Exelon
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Clinton Power Station
8401 Power Road
Clinton, IL 61727

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U.S. Nuclear Regulatory Commission
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Subject: Clinton Power Station 2009 Annual Radiological Environmental Operating Report

In accordance with Technical Specification requirement 5.6.2, Exelon Generating Company, LLC (Exelon) is submitting the 2009 Annual Radiological Environmental Operating Report for Clinton Power Station. This report covers the period from January 1, 2009 through December 31, 2009. This report provides the results for the Radiological Environmental Monitoring Program as specified in Section 5.0 and Section 7.1 of the Offsite Dose Calculation Manual.

There are no commitments contained in this letter.

Respectfully,

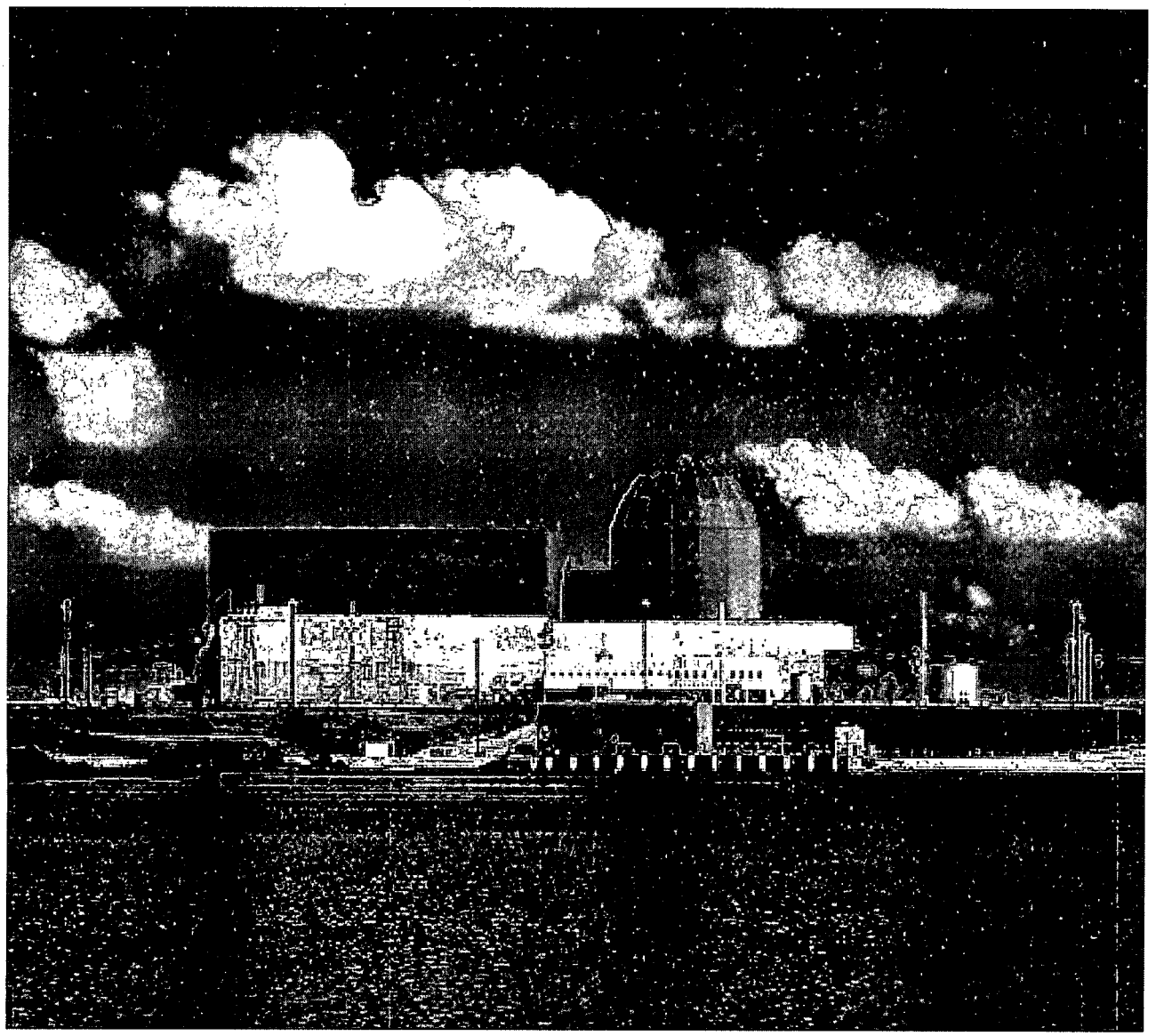
Mark E. Kanavos
Plant Manager
Clinton Power Station

SIS/EET/blf

Attachment

cc: Regional Administrator - NRC Region III
NRC Senior Resident Inspector – Clinton Power Station
Office of Nuclear Facility Safety – Illinois Emergency Management Agency

IE25
NRR



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ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

CLINTON POWER STATION

Annual Radiological Environmental Operating Report

For the period
January 1 Through December 31, 2009

Prepared By

Teledyne Brown Engineering
Environmental Services

Exelon
Nuclear

Clinton Power Station
Clinton, IL 61727
Docket No: 50-461

April 2010

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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 2009 through 31 December 2009. During that time period, 1,580 analyses were performed on 1,465 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 2009. Releases of gaseous radioactive materials were accurately measured in plant effluents. There was 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 1.05 E-03 or 0.00105 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. 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 was 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 gross beta and gamma emitting nuclides. Gross beta activities detected were consistent with those detected in previous years. 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 February 15, 1987. The site encloses approximately 13,730 acres. This includes the 4,895 acre, man-made cooling lake and about 452 acres of property not owned by Exelon. The plant is situated on approximately 150 acres. The cooling water discharge flume – which discharges to the eastern arm of the lake – occupies an additional 130 acres. Although the nuclear reactor, supporting equipment and associated electrical generation and distribution equipment lie in Harp Township, portions of the aforementioned 13,730 acre plot reside within Wilson, Rutledge, DeWitt, Creek, Nixon and Santa Anna Townships.

A Radiological Environmental Monitoring Program (REMP) for CPS was initiated in 1987. The preoperational period for most media covers the periods May 1980 through February 27, 1987 and was summarized in a separate report. This report covers those analyses performed by Teledyne Brown Engineering (TBE) and Global Dosimetry on samples collected during the period January 1, 2009 through December 31, 2009.

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 2009. 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-07D 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-07B.

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-01, CL-02, CL-03, CL-04, CL-06, CL-07, CL-08, 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 September 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-01, CL-02, CL-08 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-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 and CL-63). An additional three locations were installed as part of a volunteer comparison study near and within the site perimeter (CL-05MM, 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-02, CL-03, CL-04, CL-06, CL-07, CL-08, 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 2009. 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 and well water 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 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 grass 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.

January 21, 2009, AR # 00869781

Non-ODCM Composite Water Sampler CL-99 was found not sampling due to the frozen condition of the Creek from the low level of the Creek and with recent frigid below zero temperatures.

February 25, 2009, AR # 00885267

ODCM Water Compositor CL-14 was out of service due to the recent 138/12 KV power outages on 02/21/09. The cumulative time of potable water flow interruption from the compositor was approximately 3 hours 11 minutes. Clinton has missed approximately less than 2% of representative samples for the month of February 2009.

February 25, 2009, AR # 00885313

Environmental Air sampler CL-2 was found with the pump running but with no suction. The sample volume could not be determined. The vendor worked on the regulator and the pump was back in service with the required flow at 0913 hours. Because the sample volume could not be determined, the data will not be included in the report.

February 25, 2009, AR # 00885338

Non-ODCM Environmental Air Sampler CL-6 was found not running during the performance of the weekly ODCM Iodine and Particulate Air Sampling surveillance due to the recent 138/12 KV power outage and a power outage for the firing range. The vendor found the flow through the sampler was 110 hours.

July 28, 2009, AR # 00954998

Low timers readings were noted by the vendor on Environmental Air Samplers CL-01 (7.5 hr lost), CL-02 (7.2 hrs lost), CL-03 (7.4 hours lost), CL-04 (5.6 hours lost), CL-06 (5.6 hours lost) and CL-15 (2.5 hours lost). These low timer readings were caused by a power outage on 7/28/09.

July 28, 2009, AR # 00954998

Low timers readings were noted by the vendor on Environmental Air Samplers CL-01 (7.5 hr lost), CL-02 (7.2 hrs lost), CL-03 (7.4 hours lost), CL-04 (5.6 hours lost), CL-06 (5.6 hours lost) and CL-15 (2.5 hours lost). These low timer readings were caused by a power outage on 7/28/09.

August 18, 2009 AR # 00954592

ODCM Drinking water Compositor CL-14 was secured for approximately 10 hours due to the recent power outage on 7/28/2009. This resulted in about 1.4% loss of composite sampling, which is normally collected over a period of one month.

August 27, 2009, AR # 00959095

- Both dosimeters from TLD CL-58 were found missing during the monthly verification of ODCM TLDs. Spare dosimeters were installed on 08/29/09 resulting in an average of 13.5 ± 0.7 for the rest of the monitoring period. Due to the abbreviated monitoring period, these results were not included in the report.

- The TLD CL-78 container that houses the Environmental Area TLDs was found tampered with, as only one, not both, TLD was present. Although a spare dosimeter was installed on 08/29/09, those values (13.8, 13.8, 14.9) are not included in this report due to the partial reading of 26 days of exposure. Therefore the values of 22.1 24.5, 22.8 with an average of 23.1 ± 0.7 from the original un-tampered dosimeter are being reported.

September 10, 2009, AR # 00963332

The sample collector could not get enough monthly vegetation sample for lettuce and swiss chard and substituted the required weight with corn leaves for CL-115.

September 30, 2009, AR # 00975502

The sample collector could not get enough monthly vegetation sample for lettuce and Swiss chard and substituted the required weight with other edible plants for CL-114, CL-115 and CL-118.

September 30, 2009 AR # 1059978

The September spike in Gross Beta in AP as seen in Figure C-1, page C-26 could be attributed to an atmospheric radon inversion where radon is trapped near the ground for longer periods of time. The radon attaches to dust particles which embed upon the particulate filter. The longer lived beta emitting Pb-210 daughter with a 22 year half-life would remain on the filter, resulting in the higher activity.

October 28, 2009 - December 30, 2009, AR # 1059845

ODCM Surface Water Station CL-90 had two (2) false positive I-131 results. Although the data was reported in Appendix C on page C-1, because of the inaccuracy of the value, this data in not included within Appendix A Summary Table as part of the sample count or the summary average. This false positive was documented on both the Teledyne Brown Engineering Observation Report 10-01 and the Clinton Power Station's Corrective Action Program on AR # 1059845

December 01, 2009, AR # 01000133

ODCM CL-14 Compositor was turned off in order to fix a leak found behind the sink in the janitor closet on the first floor of the old service building. The CL-14 water Compositor was out of service for approximately 48 hours.

December 19, 2009, AR # 01008042

ODCM Water Compositor CL-14 was secured on 12/19/09@04:30 due to the 138/12 KV power outage. The Compositor was restored and was back in service on 12/19/09@18:28. The CL-14 Water Compositor was out of service for approximately 14 hours.

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 2009, 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 trees 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-05MM, 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 for the first three quarters of 2009, averaging 0.4, 0.8 and 0.6 mRem, respectively, higher than the originally installed location. The fourth quarter 2009 showed less exposure than the originally installed locations.

- TLD CL-46MM showed a slight increase for all four quarters of 2009, averaging 3.4 mRem higher than the originally installed location.

Clinton Power Station will continue this comparison study throughout 2010.

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.

Iodine-131

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, four of 12 samples at

location CL-90, two of 12 samples at location CL-91 and two 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 two of 12 samples. The values ranged from 2.4 to 7.7 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 three samples 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-7D, CL-12R and 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-07B 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-02, CL-03, CL-04, CL-06, CL-15, and CL-94). Group II represents the

locations at an intermediate distance within one to five miles of CPS (CL-01, CL-07, and CL-08), and Group III represents the control location greater than five miles from CPS (CL-11). The following analyses were performed:

Gross Beta

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

Detectable gross beta activity was observed at all locations. Comparison of results among the three groups aid in determining the effects, if any, resulting from the operation of CPS. The results from the On-Site locations (Group I) ranged from 5 to 41 E–3 pCi/m^3 with a mean of 20 E–3 pCi/m^3. The results from the Intermediate Distance location (Group II) ranged from 6 to 40 E–3 pCi/m^3 with a mean of 19 E–3 pCi/m^3. The results from the Control locations (Group III) ranged from 7 to 41 E–3 pCi/m^3 with a mean of 19 E–3 pCi/m^3. Comparison of the 2009 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 2009 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 39 samples. Naturally occurring K-40 was detected in four samples. No other nuclides were detected and all required LLDs were met.

b. Airborne Iodine

Continuous air samples were collected from 10 locations (CL-01, CL-02, CL-03, CL-04, CL-06, CL-07, CL-08, 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 September, 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 46 of 48 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-01, CL-02,

CL-08, 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 52 samples. Naturally occurring K-40 activity was found in all 52 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 2009. The average dose from the inner ring was 18.7 mR/quarter. The average dose from the outer ring was 18.9 mR/quarter. The average dose from the special interest group was 18.6 mR/quarter. The average dose from the supplemental group was 18.0 mR/quarter. The quarterly measurements ranged from 17.7 to 20.6 mR/quarter. For the 3rd quarter, one of the dosimeters for TLD station CL-78 was found to be missing during the vendor monthly verification of ODCM TLDs. The dosimeter was replaced on 08/29/09 with a spare. The dosimeter had readings of 13.8, 13.8 and 14.9, resulting in an average result of 14.2 mRem for the rest of the monitoring period. The other dosimeter for station CL-78 had readings of 22.1, 24.5 and 22.8 mRem, resulting in an average result of 23.1 mRem for the entire 3rd quarter reporting period. The 23.1 mRem was the data reported in the TLD table.

The inner ring and outer ring measurements compared well to the Control Station, CL-11, which ranged from 16.2 mR/quarter to 19.1 mR/quarter with an average measurement of 17.9 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 2009, 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 2009 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	2.9
3 NE	1.3	4.2	>5.0
4 ENE	1.7	2.6	>5.0
5 E	1.0	1.0	1.0
6 ESE	3.2	3.2	>5.0
7 SE	2.4	2.4	>5.0
8 SSE	1.7	2.7	>5.0
9 S	3.0	4.0	4.1
10 SSW	2.9	>5.0	>5.0
11 SW	0.7	>5.0	>5.0
12 WSW	1.6	2.3	3.3
13 W	1.2	2.0	>5.0
14 WNW	1.6	>5.0	>5.0
15 NW	1.6	2.4	>5.0
16 NNW	1.2	1.2	1.2

E. Errata Data

During an Exelon Nuclear Oversight audit, the following items were discovered to be in error:

1. The 2008 AREOR text and Appendix A referred to ground water. Ground water was changed to well water in the 2008 text and Appendix A Summary Table.

2. The 2008 text also listed the incorrect number and list of gamma nuclides for surface water and well water and for the drinking water, grass and vegetation. Grass was also listed twice, with a different

number of nuclides on each

3. Appendix B listed methods procedures rather than sample collection procedures.

Pages containing the corrected information for 2008 are attached in Appendix E.

F. 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, 17 out of 18 analytes met the specified acceptance criteria. One sample did not meet the specified acceptance criteria for the following reason:

1. Teledyne Brown Engineering's Analytics June 2009 Zn-65 in AP result of 137 pCi/L was higher than the known value of 101 pCi/L, resulting in a found to known ratio of 1.36. NCR 09-23 was initiated to investigate this failure. The failure appears to be a result of a slightly high bias on Detector 7. A recount on Detector 17 resulted in a Zn-65 result of 101 pCi/L. The detector has been tagged out-of-service until a recalibration can be performed. Detector 7 is not used for client samples.

For the secondary laboratory, Environmental, Inc., 11 out of 14 analytes met the specified acceptance criteria. Four samples did not meet the specified acceptance criteria for the following reasons:

1. Environmental Inc.'s ERA April 2009 Cs-137 in water result of 147.7 pCi/L exceeded the lower control limit of 151.0 pCi/L. All gamma emitters showed a low bias. A large plastic burr found on the base of the Marinelli kept the beaker from sitting directly on the detector. Recounting in a different beaker gave an acceptable result of 155.33 ± 14.55 pCi/L.
2. Environmental Inc.'s ERA April 2009 H-3 in water result of 22819 pCi/L exceeded the upper control limit of 22300 pCi/L. A recount of the original vials averaged 23,009 pCi/L. Reanalysis results were acceptable at 19,170 pCi/L. No cause could be found for the failure.
3. Environmental Inc.'s MAPEP January 2009 Sr-90 in AP result of 0.93 exceeded the upper control limit of 0.83. Reanalysis results were acceptable at 0.54 ± 0.12 Bq/filter. No cause could be found for the failure.
4. Environmental Inc.'s MAPEP July 2009 Sr-90 in soil result of 310.5 Bq/kg exceeded the lower control limit of 319 Bq/kg. Reanalysis results were acceptable at 363.3 Bq/kg. Incomplete separation of strontium from calcium could result in a higher recovery percentage and consequently lower reported activity.

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

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2. Code of Federal Regulations, Title 10, Part 20 (Nuclear Regulatory Commission).
3. CPS 2008 Annual Radioactive Effluent Release Report.
4. "Environmental Radioactivity," M. Eisenbud, 1987 (E187).
5. "Natural Radon Exposure in the United States," Donald T. Oakley, U.S. Environmental Protection Agency. ORP/SID 72-1, June 1972.
6. Federal Radiation Council Report No. 1, "Background Material for the Development of Radiation Protection Standards," May 13, 1960.
7. International Commission on Radiation Protection, Publication 2, "Report of Committee II on Permissible Dose for Internal Radiation," (1959) with 1962 Supplement issued in ICRP Publication 6; Publication 9, "Recommendations on Radiation Exposure," (1965); ICRP Publication 7 (1965), amplifying specific recommendations of Publication 26 (1977).
8. International Commission on Radiation Protection, Publication No. 39 (1984), "Principles of Limiting Exposure to the Public to Natural Sources of Radiation".
9. "Radioactivity in the Environment: Sources, Distribution and Surveillance," Ronald L. Kathren, 1984.
10. National Council on Radiation Protection and Measurements, Report No. 22, "Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and Water for Occupational Exposure," (Published as National Bureau of Standards Handbook 69, issued June 1959, superseding Handbook 52).
11. National Council on Radiation Protection and Measurements, Report No. 39, "Basic Radiation Protection Criteria," January 1971.
12. National Council on Radiation Protection and Measurements, Report No. 44, "Krypton-85 in the Atmosphere – Accumulation, Biological Significance, and Control Technology," July 1975.

13. National Council on Radiation Protection and Measurements, Report No. 91, "Recommendations on Limits for Exposure to Ionizing Radiation," June 1987.

14. National Council on Radiation Protection and Measurements, Report No. 93, "Ionizing Radiation Exposure of the Population of the United States," September 1987.

15. National Research Council, 1990, Committee on Biological Effects of Ionizing Radiation (BEIR V), Board on Radiation Effects Research on Life Sciences, "The Effects of Exposure to Low Levels of Ionizing Radiation".

