Exelon Nuclear

Clinton Power Station
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Clinton Power Station
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Clinton Power Station 2011 Annual Radioactive Effluent Release Report

Exelon Generating Company, LLC (Exelon), Clinton Power Station, is submitting the 2011 Annual Radioactive Effluent Release Report. This report is submitted in accordance with Technical Specification requirement 5.6.3, "Radioactive Effluent Release Report," and covers the period from January 1, 2011 through December 31, 2011.

Questions on this letter may be directed to Mr. Tom Veitch, Chemistry Manager, at 217-937-3200.

There are no commitments contained in this letter.

Respectfully,

William G. Noll
Site Vice President
Clinton Power Station

EET/blf

Attachment

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

IE48
NRR

Exelon Nuclear

01 January 2011 – 31 December 2011

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

CLINTON POWER STATION – DOCKET NUMBER 50-461

Prepared by:

Clinton Power Station

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SECTION 1

EXECUTIVE SUMMARY

The Annual Radioactive Effluent Release Report is a detailed description of gaseous and liquid radioactive effluents released from Clinton Power Station [CPS] and the resulting radiation doses for the period of 01 January 2011 through 31 December 2011. This report also includes a detailed meteorological section providing weather history of the surrounding area during this period. This information is used to calculate the offsite dose to our public.

The report also includes a summary of the amounts of radioactive material contained in solid waste that is packaged and shipped to a federally approved disposal / burial facility offsite. Additionally, this report notifies the U.S. Nuclear Regulatory Commission [NRC] staff of changes to CPS's Offsite Dose Calculation Manual [ODCM] and exceptions to the CPS effluent monitoring program that must be reported in accordance with ODCM Remedial Requirements 2.7.1.b and 3.9.2.b.

The Report also includes a summary of events that are to be included per ODCM Remedial Requirements.

The NRC requires that nuclear power facilities be designed, constructed, and operated in such a manner as to maintain radioactive effluent releases to unrestricted areas As Low As Reasonably Achievable [ALARA]. To ensure compliance with this criterion, the NRC has established limitations governing the release of radioactivity in effluents.

During 2011, CPS operations were well within these federally required limits. The maximum annual radiation dose delivered to the inhabitants of the area surrounding CPS - due to radioactivity released from the station – was 2.92E-02 [or 0.0292] mrem. The radiation dose to the public in the vicinity of CPS was calculated by using the concentration of radioactive nuclides from each gaseous effluent release coupled with historical weather conditions. The dose from CPS gaseous radioactive effluents was only a small fraction of the limit for the maximum exposed member of the public. There were no liquid effluent releases in 2011. As such, there was no dose received by the public from the liquid radioactive effluent pathway.

SECTION 2

INTRODUCTION

CPS is located in Harp Township, DeWitt County approximately six (6) miles east of the city of Clinton in east-central Illinois. CPS is a ~1,140 megawatt gross electrical power output boiling water reactor. Initial fuel load commenced in September of 1986 with initial criticality of the reactor occurring on 27 February 1987. Commercial operation commenced in April 1987 and the reactor reached 100% power for the first time on 15 September 1987.

CPS releases airborne effluents via two (2) gaseous effluent release points to the environment. They are the Common Station Heating, Ventilating, and Air Conditioning [HVAC] Vent and the Standby Gas Treatment System [SGTS] Vent [see Figure 1]. Each gaseous effluent release point is continuously monitored consisting of a surveillance program of periodic sampling and analysis as specified in the ODCM.

CPS is licensed to release radioactive liquid effluents in a batch mode, however there were no radioactive liquid releases in 2011 at CPS. Each release would have been sampled and analyzed prior to release. Depending upon the amount of activity in a release, liquid effluents would vary from 10 to 300 gallons per minute [GPM]. This volume is then further combined with both Plant Service Water flow [a minimum of approximately 5,000 GPM] along with Plant Circulating Water flow [0 to 567,000 GPM] in the seal well, just prior to entering the 3.4 mile discharge flume into Lake Clinton [see Figure 2].

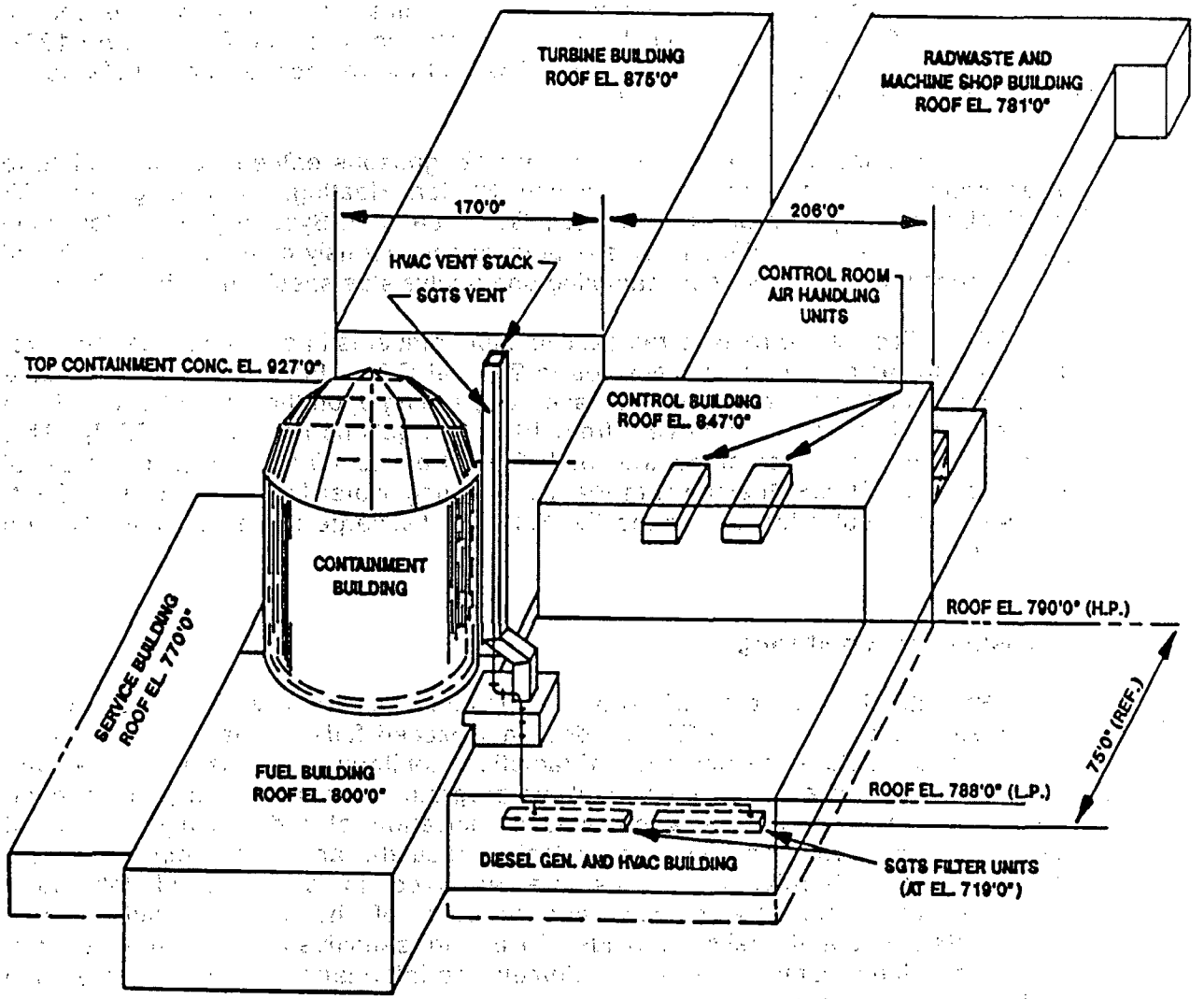
Processing and Monitoring

CPS strictly controls effluents to ensure radioactivity released to the environment is maintained ALARA and does not exceed federal release limit criteria. Effluent controls include the operation of radiation monitoring systems within the plant as well as an offsite environmental analysis program. In-plant radiation monitoring systems are used to provide a continuous indication of radioactivity in effluent streams. Some are also used to collect particulate and radioiodine samples. Radioactive effluent related samples are analyzed in a controlled laboratory environment to identify the specific concentration of those radionuclides being released. Sampling and analysis provides for a more sensitive and precise method of determining effluent composition to complement the information provided by real-time radiation monitoring instruments.

