 35	< 27	< 30	< 25	< 106	< 31	< 162
	08/04/21	< 24	< 33	< 67	< 32	< 66	< 26	< 46	< 37	< 33	< 31	< 97	< 39	< 180
	08/18/21	< 22	< 22	< 64	< 24	< 74	< 27	< 47	< 35	< 38	< 33	< 108	< 32	< 180
	09/01/21	< 14	< 14	< 29	< 13	< 31	< 15	< 26	< 25	< 16	< 14	< 64	< 16	< 102
	09/15/21	< 42	< 34	< 83	< 42	< 77	< 38	< 61	< 49	< 39	< 40	< 162	< 59	< 209
	09/29/21	< 31	< 34	< 75	< 28	< 74	< 26	< 62	< 56	< 37	< 37	< 145	< 45	< 174
	10/13/21	< 26	< 21	< 52	< 20	< 52	< 22	< 47	< 26	< 25	< 25	< 86	< 29	< 148
	10/27/21	< 21	< 25	< 39	< 30	< 59	< 25	< 44	< 39	< 26	< 19	< 92	< 27	< 173
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C-IX.2

CONCENTRATIONS OF GAMMA EMITTERS IN GRASS SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

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	05/12/21	< 29	< 27	< 64	< 22	< 68	< 28	< 44	< 22	< 22	< 30	< 92	< 34	< 167
	05/26/21	< 31	< 29	< 75	< 33	< 72	< 28	< 48	< 33	< 35	< 32	< 106	< 26	< 196
	06/09/21	< 23	< 29	< 69	< 34	< 59	< 27	< 50	< 32	< 31	< 34	< 109	< 48	< 181
	06/23/21	< 22	< 25	< 54	< 27	< 65	< 25	< 46	< 39	< 27	< 27	< 92	< 19	< 175
	07/07/21	< 36	< 37	< 70	< 38	< 75	< 36	< 55	< 36	< 38	< 33	< 120	< 38	< 229
	07/21/21	< 35	< 25	< 72	< 37	< 73	< 40	< 51	< 35	< 45	< 34	< 128	< 23	< 217
	08/04/21	< 30	< 39	< 69	< 44	< 87	< 37	< 50	< 32	< 40	< 38	< 115	< 22	< 218
	08/18/21	< 35	< 23	< 81	< 53	< 73	< 40	< 62	< 30	< 46	< 47	< 124	< 48	< 202
	09/01/21	< 20	< 21	< 42	< 19	< 43	< 21	< 36	< 32	< 21	< 21	< 88	< 27	< 109
	09/15/21	< 33	< 33	< 59	< 33	< 70	< 30	< 58	< 51	< 38	< 33	< 140	< 37	< 230
	09/29/21	< 29	< 41	< 57	< 40	< 72	< 39	< 65	< 56	< 39	< 32	< 188	< 41	< 180
	10/13/21	< 20	< 18	< 41	< 20	< 43	< 22	< 32	< 28	< 21	< 19	< 76	< 23	< 128
	10/27/21	< 26	< 32	< 72	< 33	< 75	< 29	< 43	< 38	< 33	< 25	< 92	< 31	< 174
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-116	05/12/21	< 22	< 21	< 60	< 22	< 66	< 28	< 45	< 32	< 31	< 30	< 92	< 22	< 170
	05/26/21	< 25	< 22	< 45	< 32	< 58	< 20	< 40	< 24	< 29	< 20	< 82	< 20	< 145
	06/09/21	< 25	< 26	< 78	< 34	< 70	< 28	< 48	< 27	< 27	< 30	< 92	< 35	< 168
	06/23/21	< 30	< 30	< 70	< 32	< 74	< 33	< 47	< 34	< 35	< 33	< 118	< 36	< 175
	07/07/21	< 28	< 30	< 70	< 34	< 63	< 28	< 39	< 35	< 36	< 28	< 125	< 20	< 212
	07/21/21	< 29	< 33	< 70	< 29	< 81	< 37	< 52	< 36	< 38	< 36	< 146	< 24	< 200
	08/04/21	< 29	< 27	< 72	< 33	< 66	< 33	< 42	< 35	< 38	< 29	< 114	< 38	< 179
	08/18/21	< 31	< 24	< 71	< 38	< 78	< 34	< 60	< 35	< 36	< 37	< 91	< 34	< 243
	09/01/21	< 12	< 12	< 28	< 12	< 26	< 12	< 21	< 21	< 13	< 13	< 54	< 12	< 82
	09/15/21	< 32	< 32	< 68	< 35	< 63	< 39	< 59	< 50	< 36	< 34	< 154	< 40	< 217
	09/29/21	< 31	< 34	< 80	< 30	< 74	< 29	< 51	< 54	< 30	< 31	< 157	< 61	< 165
	10/13/21	< 23	< 25	< 39	< 21	< 51	< 21	< 32	< 22	< 22	< 18	< 81	< 23	< 112
	10/27/21	< 20	< 20	< 51	< 17	< 56	< 25	< 38	< 32	< 19	< 21	< 89	< 21	< 128
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C-X.1 QUARTERLY DLR RESULTS FOR CLINTON POWER STATION, 2021

Location	Qtr 1 (mrem)	Qtr 2 (mrem)	Qtr 3 (mrem)	Qtr 4 (mrem)	Normalized Annual Dose, M_A (mrem/yr)	B_A[1]	B_A + MDD_A[2]	Annual Facility Dose, F_A (mrem)
CL-01	17.1	18.7	19.1	19.6	74.5	74.0	83.6	ND
CL-02	17.8	19.2	19.1	17.2	73.3	76.7	86.2	ND
CL-03	17.3	22.1	20.7	18.7	78.8	74.7	84.2	ND
CL-04	18.3	18.1	19.8	17.5	73.7	72.8	82.3	ND
CL-05	18.1	19.2	20.1	19.0	76.4	76.5	86.0	ND
CL-06	15.2	16.7	18.0	17.1	67.0	65.8	75.3	ND
CL-07	*16.6*	*15.9*	17.2	16.4	66.1	69.5	79.0	ND
CL-08	17.4	18.7	19.0	17.5	72.6	74.0	83.5	ND
CL-11	17.0	17.2	17.6	17.7	69.5	69.3	78.8	ND
CL-15	16.6	15.9	16.0	16.7	65.2	66.3	75.8	ND
CL-22	18.0	19.4	20.0	19.1	76.5	77.6	87.1	ND
CL-23	18.9	19.7	20.2	19.2	78.0	81.5	91.0	ND
CL-24	18.6	19.7	20.0	20.2	78.5	80.5	90.0	ND
CL-33	18.0	19.4	19.5	17.3	74.2	79.2	88.7	ND
CL-34	16.5	18.8	19.2	18.5	73.0	77.5	87.0	ND
CL-35	16.6	18.0	19.0	18.7	72.3	71.6	81.1	ND
CL-36	17.3	18.4	5.5	17.9	59.1	74.2	83.7	ND
CL-37	17.5	20.6	20.1	16.9	75.1	71.1	80.6	ND
CL-41	18.8	18.9	21.6	21.0	80.3	79.4	88.9	ND
CL-42	18.5	18.8	18.6	19.2	75.1	74.2	83.7	ND
CL-43	18.7	19.3	21.9	20.2	80.1	79.7	89.2	ND
CL-44	16.8	19.8	17.4	18.3	72.3	75.4	84.9	ND
CL-45	19.8	19.2	20.6	19.6	79.2	80.6	90.1	ND
CL-46	17.5	20.9	19.3	18.0	75.7	73.0	82.5	ND
CL-47	17.4	18.9	19.7	19.1	75.1	79.4	88.9	ND
CL-48	18.4	19.0	18.0	17.6	73.0	74.2	83.7	ND
CL-49	18.5	20.0	21.5	18.9	78.9	79.8	89.3	ND
CL-51	18.8	19.7	20.5	20.6	79.6	76.6	86.1	ND
CL-52	16.3	17.2	21.7	20.1	75.3	75.6	85.1	ND
CL-53	16.7	20.2	18.6	17.6	73.1	71.9	81.4	ND
CL-54	19.8	20.9	21.2	19.1	81.0	78.0	87.5	ND
CL-55	20.6	21.4	20.8	20.1	82.9	78.7	88.2	ND
CL-56	17.1	19.5	19.9	20.9	77.4	81.0	90.5	ND
CL-57	18.9	20.2	19.2	19.4	77.7	81.5	91.0	ND
CL-58	18.3	18.4	20.8	20.2	77.7	79.1	88.6	ND
CL-60	17.8	20.1	21.1	19.0	78.0	79.0	88.5	ND
CL-61	16.5	16.5	18.8	18.9	70.7	78.1	87.6	ND
CL-63	17.7	18.9	16.8	17.9	71.3	66.6	76.1	ND
CL-64	18.3	18.9	20.4	19.6	77.2	75.9	85.4	ND
CL-65	16.6	17.5	20.6	19.2	73.9	80.5	90.01	ND
CL-74	17.4	19.1	17.4	17.9	71.8	68	77.51	ND
CL-75	17.0	21.1	19.5	18.4	76	75.7	85.21	ND
CL-76	17.9	17.4	20.2	19.7	75.2	78.7	88.21	ND
CL-77	18.1	19.3	18.7	17.9	74	72.2	81.71	ND
CL-78	17.9	18.3	18.6	18.3	73.1	72	81.51	ND
CL-79	18.5	18.5	19.2	19.2	75.4	77.1	86.61	ND
CL-80	18.7	19.3	18.9	20.0	76.9	75.5	85.01	ND
CL-81	17.6	20.8	17.8	17.7	73.9	76.8	86.31	ND
CL-84	16.6	15.3	19.3	19.2	70.4	76.3	85.81	ND
CL-90	17.0	17.3	14.6	14.8	63.7	62.2	71.71	ND
CL-91	19.2	18.6	18.6	17.6	74	69.5	79.01	ND
CL-97	15.5	16.0	20.1	19.7	71.3	77.6	87.11	ND
CL-99	15.1	16.2	13.0	15.9	60.2	60.6	70.11	ND
CL-114	17.4	18.1	19.7	18.1	73.3	72.3	81.8	ND