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

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

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

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

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

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

22. Clinton Power Station, Updated Safety Analysis Report.

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

APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT SUMMARY

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE CLINTON POWER STATION, 2009

Name of Facility: CLINTON POWER STATION **DOCKET NUMBER:** 50-461
Location of Facility: DEWITT COUNTY IL **REPORTING PERIOD:** 2009

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER (PCI/LITER)	I-131	10	1	<LLD	<LLD	-		0
	H-3	16	2000	<LLD	<LLD	-		0
	GAMMA	48						
	BE-7		NA	<LLD	<LLD	-		0
	K-40		NA	40 (5/24) (23/69)	45 (4/24) (32/78)	57 (2/12) (37/78)	CL-99 CONTROL NORTH FORK ACCESS 3.5 MILES NNE 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

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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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	5.0 (2/12) (2.4/7.7)	NA	5.0 (2/12) (2.4/7.7)	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	63 (3/12) (48/86)	NA	63 (3/12) (48/86)	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	54 (3/12) (34/91)	NA	91 (1/4)	CL-12R 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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REPORTING PERIOD: 2009

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FISH (PCI/KG WET)	GAMMA	16						
	BE-7		NA	<LLD	<LLD	-		0
	K-40		NA	3240 (8/8) (2400/3850)	3125 (8/8) (2200/3930)	3240 (8/8) (2400/3850)	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	2						
	BE-7		NA	<LLD	NA	-		0
	K-40		NA	7230 (2/2) (6980/7480)	NA	7230 (2/2) (6980/7480)	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

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, 2009

Name of Facility: CLINTON POWER STATION **DOCKET NUMBER:** 50-461
Location of Facility: DEWITT COUNTY IL **REPORTING PERIOD:** 2009

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SEDIMENT (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	520	10	20 (468/468) (5/41)	19 (52/52) (7/41)	21 (52/52) (9/38)	CL-06 INDICATOR CLINTON'S RECREATION AREA 0.7 MILES WSW OF SITE	0
	GAMMA	40						
	BE-7		NA	107 (35/36) (35/886)	93 (4/4) (67/141)	278 (4/4) (68/886)	CL-06 INDICATOR CLINTON'S RECREATION AREA 0.7 MILES WSW OF SITE	0
	K-40		NA	36 (4/36) (25/53)	<LLD	53 (1/4)	CL-07 INDICATOR MASCOUTIN RECREATON AREA 2.3 MILES SE 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

THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
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AIR IODINE (E-3 PCI/CU.METER)	GAMMA I-131	520	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	1243 (19/19) (1080/1450)	1243 (19/19) (1080/1450)	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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TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE CLINTON POWER STATION, 2009

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VEGETATION (PCI/KG WET)	GAMMA	48						
	BE-7		NA	832 (35/36) (156/3430)	440 (11/12) (123/1160)	924 (11/12) (156/3430)	CL-115 INDICATOR SITE'S SECONDARY ACCESS ROAD 0.7 MILES NE OF SITE	0
	K-40		NA	5417 (36/36) (2210/10400)	6203 (12/12) (2760/10300)	6203 (12/12) (2760/10300)	CL-114 CONTROL CISCO 12.5 MILES SSE 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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TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE CLINTON POWER STATION, 2009

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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	2684 (39/39) (813/8300)	2179 (13/13) (1430/4590)	3126 (13/13) (1800/5440)	CL-02 INDICATOR CLINTON'S MAIN ACCESS ROAD 0.7 MILES NNE OF SITE	0

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GRASS (PCI/KG WET)	K-40		NA	6057 (39/39) (3110/8670)	6665 (13/13) (3500/8360)	6665 (13/13) (3500/8360)	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

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

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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	215	NA	18.6 (212/212) (13.8/24.5)	17.9 (4/4) (16.2/19.1)	20.5 (4/4) (18.0/24.5)	CL-43 INDICATOR 2.8 MILES SE	0

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

APPENDIX B

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

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Clinton Power Station, 2009

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-07D	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-01	Camp Quest	1.8 miles W
CL-02	Clinton's Main Access Road	0.7 miles NNE
CL-03	Clinton's Secondary Access Road	0.7 miles NE
CL-04	Residence Near Recreation Area	0.8 miles SW
CL-06	Clinton's Recreation Area	0.7 miles WSW
CL-07	Mascoutin Recreation Area	2.3 miles SE
CL-08	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-07B	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-01	Camp Quest	1.8 miles W
CL-02	Clinton's Main Access Road	0.7 miles NNE
CL-08	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, 2009

Location	Location Description	Distance & Direction From Site
J.	Environmental Dosimetry - TLD	
	Inner Ring	
CL-01		1.8 miles W
CL-05		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, 2009

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-02		0.7 miles NNE
CL-03		0.7 miles NE
CL-04		0.8 miles SW
CL-06		0.8 miles WSW
CL-07		2.3 miles SE
CL-08		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, 2009

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, 2009

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 Global Dosimetry CaF_2 elements.	Global Dosimetry Quality Assurance Manual

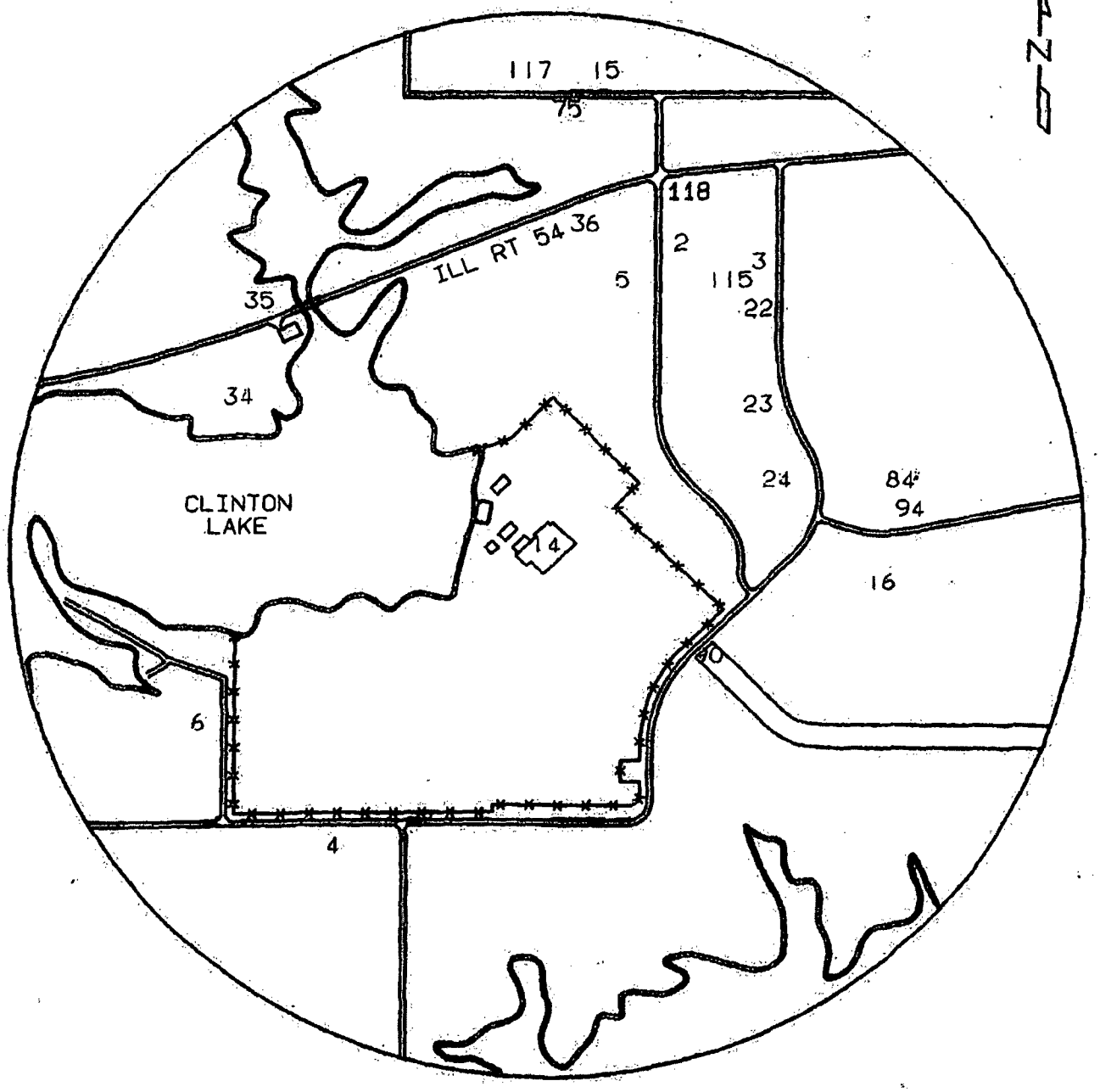


Figure B-1
Environmental Sampling Locations Between Within One Mile of the Clinton Power Station, 2009

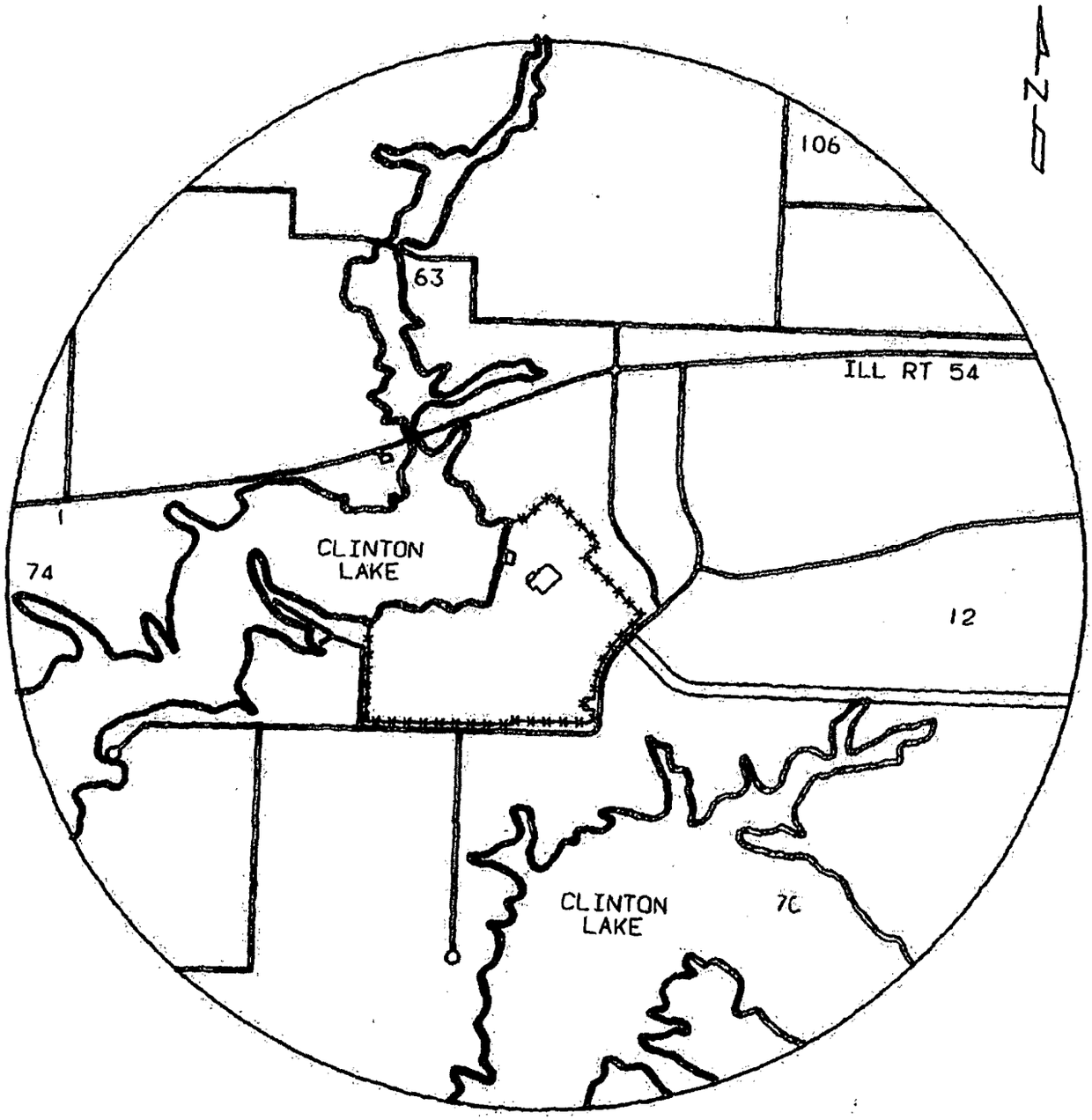


Figure B-2
Environmental Sampling Locations between One and Two Miles of the Clinton Power Station, 2009

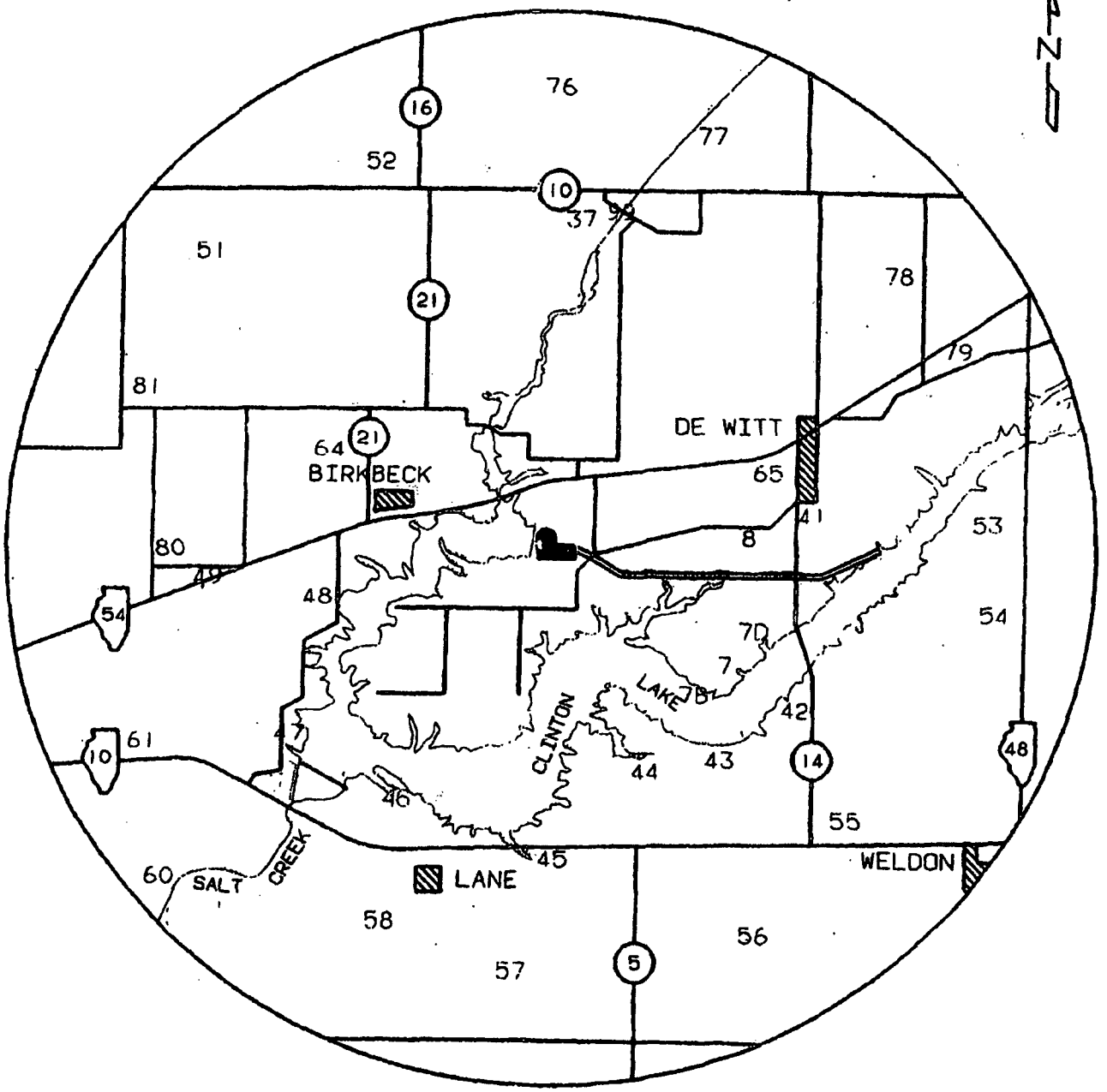


Figure B-3
Environmental Sampling Locations Between Two and Five Miles of the Clinton Power Station, 2009

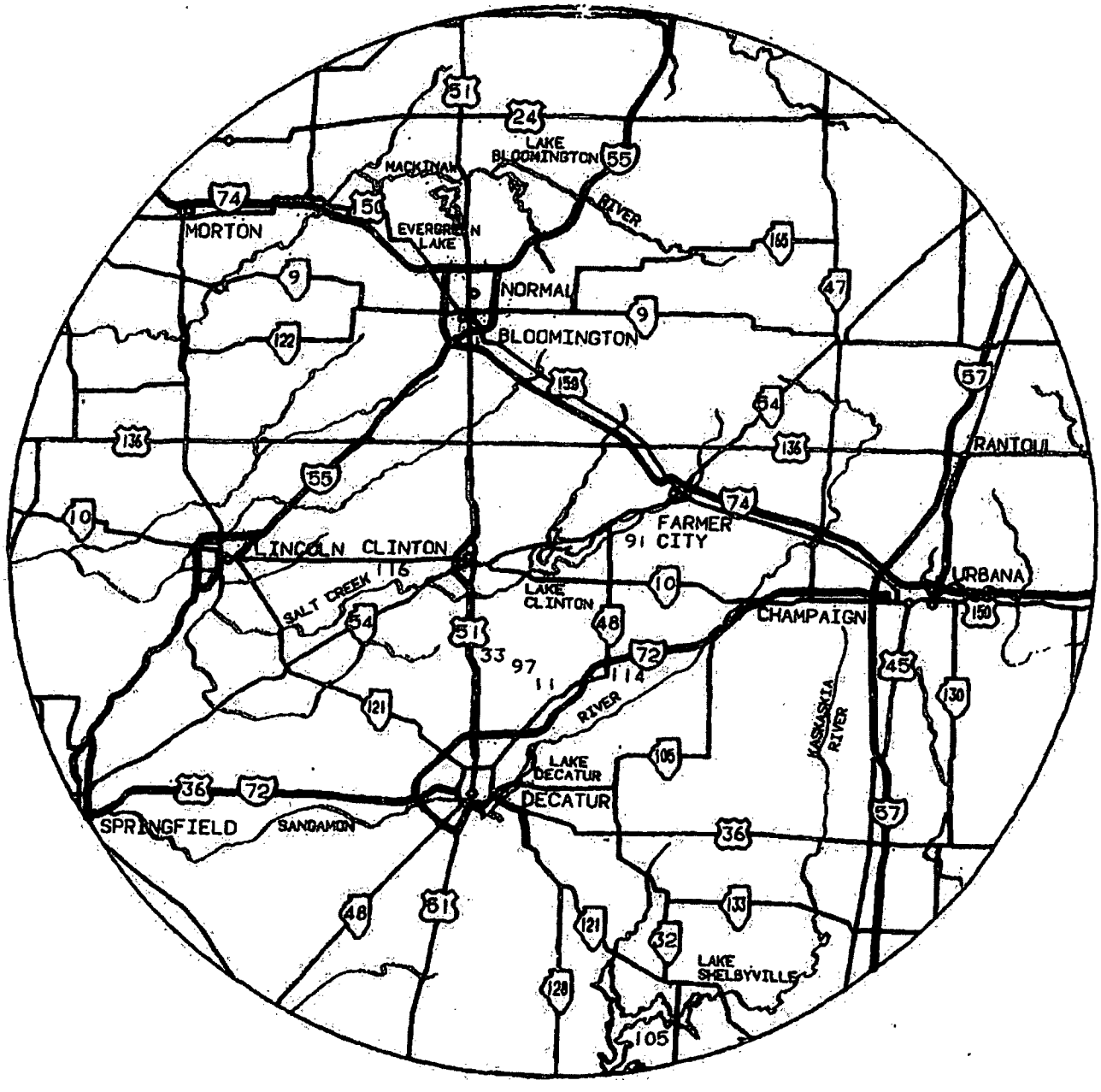


Figure B-4
Environmental Sampling Locations Greater than Five Miles of the Clinton Power Station, 2009

APPENDIX C

DATA TABLES AND FIGURES - PRIMARY LABORATORY

TABLE C-I.1 **CONCENTRATIONS OF I-131 IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-90
12/31/08 - 01/28/09	< 0.9
01/28/09 - 02/25/09	< 0.5
02/25/09 - 03/25/09	< 0.4
03/25/09 - 04/29/09	< 0.4
04/29/09 - 05/27/09	< 0.8
05/27/09 - 06/24/09	< 0.8
06/24/09 - 07/29/09	< 0.4
07/29/09 - 08/26/09	< 0.3
08/26/09 - 09/30/09	< 0.5
09/30/09 - 10/28/09	< 0.8
10/28/09 - 11/25/09	0.9 ± 0.2 (1)
11/25/09 - 12/30/09	2.0 ± 0.5 (1)
MEAN	- (1)

TABLE C-I.2 **CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-90	CL-13	CL-91	CL-99
01/28/09 - 03/25/09	< 174	< 170	< 164	< 166
04/29/09 - 06/24/09	< 121	< 120	< 120	< 122
07/29/09 - 09/30/09	< 125	< 120	< 173	< 126
10/28/09 - 12/30/09	< 150	< 148	< 159	< 161
MEAN	-	-	-	-

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
(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, 2009**

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	01/28/09 - 01/28/09	< 15	< 14	< 2	< 2	< 4	< 1	< 3	< 2	< 3	< 1	< 2	< 10	< 3	< 12
	02/25/09 - 02/25/09	< 30	< 63	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 3	< 4	< 15	< 5	< 23
	03/25/09 - 03/25/09	< 19	< 34	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 14	< 5	< 16
	04/29/09 - 04/29/09	< 9	< 20	< 1	< 1	< 2	< 1	< 2	< 1	< 2	< 1	< 1	< 17	< 5	< 6
	05/27/09 - 05/27/09	< 45	< 34	< 4	< 4	< 8	< 4	< 7	< 4	< 7	< 4	< 3	< 28	< 9	< 32
	06/24/09 - 06/24/09	< 13	25 ± 17	< 1	< 1	< 3	< 1	< 3	< 1	< 2	< 1	< 1	< 13	< 4	< 9
	07/29/09 - 07/29/09	< 30	< 55	< 3	< 3	< 7	< 3	< 6	< 3	< 6	< 3	< 3	< 28	< 8	< 24
	08/26/09 - 08/26/09	< 40	< 37	< 3	< 4	< 9	< 4	< 7	< 5	< 7	< 4	< 4	< 20	< 8	< 34
	09/30/09 - 09/30/09	< 28	< 39	< 3	< 3	< 7	< 3	< 5	< 4	< 6	< 3	< 4	< 20	< 6	< 24
	10/28/09 - 10/28/09	< 47	< 38	< 4	< 5	< 9	< 3	< 8	< 6	< 8	< 4	< 4	< 31	< 9	< 41
	11/25/09 - 11/25/09	< 20	< 18	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 19	< 7	< 14
	12/30/09 - 12/30/09	< 23	< 20	< 2	< 2	< 5	< 2	< 4	< 3	< 4	< 2	< 2	< 22	< 7	< 17
	MEAN	-	25 ± 0	-	-	-	-	-	-	-	-	-	-	-	-
CL-90	12/31/08 - 01/28/09	< 19	< 19	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 14	< 5	< 14
	01/28/09 - 02/25/09	< 41	< 50	< 4	< 3	< 9	< 4	< 8	< 5	< 7	< 4	< 5	< 20	< 9	< 33
	02/25/09 - 03/25/09	< 17	23 ± 23	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 12	< 3	< 16
	03/25/09 - 04/29/09	< 41	< 35	< 3	< 4	< 10	< 4	< 8	< 4	< 7	< 3	< 4	< 32	< 9	< 32
	04/29/09 - 05/27/09	< 42	< 54	< 5	< 4	< 11	< 6	< 10	< 6	< 10	< 4	< 5	< 39	< 13	< 29
	05/27/09 - 06/24/09	< 16	33 ± 24	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 1	< 2	< 17	< 6	< 10
	06/24/09 - 07/29/09	< 28	69 ± 34	< 2	< 3	< 7	< 2	< 6	< 3	< 6	< 3	< 3	< 24	< 9	< 20
	07/29/09 - 08/26/09	< 56	< 64	< 5	< 5	< 11	< 4	< 12	< 6	< 10	< 5	< 6	< 29	< 11	< 45
	08/26/09 - 09/30/09	< 18	< 36	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 12	< 4	< 16
	09/30/09 - 10/28/09	< 37	< 82	< 4	< 4	< 8	< 4	< 7	< 5	< 7	< 4	< 4	< 24	< 9	< 31
	10/28/09 - 11/25/09	< 25	51 ± 40	< 2	< 3	< 6	< 3	< 6	< 3	< 5	< 2	< 3	< 25	< 9	< 19
	11/25/09 - 12/30/09	< 23	< 19	< 2	< 3	< 5	< 2	< 5	< 2	< 4	< 2	< 2	< 24	< 5	< 19
	MEAN	-	44 ± 40	-	-	-	-	-	-	-	-	-	-	-	-