Beyond the plant itself, a Radiological Environmental Monitoring Program [REMP] is maintained in accordance with Federal Regulations. The purpose of the REMP program is to assess the radiological impact on the environment due to the operation of CPS. Implicit in this charter is the license requirement to trend and assess radiation exposure rates and radioactivity concentrations that may contribute to dose to the public. The program consists of two phases; pre-operational and operational. During the pre-operational phase of the program, the baseline for the local radiation environment was established. The operational phase of the program includes the objective of making confirmatory measurements to verify that the in-plant controls for the release of radioactive material are functioning as designed. Assessment of the operational impact of CPS on the environment is based on data collected since initial criticality of the reactor.

Figure 1

CPS AIRBORNE EFFLUENT RELEASE POINTS

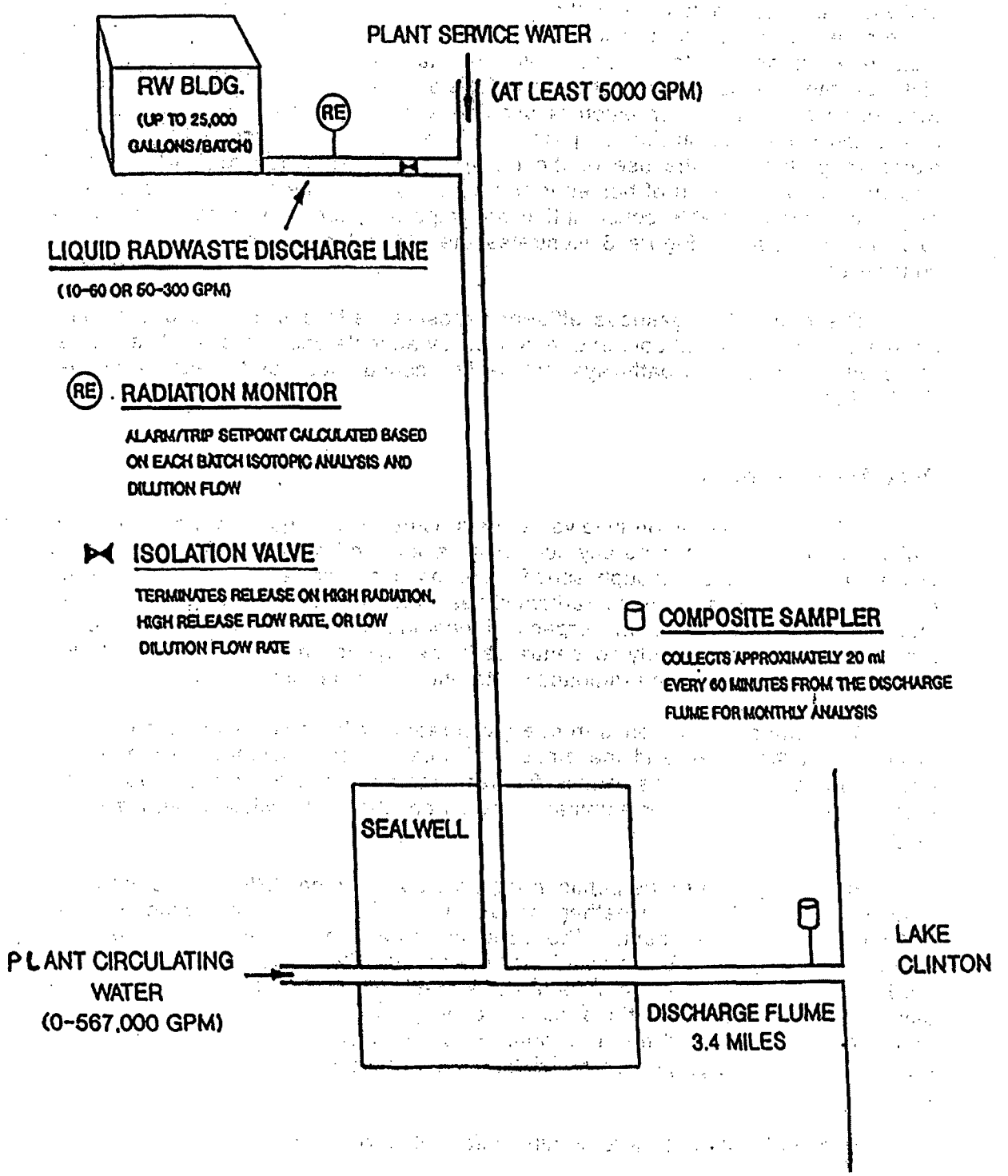


	HVAC Exhaust Vent	SGTS Exhaust Vent
Release Point Height (feet)	200	200
Building Height (feet)	190	190
Release Point Geometry	Duct	Pipe
Release Point Area (ft^2)	120	2
Release Point Diameter (feet)	12*	1
Annual Average Flow Rate (ft^3/sec)	2,738	73
Vertical Exit Velocity (feet/sec)	33	41

* Effective $2(A/\pi)^2$ diameter

Figure 2

CPS WATERBORNE EFFLUENTS RELEASE PATHWAY



Exposure Pathways

A radiological exposure pathway is the vehicle by which the public may become exposed to radioactivity released from nuclear facilities. The major pathways of concern are those that could cause the highest calculated radiation dose. These pathways are determined from the type and amount of radioactivity released, the environmental transport mechanism, and how the plant environs are used (i.e., residence, gardens, etc.). The environmental transport mechanism includes the historical meteorological characteristics of the area that are defined by wind speed and wind direction. This information is used to evaluate how the radionuclides will be distributed within the surrounding area. The most important factor in evaluating the exposure pathway is the use of the environment by the public living around CPS. Factors such as location of homes in the area, use of cattle for milk, and the growing of gardens for vegetable consumption are important considerations when evaluating exposure pathways. Figure 3 illustrates the effluent exposure pathways that were considered.

The radioactive gaseous effluent exposure pathways include direct radiation, deposition on plants and soil, and inhalation by animals and humans. The radioactive liquid effluent exposure pathways include fish consumption and direct exposure from Clinton Lake.

Dose Assessment

Whole body radiation involves the exposure of all organs in the human body to ionizing radiation. Most naturally occurring background radiation exposures consist of whole body exposure although specific organs can receive radiation exposure from distinct radionuclides. These radionuclides enter the body through inhalation and ingestion and seek different organs depending on the nuclide. For example, radioactive iodine selectively concentrates in the thyroid, radioactive cesium collects in muscle and liver tissue, and radioactive strontium in mineralized bone.

The total dose to organs from a given radionuclide also depends on the amount of activity in the organ and the amount of time that the radionuclide remains in the body. Some radionuclides remain for very short periods of time due to their rapid radioactive decay and / or elimination rate from the body, while others may remain longer.

Radiation dose to the public in the area surrounding CPS is calculated for each release using historical weather conditions coupled with the concentrations of radioactive material present. The dose is calculated for all sixteen geographical sectors surrounding CPS and includes the location of the nearest residents, vegetable gardens producing broad leaf vegetables and dairy animals in all sectors. The calculated dose also uses the scientific concept of a "maximum exposed individual" and "standard man"; and the maximum use factors for the environment, such as how much milk an average person consumes and how much air a person breathes in a year.

Section 6 contains more detailed information on dose to the public.

Gaseous Effluents

Gaseous effluent radioactivity released from CPS is classified into two (2) categories. The first category is noble gases. The second category consists of I-131, I-133, H-3, C-14 and all radionuclides in particulate form with radioactive half-lives greater than eight (8) days. Noble gases - such as xenon and krypton - are biologically and chemically non-reactive. As such, these radionuclides – specifically Kr-85m , Xe-133 and Xe-135 – are the major contributors to external doses. Halogens I-131 and I-133, H-3, C-14 and radionuclides in particulate form with radioactive half-lives greater than eight (8) days are the major contributors to internal doses.