[1] **Baseline background dose (B_A):** The estimated mean background radiation dose at each field monitoring location annually based on historical measurements, excluding any dose contribution from the monitored facility

[2] **Minimum differential dose (MDD_A):** The smallest amount of facility related dose at each monitored location annually above the baseline background dose that can be reliably detected by an environmental dosimetry system

FIGURE C-1
MEAN MONTHLY GROSS BETA CONCENTRATION IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CPS, 2021

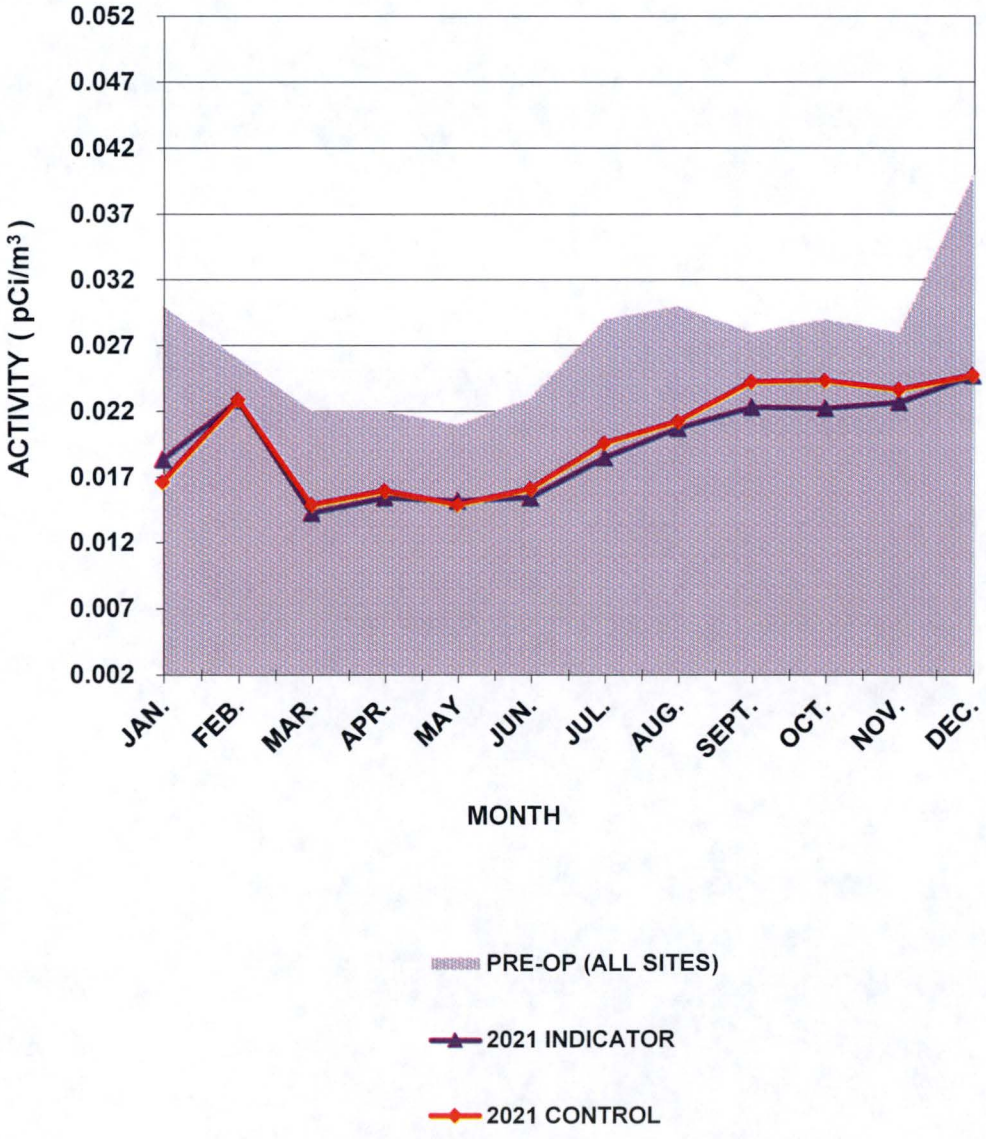
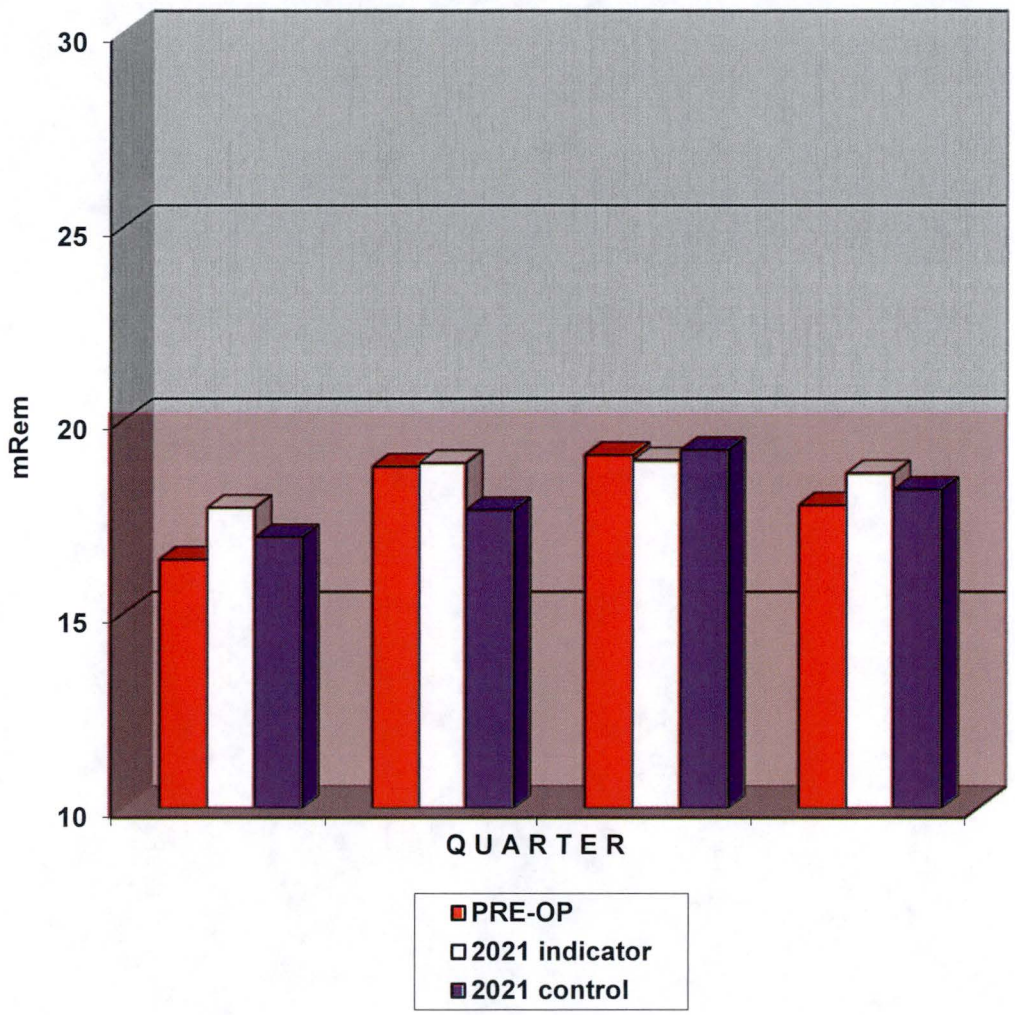