* THE MEAN AND 2 STANDARD DEVIATION VALUES 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, 2009**

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 **	12/31/08 - 01/28/09	< 14	32 ± 23	< 1	< 1	< 3	< 1	< 2	< 1	< 3	< 1	< 1	< 10	< 3	< 11
	01/28/09 - 02/25/09	< 34	< 62	< 4	< 3	< 8	< 3	< 7	< 4	< 7	< 4	< 4	< 24	< 7	< 29
	02/25/09 - 03/25/09	< 23	< 24	< 2	< 3	< 6	< 3	< 5	< 3	< 5	< 2	< 3	< 17	< 7	< 15
	03/25/09 - 04/29/09	< 9	35 ± 29	< 1	< 1	< 2	< 1	< 2	< 1	< 2	< 1	< 1	< 18	< 6	< 6
	04/29/09 - 05/27/09	< 35	< 68	< 4	< 4	< 8	< 4	< 7	< 4	< 7	< 3	< 3	< 29	< 12	< 29
	05/27/09 - 06/24/09	< 19	< 18	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 19	< 7	< 14
	06/24/09 - 07/29/09	< 22	< 49	< 2	< 2	< 5	< 2	< 4	< 3	< 5	< 2	< 2	< 24	< 7	< 17
	07/29/09 - 08/26/09	< 51	< 113	< 5	< 6	< 12	< 7	< 12	< 6	< 9	< 5	< 6	< 21	< 9	< 38
	08/26/09 - 09/30/09	< 35	< 69	< 3	< 4	< 9	< 4	< 8	< 5	< 7	< 4	< 4	< 27	< 10	< 27
	09/30/09 - 10/28/09	< 48	< 90	< 5	< 5	< 9	< 4	< 9	< 6	< 10	< 5	< 5	< 32	< 12	< 40
	10/28/09 - 11/25/09	< 28	< 68	< 2	< 3	< 6	< 3	< 6	< 3	< 6	< 2	< 3	< 25	< 8	< 21
	11/25/09 - 12/30/09	< 22	< 19	< 2	< 2	< 5	< 2	< 5	< 3	< 4	< 2	< 2	< 25	< 8	< 15
	MEAN	-	34 ± 5	-	-	-	-	-	-	-	-	-	-	-	-
CL-99 **	12/31/08 - 01/28/09	< 29	< 27	< 3	< 3	< 7	< 3	< 7	< 3	< 6	< 3	< 3	< 22	< 6	< 24
	01/28/09 - 02/25/09	< 40	< 97	< 5	< 5	< 10	< 6	< 11	< 5	< 9	< 4	< 5	< 27	< 10	< 35
	02/25/09 - 03/25/09	< 38	< 70	< 4	< 4	< 10	< 4	< 10	< 5	< 8	< 4	< 4	< 29	< 10	< 30
	03/25/09 - 04/29/09	< 9	< 18	< 1	< 1	< 2	< 1	< 1	< 1	< 2	< 1	< 1	< 15	< 5	< 5
	04/29/09 - 05/27/09	< 37	< 36	< 4	< 3	< 11	< 4	< 9	< 4	< 7	< 4	< 4	< 32	< 12	< 31
	05/27/09 - 06/24/09	< 16	< 29	< 1	< 2	< 4	< 2	< 3	< 2	< 3	< 1	< 2	< 16	< 6	< 11
	06/24/09 - 07/29/09	< 23	< 22	< 2	< 3	< 6	< 2	< 5	< 3	< 4	< 2	< 2	< 23	< 8	< 18
	07/29/09 - 08/26/09	< 43	78 ± 62	< 4	< 4	< 12	< 4	< 10	< 5	< 9	< 5	< 5	< 24	< 6	< 38
	08/26/09 - 09/30/09	< 41	< 47	< 4	< 5	< 8	< 4	< 9	< 5	< 8	< 4	< 5	< 33	< 10	< 33
	09/30/09 - 10/28/09	< 32	< 57	< 3	< 3	< 8	< 3	< 7	< 4	< 6	< 3	< 3	< 21	< 7	< 25
	10/28/09 - 11/25/09	< 20	37 ± 26	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 21	< 6	< 16
	11/25/09 - 12/30/09	< 22	< 23	< 2	< 3	< 6	< 3	< 5	< 3	< 5	< 2	< 2	< 25	< 9	< 18
	MEAN	-	57 ± 59	-	-	-	-	-	-	-	-	-	-	-	-

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

** INDICATES CONTROL LOCATION

TABLE C-II.1 **CONCENTRATIONS OF GROSS BETA IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-14
12/31/08 - 01/28/09	< 2.4
01/28/09 - 02/25/09	2.4 ± 1.4
02/25/09 - 03/25/09	< 2.3
03/25/09 - 04/29/09	< 2.1
04/29/09 - 05/27/09	< 3.3
05/27/09 - 06/24/09	7.7 ± 2.2
06/24/09 - 07/29/09	< 2.5
07/29/09 - 08/26/09	< 2.6
08/26/09 - 09/30/09	< 2.3
09/30/09 - 10/28/09	< 2.1
10/28/09 - 11/25/09	< 2.1
11/25/09 - 12/30/09	< 2.3
MEAN	5.0 ± 7.5

TABLE C-II.2 **CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-14
12/31/08 - 03/25/09	< 168
03/25/09 - 06/24/09	< 122
06/24/09 - 09/30/09	< 178
09/30/09 - 12/30/09	< 161
MEAN	-

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

TABLE C-II.3 **CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009**

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	12/31/08 - 01/28/09	< 20	< 40	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 6	< 2	< 2	< 14	< 5	< 17
	01/28/09 - 02/25/09	< 24	< 39	< 3	< 2	< 5	< 3	< 5	< 3	< 5	< 6	< 2	< 3	< 14	< 5	< 20
	02/25/09 - 03/25/09	< 26	< 57	< 3	< 3	< 7	< 3	< 5	< 4	< 5	< 9	< 3	< 3	< 19	< 6	< 21
	03/25/09 - 04/29/09	< 11	< 7	< 1	< 1	< 3	< 1	< 2	< 1	< 2	< 15	< 1	< 1	< 19	< 6	< 6
	04/29/09 - 05/27/09	< 28	< 32	< 2	< 4	< 4	< 3	< 7	< 3	< 5	< 11	< 3	< 3	< 23	< 5	< 17
	05/27/09 - 06/24/09	< 17	< 34	< 2	< 2	< 5	< 2	< 3	< 2	< 4	< 11	< 2	< 2	< 19	< 6	< 14
	06/24/09 - 07/29/09	< 29	48 ± 42	< 2	< 3	< 5	< 3	< 7	< 3	< 5	< 13	< 2	< 3	< 28	< 9	< 20
	07/29/09 - 08/26/09	< 41	86 ± 62	< 5	< 6	< 13	< 5	< 11	< 6	< 10	< 9	< 5	< 6	< 27	< 8	< 44
	08/26/09 - 09/30/09	< 36	< 42	< 4	< 5	< 9	< 5	< 9	< 4	< 8	< 11	< 4	< 4	< 26	< 10	< 27
	09/30/09 - 10/28/09	< 44	< 38	< 4	< 5	< 8	< 4	< 7	< 5	< 9	< 15	< 4	< 4	< 31	< 7	< 35
	10/28/09 - 11/25/09	< 28	< 46	< 3	< 3	< 7	< 3	< 5	< 3	< 5	< 15	< 2	< 3	< 25	< 9	< 18
	11/25/09 - 12/30/09	< 23	54 ± 40	< 2	< 2	< 5	< 2	< 4	< 3	< 4	< 14	< 2	< 2	< 23	< 9	< 16
	MEAN	-	63 ± 40	-	-	-	-	-	-	-	-	-	-	-	-	-

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

TABLE C-III.1 **CONCENTRATIONS OF TRITIUM IN WELL WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CL-07D	CL-12R	CL-12T
03/25/09 - 03/25/09	< 193	< 191	< 199
06/24/09 - 06/24/09	< 181	< 185	< 183
09/30/09 - 09/30/09	< 175	< 163	< 161
12/30/09 - 12/30/09	< 166	< 169	< 154
MEAN	-	-	-

TABLE C-III.2 CONCENTRATIONS OF GAMMA EMITTERS IN WELL WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009

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-07D	03/25/09	< 37	< 38	< 4	< 4	< 9	< 4	< 7	< 4	< 8	< 4	< 4	< 23	< 7	< 27
	06/24/09	< 31	< 74	< 3	< 3	< 5	< 3	< 7	< 4	< 6	< 3	< 4	< 24	< 6	< 25
	09/30/09	< 17	< 14	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 1	< 2	< 19	< 5	< 14
	12/30/09	< 12	34 ± 31	< 1	< 1	< 3	< 1	< 2	< 1	< 2	< 1	< 1	< 17	< 5	< 9
	MEAN	-	34 ± 0	-	-	-	-	-	-	-	-	-	-	-	-
CL-12R	03/25/09	< 44	< 92	< 4	< 4	< 8	< 4	< 10	< 5	< 8	< 4	< 4	< 29	< 11	< 34
	06/24/09	< 37	91 ± 55	< 4	< 5	< 10	< 4	< 9	< 5	< 8	< 4	< 4	< 33	< 9	< 32
	09/30/09	< 17	< 17	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 1	< 2	< 17	< 6	< 12
	12/30/09	< 9	< 32	< 1	< 1	< 2	< 1	< 2	< 1	< 2	< 1	< 1	< 12	< 4	< 6
	MEAN	-	91 ± 0	-	-	-	-	-	-	-	-	-	-	-	-
CL-12T	03/25/09	< 29	37 ± 30	< 3	< 3	< 7	< 3	< 6	< 3	< 5	< 3	< 3	< 22	< 6	< 27
	06/24/09	< 37	< 37	< 4	< 4	< 9	< 4	< 9	< 5	< 7	< 4	< 4	< 30	< 10	< 28
	09/30/09	< 23	< 20	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 23	< 7	< 18
	12/30/09	< 14	< 11	< 1	< 1	< 4	< 2	< 2	< 2	< 3	< 1	< 1	< 17	< 5	< 9
	MEAN	-	37 ± 0	-	-	-	-	-	-	-	-	-	-	-	-

* 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, 2009**

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															
Crappie	04/23/09	< 366	3060 ± 452	< 29	< 36	< 90	< 23	< 58	< 38	< 67	< 25	< 29	< 752	< 222	< 164
Carp	04/23/09	< 314	3390 ± 453	< 24	< 32	< 72	< 26	< 49	< 32	< 58	< 24	< 23	< 648	< 183	< 157
Largemouth bass	04/23/09	< 472	3140 ± 554	< 40	< 50	< 117	< 31	< 86	< 53	< 93	< 36	< 40	< 1030	< 290	< 214
Bluegill	04/23/09	< 396	3150 ± 507	< 31	< 43	< 100	< 32	< 82	< 47	< 71	< 31	< 29	< 850	< 254	< 173
Bluegill	10/19/09	< 954	3720 ± 1340	< 74	< 87	< 214	< 94	< 141	< 101	< 195	< 71	< 70	< 1010	< 503	< 423
Carp	10/19/09	< 559	2200 ± 846	< 45	< 62	< 115	< 47	< 108	< 59	< 100	< 47	< 57	< 866	< 263	< 325
Crappie	10/19/09	< 628	2410 ± 889	< 67	< 66	< 151	< 57	< 122	< 74	< 129	< 65	< 59	< 795	< 227	< 326
Largemouth bass	10/19/09	< 932	3930 ± 1190	< 74	< 91	< 231	< 70	< 158	< 105	< 151	< 76	< 81	< 1040	< 323	< 419
	MEAN	-	3125 ± 1182	-	-	-	-	-	-	-	-	-	-	-	-
CL-19															
Carp	04/23/09	< 464	3660 ± 536	< 35	< 49	< 114	< 33	< 71	< 52	< 81	< 32	< 34	< 959	< 286	< 215
Bluegill	04/23/09	< 352	2890 ± 456	< 29	< 35	< 97	< 32	< 68	< 42	< 71	< 28	< 29	< 793	< 256	< 143
Channel catfish	04/23/09	< 420	3850 ± 560	< 37	< 41	< 112	< 32	< 77	< 50	< 89	< 34	< 36	< 928	< 279	< 163
Largemouth bass	04/23/09	< 418	3770 ± 485	< 34	< 48	< 100	< 29	< 70	< 51	< 81	< 34	< 33	< 876	< 248	< 183
Bluegill	10/19/09	< 675	3700 ± 1160	< 59	< 70	< 225	< 73	< 132	< 75	< 148	< 52	< 60	< 703	< 332	< 370
Carp	10/19/09	< 530	2690 ± 775	< 61	< 62	< 120	< 38	< 100	< 62	< 84	< 47	< 55	< 651	< 202	< 248
Channel catfish	10/19/09	< 409	2400 ± 657	< 39	< 46	< 110	< 49	< 82	< 47	< 75	< 40	< 47	< 634	< 181	< 200
Largemouth bass	10/19/09	< 528	2960 ± 823	< 57	< 63	< 142	< 57	< 109	< 80	< 97	< 54	< 58	< 864	< 313	< 361
	MEAN	-	3240 ± 1134	-	-	-	-	-	-	-	-	-	-	-	-

TABLE C-V.1 CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009

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-07B	04/23/09	< 478	7480 ± 776	< 44	< 55	< 130	< 44	< 99	< 58	< 107	< 39	< 36	< 926	< 247	< 243
	10/19/09	< 337	6980 ± 662	< 30	< 30	< 77	< 26	< 53	< 35	< 58	< 24	< 30	< 392	< 124	< 153
	MEAN	-	7230 ± 707	-	-	-	-	-	-	-	-	-	-	-	-

TABLE C-VI.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009

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

(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, 2009

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

* 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, 2009**

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
12/31/08 - 01/28/09	22	38	30 ± 8	12/31/08 - 01/28/09	25	38	29 ± 7	12/31/08 - 01/28/09	27	39	31 ± 10
01/28/09 - 02/25/09	17	33	24 ± 10	01/28/09 - 02/25/09	17	33	24 ± 9	01/28/09 - 02/25/09	19	31	26 ± 10
02/25/09 - 04/01/09	11	27	19 ± 9	02/25/09 - 04/01/09	12	27	18 ± 8	02/25/09 - 04/01/09	9	25	19 ± 14
04/01/09 - 04/29/09	10	19	14 ± 6	04/01/09 - 04/29/09	10	20	15 ± 6	04/01/09 - 04/29/09	12	17	15 ± 5
04/29/09 - 06/03/09	5	21	13 ± 7	04/29/09 - 06/03/09	6	19	12 ± 7	04/29/09 - 06/03/09	7	16	12 ± 7
06/03/09 - 07/01/09	9	19	15 ± 5	06/03/09 - 07/01/09	11	18	15 ± 5	06/03/09 - 07/01/09	15	17	15 ± 3
07/01/09 - 07/29/09	7	22	16 ± 7	07/01/09 - 07/29/09	10	26	17 ± 8	07/01/09 - 07/29/09	14	21	17 ± 6
07/29/09 - 09/02/09	11	25	18 ± 8	07/29/09 - 09/02/09	10	24	16 ± 7	07/29/09 - 09/02/09	15	22	18 ± 6
09/02/09 - 09/30/09	14	37	26 ± 14	09/02/09 - 09/30/09	17	34	26 ± 15	09/02/09 - 09/30/09	7	33	18 ± 22
09/30/09 - 10/28/09	8	17	14 ± 4	09/30/09 - 10/28/09	8	19	13 ± 7	09/30/09 - 10/28/09	10	17	14 ± 6
10/28/09 - 12/02/09	14	28	21 ± 8	10/28/09 - 12/02/09	14	29	21 ± 8	10/28/09 - 12/02/09	14	25	20 ± 10
12/02/09 - 12/30/09	17	41	29 ± 15	12/02/09 - 12/30/09	18	40	29 ± 15	12/02/09 - 12/30/09	22	41	30 ± 16
12/31/08 - 12/30/09	5	41	20 ± 14	12/31/08 - 12/30/09	6	40	19 ± 14	12/31/08 - 12/30/09	7	41	19 ± 15

* 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, 2009**

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-01	12/31/08 - 04/01/09	78 ± 31	< 24	< 4	< 4	< 7	< 6	< 29	< 3	< 3	< 10	< 18
	04/01/09 - 07/01/09	90 ± 53	< 49	< 2	< 10	< 14	< 11	< 31	< 3	< 3	< 17	< 14
	07/01/09 - 09/30/09	168 ± 53	< 37	< 2	< 10	< 11	< 13	< 33	< 4	< 4	< 24	< 24
	09/30/09 - 12/30/09	35 ± 31	< 74	< 3	< 4	< 9	< 5	< 38	< 4	< 3	< 7	< 18
	MEAN	93 ± 111	-	-	-	-	-	-	-	-	-	-
CL-02	12/31/08 - 04/01/09	61 ± 20	< 37	< 2	< 3	< 5	< 4	< 19	< 2	< 2	< 5	< 11
	04/01/09 - 07/01/09	89 ± 44	< 47	< 3	< 7	< 12	< 9	< 24	< 3	< 3	< 14	< 13
	07/01/09 - 09/30/09	133 ± 40	< 50	< 3	< 8	< 14	< 10	< 33	< 4	< 3	< 16	< 14
	09/30/09 - 12/30/09	70 ± 37	< 80	< 4	< 6	< 7	< 5	< 23	< 4	< 3	< 7	< 17
	MEAN	88 ± 64	-	-	-	-	-	-	-	-	-	-
CL-03	12/31/08 - 04/01/09	80 ± 31	< 66	< 4	< 5	< 7	< 5	< 28	< 3	< 3	< 8	< 17
	04/01/09 - 07/01/09	103 ± 46	< 46	< 3	< 6	< 8	< 10	< 27	< 3	< 3	< 14	< 12
	07/01/09 - 09/30/09	64 ± 34	< 50	< 2	< 7	< 10	< 8	< 26	< 3	< 2	< 17	< 14
	09/30/09 - 12/30/09	57 ± 23	< 68	< 4	< 5	< 9	< 4	< 37	< 5	< 3	< 6	< 15
	MEAN	76 ± 41	-	-	-	-	-	-	-	-	-	-
CL-04	12/31/08 - 04/01/09	86 ± 25	26 ± 20	< 3	< 5	< 8	< 5	< 22	< 3	< 3	< 6	< 11
	04/01/09 - 07/01/09	98 ± 43	38 ± 28	< 3	< 6	< 13	< 12	< 29	< 3	< 3	< 18	< 16
	07/01/09 - 09/30/09	89 ± 44	< 37	< 4	< 7	< 14	< 12	< 38	< 4	< 3	< 20	< 16
	09/30/09 - 12/30/09	< 44	< 76	< 6	< 6	< 8	< 6	< 41	< 5	< 4	< 6	< 19
	MEAN	91 ± 12	32 ± 17	-	-	-	-	-	-	-	-	-
CL-06	12/31/08 - 04/01/09	82 ± 27	< 44	< 3	< 4	< 5	< 5	< 20	< 3	< 2	< 6	< 11
	04/01/09 - 07/01/09	77 ± 47	25 ± 21	< 3	< 5	< 9	< 8	< 19	< 3	< 2	< 14	< 12
	07/01/09 - 09/30/09	886 ± 381	< 668	< 41	< 68	< 100	< 63	< 227	< 35	< 28	< 90	< 128
	09/30/09 - 12/30/09	68 ± 28	< 83	< 3	< 6	< 8	< 5	< 29	< 4	< 4	< 6	< 15
	MEAN	278 ± 810	25 ± 0	-	-	-	-	-	-	-	-	-

