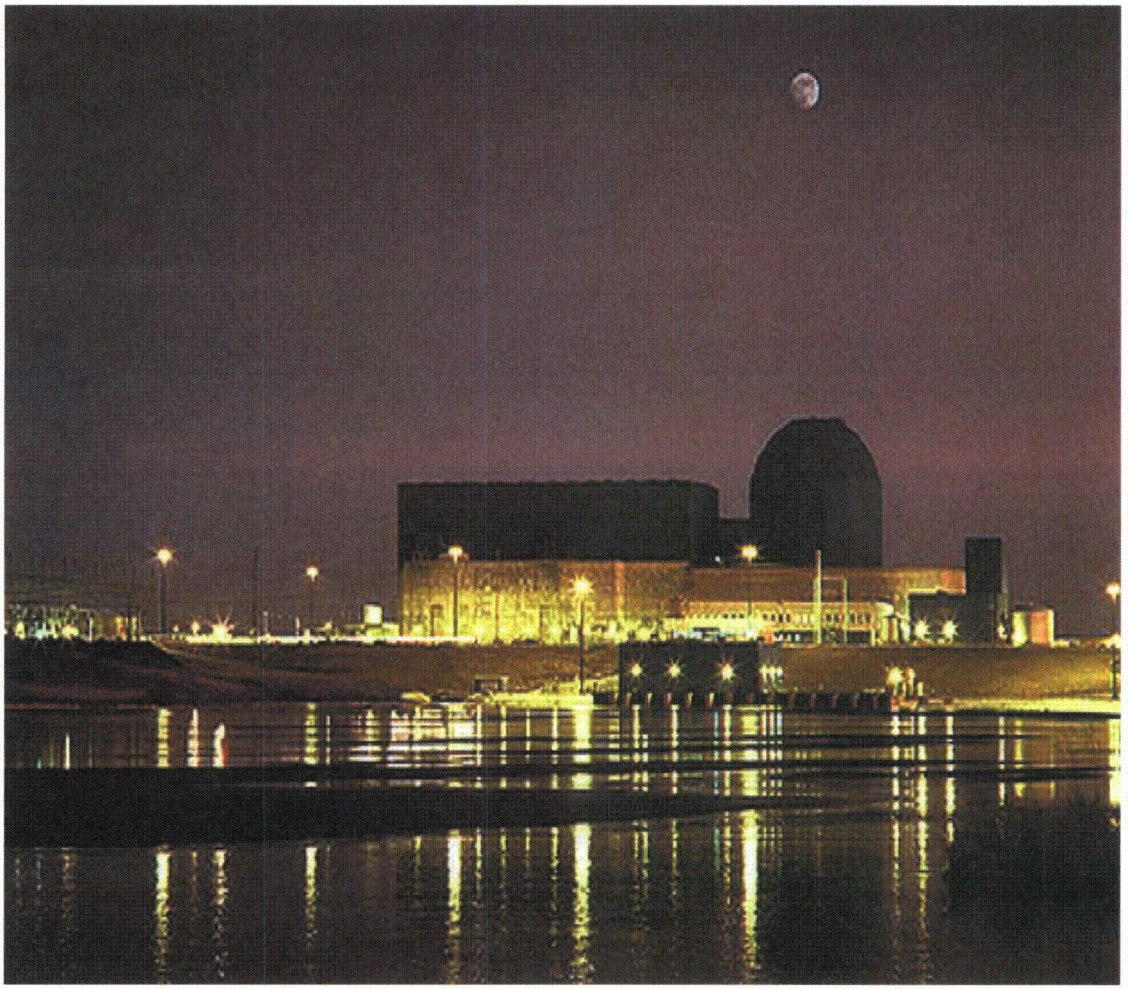

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Docket No: 50-461

CLINTON POWER STATION

Annual Radiological Environmental Operating Report

1 January Through 31 December 2010

Prepared By
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Environmental Services

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Nuclear
Clinton Power Station
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April 2011

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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 covers the period 1 January 2010 through 31 December 2010. During that time period, 1,576 analyses were performed on 1,461 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 2010. 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 due to the release of gaseous effluents from Clinton Power Station was 3.36 E-02 or 0.0336 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 I-131. Naturally occurring K-40 was detected at levels consistent with those detected in previous years. No fission or activation products were detected. Gross beta activities detected were consistent with those detected in previous years. No tritium 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. Cosmogenic Be-7 and naturally occurring K-40 were detected at levels consistent with those detected in previous years. No fission or activation products were detected.

High sensitivity I-131 analyses were performed on weekly air samples. All required LLDs were met.

Cow milk samples were analyzed for concentrations of I-131 and gamma emitting nuclides. All I-131 results were below the required LLDs. 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. Concentrations of Cosmogenic Be-7 and naturally occurring K-40 were consistent with those detected in previous years. No fission or activation products were detected.

Grass samples were analyzed for concentrations of gamma emitting nuclides. Concentrations of Cosmogenic Be-7 and naturally occurring K-40 were

consistent with those detected in previous years. No fission or activation products were detected.

Environmental gamma radiation measurements were performed quarterly using thermoluminescent dosimeters. Levels detected were consistent with those observed in previous years.

II. Introduction

The Clinton Power Station (CPS), consisting of one approximately 1140 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 15 February 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 27 February 1987 and was summarized in a separate report. This report covers those analyses performed by Teledyne Brown Engineering (TBE) and Global Dosimetry on samples collected during the period 1 January 2010 through 31 December 2010.

A. Objectives of the REMP

The objectives of the REMP are to:

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

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

B. Implementation of the Objectives

The implementation of the objectives is accomplished by:

1. Identifying significant exposure pathways.

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

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

III. Program Description

A. Sample Collection

This section describes the general collection methods used by Environmental Inc. (Midwest Labs) to obtain environmental samples for the CPS REMP in 2010. Sample locations and descriptions can be found in Tables B–1 and B–2, and Figures B–1 through B–3, Appendix B. The sampling methods used by Environmental Inc. (Midwest Labs) are listed in Table B-2.

Aquatic Environment

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

Atmospheric Environment

The atmospheric environment was evaluated by performing radiological analyses on samples of air particulate, airborne iodine, milk, food produce and grass. Airborne iodine and particulate samples were collected and analyzed weekly at ten locations (CL-1, CL-2, CL-3, CL-4, CL-6, CL-7, CL-8, CL-11, CL-15, and CL-94). The control location was CL-11. 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 the laboratory for analysis.

Milk samples were collected biweekly at one location (CL-116) from May through October, and monthly from November through April to coincide with the grazing season. All samples were collected in new unused

plastic bottles from the bulk tank at that location, preserved with sodium bisulfite, and shipped promptly to the laboratory.

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

Grass samples were collected biweekly at four locations (CL-1, CL-2, CL-8 and CL-116) from May through October. The control location was CL-116. 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 Panasonic 814 calcium sulfate ($CaSO_4$) thermoluminescent dosimeters (TLD). The TLD 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 additional three locations were installed as part of a volunteer comparison study near and within the site perimeter (CL-5MM, CL-46MM and CL-47MM).

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

A special interest set consisting of seven locations (CL-37, CL-41, CL-49, CL-64, CL65, 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 TLDs.

The specific TLD 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 sectors around the site,

where estimated annual dose from CPS, if any, would be most significant;

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

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

Two TLDs – each composed of two $CaSO_4$ thermoluminescent phosphors enclosed in plastic – were placed at each location in a vented PVC conduit located approximately three feet above ground level. The TLDs were exchanged quarterly and sent to Global Dosimetry for analysis.

B. Sample Analysis

This section describes the general analytical methodologies used by TBE and Environmental Inc. (Midwest Labs) to analyze the environmental samples for radioactivity for the CPS REMP in 2010. The analytical procedures used by the laboratories are listed in Table B-2.

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

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

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

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

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

5. Ambient gamma radiation levels at various on-site and 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" signal. 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, well water, fish, sediment, and milk 14 nuclides, 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, and Ce-144 were reported.

For drinking water, grass, and vegetation 15 nuclides, Be-7, K-40, 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 11 nuclides, Be-7, K-40, Co-60, Nb-95, Zr-95, Ru-103, Ru-106, Cs-134, Cs-137, Ce-141 and Ce-144, were reported.

Means and standard deviations of the results were calculated. The standard deviations represent the variability of measured results for different samples rather than single analysis uncertainty.

D. Program Exceptions

The exceptions 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 7.1 of the Station's ODCM.

April 28, 2010, IR # 1062603

The vendor technician discovered that ODCM drinking water compositor CL-14 was not collecting sample as expected. Plant personnel performed maintenance and returned the compositor to service, however, the April, 2010 sample did not meet the definition of a composite.

May 25, 2010, IR # 1076800

During an unplanned power outage affecting the Service Building, power was lost to ODCM drinking water compositor CL-14, rendering it unable to collect samples and meet the requirement for composite sampling for the month of May, 2010.

July 28, 2010, IR # 1095275

During a potable water outage on July 28, 2010, ODCM drinking water compositor CL-14 was unable to obtain aliquot samples and meet the requirement of composite sampling.

August 25, 2010, IR # 1106720

Due to low levels of rain fall, the vendor was unable to obtain sufficient amounts of lettuce and swiss chard to constitute valid samples for the August 2010 monthly vegetation samples from gardens CL-114, CL-115, CL-117 and CL-118. The vendor supplemented the weight with other available broad leaf plants.

September 29, 2010, IR 1186555

The sample collector was unable to obtain enough vegetation for the September monthly sample for CL-114, so the weight was

supplemented with other available vegetation. At the ODCM program owner's request, unscheduled supplemental vegetation sampling was conducted on October 13, 2010. For informational purposes, weed and tree leaf material was collected from the areas of CL-114, CL-115, CL-117, and CL-118.

October 13, 2010, IR # 1125934

On October 13, 2010, non-ODCM air samplers CL-4 and CL-6 were found without power and unable to sample due to a rain storm in the area the same morning. Flow and subsequent volumes could not be determined for analysis purposes.

November 3, 2010 IR # 1142421

On November 3, 2010, ODCM Water Compositor CL-91 was found with no flow through the instrument by the sample collection vendor. Troubleshooting was performed and flow was re-established. On November 10, 2010, CL-91 was again found with no flow. Further troubleshooting identified a worn length of tubing which, upon replacement, corrected the no-flow condition. The vendor collected grab samples during this timeframe.

November 20, 2010, IR # 1143173

During a 12 kV bus outage, the ODCM drinking water compositor CL-14 was without power and unable to sample on November 20, 2010 from 05:07 to 16:05. The compositor was isolated for approximately 11 hours.

November 24, 2010, IR # 1144688

On November 24, 2010, ODCM Air Sampler CL-15 and NON-ODCM Air Sampler CL-94 were found with no power by the sampling vendor. The vendor was able to collect samples, and all LLDs were achieved, however, continuous sampling was not achieved.

December 1, 2010, IR # 1150469

While performing routine sample collection and equipment verification activities on December 1, 2010, the sampling vendor discovered that NON-ODCM Air Sampler CL-6 had experienced an apparent power outage of approximately 111 hours at some point since the previous time the monitor was checked on November 24,

2010.

December 22, 2010 IR # 1155368

On December 22, 2010, the non-ODCM water compositor CL-99 was found to be unable to collect samples due to apparent freezing of the North Fork Creek. The condition was discovered by the sampling vendor while performing the weekly equipment inspections. While the compositor had collected some liquid sample, the November sample did not meet the definition of a composite.

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

Although there were no changes to the program in 2010, during a 2008 annual NRC ODCM REMP inspection, there was an enhancement. An Inspector observed the orientation of an environmental area TLD and as an enhancement, suggested that if relocated approximately sixty (60) feet closer towards the Station, would serve better as a direct line of sight in a cleared opening, unobstructed from tree branches and leaves.

Over the twenty (20) plus years of Unit Operation, the surrounding environment consisting of tress and their branches have grown, thus challenging the guidance ANSI N545-1975, which requires TLDs should be moved as far as possible from large or dense objects that may cause directional anomalies or otherwise perturb the radiation field. Although historical reviews were performed that resulted in no anomalous data relative to the radiation field, as part of our extent of condition, all environmental TLDs were evaluated as to locations and their respective orientations with the following determination:

Completed:

- A review of the results from adjacent Environmental Area TLD data sectors revealed no significant patterns or variances.

- An extent of condition review examined all Environmental Area TLD

locations and their respective orientations and identified three (3) additional locations as candidates for additional monitoring.

- Clinton Power Station has installed four (4) TLDs in close proximity to the original TLDs: CL-5MM, CL-46MM, CL-47MM and CL-58MM.
- These Environmental Area TLDs located within the same meteorological sector near the four (4) locations, were measured and studied for comparison (Table C-X.1).
    - TLDs CL-05MM, CL-47MM, and CL-58MM showed a slight increase in the first quarter of 2010 by a difference of 0.5, 3.0, and 0.8 mRem respectively. The second and third quarter of 2010 showed less exposure than the originally installed locations.
    - TLD CL-46MM showed a slight increase for all four quarters of 2010, averaging 3.2 mRem higher than the originally installed location.
    - TLD CL-05MM was slightly higher in the fourth quarter of 2010 by a difference of 1.0 mRem.

Clinton Power Station will continue this comparison study throughout 2011.

Because the TLD results from this study are not part of the ODCM REMP averages, the results are for comparison purposes only.

IV. Results and Discussion

A. Aquatic Environment

1. Surface Water

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

<u>Iodine-131</u>

Monthly samples from location CL-90 were analyzed for I-131 activity (Table C-I.1, Appendix C). No I-131 was found 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). The required LLD was met.

Gamma Spectrometry

Samples from all locations were analyzed for gamma emitting nuclides (Table C–I.3, Appendix C). Naturally occurring K-40 was found in one of 12 samples at location CL-13, three of 12 samples at location CL-90, one of 12 samples at location CL-91 and three of 12 samples at location CL-99. No other nuclides were detected and all required LLDs were met.

2. Drinking Water

Monthly samples were collected from a continuous compositor at one location (CL-14). The following analyses were performed:

Gross Beta

Monthly samples were analyzed for concentrations of gross beta (Tables C–II.1, Appendix C). Gross beta was found in three of 12 samples. The values ranged from 2.0 to 4.4 pCi/l. Concentrations detected were consistent with those detected in previous years.

Tritium

Monthly samples were composited quarterly and analyzed for tritium activity (Table C–II.2, Appendix C). The required LLD was met.

Gamma Spectrometry

Monthly samples were analyzed for gamma emitting nuclides (Table C–II.3, Appendix C). Naturally occurring K-40 was found in one sample at location CL-14. No other nuclides were detected and all required LLDs were met.

3. Well Water

Quarterly grab samples were collected at two locations (CL-7D and

CL-12, consisting of CL-12R [a raw water sample from this well] and CL-12T [same well water, but after treatment and available for consumption]). The following analyses were performed:

Tritium

Samples from all locations were analyzed for tritium activity (Table C–III.1, Appendix C). The required LLD was met.

Gamma Spectrometry

Samples from all locations were analyzed for gamma emitting nuclides (Table C–III.2, Appendix C). Naturally occurring K-40 was found in one of four samples for locations CL-12T. No other nuclides were detected and all required LLDs were met.

4. Fish

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

Gamma Spectrometry

The edible portion of fish samples from both locations was analyzed for gamma emitting nuclides (Table C–IV.1, Appendix C). Naturally occurring K-40 was found at both stations. No fission or activation products were found. No other nuclides were detected and the required LLDs were met.

5. Shoreline Sediment

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

Gamma Spectrometry

Shoreline sediment samples were analyzed for gamma emitting nuclides (Table C–V.1, Appendix C). Naturally occurring K-40 was detected in both samples. No fission or activation products were found. No other nuclides were detected and the required LLDs were met.

B. Atmospheric Environment

1. Airborne

a. Air Particulates

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

Gross Beta

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

Detectable gross beta activity was observed at all locations. Comparison of results among the three groups aid in determining the effects, if any, resulting from the operation of CPS. The results from the On-Site locations (Group I) ranged from 6 to 39 E–3 pCi/m^3 with a mean of 19 E–3 pCi/m^3. The results from the Intermediate Distance location (Group II) ranged from 6 to 41 E–3 pCi/m^3 with a mean of 18 E–3 pCi/m^3. The results from the Control locations (Group III) ranged from 6 to 37 E–3 pCi/m^3 with a mean of 19 E–3 pCi/m^3. Comparison of the 2010 air particulate data with previous years data indicate no effects from the operation of CPS (Figure C–5, Appendix C). In addition, a comparison of the weekly mean values for 2010 indicate no notable differences among the three groups.

Gamma Spectrometry

Weekly samples were composited quarterly and analyzed for gamma emitting nuclides (Table C–VI.3, Appendix C). Naturally occurring isotope Be-7 due to cosmic ray activity was detected in all samples. Naturally occurring K-40 was detected in two samples. No other nuclides were detected and all required LLDs were met.

b. Airborne Iodine

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

2. Terrestrial

a. Milk

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

Iodine-131

Milk samples were analyzed for concentrations of I-131 (Table C–VIII.1, Appendix C). The required LLD was met.

Gamma Spectrometry

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

b. Food Products

Broadleaf vegetation samples and substitutes as noted in exceptions were collected from four locations (CL-114, CL-115, CL-117 and CL-118) monthly June through October, to coincide with the harvest season. The following analyses were performed:

Gamma Spectrometry

Each food product sample, cabbage, swiss chard, lettuce, and substitutions as noted earlier were analyzed for concentrations of gamma emitting nuclides (Table C–IX.1, Appendix C).

Naturally occurring Be–7 due to cosmic ray activity was detected in all samples. Naturally occurring K-40 activity was found in all samples. No other nuclides were detected and all required LLDs were met.

c. Grass

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

Gamma Spectrometry

Each grass sample was analyzed for concentrations of gamma emitting nuclides (Table C–IX.2, Appendix C).

Naturally occurring Be–7 due to cosmic ray activity was detected in all samples. Naturally occurring K-40 activity was found in all samples. No other nuclides were detected and all required LLDs were met.

C. Ambient Gamma Radiation

Ambient gamma radiation levels were measured utilizing Panasonic 814 ($CaSO_4$) thermoluminescent dosimeters. Fifty-four TLD locations were established around the site. Results of TLD measurements are listed in Tables C–X.1 to C–X.3, Appendix C.

A total of 216 TLD measurements were made in 2010. The average dose from the inner ring was 18.7 mR/quarter. The average dose from the outer ring was 19.0 mR/quarter. The average dose from the special interest group was 18.7 mR/quarter. The average dose from the supplemental group was 17.9 mR/quarter. The quarterly measurements ranged from 13.8 to 23.7 mR/quarter.

The inner ring and outer ring measurements compared well to the Control Station, CL-11, which ranged from 14.9 mR/quarter to 21.3 mR/quarter with an average measurement of 17.4 mR/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).

At the end of 2010, the data comparison between the original and newly installed TLDs showed comparable results.

D. Land Use Survey

A Land Use Survey conducted during the July through October 2010 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 5.2. The purpose of the survey was to document the nearest resident, milk producing animal and garden of greater than 538 ft^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 this survey. The results of this survey are summarized below.

Distance in Miles from the CPS Station HVAC Vent Stack			
Sector	Residence Miles	Garden Miles	Milk Farm Miles
1 N	0.9	0.9	0.9
2 NNE	1.0	3.0	2.3
3 NE	1.3	2.2	>5.0
4 ENE	1.8	2.7	>5.0
5 E	1.0	1.0	>5.0
6 ESE	3.2	3.3	>5.0
7 SE	2.4	2.4	>5.0
8 SSE	1.7	>5.0	>5.0
9 S	3.0	3.0	>5.0
10 SSW	2.9	>5.0	>5.0
11 SW	0.7	3.5	>5.0
12 WSW	2.2	2.3	3.4
13 W	1.2	2.1	>5.0
14 WNW	1.6	>5.0	>5.0
15 NW	1.6	>5.0	>5.0
16 NNW	1.3	1.3	1.3

E. Summary of Results – Inter-Laboratory Comparison Program

The primary laboratories analyzed Performance Evaluation (PE) samples of air particulate, air iodine, milk, soil, vegetation and water matrices for 19 analytes (Appendix D). The PE samples, supplied by Analytics Inc., Environmental Resource Associates (ERA) and DOE's Mixed Analyte Performance Evaluation Program (MAPEP), were evaluated against the following pre-set acceptance criteria:

1. Analytics Evaluation Criteria

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

2. ERA Evaluation Criteria

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

3. DOE Evaluation Criteria

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

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

For the primary laboratory, 16 out of 18 analytes met the specified acceptance criteria. Two analytes did not meet the specified acceptance criteria for the following reason:

1. Teledyne Brown Engineering's ERA November 2010 Sr-89 in water result of 77.8 pCi/L was higher than the known value of 68.5 pCi/L, resulting in a found to known ratio of 1.14. NCR 10-09 was initiated to investigate this failure. Since the ratio of 1.14 fell within an acceptance range of 20%, Teledyne considers this an acceptable result.
2. Teledyne Brown Engineering's ERA November 2010 Zn-65 in water result of 11.0 pCi/L was lower than the known value of 102

pCi/L. NCR 10-09 was initiated to investigate this failure. The Zn-65 result of 111 was incorrectly reported as 11.0.