FIGURE C-2
MEAN QUARTERLY AMBIENT GAMMA RADIATION LEVELS (DLR)
IN THE VICINITY OF CPS, 2021



APPENDIX D

INTER-LABORATORY COMPARISON PROGRAM

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Table D.1 **Analytics Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Ratio of TBE to Analytics Result	Evaluation [b]
March 2021	E13466	Milk	Sr-89	pCi/L	84.6	87.1	0.97	A
			Sr-90	pCi/L	11.5	12.6	0.91	A
	E13467	Milk	Ce-141	pCi/L	111	125	0.89	A
			Co-58	pCi/L	123	128	0.96	A
			Co-60	pCi/L	140	154	0.91	A
			Cr-51	pCi/L	252	242	1.04	A
			Cs-134	pCi/L	130	151	0.86	A
			Cs-137	pCi/L	110	110	1.00	A
			Fe-59	pCi/L	105	109	0.96	A
			I-131	pCi/L	77.6	86.9	0.89	A
			Mn-54	pCi/L	111	112	0.99	A
			Zn-65	pCi/L	200	211	0.95	A
	E13468	Charcoal	I-131	pCi	83.5	88.5	0.94	A
	E13469	AP	Ce-141	pCi	103.0	103	1.00	A
			Co-58	pCi	93.3	105	0.89	A
			Co-60	pCi	136	126	1.08	A
			Cr-51	pCi	213	198	1.07	A
			Cs-134	pCi	123.0	124	0.99	A
			Cs-137	pCi	86.3	90.1	0.96	A
			Fe-59	pCi	81.3	89.6	0.91	A
			Mn-54	pCi	93.5	92.0	1.02	A
			Zn-65	pCi	166	173	0.96	A
	E13470	Soil	Ce-141	pCi/g	0.232	0.262	0.89	A
			Co-58	pCi/g	0.251	0.268	0.94	A
			Co-60	pCi/g	0.306	0.322	0.95	A
			Cr-51	pCi/g	0.517	0.506	1.02	A
			Cs-134	pCi/g	0.263	0.317	0.83	A
			Cs-137	pCi/g	0.278	0.301	0.92	A
			Fe-59	pCi/g	0.228	0.229	1.00	A
			Mn-54	pCi/g	0.221	0.235	0.94	A
			Zn-65	pCi/g	0.448	0.441	1.02	A
	E13471	AP	Sr-89	pCi	92.2	95.5	0.97	A
			Sr-90	pCi	11.7	13.9	0.84	A

(a) 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

(b) 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

Table D.1 **Analytics Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Ratio of TBE to Analytics Result	Evaluation [b]
September 2021	E13472	Milk	Sr-89	pCi/L	66.4	85.4	0.78	W
			Sr-90	pCi/L	11.9	14.0	0.85	A
	E13473	Milk	Ce-141	pCi/L	118	114	1.03	A
			Co-58	pCi/L	116	118	0.98	A
			Co-60	pCi/L	142	145	0.98	A
			Cr-51	pCi/L	244	236	1.03	A
			Cs-134	pCi/L	81	93.1	0.87	A
			Cs-137	pCi/L	105	112	0.94	A
			Fe-59	pCi/L	105	102	1.03	A
			I-131	pCi/L	65.1	85.6	0.76	W
			Mn-54	pCi/L	128	128	1.00	A
			Zn-65	pCi/L	158	153	1.03	A
	E13474	Charcoal	I-131	pCi	85.2	90.9	0.94	A
	E13475	AP	Ce-141	pCi	126	135	0.94	A
			Co-58	pCi	148	139	1.07	A
			Co-60	pCi	183	171	1.07	A
			Cr-51	pCi	322	278	1.16	A
			Cs-134	pCi	118	110	1.08	A
			Cs-137	pCi	147	132	1.12	A
			Fe-59	pCi	131	120	1.09	A
			Mn-54	pCi	161	151	1.06	A
			Zn-65	pCi	202	180	1.12	A
	E13476	Soil	Ce-141	pCi/g	0.215	0.219	0.98	A
			Co-58	pCi/g	0.208	0.226	0.92	A
			Co-60	pCi/g	0.277	0.277	1.00	A
			Cr-51	pCi/g	0.388	0.452	0.86	A
			Cs-134	pCi/g	0.157	0.178	0.88	A
			Cs-137	pCi/g	0.270	0.284	0.95	A
			Fe-59	pCi/g	0.218	0.195	1.12	A
			Mn-54	pCi/g	0.239	0.246	0.97	A
			Zn-65	pCi/g	0.312	0.293	1.06	A
	E13477	AP	Sr-89	pCi	85.6	68.3	1.25	W
			Sr-90	pCi	12.6	11.2	1.13	A