* 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, 2009**

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-07	12/31/08 - 04/01/09	61 ± 25	53 ± 23	< 3	< 5	< 7	< 5	< 26	< 3	< 4	< 7	< 16
	04/01/09 - 07/01/09	91 ± 57	< 56	< 4	< 8	< 10	< 10	< 32	< 4	< 3	< 20	< 17
	07/01/09 - 09/30/09	77 ± 53	< 27	< 2	< 5	< 12	< 11	< 29	< 4	< 3	< 20	< 17
	09/30/09 - 12/30/09	60 ± 30	< 82	< 5	< 5	< 10	< 6	< 40	< 5	< 4	< 8	< 18
	MEAN	72 ± 29	53 ± 0	-	-	-	-	-	-	-	-	-
CL-08	12/31/08 - 04/01/09	111 ± 29	< 59	< 3	< 4	< 8	< 6	< 29	< 3	< 3	< 9	< 19
	04/01/09 - 07/01/09	83 ± 32	< 39	< 3	< 4	< 8	< 8	< 23	< 3	< 2	< 13	< 11
	07/01/09 - 09/30/09	84 ± 32	< 29	< 3	< 5	< 7	< 9	< 23	< 3	< 2	< 12	< 11
	09/30/09 - 12/30/09	78 ± 37	< 61	< 4	< 4	< 8	< 6	< 41	< 5	< 4	< 7	< 17
	MEAN	89 ± 30	-	-	-	-	-	-	-	-	-	-
CL-11 **	12/31/08 - 04/01/09	73 ± 23	< 32	< 3	< 3	< 7	< 4	< 24	< 2	< 2	< 5	< 10
	04/01/09 - 07/01/09	141 ± 50	< 43	< 4	< 7	< 11	< 10	< 31	< 4	< 3	< 18	< 16
	07/01/09 - 09/30/09	91 ± 46	< 73	< 5	< 10	< 13	< 12	< 37	< 4	< 5	< 26	< 23
	09/30/09 - 12/30/09	67 ± 28	< 95	< 4	< 5	< 9	< 6	< 43	< 4	< 4	< 7	< 17
	MEAN	93 ± 67	-	-	-	-	-	-	-	-	-	-
CL-15	12/31/08 - 04/01/09	90 ± 36	< 30	< 3	< 3	< 6	< 5	< 29	< 3	< 4	< 7	< 15
	04/01/09 - 07/01/09	72 ± 47	< 31	< 3	< 6	< 11	< 8	< 28	< 4	< 2	< 13	< 11
	07/01/09 - 09/30/09	110 ± 41	< 40	< 4	< 7	< 12	< 9	< 34	< 4	< 3	< 16	< 14
	09/30/09 - 12/30/09	84 ± 31	< 69	< 4	< 4	< 8	< 4	< 32	< 4	< 3	< 6	< 18
	MEAN	89 ± 32	-	-	-	-	-	-	-	-	-	-
CL-94	12/31/08 - 04/01/09	91 ± 22	< 40	< 3	< 4	< 9	< 5	< 24	< 3	< 3	< 6	< 11
	04/01/09 - 07/01/09	92 ± 47	< 44	< 2	< 7	< 10	< 10	< 25	< 3	< 2	< 14	< 13
	07/01/09 - 09/30/09	77 ± 37	< 46	< 3	< 6	< 11	< 10	< 23	< 3	< 2	< 17	< 15
	09/30/09 - 12/30/09	78 ± 26	< 82	< 5	< 5	< 9	< 6	< 33	< 4	< 3	< 7	< 15
	MEAN	85 ± 16	-	-	-	-	-	-	-	-	-	-

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

** INDICATES CONTROL STATION

TABLE C-VII.1 CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009

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
12/31/08 - 01/07/09	< 35	< 35	< 35	< 35	< 57	< 58
01/07/09 - 01/14/09	< 25	< 25	< 26	< 25	< 45	< 46
01/14/09 - 01/21/09	< 47	< 46	< 47	< 45	< 40	< 41
01/21/09 - 01/28/09	< 25	< 41	< 41	< 40	< 36	< 37
01/28/09 - 02/04/09	< 57	< 56	< 56	< 55	< 41	< 43
02/04/09 - 02/11/09	< 40	< 29	< 38	< 37	< 64	< 66
02/11/09 - 02/18/09	< 56	< 55	< 58	< 54	< 59	< 62
02/18/09 - 02/25/09	< 26	< 24	< 19	< 40	< 22	< 22
02/25/09 - 03/04/09	< 59	< 60	< 59	< 62	< 45	< 46
03/04/09 - 03/11/09	< 50	< 49	< 50	< 30	< 35	< 36
03/11/09 - 03/18/09	< 45	< 42	< 42	< 42	< 39	< 38
03/18/09 - 03/25/09	< 32	< 33	< 32	< 31	< 38	< 38
03/25/09 - 04/01/09	< 54	< 54	< 54	< 53	< 18	< 17
04/01/09 - 04/08/09	< 67	< 64	< 65	< 64	< 55	< 56
04/08/09 - 04/15/09	< 35	< 34	< 34	< 33	< 33	< 33
04/15/09 - 04/22/09	< 65	< 61	< 63	< 64	< 66	< 66
04/22/09 - 04/29/09	< 52	< 50	< 47	< 46	< 38	< 40
04/29/09 - 05/06/09	< 70	< 68	< 66	< 66	< 28	< 52
05/06/09 - 05/13/09	< 60	< 59	< 58	< 59	< 41	< 41
05/13/09 - 05/20/09	< 59	< 60	< 59	< 59	< 50	< 41
05/20/09 - 05/27/09	< 41	< 42	< 39	< 39 (1)	< 53	< 53
05/27/09 - 06/03/09	< 54	< 52	< 54	< 53	< 66	< 68
06/03/09 - 06/10/09	< 51	< 51	< 50	< 49	< 61	< 62
06/10/09 - 06/17/09	< 22	< 52	< 30	< 29	< 61	< 62
06/17/09 - 06/24/09	< 67	< 14	< 65	< 65	< 38	< 14
06/24/09 - 07/01/09	< 59	< 25	< 59	< 58	< 66	< 65
07/01/09 - 07/08/09	< 40	< 40	< 40	< 22	< 35	< 15
07/08/09 - 07/15/09	< 53	< 54	< 32	< 56	< 27	< 64
07/15/09 - 07/22/09	< 26	< 47	< 46	< 45	< 46	< 46
07/22/09 - 07/29/09	< 12	< 22	< 22	< 22	< 13	< 29
07/29/09 - 08/05/09	< 19	< 20	< 19	< 19	< 10	< 14
08/05/09 - 08/12/09	< 20	< 11	< 19	< 19	< 32	< 31
08/12/09 - 08/19/09	< 31	< 31	< 31	< 13	< 25	< 11
08/19/09 - 08/26/09	< 33	< 35	< 33	< 33	< 32	< 31
08/26/09 - 09/02/09	< 40	< 41	< 23	< 40	< 40	< 40
09/02/09 - 09/09/09	< 43	< 25	< 43	< 42	< 50	< 49
09/09/09 - 09/16/09	< 33	< 61	< 58	< 59	< 50	< 50
09/16/09 - 09/23/09	< 36	< 21	< 35	< 36	< 18	< 32
09/23/09 - 09/30/09	< 20	< 11	< 20	< 20	< 26	< 57
09/30/09 - 10/07/09	< 42	< 44	< 43	< 42	< 62	< 61
10/07/09 - 10/14/09	< 21	< 12	< 21	< 21	< 14	< 33
10/14/09 - 10/21/09	< 29	< 31	< 32	< 31	< 20	< 45
10/21/09 - 10/28/09	< 27	< 27	< 16	< 27	< 32	< 56
10/28/09 - 11/04/09	< 32	< 55	< 55	< 51	< 54	< 54
11/04/09 - 11/11/09	< 56	< 57	< 32	< 57	< 67	< 66
11/11/09 - 11/18/09	< 59	< 30	< 63	< 59	< 32	< 51
11/18/09 - 11/25/09	< 66	< 64	< 37	< 64	< 28	< 66
11/25/09 - 12/02/09	< 46	< 47	< 26	< 47	< 60	< 60
12/02/09 - 12/09/09	< 43	< 42	< 43	< 43	< 32	< 32
12/09/09 - 12/16/09	< 57	< 59	< 57	< 32	< 67	< 67
12/16/09 - 12/23/09	< 62	< 62	< 35	< 62	< 23	< 54
12/23/09 - 12/30/09	< 46	< 45	< 46	< 45	< 50	< 50
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, 2009

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

* INDICATES CONTROL STATION

TABLE C-VIII.1 **CONCENTRATIONS OF I-131 IN MILK SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	CONTROL FARM CL-116
01/28/09	< 0.7
02/25/09	< 0.6
03/25/09	< 0.9
04/29/09	< 0.6
05/13/09	< 0.5
05/27/09	< 0.5
06/10/09	< 0.5
06/24/09	< 0.6
07/08/09	< 0.6
07/22/09	< 0.5
08/05/09	< 0.4
08/19/09	< 0.7
09/02/09	< 0.6
09/16/09	< 0.7
09/30/09	< 0.6
10/14/09	< 0.4
10/28/09	< 0.6
11/25/09	< 0.5
12/30/09	< 0.8
MEAN	-

TABLE C-VIII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009

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 **	01/28/09	< 37	1260 ± 116	< 4	< 5	< 12	< 4	< 11	< 5	< 8	< 4	< 4	< 24	< 5	< 36
	02/25/09	< 53	1160 ± 148	< 6	< 6	< 14	< 5	< 13	< 7	< 10	< 5	< 7	< 26	< 8	< 40
	03/25/09	< 38	1130 ± 118	< 5	< 5	< 11	< 6	< 12	< 5	< 9	< 4	< 5	< 24	< 7	< 30
	04/29/09	< 46	1280 ± 124	< 5	< 5	< 10	< 4	< 9	< 5	< 9	< 5	< 6	< 32	< 11	< 35
	05/13/09	< 56	1280 ± 140	< 6	< 6	< 17	< 7	< 15	< 7	< 11	< 5	< 6	< 43	< 9	< 42
	05/27/09	< 40	1140 ± 117	< 5	< 6	< 11	< 5	< 11	< 6	< 9	< 4	< 5	< 31	< 10	< 39
	06/10/09	< 41	1250 ± 129	< 6	< 6	< 13	< 7	< 11	< 6	< 10	< 5	< 6	< 24	< 6	< 35
	06/24/09	< 13	1110 ± 36	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 1	< 1	< 14	< 4	< 10
	07/08/09	< 58	1080 ± 149	< 6	< 6	< 18	< 5	< 15	< 7	< 13	< 7	< 8	< 32	< 12	< 49
	07/22/09	< 41	1360 ± 124	< 5	< 4	< 10	< 6	< 12	< 5	< 10	< 4	< 5	< 24	< 6	< 37
	08/05/09	< 41	1260 ± 90	< 4	< 5	< 11	< 5	< 11	< 6	< 8	< 4	< 5	< 29	< 10	< 31
	08/19/09	< 66	1310 ± 166	< 6	< 7	< 17	< 8	< 18	< 8	< 10	< 7	< 6	< 33	< 9	< 50
	09/02/09	< 34	1320 ± 97	< 4	< 4	< 10	< 4	< 9	< 5	< 8	< 4	< 4	< 23	< 7	< 34
	09/16/09	< 62	1450 ± 146	< 6	< 7	< 15	< 7	< 15	< 8	< 11	< 5	< 7	< 34	< 8	< 56
	09/30/09	< 57	1140 ± 129	< 6	< 6	< 16	< 6	< 13	< 7	< 12	< 5	< 7	< 33	< 6	< 52
	10/14/09	< 61	1130 ± 148	< 7	< 7	< 16	< 8	< 18	< 7	< 12	< 7	< 8	< 32	< 10	< 56
	10/28/09	< 56	1380 ± 140	< 6	< 7	< 16	< 7	< 16	< 8	< 12	< 6	< 7	< 47	< 15	< 41
	11/25/09	< 69	1360 ± 152	< 7	< 6	< 14	< 6	< 14	< 8	< 13	< 6	< 6	< 47	< 12	< 50
	12/30/09	< 35	1210 ± 84	< 4	< 4	< 10	< 4	< 7	< 4	< 7	< 3	< 4	< 34	< 12	< 28
	MEAN	-	1243 ± 212	-	-	-	-	-	-	-	-	-	-	-	-

** INDICATES CONTROL STATION

TABLE C-IX.1 CONCENTRATIONS OF GAMMA EMITTERS IN VEGETATION SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009

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	06/24/09	256 ± 168	6590 ± 695	< 26	< 30	< 57	< 24	< 67	< 30	< 49	< 42	< 29	< 29	< 134	< 36	< 164
lettuce	06/24/09	247 ± 94	3990 ± 334	< 11	< 7	< 25	< 12	< 18	< 10	< 13	< 15	< 9	< 9	< 44	< 12	< 54
swiss chard	06/24/09	305 ± 126	8880 ± 521	< 11	< 15	< 33	< 15	< 37	< 14	< 27	< 23	< 13	< 16	< 59	< 13	< 78
cabbage	07/29/09	215 ± 48	2880 ± 107	< 3	< 4	< 10	< 3	< 8	< 4	< 8	< 41	< 3	< 4	< 54	< 14	< 25
lettuce	07/29/09	298 ± 90	6710 ± 205	< 4	< 5	< 13	< 4	< 10	< 5	< 9	< 56	< 4	< 4	< 73	< 18	< 52
swiss chard	07/29/09	393 ± 72	8240 ± 213	< 6	< 7	< 18	< 6	< 15	< 7	< 13	< 53	< 5	< 6	< 80	< 19	< 29
cabbage	08/26/09	636 ± 204	3520 ± 595	< 31	< 35	< 71	< 35	< 75	< 35	< 60	< 52	< 28	< 28	< 154	< 54	< 171
lettuce	08/26/09	1160 ± 335	10300 ± 699	< 27	< 27	< 59	< 25	< 59	< 31	< 45	< 53	< 26	< 25	< 156	< 43	< 236
swiss chard	08/26/09	239 ± 168	7290 ± 625	< 21	< 22	< 42	< 24	< 50	< 31	< 47	< 48	< 21	< 25	< 132	< 38	< 157
broadleaf	09/30/09	970 ± 129	7580 ± 302	< 12	< 13	< 31	< 12	< 25	< 14	< 23	< 58	< 11	< 12	< 105	< 28	< 79
cabbage	09/30/09	< 46	2760 ± 114	< 5	< 5	< 13	< 5	< 11	< 6	< 10	< 23	< 5	< 5	< 45	< 12	< 37
swiss chard	09/30/09	123 ± 40	5690 ± 159	< 6	< 6	< 18	< 6	< 15	< 7	< 12	< 25	< 5	< 6	< 47	< 13	< 34
	MEAN	440 ± 676	6203 ± 4930	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-115																
cabbage	06/24/09	156 ± 108	4380 ± 401	< 16	< 16	< 31	< 20	< 34	< 16	< 27	< 30	< 13	< 18	< 65	< 19	< 99
lettuce	06/24/09	1050 ± 194	5570 ± 553	< 22	< 21	< 55	< 22	< 54	< 25	< 37	< 37	< 19	< 25	< 102	< 21	< 148
swiss chard	06/24/09	776 ± 157	6620 ± 467	< 18	< 16	< 47	< 20	< 42	< 18	< 30	< 30	< 16	< 17	< 93	< 24	< 103
cabbage	07/29/09	< 344	3460 ± 617	< 29	< 37	< 91	< 26	< 80	< 46	< 59	< 50	< 25	< 28	< 539	< 125	< 196
lettuce	07/29/09	445 ± 93	3660 ± 182	< 5	< 6	< 13	< 5	< 10	< 6	< 10	< 54	< 4	< 5	< 74	< 21	< 28
swiss chard	07/29/09	1200 ± 119	6860 ± 240	< 5	< 6	< 15	< 5	< 11	< 6	< 11	< 60	< 5	< 6	< 80	< 21	< 35
cabbage	08/26/09	341 ± 163	3260 ± 362	< 16	< 18	< 28	< 19	< 40	< 20	< 23	< 30	< 16	< 18	< 89	< 24	< 104
lettuce	08/26/09	1770 ± 270	4160 ± 458	< 24	< 29	< 52	< 27	< 57	< 32	< 46	< 52	< 22	< 26	< 127	< 27	< 177
swiss chard	08/26/09	483 ± 204	6380 ± 545	< 24	< 28	< 47	< 27	< 61	< 34	< 47	< 51	< 27	< 27	< 129	< 44	< 156
cabbage	09/30/09	216 ± 44	2690 ± 108	< 4	< 5	< 12	< 4	< 11	< 6	< 9	< 22	< 4	< 5	< 41	< 11	< 30
lettuce	09/30/09	3430 ± 310	3800 ± 381	< 11	< 12	< 23	< 11	< 22	< 13	< 20	< 53	< 10	< 13	< 105	< 28	< 70
swiss chard	09/30/09	292 ± 80	6670 ± 205	< 8	< 8	< 22	< 8	< 20	< 9	< 15	< 37	< 7	< 8	< 71	< 18	< 54
	MEAN	924 ± 1935	4793 ± 3054	-	-	-	-	-	-	-	-	-	-	-	-	-

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

TABLE C-IX.1 CONCENTRATIONS OF GAMMA EMITTERS IN VEGETATION SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009

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	06/24/09	178 ± 72	3890 ± 261	< 7	< 7	< 18	< 8	< 16	< 8	< 11	< 14	< 6	< 8	< 37	< 7	< 49
lettuce	06/24/09	834 ± 189	4620 ± 506	< 16	< 17	< 36	< 18	< 43	< 18	< 32	< 30	< 16	< 19	< 84	< 29	< 108
swiss chard	06/24/09	555 ± 156	7900 ± 595	< 21	< 18	< 49	< 22	< 41	< 18	< 36	< 34	< 17	< 19	< 78	< 21	< 115
cabbage	07/29/09	381 ± 61	2970 ± 134	< 4	< 4	< 10	< 3	< 8	< 4	< 7	< 41	< 3	< 4	< 56	< 12	< 23
lettuce	07/29/09	511 ± 70	4480 ± 163	< 4	< 4	< 12	< 4	< 9	< 5	< 9	< 51	< 4	< 4	< 68	< 18	< 24
swiss chard	07/29/09	620 ± 72	7640 ± 169	< 5	< 5	< 14	< 5	< 11	< 6	< 10	< 57	< 4	< 5	< 77	< 20	< 30
cabbage	08/26/09	234 ± 79	2210 ± 215	< 8	< 9	< 20	< 10	< 21	< 9	< 15	< 18	< 9	< 9	< 49	< 12	< 61
lettuce	08/26/09	1610 ± 531	7070 ± 1020	< 24	< 24	< 51	< 26	< 49	< 18	< 33	< 51	< 16	< 22	< 131	< 28	< 142
swiss chard	08/26/09	591 ± 216	7910 ± 619	< 22	< 23	< 67	< 33	< 71	< 34	< 40	< 51	< 23	< 27	< 146	< 45	< 157
corn Leaves	09/30/09	203 ± 35	2920 ± 102	< 4	< 4	< 11	< 4	< 9	< 4	< 8	< 19	< 3	< 4	< 36	< 9	< 26
Lettuce	09/30/09	2620 ± 149	4720 ± 227	< 8	< 9	< 21	< 8	< 18	< 10	< 17	< 55	< 8	< 8	< 87	< 22	< 66
swiss chard	09/30/09	362 ± 88	8210 ± 208	< 8	< 9	< 22	< 8	< 19	< 9	< 16	< 41	< 7	< 8	< 74	< 21	< 55
	MEAN	725 ± 1421	5378 ± 4459	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-118																
cabbage	06/24/09	216 ± 86	3430 ± 300	< 11	< 11	< 25	< 9	< 26	< 12	< 19	< 21	< 10	< 13	< 48	< 14	< 72
lettuce	06/24/09	982 ± 267	6120 ± 758	< 31	< 29	< 71	< 28	< 79	< 31	< 49	< 43	< 26	< 32	< 128	< 33	< 202
swiss chard	06/24/09	906 ± 154	8730 ± 504	< 18	< 18	< 46	< 19	< 49	< 18	< 32	< 31	< 16	< 20	< 84	< 22	< 106
cabbage	07/29/09	527 ± 206	3270 ± 315	< 15	< 21	< 47	< 14	< 32	< 21	< 33	< 58	< 13	< 17	< 350	< 96	< 97
lettuce	07/29/09	573 ± 79	5520 ± 169	< 5	< 6	< 15	< 6	< 12	< 6	< 11	< 56	< 4	< 5	< 80	< 22	< 26
swiss chard	07/29/09	1180 ± 329	10400 ± 621	< 28	< 35	< 102	< 26	< 69	< 42	< 59	< 55	< 25	< 27	< 601	< 141	< 168
cabbage	08/26/09	393 ± 109	3900 ± 296	< 14	< 13	< 27	< 15	< 32	< 15	< 24	< 24	< 11	< 15	< 69	< 19	< 90
lettuce	08/26/09	1770 ± 275	7210 ± 592	< 21	< 23	< 51	< 23	< 43	< 23	< 46	< 46	< 23	< 24	< 119	< 31	< 152
swiss chard	08/26/09	713 ± 247	8570 ± 752	< 32	< 33	< 75	< 33	< 73	< 32	< 48	< 56	< 27	< 30	< 149	< 46	< 179
corn leaves	09/30/09	2110 ± 165	3210 ± 246	< 10	< 11	< 25	< 10	< 19	< 12	< 18	< 53	< 9	< 10	< 96	< 26	< 64
soybeans	09/30/09	330 ± 43	3530 ± 118	< 5	< 5	< 13	< 5	< 12	< 6	< 9	< 25	< 4	< 5	< 43	< 13	< 27
swiss chard	09/30/09	547 ± 106	9080 ± 279	< 9	< 10	< 26	< 9	< 21	< 10	< 18	< 50	< 8	< 8	< 92	< 22	< 53
	MEAN	854 ± 1166	6081 ± 5288	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE C-IX.2 CONCENTRATIONS OF GAMMA EMITTERS IN GRASS SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009