For the secondary laboratory, Environmental, Inc., 14 out of 14 analytes met the specified acceptance criteria.

The Inter-Laboratory Comparison Program provides evidence of the 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 2010 Annual Radioactive Effluent Release Report.
4. "Environmental Radioactivity," M. Eisenbud, 1987 (E187).
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APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT SUMMARY

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TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE CLINTON POWER STATION, 2010

Name of Facility: CLINTON POWER STATION **DOCKET NUMBER:** 50-461
Location of Facility: DEWITT COUNTY IL **REPORTING PERIOD:** 2010

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER (PCI/LITER)	I-131	12	1	<LLD	NA			0
	H-3	16	2000	<LLD	<LLD	-		0
	GAMMA	48						
	BE-7		NA	<LLD	<LLD	-		0
	K-40		NA	83 (4/24) (53/127)	73 (4/24) (49/137)	95 (1/12)	CL-13 INDICATOR SALT CREEK BRIDGE ON RT. 10 3.6 MILES SW OF SITE	0
	MN-54		15	<LLD	<LLD	-		0
	CO-58		15	<LLD	<LLD	-		0
	FE-59		30	<LLD	<LLD	-		0
	CO-60		15	<LLD	<LLD	-		0

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FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

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SURFACE WATER (PCI/LITER)	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

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DRINKING WATER (PCI/LITER)	GR-B	12	4	2.8 (3/12) (2.0/4.4)	NA	2.8 (3/12) (2.0/4.4)	CL-14 INDICATOR STATION PLANT SERVICE BLDG ONSITE	0
	H-3	4	2000	<LLD	NA	-		0
	GAMMA	12						
	BE-7		NA	<LLD	NA	-		0
	K-40		NA	91 (1/12)	NA	91 (1/12)	CL-14 INDICATOR STATION PLANT SERVICE BLDG ONSITE	0
	MN-54		15	<LLD	NA	-		0
	CO-58		15	<LLD	NA	-		0
	FE-59		30	<LLD	NA	-		0
	CO-60		15	<LLD	NA	-		0

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DRINKING WATER (PCI/LITER)	ZN-65		30	<LLD	NA	-		0
	NB-95		15	<LLD	NA	-		0
	ZR-95		30	<LLD	NA	-		0
	I-131		15	<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

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DRINKING WATER (PCI/LITER)	CE-144		NA	<LLD	NA	-		0
WELL WATER (PCI/LITER)	H-3	12	2000	<LLD	NA	-		0
	GAMMA	12						
	BE-7		NA	<LLD	NA	-		0
	K-40		NA	53 (1/12)	NA	53 (1/4)	CL-12T INDICATOR DEWITT PUMP HOUSE 1.6 MILES E OF SITE	0
	MN-54		15	<LLD	NA	-		0
	CO-58		15	<LLD	NA	-		0
	FE-59		30	<LLD	NA	-		0
	CO-60		15	<LLD	NA	-		0

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WELL WATER (PCI/LITER)	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

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FISH (PCI/KG WET)	GAMMA	16						
	BE-7		NA	<LLD	<LLD	-		0
	K-40		NA	3150 (8/8) (2620/4580)	2474 (8/8) (1850/3230)	3150 (8/8) (2620/4580)	CL-19 INDICATOR END OF DISCHARGE FLUME 3.4 MILES E OF SITE	0
	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

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FISH (PCI/KG WET)	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
SEDIMENT (PCI/KG DRY)	GAMMA BE-7	2	NA	<LLD	NA	-		0
	K-40		NA	8685 (2/2) (8040/9330)	NA	8685 (2/2) (8040/9330)	CL-07B INDICATOR CLINTON LAKE 2.1 MILES SE OF SITE	0

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SEDIMENT (PCI/KG DRY)	MN-54		NA	<LLD	NA	-		0
	CO-58		NA	<LLD	NA	-		0
	FE-59		NA	<LLD	NA	-		0
	CO-60		NA	<LLD	NA	-		0
	ZN-65		NA	<LLD	NA	-		0
	NB-95		NA	<LLD	NA	-		0
	ZR-95		NA	<LLD	NA	-		0
	CS-134		150	<LLD	NA	-		0

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SEDIMENT (PCI/KG DRY)	CS-137		180	<LLD	NA	-		0
	BA-140		NA	<LLD	NA	-		0
	LA-140		NA	<LLD	NA	-		0
	CE-144		NA	<LLD	NA	-		0
AIR PARTICULATE (E-3 PCI/CU.METER)	GR-B	518	10	19 (465/466) (6/41)	19 (52/52) (6/37)	20 (52/52) (7/39)	CL-94 INDICATOR OLD CLINTON ROAD 0.6 MILES E OF SITE	0
	GAMMA	40						
	BE-7		NA	81 (36/36) (51/117)	86 (4/4) (58/111)	92 (4/4) (64/115)	CL-6 INDICATOR CLINTON'S RECREATION AREA 0.7 MILES WSW OF SITE	0
	K-40		NA	27 (2/36) (24/29)	<LLD	29 (1/4)	CL-3 INDICATOR CLINTON'S SECONDARY ACCESS ROAD 0.7 MILES NE OF SITE	0
	CO-60		NA	<LLD	<LLD	-		0

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AIR PARTICULATE (E-3 PCI/CU.METER)	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

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AIR IODINE (E-3 PCI/CU.METER)	GAMMA I-131	518	70	<LLD	<LLD	-		0
MILK (PCI/LITER)	I-131	19	1	NA	<LLD	-		0
	GAMMA BE-7	19	NA	NA	<LLD	-		0
	K-40		NA	NA	1214 (19/19) (1010/1390)	1214 (19/19) (1010/1390)	CL-116 CONTROL PASTURE IN RURAL KENNEY 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

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MILK (PCI/LITER)	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

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VEGETATION (PCI/KG WET)	GAMMA	48						
	BE-7		NA	885 (36/36) (160/2450)	1149 (12/12) (136/2850)	1149 (12/12) (136/2850)	CL-114 CONTROL CISCO 12.5 MILES SSE OF SITE	0
	K-40		NA	5243 (36/36) (2660/10200)	5211 (12/12) (3230/9190)	6178 (12/12) (2670/10200)	CL-118 INDICATOR SITE'S MAIN ACCESS ROAD 0.7 MILES NNE OF SITE	0
	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

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Location of Facility: DEWITT COUNTY IL **REPORTING PERIOD:** 2010

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
VEGETATION (PCI/KG WET)	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
GRASS (PCI/KG WET)	GAMMA	52						
	BE-7		NA	2105 (39/39) (478/5060)	2804 (13/13) (1400/4880)	2804 (13/13) (1400/4880)	CL-116 CONTROL PASTURE IN RURAL KENNEY 14 MILES WSW OF SITE	0

THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE CLINTON POWER STATION, 2010

Name of Facility: CLINTON POWER STATION **DOCKET NUMBER:** 50-461
Location of Facility: DEWITT COUNTY IL **REPORTING PERIOD:** 2010

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
GRASS (PCI/KG WET)	K-40		NA	6595 (39/39) (3400/15700)	7447 (13/13) (4690/15100)	7447 (13/13) (4690/15100)	CL-116 CONTROL PASTURE IN RURAL KENNEY 14 MILES WSW OF SITE	0
	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

THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE CLINTON POWER STATION, 2010

Name of Facility: CLINTON POWER STATION **DOCKET NUMBER:** 50-461
Location of Facility: DEWITT COUNTY IL **REPORTING PERIOD:** 2010

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
GRASS (PCI/KG WET)	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 (MILLI-ROENTGEN/QTR.)	TLD-QUARTERLY	216	NA	18.6 (212/212) (13.8/23.7)	17.4 (4/4) (14.9/21.3)	19.7 (4/4) (16.8/22.5)	CL-43 INDICATOR 2.8 MILES SE	0

THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

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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, 2010

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

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Clinton Power Station, 2010

Location	Location Description	Distance & Direction From Site
J.	Environmental Dosimetry - TLD	
	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

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Clinton Power Station, 2010

Location	Location Description	Distance & Direction From Site
J.	Environmental Dosimetry – TLD (cont.)	
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
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, 2010

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

TABLE B-2: Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Clinton Power Station, 2010

Sample Medium	Analysis	Sampling Method	Analytical Procedure Number
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
TLD	Thermoluminescence Dosimetry	Quarterly TLDs comprised of two Mirion CaF_2 elements.	Mirion Technologies Quality Assurance Manual

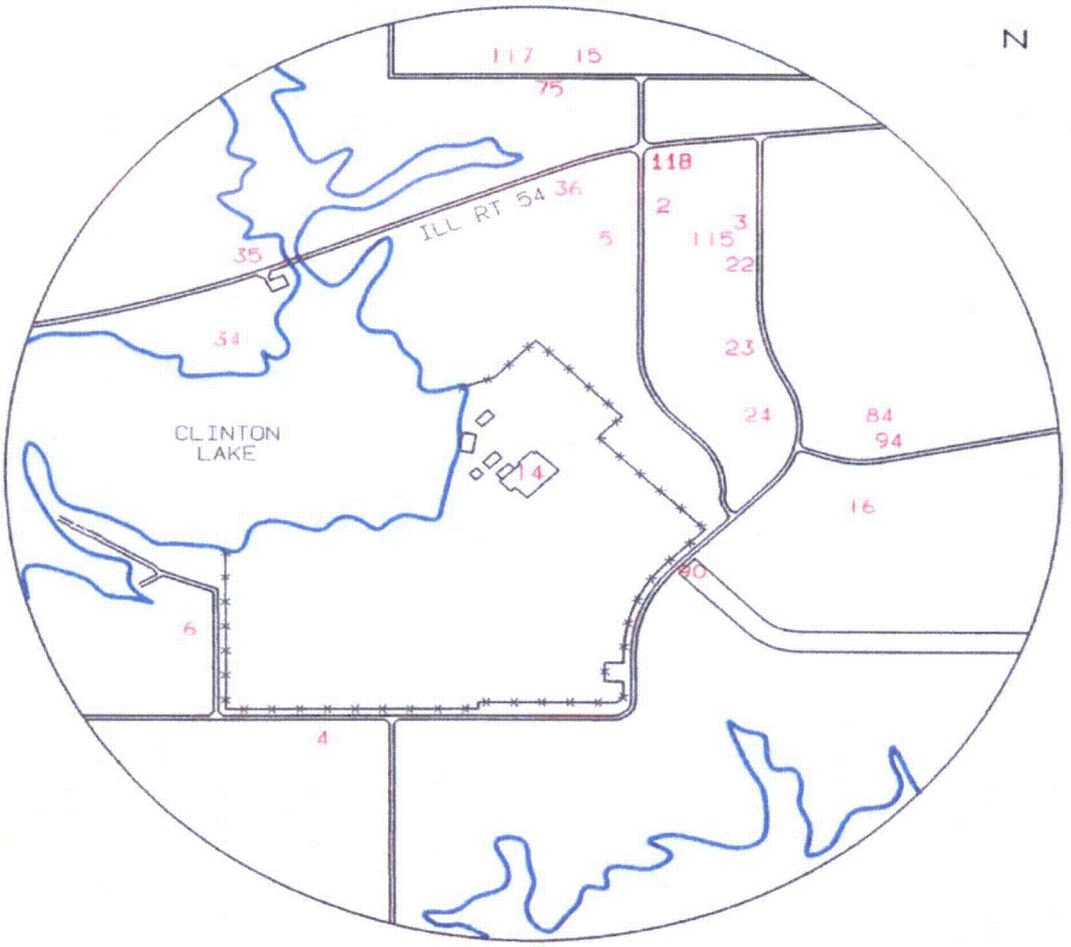

Figure B-1
Environmental Sampling Locations Within One
Mile of the Clinton Power Station, 2010

Figure B-2
Environmental Sampling Locations Between One and Two
Miles of the Clinton Power Station, 2010

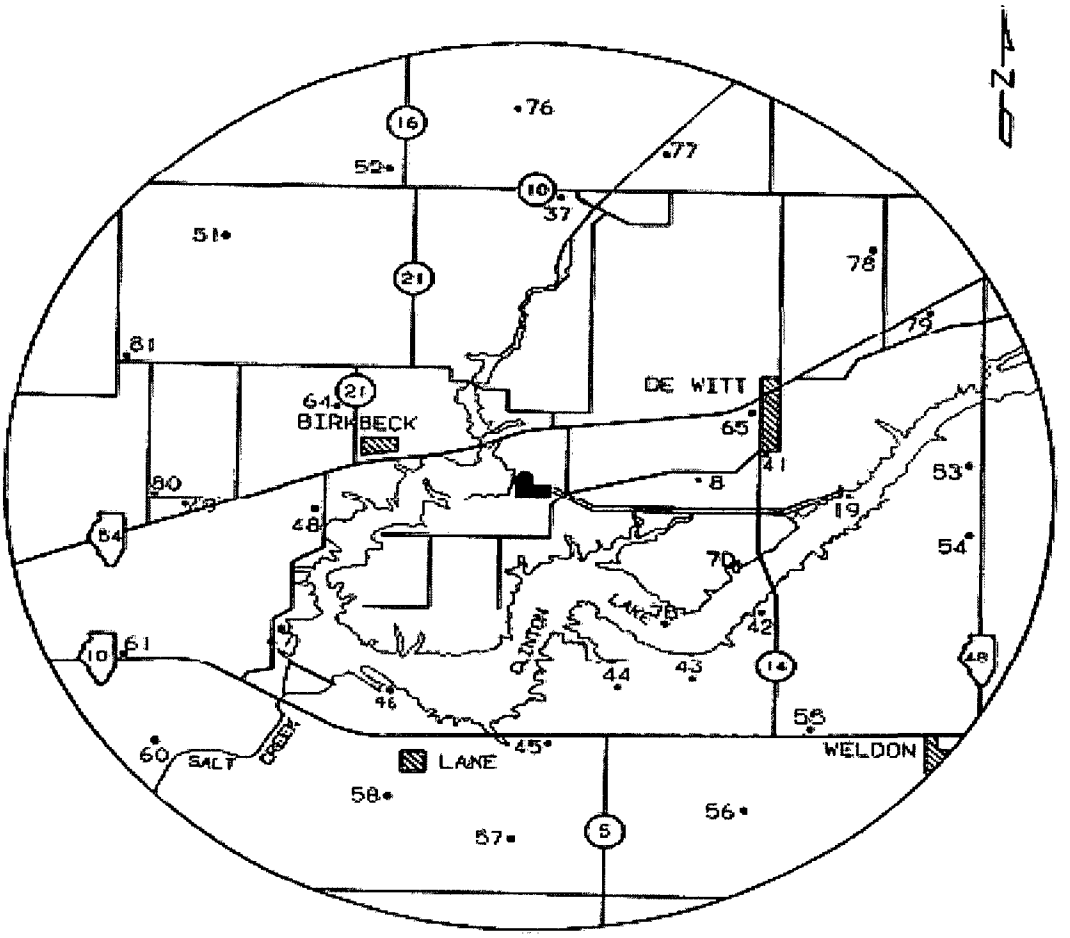

Figure B-3
Environmental Sampling Locations Between Two and Five Miles from the Clinton Power Station, 2010

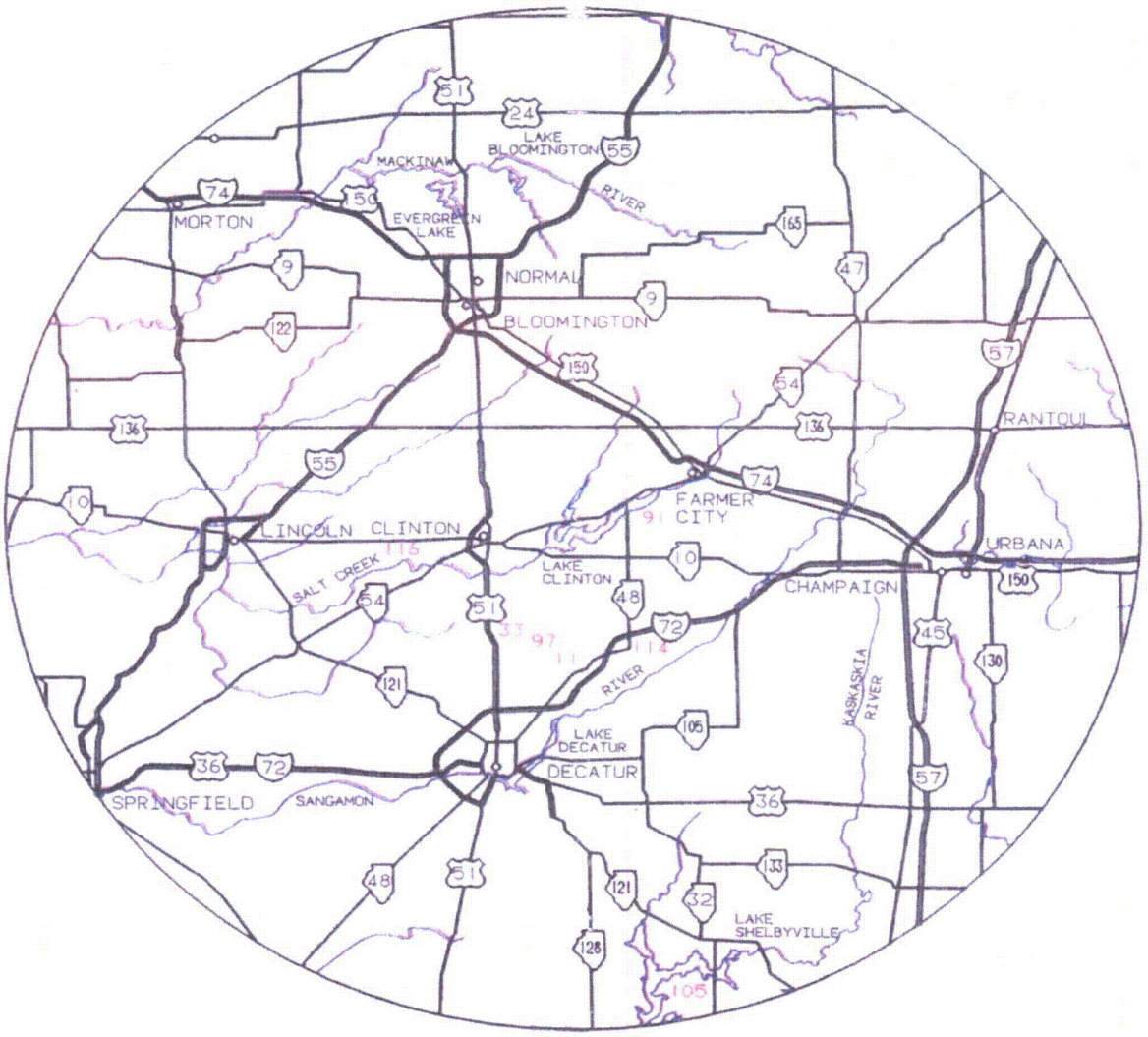

Figure B-4
Environmental Sampling Locations Greater Than Five Miles of the Clinton Power Station, 2010

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APPENDIX C

DATA TABLES AND FIGURES - PRIMARY LABORATORY

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TABLE C-I.1 **CONCENTRATIONS OF I-131 IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-90
12/30/09 - 01/27/10	< 0.7
01/27/10 - 02/24/10	< 0.7
02/24/10 - 03/31/10	< 0.8
03/31/10 - 04/28/10	< 0.9
04/28/10 - 05/26/10	< 0.7
05/26/10 - 06/30/10	< 0.9
06/30/10 - 07/28/10	< 0.7
07/28/10 - 08/25/10	< 0.8
08/25/10 - 09/29/10	< 0.4
09/29/10 - 10/27/10	< 0.9
10/27/10 - 11/24/10	< 0.6
11/24/10 - 12/29/10	< 0.5
MEAN	-