(a) 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

(b) 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

Table D.2 **DOE's Mixed Analyte Performance Evaluation Program (MAPEP)**
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Acceptance Range	Evaluation [b]
February 2021	21-GrF44	AP	Gross Alpha	Bq/sample	0.371	1.77	0.53 - 3.01	N[3]
			Gross Beta	Bq/sample	0.731	0.65	0.325 - 0.974	A
	21-MaS44	Soil	Ni-63	Bq/kg	310	689.0	482 - 896	N[4]
			Tc-99	Bq/kg	457	638	447 - 829	W
	21-MaSU44	Urine	Cs-134	Bq/L	2.34	2.73	1.91 - 3.55	A
			Cs-137	Bq/L	2.54	2.71	1.90 - 3.52	A
			Co-57	Bq/L	0.4100		*(1)*	A
			Co-60	Bq/L	2.24	2.44	1.71 - 3.17	A
			Mn-54	Bq/L	2.03	2.03	1.42 - 2.64	A
			K-40	Bq/L	52.8	54.0	38 - 70	A
			U-234	Bq/L	0.108	0.0877	0.0614 - 0.114	W
			U-238	Bq/L	0.101	0.091	0.064 - 0.118	A
			Zn-65	Bq/L	1.06	1.34	*(2)*	A
	21-MaW44	Water	Ni-63	Bq/L	6.7	8.2	5.7 - 10.7	A
			Tc-99	Bq/L	3.850	4.01	2.81 - 5.21	A
	21-RdV44	Vegetation	Cs-134	Bq/sample	3.13	3.60	2.5 - 4.7	A
			Cs-137	Bq/sample	4.64	4.69	3.28 - 6.10	A
			Co-57	Bq/sample	5.25	5.05	3.54 - 6.57	A
			Co-60	Bq/sample	2.86	2.99	2.09 - 3.89	A
			Mn-54	Bq/sample	5.02	5.25	3.68 - 6.83	A
			Sr-90	Bq/sample	0.631	0.673	0.471 - 0.875	A
			Zn-65	Bq/sample	-0.233		*(1)*	A
August 2021	21-GrF45	AP	Gross Alpha	Bq/sample	0.368	0.960	0.288 - 1.632	A
			Gross Beta	Bq/sample	0.595	0.553	0.277 - 0.830	A
	21-MaS45	Soil	Ni-63	Bq/kg	546	1280	896 - 1664	N[5]
			Tc-99	Bq/kg	453	777	544 - 1010	N[5]
	21-MaSU45	Urine	Cs-134	Bq/L	3.10	3.62	2.53 - 4.71	A
			Cs-137	Bq/L	0.083		*(1)*	A
			Co-57	Bq/L	0.844	0.87	0.606 - 1.125	A
			Co-60	Bq/L	0.0535		*(1)*	A
			Mn-54	Bq/L	0.459	0.417	*(2)*	A
			K-40	Bq/L	48.8	54.0	38 - 70	A
			U-234	Bq/L	0.133	0.116	0.081 - 0.151	A
			U-238	Bq/L	0.137	0.121	0.085 - 0.157	A
			Zn-65	Bq/L	0.339	0.420	*(2)*	A
	21-MaW45	Water	Ni-63	Bq/L	33.5	39.5	27.7 - 51.4	A
			Tc-99	Bq/L	3.5	3.7	2.60 - 4.82	A
	21-RdV45	Vegetation	Cs-134	Bq/sample	3.42	4.34	3.04 - 5.64	W
			Cs-137	Bq/sample	2.14	2.21	1.55 - 2.87	A
			Co-57	Bq/sample	4.08	4.66	3.26 - 6.06	A
			Co-60	Bq/sample	2.81	3.51	2.46 - 4.56	A
			Mn-54	Bq/sample	0.035		*(1)*	A
			Sr-90	Bq/sample	1.15	1.320	0.92 - 1.72	A
			Zn-65	Bq/sample	2.05	2.43	1.70 - 3.16	A

(a) 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

(b) DOE/MAPEP evaluation:
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

(1) False positive test
(2) Sensitivity evaluation
*(3) See **NCR 21-02***
*(4) See **NCR 21-03***
*(5) See **NCR 21-13***
(6) Tc-99 cross-checks done for TBE information only - not required

Table D.3 **ERA Environmental Radioactivity Cross Check Program**
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Reported Value	Known Value [a]	Acceptance Limits	Evaluation [b]
March 2021	MRAD-34	Water	Am-241	pCi/L	175	157	108 - 201	A
			Fe-55	pCi/L	579	275	162 - 400	N[1]
			Pu-238	pCi/L	181	171	103 - 222	A
			Pu-239	pCi/L	153	142	87.9 - 175	A
		Soil	Sr-90	pCi/kg	6570	9190	2860 - 14,300	A
		AP	Fe-55	pCi/filter	107	121	44.2 - 193	A
			U-234	pCi/filter	25.99	25.5	18.9 - 29.9	A
			U-238	pCi/filter	24.7	25.3	19.1 - 30.2	A
April 2021	RAD-125	Water	Ba-133	pCi/L	92.3	90.5	76.2 - 99.6	A
			Cs-134	pCi/L	62.9	70.5	57.5 - 77.6	A
			Cs-137	pCi/L	161	168	151 - 187	A
			Co-60	pCi/L	22.5	20.9	17.7 - 25.8	A
			Zn-65	pCi/L	183	177.0	159 - 208	A
			GR-A	pCi/L	30.8	30.2	15.4 - 39.4	A
			GR-B	pCi/L	60.1	67.5	46.8 - 74.2	A
			U-Nat	pCi/L	36.45	36.9	30.0 - 40.8	A
			H-3	pCi/L	13,400	14,600	12,800 - 16,100	A
			Sr-89	pCi/L	64.5	63.5	51.4 - 71.5	A
			Sr-90	pCi/L	22.8	23.0	16.5 - 27.0	A
			I-131	pCi/L	28.2	26.7	22.2 - 31.4	A
September 2021	MRAD-35	Water	Am-241	pCi/L	68	63.7	43.7 - 81.5	A
			Fe-55	pCi/L	179	246	145 - 358	A
			Pu-238	pCi/L	102	114	68.5 - 148	A
			Pu-239	pCi/L	32	34.3	21.2 - 42.3	A
		Soil	Sr-90	pCi/kg	6160	6090	1,900 - 9,490	A
		AP	Fe-55	pCi/filter	493	548	200 - 874	A
			Pu-238	pCi/filter	28	28.5	21.5 - 35.0	A
			Pu-239	pCi/filter	21	21.6	16.1 - 26.1	A
			U-234	pCi/filter	7.95	7.76	5.75 - 9.09	A
			U-238	pCi/filter	8.0	7.69	5.81 - 9.17	A
October 2021	RAD-127	Water	Ba-133	pCi/L	82.8	87.5	73.6 - 96.2	A
			Cs-134	pCi/L	64.0	70.1	57.1 - 77.1	A
			Cs-137	pCi/L	145	156	140 - 174	A
			Co-60	pCi/L	83.2	85.9	77.3 - 96.8	A
			Zn-65	pCi/L	133	145	130 - 171	A
			GR-A	pCi/L	76.0	66.7	35.0 - 82.5	A
			GR-B	pCi/L	63.0	55.7	38.1 - 62.6	N[2]
			U-Nat	pCi/L	52.88	55.5	45.3 - 61.1	A
			H-3	pCi/L	13,800	17,200	15,000 - 18,900	N[3]
			Sr-89	pCi/L	54.9	61.0	49.1 - 68.9	A
			Sr-90	pCi/L	24.8	29.3	21.3 - 34.0	A
			I-131	pCi/L	27.4	26.4	21.9 - 31.1	A
December 2021	QR 120121Y	Water	GR-B	pCi/L	47.6	39.8	26.4 - 47.3	N[4]
			H-3	pCi/L	17,500	17,800	15,600 - 19,600	A

(a) 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.

(b) ERA evaluation:
A = Acceptable - Reported value falls within the Acceptance Limits
N = Not Acceptable - Reported value falls outside of the Acceptance Limits

*(1) See **NCR 21-01***
*(2) See **NCR 21-10***
*(3) See **NCR 21-11***
*(4) See **NCR 21-14***

APPENDIX E

ERRATA DATA

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There was no errata data for 2021.

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APPENDIX F

ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

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ARGPPR Table Of Contents

ARGPPR Appendices

I. Summary and Conclusions

In 2006, Exelon instituted a comprehensive program to evaluate the impact of station operations on groundwater and surface water in the vicinity of Clinton Power Station (CPS). This evaluation involved numerous station personnel and contractor support personnel. This report covers groundwater and surface water samples, collected outside of the Licensee required Off-Site Dose Calculation Manual (ODCM) requirements, both on and off station property in 2021. During that time period, 129 analyses were performed on 72 samples from 28 locations. The monitoring was conducted in four phases.

In assessing all the data gathered for this report, it was concluded that the operation of CPS had no adverse radiological impact on the environment, and there are no known active releases into the groundwater or surface water at CPS. No program changes occurred during the sampling year of 2021.

Gamma-emitting radionuclides associated with licensed plant operations were not detected at concentrations greater than their respective Lower Limits of Detection (LLDs) as specified in NUREG-1302 in any of the groundwater or surface water samples. In the case of tritium, Exelon specified that the independent laboratory achieve a lower limit of detection ten times lower than that required by the United States Environmental Protection Agency (USEPA) regulation.