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-01	05/06/09	2420 ± 78	4650 ± 105	< 2	< 2	< 6	< 2	< 4	< 2	< 4	< 52	< 1	< 2	< 49	< 11	< 12
	05/20/09	2140 ± 101	6050 ± 171	< 5	< 6	< 16	< 5	< 12	< 6	< 11	< 50	< 5	< 4	< 74	< 16	< 34
	06/03/09	813 ± 183	3110 ± 334	< 16	< 16	< 34	< 16	< 34	< 16	< 27	< 54	< 14	< 13	< 109	< 25	< 102
	06/17/09	1950 ± 274	4900 ± 435	< 16	< 17	< 46	< 18	< 43	< 19	< 33	< 54	< 19	< 19	< 115	< 33	< 119
	07/01/09	2760 ± 280	7420 ± 528	< 15	< 17	< 38	< 17	< 39	< 18	< 33	< 56	< 17	< 16	< 113	< 29	< 111
	07/15/09	2240 ± 270	4100 ± 429	< 18	< 22	< 50	< 18	< 45	< 21	< 35	< 49	< 17	< 18	< 122	< 29	< 135
	07/29/09	1460 ± 117	4250 ± 215	< 5	< 6	< 16	< 6	< 12	< 6	< 11	< 49	< 4	< 5	< 77	< 24	< 28
	08/12/09	2350 ± 136	5920 ± 223	< 8	< 9	< 22	< 8	< 20	< 10	< 16	< 52	< 7	< 8	< 85	< 21	< 51
	08/26/09	2380 ± 341	5940 ± 583	< 26	< 24	< 58	< 27	< 59	< 26	< 46	< 48	< 22	< 27	< 135	< 26	< 172
	09/09/09	1990 ± 249	5670 ± 504	< 13	< 12	< 40	< 16	< 30	< 16	< 31	< 50	< 13	< 11	< 103	< 25	< 99
	09/23/09	1530 ± 276	5020 ± 529	< 27	< 25	< 63	< 33	< 56	< 29	< 46	< 51	< 25	< 30	< 134	< 46	< 161
	10/07/09	2730 ± 326	7080 ± 643	< 28	< 28	< 67	< 24	< 59	< 28	< 52	< 49	< 26	< 28	< 136	< 31	< 196
	10/21/09	8300 ± 550	7170 ± 693	< 30	< 30	< 73	< 29	< 73	< 31	< 55	< 50	< 27	< 32	< 154	< 47	< 217
	MEAN	2543 ± 3624	5483 ± 2596	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-02	05/06/09	1980 ± 83	5740 ± 141	< 2	< 2	< 7	< 2	< 5	< 2	< 4	< 58	< 2	< 2	< 48	< 14	< 11
	05/20/09	5440 ± 187	6540 ± 232	< 5	< 6	< 14	< 5	< 11	< 6	< 10	< 49	< 4	< 5	< 62	< 19	< 28
	06/03/09	1940 ± 239	3830 ± 329	< 7	< 6	< 14	< 8	< 17	< 8	< 11	< 23	< 6	< 8	< 50	< 10	< 52
	06/17/09	3010 ± 138	6130 ± 238	< 9	< 10	< 23	< 9	< 22	< 11	< 17	< 28	< 9	< 10	< 62	< 14	< 67
	07/01/09	2960 ± 324	7600 ± 500	< 15	< 15	< 41	< 14	< 33	< 13	< 28	< 51	< 13	< 15	< 104	< 25	< 91
	07/15/09	2650 ± 308	6510 ± 595	< 25	< 25	< 57	< 21	< 44	< 25	< 46	< 59	< 21	< 23	< 140	< 44	< 137
	07/29/09	2510 ± 189	5950 ± 265	< 6	< 7	< 15	< 5	< 12	< 7	< 13	< 58	< 5	< 6	< 86	< 21	< 33
	08/12/09	2290 ± 146	8060 ± 254	< 9	< 11	< 26	< 9	< 23	< 11	< 19	< 56	< 9	< 10	< 100	< 25	< 58
	08/26/09	4040 ± 412	8040 ± 709	< 33	< 27	< 80	< 39	< 82	< 31	< 55	< 59	< 27	< 28	< 175	< 50	< 213
	09/09/09	3210 ± 322	4600 ± 466	< 15	< 15	< 31	< 20	< 41	< 18	< 28	< 59	< 16	< 15	< 121	< 31	< 96
	09/23/09	1800 ± 257	7400 ± 605	< 26	< 23	< 55	< 23	< 67	< 24	< 42	< 41	< 23	< 26	< 111	< 36	< 153
	10/07/09	3850 ± 393	8670 ± 703	< 31	< 31	< 61	< 31	< 63	< 31	< 49	< 58	< 30	< 30	< 147	< 30	< 201
	10/21/09	4960 ± 427	6900 ± 690	< 30	< 29	< 62	< 23	< 70	< 34	< 64	< 59	< 29	< 29	< 160	< 35	< 182
	MEAN	3126 ± 2303	6613 ± 2786	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE C-IX.2 CONCENTRATIONS OF GAMMA EMITTERS IN GRASS SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009

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-08	05/06/09	1170 ± 66	5360 ± 126	< 2	< 2	< 6	< 2	< 5	< 3	< 5	< 57	< 2	< 2	< 51	< 11	< 11
	05/20/09	1360 ± 87	5320 ± 154	< 6	< 7	< 19	< 6	< 14	< 8	< 12	< 59	< 5	< 6	< 83	< 23	< 37
	06/03/09	848 ± 194	3930 ± 402	< 11	< 10	< 25	< 13	< 26	< 12	< 19	< 33	< 9	< 14	< 73	< 20	< 77
	06/17/09	2100 ± 145	8460 ± 309	< 11	< 12	< 30	< 11	< 28	< 13	< 22	< 30	< 10	< 11	< 72	< 18	< 76
	07/01/09	1930 ± 223	7010 ± 435	< 16	< 16	< 36	< 19	< 37	< 17	< 27	< 47	< 15	< 16	< 108	< 26	< 97
	07/15/09	1790 ± 258	6070 ± 475	< 19	< 17	< 50	< 23	< 44	< 20	< 37	< 49	< 17	< 19	< 113	< 28	< 122
	07/29/09	2050 ± 109	4460 ± 182	< 5	< 5	< 14	< 6	< 11	< 6	< 9	< 47	< 4	< 5	< 71	< 20	< 26
	08/12/09	2640 ± 179	8020 ± 267	< 9	< 9	< 23	< 8	< 20	< 10	< 18	< 54	< 8	< 9	< 99	< 24	< 55
	08/26/09	5930 ± 419	8490 ± 686	< 28	< 30	< 58	< 23	< 62	< 29	< 50	< 58	< 29	< 27	< 141	< 43	< 201
	09/09/09	1140 ± 209	4330 ± 563	< 13	< 17	< 35	< 15	< 38	< 17	< 26	< 51	< 14	< 15	< 116	< 27	< 86
	09/23/09	2770 ± 260	6260 ± 434	< 20	< 22	< 44	< 17	< 48	< 26	< 38	< 43	< 22	< 21	< 104	< 30	< 169
	10/07/09	4630 ± 337	4290 ± 514	< 23	< 24	< 45	< 21	< 47	< 26	< 43	< 42	< 23	< 25	< 114	< 33	< 151
	10/21/09	2620 ± 357	6970 ± 642	< 29	< 24	< 52	< 30	< 62	< 24	< 42	< 47	< 24	< 28	< 116	< 36	< 166
	MEAN	2383 ± 2891	6075 ± 3242	-	-	-	-	-	-	-	-	-	-	-	-	-
CL-116	05/06/09	1750 ± 86	5530 ± 133	< 2	< 3	< 8	< 2	< 6	< 3	< 5	< 59	< 2	< 2	< 62	< 19	< 13
	05/20/09	1840 ± 92	5750 ± 166	< 5	< 6	< 16	< 6	< 13	< 7	< 11	< 55	< 5	< 5	< 74	< 20	< 33
	06/03/09	1430 ± 177	3500 ± 306	< 14	< 16	< 34	< 16	< 35	< 15	< 28	< 46	< 14	< 15	< 111	< 26	< 83
	06/17/09	2070 ± 142	6700 ± 278	< 10	< 10	< 23	< 9	< 20	< 10	< 19	< 33	< 9	< 10	< 71	< 17	< 83
	07/01/09	2220 ± 241	7550 ± 473	< 18	< 17	< 42	< 19	< 39	< 18	< 30	< 58	< 15	< 18	< 116	< 31	< 106
	07/15/09	3390 ± 278	7860 ± 457	< 22	< 22	< 51	< 22	< 49	< 25	< 38	< 54	< 20	< 21	< 134	< 36	< 124
	07/29/09	1570 ± 107	8360 ± 238	< 6	< 7	< 17	< 6	< 13	< 7	< 12	< 59	< 5	< 5	< 83	< 23	< 34
	08/12/09	2340 ± 116	5290 ± 189	< 8	< 9	< 22	< 8	< 18	< 9	< 16	< 47	< 7	< 8	< 82	< 23	< 48
	08/26/09	1970 ± 227	6060 ± 493	< 21	< 22	< 47	< 22	< 40	< 20	< 35	< 38	< 18	< 21	< 97	< 24	< 117
	09/09/09	1940 ± 241	6850 ± 476	< 17	< 18	< 41	< 15	< 36	< 15	< 29	< 54	< 14	< 14	< 113	< 35	< 93
	09/23/09	1440 ± 284	8090 ± 544	< 27	< 27	< 51	< 28	< 62	< 30	< 47	< 45	< 25	< 25	< 124	< 38	< 160
	10/07/09	1780 ± 252	6770 ± 582	< 25	< 28	< 55	< 24	< 61	< 24	< 47	< 42	< 23	< 27	< 123	< 34	< 155
	10/21/09	4590 ± 479	8340 ± 725	< 29	< 32	< 58	< 31	< 62	< 31	< 54	< 54	< 27	< 29	< 148	< 38	< 191
	MEAN	2179 ± 1766	6665 ± 2850	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE C-X.1 QUARTERLY TLD RESULTS FOR CLINTON POWER STATION, 2009

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	18.1 ± 3.6	17.0 ± 0.9	16.7 ± 2.5	20.7 ± 2.1	18.1 ± 1.2
CL-02	19.3 ± 3.7	19.5 ± 2.4	17.2 ± 1.3	21.7 ± 2.8	18.8 ± 1.1
CL-03	18.2 ± 1.6	18.0 ± 2.9	17.4 ± 0.7	19.3 ± 1.3	17.9 ± 1.2
CL-04	18.5 ± 2.1	18.6 ± 1.3	17.0 ± 1.8	19.4 ± 1.7	19.0 ± 2.7
CL-05	19.2 ± 2.2	18.8 ± 2.5	17.8 ± 1.8	20.4 ± 2.8	19.6 ± 1.4
CL-06	16.8 ± 2.7	15.8 ± 1.1	15.5 ± 1.5	18.1 ± 2.5	17.9 ± 2.1
CL-07	17.7 ± 4.0	17.7 ± 2.6	15.0 ± 0.9	19.9 ± 1.8	18.0 ± 1.3
CL-08	18.6 ± 3.8	17.5 ± 2.0	16.5 ± 1.0	19.7 ± 1.7	20.6 ± 2.0
CL-11	17.9 ± 2.4	17.9 ± 0.8	16.2 ± 1.4	19.1 ± 1.1	18.3 ± 2.3
CL-15	16.6 ± 4.0	16.4 ± 2.5	14.5 ± 1.0	19.3 ± 2.0	16.2 ± 1.2
CL-22	18.7 ± 1.7	19.1 ± 3.3	17.5 ± 0.7	19.3 ± 0.9	19.0 ± 0.5
CL-23	19.3 ± 2.0	19.6 ± 2.8	17.8 ± 2.1	20.0 ± 3.2	19.6 ± 2.7
CL-24	18.5 ± 2.0	17.6 ± 0.9	17.7 ± 3.0	19.7 ± 0.7	18.8 ± 1.3
CL-33	19.7 ± 3.2	19.8 ± 0.8	17.4 ± 1.9	21.2 ± 5.1	20.2 ± 1.2
CL-34	19.6 ± 3.9	18.0 ± 3.5	18.1 ± 1.7	22.1 ± 2.2	20.1 ± 1.5
CL-35	18.2 ± 3.0	18.3 ± 1.2	16.0 ± 1.8	19.0 ± 3.0	19.3 ± 2.2
CL-36	18.7 ± 4.6	18.5 ± 0.7	15.9 ± 1.6	21.5 ± 2.5	18.7 ± 1.9
CL-37	18.1 ± 1.9	18.2 ± 2.5	17.2 ± 1.7	19.4 ± 2.4	17.7 ± 2.6
CL-41	19.6 ± 3.9	19.3 ± 3.0	17.9 ± 1.2	22.4 ± 2.2	18.9 ± 2.0
CL-42	18.5 ± 3.6	18.2 ± 1.0	16.8 ± 1.3	21.0 ± 2.1	18.0 ± 2.6
CL-43	20.5 ± 5.9	18.5 ± 2.4	18.0 ± 0.9	24.5 ± 1.8	21.0 ± 3.3
CL-44	18.9 ± 4.4	17.0 ± 0.8	17.9 ± 1.4	22.0 ± 1.4	18.5 ± 2.3
CL-45	20.1 ± 4.1	20.4 ± 1.6	17.3 ± 1.3	22.3 ± 2.3	20.4 ± 1.7
CL-46	16.5 ± 3.6	16.2 ± 1.5	14.3 ± 1.1	18.7 ± 2.1	16.9 ± 1.4
CL-47	19.1 ± 2.9	20.0 ± 2.7	17.0 ± 1.7	20.2 ± 1.9	19.1 ± 1.1
CL-48	19.1 ± 3.7	19.3 ± 1.8	16.4 ± 1.4	20.4 ± 1.5	20.1 ± 2.9
CL-49	19.6 ± 3.9	19.5 ± 3.7	17.1 ± 0.9	21.9 ± 1.5	19.8 ± 2.2
CL-51	18.9 ± 4.0	18.0 ± 2.0	17.1 ± 1.5	21.7 ± 0.8	18.9 ± 1.8
CL-52	19.0 ± 3.8	18.3 ± 3.0	16.9 ± 1.2	19.3 ± 0.9	21.4 ± 2.2
CL-53	18.6 ± 4.0	18.4 ± 3.5	15.8 ± 0.8	20.3 ± 3.2	19.7 ± 1.8
CL-54	19.4 ± 3.3	19.9 ± 2.7	17.0 ± 1.5	20.8 ± 2.4	19.8 ± 1.0
CL-55	18.8 ± 2.0	19.5 ± 0.8	17.3 ± 1.8	19.0 ± 0.9	19.3 ± 0.6
CL-56	19.8 ± 3.8	19.7 ± 1.8	17.2 ± 0.7	21.0 ± 3.6	21.4 ± 2.0
CL-57	19.3 ± 2.5	19.1 ± 0.7	17.6 ± 1.4	20.2 ± 1.3	20.2 ± 1.4
CL-58	17.2 ± 5.2	18.8 ± 1.5	17.2 ± 1.0	(1)	19.2 ± 1.9
CL-60	19.7 ± 4.0	19.7 ± 1.1	17.0 ± 1.2	21.9 ± 3.5	20.0 ± 3.2
CL-61	18.8 ± 3.1	19.7 ± 1.8	16.5 ± 1.0	19.6 ± 1.4	19.3 ± 1.6
CL-63	16.7 ± 2.7	16.8 ± 0.5	14.9 ± 0.9	18.1 ± 2.3	17.1 ± 1.6
CL-64	19.0 ± 3.6	20.9 ± 1.4	16.8 ± 1.8	20.0 ± 2.1	18.4 ± 1.3
CL-65	19.3 ± 2.4	19.4 ± 1.8	17.8 ± 1.9	20.7 ± 1.2	19.3 ± 1.5
CL-74	16.8 ± 2.3	16.7 ± 1.2	15.2 ± 1.6	17.8 ± 2.9	17.3 ± 0.8
CL-75	17.8 ± 3.2	18.7 ± 1.4	15.4 ± 3.1	18.7 ± 0.8	18.3 ± 0.6
CL-76	19.5 ± 4.2	20.1 ± 1.7	16.7 ± 0.8	21.7 ± 1.6	19.4 ± 2.9
CL-77	17.8 ± 2.6	16.8 ± 1.4	16.8 ± 1.2	18.1 ± 1.1	19.5 ± 2.3
CL-78	18.7 ± 1.9	19.1 ± 1.6	17.4 ± 1.0	23.1 ± 2.5 (1)	19.7 ± 1.4
CL-79	18.5 ± 3.9	17.5 ± 1.3	16.4 ± 1.1	20.8 ± 1.5	19.3 ± 2.6
CL-80	18.9 ± 3.3	19.3 ± 1.5	16.5 ± 1.9	20.3 ± 1.6	19.4 ± 2.3
CL-81	18.6 ± 3.2	17.7 ± 3.0	17.1 ± 1.5	20.8 ± 2.8	18.7 ± 2.8
CL-84	19.2 ± 4.0	19.0 ± 1.3	17.0 ± 1.9	21.9 ± 2.5	19.0 ± 1.1
CL-90	16.5 ± 3.1	16.0 ± 1.5	14.5 ± 1.4	17.7 ± 1.8	17.7 ± 4.0
CL-91	17.3 ± 4.1	15.7 ± 0.7	15.7 ± 1.1	20.0 ± 1.2	17.7 ± 2.3
CL-97	19.5 ± 2.3	19.4 ± 3.9	18.1 ± 2.4	20.9 ± 1.5	19.6 ± 1.0
CL-99	15.6 ± 2.5	15.7 ± 2.1	13.8 ± 1.1	16.2 ± 0.7	16.6 ± 0.4
CL-114	18.5 ± 2.9	18.2 ± 3.1	16.6 ± 1.8	19.9 ± 2.9	19.2 ± 2.5

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-X.1 QUARTERLY TLD RESULTS FOR CLINTON POWER STATION, 2009

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	18.2 ± 3.4	17.0 ± 2.3	16.6 ± 0.7	20.3 ± 3.4	18.7 ± 1.7
CL-46MM	19.2 ± 3.0	20.0 ± 0.9	17.1 ± 1.4	20.4 ± 1.9	19.4 ± 1.1
CL-47MM	18.8 ± 3.7	20.3 ± 1.1	16.1 ± 1.3	19.3 ± 1.5	19.5 ± 0.6
CL-58MM	19.0 ± 3.6	18.5 ± 1.3	16.7 ± 2.3	20.6 ± 2.2	20.2 ± 1.7

* **SEE PAGE 11, SECTION E FOR EXPLANATION**

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	19.2 ± 2.2	18.8 ± 2.5	17.8 ± 1.8	20.4 ± 2.8	19.6 ± 1.4
CL-05MM	19.6 ± 3.4	21.4 ± 0.9	18.4 ± 1.2	20.7 ± 0.7	17.9 ± 1.3
CL-46	16.5 ± 3.6	16.2 ± 1.5	14.3 ± 1.1	18.7 ± 2.1	16.9 ± 1.4
CL-46MM	20.0 ± 3.1	22.1 ± 2.4	18.8 ± 1.6	20.1 ± 1.1	18.8 ± 1.7
CL-47	19.1 ± 2.9	20.0 ± 2.7	17.0 ± 1.7	20.2 ± 1.9	19.1 ± 1.1
CL-47MM	19.8 ± 4.0	22.0 ± 1.5	18.1 ± 1.3	21.0 ± 1.4	18.2 ± 1.6
CL-58	17.2 ± 5.2	18.8 ± 1.5	17.2 ± 1.0	(1)	19.2 ± 1.9
CL-58MM	19.2 ± 2.6	20.8 ± 1.7	18.1 ± 0.8	19.6 ± 0.9	18.1 ± 0.8

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-X.2 MEAN QUARTLY TLD RESULTS FOR THE INNER RING, OUTER RING, SPECIAL INTEREST, SUPPLEMENTAL AND CONTROL LOCATIONS FOR CLINTON POWER STATION, 2009

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	18.3 ± 2.4	18.9 ± 1.9	19.0 ± 2.6	17.7 ± 3.0	17.9
APR-JUN	16.9 ± 2.3	16.9 ± 0.9	16.8 ± 2.2	16.2 ± 2.6	16.2
JUL-SEP	20.6 ± 3.2	20.6 ± 2.5	20.1 ± 3.3	19.7 ± 3.1	19.1
OCT-DEC	19.0 ± 2.3	19.7 ± 1.5	18.5 ± 1.8	18.5 ± 2.5	18.3

TABLE C-X.3 SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR CLINTON POWER STATION, 2009

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	14.3	24.5	18.7 ± 3.7	
OUTER RING	63	15.8	23.1	19.0 ± 3.3	18 ± 2.4
SPECIAL INTEREST	28	15.2	22.4	18.6 ± 3.4	
SUPPLEMENTAL	56	13.8	21.9	18.0 ± 3.8	
CONTROL	4	16.2	19.1	17.9 ± 2.4	