Liquid Effluents

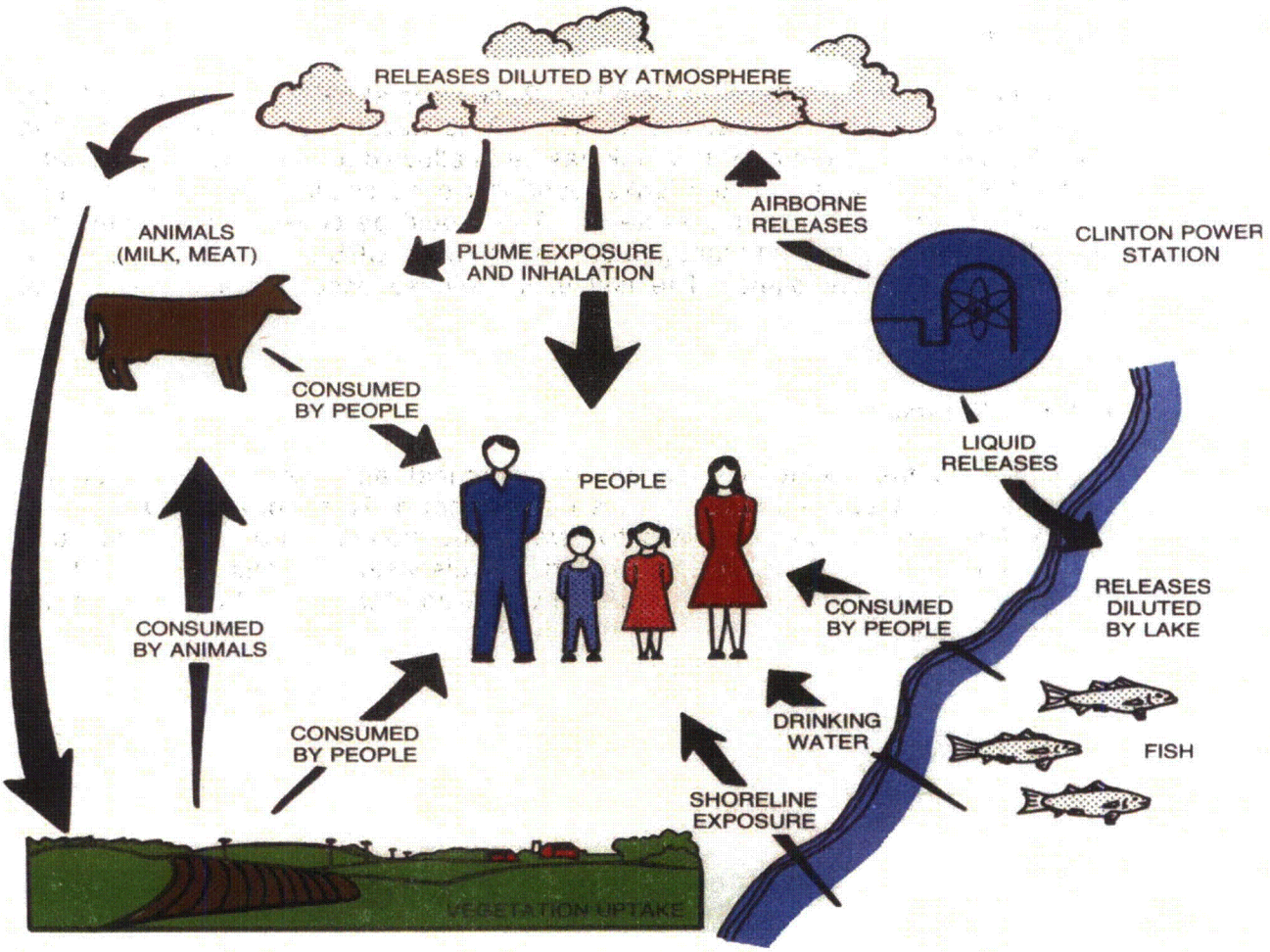
Liquid effluents may originate from two (2) sources at CPS. The first is effluent from the Radioactive Waste Treatment System. This water is demineralized prior to release. Samples are taken after the tank has been allowed to adequately recirculate. The second is from heat exchanger leaks found in closed cooling water systems that service radioactively contaminated systems. This would be considered an abnormal release. As a matter of station management commitment, CPS strives to be a zero (0) radioactive liquid release plant. The last liquid release occurred in September of 1992.

Solid Waste Shipments

To reduce the radiation exposure to personnel and maintain the federally required ALARA concept, the NRC and the Department of Transportation [DOT] have established limits on the types of radioactive waste and the amount of radioactivity that may be packaged and shipped offsite for burial or disposal. To ensure that CPS is complying with these regulations, the types of waste and the radioactivity present are reported to the NRC.

FIGURE 3

EFFLUENT EXPOSURE PATHWAYS



SECTION 3

SUPPLEMENTAL INFORMATION

I. REGULATORY LIMITS

The NRC requires nuclear power facilities to be designed, constructed and operated in such a way that the radioactivity in effluent releases to unrestricted areas are kept ALARA. To ensure these criteria are met, each license authorizing nuclear reactor operation includes the Offsite Dose Calculation Manual [ODCM] governing the release of radioactive effluents. The ODCM designates the limits for release of effluents, as well as the limits for doses to the general public from the release of radioactive liquids and gases. These limits are taken from Title 10 of the Code of Federal Regulations, Part 50, Appendix I (10CFR50 Appendix I), Title 10 of the Code of Federal Regulations, Part 20.1301 (10CFR20.1301) and Section 5.5.1 of our Station's Technical Specifications. Maintaining effluent releases within these operating limitations demonstrates compliance with ALARA principles. These limits are just a fraction of the dose limits established by the Environmental Protection Agency [EPA] found within Environmental Dose Standard Title 40, Code of Federal Regulations, Part 190 [40CFR190]. The EPA has established dose limits for members of the public in the vicinity of a nuclear power plant. These dose limits are:

- Less than or equal to 25 mrem per year to the total body.
- Less than or equal to 75 mrem per year to the thyroid.
- Less than or equal to 25 mrem per year to any other organ.

Specific limit information is given below.

A. Gaseous Effluents

1. The maximum permissible concentrations for gaseous effluents shall not exceed the values provided within Section 5.5.4.g of Station Technical Specifications. To ensure these concentrations are not exceeded, dose rates due to radioactive materials released in gaseous effluents from the site to areas at and beyond the site area boundary shall be limited to the following:

   a. Noble gases

      - Less than or equal to 500 mrem/year to the total body.
      - Less than or equal to 3,000 mrem/year to the skin.

   b. I-131, I-133, H-3, C-14, and all radionuclides in particulate form with radioactive half-lives greater than eight (8) days:

      - Less than or equal to 1,500 mrem/year to any organ.

2. In accordance with Title 10 of the Code of Federal Regulations, Part 50, Appendix I, (10CFR50 Appendix I) air dose due to noble gases released in gaseous effluents to areas at and beyond the site boundary shall be limited to the following:

   a. Less than or equal to 5 mrad for gamma radiation and less than or equal to 10 mrad for beta radiation during any calendar quarter.

   b. Less than or equal to 10 mrad for gamma radiation and less than or equal to 20 mrad for beta radiation during any calendar year.

3. In accordance with Title 10 of the Code of Federal Regulations, Part 50, Appendix I, (10CFR50 Appendix I), dose to a member of the public (from I-131, I-133, H-3, C-14, and all radionuclides in particulate form with radioactive half-lives greater than eight (8) days) in gaseous effluents released to areas at and beyond the site boundary shall be limited to the following values:

   a. Less than or equal to 7.5 mrem to any organ, during any calendar quarter.

   b. Less than or equal to 15 mrem to any organ, during any calendar year.

B. Liquid Effluents

1. The concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to the values provided within Section 5.5.4.b of Station Technical Specifications for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2.0E-04 µCi/ml total activity.

2. The dose or dose commitment to a member of the public from radioactive materials in liquid effluents released to unrestricted areas shall be limited to:

   a. Less than or equal to 1.5 mrem to the total body and less than or equal to 5 mrem to any organ during any calendar quarter.

   b. Less than or equal to 3 mrem to the total body and less than or equal to 10 mrem to any organ during any calendar year.

II. AVERAGE ENERGY

The CPS ODCM limits the dose equivalent rates due to the release of fission and activation gases to less than or equal to 500 mrem per year to the total body and less than or equal to 3,000 mrem per year to the skin. These limits are based on dose calculations using actual isotopic concentrations from our effluent release streams and not based upon the gross count rate from our monitoring systems. Therefore, the average beta and gamma energies [E] for gaseous effluents as described in

Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants", are not applicable.