Strontium-89 (Sr-89) was not detected in any samples. Strontium-90 (Sr-90) was not detected in any samples.

Gross Alpha in the suspended fraction was not detected in any samples. Gross Alpha in the dissolved fraction was detected in one sample.

Tritium was not detected in any of the groundwater or surface water samples at concentrations greater than the United States Environmental Protection Agency (USEPA) drinking water standard (and the Nuclear Regulatory Commission Reporting Limit) of 20,000 pCi/L. Background levels of tritium were detected at concentrations greater than the self-imposed LLD of 200 pCi/L in two of seventeen groundwater monitoring locations. The tritium concentrations ranged from 243 ± 128 pCi/L to 1,500 ± 219 pCi/L. Tritium was not detected in any precipitation water samples.

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 27, 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.

This report covers those analyses performed by Teledyne Brown Engineering (TBE) on samples collected in 2021.

A. Objectives of the Radiological Groundwater Protection Program (RGPP)

The long-term objectives of the RGPP are as follows:

1. Identify suitable locations to monitor and evaluate potential impacts from station operations before significant radiological impact to the environment and potential drinking water sources.
2. Understand the local hydrogeologic regime in the vicinity of the station and maintain knowledge of flow patterns on the surface and shallow subsurface.
3. Perform routine water sampling and radiological analysis of water from selected locations.
4. Report new leaks, spills, or other detections with potential radiological significance to stakeholders in a timely manner.
5. Regularly assess analytical results to identify adverse trends.
6. Take necessary corrective actions to protect groundwater resources.

B. Implementation of the Objectives

The objectives identified have been implemented at Clinton Power Station as discussed below:

1. Exelon and its consultant identified locations as described in the Phase 1 study. Phase 1 studies were conducted by Connestoga Rovers and Associates (CRA) and the results and conclusions were made available to state and federal regulators as well as the public in station specific reports.

2. The Clinton Power Station reports describe the local hydrogeologic regime. Periodically, the flow patterns on the surface and shallow subsurface are updated based on ongoing measurements.

3. Clinton Power Station will continue to perform routine sampling and radiological analysis of water from selected locations.

4. Clinton Power Station has procedures to identify and report new leaks, spills, or other detections with potential radiological significance in a timely manner.

5. Clinton Power Station staff and consulting hydrogeologist assess analytical results on an ongoing basis to identify adverse trends.

C. Program Description

1. Sample Collection

Sample locations can be found in Table A–1 and Figures A–1, A–2, A–3, and A–4 Appendix A.

Groundwater, Surface Water and Precipitation Water

Samples of water are collected, managed, transported and analyzed in accordance with approved procedures following regulatory methods. Groundwater, surface water, and precipitation water are collected. Sample locations, sample collection frequencies and analytical frequencies are controlled in accordance with approved station procedures. Contractor and/or station personnel are trained in the collection, preservation management, and shipment of samples, as well as in documentation of sampling events. Analytical laboratories are subject to internal quality assurance programs and inter-laboratory cross-check programs, as well as nuclear industry audits. Station personnel review and evaluate all analytical data deliverables after initial review by the contractor.

Analytical data results are reviewed by both station personnel and an independent hydrogeologist for adverse trends or changes to hydrogeologic conditions.

D. Characteristics of Tritium (H-3)

Tritium (chemical symbol H-3) is a radioactive isotope of hydrogen. The most common form of tritium is tritium oxide, which is also called "tritiated water." The chemical properties of tritium are essentially those of ordinary hydrogen.

Tritiated water behaves the same as ordinary water in both the environment and the body. Tritium can be taken into the body by drinking water, breathing air, eating food, or absorption through skin. Once tritium

enters the body, it disperses quickly and is uniformly distributed throughout the body. Tritium is excreted primarily through urine with a clearance rate characterized by an effective biological half-life of about 14 days. Within one month or so after ingestion, essentially all tritium is cleared. Organically bound tritium (tritium that is incorporated in organic compounds) can remain in the body for a longer period.

Tritium is produced naturally in the upper atmosphere when cosmic rays strike air molecules. Tritium is also produced during nuclear weapons explosions, as a by-product in reactors producing electricity, and in special production reactors, where the isotopes Lithium-7 (Li-7) and/or Boron-10 (B-10) are activated to produce tritium. Like normal water, tritiated water is colorless and odorless. Tritiated water behaves chemically and physically like non-tritiated water in the subsurface, and therefore tritiated water will travel at the same velocity as the average groundwater velocity.

Tritium has a half-life of approximately 12.3 years. It decays spontaneously to Helium-3 (3He). This radioactive decay releases a beta particle (low-energy electron). The radioactive decay of tritium is the source of the health risk from exposure to tritium. Tritium is one of the least dangerous radionuclides because it emits very weak beta radiation and leaves the body relatively quickly. Since tritium is almost always found as water, it goes directly into soft tissues and organs. The associated dose to these tissues is generally uniform and is dependent on the water content of the specific tissue.

III. Program Description

A. Sample Analysis

This section describes the general analytical methodologies used by TBE to analyze the environmental samples for radioactivity for the Clinton Power Station RGPP in 2021. In order to achieve the stated objectives, the current program includes the following analyses:

1. Concentrations of gamma emitters in groundwater
2. Concentrations of strontium in groundwater
3. Concentrations of tritium in groundwater and precipitation samples
4. Concentrations of gross alpha (dissolved and suspended) in groundwater

B. Data Interpretation

The radiological data collected prior to Clinton Power Station becoming operational were used as a baseline with which these operational data were compared. For the purpose of this report, Clinton Power Station was considered operational at initial criticality. 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) is 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" signal. The LLD is intended as an *a priori* (a before the fact) estimate of a system (including instrumentation, procedure and sample type) and not as an *a posteriori* (after the fact) criteria for the presence of activity. All analyses were designed to achieve the required CPS detection capabilities for environmental sample analysis.

The minimum detectable concentration (MDC) is defined above with the exception that the measurement is an *a posteriori* (after the fact) estimate of the presence of activity.

2. Laboratory Measurements Uncertainty

The estimated uncertainty in measurement of tritium in environmental samples is frequently on the order of 50% of the measurement value. Statistically, the exact value of a measurement is expressed as a range with a stated level of confidence. The convention is to report results with a 95% level of confidence. The uncertainty comes from calibration standards,

sample volume or weight measurements, sampling uncertainty and other factors. Exelon reports the uncertainty of a measurement created by statistical process (counting error) as well as all sources of error (Total Propagated Uncertainty or TPU). Each result has two values calculated. Exelon reports the TPU by following the result with plus or minus ± the estimated sample standard deviation, as TPU, that is obtained by propagating all sources of analytical uncertainty in measurements.

Analytical uncertainties are reported at the 95% confidence level in this report for reporting consistency with the AREOR.

C. Background Analysis

Pre-operational Radiological Environmental Monitoring Program (pre-operational REMP) was conducted to establish background radioactivity levels prior to operation of the Station. The environmental media sampled and analyzed during the pre-operational REMP were atmospheric radiation, fall-out, domestic water, surface water, marine life, milk, and vegetation. The results of the monitoring were detailed in the report entitled, Environmental Radiological Monitoring for Clinton Power Nuclear Power Station, Illinois Power Company, Annual Report 1987, May 1988.

The pre-operational REMP contained analytical results from samples collected from the surface water and groundwater.

1. Background Concentrations of Tritium

The purpose of the following discussion is to summarize background measurements of tritium in various media performed by others:

a. Tritium Production

Tritium is created in the environment from naturally-occurring processes both cosmic and subterranean, as well as from anthropogenic (i.e., man-made) sources. In the upper atmosphere, "Cosmogenic" tritium is produced from the bombardment of stable nuclides and combines with oxygen to form tritiated water, which will then enter the hydrologic cycle. Below ground, "lithogenic" tritium is produced by the bombardment of natural lithium present in crystalline rocks by neutrons produced by the radioactive decay of naturally abundant uranium and thorium. Lithogenic production of tritium is usually negligible compared to other sources due to the limited abundance of lithium in rock. The lithogenic tritium is introduced directly to groundwater.