TABLE C-I.2 **CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-90	CL-13	CL-91	CL-99
01/27/10 - 03/31/10	< 180	< 180	< 182	< 175
04/28/10 - 06/30/10	< 159	< 159	< 158	< 162
06/30/10 - 09/29/10	< 193	< 192	< 196	< 173
10/27/10 - 12/29/10	< 172	< 168	< 169 (1)	< 169 (1)
MEAN	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-I.3 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	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	Ce-144
CL-13	01/27/10 - 01/27/10	< 46	< 47	< 5	< 4	< 10	< 4	< 10	< 6	< 8	< 5	< 6	< 26	< 9	< 37
	02/24/10 - 02/24/10	< 40	< 101	< 4	< 4	< 7	< 5	< 9	< 5	< 7	< 4	< 5	< 21	< 7	< 39
	03/31/10 - 03/31/10	< 27	95 ± 27	< 3	< 3	< 7	< 3	< 6	< 3	< 6	< 3	< 3	< 21	< 6	< 23
	04/28/10 - 04/28/10	< 48	< 78	< 5	< 6	< 11	< 6	< 13	< 6	< 11	< 7	< 5	< 27	< 9	< 40
	05/26/10 - 05/26/10	< 19	< 44	< 2	< 2	< 5	< 2	< 5	< 2	< 4	< 2	< 2	< 20	< 6	< 14
	06/30/10 - 06/30/10	< 41	< 56	< 4	< 4	< 9	< 4	< 9	< 5	< 8	< 4	< 5	< 25	< 9	< 38
	07/28/10 - 07/28/10	< 58	< 144	< 7	< 7	< 12	< 8	< 13	< 9	< 12	< 7	< 6	< 34	< 10	< 55
	08/25/10 - 08/25/10	< 34	< 32	< 3	< 4	< 8	< 3	< 7	< 5	< 7	< 3	< 4	< 25	< 7	< 26
	09/29/10 - 09/29/10	< 60	< 65	< 7	< 7	< 13	< 7	< 10	< 7	< 13	< 6	< 6	< 28	< 12	< 55
	10/27/10 - 10/27/10	< 38	< 55	< 4	< 4	< 7	< 3	< 8	< 4	< 6	< 4	< 4	< 26	< 8	< 31
	11/24/10 - 11/24/10	< 33	< 60	< 3	< 4	< 8	< 4	< 7	< 5	< 6	< 3	< 3	< 25	< 9	< 26
	12/29/10 - 12/29/10	< 56	< 122	< 6	< 7	< 13	< 6	< 12	< 7	< 10	< 6	< 6	< 36	< 8	< 50
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-90	12/30/09 - 01/27/10	< 50	< 130	< 6	< 6	< 14	< 7	< 14	< 9	< 12	< 6	< 6	< 32	< 9	< 48
	01/27/10 - 02/24/10	< 40	< 86	< 3	< 4	< 9	< 4	< 8	< 5	< 9	< 4	< 5	< 24	< 6	< 33
	02/24/10 - 03/31/10	< 50	< 86	< 4	< 5	< 10	< 4	< 10	< 6	< 9	< 6	< 5	< 33	< 9	< 46
	03/31/10 - 04/28/10	< 34	< 46	< 5	< 4	< 9	< 4	< 9	< 5	< 7	< 4	< 5	< 22	< 8	< 31
	04/28/10 - 05/26/10	< 56	< 38	< 5	< 5	< 11	< 4	< 10	< 6	< 10	< 5	< 5	< 48	< 13	< 43
	05/26/10 - 06/30/10	< 45	57 ± 53	< 6	< 5	< 11	< 6	< 12	< 6	< 9	< 5	< 5	< 31	< 12	< 38
	06/30/10 - 07/28/10	< 67	127 ± 81	< 8	< 7	< 15	< 9	< 20	< 9	< 15	< 10	< 9	< 37	< 11	< 63
	07/28/10 - 08/25/10	< 28	< 27	< 3	< 3	< 7	< 3	< 5	< 4	< 5	< 3	< 3	< 21	< 6	< 24
	08/25/10 - 09/29/10	< 48	< 87	< 6	< 6	< 9	< 6	< 13	< 7	< 11	< 6	< 6	< 28	< 11	< 46
	09/29/10 - 10/27/10	< 45	< 54	< 5	< 6	< 10	< 7	< 10	< 6	< 11	< 4	< 6	< 29	< 11	< 37
	10/27/10 - 11/24/10	< 34	53 ± 52	< 3	< 3	< 8	< 4	< 7	< 4	< 6	< 4	< 4	< 25	< 7	< 29
	11/24/10 - 12/29/10	< 53	< 58	< 6	< 7	< 13	< 6	< 13	< 5	< 10	< 6	< 6	< 28	< 11	< 40
	MEAN	-	79 ± 83	-	-	-	-	-	-	-	-	-	-	-	-

* THE MEAN AND 2 STANDARD DEVIATION ARE CALCULATED USING THE POSITIVE VALUES

TABLE C-I.3 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	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	Ce-144
CL-91 **	12/30/09 - 01/27/10	< 42	< 77	< 5	< 5	< 8	< 6	< 10	< 4	< 9	< 4	< 5	< 24	< 7	< 37
	01/27/10 - 02/24/10	< 44	< 63	< 5	< 5	< 11	< 5	< 13	< 6	< 9	< 5	< 6	< 23	< 8	< 36
	02/24/10 - 03/31/10	< 35	< 37	< 3	< 4	< 9	< 4	< 7	< 4	< 7	< 3	< 4	< 24	< 7	< 29
	03/31/10 - 04/28/10	< 39	< 90	< 4	< 4	< 8	< 4	< 8	< 4	< 8	< 4	< 4	< 25	< 6	< 40
	04/28/10 - 05/26/10	< 18	< 16	< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 2	< 2	< 17	< 6	< 14
	05/26/10 - 06/30/10	< 43	< 79	< 5	< 5	< 10	< 4	< 10	< 5	< 9	< 5	< 5	< 30	< 9	< 41
	06/30/10 - 07/28/10	< 54	< 125	< 4	< 7	< 11	< 6	< 10	< 6	< 8	< 6	< 8	< 32	< 7	< 51
	07/28/10 - 08/25/10	< 38	< 82	< 4	< 4	< 10	< 3	< 8	< 5	< 8	< 4	< 5	< 33	< 9	< 35
	08/25/10 - 09/29/10	< 61	< 89	< 6	< 8	< 13	< 7	< 17	< 10	< 13	< 7	< 6	< 34	< 10	< 57
	09/29/10 - 10/27/10	< 52	< 127	< 6	< 6	< 17	< 7	< 13	< 7	< 12	< 5	< 6	< 38	< 13	< 45
	10/27/10 - 11/24/10 (1)	< 37	49 ± 48	< 4	< 4	< 7	< 3	< 7	< 4	< 7	< 4	< 4	< 30	< 7	< 29
	11/24/10 - 12/29/10	< 37	< 81	< 5	< 5	< 7	< 5	< 11	< 5	< 10	< 4	< 5	< 29	< 8	< 35
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-99 **	12/30/09 - 01/27/10	< 60	< 123	< 6	< 7	< 11	< 7	< 11	< 7	< 11	< 7	< 7	< 32	< 10	< 54
	01/27/10 - 02/24/10	< 48	< 107	< 5	< 5	< 10	< 5	< 10	< 5	< 9	< 5	< 5	< 25	< 7	< 42
	02/24/10 - 03/31/10	< 40	< 76	< 4	< 4	< 9	< 4	< 7	< 6	< 7	< 4	< 5	< 29	< 9	< 33
	03/31/10 - 04/28/10	< 37	< 36	< 4	< 4	< 8	< 4	< 8	< 4	< 7	< 4	< 4	< 22	< 8	< 33
	04/28/10 - 05/26/10	< 19	< 14	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 2	< 2	< 17	< 5	< 14
	05/26/10 - 06/30/10	< 38	< 87	< 5	< 5	< 9	< 5	< 8	< 4	< 7	< 4	< 4	< 25	< 8	< 33
	06/30/10 - 07/28/10	< 56	< 47	< 5	< 6	< 12	< 5	< 13	< 6	< 11	< 8	< 6	< 31	< 8	< 56
	07/28/10 - 08/25/10	< 38	< 35	< 4	< 4	< 10	< 5	< 8	< 5	< 8	< 4	< 5	< 32	< 8	< 33
	08/25/10 - 09/29/10	< 65	< 52	< 6	< 7	< 10	< 6	< 13	< 8	< 9	< 6	< 7	< 35	< 7	< 60
	09/29/10 - 10/27/10	< 45	51 ± 49	< 5	< 5	< 12	< 4	< 8	< 6	< 8	< 5	< 5	< 29	< 9	< 34
	10/27/10 - 11/24/10	< 39	56 ± 50	< 4	< 4	< 9	< 4	< 8	< 4	< 7	< 4	< 4	< 28	< 8	< 30
	11/24/10 - 12/29/10 (1)	< 49	137 ± 85	< 6	< 5	< 13	< 6	< 8	< 6	< 10	< 5	< 6	< 28	< 9	< 44
	MEAN	-	81 ± 97	-	-	-	-	-	-	-	-	-	-	-	-

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES

** INDICATES CONTROL LOCATION

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-II.1 **CONCENTRATIONS OF GROSS BETA IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-14
12/30/09 - 01/27/10	2.1 ± 1.4
01/27/10 - 02/24/10	< 2.6
02/24/10 - 03/31/10	< 3.6
03/31/10 - 04/28/10 (1)	< 2.6
04/28/10 - 05/26/10 (1)	4.4 ± 2.0
05/26/10 - 06/30/10	< 2.4
06/30/10 - 07/28/10 (1)	< 2.2
07/28/10 - 08/25/10	2.0 ± 1.4
08/25/10 - 09/29/10	< 2.2
09/29/10 - 10/27/10	< 1.9
10/27/10 - 11/24/10 (1)	< 3.3
11/24/10 - 12/29/10	< 3.2
MEAN	2.8 ± 2.8

TABLE C-II.2 **CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-14
12/30/09 - 03/31/10	< 182
03/31/10 - 06/30/10	< 160
06/30/10 - 09/29/10	< 166
09/29/10 - 12/29/10	< 167
MEAN	-

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-II.3 **CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	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-14	12/30/09 - 01/27/10	< 55	< 59	< 5	< 6	< 14	< 7	< 13	< 7	< 9	< 12	< 6	< 7	< 39	< 10	< 47
	01/27/10 - 02/24/10	< 45	< 88	< 4	< 4	< 11	< 5	< 8	< 5	< 8	< 8	< 5	< 5	< 23	< 6	< 35
	02/24/10 - 03/31/10	< 42	< 100	< 5	< 5	< 11	< 5	< 10	< 5	< 8	< 12	< 4	< 5	< 26	< 10	< 34
	03/31/10 - 04/28/10 (1)	< 52	91 ± 84	< 5	< 5	< 10	< 5	< 13	< 6	< 8	< 11	< 5	< 5	< 27	< 9	< 49
	04/28/10 - 05/26/10 (1)	< 15	< 38	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 8	< 1	< 2	< 16	< 5	< 12
	05/26/10 - 06/30/10	< 51	< 86	< 5	< 7	< 8	< 4	< 12	< 6	< 11	< 13	< 4	< 5	< 37	< 12	< 42
	06/30/10 - 07/28/10 (1)	< 68	< 119	< 6	< 7	< 15	< 6	< 12	< 8	< 11	< 14	< 7	< 7	< 30	< 8	< 65
	07/28/10 - 08/25/10	< 38	< 85	< 4	< 4	< 8	< 5	< 9	< 5	< 7	< 14	< 4	< 4	< 33	< 11	< 31
	08/25/10 - 09/29/10	< 72	< 145	< 6	< 6	< 16	< 5	< 18	< 9	< 14	< 13	< 7	< 6	< 30	< 10	< 56
	09/29/10 - 10/27/10	< 47	< 110	< 6	< 5	< 12	< 5	< 7	< 6	< 9	< 14	< 4	< 5	< 31	< 10	< 39
	10/27/10 - 11/24/10 (1)	< 39	< 55	< 4	< 5	< 11	< 4	< 8	< 5	< 9	< 14	< 4	< 6	< 34	< 8	< 37
	11/24/10 - 12/29/10	< 43	< 78	< 4	< 4	< 9	< 5	< 8	< 5	< 8	< 10	< 4	< 6	< 25	< 9	< 37
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-III.1 **CONCENTRATIONS OF TRITIUM IN WELL WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-7D	CL-12R	CL-12T
03/31/10 - 03/31/10	< 181	< 179	< 180
06/30/10 - 06/30/10	< 164	< 161	< 163
09/29/10 - 09/29/10	< 164	< 200	< 198
12/29/10 - 12/29/10	< 169	< 170	< 172
MEAN	-	-	-

TABLE C-III.2 **CONCENTRATIONS OF GAMMA EMITTERS IN WELL WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	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	Ce-144
CL-7D	03/31/10	< 34	< 75	< 3	< 3	< 8	< 3	< 7	< 5	< 7	< 4	< 4	< 28	< 7	< 28
	06/30/10	< 43	< 42	< 5	< 5	< 10	< 5	< 9	< 6	< 9	< 4	< 4	< 30	< 9	< 35
	09/29/10	< 49	< 51	< 7	< 6	< 15	< 6	< 14	< 6	< 12	< 5	< 6	< 26	< 9	< 48
	12/29/10	< 38	< 76	< 4	< 4	< 8	< 4	< 7	< 4	< 7	< 4	< 4	< 23	< 8	< 32
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-12R	03/31/10	< 49	< 90	< 5	< 4	< 11	< 5	< 10	< 5	< 9	< 4	< 5	< 30	< 10	< 38
	06/30/10	< 45	< 96	< 4	< 5	< 12	< 4	< 10	< 5	< 8	< 4	< 5	< 29	< 10	< 35
	09/29/10	< 48	< 82	< 4	< 4	< 10	< 5	< 8	< 6	< 9	< 5	< 5	< 24	< 9	< 36
	12/29/10	< 36	< 82	< 4	< 4	< 9	< 5	< 8	< 5	< 8	< 4	< 5	< 23	< 9	< 30
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-12T	03/31/10	< 36	< 31	< 4	< 4	< 10	< 4	< 9	< 4	< 8	< 4	< 4	< 28	< 11	< 28
	06/30/10	< 50	< 37	< 5	< 5	< 11	< 5	< 11	< 5	< 10	< 4	< 5	< 33	< 10	< 46
	09/29/10	< 47	< 63	< 6	< 7	< 9	< 6	< 9	< 6	< 10	< 6	< 6	< 29	< 8	< 42
	12/29/10	< 40	53 ± 49	< 3	< 4	< 7	< 4	< 8	< 5	< 6	< 4	< 5	< 23	< 7	< 28
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES

TABLE C-IV.1 **CONCENTRATIONS OF GAMMA EMITTERS IN FISH SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD	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	Ce-144
CL-105															
Bluegill	04/15/10	< 390	2360 ± 509	< 37	< 44	< 114	< 38	< 78	< 41	< 73	< 36	< 36	< 617	< 191	< 191
Carp	04/15/10	< 539	2190 ± 628	< 51	< 53	< 156	< 46	< 90	< 71	< 91	< 50	< 43	< 863	< 285	< 241
Crappie	04/15/10	< 361	2150 ± 616	< 38	< 45	< 98	< 41	< 75	< 44	< 87	< 33	< 41	< 678	< 178	< 206
Largemouth bass	04/15/10	< 305	3230 ± 505	< 24	< 35	< 80	< 35	< 57	< 32	< 49	< 25	< 28	< 514	< 158	< 130
Carp	10/14/10	< 446	2170 ± 710	< 42	< 44	< 104	< 47	< 78	< 50	< 60	< 40	< 44	< 312	< 59	< 238
Bluegill	10/14/10	< 598	1850 ± 890	< 56	< 65	< 148	< 67	< 102	< 55	< 95	< 66	< 66	< 399	< 112	< 314
Largemouth bass	10/14/10	< 351	2800 ± 843	< 41	< 40	< 114	< 48	< 78	< 44	< 77	< 42	< 49	< 308	< 107	< 244
Crappie	10/14/10	< 380	3040 ± 717	< 34	< 43	< 99	< 31	< 72	< 36	< 78	< 41	< 41	< 254	< 47	< 221
	MEAN	-	2474 ± 979	-	-	-	-	-	-	-	-	-	-	-	-
CL-19															
Bluegill	04/15/10	< 501	3120 ± 781	< 59	< 52	< 130	< 54	< 132	< 70	< 124	< 36	< 49	< 901	< 252	< 341
Carp	04/15/10	< 493	2620 ± 664	< 45	< 53	< 127	< 50	< 112	< 45	< 101	< 37	< 43	< 745	< 233	< 222
Channel catfish	04/15/10	< 422	2670 ± 579	< 41	< 59	< 150	< 45	< 93	< 43	< 106	< 40	< 35	< 676	< 235	< 362
Largemouth bass	04/15/10	< 434	2750 ± 628	< 39	< 41	< 125	< 35	< 88	< 44	< 94	< 41	< 43	< 825	< 271	< 221
Largemouth bass	10/14/10	< 353	3420 ± 771	< 39	< 46	< 96	< 37	< 79	< 52	< 78	< 41	< 44	< 289	< 84	< 241
Channel catfish	10/14/10	< 427	4580 ± 895	< 41	< 50	< 111	< 41	< 109	< 57	< 85	< 47	< 43	< 344	< 86	< 264
Bluegill	10/14/10	< 704	3320 ± 1020	< 78	< 82	< 180	< 73	< 185	< 102	< 137	< 74	< 79	< 483	< 159	< 475
Carp	10/14/10	< 377	2720 ± 656	< 48	< 52	< 124	< 49	< 108	< 59	< 85	< 56	< 52	< 355	< 120	< 248
	MEAN	-	3150 ± 1310	-	-	-	-	-	-	-	-	-	-	-	-

TABLE C-V.1 CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010

RESULTS IN UNITS OF PCI/KG DRY ± 2 SIGMA

STC	COLLECTION PERIOD	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	Ce-144
CL-7B	04/15/10	< 462	9330 ± 1020	< 49	< 52	< 150	< 46	< 97	< 66	< 81	< 37	< 43	< 672	< 325	< 245
	10/14/10	< 305	8040 ± 692	< 32	< 33	< 83	< 36	< 82	< 38	< 74	< 27	< 32	< 262	< 79	< 178
	MEAN	-	8685 ± 1824	-	-	-	-	-	-	-	-	-	-	-	-