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*

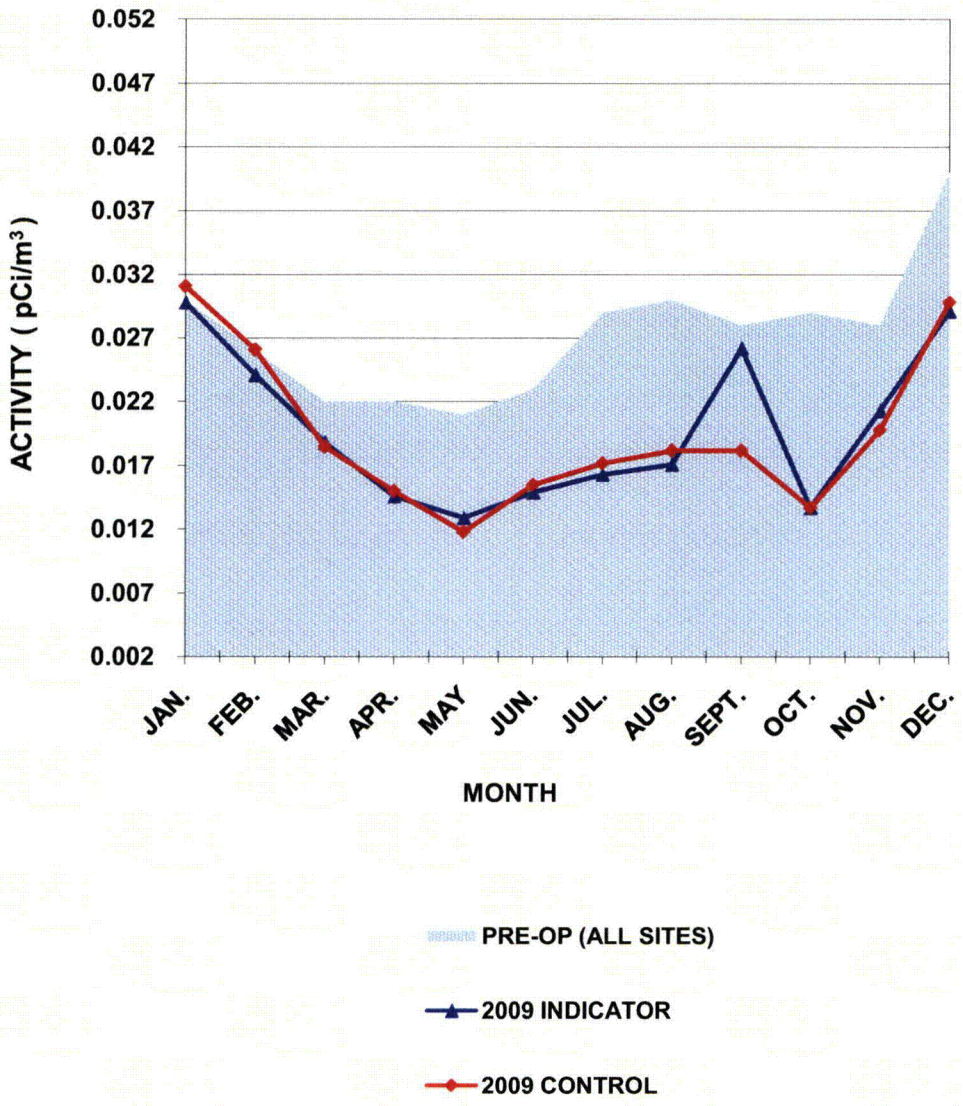
SPECIAL INTEREST STATIONS - CL-37, CL-41, CL-49, CL-64, CL-65, CL-74, CL-75

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

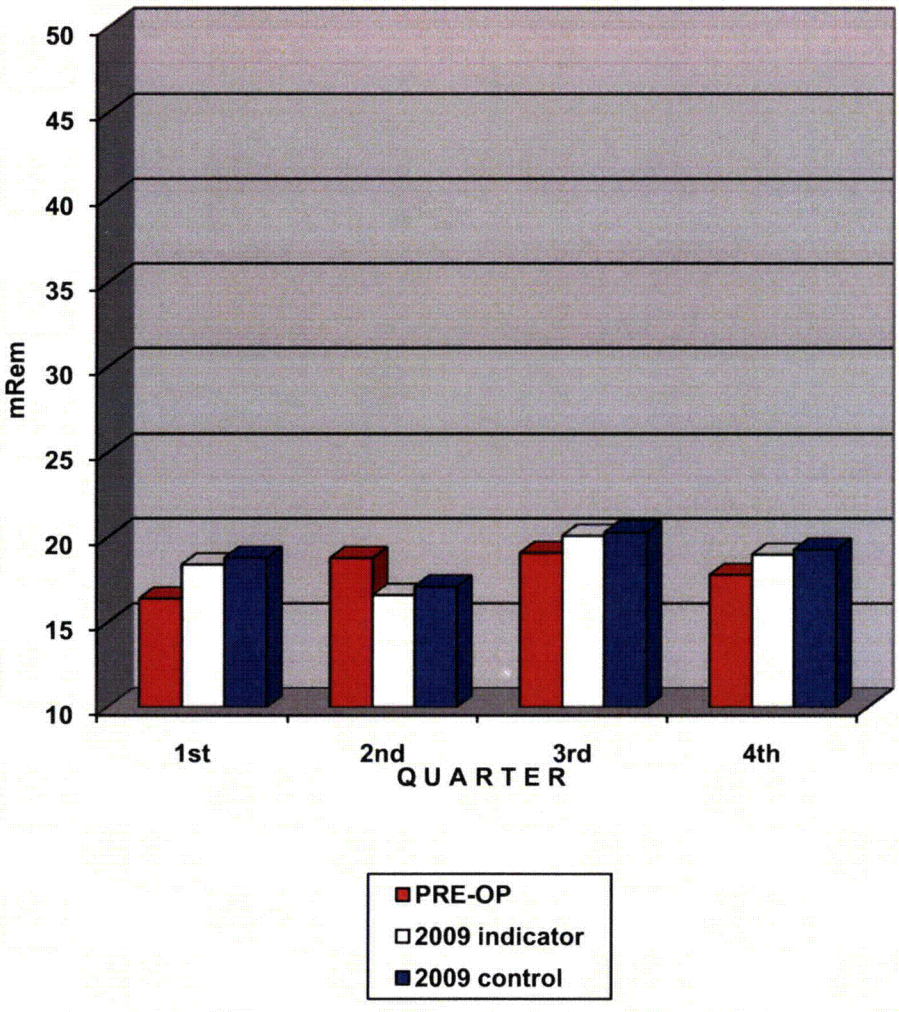
* THE RESULTS FOR TLDs CL-05MM, CL-47MM, CL-58MM ARE NOT PART OF THE REMP AVERAGES. THEY ARE USED FOR COMPARISON PURPOSES ONLY.

FIGURE C-1
MEAN MONTHLY GROSS BETA CONCENTRATION IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF CPS, 2009



SEE PROGRAM EXCEPTIONS SECTION TO EXPLAIN SEPTEMBER SPIKE

FIGURE C-2
MEAN QUARTERLY AMBIENT GAMMA RADIATION LEVELS (TLD) IN THE VICINITY OF CPS, 2009



APPENDIX D

INTER-LABORATORY COMPARISON PROGRAM

TABLE D-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2009
(PAGE 1 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
March 2009	E6533-396	Milk	Sr-89	pCi/L	102	97.7	1.04	A
			Sr-90	pCi/L	14.9	15.6	0.96	A
	E6534-396	Milk	I-131	pCi/L	66.7	79.3	0.84	A
			Ce-141	pCi/L	87.5	94.9	0.92	A
			Cr-51	pCi/L	275	305	0.90	A
			Cs-134	pCi/L	82.0	93.7	0.88	A
			Cs-137	pCi/L	111	111	1.00	A
			Co-58	pCi/L	114	119	0.96	A
			Mn-54	pCi/L	136	128	1.06	A
			Fe-59	pCi/L	112	99.9	1.12	A
			Zn-65	pCi/L	160	156	1.03	A
			Co-60	pCi/L	142	142	1.00	A
	E6536-396	AP	Ce-141	pCi	120	115	1.04	A
			Cr-51	pCi	385	371	1.04	A
			Cs-134	pCi	113	114	0.99	A
			Cs-137	pCi	149	135	1.10	A
			Co-58	pCi	153	145	1.06	A
			Mn-54	pCi	155	155	1.00	A
			Fe-59	pCi	118	121	0.98	A
			Zn-65	pCi	195	189	1.03	A
			Co-60	pCi	190	173	1.10	A
	E6535-396	Charcoal	I-131	pCi	82.8	79.4	1.04	A
June 2009	E6742-396	Milk	Sr-89	pCi/L	107	112	0.96	A
			Sr-90	pCi/L	19.0	16.7	1.14	A
	E6743-396	Milk	I-131	pCi/L	98.1	102.0	0.96	A
			Ce-141	pCi/L	260	284	0.92	A
			Cr-51	pCi/L	389	400	0.97	A
			Cs-134	pCi/L	144.0	166	0.87	A
			Cs-137	pCi/L	185	192	0.96	A
			Co-58	pCi/L	86.9	91.9	0.95	A
			Mn-54	pCi/L	133	137	0.97	A
			Fe-59	pCi/L	126	122	1.03	A
			Zn-65	pCi/L	173	175	0.99	A
			Co-60	pCi/L	298	312	0.96	A
	E6745-396	AP	Ce-141	pCi	186	163	1.14	A
			Cr-51	pCi	262	231	1.13	A
			Cs-134	pCi	101	95	1.06	A
			Cs-137	pCi	135	111	1.22	W
			Co-58	pCi	61	53	1.16	A
			Mn-54	pCi	83.1	79	1.05	A
			Fe-59	pCi	84	70	1.19	A
			Zn-65	pCi	137	101	1.36	N (1)
			Co-60	pCi	202	180	1.12	A
	E6744-396	Charcoal	I-131	pCi	92.2	95.8	0.96	A

TABLE D-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2009
(PAGE 2 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
September 2009	E6897-396	Milk	Sr-89	pCi/L	113	107	1.06	A
			Sr-90	pCi/L	17.4	18.8	0.93	A
	E6898-396	Milk	I-131	pCi/L	89.2	98.6	0.90	A
			Ce-141	pCi/L	249	275	0.91	A
			Cr-51	pCi/L	213	221	0.96	A
			Cs-134	pCi/L	104.0	123	0.85	A
			Cs-137	pCi/L	172	185	0.93	A
			Co-58	pCi/L	96.3	99.4	0.97	A
			Mn-54	pCi/L	201	206	0.98	A
			Fe-59	pCi/L	154	147	1.05	A
			Zn-65	pCi/L	213	204	1.04	A
			Co-60	pCi/L	154	160	0.96	A
	E6900-396	AP	Ce-141	pCi	181	161	1.12	A
			Cr-51	pCi	145	130	1.12	A
			Cs-134	pCi	71.8	72	0.99	A
			Cs-137	pCi	115	109	1.06	A
			Co-58	pCi	62	58	1.06	A
			Mn-54	pCi	129	121	1.07	A
			Fe-59	pCi	97	98	0.98	A
			Zn-65	pCi	110	120	0.92	A
			Co-60	pCi	98.7	94.1	1.05	A
	E6899-396	Charcoal	I-131	pCi	89.5	92.3	0.97	A
December 2009	E6946-396	Milk	Sr-89	pCi/L	131	131	1.00	A
			Sr-90	pCi/L	19.3	17.9	1.08	A
	E6947-396	Milk	I-131	pCi/L	79.2	87.3	0.91	A
			Ce-141	pCi/L	193	202	0.96	A
			Cr-51	pCi/L	512	548	0.93	A
			Cs-134	pCi/L	222	253	0.88	A
			Cs-137	pCi/L	163	179	0.91	A
			Co-58	pCi/L	200	211	0.95	A
			Mn-54	pCi/L	178	178	1.00	A
			Fe-59	pCi/L	176	178	0.99	A
			Zn-65	pCi/L	326	345	0.94	A
			Co-60	pCi/L	240	256	0.94	A
	E6949-396	AP	Ce-141	pCi	103	103	1.00	A
			Cr-51	pCi	290	280	1.04	A
			Cs-134	pCi	116	129	0.90	A
			Cs-137	pCi	93.4	91.5	1.02	A
			Co-58	pCi	111	108	1.03	A
			Mn-54	pCi	81.0	90.8	0.89	A
			Fe-59	pCi	106	90.8	1.17	A
			Zn-65	pCi	155	176	0.88	A
			Co-60	pCi	135	131	1.03	A

TABLE D-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2009
(PAGE 3 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
December 2009	E6948-396	Charcoal	I-131	pCi	93.3	93.9	0.99	A

(1) Detector 7 appears to have a slightly high bias. Detector 7 was removed from service until it can be recalibrated. NCR 09-23

(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, 2009
(PAGE 1 OF 1)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Control Limits	Evaluation (c)
April 2009	RAD 77	Water	Sr-89	pCi/L	57.4	48.3	37.8 - 55.7	N (1)
			Sr-90	pCi/L	30.6	31.4	22.9 - 36.4	A
			Ba-133	pCi/L	55.2	52.7	43.4 - 58.3	A
			Cs-134	pCi/L	65.8	72.9	59.5 - 80.2	A
			Cs-137	pCi/L	157	168	151 - 187	A
			Co-60	pCi/L	86.4	88.9	80.0 - 100	A
			Zn-65	pCi/L	85.5	84.4	76.0 - 101	A
			Gr-A	pCi/L	47.7	54.2	28.3 - 67.7	A
			Gr-B	pCi/L	45.2	43.5	29.1 - 50.8	A
			I-131	pCi/L	25.2	26.1	21.7 - 30.8	A
			H-3	pCi/L	19733	20300	17800 - 22300	A
October 2009	RAD 79	Water	Sr-89	pCi/L	64.75	62.2	50.2 - 70.1	A
			Sr-90	pCi/L	30.30	30.7	22.4 - 35.6	A
			Ba-133	pCi/L	97.9	92.9	78.3 - 102	A
			Cs-134	pCi/L	76.8	79.4	65.0 - 87.3	A
			Cs-137	pCi/L	59.9	54.6	49.1 - 62.9	A
			Co-60	pCi/L	121	117	105 - 131	A
			Zn-65	pCi/L	115	99.5	89.6 - 119	A
			Gr-A	pCi/L	19.6	23.2	11.6 - 31.1	A
			Gr-B	pCi/L	28.5	26.0	16.2 - 33.9	A
			I-131	pCi/L	22.1	22.2	18.4 - 26.5	A
			H-3	pCi/L	16133	16400	14300 - 18000	A

(1) Calculation did not allow for Y-90 ingrowth on the Sr-89 mount. NCR 09-14

(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, 2009
(PAGE 1 OF 2)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
March 2009	09-MaW20	Water	Cs-134	Bq/L	18.8	22.5	18.5 - 29.3	A
			Cs-137	Bq/L	0.0601		(1)	A
			Co-57	Bq/L	17.0	18.9	13.2 - 24.6	A
			Co-60	Bq/L	16.1	17.21	12.05 - 22.37	A
			H-3	Bq/L	332	330.9	231.6 - 430.2	A
			Mn-54	Bq/L	13.8	14.7	10.26 - 19.06	A
			Sr-90	Bq/L	6.88	7.21	5.05- 9.37	A
			Zn-65	Bq/L	13.2	13.6	9.5 - 17.7	A
	09-GrW20	Water	Gr-A	Bq/L	0.529	0.635	>0.0 - 1.270	A
			Gr-B	Bq/L	1.87	1.27	0.64 - 1.91	A
	09-MaS20	Soil	Cs-134	Bq/kg	433	467	327 - 607	A
			Cs-137	Bq/kg	649	605	424 - 787	A
			Co-57	Bq/kg	-0.120		(1)	A
			Co-60	Bq/kg	3.91	4.113	(2)	A
			Mn-54	Bq/kg	339	307	215 - 399	A
			K-40	Bq/kg	644	570	399 - 741	A
			Sr-90	Bq/kg	245	257	180 - 334	A
			Zn-65	Bq/kg	272	242	169 - 315	A
	09-RdF20	AP	Cs-134	Bq/sample	2.77	2.93	2.05 - 3.81	A
			Cs-137	Bq/sample	1.41	1.52	1.06 - 1.98	A
			Co-57	Bq/sample	1.24	1.30	0.91 - 1.69	A
			Co-60	Bq/sample	1.33	1.22	0.85 - 1.59	A
			Mn-54	Bq/sample	2.42	2.2709	1.5898 - 2.9522	A
			Sr-90	Bq/sample	0.713	0.64	0.448 - 0.832	A
			Zn-65	Bq/sample	1.30	1.36	0.95 - 1.77	A
	09-GrF20	AP	Gr-A	Bq/sample	0.188	0.348	>0.0 - 0.696	A
			Gr-B	Bq/sample	0.313	0.279	0.140 - 0.419	A
March 2009	09-RdV20	Vegetation	Cs-134	Bq/sample	3.48	3.40	2.38 - 4.42	A
			Cs-137	Bq/sample	1.15	0.93	0.65 - 1.21	W
			Co-57	Bq/sample	3.12	2.36	1.65 - 3.07	N (3)
			Co-60	Bq/sample	-0.0105		(1)	A
			Mn-54	Bq/sample	2.98	2.3	1.61 - 2.99	W
			K-40	Bq/sample	64.1		(4)	
			Sr-90	Bq/sample	1.09	1.260	0.882 - 1.638	A
			Zn-65	Bq/sample	1.73	1.3540	0.948 - 1.760	W
September 2009	09-MaW21	Water	Cs-134	Bq/L	26.5	32.2	22.5 - 41.9	A
			Cs-137	Bq/L	37.2	41.2	28.8 - 53.6	A
			Co-57	Bq/L	32.2	36.6	25.6 - 47.6	A
			Co-60	Bq/L	14.0	15.40	10.8 - 20.0	A
			H-3	Bq/L	705	634.1	443.9 - 824.3	A
			Mn-54	Bq/L	-0.1015		(1)	A
			Sr-90	Bq/L	13.9	12.99	9.09- 16.89	A
			Zn-65	Bq/L	26.2	26.9	18.8 - 35.0	A
	09-GrW21	Water	Gr-A	Bq/L	1.27	1.047	>0.0 - 2.094	A
			Gr-B	Bq/L	9.70	7.53	3.77 - 11.30	A

TABLE D-3 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING, 2009
(PAGE 2 OF 2)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
September 2009	09-MaS21	Soil	Am-241	Bq/kg	74.7	89.8	62.9 - 116.7	A
			Cs-134	Bq/kg	0.554		(1)	A
			Cs-137	Bq/kg	706	669	468 - 870	A
			Co-57	Bq/kg	606	586	410 - 762	A
			Co-60	Bq/kg	350	327.000	229 - 425	A
			Mn-54	Bq/kg	876	796	557 - 1035	A
			K-40	Bq/kg	425	375	263 - 488	A
			Sr-90	Bq/kg	505	455	319 - 592	A
			Zn-65	Bq/kg	1370	1178	825 - 1531	A
	09-RdF21	AP	Cs-134	Bq/sample	-0.02		(1)	A
			Cs-137	Bq/sample	1.4	1.4	0.98 - 1.82	A
			Co-57	Bq/sample	5.98	6.48	4.54 - 8.42	A
			Co-60	Bq/sample	1.01	1.03	0.72 - 1.34	A
			Mn-54	Bq/sample	5.16	5.49	3.84 - 7.14	A
			Sr-90	Bq/sample	0.925	0.0835	0.585 - 1.086	A
			Zn-65	Bq/sample	4.39	3.93	2.75 - 5.11	A
	09-GrF21	AP	Gr-A	Bq/sample	0.357	0.659	>0.0 - 1.318	A
			Gr-B	Bq/sample	1.403	1.320	0.66 - 1.98	A
	09-RdV21	Vegetation	Cs-134	Bq/sample	-0.0027		(1)	A
			Cs-137	Bq/sample	2.36	2.43	1.70 - 3.16	A
			Co-60	Bq/sample	2.58	2.57	1.80 - 3.34	A
			Mn-54	Bq/sample	8.36	7.9	5.5 - 10.3	A
			K-40	Bq/sample	57.8		(4)	
			Sr-90	Bq/sample	1.73	1.78	1.25 - 2.31	A
			Zn-65	Bq/sample	-0.59		(1)	A

(1) False positive test.

(2) Sensativity evaluation.

(3) Homogeniety problem. MAPEP requires using entire sample but due to geometry limitations we can only use part of the sample. NCR 09-13

(4) Not evaluated by MAPEP.