A major anthropogenic source of tritium and Sr-90 comes from the former atmospheric testing of thermonuclear weapons. Levels of tritium in precipitation increased significantly during the

1950s and early 1960s, and later with additional testing, resulting in the release of significant amounts of tritium to the atmosphere. The Canadian heavy water nuclear power reactors, other commercial power reactors, nuclear research and weapons production continue to influence tritium concentrations in the environment.

b. Precipitation Data

Precipitation samples are routinely collected at stations around the world for the analysis of tritium and other radionuclides. Two publicly available databases that provide tritium concentrations in precipitation are Global Network of Isotopes in Precipitation (GNIP) and USEPA's RadNet database. GNIP provides tritium precipitation concentration data for samples collected world wide from 1960 to 2006. RadNet provides tritium precipitation concentration data for samples collected at stations through out the U.S. from 1960 up to and including 2006. Based on GNIP data for sample stations located in the U.S. Midwest, tritium concentrations peaked around 1963. This peak, which approached 10,000 pCi/L for some stations, coincided with the atmospheric testing of thermonuclear weapons. Tritium concentrations in surface water showed a sharp decline up until 1975, followed by a gradual decline since that time. Tritium concentrations in Midwest precipitation have typically been below 100 pCi/L since around 1980. Tritium concentrations in wells may still be above the 200 pCi/L detection limit from the external causes described above.

c. Surface Water Data

Tritium concentrations are routinely measured in Clinton Lake. According to the USEPA, surface water data typically has an uncertainty ± 70 to 100 pCi/L 95% confidence bound on each given measurement. Therefore, the typical background data provided may be subject to measurement uncertainty of approximately ± 70 to 100 pCi/L.

The radio-analytical laboratory is counting tritium results to an Exelon specified LLD of 200 pCi/L. Typically, the lowest positive measurement will be reported within a range of 40 – 240 pCi/L or 140 ± 100 pCi/L. Clearly, these sample results cannot be distinguished as different from background at this concentration.

IV. Results and Discussion

A. Program Exceptions

1. Sample Anomalies

There were no sample anomalies in 2021.

2. Missed Samples

There were no missed samples in 2021.

B. Program Changes

There were no program changes in 2021.

C. Groundwater Results

Groundwater

Baseline samples were collected from off-site wells during four (4) phases at the station. Analytical results are discussed below:

Tritium

Samples from seventeen locations were analyzed for tritium activity. Tritium values ranged from below the Exelon-imposed LLD of 200 pCi/l to 1,500 pCi/l. (Table B–I.1 Appendix B)

Strontium

Sr-89 was not detected in any of the samples analyzed and the required LLD of 10 pCi/L was met. Sr-90 was also not detected in any of the samples analyzed and the required LLD of 1 pCi/L was met. (Table B-I.1 Appendix B)

Gamma Emitters

No plant-produced radionuclides were detected. (Table B–I.2, Appendix B)

Hard-to-Detect

Hard-to-Detect analyses were not performed in 2021. (Table B–I.3 Appendix B)

D. Surface Water Results

There were no surface water samples analyzed in 2021. (Table B–II.1 Appendix B)

E. Precipitation Water Results (Recapture)

Precipitation water samples from 11 locations were analyzed for tritium

activity. Tritium was detected in one samples at a concentration of 194 pCi/L. (Table B-III.1, Appendix B)

F. Summary of Results – Inter-Laboratory Comparison Program

Inter-Laboratory Comparison Program results for TBE are presented in Section IV, Part G in the Annual Radiological Environmental Operating Report.

G. Errata Data

There was no Errata Data for 2021.

H. Leaks, Spills, and Releases

There were no leaks, spills or releases in 2021.

I. Trends

No trends have been identified in 2021.

J. Investigations

Currently no investigations are on-going.

K. Actions Taken

1. Compensatory Actions

   There have been no station events requiring compensatory actions at the Clinton Power Station in 2021.

2. Installation of Monitoring Wells

   No new wells were installed during the 2021.

3. Actions to Recover/Reverse Plumes

   No actions were required to recover or reverse groundwater plumes.

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APPENDIX A

LOCATION DESIGNATION OF THE ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

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TABLE A-1: Radiological Groundwater Protection Program - Sampling Locations, Clinton Power Station, 2021

Site	Site Type
B-3	Monitoring Well
MW-CL-1	Monitoring Well
MW-CL-2	Monitoring Well
MW-CL-12I	Monitoring Well
MW-CL-13I	Monitoring Well
MW-CL-13S	Monitoring Well
MW-CL-14S	Monitoring Well
MW-CL-15I	Monitoring Well
MW-CL-15S	Monitoring Well
MW-CL-16S	Monitoring Well
MW-CL-17S	Monitoring Well
MW-CL-18I	Monitoring Well
MW-CL-18S	Monitoring Well
MW-CL-19S	Monitoring Well
MW-CL-20S	Monitoring Well
MW-CL-21S	Monitoring Well
MW-CL-22S	Monitoring Well
RG-E	Precipitation Water
RG-ENE	Precipitation Water
RG-N	Precipitation Water
RG-NE	Precipitation Water
RG-NNW	Precipitation Water
RG-S	Precipitation Water
RG-SE	Precipitation Water
RG-SW	Precipitation Water
RG-W	Precipitation Water
RG-WNW	Precipitation Water
RG-WSW	Precipitation Water