TABLE C-VI.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010

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

COLLECTION PERIOD	GROUP I					
	CL-02	CL-03	CL-04	CL-06	CL-15	CL-94
12/30/09 - 01/06/10	32 ± 5	29 ± 5	29 ± 5	30 ± 5	27 ± 5	31 ± 5
01/06/10 - 01/13/10	29 ± 5	30 ± 5	33 ± 5	33 ± 5	36 ± 5	33 ± 5
01/13/10 - 01/20/10	26 ± 5	24 ± 4	28 ± 5	26 ± 4	30 ± 5	28 ± 5
01/20/10 - 01/27/10	16 ± 4	19 ± 4	20 ± 5	13 ± 4	18 ± 5	18 ± 5
01/27/10 - 02/03/10	20 ± 5	18 ± 5	22 ± 5	20 ± 5	22 ± 5	20 ± 5
02/03/10 - 02/10/10	20 ± 5	25 ± 5	23 ± 5	22 ± 5	19 ± 5	20 ± 5
02/10/10 - 02/17/10	16 ± 4	17 ± 4	20 ± 4	16 ± 4	17 ± 4	18 ± 4
02/17/10 - 02/24/10	25 ± 4	23 ± 4	25 ± 4	24 ± 4	27 ± 4	29 ± 4
02/24/10 - 03/03/10	16 ± 4	20 ± 4	16 ± 4	17 ± 4	16 ± 4	22 ± 4
03/03/10 - 03/10/10	23 ± 4	15 ± 4	23 ± 4	21 ± 4	21 ± 4	26 ± 4
03/10/10 - 03/17/10	12 ± 4	7 ± 3	8 ± 3	8 ± 3	7 ± 3	10 ± 3
03/17/10 - 03/24/10	< 8	18 ± 6	17 ± 6	19 ± 6	11 ± 5	9 ± 5
03/24/10 - 03/31/10	15 ± 5	14 ± 5	13 ± 5	15 ± 5	16 ± 5	19 ± 6
03/31/10 - 04/07/10	15 ± 4	19 ± 4	13 ± 4	16 ± 4	15 ± 4	16 ± 4
04/07/10 - 04/14/10	15 ± 4	16 ± 4	16 ± 4	19 ± 4	19 ± 4	19 ± 4
04/14/10 - 04/21/10	16 ± 4	17 ± 4	17 ± 4	17 ± 4	15 ± 4	16 ± 4
04/21/10 - 04/28/10	16 ± 4	13 ± 4	17 ± 4	17 ± 4	16 ± 4	17 ± 4
04/28/10 - 05/05/10	11 ± 4	14 ± 4	20 ± 5	14 ± 4	15 ± 4	17 ± 5
05/05/10 - 05/12/10	9 ± 4	10 ± 4	12 ± 4	11 ± 4	9 ± 4	9 ± 4
05/12/10 - 05/19/10	7 ± 4	9 ± 4	6 ± 4	6 ± 4	8 ± 4	8 ± 4
05/19/10 - 05/26/10	14 ± 4	10 ± 4	12 ± 4	13 ± 4	10 ± 4	12 ± 4
05/26/10 - 06/02/10	22 ± 5	19 ± 4	20 ± 4	20 ± 4	22 ± 4	20 ± 4
06/02/10 - 06/09/10	16 ± 4	16 ± 4	15 ± 4	14 ± 4	14 ± 4	17 ± 4
06/09/10 - 06/16/10	12 ± 4	11 ± 4	14 ± 4	13 ± 4	12 ± 4	11 ± 4
06/16/10 - 06/23/10	7 ± 4	7 ± 4	7 ± 4	8 ± 4	8 ± 4	7 ± 4
06/23/10 - 06/30/10	11 ± 4	8 ± 4	11 ± 4	14 ± 4	8 ± 4	10 ± 4
06/30/10 - 07/07/10	18 ± 4	18 ± 4	14 ± 4	16 ± 4	15 ± 4	20 ± 4
07/07/10 - 07/14/10	16 ± 4	20 ± 5	18 ± 4	20 ± 5	17 ± 4	21 ± 5
07/14/10 - 07/21/10	21 ± 4	18 ± 4	18 ± 4	18 ± 4	19 ± 4	19 ± 4
07/21/10 - 07/28/10	15 ± 4	16 ± 4	13 ± 4	15 ± 4	15 ± 4	14 ± 4
07/28/10 - 08/04/10	21 ± 4	21 ± 4	23 ± 4	23 ± 4	19 ± 4	24 ± 4
08/04/10 - 08/11/10	21 ± 5	23 ± 5	22 ± 5	22 ± 5	19 ± 5	22 ± 5
08/11/10 - 08/18/10	16 ± 5	20 ± 5	15 ± 5	14 ± 4	15 ± 5	15 ± 5
08/18/10 - 08/25/10	23 ± 5	18 ± 4	24 ± 5	26 ± 5	17 ± 4	20 ± 5
08/25/10 - 09/01/10	20 ± 5	22 ± 5	17 ± 4	20 ± 5	16 ± 4	20 ± 5
09/01/10 - 09/08/10	16 ± 4	18 ± 4	18 ± 4	18 ± 4	14 ± 4	17 ± 4
09/08/10 - 09/15/10	20 ± 4	21 ± 4	23 ± 4	26 ± 4	20 ± 4	24 ± 4
09/15/10 - 09/22/10	23 ± 5	28 ± 5	23 ± 5	23 ± 5	20 ± 5	19 ± 5
09/22/10 - 09/29/10	20 ± 5	16 ± 4	16 ± 4	13 ± 4	15 ± 5	20 ± 5
09/29/10 - 10/06/10	15 ± 4	16 ± 4	16 ± 4	14 ± 4	16 ± 4	15 ± 4
10/06/10 - 10/13/10	35 ± 4	35 ± 4	(1)	(1)	35 ± 4	39 ± 4
10/13/10 - 10/20/10	25 ± 5	23 ± 5	24 ± 5	22 ± 5	23 ± 5	22 ± 5
10/20/10 - 10/27/10	26 ± 5	22 ± 5	19 ± 5	26 ± 5	19 ± 5	25 ± 5
10/27/10 - 11/03/10	12 ± 3	14 ± 3	12 ± 3	12 ± 3	14 ± 3	14 ± 3
11/03/10 - 11/10/10	13 ± 4	13 ± 4	12 ± 4	12 ± 4	13 ± 4	14 ± 4
11/10/10 - 11/17/10	30 ± 5	31 ± 5	27 ± 5	27 ± 5	27 ± 5	34 ± 6
11/17/10 - 11/24/10	28 ± 5	29 ± 5	31 ± 5	30 ± 5	25 ± 4 (1)	24 ± 4 (1)
11/24/10 - 12/01/10	21 ± 4	20 ± 4	22 ± 4	26 ± 9 (1)	23 ± 4	22 ± 4
12/01/10 - 12/08/10	29 ± 4	24 ± 4	31 ± 4	29 ± 4	27 ± 4	27 ± 4
12/08/10 - 12/15/10	29 ± 4	27 ± 4	34 ± 4	29 ± 4	31 ± 4	33 ± 4
12/15/10 - 12/22/10	39 ± 4	34 ± 4	36 ± 4	37 ± 4	36 ± 4	39 ± 4
12/22/10 - 12/29/10	14 ± 4	15 ± 4	14 ± 4	12 ± 4	13 ± 4	12 ± 4
MEAN	19 ± 14	19 ± 13	19 ± 14	19 ± 13	18 ± 14	20 ± 15

* THE MEAN AND 2 STANDARD DEVIATION VALUES 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, 2010

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

COLLECTION	GROUP II			GROUP III
PERIOD	CL-01	CL-07	CL-08	CL-11 **
12/30/09 - 01/06/10	27 ± 5	29 ± 5	27 ± 5	33 ± 5
01/06/10 - 01/13/10	28 ± 5	30 ± 5	29 ± 5	29 ± 5
01/13/10 - 01/20/10	22 ± 5	29 ± 5	27 ± 5	30 ± 5
01/20/10 - 01/27/10	16 ± 4	18 ± 4	15 ± 4	17 ± 4
01/27/10 - 02/03/10	16 ± 5	23 ± 5	22 ± 5	20 ± 5
02/03/10 - 02/10/10	22 ± 5	15 ± 4	22 ± 5	22 ± 5
02/10/10 - 02/17/10	19 ± 4	17 ± 4	17 ± 4	14 ± 4
02/17/10 - 02/24/10	25 ± 4	22 ± 4	24 ± 4	24 ± 4
02/24/10 - 03/03/10	14 ± 4	15 ± 4	16 ± 4	16 ± 4
03/03/10 - 03/10/10	23 ± 4	19 ± 4	19 ± 4	19 ± 4
03/10/10 - 03/17/10	7 ± 3	9 ± 3	8 ± 3	15 ± 4
03/17/10 - 03/24/10	18 ± 6	16 ± 6	9 ± 5	16 ± 6
03/24/10 - 03/31/10	11 ± 5	13 ± 5	17 ± 6	21 ± 6
03/31/10 - 04/07/10	18 ± 4	17 ± 4	13 ± 4	12 ± 4
04/07/10 - 04/14/10	16 ± 4	20 ± 4	16 ± 4	17 ± 4
04/14/10 - 04/21/10	15 ± 4	17 ± 4	15 ± 4	17 ± 4
04/21/10 - 04/28/10	14 ± 4	12 ± 4	18 ± 4	15 ± 4
04/28/10 - 05/05/10	8 ± 4	13 ± 4	13 ± 4	19 ± 5
05/05/10 - 05/12/10	12 ± 4	10 ± 4	11 ± 4	10 ± 4
05/12/10 - 05/19/10	8 ± 4	10 ± 4	8 ± 4	8 ± 4
05/19/10 - 05/26/10	13 ± 4	12 ± 4	14 ± 4	11 ± 4
05/26/10 - 06/02/10	19 ± 4	16 ± 4	20 ± 4	21 ± 4
06/02/10 - 06/09/10	15 ± 4	17 ± 4	13 ± 4	18 ± 4
06/09/10 - 06/16/10	15 ± 4	12 ± 4	11 ± 4	19 ± 4
06/16/10 - 06/23/10	6 ± 4	9 ± 4	7 ± 4	8 ± 4
06/23/10 - 06/30/10	9 ± 4	6 ± 4	8 ± 4	6 ± 4
06/30/10 - 07/07/10	19 ± 4	17 ± 4	15 ± 4	19 ± 4
07/07/10 - 07/14/10	19 ± 5	17 ± 4	22 ± 5	22 ± 5
07/14/10 - 07/21/10	19 ± 4	15 ± 4	21 ± 4	17 ± 4
07/21/10 - 07/28/10	14 ± 4	14 ± 4	15 ± 4	12 ± 4
07/28/10 - 08/04/10	18 ± 4	19 ± 4	21 ± 4	19 ± 4
08/04/10 - 08/11/10	19 ± 5	21 ± 5	22 ± 5	18 ± 5
08/11/10 - 08/18/10	15 ± 5	16 ± 5	15 ± 5	17 ± 5
08/18/10 - 08/25/10	21 ± 5	23 ± 5	22 ± 5	22 ± 5
08/25/10 - 09/01/10	21 ± 5	19 ± 4	21 ± 5	24 ± 5
09/01/10 - 09/08/10	19 ± 4	18 ± 4	13 ± 4	18 ± 4
09/08/10 - 09/15/10	21 ± 4	24 ± 4	25 ± 4	23 ± 4
09/15/10 - 09/22/10	24 ± 5	18 ± 4	24 ± 5	21 ± 5
09/22/10 - 09/29/10	14 ± 4	14 ± 4	14 ± 4	17 ± 4
09/29/10 - 10/06/10	17 ± 4	12 ± 4	12 ± 4	16 ± 4
10/06/10 - 10/13/10	36 ± 4	39 ± 4	38 ± 4	37 ± 4
10/13/10 - 10/20/10	21 ± 5	22 ± 4	20 ± 4	23 ± 5
10/20/10 - 10/27/10	22 ± 5	19 ± 5	21 ± 5	19 ± 5
10/27/10 - 11/03/10	13 ± 3	13 ± 3	12 ± 3	12 ± 3
11/03/10 - 11/10/10	10 ± 4	10 ± 4	12 ± 4	11 ± 4
11/10/10 - 11/17/10	30 ± 5	30 ± 5	30 ± 5	24 ± 5
11/17/10 - 11/24/10	26 ± 5	23 ± 4	30 ± 5	19 ± 4
11/24/10 - 12/01/10	21 ± 4	22 ± 4	19 ± 4	23 ± 4
12/01/10 - 12/08/10	29 ± 4	27 ± 4	27 ± 4	30 ± 4
12/08/10 - 12/15/10	30 ± 4	30 ± 4	27 ± 4	31 ± 4
12/15/10 - 12/22/10	35 ± 4	39 ± 4	41 ± 4	36 ± 4
12/22/10 - 12/29/10	15 ± 4	10 ± 4	10 ± 4	14 ± 4
MEAN	19 ± 14	18 ± 14	18 ± 15	19 ± 14

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
** INDICATES CONTROL STATION

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, 2010**

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
12/30/09 - 02/03/10	13	36	25 ± 12	12/30/09 - 02/03/10	15	30	24 ± 11	12/30/09 - 02/03/10	17	33	26 ± 14
02/03/10 - 03/03/10	16	29	20 ± 8	02/03/10 - 03/03/10	14	25	19 ± 8	02/03/10 - 03/03/10	14	24	19 ± 9
03/03/10 - 03/31/10	7	26	15 ± 11	03/03/10 - 03/31/10	7	23	14 ± 11	03/03/10 - 03/31/10	15	21	18 ± 6
03/31/10 - 04/28/10	13	19	16 ± 3	03/31/10 - 04/28/10	12	20	16 ± 5	03/31/10 - 04/28/10	12	17	15 ± 5
04/28/10 - 06/02/10	6	22	13 ± 10	04/28/10 - 06/02/10	8	20	13 ± 8	04/28/10 - 06/02/10	8	21	14 ± 11
06/02/10 - 06/30/10	7	17	11 ± 6	06/02/10 - 06/30/10	6	17	11 ± 8	06/02/10 - 06/30/10	6	19	13 ± 14
06/30/10 - 07/28/10	13	21	17 ± 5	06/30/10 - 07/28/10	14	22	17 ± 5	06/30/10 - 07/28/10	12	22	17 ± 9
07/28/10 - 09/01/10	14	26	20 ± 6	07/28/10 - 09/01/10	15	23	19 ± 5	07/28/10 - 09/01/10	17	24	20 ± 6
09/01/10 - 09/29/10	13	28	20 ± 8	09/01/10 - 09/29/10	13	25	19 ± 9	09/01/10 - 09/29/10	17	23	20 ± 5
09/29/10 - 11/03/10	12	39	21 ± 15	09/29/10 - 11/03/10	12	39	21 ± 19	09/29/10 - 11/03/10	12	37	21 ± 20
11/03/10 - 12/01/10	12	34	23 ± 14	11/03/10 - 12/01/10	10	30	22 ± 16	11/03/10 - 12/01/10	11	24	19 ± 12
12/01/10 - 12/29/10	12	39	27 ± 18	12/01/10 - 12/29/10	10	41	27 ± 20	12/01/10 - 12/29/10	14	36	28 ± 19
12/30/09 - 12/29/10	6	39	19 ± 14	12/30/09 - 12/29/10	6	41	18 ± 14	12/30/09 - 12/29/10	6	37	19 ± 14

* GROUP I LOCATIONS WITHIN 1 MILES OF CPS
** GROUP II LOCATIONS WITHIN 1-5 MILES OF CPS
*** GROUP III LOCATIONS GREATER THAN 5 MILES OF CPS

TABLE C-VI.3 **CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

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

STC	COLLECTION PERIOD	Be-7	K-40	Co-60	Nb-95	Zr-95	Ru-103	Ru-106	Cs-134	Cs-137	Ce-141	Ce-144
CL-1	12/30/09 - 03/31/10	88 ± 31	< 41	< 3	< 5	< 8	< 5	< 19	< 2	< 2	< 7	< 12
	03/31/10 - 06/30/10	88 ± 30	< 69	< 4	< 5	< 7	< 6	< 34	< 4	< 3	< 8	< 22
	06/30/10 - 09/29/10	70 ± 23	< 46	< 2	< 3	< 6	< 3	< 19	< 2	< 2	< 5	< 10
	09/29/10 - 12/29/10	51 ± 19	< 42	< 2	< 3	< 5	< 3	< 23	< 3	< 2	< 4	< 13
	MEAN	74 ± 35	-	-	-	-	-	-	-	-	-	-
CL-11**	12/30/09 - 03/31/10	111 ± 43	< 43	< 3	< 6	< 7	< 8	< 30	< 4	< 4	< 11	< 14
	03/31/10 - 06/30/10	106 ± 29	< 58	< 4	< 4	< 6	< 5	< 28	< 3	< 3	< 6	< 14
	06/30/10 - 09/29/10	69 ± 20	< 53	< 3	< 4	< 7	< 5	< 28	< 3	< 3	< 7	< 16
	09/29/10 - 12/29/10	58 ± 20	< 52	< 3	< 3	< 5	< 3	< 22	< 2	< 1	< 4	< 9
	MEAN	86 ± 53	-	-	-	-	-	-	-	-	-	-
CL-15	12/30/09 - 03/31/10	82 ± 39	< 47	< 3	< 5	< 9	< 8	< 23	< 3	< 3	< 9	< 14
	03/31/10 - 06/30/10	97 ± 27	< 61	< 4	< 5	< 9	< 5	< 32	< 4	< 4	< 8	< 20
	06/30/10 - 09/29/10	59 ± 27	< 38	< 3	< 4	< 5	< 4	< 19	< 3	< 2	< 6	< 11
	09/29/10 - 12/29/10	63 ± 26	< 62	< 3	< 3	< 4	< 3	< 23	< 2	< 3	< 3	< 9
	MEAN	75 ± 36	-	-	-	-	-	-	-	-	-	-
CL-2	12/30/09 - 03/31/10	67 ± 37	< 58	< 4	< 7	< 9	< 6	< 30	< 3	< 4	< 10	< 15
	03/31/10 - 06/30/10	109 ± 34	< 66	< 4	< 6	< 11	< 5	< 30	< 4	< 5	< 8	< 18
	06/30/10 - 09/29/10	62 ± 28	< 50	< 3	< 4	< 8	< 5	< 26	< 3	< 3	< 7	< 14
	09/29/10 - 12/29/10	76 ± 21	< 50	< 3	< 3	< 3	< 3	< 20	< 2	< 3	< 4	< 11
	MEAN	78 ± 42	-	-	-	-	-	-	-	-	-	-

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES

** INDICATES CONTROL STATION

TABLE C-VI.3 **CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

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

STC	COLLECTION PERIOD	Be-7	K-40	Co-60	Nb-95	Zr-95	Ru-103	Ru-106	Cs-134	Cs-137	Ce-141	Ce-144
CL-3	12/30/09 - 03/31/10	97 ± 26	< 38	< 2	< 4	< 8	< 5	< 14	< 2	< 2	< 6	< 10
	03/31/10 - 06/30/10	82 ± 26	< 49	< 3	< 4	< 7	< 4	< 27	< 3	< 3	< 5	< 13
	06/30/10 - 09/29/10	79 ± 23	29 ± 24	< 3	< 3	< 6	< 4	< 18	< 3	< 2	< 5	< 11
	09/29/10 - 12/29/10	59 ± 23	< 21	< 2	< 3	< 2	< 3	< 19	< 2	< 2	< 4	< 8
	MEAN	79 ± 32	-	-	-	-	-	-	-	-	-	-
CL-4	12/30/09 - 03/31/10	93 ± 36	< 58	< 3	< 5	< 10	< 7	< 25	< 3	< 2	< 9	< 13
	03/31/10 - 06/30/10	92 ± 33	< 69	< 4	< 4	< 7	< 4	< 36	< 3	< 2	< 6	< 16
	06/30/10 - 09/29/10	69 ± 27	< 51	< 4	< 5	< 8	< 5	< 30	< 4	< 2	< 7	< 13
	09/29/10 - 12/29/10	75 ± 24	< 42	< 1	< 2	< 3	< 2	< 20	< 2	< 2	< 3	< 7
	MEAN	82 ± 25	-	-	-	-	-	-	-	-	-	-
CL-6	12/30/09 - 03/31/10	88 ± 28	< 41	< 2	< 3	< 6	< 5	< 22	< 3	< 2	< 7	< 10
	03/31/10 - 06/30/10	115 ± 33	< 72	< 5	< 5	< 8	< 5	< 39	< 4	< 3	< 8	< 21
	06/30/10 - 09/29/10	100 ± 28	< 52	< 2	< 3	< 4	< 4	< 14	< 2	< 2	< 5	< 9
	09/29/10 - 12/29/10	64 ± 23	< 37	< 2	< 3	< 5	< 3	< 21	< 3	< 3	< 4	< 11
	MEAN	92 ± 43	-	-	-	-	-	-	-	-	-	-
CL-7	12/30/09 - 03/31/10	88 ± 38	< 44	< 3	< 3	< 8	< 4	< 22	< 3	< 3	< 9	< 11
	03/31/10 - 06/30/10	82 ± 24	24 ± 21	< 4	< 3	< 5	< 3	< 21	< 3	< 3	< 4	< 10
	06/30/10 - 09/29/10	92 ± 23	< 51	< 3	< 4	< 5	< 4	< 24	< 3	< 3	< 5	< 11
	09/29/10 - 12/29/10	60 ± 26	< 44	< 2	< 3	< 5	< 4	< 20	< 3	< 3	< 4	< 11
	MEAN	80 ± 29	-	-	-	-	-	-	-	-	-	-