III. MEASUREMENT AND APPROXIMATIONS OF TOTAL RADIOACTIVITY

A. Fission and Activation Gases

1. Gas samples are collected weekly and are counted on a high purity germanium detector (HPGe) for principal gamma emitters. The HVAC and SGTS release points are continuously monitored and the average release flow rates for each release point are used to calculate the total activity released during a given time period.

2. Tritium is also collected by passing a known volume of the sample stream through a gas washer containing a known quantity of demineralized water. The collected samples are distilled and analyzed by liquid scintillation. The tritium released was calculated for each release point from the measured tritium concentration, the volume of the sample, the tritium collection efficiency, and the respective stack exhaust flow rates.

3. Carbon-14 release values were estimated using the methodology included in the Electric Power Research Institute (EPRI) Technical Report 1021106, using the 2011 Clinton Power Station specific parameters of normalized Carbon-14 production rate of 5.049 Ci/GWt-yr, a gaseous release fraction of 0.99, a Carbon-14 carbon dioxide fraction of 0.95, a reactor power rating of 3473 MWt, and equivalent full power operation of 328.1 days.

B. Iodines

Iodine is continuously collected on a silver zeolite cartridge filter via an isokinetic sampling assembly from each release point. Filters are normally exchanged once per week and then analyzed on an HPGe system. The average flow rates for each release point are averaged over the duration of the sampling period and these results - along with specific isotopic concentrations - are then used to determine the total activity released during the time period in question.

C. Particulates

Particulates are continuously collected on a filter paper via an isokinetic sampling assembly on each release point. Filters are normally exchanged once per week and then analyzed on an HPGe system. The average flow rates for each release point are averaged over the duration of the sampling period and these results - along with specific isotopic concentrations - are then used to determine the total activity released during the time period in question.

D. Liquid Effluents

Each tank of liquid radwaste is recirculated for at least two (2) tank volumes, sampled, and analyzed for principal gamma emitters prior to release. Each sample tank is recirculated for a sufficient amount of time prior to sampling ensuring that a representative sample is obtained. Samples are then analyzed on an HPGe system and liquid release permits are generated based upon the values obtained from the isotopic analysis and the most recent values for H-3, gross alpha, Fe-55, Sr-89 and Sr-90. An aliquot based on release volume is saved and added to composite containers.

The concentrations of composited isotopes and the volumes of the releases associated with these composites establish the proportional relationships that are then utilized for calculating the total activity released for these isotopes.

IV. DESCRIPTION OF ERROR ESTIMATES

Estimates of measurement and analytical error for gaseous and liquid effluents are calculated as follows:

$$E_T = \sqrt{[(E_1)^2 + (E_2)^2 + ...(E_n)^2]}$$

where: E_T = total percent error, and
$E_1 ... E_N$ = percent error due to calibration standards, laboratory analysis, instruments, sample flow, etc.

SECTION 4

RADIOACTIVE EFFLUENT DATA

TABLE 1
GASEOUS EFFLUENTS - Summation Of All Releases
Data Period: 01 January 2011 – 31 December 2011
Continuous Mixed Mode

	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Est. Total Error, %
A. Fission & Activation Gases						
1. Total Release	Ci	**1.62E+00**	**0.00E+01**	**0.00E+01**	**5.18E+00**	30
2. Average release rate for period	µCi/sec	**2.08E-01**	**0.00E+01**	**0.00E+01**	**6.51E-01**	
3. Percent of ODCM Limit	%	*	*	*	*	
B. Iodines						
1. Total Iodine-131	Ci	**9.84E-06**	**7.53E-06**	**2.46E-06**	**4.80E-06**	31
2. Average release rate for period	µCi/sec	**1.27E-06**	**9.58E-07**	**3.10E-07**	**6.04E-07**	
3. Percent of ODCM Limit	%	*	*	*	*	
C. Particulates						
1. Particulates with half-lives >8 days	Ci	**0.00E+01**	**7.51E-06**	**1.02E-05**	**1.99E-04**	24
2. Average release rate for period	µCi/sec	**0.00E+01**	**9.55E-07**	**1.28E-06**	**2.51E-05**	
3. Percent of ODCM Limit	%	*	*	*	*	
4. Gross alpha radioactivity	Ci	**3.37E-07**	**1.19E-07**	**0.00E+00**	**0.00E+00**	
D. Tritium						
1. Total Release	Ci	**5.05E+00**	**4.79E+00**	**4.32E+00**	**2.26E+00**	21
2. Average release rate for period	µCi/sec	**6.50E-01**	**6.09E-01**	**5.44E-01**	**2.84E-01**	
3. Percent of ODCM Limit	%	*	*	*	*	
E. Carbon-14						
1. Total Release	Ci	**3.98E+00**	**4.00E+00**	**4.04E+00**	**2.96E+00**	
2. Average release Rate for period	µCi/sec	**5.12E-01**	**5.09E-01**	**5.08E-01**	**3.72E-01**	

* Applicable limits are expressed in terms of dose. See Tables 1A and 1B of this report.

TABLE 1A

Air Doses Due to Gaseous Releases

Doses per Quarter

Type of Radiation	ODCM Limit	1st Quarter	% of Limit	2nd Quarter	% of Limit	3rd Quarter	% of Limit	4th Quarter	% of Limit
Gamma	5 mrad	7.53E-05	1.51E-03	0.00E+01	0.00E+01	0.00E+01	0.00E+01	2.41E-04	4.82E-03
Beta	10 mrad	2.66E-05	2.66E-04	0.00E+01	0.00E+01	0.00E+01	0.00E+01	8.50E-05	8.50E-04

Doses per Year

Type of Radiation	ODCM Limit	Year	% of Limit
Gamma	10 mrad	3.16E-04	3.16E-03
Beta	20 mrad	1.12E-04	5.58E-04

TABLE 1B

Doses to a Member of the Public Due to Radioiodines, Tritium, Carbon-14, and Particulates in Gaseous Releases

Doses per Quarter

Type of Organ	ODCM Limit	Quarter 1	% of Limit	Quarter 2	% of Limit	Quarter 3	% of Limit	Quarter 4	% of Limit
Bone	7.5 mrem	7.76E-03	1.04E-01	7.80E-03	1.04E-01	7.88E-03	1.05E-01	5.77E-03	7.70E-02
Liver	7.5 mrem	8.45E-05	1.13E-03	8.00E-05	1.07E-03	7.22E-05	9.62E-04	4.23E-05	5.64E-04
TBody	7.5 mrem	1.62E-03	2.17E-02	1.63E-03	2.18E-02	1.65E-03	2.20E-02	1.21E-03	1.61E-02
Thyroid	7.5 mrem	1.16E-04	1.55E-03	1.04E-04	1.39E-03	8.02E-05	1.07E-03	5.33E-05	7.11E-04
Kidney	7.5 mrem	8.46E-05	1.13E-03	8.01E-05	1.07E-03	7.23E-05	9.64E-04	3.81E-05	5.08E-04
Lung	7.5 mrem	8.45E-05	1.13E-03	8.00E-05	1.07E-03	7.23E-05	9.64E-04	3.96E-05	5.28E-04
GI LLI	7.5 mrem	8.45E-05	1.13E-03	8.00E-05	1.07E-03	7.35E-05	9.80E-04	5.82E-05	7.76E-04

Doses per Year

Type of Organ	ODCM Limit	Year	% of Limit
Bone	15 mrem	2.92E-02	1.95E-01
Liver	15 mrem	2.79E-04	1.86E-03
TBody	15 mrem	6.11E-03	4.07E-02
Thyroid	15 mrem	3.54E-04	2.36E-03
Kidney	15 mrem	2.75E-04	1.83E-03
Lung	15 mrem	2.76E-04	1.84E-03
GI LLI	15 mrem	2.96E-04	1.97E-03

All dose calculations were performed using the methodology contained in the CPS ODCM, with the exception of dose due to C-14, which was calculated using methodology included in the EPRI Technical Report 1021106.