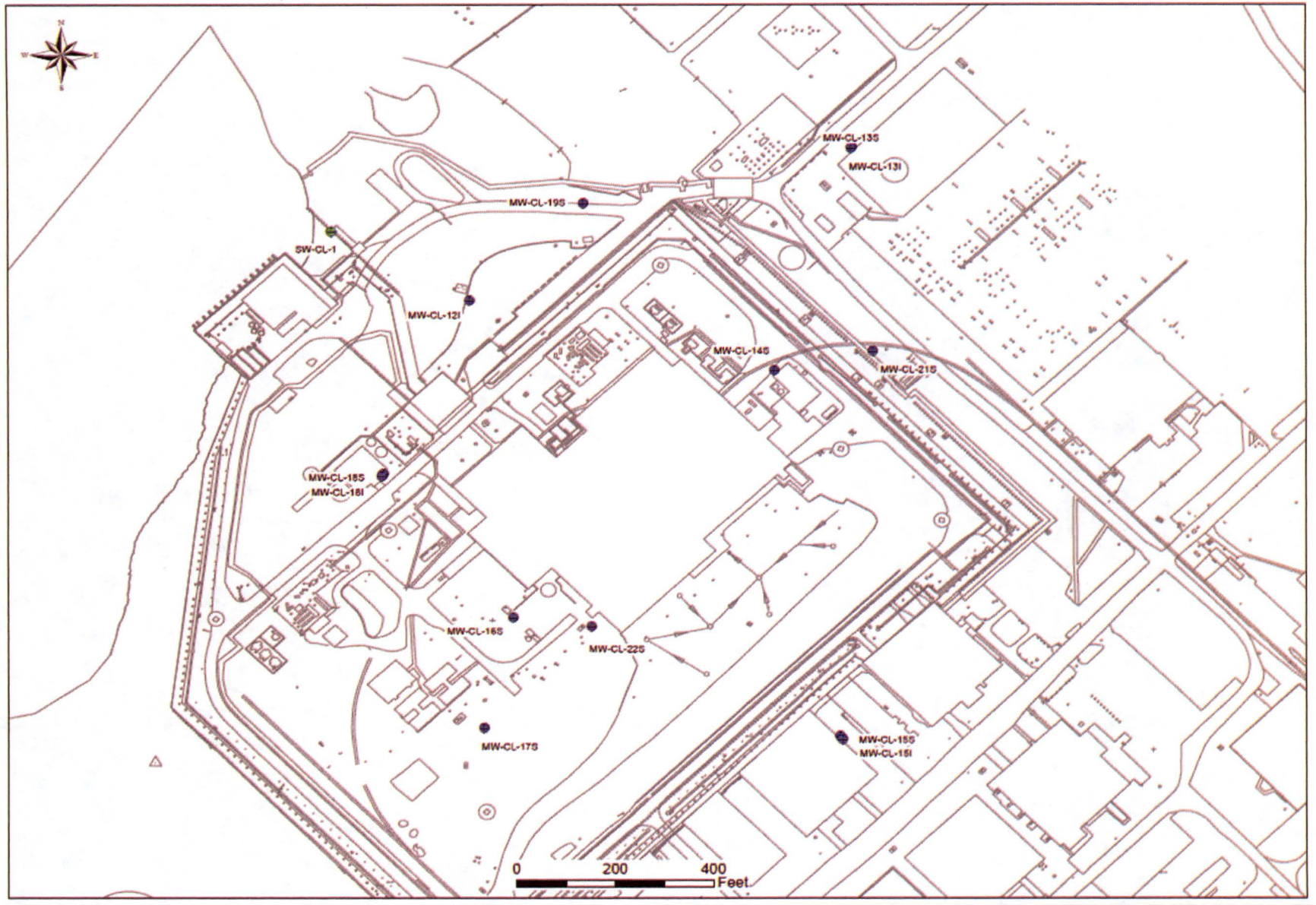

Figure A – 1
Onsite Sampling Locations at Clinton Power Station

Figure A – 2
Sampling Locations South of Clinton Power Station

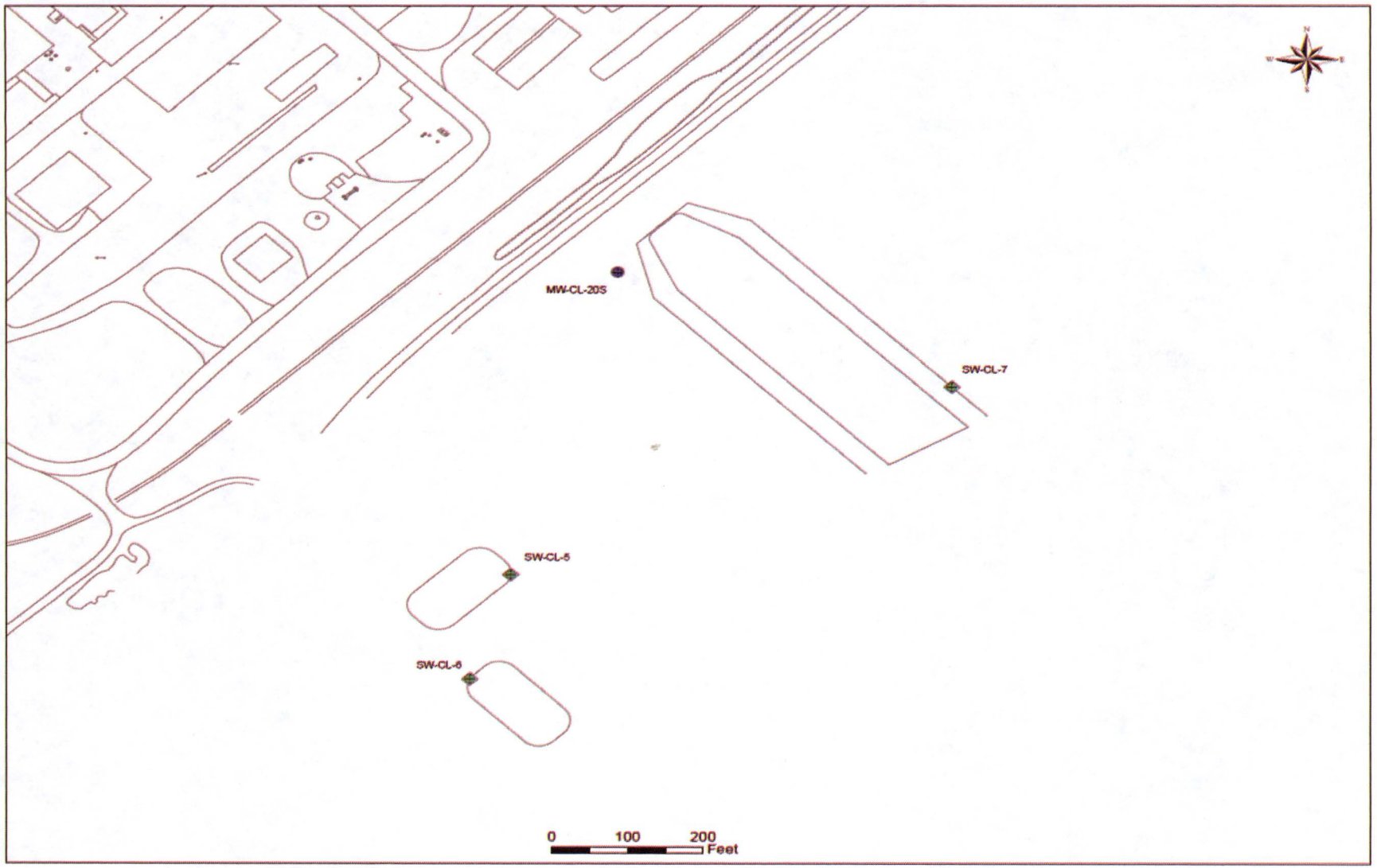

Figure A – 3
Sampling Locations East of Clinton Power Station

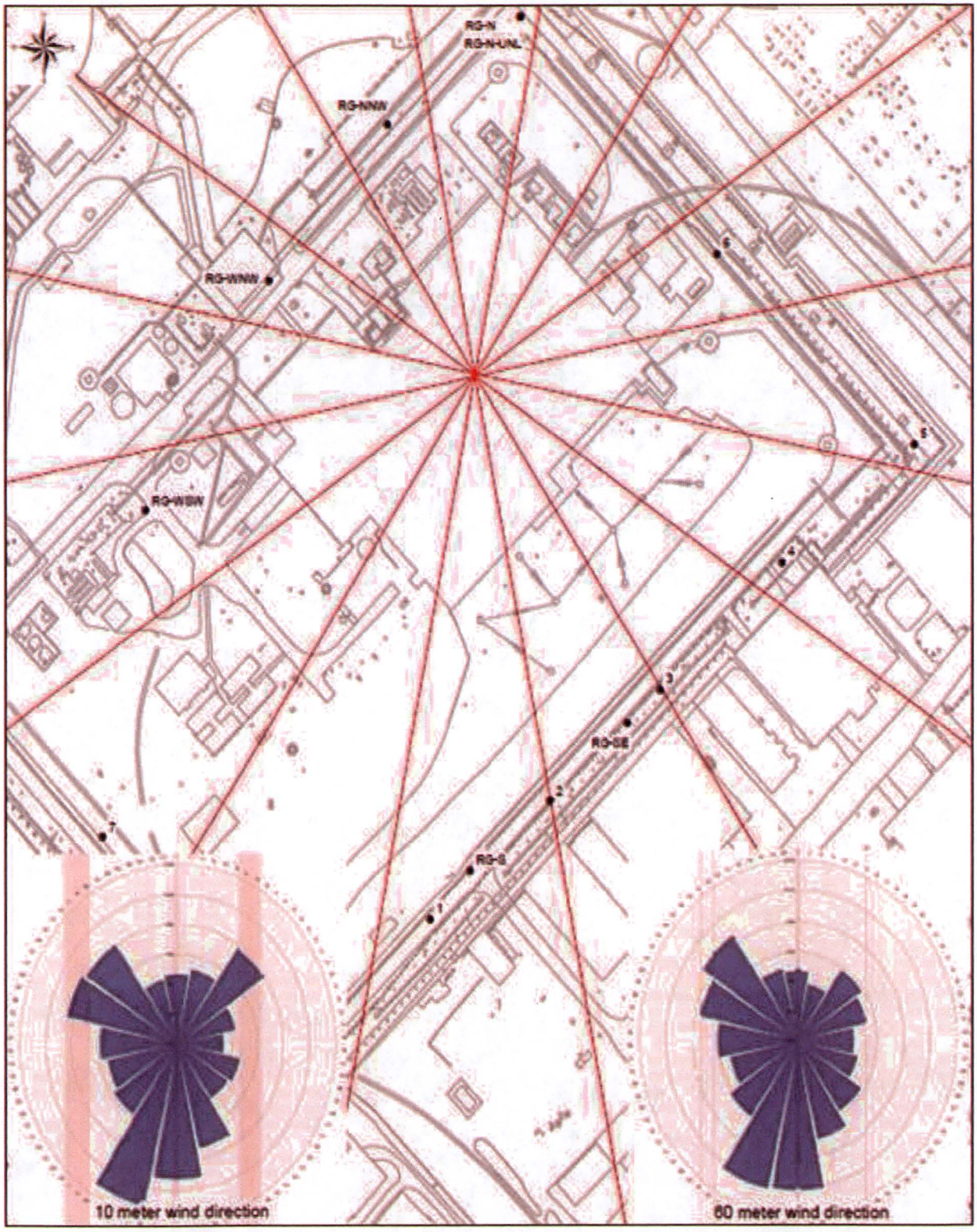

Figure A – 4
Recapture Sampling Locations of Clinton Power Station

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APPENDIX B

DATA TABLES OF THE ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

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TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM AND GROSS ALPHA IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	Sr-89	Sr-90	Gr-A (Dis)	Gr-A (Sus)
B-3	04/28/21	< 191				
MW-CL-1	04/28/21	< 193				
MW-CL-2	04/28/21	< 195				
MW-CL-12I	03/03/21	< 186				
MW-CL-12I	04/28/21	< 195	< 7.9	< 0.9	< 0.9	< 1.1
MW-CL-12I	07/27/21	< 190				
MW-CL-12I	11/03/21	< 193				
MW-CL-13I	04/28/21	< 195				
MW-CL-13S	03/03/21	< 182				
MW-CL-13S	04/28/21	< 198	< 7.3	< 0.9	< 1.0	< 1.1
MW-CL-13S	07/27/21	< 185				
MW-CL-13S	11/03/21	< 190				
MW-CL-14S	03/04/21	1500 ± 219				
MW-CL-14S	04/08/21	502 ± 145				
MW-CL-14S	04/29/21	249 ± 130	< 7.4	< 0.9	< 0.8	< 1.1
MW-CL-14S	07/28/21	243 ± 128				
MW-CL-14S	11/04/21	< 190				
MW-CL-15I	04/28/21	< 194				
MW-CL-15S	04/28/21	< 191				
MW-CL-16S	03/04/21	< 181				
MW-CL-16S	04/29/21	332 ± 129	< 8.6	< 0.9	1.1 ± 0.7	< 1.1
MW-CL-16S	07/28/21	258 ± 129				
MW-CL-16S	11/04/21	< 187				
MW-CL-17S	03/04/21	< 184				
MW-CL-17S	04/29/21	< 192	< 9.0	< 0.8	< 1.8	< 1.1
MW-CL-17S	07/28/21	< 187				
MW-CL-17S	11/04/21	< 198				
MW-CL-18I	03/04/21	< 184				
MW-CL-18I	04/29/21	< 192	< 7.7	< 0.8	< 1.1	< 1.0
MW-CL-18I	07/28/21	< 185				
MW-CL-18I	11/04/21	< 195				
MW-CL-18S	03/04/21	< 182				
MW-CL-18S	04/29/21	< 189	< 9.2	< 0.9	< 1.2	< 1.0
MW-CL-18S	07/28/21	< 174				
MW-CL-18S	11/04/21	< 196				
MW-CL-19S	03/03/21	< 173				
MW-CL-19S	04/28/21	< 192	< 6.8	< 0.8	< 2.3	< 1.0
MW-CL-19S	07/27/21	< 180				
MW-CL-19S	11/03/21	< 187				
MW-CL-20S	04/28/21	< 193				
MW-CL-21S	03/03/21	< 183				
MW-CL-21S	04/28/21	< 194	< 7.6	< 0.8	< 1.1	< 1.0
MW-CL-21S	07/27/21	< 174				
MW-CL-21S	11/03/21	< 198				
MW-CL-22S	03/04/21	< 182				
MW-CL-22S	04/29/21	< 193	< 7.9	< 0.8	< 1.7	< 1.0
MW-CL-22S	07/28/21	< 197				
MW-CL-22S	11/04/21	< 196				