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES

TABLE C-VI.3 **CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

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

STC	COLLECTION PERIOD	Be-7	K-40	Co-60	Nb-95	Zr-95	Ru-103	Ru-106	Cs-134	Cs-137	Ce-141	Ce-144
CL-8	12/30/09 - 03/31/10	111 ± 40	< 63	< 3	< 5	< 8	< 8	< 28	< 3	< 3	< 10	< 14
	03/31/10 - 06/30/10	117 ± 41	< 79	< 4	< 4	< 8	< 5	< 23	< 4	< 3	< 8	< 17
	06/30/10 - 09/29/10	75 ± 24	< 37	< 2	< 3	< 5	< 4	< 18	< 2	< 2	< 5	< 12
	09/29/10 - 12/29/10	53 ± 20	< 42	< 2	< 3	< 5	< 3	< 20	< 3	< 2	< 4	< 11
	MEAN	89 ± 61	-	-	-	-	-	-	-	-	-	-
CL-94	12/30/09 - 03/31/10	79 ± 37	< 56	< 3	< 5	< 10	< 8	< 34	< 3	< 3	< 13	< 18
	03/31/10 - 06/30/10	93 ± 23	< 47	< 3	< 3	< 6	< 4	< 24	< 3	< 2	< 5	< 9
	06/30/10 - 09/29/10	94 ± 22	< 37	< 2	< 3	< 7	< 4	< 20	< 2	< 2	< 5	< 10
	09/29/10 - 12/29/10	51 ± 20	< 36	< 3	< 3	< 5	< 2	< 22	< 3	< 2	< 3	< 11
	MEAN	79 ± 40	-	-	-	-	-	-	-	-	-	-

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES

TABLE C-VII.1 CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010

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
12/30/09 - 01/06/10	< 53	< 54	< 54	< 53	< 40	< 40
01/06/10 - 01/13/10	< 43	< 42	< 43	< 43	< 58	< 59
01/13/10 - 01/20/10	< 36	< 35	< 36	< 35	< 33	< 32
01/20/10 - 01/27/10	< 31	< 30	< 31	< 23	< 41	< 43
01/27/10 - 02/03/10	< 27	< 26	< 26	< 26	< 30	< 30
02/03/10 - 02/10/10	< 34	< 34	< 34	< 17	< 16	< 26
02/10/10 - 02/17/10	< 31	< 32	< 32	< 17	< 34	< 34
02/17/10 - 02/24/10	< 31	< 31	< 31	< 31	< 29	< 29
02/24/10 - 03/03/10	< 33	< 33	< 32	< 32	< 22	< 21
03/03/10 - 03/10/10	< 25	< 24	< 25	< 25	< 26	< 27
03/10/10 - 03/17/10	< 39	< 38	< 40	< 39	< 68	< 67
03/17/10 - 03/24/10	< 13	< 22	< 23	< 23	< 23	< 23
03/24/10 - 03/31/10	< 32	< 31	< 32	< 38	< 26	< 26
03/31/10 - 04/07/10	< 7	< 4	< 7	< 7	< 10	< 10
04/07/10 - 04/14/10	< 6	< 6	< 6	< 6	< 33	< 33
04/14/10 - 04/21/10	< 27	< 26	< 14	< 26	< 32	< 32
04/21/10 - 04/28/10	< 32	< 30	< 32	< 32	< 38	< 37
04/28/10 - 05/05/10	< 29	< 28	< 28	< 15	< 41	< 42
05/05/10 - 05/12/10	< 20	< 19	< 20	< 20	< 30	< 30
05/12/10 - 05/19/10	< 27	< 26	< 25	< 14	< 35	< 36
05/19/10 - 05/26/10	< 28	< 27	< 27	< 27	< 34	< 33
05/26/10 - 06/02/10	< 36	< 33	< 34	< 34	< 38	< 39
06/02/10 - 06/09/10	< 43	< 42	< 42	< 42	< 50	< 50
06/09/10 - 06/16/10	< 27	< 27	< 27	< 15	< 27	< 27
06/16/10 - 06/23/10	< 40	< 40	< 41	< 40	< 57	< 57
06/23/10 - 06/30/10	< 39	< 37	< 38	< 38	< 40	< 39
06/30/10 - 07/07/10	< 30	< 30	< 30	< 30	< 29	< 29
07/07/10 - 07/14/10	< 33	< 34	< 33	< 33	< 19	< 43
07/14/10 - 07/21/10	< 41	< 40	< 40	< 40	< 45	< 45
07/21/10 - 07/28/10	< 26	< 24	< 25	< 25	< 29	< 17
07/28/10 - 08/04/10	< 25	< 23	< 24	< 23	< 30	< 31
08/04/10 - 08/11/10	< 28	< 27	< 27	< 27	< 42	< 41
08/11/10 - 08/18/10	< 30	< 29	< 30	< 29	< 30	< 30
08/18/10 - 08/25/10	< 29	< 51	< 52	< 50	< 55	< 23
08/25/10 - 09/01/10	< 38	< 36	< 37	< 46	< 37	< 38
09/01/10 - 09/08/10	< 28	< 15	< 28	< 27	< 32	< 31
09/08/10 - 09/15/10	< 30	< 28	< 29	< 16	< 32	< 14
09/15/10 - 09/22/10	< 8	< 8	< 4	< 8	< 10	< 10
09/22/10 - 09/29/10	< 27	< 25	< 26	< 26	< 50	< 48
09/29/10 - 10/06/10	< 50	< 50	< 51	< 23	< 40	< 41
10/06/10 - 10/13/10	< 41	< 40	(1)	(1)	< 55	< 24
10/13/10 - 10/20/10	< 45	< 43	< 51	< 28	< 49	< 49
10/20/10 - 10/27/10	< 28	< 27	< 29	< 29	< 44	< 43
10/27/10 - 11/03/10	< 38	< 37	< 38	< 29	< 40	< 41
11/03/10 - 11/10/10	< 69	< 68	< 68	< 51	< 46	< 28
11/10/10 - 11/17/10	< 40	< 40	< 40	< 17	< 38	< 38
11/17/10 - 11/24/10	< 52	< 51	< 50	< 27	< 21 (1)	< 40 (1)
11/24/10 - 12/01/10	< 53	< 53	< 52	< 18 (1)	< 56	< 24
12/01/10 - 12/08/10	< 32	< 32	< 32	< 31	< 40	< 42
12/08/10 - 12/15/10	< 53	< 53	< 52	< 52	< 65	< 28
12/15/10 - 12/22/10	< 57	< 57	< 57	< 58	< 42	< 43
12/22/10 - 12/29/10	< 55	< 55	< 55	< 56	< 38	< 41
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, 2010

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

COLLECTION PERIOD	GROUP II			GROUP III
	CL-01	CL-07	CL-08	CL-11 *
12/30/09 - 01/06/10	< 30	< 22	< 39	< 39
01/06/10 - 01/13/10	< 24	< 59	< 26	< 59
01/13/10 - 01/20/10	< 21	< 13	< 32	< 32
01/20/10 - 01/27/10	< 32	< 41	< 41	< 41
01/27/10 - 02/03/10	< 20	< 16	< 30	< 30
02/03/10 - 02/10/10	< 35	< 26	< 25	< 25
02/10/10 - 02/17/10	< 33	< 34	< 34	< 33
02/17/10 - 02/24/10	< 17	< 13	< 29	< 29
02/24/10 - 03/03/10	< 14	< 16	< 21	< 22
03/03/10 - 03/10/10	< 11	< 12	< 27	< 28
03/10/10 - 03/17/10	< 22	< 29	< 68	< 66
03/17/10 - 03/24/10	< 23	< 9	< 23	< 23
03/24/10 - 03/31/10	< 32	< 38	< 38	< 26
03/31/10 - 04/07/10	< 7	< 4	< 10	< 10
04/07/10 - 04/14/10	< 6	< 32	< 32	< 33
04/14/10 - 04/21/10	< 26	< 13	< 31	< 31
04/21/10 - 04/28/10	< 17	< 16	< 37	< 37
04/28/10 - 05/05/10	< 28	< 18	< 41	< 42
05/05/10 - 05/12/10	< 11	< 13	< 30	< 30
05/12/10 - 05/19/10	< 25	< 15	< 35	< 36
05/19/10 - 05/26/10	< 15	< 14	< 33	< 33
05/26/10 - 06/02/10	< 35	< 39	< 17	< 40
06/02/10 - 06/09/10	< 23	< 21	< 49	< 49
06/09/10 - 06/16/10	< 27	< 26	< 27	< 11
06/16/10 - 06/23/10	< 22	< 24	< 56	< 56
06/23/10 - 06/30/10	< 22	< 17	< 39	< 39
06/30/10 - 07/07/10	< 13	< 12	< 29	< 28
07/07/10 - 07/14/10	< 19	< 43	< 43	< 43
07/14/10 - 07/21/10	< 23	< 19	< 44	< 44
07/21/10 - 07/28/10	< 13	< 28	< 29	< 29
07/28/10 - 08/04/10	< 14	< 13	< 30	< 31
08/04/10 - 08/11/10	< 16	< 18	< 41	< 42
08/11/10 - 08/18/10	< 13	< 13	< 30	< 30
08/18/10 - 08/25/10	< 51	< 53	< 53	< 53
08/25/10 - 09/01/10	< 37	< 45	< 47	< 48
09/01/10 - 09/08/10	< 29	< 13	< 31	< 30
09/08/10 - 09/15/10	< 30	< 31	< 32	< 33
09/15/10 - 09/22/10	< 8	< 4	< 4	< 10
09/22/10 - 09/29/10	< 15	< 20	< 47	< 46
09/29/10 - 10/06/10	< 48	< 28	< 41	< 41
10/06/10 - 10/13/10	< 41	< 54	< 55	< 55
10/13/10 - 10/20/10	< 45	< 20	< 48	< 48
10/20/10 - 10/27/10	< 15	< 19	< 45	< 44
10/27/10 - 11/03/10	< 36	< 29	< 40	< 31
11/03/10 - 11/10/10	< 68	< 45	< 45	< 45
11/10/10 - 11/17/10	< 40	< 38	< 38	< 28
11/17/10 - 11/24/10	< 48	< 39	< 39	< 39
11/24/10 - 12/01/10	< 53	< 55	< 55	< 55
12/01/10 - 12/08/10	< 24	< 17	< 41	< 41
12/08/10 - 12/15/10	< 29	< 64	< 64	< 65
12/15/10 - 12/22/10	< 31	< 23	< 41	< 41
12/22/10 - 12/29/10	< 40	< 30	< 40	< 42
MEAN	-	-	-	-

* INDICATES CONTROL STATION

TABLE C-VIII.1 **CONCENTRATIONS OF I-131 IN MILK SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CONTROL FARM CL-116
01/27/10	< 0.6
02/24/10	< 0.5
03/31/10	< 0.7
04/28/10	< 0.7
05/12/10	< 0.9
05/26/10	< 0.6
06/09/10	< 0.7
06/23/10	< 0.8
07/07/10	< 0.8
07/21/10	< 0.7
08/04/10	< 0.6
08/18/10	< 0.7
09/01/10	< 0.8
09/15/10	< 0.4
09/29/10	< 0.5
10/13/10	< 0.4
10/27/10	< 0.7
11/24/10	< 0.8
12/29/10	< 0.8
MEAN	-

TABLE C-VIII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	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	Ce-144
CL-116 *	01/27/10	< 51	1200 ± 179	< 8	< 7	< 17	< 7	< 18	< 7	< 16	< 7	< 9	< 35	< 9	< 44
	02/24/10	< 40	1120 ± 110	< 5	< 5	< 12	< 6	< 11	< 5	< 9	< 4	< 5	< 22	< 8	< 31
	03/31/10	< 86	1230 ± 175	< 9	< 11	< 21	< 8	< 23	< 10	< 19	< 10	< 9	< 50	< 9	< 94
	04/28/10	< 54	1150 ± 118	< 5	< 6	< 14	< 6	< 14	< 7	< 11	< 5	< 6	< 39	< 9	< 42
	05/12/10	< 39	1130 ± 110	< 5	< 5	< 13	< 5	< 12	< 5	< 9	< 4	< 4	< 27	< 10	< 37
	05/26/10	< 25	1280 ± 54	< 2	< 3	< 6	< 2	< 5	< 3	< 5	< 2	< 2	< 26	< 8	< 20
	06/09/10	< 57	1310 ± 109	< 6	< 7	< 14	< 6	< 15	< 7	< 11	< 8	< 6	< 45	< 12	< 51
	06/23/10	< 60	1350 ± 164	< 7	< 7	< 16	< 6	< 15	< 8	< 15	< 6	< 8	< 35	< 10	< 48
	07/07/10	< 66	1390 ± 148	< 6	< 8	< 15	< 7	< 17	< 8	< 13	< 7	< 7	< 30	< 10	< 50
	07/21/10	< 66	1110 ± 180	< 7	< 9	< 18	< 9	< 20	< 9	< 15	< 7	< 9	< 43	< 9	< 67
	08/04/10	< 64	1170 ± 159	< 7	< 7	< 16	< 8	< 15	< 9	< 14	< 7	< 9	< 55	< 14	< 56
	08/18/10	< 42	1200 ± 114	< 5	< 5	< 10	< 6	< 9	< 6	< 8	< 4	< 5	< 35	< 11	< 33
	09/01/10	< 37	1160 ± 113	< 4	< 4	< 10	< 4	< 9	< 4	< 7	< 3	< 4	< 31	< 8	< 32
	09/15/10	< 35	1210 ± 96	< 3	< 4	< 11	< 5	< 8	< 4	< 8	< 3	< 4	< 33	< 8	< 28
	09/29/10	< 45	1150 ± 133	< 6	< 6	< 13	< 7	< 12	< 5	< 9	< 4	< 5	< 22	< 5	< 42
	10/13/10	< 57	1010 ± 143	< 7	< 7	< 14	< 8	< 14	< 7	< 11	< 7	< 7	< 33	< 8	< 46
	10/27/10	< 56	1350 ± 161	< 7	< 7	< 16	< 6	< 14	< 7	< 12	< 5	< 7	< 31	< 10	< 52
	11/24/10	< 53	1350 ± 157	< 6	< 7	< 15	< 8	< 16	< 7	< 13	< 6	< 7	< 45	< 14	< 44
	12/29/10	< 63	1200 ± 161	< 7	< 8	< 15	< 9	< 17	< 7	< 14	< 6	< 8	< 36	< 10	< 54
	MEAN	-	1214 ± 196	-	-	-	-	-	-	-	-	-	-	-	-