TABLE 2

CLINTON POWER STATION
GASEOUS EFFLUENTS - Nuclides Released
YEAR: 2011

Mixed Mode Release	**X**
Elevated Release	
Ground-Level Release	

Continuous Mode	**X**
Batch Mode	

	Units	Quarter 1[2]	Quarter 2[2]	Quarter 3[2]	Quarter 4[2]
A. Fission Gases [1]					
Ar-41	Ci	1.62E+00	<LLD	<LLD	5.18E+00
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	1.62E+00	<LLD	<LLD	5.18E+00
B. Iodines [1]					
I-131	Ci	9.84E-06	7.53E-06	2.46E-06	4.80E-06
I-133	Ci	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	9.84E-06	7.53E-06	2.46E-06	4.80E-06
C. Particulates [1]					
Cr-51	Ci	<LLD	7.31E-06	<LLD	8.63E-05
Mn-54	Ci	<LLD	<LLD	<LLD	3.80E-05
Co-58	Ci	<LLD	<LLD	<LLD	1.46E-06
Fe-59	Ci	<LLD	<LLD	<LLD	4.94E-05
Co-60	Ci	<LLD	<LLD	<LLD	1.43E-05
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	1.96E-07	1.02E-05	9.69E-06
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD
Gross Alpha	Ci	3.37E-07	1.19E-07	<LLD	<LLD
Total for Period	Ci	3.37E-07	7.63E-06	1.02E-05	1.99E-04
D. Tritium [1]					
Total for Period	Ci	5.05E+00	4.79E+00	4.32E+00	2.26E+00
E. Carbon-14 [1]					
Total for Period	Ci	3.98E+00	4.00E+00	4.04E+00	2.96E+00

[1] Ten (10) times the values found in 10CFR20 Appendix B, Table 2, Column 1 are used for all Effluent Concentration Limit [ECL] calculations. For dissolved and entrained noble gases, the concentration is limited to 2.00E-04 µCi/cc total activity.

[2] The lower the value of the actual sample activity - with respect to background activity – the greater the counting error. Proportionally, large errors are reported for the various components of CPS gaseous effluents because of their consistent low sample activity.

ODCM required LLD values are listed in Table 6. All analyses met the required LLD's.

TABLE 3

RADIOACTIVE GASEOUS WASTE LLD VALUES

TYPE OF ACTIVITY ANALYSIS	ODCM Required Lower Limit of Detection (LLD) [a] (μCi/cc)
Principal Gamma Emitters, [Noble Gases] [b,c]	≤1.00E-04
H-3 [c]	≤1.00E-06
I-131 [d]	≤1.00E-12
I-133 [d]	≤1.00E-10
Principal Gamma Emitters, [Particulates] [b,e]	≤1.00E-11
Sr-89, Sr-90 [f]	≤1.00E-11
Gross Alpha [f]	≤1.00E-11

Table 3 Notations

[a]The Lower Limit of Detection (LLD) as defined for purposes of these specifications, as an "a priori" determination of the smallest concentration of radioactive material in a sample that will yield a net count - above system background - that will be detected with a 95% probability and with a low (5%) probability of incorrectly concluding that a blank observation represents a "real" signal.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66 \cdot s_b}{E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot e^{-\lambda \Delta t}}$$

Table 3 Notations (continued)

Where:

LLD is the "a priori" lower limit of detection as defined above, as µCi per unit mass or volume,

s_b is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate, in counts per minute (cpm),

E is the counting efficiency, in counts per disintegration,

V is the sample size in units of mass or volume,

2.22E+06 is the number of disintegrations per minute (dpm) per microcurie,

Y is the fractional radiochemical yield, when applicable,

λ is the radioactive decay constant for the particular radionuclide (sec^{-1}) and

Δt for plant effluents is the elapsed time between the midpoint of sample collection and the time of counting (sec).

Typical values of E, V, Y, and Δt should be used in the calculation.

The LLD is defined as an ***a priori*** (before the fact) limit representing the capability of a measurement system and not as an ***a posteriori*** (after the fact) limit for a particular measurement.

[b]The principal gamma emitters for which the LLD specification applies include the following radionuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, and Xe-138 in noble gas releases and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, I-131, Cs-134, Cs-137, Ce-141, and Ce-144 in iodine and particulate releases. This list does not mean that only these nuclides are to be considered. Other gamma peaks that are identifiable - together with those of the above nuclides - shall also be analyzed and reported in the Radioactive Effluent Release Report.

[c]Weekly grab sample and analysis

[d]Continuous charcoal sample analyzed weekly

[e]Continuous particulate sample analyzed weekly

[f]Composite particulate sample analyzed monthly

TABLE 4

WATERBORNE EFFLUENTS - Summation Of All Releases
Data Period: 01 January 2011 through 31 December 2011

There were zero (0) liquid radwaste releases from CPS in 2011.

	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Est. Total Error, %
A. Fission & Activation Products						
1. Total Release	Ci	**0.00E+01**	**0.00E+01**	**0.00E+01**	**0.00E+01**	N/A
2. Average diluted concentration during period	µCi/ml	0.00E+01	0.00E+01	0.00E+01	0.00E+01	
3. Percent of ODCM Limit	%	N/A	N/A	N/A	N/A	
B. Tritium						
1. Total Release	Ci	**0.00E+01**	**0.00E+01**	**0.00E+01**	**0.00E+01**	N/A
2. Average diluted concentration during period	µCi/ml	0.00E+01	0.00E+01	0.00E+01	0.00E+01	
3. Percent of ODCM Limit	%	N/A	N/A	N/A	N/A	
C. Dissolved and Entrained Gases						
1. Total Release	Ci	**0.00E+01**	**0.00E+01**	**0.00E+01**	**0.00E+01**	N/A
2. Average diluted concentration during period	µCi/ml	0.00E+01	0.00E+01	0.00E+01	0.00E+01	
3. Percent of ODCM Limit	%	N/A	N/A	N/A	N/A	
D. Gross Alpha Radioactivity						
Gross alpha radioactivity	Ci	**0.00E+01**	**0.00E+01**	**0.00E+01**	**0.00E+01**	N/A
E. Volume of Waste Released (prior to Dilution)	Liters	0.00E+01	0.00E+01	0.00E+01	0.00E+01	N/A
F. Volume of dilution water used during period	Liters	0.00E+01	0.00E+01	0.00E+01	0.00E+01	N/A

TABLE 5

WATERBORNE EFFLUENTS - Nuclides Released [1]
Data Period: 01 January 2011 – 31 December 2011
All Modes

There were zero (0) liquid radwaste releases from CPS in 2011.

Continuous Mode		**Batch Mode**	**X**

Nuclide	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
A. Tritium					
H-3	Ci	**0.00E+01**	**0.00E+01**	**0.00E+01**	**0.00E+01**
B. Fission and Activation Products					
Sr-89	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Sr-90	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Cs-134	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Cs-137	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
I-131	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Co-58	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Co-60	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Fe-59	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Zn-65	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Mn-54	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Cr-51	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Zr/Nb-95	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Mo-99	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Tc-99m	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Ba/La-140	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Ce-141	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Ce-144	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Total	Ci	**0.00E+01**	**0.00E+01**	**0.00E+01**	**0.00E+01**
C. Dissolved and Entrained Noble Gases					
Xe-133	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Xe-135	Ci	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Total	Ci	**0.00E+01**	**0.00E+01**	**0.00E+01**	**0.00E+01**

[1] A value corresponding to ten times the values found in 10CFR20 Appendix B, Table 2, Column 2 are used for all Effluent Concentration Limit (ECL) calculations. For dissolved and entrained noble gases, the concentration is limited to 2.00E-04 µCi/ml total activity.

TABLE 6

RADIOACTIVE LIQUID WASTE LLD VALUES

TYPE OF ACTIVITY ANALYSIS	ODCM Required Lower Limit of Detection (LLD) [a] (µCi/ml)
Principal Gamma Emitters [b]	≤5.00E-07
I-131	≤1.00E-06
Dissolved and Entrained Gases (Gamma Emitters) [c]	≤1.00E-05
H-3	≤1.00E-05
Gross Alpha	≤1.00E-07
Sr-89, Sr-90	≤5.00E-08
Fe-55	≤1.00E-06

Table 6 Notations

[a] The Lower Limit of Detection (LLD) as defined for purposes of these specifications, as an "a priori" determination of the smallest concentration of radioactive material in a sample that will yield a net count - above system background - that will be detected with a 95% probability and with only a 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66 \cdot s_b}{E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot e^{-\lambda \Delta t}}$$

Where:

LLD is the "a priori" lower limit of detection as defined above, as µCi per unit mass or volume,

s_b is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate, in counts per minute (cpm),

Table 6 Notations (continued)

E is the counting efficiency, as counts per disintegration,

V is the sample size in units of mass or volume,

2.22E+06 is the number of disintegrations per minute (dpm) per microcurie,

Y is the fractional radiochemical yield, when applicable,

λ is the radioactive decay constant for the particular radionuclide (sec^{-1}) and

Δ_t for plant effluents is the elapsed time between the midpoint of sample collection and the time of counting (sec).