Table B-I.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

RESULTS IN UNITS OF PCI/LITER + SIGMA

SITE	COLLECTION DATE	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
B-3	04/28/21	< 20	< 22	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 11	< 3
MW-CL-1	04/28/21	< 14	< 17	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 2	< 2	< 8	< 3
MW-CL-2	04/28/21	< 15	< 32	< 2	< 2	< 3	< 2	< 4	< 2	< 3	< 2	< 2	< 9	< 3
MW-CL-12I	04/28/21	< 18	< 21	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 10	< 3
MW-CL-13I	04/28/21	< 16	< 32	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 2	< 2	< 9	< 3
MW-CL-13S	04/28/21	< 12	< 18	< 1	< 1	< 3	< 1	< 2	< 1	< 2	< 1	< 1	< 6	< 2
MW-CL-14S	04/29/21	< 14	< 30	< 2	< 2	< 3	< 2	< 3	< 2	< 3	< 2	< 2	< 8	< 3
MW-CL-15I	04/28/21	< 18	< 39	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 10	< 4
MW-CL-15S	04/28/21	< 17	< 17	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 2	< 2	< 10	< 3
MW-CL-16S	04/29/21	< 14	< 29	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 9	< 3
MW-CL-17S	04/29/21	< 13	< 25	< 2	< 1	< 3	< 2	< 3	< 2	< 3	< 2	< 2	< 7	< 3
MW-CL-18I	04/29/21	< 23	< 44	< 2	< 2	< 5	< 3	< 5	< 3	< 5	< 3	< 3	< 13	< 5
MW-CL-18S	04/29/21	< 16	< 33	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 2	< 2	< 9	< 4
MW-CL-19S	04/28/21	< 17	< 32	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 2	< 2	< 10	< 3
MW-CL-20S	04/28/21	< 12	< 12	< 1	< 1	< 2	< 1	< 2	< 1	< 3	< 1	< 1	< 7	< 2
MW-CL-21S	04/28/21	< 15	< 15	< 2	< 2	< 3	< 2	< 3	< 2	< 3	< 2	< 2	< 8	< 3
MW-CL-22S	04/29/21	< 14	< 34	< 2	< 2	< 3	< 2	< 3	< 2	< 3	< 2	< 2	< 8	< 3

TABLE B-I.3

CONCENTRATIONS OF HARD TO DETECTS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

There were no HTD Samples analyzed in 2021

TABLE B-II.1 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

There were no Surface Water Samples analyzed in 2021

TABLE B-III.1 CONCENTRATIONS OF TRITIUM IN PRECIPITATION WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2021

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3
RG-E	06/22/21	< 181
RG-E	12/29/21	< 179
RG-ENE	06/22/21	194 ± 119
RG-ENE	12/29/21	< 191
RG-ESE	06/22/21	< 192
RG-ESE	12/29/21	< 184
RG-N	06/22/21	< 173
RG-N	12/29/21	< 180
RG-NE	06/22/21	< 177
RG-NE	12/29/21	< 192
RG-NNW	06/22/21	< 198
RG-NNW	12/29/21	< 184
RG-S	06/22/21	< 179
RG-S	12/29/21	< 182
RG-SE	06/22/21	< 197

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