* INDICATES CONTROL STATION

TABLE C-IX.1 **CONCENTRATIONS OF GAMMA EMITTERS IN VEGETATION SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	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	06/30/10	418 ± 100	3380 ± 279	< 12	< 10	< 25	< 11	< 23	< 12	< 20	< 18	< 10	< 11	< 45	< 17	< 72
Swiss Chard	06/30/10	567 ± 164	6220 ± 479	< 17	< 17	< 48	< 21	< 44	< 17	< 33	< 30	< 15	< 19	< 80	< 24	< 97
Lettuce	06/30/10	1020 ± 252	6210 ± 592	< 27	< 24	< 62	< 24	< 63	< 28	< 49	< 38	< 22	< 29	< 110	< 25	< 133
Cabbage	07/28/10	306 ± 120	3420 ± 482	< 21	< 22	< 46	< 25	< 50	< 22	< 39	< 29	< 17	< 21	< 92	< 27	< 119
Lettuce	07/28/10	2850 ± 351	3230 ± 519	< 25	< 31	< 66	< 27	< 68	< 31	< 52	< 58	< 28	< 33	< 136	< 51	< 197
Swiss Chard	07/28/10	878 ± 243	6980 ± 592	< 24	< 22	< 48	< 25	< 48	< 22	< 40	< 40	< 19	< 20	< 107	< 26	< 156
Cabbage	08/25/10	171 ± 106	3850 ± 273	< 10	< 11	< 28	< 13	< 26	< 11	< 21	< 45	< 8	< 11	< 94	< 26	< 73
Corn leaves	08/25/10 (1)	2690 ± 144	5280 ± 216	< 9	< 10	< 23	< 11	< 21	< 11	< 18	< 51	< 9	< 9	< 93	< 23	< 60
Swiss Chard	08/25/10	397 ± 92	6320 ± 282	< 11	< 12	< 29	< 13	< 23	< 13	< 20	< 51	< 11	< 12	< 92	< 26	< 63
Cabbage	09/29/10	136 ± 90	5200 ± 246	< 7	< 8	< 21	< 10	< 18	< 9	< 14	< 21	< 7	< 8	< 46	< 12	< 60
Violets	09/29/10 (1)	2170 ± 253	9190 ± 577	< 21	< 20	< 47	< 23	< 43	< 23	< 39	< 51	< 17	< 20	< 117	< 35	< 131
Weeds/Tree Leaves	10/13/10 (1)	2190 ± 269	3250 ± 408	< 16	< 12	< 23	< 15	< 31	< 14	< 22	< 16	< 15	< 14	< 58	< 14	< 97
	MEAN	1149 ± 2055	5211 ± 3737	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-115																
Cabbage	06/30/10	628 ± 214	2660 ± 412	< 18	< 17	< 37	< 19	< 39	< 21	< 32	< 34	< 19	< 22	< 97	< 27	< 138
Swiss Chard	06/30/10	851 ± 181	5200 ± 442	< 17	< 16	< 37	< 18	< 41	< 19	< 34	< 30	< 15	< 19	< 84	< 24	< 110
Lettuce	06/30/10	835 ± 217	5280 ± 519	< 18	< 21	< 40	< 22	< 54	< 22	< 39	< 35	< 19	< 22	< 102	< 30	< 122
Cabbage	07/28/10	844 ± 229	5830 ± 610	< 28	< 27	< 59	< 32	< 53	< 27	< 40	< 47	< 23	< 27	< 147	< 42	< 148
Lettuce	07/28/10	872 ± 254	6380 ± 640	< 27	< 27	< 60	< 31	< 62	< 29	< 49	< 50	< 27	< 31	< 146	< 37	< 176
Swiss Chard	07/28/10	530 ± 209	6680 ± 552	< 19	< 20	< 46	< 23	< 43	< 24	< 31	< 36	< 18	< 22	< 95	< 32	< 123
Cabbage	08/25/10	450 ± 139	3200 ± 275	< 13	< 15	< 32	< 15	< 31	< 16	< 26	< 57	< 12	< 13	< 112	< 32	< 80
Corn leaves	08/25/10 (1)	2140 ± 134	3040 ± 203	< 10	< 10	< 22	< 9	< 18	< 11	< 17	< 56	< 9	< 9	< 92	< 21	< 63
Swiss Chard	08/25/10	607 ± 89	6390 ± 216	< 8	< 9	< 22	< 10	< 20	< 9	< 16	< 46	< 7	< 8	< 80	< 20	< 53
Cabbage	09/29/10	490 ± 176	5350 ± 444	< 20	< 21	< 45	< 24	< 48	< 23	< 36	< 52	< 19	< 22	< 117	< 35	< 127
Swiss Chard	09/29/10	519 ± 91	5740 ± 271	< 9	< 8	< 23	< 12	< 21	< 9	< 16	< 22	< 7	< 9	< 47	< 10	< 62
Weeds	10/13/10 (1)	1870 ± 207	3000 ± 326	< 12	< 11	< 22	< 13	< 24	< 11	< 19	< 13	< 12	< 10	< 42	< 9	< 74
	MEAN	886 ± 1095	4896 ± 2989	-	-	-	-	-	-	-	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-IX.1 **CONCENTRATIONS OF GAMMA EMITTERS IN VEGETATION SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	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-117																
Cabbage	06/30/10	1030 ± 137	3640 ± 354	< 12	< 15	< 33	< 16	< 33	< 15	< 24	< 28	< 13	< 17	< 73	< 18	< 97
Swiss Chard	06/30/10	173 ± 80	4390 ± 257	< 9	< 10	< 18	< 8	< 20	< 9	< 15	< 16	< 7	< 9	< 36	< 12	< 60
Lettuce	06/30/10	682 ± 148	3740 ± 390	< 18	< 17	< 37	< 15	< 40	< 19	< 32	< 34	< 16	< 19	< 97	< 28	< 108
Cabbage	07/28/10	266 ± 146	2840 ± 293	< 14	< 16	< 36	< 19	< 40	< 16	< 30	< 23	< 13	< 15	< 86	< 26	< 65
Lettuce	07/28/10	914 ± 279	7650 ± 672	< 25	< 26	< 58	< 28	< 70	< 25	< 43	< 50	< 21	< 26	< 129	< 39	< 167
Swiss Chard	07/28/10	160 ± 130	5930 ± 339	< 11	< 14	< 29	< 13	< 30	< 12	< 24	< 24	< 13	< 14	< 70	< 13	< 100
Cabbage	08/25/10	339 ± 82	4790 ± 190	< 8	< 9	< 21	< 9	< 17	< 9	< 16	< 47	< 7	< 8	< 83	< 23	< 53
Corn leaves	08/25/10 (1)	2140 ± 119	4650 ± 200	< 9	< 9	< 23	< 10	< 20	< 11	< 19	< 53	< 9	< 10	< 90	< 25	< 58
Swiss Chard	08/25/10	327 ± 112	5570 ± 320	< 10	< 12	< 32	< 14	< 25	< 12	< 19	< 47	< 9	< 10	< 94	< 21	< 66
Cabbage	09/29/10	233 ± 143	4000 ± 290	< 12	< 12	< 28	< 13	< 28	< 13	< 20	< 33	< 11	< 11	< 70	< 14	< 83
Swiss Chard	09/29/10	305 ± 62	5220 ± 220	< 7	< 8	< 20	< 10	< 18	< 8	< 14	< 17	< 7	< 8	< 43	< 11	< 46
Tree Leaves	10/13/10 (1)	1290 ± 209	3450 ± 380	< 15	< 14	< 28	< 17	< 35	< 14	< 23	< 17	< 15	< 17	< 55	< 16	< 92
	MEAN	655 ± 1199	4656 ± 2620	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-118																
Cabbage	06/30/10	678 ± 249	4880 ± 482	< 29	< 29	< 61	< 28	< 73	< 32	< 50	< 57	< 41	< 31	< 146	< 38	< 220
Swiss Chard	06/30/10	1050 ± 249	8980 ± 745	< 29	< 25	< 55	< 27	< 57	< 31	< 43	< 57	< 25	< 30	< 140	< 28	< 195
Lettuce	06/30/10	638 ± 159	5350 ± 423	< 16	< 16	< 38	< 16	< 40	< 19	< 30	< 30	< 15	< 21	< 86	< 20	< 111
Cabbage	07/28/10	680 ± 173	5380 ± 421	< 17	< 17	< 35	< 18	< 37	< 16	< 29	< 30	< 14	< 19	< 79	< 21	< 103
Lettuce	07/28/10	666 ± 220	6390 ± 574	< 18	< 23	< 49	< 21	< 56	< 18	< 40	< 41	< 20	< 23	< 110	< 22	< 137
Swiss Chard	07/28/10	1190 ± 168	9160 ± 497	< 20	< 22	< 51	< 21	< 52	< 22	< 40	< 38	< 22	< 22	< 100	< 22	< 161
Cabbage	08/25/10	767 ± 148	5460 ± 325	< 11	< 11	< 29	< 13	< 21	< 13	< 21	< 55	< 10	< 13	< 105	< 26	< 73
Corn leaves	08/25/10 (1)	2450 ± 142	3160 ± 193	< 8	< 10	< 21	< 9	< 18	< 10	< 16	< 50	< 8	< 9	< 88	< 22	< 57
Swiss Chard	08/25/10	821 ± 204	8300 ± 532	< 12	< 14	< 28	< 14	< 31	< 11	< 23	< 48	< 10	< 14	< 104	< 32	< 68
Cabbage	09/29/10	252 ± 132	4200 ± 292	< 10	< 10	< 28	< 13	< 27	< 11	< 18	< 28	< 9	< 11	< 60	< 15	< 76
Swiss Chard	09/29/10	2020 ± 260	10200 ± 566	< 22	< 24	< 54	< 28	< 55	< 26	< 45	< 60	< 23	< 25	< 151	< 37	< 143
Tree Leaves	10/13/10 (1)	2140 ± 244	2670 ± 342	< 11	< 11	< 20	< 13	< 28	< 11	< 22	< 14	< 13	< 12	< 48	< 11	< 83
	MEAN	1113 ± 1404	6178 ± 4911	-	-	-	-	-	-	-	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-IX.2 CONCENTRATIONS OF GAMMA EMITTERS IN GRASS SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	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-1	05/12/10	1480 ± 188	3400 ± 354	< 13	< 16	< 32	< 12	< 25	< 13	< 23	< 34	< 12	< 14	< 83	< 22	< 90
	05/26/10	1230 ± 132	5640 ± 286	< 9	< 11	< 28	< 12	< 23	< 10	< 20	< 58	< 9	< 10	< 95	< 26	< 67
	06/09/10	1290 ± 122	5300 ± 237	< 9	< 10	< 27	< 10	< 22	< 11	< 18	< 45	< 9	< 10	< 89	< 21	< 59
	06/16/10	4040 ± 130	4910 ± 185	< 7	< 7	< 18	< 7	< 18	< 8	< 14	< 24	< 7	< 8	< 53	< 13	< 48
	07/07/10	2320 ± 420	6670 ± 903	< 34	< 42	< 89	< 48	< 85	< 42	< 74	< 41	< 38	< 41	< 132	< 40	< 237
	07/21/10	2280 ± 133	4290 ± 250	< 11	< 10	< 25	< 11	< 26	< 12	< 19	< 19	< 10	< 12	< 48	< 15	< 70
	08/04/10	478 ± 150	5710 ± 336	< 12	< 12	< 38	< 13	< 29	< 15	< 23	< 53	< 10	< 12	< 103	< 28	< 75
	08/18/10	2310 ± 137	6080 ± 253	< 10	< 11	< 27	< 12	< 24	< 12	< 20	< 36	< 9	< 11	< 76	< 19	< 67
	09/01/10	1820 ± 109	5100 ± 209	< 8	< 9	< 23	< 10	< 20	< 9	< 16	< 53	< 8	< 8	< 84	< 19	< 56
	09/15/10	2310 ± 130	9890 ± 264	< 9	< 10	< 25	< 12	< 21	< 11	< 18	< 53	< 9	< 9	< 86	< 24	< 59
	09/29/10	2810 ± 255	6310 ± 461	< 14	< 18	< 42	< 19	< 38	< 20	< 32	< 60	< 16	< 17	< 126	< 37	< 117
	10/13/10	2840 ± 87	4720 ± 130	< 5	< 5	< 13	< 7	< 13	< 6	< 10	< 18	< 5	< 5	< 40	< 11	< 33
	10/27/10	3920 ± 207	6680 ± 329	< 15	< 16	< 36	< 18	< 35	< 17	< 28	< 55	< 14	< 16	< 114	< 33	< 104
	MEAN	2241 ± 2045	5746 ± 3127	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-2	05/12/10	491 ± 117	4250 ± 370	< 11	< 15	< 36	< 15	< 35	< 15	< 23	< 38	< 12	< 13	< 90	< 27	< 73
	05/26/10	949 ± 121	5110 ± 270	< 10	< 10	< 26	< 9	< 21	< 10	< 19	< 55	< 8	< 10	< 92	< 24	< 65
	06/09/10	1490 ± 107	5690 ± 224	< 10	< 11	< 26	< 9	< 23	< 12	< 21	< 58	< 11	< 11	< 101	< 19	< 88
	06/16/10	2720 ± 123	5620 ± 200	< 7	< 8	< 19	< 8	< 18	< 8	< 14	< 24	< 7	< 8	< 51	< 13	< 49
	07/07/10	2940 ± 454	7570 ± 866	< 40	< 27	< 88	< 44	< 92	< 36	< 70	< 36	< 41	< 35	< 130	< 47	< 255
	07/21/10	3940 ± 164	6320 ± 295	< 13	< 13	< 28	< 13	< 27	< 13	< 22	< 21	< 12	< 13	< 61	< 14	< 87
	08/04/10	1470 ± 170	7100 ± 330	< 11	< 12	< 29	< 11	< 27	< 12	< 22	< 58	< 10	< 11	< 104	< 21	< 74
	08/18/10	3330 ± 162	7930 ± 279	< 11	< 12	< 27	< 13	< 27	< 12	< 20	< 39	< 10	< 11	< 80	< 23	< 69
	09/01/10	2220 ± 176	3800 ± 242	< 8	< 9	< 21	< 8	< 18	< 9	< 16	< 58	< 8	< 9	< 94	< 23	< 61
	09/15/10	3210 ± 159	11900 ± 326	< 10	< 11	< 29	< 13	< 26	< 11	< 19	< 59	< 9	< 10	< 101	< 26	< 67
	09/29/10	3960 ± 285	8070 ± 475	< 14	< 14	< 39	< 20	< 35	< 14	< 29	< 55	< 13	< 15	< 116	< 28	< 97
	10/13/10	1610 ± 163	5460 ± 268	< 12	< 13	< 32	< 15	< 30	< 20	< 23	< 59	< 11	< 12	< 114	< 40	< 75
	10/27/10	2630 ± 145	8200 ± 286	< 11	< 11	< 29	< 14	< 25	< 13	< 19	< 38	< 10	< 11	< 83	< 23	< 72
	MEAN	2382 ± 2226	6694 ± 4259	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE C-IX.2 CONCENTRATIONS OF GAMMA EMITTERS IN GRASS SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	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-8	05/12/10	542 ± 174	4660 ± 380	< 13	< 14	< 37	< 16	< 29	< 15	< 24	< 40	< 14	< 15	< 91	< 25	< 92
	05/26/10	1260 ± 171	4510 ± 278	< 9	< 10	< 26	< 9	< 22	< 12	< 18	< 57	< 9	< 10	< 105	< 24	< 64
	06/09/10	1920 ± 120	5450 ± 236	< 5	< 5	< 13	< 4	< 10	< 5	< 10	< 25	< 5	< 5	< 47	< 11	< 33
	06/16/10	3140 ± 114	7870 ± 229	< 7	< 8	< 20	< 8	< 19	< 8	< 14	< 26	< 7	< 7	< 52	< 14	< 47
	07/07/10	2490 ± 362	5630 ± 753	< 25	< 26	< 67	< 37	< 72	< 32	< 49	< 42	< 31	< 37	< 112	< 29	< 223
	07/21/10	5060 ± 182	6940 ± 278	< 11	< 11	< 27	< 12	< 24	< 12	< 20	< 22	< 11	< 13	< 56	< 13	< 76
	08/04/10	631 ± 111	9120 ± 403	< 12	< 13	< 34	< 14	< 31	< 14	< 26	< 56	< 10	< 12	< 115	< 25	< 82
	08/18/10	820 ± 87	6260 ± 215	< 9	< 9	< 21	< 10	< 19	< 9	< 16	< 30	< 8	< 9	< 63	< 16	< 53
	09/01/10	958 ± 89	4810 ± 169	< 7	< 8	< 19	< 8	< 15	< 8	< 13	< 43	< 6	< 7	< 70	< 18	< 44
	09/15/10	1650 ± 127	15700 ± 342	< 8	< 9	< 21	< 10	< 19	< 10	< 17	< 57	< 8	< 9	< 91	< 15	< 69
	09/29/10	1380 ± 227	7380 ± 528	< 14	< 17	< 47	< 22	< 45	< 18	< 32	< 56	< 14	< 16	< 122	< 28	< 110
	10/13/10	843 ± 102	7040 ± 245	< 8	< 9	< 23	< 12	< 20	< 9	< 16	< 38	< 7	< 7	< 72	< 18	< 49
	10/27/10	1320 ± 100	10100 ± 242	< 7	< 8	< 20	< 10	< 19	< 8	< 15	< 27	< 7	< 8	< 57	< 14	< 54
	MEAN	1693 ± 2518	7344 ± 6068	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-116	05/12/10	2560 ± 264	5490 ± 462	< 16	< 18	< 37	< 21	< 32	< 17	< 31	< 46	< 16	< 18	< 91	< 27	< 101
	05/26/10	1430 ± 155	4690 ± 294	< 10	< 11	< 32	< 11	< 26	< 13	< 21	< 58	< 10	< 11	< 109	< 25	< 70
	06/09/10	1810 ± 132	5260 ± 190	< 9	< 11	< 24	< 9	< 23	< 11	< 20	< 52	< 10	< 10	< 90	< 22	< 79
	06/16/10	4880 ± 160	9130 ± 240	< 11	< 12	< 29	< 11	< 27	< 13	< 22	< 40	< 11	< 12	< 80	< 18	< 92
	07/07/10	2920 ± 418	8520 ± 883	< 40	< 35	< 73	< 34	< 95	< 44	< 73	< 46	< 39	< 42	< 152	< 45	< 294
	07/21/10	3230 ± 128	6120 ± 233	< 9	< 9	< 22	< 10	< 22	< 9	< 16	< 17	< 9	< 10	< 46	< 12	< 59
	08/04/10	1620 ± 171	7140 ± 349	< 11	< 12	< 33	< 9	< 29	< 13	< 24	< 60	< 10	< 12	< 94	< 24	< 77
	08/18/10	2190 ± 122	6530 ± 237	< 9	< 9	< 24	< 12	< 23	< 10	< 17	< 31	< 8	< 9	< 64	< 18	< 54
	09/01/10	1400 ± 141	6070 ± 269	< 12	< 12	< 31	< 13	< 27	< 13	< 24	< 57	< 10	< 12	< 104	< 30	< 71
	09/15/10	3930 ± 194	15100 ± 408	< 8	< 10	< 21	< 9	< 19	< 10	< 17	< 58	< 9	< 10	< 92	< 17	< 75
	09/29/10	4450 ± 292	8240 ± 486	< 16	< 14	< 37	< 18	< 36	< 15	< 29	< 54	< 13	< 15	< 113	< 26	< 104
	10/13/10	3160 ± 202	6850 ± 307	< 11	< 13	< 30	< 15	< 28	< 15	< 22	< 58	< 10	< 12	< 107	< 27	< 74
	10/27/10	2870 ± 134	7670 ± 279	< 10	< 12	< 28	< 14	< 26	< 11	< 20	< 39	< 10	< 11	< 79	< 22	< 72
	MEAN	2804 ± 2258	7447 ± 5304	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE C-X.1 QUARTERLY TLD RESULTS FOR CLINTON POWER STATION, 2010

RESULTS IN UNITS OF MILLI-ROENTGEN/QUARTER ± 2 STANDARD DEVIATIONS

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC
CL-01	17.7 ± 5.0	15.5 ± 1.7	20.8 ± 2.1	15.8 ± 1.7	18.6 ± 2.3
CL-02	19.4 ± 4.6	16.6 ± 0.9	21.8 ± 1.2	18.5 ± 2.7	20.7 ± 1.8
CL-03	18.2 ± 5.2	15.6 ± 2.0	21.1 ± 1.1	16.4 ± 0.8	19.6 ± 2.5
CL-04	18.2 ± 4.5	16.5 ± 1.4	21.1 ± 1.7	16.4 ± 1.6	18.9 ± 1.6
CL-05	19.1 ± 4.6	16.5 ± 1.2	21.9 ± 1.8	18.3 ± 1.0	19.7 ± 2.9
CL-06	16.5 ± 5.3	14.2 ± 1.2	19.7 ± 1.3	14.4 ± 1.3	17.5 ± 2.2
CL-07	17.6 ± 5.4	14.9 ± 1.9	21.1 ± 0.9	16.2 ± 0.9	18.2 ± 1.3
CL-08	18.7 ± 4.3	17.6 ± 4.7	21.2 ± 1.4	16.3 ± 0.6	19.5 ± 1.3
CL-11	17.4 ± 6.0	14.9 ± 1.3	21.3 ± 1.5	15.2 ± 1.8	18.2 ± 1.8
CL-15	16.8 ± 5.1	14.7 ± 1.7	20.1 ± 1.5	14.9 ± 1.8	17.3 ± 1.9
CL-22	19.4 ± 6.1	16.2 ± 2.8	23.0 ± 1.6	17.6 ± 1.8	20.7 ± 1.3
CL-23	19.5 ± 5.3	16.5 ± 3.1	22.4 ± 2.0	18.1 ± 1.8	20.8 ± 2.9
CL-24	19.2 ± 6.7	15.8 ± 1.9	23.1 ± 1.5	17.1 ± 1.0	20.9 ± 2.4
CL-33	18.9 ± 5.5	15.9 ± 1.2	22.2 ± 1.5	17.5 ± 2.1	19.9 ± 1.5
CL-34	19.4 ± 5.4	16.5 ± 1.0	22.5 ± 1.1	17.8 ± 0.8	20.6 ± 2.4
CL-35	18.0 ± 5.6	15.4 ± 1.2	21.4 ± 1.8	16.1 ± 1.9	19.2 ± 1.9
CL-36	18.8 ± 5.5	16.8 ± 2.0	21.9 ± 1.6	16.2 ± 0.6	20.4 ± 2.0
CL-37	17.8 ± 6.4	14.5 ± 1.4	21.9 ± 1.7	16.2 ± 2.0	18.7 ± 2.3
CL-41	19.2 ± 6.3	16.0 ± 1.1	22.4 ± 1.4	17.1 ± 1.6	21.4 ± 2.9
CL-42	18.5 ± 5.0	15.9 ± 1.8	21.4 ± 1.9	17.0 ± 2.8	19.6 ± 1.6
CL-43	19.7 ± 5.5	16.8 ± 1.4	22.5 ± 1.5	18.0 ± 1.1	21.5 ± 2.0
CL-44	18.9 ± 5.7	15.6 ± 1.6	22.3 ± 2.1	18.0 ± 2.2	19.8 ± 1.0
CL-45	19.1 ± 5.9	15.7 ± 1.6	22.1 ± 1.7	17.7 ± 1.1	20.9 ± 2.1
CL-46	16.6 ± 5.5	13.8 ± 0.8	19.6 ± 1.0	14.7 ± 1.3	18.1 ± 2.0
CL-47	19.1 ± 6.0	16.1 ± 1.2	22.3 ± 1.5	17.1 ± 1.6	21.0 ± 2.3
CL-48	18.7 ± 6.7	14.4 ± 2.2	22.2 ± 1.5	17.9 ± 0.7	20.2 ± 1.4
CL-49	19.4 ± 6.9	15.6 ± 1.9	23.4 ± 2.6	17.6 ± 1.6	20.9 ± 5.5
CL-51	19.5 ± 6.8	15.5 ± 1.3	23.2 ± 2.3	17.9 ± 2.4	21.2 ± 1.2
CL-52	19.6 ± 6.2	16.5 ± 3.3	23.6 ± 2.1	18.0 ± 0.9	20.1 ± 1.6
CL-53	19.2 ± 5.7	16.7 ± 3.2	22.9 ± 1.5	17.3 ± 1.0	19.9 ± 2.9
CL-54	19.7 ± 6.6	16.4 ± 0.9	23.7 ± 1.8	17.6 ± 1.5	21.0 ± 1.4
CL-55	19.2 ± 6.8	15.5 ± 0.6	23.5 ± 1.9	17.7 ± 1.6	20.0 ± 2.6
CL-56	19.4 ± 6.1	16.2 ± 1.6	23.3 ± 0.5	17.9 ± 1.8	20.2 ± 3.1
CL-57	19.2 ± 3.4	17.5 ± 1.0	21.2 ± 1.2	18.1 ± 1.4	19.9 ± 2.8
CL-58	19.1 ± 3.8	17.1 ± 2.8	21.2 ± 1.4	17.9 ± 1.8	20.1 ± 1.7
CL-60	18.9 ± 4.7	16.7 ± 2.8	21.2 ± 1.0	17.1 ± 1.5	20.6 ± 1.3
CL-61	18.6 ± 4.9	16.5 ± 2.9	20.4 ± 0.8	16.4 ± 0.9	20.9 ± 2.4
CL-63	16.6 ± 4.1	14.8 ± 1.9	18.7 ± 1.6	14.8 ± 0.7	17.9 ± 1.9
CL-64	18.9 ± 3.7	17.2 ± 1.8	20.8 ± 2.5	17.4 ± 2.0	20.1 ± 1.4
CL-65	19.4 ± 4.3	17.3 ± 3.3	22.1 ± 2.5	18.1 ± 1.4	20.2 ± 1.8
CL-74	17.4 ± 5.3	15.2 ± 0.7	19.9 ± 1.4	15.0 ± 2.1	19.4 ± 3.0
CL-75	18.6 ± 5.3	16.3 ± 2.4	22.0 ± 2.9	16.7 ± 1.1	19.3 ± 2.3
CL-76	18.7 ± 6.6	15.3 ± 2.0	22.1 ± 0.9	16.6 ± 2.1	20.9 ± 2.6
CL-77	18.3 ± 4.6	15.6 ± 2.4	20.8 ± 1.9	17.2 ± 1.3	19.5 ± 1.3
CL-78	19.1 ± 4.9	17.4 ± 1.6	21.9 ± 2.1	16.7 ± 1.5	20.4 ± 3.3
CL-79	18.8 ± 5.4	15.9 ± 1.8	20.9 ± 1.0	17.2 ± 2.4	21.3 ± 1.1
CL-80	18.5 ± 4.9	16.0 ± 2.9	21.2 ± 1.6	16.8 ± 1.2	19.8 ± 1.4
CL-81	18.9 ± 5.6	16.2 ± 1.4	22.3 ± 1.9	17.0 ± 1.5	20.0 ± 1.8
CL-84	19.0 ± 5.0	16.3 ± 0.6	21.3 ± 2.4	17.3 ± 1.6	20.9 ± 4.2
CL-90	16.8 ± 5.2	14.8 ± 1.5	20.1 ± 1.8	14.7 ± 2.3	17.7 ± 1.4
CL-91	17.9 ± 5.1	15.4 ± 1.6	20.9 ± 2.9	16.3 ± 1.9	19.1 ± 1.8
CL-97	18.9 ± 5.6	15.7 ± 1.3	21.6 ± 3.0	17.4 ± 2.0	20.9 ± 1.8
CL-99	16.3 ± 4.5	14.2 ± 1.4	18.5 ± 2.7	14.6 ± 2.1	18.0 ± 1.3
CL-114	17.5 ± 4.5	15.5 ± 2.1	19.7 ± 3.8	15.6 ± 2.1	19.2 ± 1.9