(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 E

ERRATA DATA

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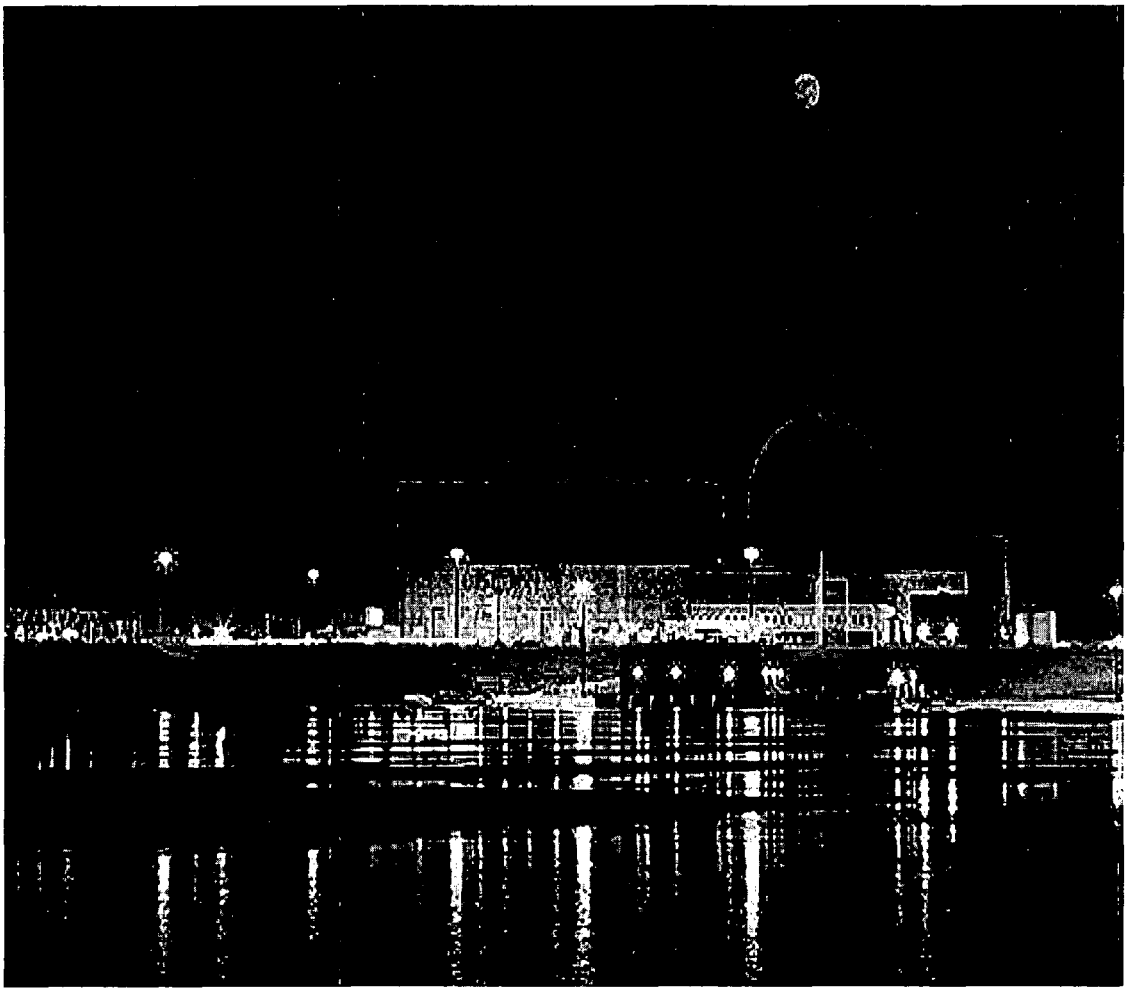

Docket No: 50-461

CLINTON POWER STATION

Annual Radiological Environmental Operating Report

1 January Through 31 December 2008

Prepared By
Teledyne Brown Engineering
Environmental Services

Exelon
Nuclear
Clinton Power Station
Clinton, IL 61727

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Appendix E Annual Radiological Groundwater Protection Program Report (ARGPPR)

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 2008 through 31 December 2008. During that time period, 1,578 analyses were performed on 1,462 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 2008. Releases of gaseous radioactive materials were accurately measured in plant effluents. There was 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 7.45 E-04 or 0.000745 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. 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 was 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 gross beta and gamma emitting nuclides. Gross beta activities detected were consistent with those detected in previous years. 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 2008 through 31 December 2008.

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 2008. 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-07D 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-07B.

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-01, CL-02, CL-03, CL-04, CL-06, CL-07, CL-08, 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 September 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-01, CL-02, CL-08 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-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 and CL-63). An additional three locations were installed as part of a volunteer comparison study near and within the site perimeter (CL-05MM, 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 designed to measure possible exposures to close-in population.

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-02, CL-03, CL-04, CL-06, CL-07, CL-08, 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 2008. 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 and well water 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 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.

February 06, 2008, Issue Report IR # 732558

Non-ODCM Composite Water sampler CL-99 was found flooded during the weekly inspection. The flooding caused the compositor to fail and subsequent troubleshooting revealed the sampling diffuser had also become clogged, restricting sample flow.

February 27, 2008, IR # 741702

Environmental Air Sampler CL-03 was found not running during the performance of the weekly surveillance. Additionally, the digital timer was also found to have stopped recording run time. The malfunction was a blown fuse. The Air Sampler collected sufficient volume, therefore was analyzed and required LLDs were achieved.

May 27, 2008, IR # 779850

TLD CL-56 was found to be missing during the vendor monthly verification of ODCM TLDs. Additionally, the TLD holder container that houses the TLD was found tampered with as the bottom had been dismantled. This container housing the TLD is mounted on a metal rod driven into the ground, which was also missing. TLD CL-56 was replaced on 05/28/08 with a spare, having a result of 12.8 mRem for the rest of the monitoring period.

June 25, 2008, IR # 793454

Broadleaf vegetation was substituted for CL-114 and CL-115 due to late planting and heavy rain with flooding.

July 09, 2008 – July 16, 2008 IR # 797218

Environmental Air sampler CL-94 had a lengthy power interruption due to a severe thunder and lightning storm. Pressure and flow adjustments were made after power was restored. The total sample volume did not meet the minimum acceptance criteria.

July 16, 2008 – July 23, 2008 IR 799543

Environmental Air sampler CL-11 had a lengthy power interruption due to a severe thunder and lightning storm. Pressure and flow adjustments were made after power was restored. The total volume did not meet the minimum acceptance criteria.

December 17, 2008 – December 26, 2008 IR # 860278

Environmental Air Sampler CL-06 was not sampled and analyzed due to icy conditions for the weekly surveillance. The sample was collected and analyzed after the due date as weather conditions permitted. There was no impact to the data and all LLDs were achieved.

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 2008, during an 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-05MM, 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).
    - Although TLDs CL-05MM, CL-47MM and CL-58MM were closer to the Station, they resulted in less exposure than the originally installed locations for all four quarters of 2008.
    - TLD CL-46MM showed a slight increase for all four quarters of 2008, averaging 1.6 mRem higher than the originally installed location.

Clinton Power Station will continue this comparison study throughout 2009.

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, and grab samples to supplement during periods of inoperability – see exceptions, 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.

Iodine-131

Monthly samples from location CL-90 were analyzed for I-131 activity (Table C-I.1, Appendix C). 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 locations CL-13 and CL-90 and three of 12 samples at locations 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 two of 12 samples. The values ranged from 1.8 to 4.1 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). No 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-07B 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-02, CL-03, CL-04, CL-06, CL-15, and CL-94). Group II represents the locations at an intermediate distance within one to five miles of CPS (CL-01, CL-07, and CL-08), 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 8 to 39 E–3 pCi/m^3 with a mean of 20 E–3 pCi/m^3. The results from the Intermediate Distance location (Group II) ranged from 8 to 55 E–3 pCi/m^3 with a mean of 19 E–3 pCi/m^3. The results from the Control locations (Group III) ranged from 8 to 39 E–3 pCi/m^3 with a mean of 21 E–3 pCi/m^3. Comparison of the 2008 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 2008 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 isotopes Be-7 due to cosmic ray activity was detected in 34 samples. No other nuclides were detected and all required LLDs were met.

b. Airborne Iodine

Continuous air samples were collected from 10 locations (CL-01, CL-02, CL-03, CL-04, CL-06, CL-07, CL-08, 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 September, 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 39 of 44 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-01, CL-02, CL-08, 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 51 of 52 samples. Naturally occurring K-40 activity was found in 51 of 52 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 2008. The average dose from the inner ring was 20.2 mR/quarter. The average dose from the outer ring was 20.3 mR/quarter. The average dose from the special interest group was 20.1 mR/quarter. The average dose from the supplemental group was 19.1 mR/quarter. The quarterly measurements ranged from 15.7 to 25.3 mR/quarter. Some statistical anomalies were noted for two TLD stations. TLD CL-49 for fourth quarter had a slightly higher than average 2 standard deviation of 6.4 mR/quarter. The two TLDs associated with the standard deviation had the following results:

one had readings of 23.6, 25.6 and 26.8 and the other had readings of 19.6, 19.6 and 20.3, resulting in the higher than average 2 standard deviation. TLD CL-58 for third quarter has a slightly higher than average 2 standard deviation of 4.8 mR/quarter. The two TLDs associated with the standard deviation had the following results: one had readings of 20.1, 25.6 and 26.8 and the other had readings of 18.1, 18.8 and 18.1, resulting in the higher than average 2 standard deviation. The inner ring and outer ring measurements compared well to the Control Station, CL-11, which ranged from 17.3 mR/quarter to 21.6 mR/quarter with an average measurement of 19.3 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 2008, 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 2008 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	2.3	3.0
3 NE	1.3	2.1	>5.0
4 ENE	1.8	2.6	>5.0
5 E	1.0	1.0	1.0
6 ESE	3.2	3.3	>5.0
7 SE	2.4	2.4	>5.0
8 SSE	1.7	2.7	>5.0
9 S	3.0	3.0	4.1
10 SSW	2.9	>5.0	3.4
11 SW	0.7	>5.0	3.6
12 WSW	1.6	2.3	3.4
13 W	1.2	2.0	>5.0
14 WNW	1.6	>5.0	>5.0
15 NW	1.6	2.3	>5.0
16 NNW	1.7	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 samples did not meet the specified acceptance criteria for the following reasons:

1. Teledyne Brown Engineering's Analytics December 2008 Sr-89 in milk result of 18.0 pCi/L was higher than the known value of 12.6 pCi/L, resulting in a found to known ratio of 1.43. NCR 09-02 was initiated to investigate this failure.

2. Teledyne Brown Engineering's Analytics' ERA Quik Response water sample January 2008 Sr-89 result of 37.33 pCi/L exceeded the upper acceptance limit of 25.2 pCi/L. No cause could be found for the failure. Studies bracketing these results, RAD 71 and RAD

72 had acceptable Sr-89 results. NCR 08-03

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

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

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

22. Clinton Power Station, Updated Safety Analysis Report.

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

APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT SUMMARY

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TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE CLINTON POWER STATION, 2008

Name of Facility: CLINTON POWER STATION **DOCKET NUMBER:** 50-461
Location of Facility: DEWITT COUNTY IL **REPORTING PERIOD:** 2008

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER (PCI/LITER)	I-131	12	1	<LLD	NA	-		0
	H-3	16	2000	<LLD	<LLD	-		0
	GAMMA	48						
	BE-7		NA	ND	ND	-		0
	K-40		NA	49 (2/24) (28/71)	106 (3/24) (38/194)	106 (3/12) (38/194)	CL-99 CONTROL NORTH FORK ACCESS 3.5 MILES NNE OF SITE	0
	MN-54		15	<LLD	<LLD	-		0
	CO-58		15	<LLD	<LLD	-		0
	FE-59		30	<LLD	<LLD	-		0

ND = NOT DETECTED
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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SURFACE WATER (PCI/LITER)	CO-60		15	<LLD	<LLD	-		0
	ZN-65		30	<LLD	<LLD	-		0
	NB-95		15	<LLD	<LLD	-		0
	ZR-95		30	<LLD	<LLD	-		0
	CS-134		15	<LLD	<LLD	-		0
	CS-137		18	<LLD	<LLD	-		0
	BA-140		60	<LLD	<LLD	-		0

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SURFACE WATER (PCI/LITER)	LA-140		15	<LLD	<LLD	-		0
	CE-144		NA	ND	ND	-		0
DRINKING WATER (PCI/LITER)	GR-B	12	4	3 (2/12) (1.8/4.1)	NA	3 (2/12) (1.8/4.1)	CL-14 INDICATOR STATION PLANT SERVICE BLDG ONSITE	0
	H-3	4	2000	<LLD	NA	-		0
	GAMMA	12						
	BE-7		NA	ND	NA	-		0
	K-40		NA	183 (1/12)	NA	183 (1/12)	CL-14 INDICATOR STATION PLANT SERVICE BLDG ONSITE	0
	MN-54		15	<LLD	NA	-		0

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DRINKING WATER (PCI/LITER)	CO-58		15	<LLD	NA	-		0
	FE-59		30	<LLD	NA	-		0
	CO-60		15	<LLD	NA	-		0
	ZN-65		30	<LLD	NA	-		0
	NB-95		15	<LLD	NA	-		0
	ZR-95		30	<LLD	NA	-		0
	I-131		15	<LLD	NA	-		0

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DRINKING WATER (PCI/LITER)	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	ND	NA	-		0
WELL WATER (PCI/LITER)	H-3	12	200	<LLD	NA	-		0
	GAMMA BE-7	12	NA	ND	NA	-		0

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WELL WATER (PCI/LITER)	K-40		NA	ND	NA	-		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
	ZN-65		30	<LLD	NA	-		0
	NB-95		15	<LLD	NA	-		0

ND = NOT DETECTED
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TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE CLINTON POWER STATION, 2008

Name of Facility: CLINTON POWER STATION **DOCKET NUMBER:** 50-461
Location of Facility: DEWITT COUNTY IL **REPORTING PERIOD:** 2008

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (M) (F) RANGE	CONTROL LOCATION MEAN (M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN (M) MEAN (M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
WELL WATER (PCI/LITER)	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	ND	NA	-		0
FISH (PCI/KG WET)	GAMMA BE-7	16	NA	ND	ND	-		0

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FISH (PCI/KG WET)	K-40		NA	3130 (8/8) (2410/3650)	3063 (8/8) (2260/3380)	3130 (8/8) (2410/3650)	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	ND	ND	-		0

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FISH (PCI/KG WET)	ZR-95		NA	ND	ND	-		0
	CS-134		100	<LLD	<LLD	-		0
	CS-137		100	<LLD	<LLD	-		0
	BA-140		NA	ND	ND	-		0
	LA-140		NA	ND	ND	-		0
	CE-144		NA	ND	ND	-		0
SEDIMENT (PCI/KG DRY)	GAMMA BE-7	2	NA	ND	NA	-		0

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SEDIMENT (PCI/KG DRY)	K-40		NA	8420 (2/2) (6980/9860)	NA	8420 (2/2) (6980/9860)	CL-07B INDICATOR CLINTON LAKE 2.1 MILES SE OF SITE	0
	MN-54		NA	ND	NA	-		0
	CO-58		NA	ND	NA	-		0
	FE-59		NA	ND	NA	-		0
	CO-60		NA	ND	NA	-		0
	ZN-65		NA	ND	NA	-		0
	NB-95		NA	ND	NA	-		0

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SEDIMENT (PCI/KG DRY)	ZR-95		NA	ND	NA	-		0
	CS-134		150	<LLD	NA	-		0
	CS-137		180	<LLD	NA	-		0
	BA-140		NA	ND	NA	-		0
	LA-140		NA	ND	NA	-		0
	CE-144		NA	ND	NA	-		0
AIR PARTICULATE (E-3 PCI/CU.METER)	GR-B	520	10	19 (465/468) (6/55)	21 (52/52) (8/110)	21 (52/52) (8/110)	CL-11 CONTROL AMERENIP SUBSTATION 16 MILES S OF SITE	0

ND = NOT DETECTED
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AIR PARTICULATE (E-3 PCI/CU.METER)	GAMMA	40						
	BE-7		NA	89 (31/36) (47.8/186)	79.8 (3/4) (62.1/104)	112.7 (4/4) (58.9/186)	CL-08 INDICATOR DEWITT CEMETERY 2.2 MILES E OF SITE	0
	K-40		NA	ND	ND	-		0
	CO-60		NA	ND	ND	-		0
	NB-95		NA	ND	ND	-		0
	ZR-95		NA	ND	ND	-		0
	RU-103		NA	ND	ND	-		0
	RU-106		NA	ND	ND	-		0

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AIR PARTICULATE (E-3 PCI/CU.METER)	CS-134		50	<LLD	<LLD	-		0
	CS-137		60	<LLD	<LLD	-		0
	CE-141		NA	ND	ND	-		0
	CE-144		NA	ND	ND	-		0
AIR IODINE (E-3 PCI/CU.METER)	GAMMA I-131	520	70	<LLD	<LLD	-		0
MILK (PCI/LITER)	I-131	20	1	NA	<LLD	-		0
	GAMMA BE-7	20	NA	NA	ND	-		0

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MILK (PCI/LITER)	K-40		NA	NA	1207 (20/20) (965/1380)	1207 (20/20) (965/1380)	CL-116 CONTROL PASTURE IN RURAL KENNEY 14 MILES WSW OF SITE	0
	MN-54		NA	NA	ND	-		0
	CO-58		NA	NA	ND	-		0
	FE-59		NA	NA	ND	-		0
	CO-60		NA	NA	ND	-		0
	ZN-65		NA	NA	ND	-		0
	NB-95		NA	NA	ND	-		0

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MILK (PCI/LITER)	ZR-95		NA	NA	ND	-		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	ND	-		0

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VEGETATION (PCI/KG WET)	GAMMA	44						
	BE-7		NA	406.4 (30/34) (108/2090)	337.1 (9/10) (112/667)	581.1 (10/10) (148/2090)	CL-115 INDICATOR SITE'S SECONDARY ACCESS ROAD 0.7 MILES NE OF SITE	0
	K-40		NA	4771.8 (34/34) (1670/8370)	5035 (10/10) (2570/7820)	5281.7 (12/12) (2760/8370)	CL-118 INDICATOR SITE'S MAIN ACCESS ROAD 0.7 MILES NNE OF SITE	0
	MN-54		NA	ND	ND	-		0
	CO-58		NA	ND	ND	-		0
	FE-59		NA	ND	ND	-		0
	CO-60		NA	ND	ND	-		0
	ZN-65		NA	ND	ND	-		0

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VEGETATION (PCI/KG WET)	NB-95		NA	ND	ND	-		0
	ZR-95		NA	ND	ND	-		0
	I-131		60	<LLD	<LLD	-		0
	CS-134		60	<LLD	<LLD	-		0
	CS-137		80	<LLD	<LLD	-		0
	BA-140		NA	ND	ND	-		0
	LA-140		NA	ND	ND	-		0

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VEGETATION (PCI/KG WET)	CE-144		NA	ND	ND	-		0
GRASS (PCI/KG WET)	GAMMA	52						
	BE-7		NA	2152.9 (38/39) (437/5160)	1823.1 (13/13) (1160/3080)	2896.9 (13/13) (1310/5160)	CL-02 INDICATOR CLINTON'S MAIN ACCESS ROAD 0.7 MILES NNE OF SITE	0
	K-40		NA	5039.5 (38/39) (3160/8400)	4462.3 (13/13) (2430/5590)	5306.9 (13/13) (3480/8400)	CL-08 INDICATOR DEWITT CEMETERY 2.2 MILES E OF SITE	0
	MN-54		NA	ND	ND	-		0
	CO-58		NA	ND	ND	-		0
	FE-59		NA	ND	ND	-		0
	CO-60		NA	ND	ND	-		0

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GRASS (PCI/KG WET)	ZN-65		NA	ND	ND	-		0
	NB-95		NA	ND	ND	-		0
	ZR-95		NA	ND	ND	-		0
	I-131		60	<LLD	<LLD	-		0
	CS-134		60	<LLD	<LLD	-		0
	CS-137		80	<LLD	<LLD	-		0
	BA-140		NA	ND	ND	-		0

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GRASS (PCI/KG WET)	LA-140		NA	ND	ND	-		0
	CE-144		NA	ND	ND	-		0
DIRECT RADIATION (MILLI-ROENTGEN/QTR.)	TLD-QUARTERLY	216	NA	19.9 (212/212) (15.7/25.3)	19.3 (4/4) (17.3/21.6)	21.6 (4/4) (19.2/25.3)	CL-58 INDICATOR 4.3 MILES SSW	0

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APPENDIX B

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

TABLE B-1: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Clinton Power Station, 2008

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-07D	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-01	Camp Quest	1.8 miles W
CL-02	Clinton's Main Access Road	0.7 miles NNE
CL-03	Clinton's Secondary Access Road	0.7 miles NE
CL-04	Residence Near Recreation Area	0.8 miles SW
CL-06	Clinton's Recreation Area	0.7 miles WSW
CL-07	Mascoutin Recreation Area	2.3 miles SE
CL-08	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-07B	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-01	Camp Quest	1.8 miles W
CL-02	Clinton's Main Access Road	0.7 miles NNE
CL-08	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, 2008

Location	Location Description	Distance & Direction From Site
J.	Environmental Dosimetry - TLD	
	Inner Ring	
CL-01		1.8 miles W
CL-05		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, 2008

Location	Location Description	Distance & Direction From Site
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-02		0.7 miles NNE
CL-03		0.7 miles NE
CL-04		0.8 miles SW
CL-06		0.8 miles WSW
CL-07		2.3 miles SE
CL-08		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, 2008

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, 2008

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 Global Dosimetry CaF_2 elements.	Global Dosimetry Quality Assurance Manual