Typical values of E, V, Y, and λt should be used in the calculation.

The LLD is defined as an ***a priori*** (before the fact) limit representing the capability of a measurement system and not as an ***a posteriori*** (after the fact, MDA) limit for a particular measurement.

[b]The principal gamma emitters for which the LLD requirement applies include the following radionuclides: Mn^{54}, Fe^{59}, Co^{58}, Co^{60}, Zn^{65}, Mo^{99}, Cs^{134}, Cs^{137}, Ce^{141}, and Ce^{144} shall also be measured, but with an LLD of 5.0E-06. This list does not mean that only these nuclides are detected and reported. Other gamma peaks that are measurable - together with those of the above nuclides - shall also be analyzed and reported in the Radioactive Effluent Release Report.

[c]Dissolved and entrained gases are: Xe^{133}, Xe^{135}, Xe^{138}, Kr^{85m}, Kr^{87} and Kr^{88}.

BATCH RELEASES

There were zero (0.0) liquid radwaste releases from CPS in 2011.

A. Batch Liquid Releases: 2011

1.	Number of batch releases:	0
2.	Total time period for batch releases:	N/A
3.	Maximum time period for batch release:	N/A
4.	Average time period for batch release:	N/A
5.	Minimum time period for batch release:	N/A
6.	Average stream flow during periods of release:	N/A
7.	Total waste volume:	N/A
8.	Total dilution volume:	N/A

B. Batch Gaseous Releases: 2011

1.	Number of batch releases:	0
2.	Total time period for batch releases:	N/A
3.	Maximum time period for batch release:	N/A
4.	Average time period for batch release	N/A
5.	Minimum time period for batch release:	N/A

ABNORMAL RELEASES

Information concerning abnormal radioactive liquid and gaseous releases is presented below for the year 2011. There were no abnormal or unplanned liquid or gaseous releases from CPS in 2011.

Liquid Releases:

Number of Abnormal Liquid Releases: Zero (0)

Activity Released [Ci]

Nuclides	Activity [Ci]
N/A	0.0
N/A	0.0
N/A	0.0
N/A	0.0
N/A	0.0
N/A	0.0
Total	0.0

Gaseous Releases:

Number of Abnormal Gaseous Releases: Zero (0)

Activity Released [Ci]

Nuclides	Activity [Ci]
N/A	0.0
N/A	0.0
N/A	0.0
N/A	0.0
N/A	0.0
N/A	0.0
Total	0.0

SECTION 5

SOLID WASTE DISPOSAL INFORMATION

During this reporting period – 01 January 2011 through 31 December 2011 - there were Twenty Two (22) radioactive waste shipments and zero **(0)** irradiated fuel shipments from CPS. In addition, the CPS ODCM requires reporting of the following information for solid waste shipped offsite during the above reporting period:

1. Container volume: Class A Waste: **2.50E+04** ft^3 / Class B Waste: **0.0** ft^3 / Class C Waste: **0.0** ft^3

   This total includes Dry Active Waste (DAW), resins, filter sludges and evaporator bottoms.

2. Total curie quantity: Class A Waste was **358** curies and Class B Waste was **0.0** curies (determined by dose-to-curie and sample concentration methodology estimates) and Class C Waste was **0.0** curies in 2011.

3. Principal radionuclides: See A.2 for listing of measured radionuclides.

4. Source of waste and processing employed: Resins, filter sludges and evaporator bottoms dewatered, non-compacted dry active waste, and Sealand bags.

5. Type of container: Type A and Strong Tight Container.

6. Solidification agent or absorbent: None.

Table 7

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. Solid Waste Shipped Offsite for Burial or Disposal: [***NOT*** irradiated fuel]

A.1. Type of Waste		Units	January – June 2011	July – December 2011	Est. Total Error, %
a.	Spent resins, filter sludges, evaporator bottoms, etc.	ft^3	1.38E+03	1.02E+03	25
		Ci	2.60E+02	1.00E+02	
b.	Dry compactable waste, contaminated equipment, etc.	ft^3	9.20E+03	1.50E+04	25
		Ci	1.97E-01	2.90E-01	
c.	Irradiated components, control rods, etc.	ft^3	0	0	25
		Ci	0	0	
d.	Other Wastes	ft^3	0.0	1.00E+03	25
		Ci	0.0	2.04E-04	

* Total curie quantity and principal radionuclides were determined by measurements.

A.2. Estimate of major nuclide composition (by type of waste)

1. Spent resins, filters, evaporator bottoms, etc.

Waste Class	Nuclide Name	% Percent Abundance	Curies
A	Mn-54	2.67	9.55E+00
	Fe-55	82.89	2.96E+02
	Co-60	13.24	4.73E+01
	Zn-65	0.39	1.38E+00
	Ni-63	0.69	2.45E+00
	Other	0.13	4.58E-01

2. Dry compactable waste, contaminated equipment, etc.

Waste Class	Nuclide Name	% Percent Abundance	Curies
A	Mn-54	16.80	7.34E-02
	Fe-55	42.87	1.87E-01
	Co-60	38.57	1.69E-01
	Zn-65	0.74	3.21E-03
	Ni-63	0.78	3.43E-03
	Other	0.25	1.08E-03

3. Other Wastes

Waste Class	Nuclide Name	% Percent Abundance	Curies
A	Mn-54	10.84	2.21E-05
[redacted]	Fe-55	49.70	1.01E-04
[redacted]	Co-60	37.87	7.71E-05
[redacted]	Zn-65	0.60	1.22E-06
[redacted]	Ni-63	0.72	1.45E-06
[redacted]	Other	0.27	5.55E-07

Table 7

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS [continued]

A.3. Solid Waste Disposition

January - June 2011

Number of Shipments	Mode of Transportation	Destination
1	Hittman Transport	Barnwell Processing Facility
2	Hittman Transport	Clive Disposal Facility (Containerized)
9	Hittman Transport	Duratek/Bear Creek

July - December 2011

Number of Shipments	Mode of Transportation	Destination
6	Hittman Transport	Duratek/Bear Creek
2	Hittman Transport	Duratek/Gallaher Road Facility
1	Hittman Transport	Barnwell Processing Facility
1	Hittman Transport	Clive Disposal Facility (Containerized)

B. Irradiated Fuel Shipments (Disposition)

Number of Shipments	Mode of Transportation	Destination
N/A	N/A	N/A

SECTION 6

DOSE MEASUREMENTS AND ASSESSMENTS

This section of the Annual Effluent Release Report provides the dose received by receptors around CPS from gaseous and liquid effluents. The dose to the receptor that would have received the highest dose in each sector (defined as the Critical Receptor for that sector) is listed within this report. This section also provides the dose to individuals who were inside the Site Boundary. This section also summarizes CPS's compliance with the requirements found within 49CFR190.

The 2011 maximum expected annual dose from Carbon-14 released from CPS has been calculated using the methodology included in the EPRI Technical Report 1021106 using the maximum gross thermal capacity maintained for 328.1 days of equivalent full power operation.

The assumptions used in determining dose values are as follows:

- All receptors within a five (5) mile radius are included in the Annual Land Use Census. This Annual Census determines what dose pathways are present as well as the distance of each receptor from the site.
- The annual average meteorological data for 2011 was used in conjunction with the Annual Land Use Census to determine the dose to each receptor within five (5) miles.
- The doses for each receptor from each sector were determined using methodologies given in the ODCM, with the exception of dose due to C-14, which was calculated using methodology included in the EPRI Technical Report 1021106.
- The occupancy factor was taken into consideration by calculating the dose to individuals using areas inside the Site Boundary in non-residential areas. The occupancy factor is determined by dividing the number of hour[s] of occupancy per year (taken from the ODCM) and dividing that value by the total number of hour[s] per year.
- Dose to individuals using areas inside the Site Boundary (that are not residences) was calculated using the Ground Plane and Inhalation pathways.