TABLE C-X.1 QUARTERLY TLD RESULTS FOR CLINTON POWER STATION, 2010

RESULTS IN UNITS OF MILLI-ROENTGEN/QUARTER ± 2 STANDARD DEVIATIONS

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC
CL-05MM	18.9 ± 3.4	17.0 ± 1.8	19.9 ± 1.1	17.9 ± 2.3	20.7 ± 2.6
CL-46MM	19.7 ± 3.4	18.2 ± 1.4	21.4 ± 0.6	18.2 ± 2.4	20.8 ± 1.0
CL-47MM	18.9 ± 2.7	19.1 ± 1.4	20.0 ± 1.8	17.0 ± 1.5	19.6 ± 1.6
CL-58MM	18.3 ± 1.3	17.9 ± 1.1	18.2 ± 2.1	17.7 ± 1.3	19.2 ± 1.6

COMPARISON OF STATIONS CL-05, CL-46, CL-47 AND CL-58 AND CORRESPONDING MM SAMPLES

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC
CL-05	19.1 ± 4.6	16.5 ± 1.2	21.9 ± 1.8	18.3 ± 1.0	19.7 ± 2.9
CL-05MM	18.9 ± 3.4	17.0 ± 1.8	19.9 ± 1.1	17.9 ± 2.3	20.7 ± 2.6
CL-46	16.6 ± 5.5	13.8 ± 0.8	19.6 ± 1.0	14.7 ± 1.3	18.1 ± 2.0
CL-46MM	19.7 ± 3.4	18.2 ± 1.4	21.4 ± 0.6	18.2 ± 2.4	20.8 ± 1.0
CL-47	19.1 ± 6.0	16.1 ± 1.2	22.3 ± 1.5	17.1 ± 1.6	21.0 ± 2.3
CL-47MM	18.9 ± 2.7	19.1 ± 1.4	20.0 ± 1.8	17.0 ± 1.5	19.6 ± 1.6
CL-58	19.1 ± 3.8	17.1 ± 2.8	21.2 ± 1.4	17.9 ± 1.8	20.1 ± 1.7
CL-58MM	18.3 ± 1.3	17.9 ± 1.1	18.2 ± 2.1	17.7 ± 1.3	19.2 ± 1.6

TABLE C-X.2 MEAN QUARTLY TLD RESULTS FOR THE INNER RING, OUTER RING, SPECIAL INTEREST, SUPPLEMENTAL AND CONTROL LOCATIONS FOR CLINTON POWER STATION, 2010

RESULTS IN UNITS OF MILLI-ROENTGEN/QUARTER ± 2 STANDARD DEVIATIONS OF THE STATION DATA

COLLECTION PERIOD	INNER RING ± 2 S.D.	OUTER RING	SPECIAL INTEREST	SUPPLEMENTAL	CONTROL
JAN-MAR	15.8 ± 1.7	16.3 ± 1.3	16.0 ± 2.0	15.6 ± 1.9	14.9
APR-JUN	21.8 ± 2.4	22.1 ± 2.3	21.8 ± 2.3	20.7 ± 2.0	21.3
JUL-SEP	17.0 ± 2.3	17.3 ± 1.1	16.9 ± 2.1	16.2 ± 2.5	15.2
OCT-DEC	20.0 ± 2.2	20.4 ± 1.1	20.0 ± 1.9	19.1 ± 2.5	18.2

TABLE C-X.3 SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR CLINTON POWER STATION, 2010

RESULTS IN UNITS OF MILLI-ROENTGEN/QUARTER

LOCATION	SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 S.D.	PRE-OP MEAN, ± 2 S.D., ALL LOCATIONS
INNER RING	64	13.8	23.1	18.6 ± 5.2	
OUTER RING	64	15.3	23.7	19.0 ± 4.9	18 ± 2.4
SPECIAL INTEREST	28	14.5	23.4	18.7 ± 5.1	
SUPPLEMENTAL	56	14.2	22.2	17.9 ± 4.8	
CONTROL	4	14.9	21.3	17.4 ± 6.0	

INNER RING STATIONS - CL-01, CL-05, CL-22, CL-23, CL-24, CL-34, CL-35, CL-36, CL-42, CL-43, CL-44, CL-45, CL-46, CL-47, CL-48, CL-63, CL-5MM*, CL-46MM*, CL-47MM*

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

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

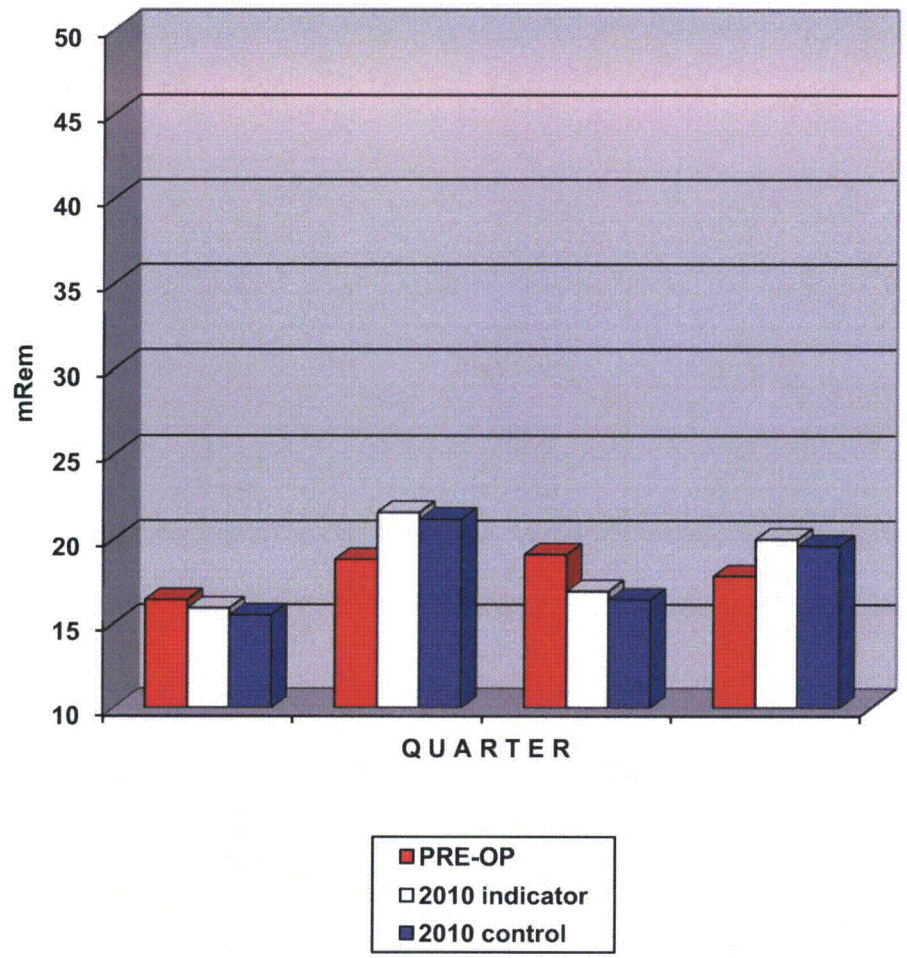
SUPPLEMENTAL STATIONS - CL-02, CL-03, CL-04, CL-06, CL-07, CL-08, CL-114, CL-15, CL-33, CL-84, CL-90, CL-91, CL-97, CL-99

CONTROL STATIONS - CL-11

* THE RESULTS FOR TLDs CL-05MM, CL-47MM, CL-58MM ARE NOT PART OF THE REMP AVERAGES. THEY ARE USED FOR COMPARISON PURPOSES ONLY.

FIGURE C-1
MEAN MONTHLY GROSS BETA CONCENTRATION IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CPS, 2010

FIGURE C-2
MEAN QUARTERLY AMBIENT GAMMA RADIATION LEVELS (TLD) IN THE VICINITY OF CPS, 2010



APPENDIX D

INTER-LABORATORY COMPARISON PROGRAM

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TABLE D-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2010
(PAGE 1 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
March 2010	E6978-396	Milk	Sr-89	pCi/L	89.3	92.8	0.96	A
			Sr-90	pCi/L	13.8	12.7	1.09	A
	E6979-396	Milk	I-131	pCi/L	65.2	74.0	0.88	A
			Ce-141	pCi/L	241	261	0.92	A
			Cr-51	pCi/L	388	361	1.07	A
			Cs-134	pCi/L	157	178	0.88	A
			Cs-137	pCi/L	150	158	0.95	A
			Co-58	pCi/L	143	143	1.00	A
			Mn-54	pCi/L	202	207	0.98	A
			Fe-59	pCi/L	146	137	1.07	A
			Zn-65	pCi/L	247	254	0.97	A
			Co-60	pCi/L	177	183	0.97	A
	E6981-396	AP	Ce-141	pCi	211	185	1.14	A
			Cr-51	pCi	304	255	1.19	A
			Cs-134	pCi	142	125	1.14	A
			Cs-137	pCi	131	111	1.18	A
			Co-58	pCi	119	101	1.18	A
			Mn-54	pCi	162	146	1.11	A
			Fe-59	pCi	110	97	1.14	A
			Zn-65	pCi	217	179	1.21	W
			Co-60	pCi	145	129	1.12	A
	E6980-396	Charcoal	I-131	pCi	80.2	85.6	0.94	A
June 2010	E7132-396	Milk	Sr-89	pCi/L	82.0	93.4	0.88	A
			Sr-90	pCi/L	15.8	16.7	0.95	A
	E7133-396	Milk	I-131	pCi/L	83.5	96.9	0.86	A
			Ce-141	pCi/L	107	110	0.97	A
			Cr-51	pCi/L	325	339	0.96	A
			Cs-134	pCi/L	114	126	0.90	A
			Cs-137	pCi/L	144	150	0.96	A
			Co-58	pCi/L	92.3	101	0.91	A
			Mn-54	pCi/L	165	169	0.98	A
			Fe-59	pCi/L	121	119	1.02	A
			Zn-65	pCi/L	197	206	0.96	A
			Co-60	pCi/L	190	197	0.96	A
	E7135-396	AP	Ce-141	pCi	88.4	91.6	0.97	A
			Cr-51	pCi	292	282	1.04	A
			Cs-134	pCi	101	105	0.96	A
			Cs-137	pCi	132	125	1.06	A
			Co-58	pCi	87.3	84.0	1.04	A
			Mn-54	pCi	150	140	1.07	A
			Fe-59	pCi	105	98.6	1.06	A
			Zn-65	pCi	168	171	0.98	A
			Co-60	pCi	170	163	1.04	A
	E7134-396	Charcoal	I-131	pCi	76.4	79.9	0.96	A

TABLE D-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2010
(PAGE 2 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
September 2010	E7229-396	Milk	Sr-89	pCi/L	85.0	92.8	0.92	A
			Sr-90	pCi/L	12.6	14.7	0.86	A
	E7230-396	Milk	I-131	pCi/L	80.2	94.1	0.85	A
			Ce-141	pCi/L	130	130	1.00	A
			Cr-51	pCi/L	235	234	1.00	A
			Cs-134	pCi/L	83.2	93.0	0.89	A
			Cs-137	pCi/L	95.1	94.5	1.01	A
			Co-58	pCi/L	77.3	73.7	1.05	A
			Mn-54	pCi/L	121	119	1.02	A
			Fe-59	pCi/L	96.4	91.1	1.06	A
			Zn-65	pCi/L	216	204	1.06	A
			Co-60	pCi/L	172	171	1.01	A
	E7232-396	AP	Ce-141	pCi	122	119	1.03	A
			Cr-51	pCi	228	214	1.07	A
			Cs-134	pCi	79.9	85.3	0.94	A
			Cs-137	pCi	93.8	86.7	1.08	A
			Co-58	pCi	71.5	67.6	1.06	A
			Mn-54	pCi	113	110	1.03	A
			Fe-59	pCi	73.8	83.6	0.88	A
			Zn-65	pCi	186	187	0.99	A
			Co-60	pCi	163	157	1.04	A
	E7231-396	Charcoal	I-131	pCi/L	62.3	59.9	1.04	A
December 2010	E7375-396	Milk	Sr-89	pCi/L	92.7	98.0	0.95	A
			Sr-90	pCi/L	13.5	13.5	1.00	A
	E7376-396	Milk	I-131	pCi/L	87.9	96.9	0.91	A
			Ce-141	pCi/L	not provided by Analytics for this study			
			Cr-51	pCi/L	389	456	0.85	A
			Cs-134	pCi/L	137	157	0.87	A
			Cs-137	pCi/L	172	186	0.92	A
			Co-58	pCi/L	84.3	90.2	0.93	A
			Mn-54	pCi/L	120	120	1.00	A
			Fe-59	pCi/L	134	131	1.02	A
			Zn-65	pCi/L	162	174	0.93	A
			Co-60	pCi/L	284	301	0.94	A
	E7378-396	AP	Ce-141	pCi	not provided by Analytics for this study			
			Cr-51	pCi	387	365	1.06	A
			Cs-134	pCi	135	126	1.07	A
			Cs-137	pCi	157	149	1.05	A
			Co-58	pCi	73.6	72.3	1.02	A
			Mn-54	pCi	88.7	96	0.92	A
			Fe-59	pCi	127	105	1.21	W
			Zn-65	pCi	151	139	1.09	A
			Co-60	pCi	249	241	1.03	A

TABLE D-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2010
(PAGE 3 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
December 2010	E7377-396	Charcoal	I-131	pCi	79.6	84.2	0.95	A

(a) Teledyne Brown Engineering reported result.

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

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

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

TABLE D-2 **ERA ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM**
TELEDYNE BROWN ENGINEERING, 2010
(PAGE 1 OF 1)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Control Limits	Evaluation (c)
May 2010	RAD-81	Water	Sr-89	pCi/L	64.4	60.4	48.6 - 68.2	A
			Sr-90	pCi/L	37.8	41.3	30.4 - 47.4	A
			Ba-133	pCi/L	66.4	65.9	54.9 - 72.5	A
			Cs-134	pCi/L	66.43	71.6	58.4 - 78.8	A
			Cs-137	pCi/L	137.33	146	131 - 163	A
			Co-60	pCi/L	83.33	84.5	76.0 - 95.3	A
			Zn-65	pCi/L	177	186	167 - 219	A
			Gr-A	pCi/L	26.37	32.9	16.9 - 42.6	A
			Gr-B	pCi/L	28.77	37.5	24.7 - 45.0	A
			I-131	pCi/L	26.27	26.4	21.9 - 31.1	A
			H-3	pCi/L	12967	12400	10800 - 13600	A
November 2010	RAD-83	Water	Sr-89	pCi/L	77.8	68.5	55.8 - 76.7	N (1)
			Sr-90	pCi/L	39.3	43.0	31.7 - 49.3	A
			Ba-133	pCi/L	70.3	68.9	57.5 - 75.8	A
			Cs-134	pCi/L	39.9	43.2	34.5 - 47.5	A
			Cs-137	pCi/L	117	123	111 - 138	A
			Co-60	pCi/L	53.5	53.4	48.1 - 61.3	A
			Zn-65	pCi/L	11.0	102	91.8 - 122	N (2)
			Gr-A	pCi/L	35.1	42.3	21.9 - 53.7	A
			Gr-B	pCi/L	35.5	36.6	24.0 - 44.2	A
			I-131	pCi/L	27.9	27.5	22.9 - 32.3	A
			H-3	pCi/L	13233	12900	11200 - 14200	A

(1) Sr-89 TBE to known ratio of 1.14 fell within acceptable range of ± 20%. No action required. NCR 10-09

(2) Zn-65 result of 111 was incorrectly reported as 11.0. No action required. NCR 10-09

(a) Teledyne Brown Engineering reported result.

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

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

TABLE D-3 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING, 2010
(PAGE 1 OF 2)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
March 2010	10-MaW22	Water	Cs-134	Bq/L	-0.0942		(1)	A
			Cs-137	Bq/L	58.5	60.6	42.4 - 78.8	A
			Co-57	Bq/L	27.2	28.3	19.8 - 36.8	A
			Co-60	Bq/L	0.0226		(1)	A
			H-3	Bq/L	104	90.8	63.6 - 118.0	A
			Mn-54	Bq/L	26.6	26.9	18.8 - 35.0	A
			Sr-90	Bq/L	0.1029		(1)	A
			Zn-65	Bq/L	42.0	40.7	28.5 - 52.9	A
	10-GrW22	Water	Gr-A	Bq/L	0.5173	0.676	0.00 - 1.352	A
			Gr-B	Bq/L	3.98	3.09	1.55 - 4.64	A
	10-MaS22	Soil	Cs-134	Bq/kg	665	733	513 - 953	A
			Cs-137	Bq/kg	800	779	545 - 1013	A
			Co-57	Bq/kg	508	522	365 - 679	A
			Co-60	Bq/kg	648	622	435 - 809	A
			Mn-54	Bq/kg	893	849	594 - 1104	A
			K-40	Bq/kg	597	559	391 - 727	A
			Sr-90	Bq/kg	221	288	202 - 374	W
			Zn-65	Bq/kg	-4.97		(1)	A
	10-RdF22	AP	Cs-134	Bq/sample	1.81	2.13	1.49 - 2.77	A
			Cs-137	Bq/sample	1.70	1.53	1.07 - 1.99	A
			Co-57	Bq/sample	0.0056		(1)	A
			Co-60	Bq/sample	2.65	2.473	1.731 - 3.215	A
			Mn-54	Bq/sample	3.70	3.02	2.11 - 3.93	W
			Sr-90	Bq/sample	0.0523		(1)	A
			Zn-65	Bq/sample	-0.0627		(1)	A
	10-GrF22	AP	Gr-A	Bq/sample	0.1533	0.0427	0.00 - 0.854	A
			Gr-B	Bq/sample	1.240	1.29	0.65 - 1.94	A
	10-RdV22	Vegetation	Cs-134	Bq/sample	4.48	4.39	3.07 - 5.71	A
			Cs-137	Bq/sample	3.43	3.06	2.14 - 3.98	A
			Co-57	Bq/sample	-0.0117		(1)	A
			Co-60	Bq/sample	3.55	3.27	2.29 - 4.25	A
			Mn-54	Bq/sample	0.007		(1)	A
			Sr-90	Bq/sample	-0.0002		(1)	A
			Zn-65	Bq/sample	8.12	7.10	4.97 - 9.23	A
September 2010	10-MaW23	Water	Cs-134	Bq/L	27.1	31.4	22.0 - 40.8	A
			Cs-137	Bq/L	41.8	44.2	30.9 - 57.5	A
			Co-57	Bq/L	33.2	36.0	25.2 - 46.8	A
			Co-60	Bq/L	26.5	28.3	19.8 - 36.8	A
			H-3	Bq/L	500	453.4	317.4 - 589.4	A
			Mn-54	Bq/L	0.024		(1)	A
			Sr-90	Bq/L	8.10	8.3	5.8 - 10.8	A
			Zn-65	Bq/L	30.8	31.0	21.7 - 40.3	A
	10-GrW23	Water	Gr-A	Bq/L	2.36	1.92	0.58 - 3.26	A
			Gr-B	Bq/L	6.37	4.39	2.20 - 6.59	A

TABLE D-3 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING, 2010
(PAGE 2 OF 2)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
September 2010	10-MaS23	Soil	Cs-134	Bq/kg	837	940	658 - 1222	A
			Cs-137	Bq/kg	680	670	469 - 871	A
			Co-57	Bq/kg	2.78		(1)	A
			Co-60	Bq/kg	350	343	240 - 446	A
			Mn-54	Bq/kg	853	820	574 - 1066	A
			K-40	Bq/kg	721	699	489 - 909	A
			Sr-90	Bq/kg	2.24		(1)	A
			Zn-65	Bq/kg	287	265	186 - 345	A
	10-RdF23	AP	Cs-134	Bq/sample	2.31	2.98	2.09 - 3.87	W
			Cs-137	Bq/sample	-0.025		(1)	A
			Co-57	Bq/sample	3.64	4.08	2.86 - 5.380	A
			Co-60	Bq/sample	2.81	2.92	2.04 - 3.80	A
			Mn-54	Bq/sample	3.19	3.18	2.23- 4.13	A
			Sr-90	Bq/sample	1.01	1.01	0.71 - 1.31	A
			Zn-65	Bq/sample	0.0310		(1)	A
	10-GrF23	AP	Gr-A	Bq/sample	0.004		(1)	A
			Gr-B	Bq/sample	0.473	0.50	0.25 - 0.75	A
	10-RdV23	Vegetation	Cs-134	Bq/sample	4.90	4.79	3.35 - 6.23	A
			Cs-137	Bq/sample	6.78	5.88	4.12 - 7.64	A
			Co-57	Bq/sample	10.2	8.27	5.79 - 10.75	W
			Co-60	Bq/sample	0.00		(1)	A
			Mn-54	Bq/sample	7.36	6.287	4.401 - 8.173	A
			Sr-90	Bq/sample	2.53	2.63	1.84 - 3.42	A
			Zn-65	Bq/sample	6.40	5.3900	3.77 - 7.01	A

(1) False positive test.