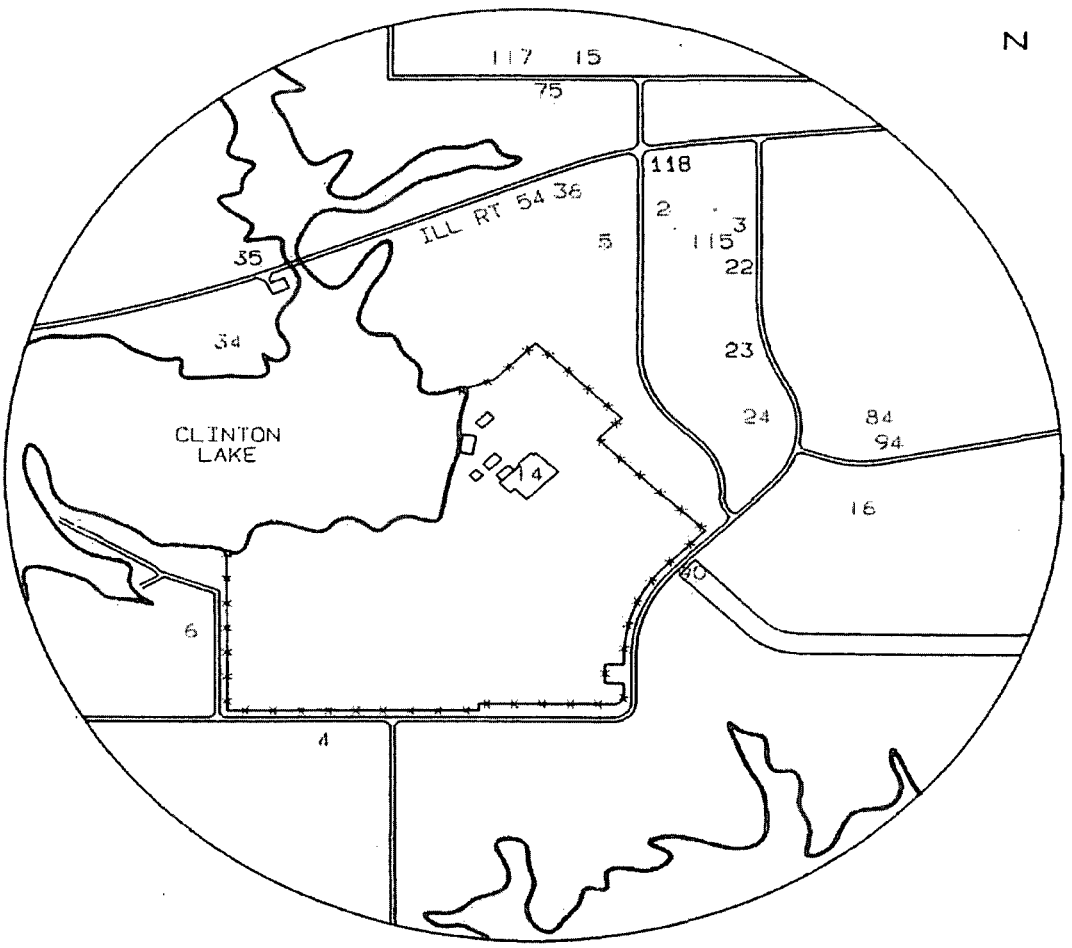

Figure B-1
Environmental Sampling Locations Within One
Mile of the Clinton Power Station, 2008

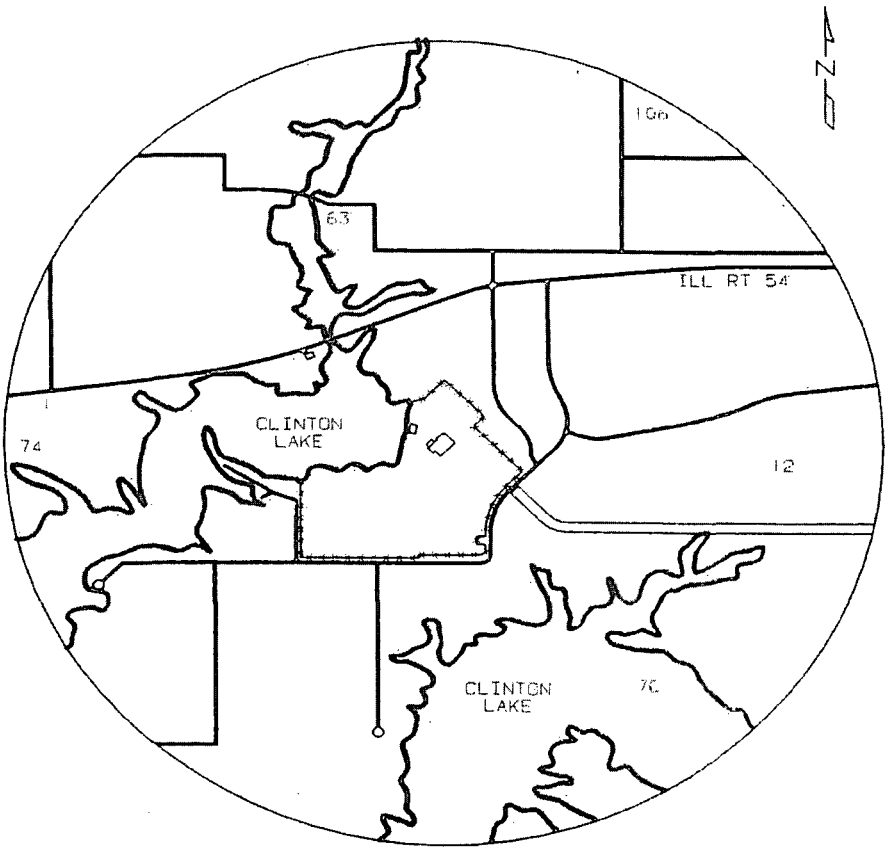

Figure B-2
Environmental Sampling Locations Between One and Two
Miles of the Clinton Power Station, 2008

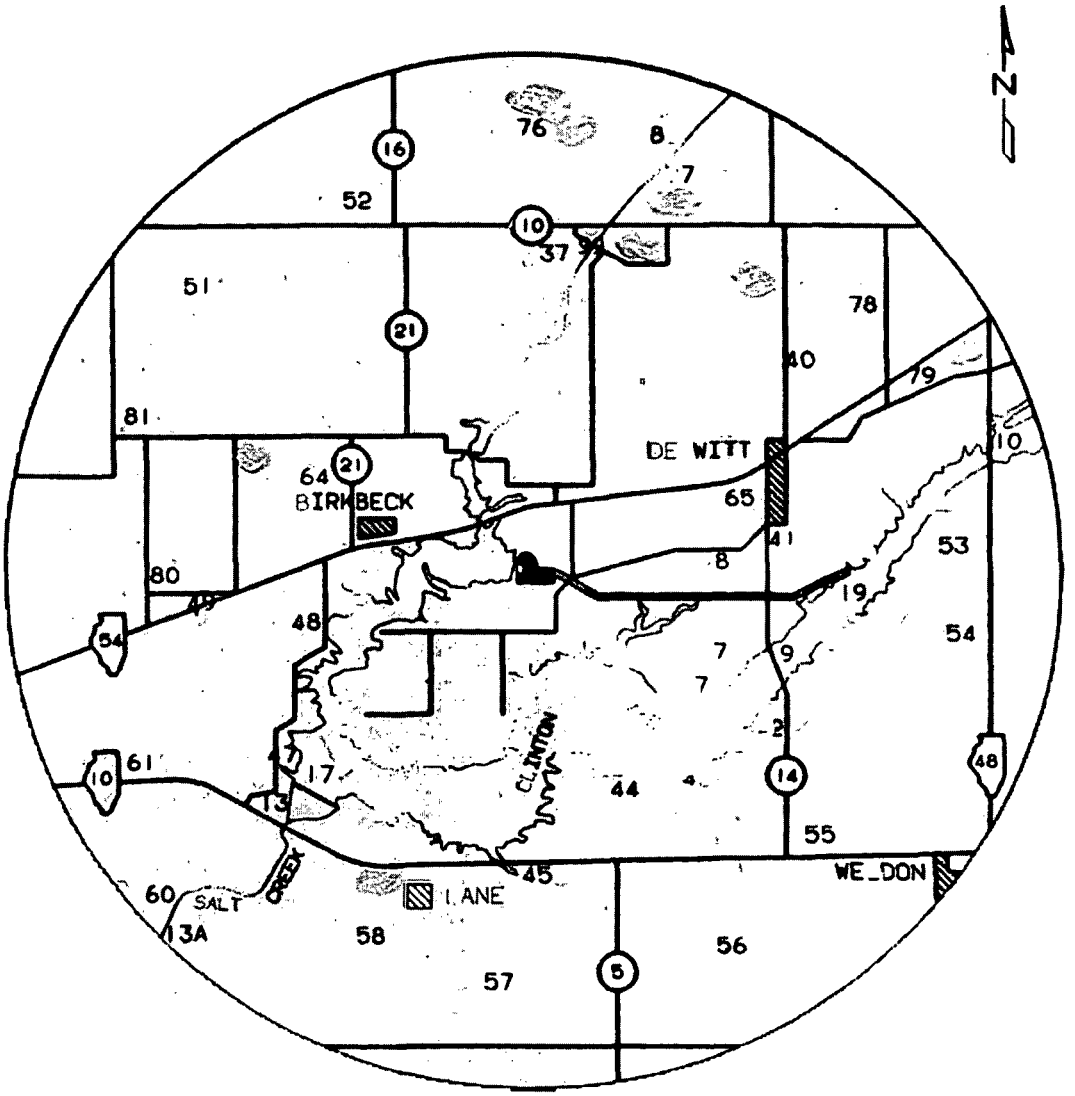

Figure B-3
Environmental Sampling Locations Between Two and Five
Miles of the Clinton Power Station, 2008

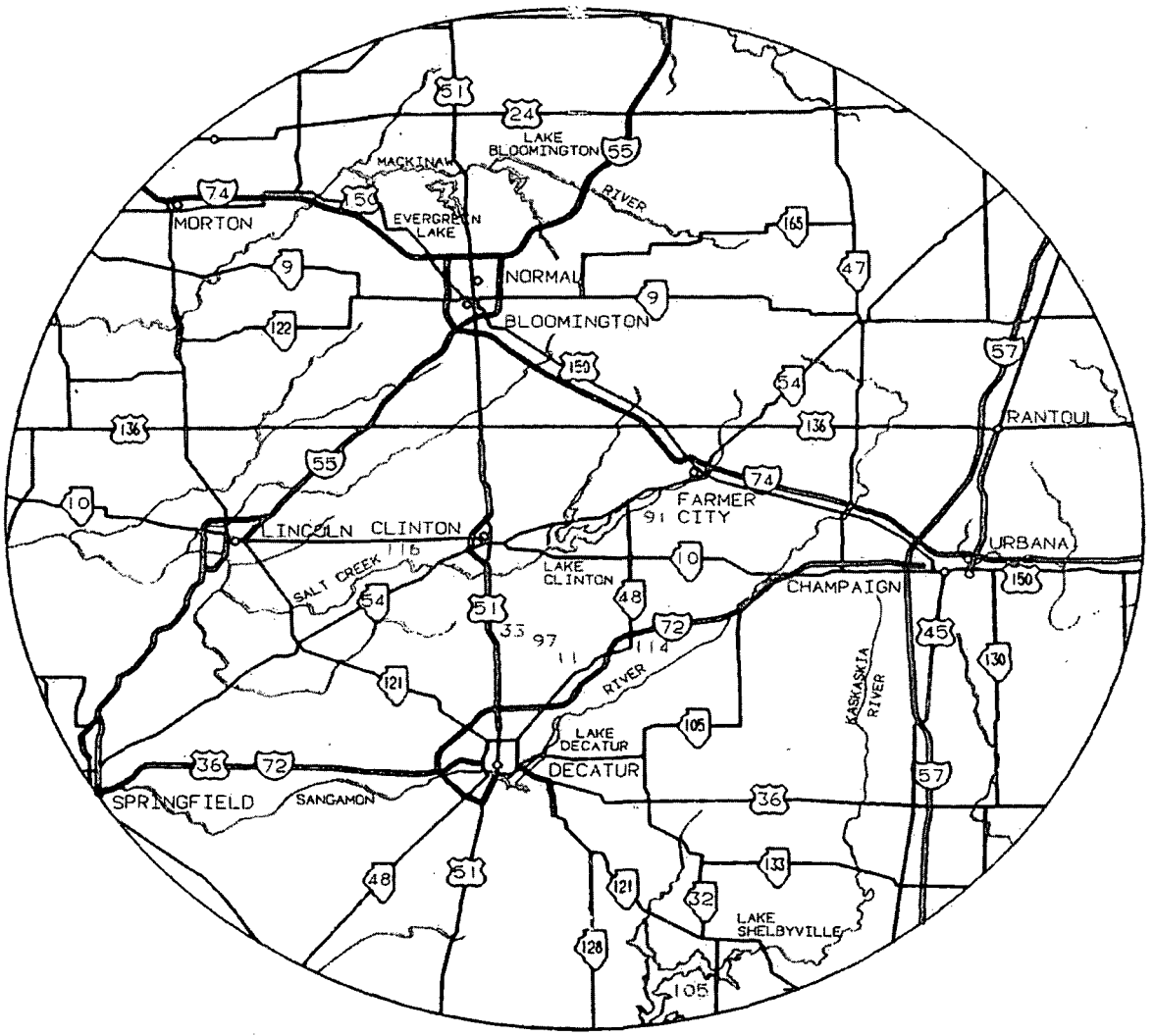

Figure B-4
Environmental Sampling Locations Greater Than Five Miles of the Clinton Power Station, 2008

APPENDIX F

ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

CLINTON POWER STATION

Annual Radiological Groundwater Protection Program Report

January 1 Through December 31, 2009

Prepared By

Teledyne Brown Engineering
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Docket No: 50-461

April 2010

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Security-Related Information: Maps of the Clinton Power Station have been withheld from public disclosure under 10CFR2.390 and N.J.S.A. 47:1A-1.1

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Table B-I.1 Concentrations of Tritium and Strontium in Groundwater Samples Collected in the Vicinity of Clinton Power Station, 2009.

Table B-I.2 Concentrations of Gamma Emitters in Groundwater Samples Collected in the Vicinity of Clinton Power Station, 2009.

Table B-II.1 Concentrations of Tritium and Strontium in Surface Water Samples Collected in the Vicinity of Clinton Power Station, 2009.

Table B-II.2 Concentrations of Gamma Emitters in Surface Water Samples Collected in the Vicinity of Clinton Power Station, 2009.

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 2009. During that time period, 73 analyses were performed on 40 samples from 23 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.

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 2009.

Tritium was not detected in any of the groundwater or surface water samples at concentrations greater than the United States Environmental Protection Agency (USEPA) drinking water standard (and the Nuclear Regulatory Commission Reporting Limit) of 20,000 pCi/L. Background levels of tritium were detected at concentrations greater than the self-imposed LLD of 200 pCi/L in two of 17 groundwater monitoring locations. The tritium concentrations ranged from 217 ± 95 pCi/L to 933 ± 170 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 AmerGen Energy Company and became operational in 1987. Unit No. 1 went critical on February 15, 1987. The site encloses approximately 13,730 acres. This includes the 4,895 acre, man-made cooling lake and about 452 acres of property not owned by 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 2009.

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 on an Exelon web site in station specific reports. http://www.exeloncorp.com/ourcompanies/powergen/nuclear/Tritium.htm

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 2009.

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. Analytical results and anomalies are discussed below.

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 933 pCi/l.

Strontium

Strontium-90 was not evaluated in 2009.

Gamma Emitters

Naturally occurring Beryllium-7 was not detected in 2009. Additionally, naturally occurring Potassium-40 was detected in one of 17 samples. The concentration was 66 pCi/liter. No other 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. Analytical results and anomalies are discussed below.

Tritium

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

Strontium

Strontium-90 was not evaluated in 2009.

Gamma Emitters

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

APPENDIX A

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

TABLE A-1: Radiological Groundwater Protection Program - Sampling Locations, Clinton Power Station, 2009

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
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

APPENDIX B

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

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM AND STRONTIUM IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE		COLLECTION DATE	H-3	SR-90
B-3		04/23/09	< 131	
B-3		10/21/09	< 165	
MW-CL-1		04/23/09	< 131	
MW-CL-1		10/21/09	< 167	
MW-CL-2		04/22/09	< 132	
MW-CL-2		10/21/09	< 168	
MW-CL-12I		04/23/09	< 131	
MW-CL-12I		10/22/09	< 172	
MW-CL-13I		04/29/09	< 160	
MW-CL-13I		10/22/09	< 172	
MW-CL-13S	ORIGINAL	04/22/09	230 ± 96	
MW-CL-13S	RERUN	04/22/09	< 157	
MW-CL-13S		10/22/09	< 174	
MW-CL-14S		04/23/09	< 131	
MW-CL-14S		10/21/09	< 186	
MW-CL-15I		04/22/09	< 131	
MW-CL-15I		10/21/09	< 166	
MW-CL-15S		04/22/09	< 131	
MW-CL-15S		10/21/09	< 175	
MW-CL-16S	ORIGINAL	04/22/09	217 ± 95	
MW-CL-16S	RECOUNT	04/22/09	380 ± 109	
MW-CL-16S	RERUN	04/22/09	309 ± 115	
MW-CL-16S		10/21/09	< 186	
MW-CL-17S		04/22/09	< 131	
MW-CL-17S		10/21/09	< 174	
MW-CL-18I		04/22/09	< 129	
MW-CL-18I		10/21/09	< 180	
MW-CL-18S		04/22/09	< 126	
MW-CL-18S		10/21/09	< 188	
MW-CL-19S		04/23/09	< 133	
MW-CL-19S		10/22/09	< 181	
MW-CL-20S		04/22/09	< 133	
MW-CL-20S		10/22/09	< 186	
MW-CL-21S		01/21/09	933 ± 170	
MW-CL-21S	ORIGINAL	04/23/09	592 ± 112	
MW-CL-21S	RERUN	04/23/09	715 ± 141	
MW-CL-21S		07/22/09	578 ± 110	
MW-CL-21S		10/22/09	670 ± 145	
MW-CL-22S		04/22/09	< 169	
MW-CL-22S		10/21/09	< 181	

TABLE B-I.2 **CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009**

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	10/21/09	< 37	< 28	< 4	< 4	< 8	< 4	< 6	< 4	< 7	< 3	< 4	< 25	< 8
MW-CL-1	10/21/09	< 37	< 91	< 5	< 4	< 11	< 5	< 7	< 5	< 9	< 4	< 4	< 26	< 10
MW-CL-2	10/21/09	< 33	< 64	< 3	< 3	< 8	< 4	< 6	< 3	< 6	< 3	< 3	< 24	< 7
MW-CL-12I	10/22/09	< 37	< 85	< 4	< 5	< 9	< 5	< 9	< 4	< 7	< 4	< 5	< 30	< 9
MW-CL-13I	10/22/09	< 32	66 ± 34	< 3	< 3	< 8	< 3	< 7	< 4	< 6	< 3	< 3	< 21	< 7
MW-CL-13S	10/22/09	< 40	< 87	< 5	< 5	< 11	< 4	< 9	< 5	< 9	< 4	< 5	< 32	< 10
MW-CL-14S	10/21/09	< 32	< 32	< 3	< 3	< 6	< 3	< 7	< 3	< 5	< 3	< 3	< 22	< 8
MW-CL-15I	10/21/09	< 34	< 31	< 3	< 3	< 7	< 3	< 6	< 4	< 7	< 3	< 3	< 23	< 6
MW-CL-15S	10/21/09	< 37	< 35	< 4	< 4	< 9	< 4	< 8	< 5	< 8	< 4	< 4	< 28	< 8
MW-CL-16S	10/21/09	< 39	< 32	< 4	< 4	< 10	< 4	< 8	< 5	< 8	< 4	< 5	< 29	< 8
MW-CL-17S	10/21/09	< 31	< 30	< 3	< 4	< 8	< 4	< 7	< 4	< 7	< 3	< 3	< 26	< 9
MW-CL-18I	10/21/09	< 46	< 81	< 4	< 5	< 10	< 4	< 8	< 6	< 9	< 4	< 4	< 32	< 10
MW-CL-18S	10/21/09	< 38	< 39	< 4	< 4	< 8	< 4	< 9	< 5	< 9	< 3	< 4	< 30	< 8
MW-CL-19S	10/22/09	< 35	< 69	< 3	< 4	< 10	< 4	< 8	< 4	< 8	< 4	< 4	< 27	< 7
MW-CL-20S	10/22/09	< 44	< 36	< 5	< 4	< 9	< 4	< 10	< 6	< 9	< 4	< 4	< 34	< 7
MW-CL-21S	10/22/09	< 41	< 51	< 3	< 4	< 10	< 2	< 6	< 4	< 7	< 2	< 3	< 24	< 6
MW-CL-22S	10/21/09	< 42	< 83	< 5	< 5	< 11	< 5	< 10	< 6	< 9	< 4	< 5	< 33	< 11

TABLE B-II.1 **CONCENTRATIONS OF TRITIUM AND STRONTIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	SR-90
SW-CL-1	04/23/09	< 152	
SW-CL-1	10/22/09	< 177	
SW-CL-2	04/23/09	< 154	
SW-CL-2	10/21/09	< 179	
SW-CL-4	04/23/09	< 154	
SW-CL-4	10/21/09	< 179	
SW-CL-5	04/23/09	< 155	
SW-CL-5	10/22/09	< 184	
SW-CL-6	10/22/09	< 179	
SW-CL-7	10/22/09	< 179	

TABLE B-II.2 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF CLINTON POWER STATION, 2009**

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	10/22/09	< 37	< 37	< 4	< 5	< 9	< 3	< 9	< 5	< 8	< 4	< 4	< 29	< 9
SW-CL-2	10/21/09	< 38	< 28	< 4	< 4	< 9	< 4	< 7	< 5	< 7	< 4	< 4	< 30	< 7
SW-CL-4	10/21/09	< 42	< 42	< 4	< 5	< 8	< 5	< 8	< 5	< 10	< 4	< 4	< 34	< 11
SW-CL-5	10/22/09	< 18	< 18	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 16	< 6
SW-CL-6	10/22/09	< 18	< 32	< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 2	< 2	< 17	< 5
SW-CL-7	10/22/09	< 19	< 15	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 16	< 5

End of Report