TABLE 8

MAXIMUM OFFSITE DOSES AND DOSE COMMITMENTS
TO MEMBERS OF THE PUBLIC IN EACH SECTOR
Data Period: 01 January 2011 – 31 December 2011

This table illustrates the dose that a member from the public would most likely be exposed to from radioactive effluents in each sector from CPS. These values represent the maximum dose likely to expose a member of the public in each sector.

RECEPTOR INFORMATION					AIRBORNE EFFLUENT DOSE				WATERBORNE EFFLUENT DOSE (mrem) [1]	
					Iodine and Particulates (mrem)		Noble Gases 6 (mrad)			
Sector	Distance (miles)	Pathways	Organ	Age	Organ	Total Body	Gamma	Beta	Organ	Total Body
N	0.9	GP, I, M, V	B	A	2.92E-02	6.11E-03	2.59E-04	9.12E-05	0.00E+01	0.00E+01
NNE	2.3	GP, I, M	B	A	1.38E-02	2.82E-03	1.65E-04	5.82E-05		
NE	2.1	GP, I, V	B	A	4.11E-03	9.29E-04	1.20E-04	4.24E-05		
ENE	1.8	GP, I, V	B	C	5.90E-03	1.30E-03	9.78E-05	3.45E-05		
E	2.5	GP, I, V	B	A	2.90E-03	6.56E-04	8.48E-05	2.99E-05		
ESE	3.3	GP, I, V	B	A	3.07E-03	6.94E-04	8.98E-05	3.17E-05		
SE	4.4	GP, I, V	B	C	3.32E-03	7.33E-04	5.51E-05	1.94E-05		
SSE	2.8	GP, I, V	B	A	2.29E-03	5.18E-04	6.70E-05	2.36E-05		
S	4.1	GP, I, V	B	A	2.02E-03	4.56E-04	5.89E-05	2.08E-05		
SSW	2.9	GP, I	B	A	2.78E-04	7.47E-05	6.07E-05	2.14E-05		
SW	3.6	GP, I, V	B	C	4.42E-03	9.76E-04	7.34E-05	2.59E-05		
WSW	3.4	GP, I, M	B	A	4.81E-03	9.85E-04	5.77E-05	2.04E-05		
W	2.0	GP, I, V	B	C	3.30E-03	7.29E-04	5.47E-05	1.93E-05		
WNW	1.6	GP, I, V	B	A	2.84E-03	6.42E-04	8.30E-05	2.93E-05		
NW	1.6	GP, I	B	A	4.43E-04	1.19E-04	9.68E-05	3.41E-05		
NNW	1.3	GP, I, M, V	B	A	1.67E-02	3.50E-03	1.48E-04	5.23E-05		

Key for Table 8

GP = Ground Plane	V = Vegetables	A = Adult
I = Inhalation	B = Bone	T = Teen
M = Cows Meat		I = Infant
		C = Child

[1] There were zero (0) liquid radwaste releases from CPS in 2011.

All doses were within all regulatory limits, including limits from 40CFR190.

All dose calculations were performed using the methodology contained in the CPS ODCM, with the exception of dose due to C-14, which was calculated using methodology included in the EPRI Technical Report 1021106.

COMPLIANCE WITH 40CFR190 REQUIREMENTS

Thermoluminescent dosimeters [TLD] are stationed around CPS to measure the ambient gamma radiation field. Monitoring stations are placed near the site boundary and approximately five (5) miles from the reactor, in locations representing the sixteen (16) compass sectors. Other locations are chosen to measure the radiation field at places of special interest such as nearby residences, meeting places and population centers. Control sites are located further than ten (10) miles from the site, in areas that should not be affected by plant operations. The results from the TLDs are reported in the Annual Radiological Environmental Monitoring Report [REMP]. The results from this effort indicated no excess dose to offsite areas.

Additionally, NUREG-0543, METHODS FOR DEMONSTRATING LWR COMPLIANCE WITH THE EPA URANIUM FUEL CYCLE STANDARD (40 CFR PART 190) states in section IV, "As long as a nuclear plant site operates at a level below the Appendix I reporting requirements, no extra analysis is required to demonstrate compliance with 40 CFR Part 190." The organ and whole body doses reported in Table 8 are determined using 10 CFR 50 Appendix I methodology. The doses reported are well below the limits of Appendix I.

DOSE TO MEMBERS OF THE PUBLIC WITHIN THE SITE BOUNDARY

CPS ODCM section 7.2 requires that the Radioactive Effluent Release Report include an assessment of the radiation doses from radioactive liquids and gaseous effluents to MEMBERS OF THE PUBLIC due to their activities inside the SITE BOUNDARY. Within the CPS site boundary there are seven areas that are open to members of the public as identified by CPS ODCM Table 3.4-4 (see Figure 4):

- The Department of Natural Resources Recreation Area at 1.287 kilometers (0.8 miles) in the ESE sector
- A road at 0.495 kilometers (0.3 miles) in the SE sector
- A residence at 2.736 kilometers (1.7 miles) in the SSE sector
- A residence at 1.219 kilometers (0.8 miles) in the SW sector
- Agricultural acreage at 1.372 kilometers (0.9 miles) in the SSW sector
- A residence at 2.414 kilometers (1.5 miles) in the WSW sector
- A portion of Clinton Lake at 0.335 kilometers (0.2 miles) in the NW sector

At all of the above locations, the plume, inhalation and ground-plane exposure pathways are used for dose calculations. The 2011 Annual Land Use Census identified no other exposure pathways. All dose calculations were performed using the methodology contained in the CPS ODCM, with the exception of dose due to C-14, which was calculated using methodology included in the EPRI Technical Report 1021106.