(a) Teledyne Brown Engineering reported result.

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

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

APPENDIX F

ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

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Docket No: 50-461

CLINTON POWER STATION

Annual Radiological Groundwater Protection Program Report

1 January through 31 December 2010

Prepared By

Teledyne Brown Engineering
Environmental Services

Exelon SM
Nuclear

Clinton Power Station
Clinton, IL 61727

May 2011

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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. 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 2010. During that time period, 95 analyses were performed on 71 samples from 24 locations. The monitoring was conducted in two phases.

In assessing all the data gathered for this report, it was concluded that the operation of Clinton Power Station had no adverse radiological impact on the environment, and there are no known active releases into the groundwater or surface water at Clinton Power Station. No program changes occurred during the sampling year of 2010. New corporate procedures were implemented in late 2010 and early 2011, with compliance to begin in the first quarter of 2011. Administratively, monitoring well sampling and available surface water points for tritium analysis was conducted in the fourth quarter of 2010.

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 10 times lower than that required by the United States Environmental Protection Agency (USEPA) regulation.

Strontium-90 was not evaluated in 2010.

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 three of 17 groundwater monitoring locations. The tritium concentrations ranged from 184 ± 104 pCi/L to 744 ± 130 pCi/L.

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II. Introduction

The Clinton Power Station (CPS), consisting of one approximately 1140 MW gross electrical power output boiling water reactor is located in Harp Township, DeWitt County, Illinois. CPS is owned and operated by Exelon Nuclear and became operational in 1987. Unit No. 1 went critical on 15 February 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 AmerGen. 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 2010.

A. Objectives of the 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 up-to-date 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 implemented new 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 and A–2, Appendix A.

Groundwater and Surface Water

Samples of water are collected, managed, transported and analyzed in accordance with approved procedures following regulatory methods. Both groundwater and surface 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, 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 and/or boron-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 and EIML to analyze the environmental samples for radioactivity for the Clinton Power Station RGPP in 2010.

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

1. Concentrations of gamma emitters in groundwater and surface water.

2. Concentrations of strontium in groundwater and surface water.

3. Concentrations of tritium in groundwater and surface water.

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 specified by federal regulation as a minimum sensitivity value that must be achieved routinely by the analytical parameter.

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.

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

For groundwater and surface water 13 nuclides, Be-7, K-40, Mn-54, Co-58, Fe-59, Co-60, Zn-65, Nb-95, Zr-95, Cs-134, Cs-137, Ba-140 and La-140 were reported.

C. Background Analysis

A 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 strontium-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. Groundwater Results

Groundwater

Baseline samples were collected from on and off-site wells during two (2) Phases at the station, with an administratively requested additional third phase occurring in the 4th quarter. Analytical results are discussed below. No anomalies were noted during the year.

Tritium

Samples from 17 locations were analyzed for tritium activity (Table B–I.1 Appendix B). Tritium values ranged from below the Exelon imposed LLD of 200 pico-curies per liter to 744 pCi/l.

Strontium

Contrary to the requirements of the station RGPP, strontium analysis was not carried out for any of the ground water samples at the specified frequency of once every two years (due in 2010). Collection of groundwater for strontium analysis under the newly implemented corporate procedures is scheduled for the third quarter of 2011. Reference IR 1204840.

Gamma Emitters

No gamma emitting nuclides were detected (Table B–I.2, Appendix B).

B. Surface Water Results

Surface Water

Baseline samples were collected from on and off-site surface water during two (2) Phases at the station, with an administratively requested additional third phase occurring in the 4th quarter. Four of the surface water locations were unavailable due to freezing during the 4th quarter collection.

Analytical results are discussed below. No anomalies were noted during the year.

Tritium

Samples from seven locations were analyzed for tritium activity (Table B–II.1 Appendix B). Tritium was not detected at concentrations greater than the LLD.

Strontium

Contrary to the requirements of the station RGPP, strontium analysis was not carried out for any of the surface water samples at the specified frequency of once every two years (due in 2010). Strontium analysis for surface water under newly implemented corporate procedures is a triggered event, with no future routine collection scheduled. Reference IR 1204840.

Gamma Emitters

Naturally occurring Potassium-40 was detected in one sample at a concentration of 157 pCi/L. No other gamma emitting nuclides were detected. (Table B–II.2, Appendix B).

C. Summary of Results – Inter-Laboratory Comparison Program

Inter-Laboratory Comparison Program results for TBE are presented in the Annual Radiological Environmental Operating Report.

D. Leaks, Spills, and Releases

No leaks, spills or releases were identified during the year.

E. Trends

No trends were identified during the year.

F. Investigations

Currently no investigations are on-going.

G. Actions Taken

1. Compensatory Actions

There have been no station events requiring compensatory actions at the Clinton Power Station in 2010.

2. Installation of Monitoring Wells

   No new wells were installed during the year.

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, 2010

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
Sewage Treatment Plant	Surface water
SW-CL-1	Surface Water
SW-CL-2	Surface Water
SW-CL-4	Surface Water
SW-CL-5	Surface Water
SW-CL-6	Surface Water
SW-CL-7	Surface Water

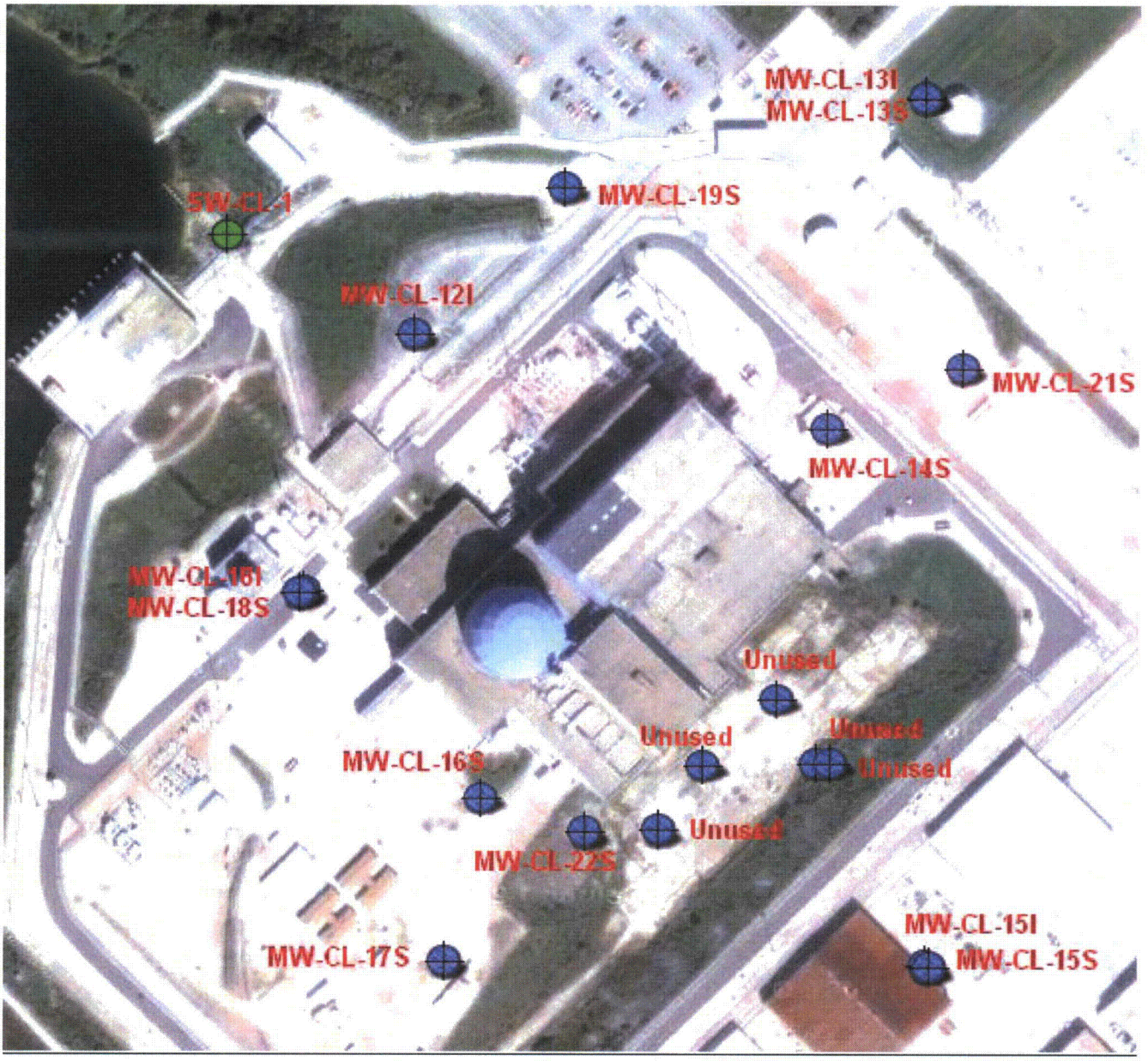

Figure A – 1
Onsite Sampling Locations at Clinton Power Station

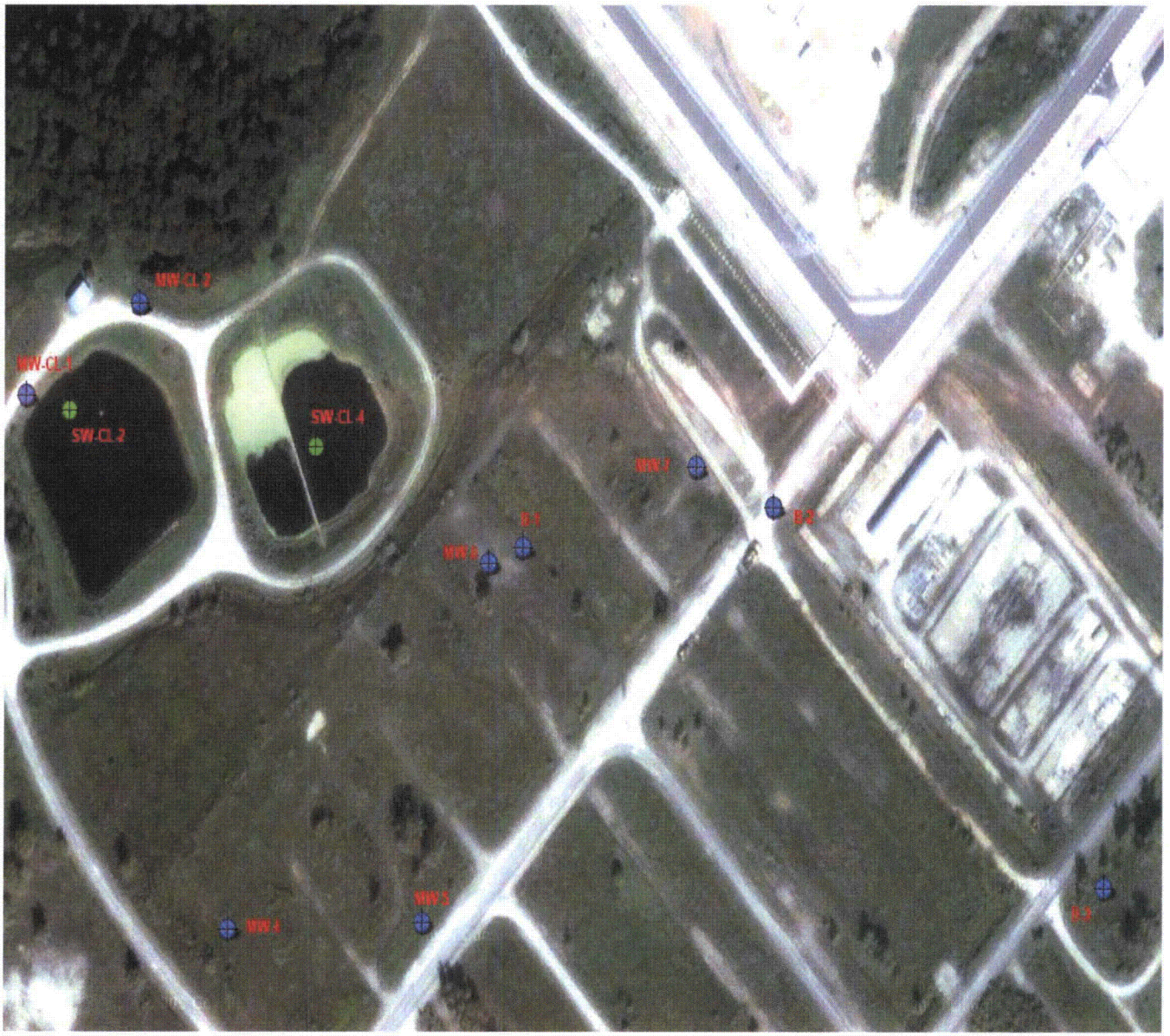

Figure A – 2
Sampling Locations South of Clinton Power Station

Figure A – 3
Sampling Locations East of Clinton Power Station

APPENDIX B

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

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TABLE B-I.1 CONCENTRATIONS OF TRITIUM IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE		COLLECTION DATE	H-3
B-3		03/24/10	< 152
B-3		09/08/10	< 165
B-3		12/20/10	< 166
MW-CL-1		03/24/10	< 154
MW-CL-1		09/08/10	< 172
MW-CL-1		12/20/10	< 164
MW-CL-12I		03/24/10	< 153
MW-CL-12I		09/08/10	< 173
MW-CL-12I		12/20/10	< 182
MW-CL-13I		03/24/10	< 154
MW-CL-13I		09/08/10	< 174
MW-CL-13I		12/20/10	< 182
MW-CL-13S		03/24/10	184 ± 104
MW-CL-13S		09/08/10	< 180
MW-CL-13S		12/20/10	< 182
MW-CL-14S	Original	03/24/10	320 ± 110
MW-CL-14S	Rerun	03/24/10	186 ± 115
MW-CL-14S		04/21/10	216 ± 112
MW-CL-14S		09/09/10	< 170
MW-CL-14S		12/22/10	< 169
MW-CL-15I		03/24/10	< 150
MW-CL-15I		09/08/10	< 172
MW-CL-15I		12/20/10	< 180
MW-CL-15S		03/24/10	< 154
MW-CL-15S		09/08/10	< 187
MW-CL-15S		12/20/10	< 181
MW-CL-16S		04/12/10	< 163
MW-CL-16S		09/09/10	< 186
MW-CL-16S		12/22/10	< 179
MW-CL-17S		04/12/10	< 166
MW-CL-17S		09/09/10	< 183
MW-CL-17S		12/22/10	< 184
MW-CL-18I		04/12/10	< 163
MW-CL-18I		09/09/10	< 181
MW-CL-18I		12/22/10	< 183
MW-CL-18S		04/12/10	< 168
MW-CL-18S		09/09/10	< 187
MW-CL-18S		12/22/10	< 182
MW-CL-19S		03/24/10	< 152
MW-CL-19S		09/08/10	< 185
MW-CL-19S		12/20/10	< 188
MW-CL-2		03/24/10	< 152
MW-CL-2		09/08/10	< 170
MW-CL-2		12/20/10	< 181
MW-CL-20S		03/24/10	< 153
MW-CL-20S		09/08/10	< 182

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3
MW-CL-20S	12/20/10	< 180
MW-CL-21S	01/20/10	636 ± 131
MW-CL-21S	03/24/10	744 ± 130
MW-CL-21S	06/21/10	550 ± 135
MW-CL-21S	08/25/10	532 ± 130
MW-CL-21S	09/08/10	618 ± 143
MW-CL-21S	11/09/10	514 ± 126
MW-CL-22S	04/12/10	< 165
MW-CL-22S	09/09/10	< 180
MW-CL-22S	12/22/10	< 179

TABLE B-I.2 **CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± SIGMA

STC	COLLECTION PERIOD	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	09/08/10	< 18	< 27	< 1	< 2	< 3	< 1	< 3	< 2	< 3	< 2	< 2	< 19	< 4
MW-CL-1	09/08/10	< 19	< 17	< 2	< 2	< 5	< 2	< 4	< 2	< 3	< 2	< 2	< 21	< 7
MW-CL-12I	09/08/10	< 11	< 16	< 1	< 1	< 3	< 1	< 2	< 1	< 2	< 1	< 1	< 13	< 4
MW-CL-13I	09/08/10	< 17	< 30	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 1	< 2	< 20	< 6
MW-CL-13S	09/08/10	< 19	< 16	< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 2	< 2	< 21	< 7
MW-CL-14S	09/09/10	< 16	< 13	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 1	< 2	< 18	< 5
MW-CL-15I	09/08/10	< 18	< 13	< 2	< 2	< 4	< 1	< 3	< 2	< 3	< 2	< 2	< 20	< 6
MW-CL-15S	09/08/10	< 14	< 11	< 1	< 1	< 3	< 1	< 3	< 2	< 3	< 1	< 1	< 16	< 5
MW-CL-16S	09/09/10	< 19	< 14	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 21	< 6
MW-CL-17S	09/09/10	< 18	< 35	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 19	< 7
MW-CL-18I	09/09/10	< 16	< 24	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 1	< 1	< 18	< 5
MW-CL-18S	09/09/10	< 19	< 40	< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 2	< 2	< 21	< 6
MW-CL-19S	09/08/10	< 19	< 39	< 1	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 23	< 6
MW-CL-2	09/08/10	< 16	< 32	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 1	< 1	< 17	< 5
MW-CL-20S	09/08/10	< 18	< 36	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 1	< 2	< 22	< 5
MW-CL-21S	09/08/10	< 18	< 36	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 1	< 2	< 22	< 7
MW-CL-22S	09/09/10	< 18	< 14	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 21	< 6

TABLE B-II.1 **CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3
SEWAGE TREATMENT PLANT	03/24/10	< 152
SEWAGE TREATMENT PLANT	12/20/10	< 181
SW-CL-1	03/24/10	< 152
SW-CL-1	09/08/10	< 179
SW-CL-1	12/20/10	< 185
SW-CL-2	03/24/10	< 155
SW-CL-2	09/08/10	< 175
SW-CL-4	03/24/10	< 153
SW-CL-4	09/08/10	< 179
SW-CL-5	04/12/10	< 163
SW-CL-5	09/08/10	< 178
SW-CL-6	04/12/10	< 163
SW-CL-6	09/08/10	< 177
SW-CL-7	03/24/10	< 152
SW-CL-7	09/08/10	< 178
SW-CL-7	12/20/10	< 181

TABLE B-II.2 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± SIGMA

STC	COLLECTION PERIOD	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
SW-CL-1	09/08/10	< 17	< 12	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 1	< 2	< 20	< 5
SW-CL-2	09/08/10	< 17	< 14	< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 1	< 2	< 21	< 7
SW-CL-4	09/08/10	< 18	< 38	< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 2	< 2	< 23	< 6
SW-CL-5	09/08/10	< 17	< 25	< 2	< 2	< 4	< 1	< 3	< 2	< 3	< 1	< 1	< 21	< 6
SW-CL-6	09/08/10	< 17	157 ± 29	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 1	< 2	< 22	< 6
SW-CL-7	09/08/10	< 19	< 15	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 22	< 7