FIGURE 4

AREAS WITHIN THE CPS SITE BOUNDARY OPEN TO MEMBERS OF THE PUBLIC

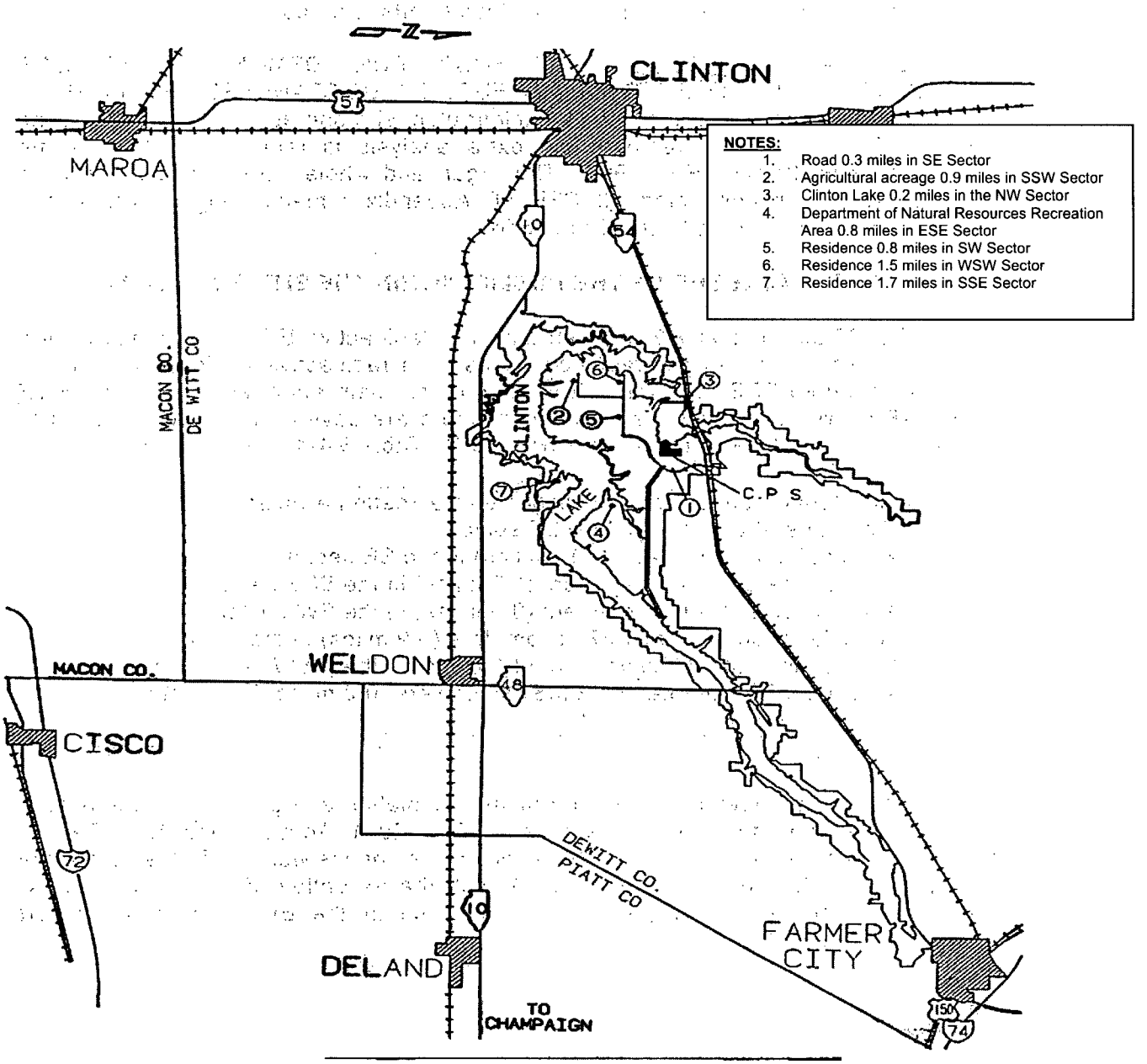


TABLE 9

CALCULATED DOSES TO MEMBERS OF THE PUBLIC DURING USE OF THE DEPARTMENT OF NATURAL RESOURCES RECREATION AREA IN THE EAST-SOUTHEAST SECTOR WITHIN THE CPS SITE BOUNDARY
Data Period: 01 January 2011 – 31 December 2011

DESCRIPTION	DOSE	UNITS
Total Body Dose Rate (Noble Gases)	5.96E-05	mrem/year
Skin Dose Rate (Noble Gases)	8.70E-05	mrem/year
Gamma Air Dose	6.21E-05	mrad
Beta Air Dose	2.19E-05	mrad
Total Body Dose (Particulates)	8.17E-05	mrem
Skin Dose (Particulates) [1]	1.01E-05	mrem

[1] DOSE includes the dose values resulting from the release of iodines, particulates (with half-lives >8 days) tritium, and carbon-14 in gaseous effluents.

Highest Organ Dose by Age Group:

Adult Bone	2.90E-04	mrem
Teen Bone	NA[2]	mrem
Child Bone	NA[2]	mrem
Infant Bone	NA[2]	mrem

[2] Dose calculated only for the age groups likely to be in the field.

TABLE 10

CALCULATED DOSES TO MEMBERS OF THE PUBLIC DURING USE OF THE ROAD IN THE SOUTHEAST SECTOR WITHIN THE CPS SITE BOUNDARY
Data Period: 01 January 2011 – 31 December 2011

DESCRIPTION	DOSE	UNITS
Total Body Dose Rate (Noble Gases)	1.79E-05	mrem/year
Skin Dose Rate (Noble Gases)	2.61E-05	mrem/year
Gamma Air Dose	1.88E-05	mrad
Beta Air Dose	6.63E-06	mrad
Total Body Dose (Particulates)	3.14E-05	mrem
Skin Dose (Particulates) [1]	2.76E-06	mrem

[1] DOSE includes the dose values resulting from the release of iodines, particulates (with half lives >8 days) tritium, and carbon-14 in gaseous effluents.

Highest Organ Dose by Age Group:

Adult Bone	8.74E-05	mrem
Teen Bone	1.24E-04	mrem
Child Bone	1.70E-04	mrem
Infant Bone	1.26E-04	mrem

TABLE 11

CALCULATED DOSES FOR THE RESIDENTS IN THE SOUTH-SOUTHEAST SECTOR
(2.736 kilometers) WITHIN THE CPS SITE BOUNDARY
Data Period: 01 January 2011 – 31 December 2011

DESCRIPTION	DOSE	UNITS
Total Body Dose Rate (Noble Gases)	9.01E-05	mrem/year
Skin Dose Rate (Noble Gases)	1.32E-04	mrem/year
Gamma Air Dose	9.48E-05	mrad
Beta Air Dose	3.34E-05	mrad
Total Body Dose (Particulates)	1.22E-04	mrem
Skin Dose (Particulates) [1]	7.62E-06	mrem

[1] DOSE includes the dose values resulting from the release of iodines, particulates (with half lives >8 days) tritium, and carbon-14 in gaseous effluents.

Highest Organ Dose by Age Group:

Adult Bone	4.36E-04	mrem
Teen Bone	6.52E-04	mrem
Child Bone	NA[2]	mrem
Infant Bone	NA[2]	mrem

[2] No receptors of this age at this location

TABLE 12

CALCULATED DOSES FOR THE RESIDENTS IN THE SOUTHWEST SECTOR (1.219 kilometers) WITHIN THE CPS SITE BOUNDARY
Data Period: 01 January 2011 – 31 December 2011

DESCRIPTION	DOSE	UNITS
Total Body Dose Rate (Noble Gases)	1.86E-04	mrem/year
Skin Dose Rate (Noble Gases)	2.72E-04	mrem/year
Gamma Air Dose	1.96E-04	mrad
Beta Air Dose	6.91E-05	mrad
Total Body Dose (Particulates)	2.54E-04	mrem
Skin Dose (Particulates) [1]	2.81E-05	mrem

[1] DOSE includes the dose values resulting from the release of iodines, particulates (with half lives >8 days) tritium, and carbon-14 in gaseous effluents.

Highest Organ Dose by Age Group:

Adult Bone	9.10E-04	mrem
Teen Bone	N/A [2]	mrem
Child Bone	N/A [2]	mrem
Infant Bone	N/A [2]	mrem

[2] No receptors of this age at this location

TABLE 13

CALCULATED DOSES TO MEMBERS OF THE PUBLIC DURING USE OF THE AGRICULTURAL ACREAGE IN THE SOUTH-SOUTHWEST SECTOR WITHIN THE CPS SITE BOUNDARY
Data Period: 01 January 2011 – 31 December 2011

DESCRIPTION	DOSE	UNITS
Total Body Dose Rate (Noble Gases)	1.47E-05	mrem/year
Skin Dose Rate (Noble Gases)	2.15E-05	mrem/year
Gamma Air Dose	1.54E-05	mrad
Beta Air Dose	5.44E-06	mrad
Total Body Dose (Particulates)	2.03E-05	mrem
Skin Dose (Particulates) [1]	2.50E-06	mrem

[1] DOSE includes the dose values resulting from the release of iodines, particulates (with half lives >8 days) tritium, and carbon-14 in gaseous effluents.

Highest Organ Dose by Age Group:

Adult Bone	7.20E-05	mrem
Teen Bone	N/A [2]	mrem
Child Bone	N/A [2]	mrem
Infant Bone	N/A [2]	mrem

[2] Dose calculated only for the age groups likely to be in the field.

TABLE 14

CALCULATED DOSES FOR THE RESIDENTS IN THE WEST-SOUTHWEST SECTOR WITHIN THE CPS SITE BOUNDARY
Data Period: 01 January 2011 – 31 December 2011

DESCRIPTION	DOSE	UNITS
Total Body Dose Rate (Noble Gases)	8.77E-05	mrem/year
Skin Dose Rate (Noble Gases)	1.28E-04	mrem/year
Gamma Air Dose	9.22E-05	mrad
Beta Air Dose	3.25E-05	mrad
Total Body Dose (Particulates)	1.15E-04	mrem
Skin Dose (Particulates) [1]	7.72E-06	mrem

[1] DOSE includes the dose values resulting from the release of iodines, particulates (with half lives >8 days) tritium, and carbon-14 in gaseous effluents.

Highest Organ Dose by Age Group:

Adult Bone	4.24E-04	mrem
Teen Bone	N/A [2]	mrem
Child Bone	N/A [2]	mrem
Infant Bone	N/A [2]	mrem

[2] No receptors of this age at this location

TABLE 15

CALCULATED DOSES TO MEMBERS OF THE PUBLIC DURING USE OF CLINTON LAKE IN THE NORTHWEST SECTOR WITHIN THE CPS SITE BOUNDARY
Data Period: 01 January 2011 – 31 December 2011

DESCRIPTION	DOSE	UNITS
Total Body Dose Rate (Noble Gases)	1.56E-04	mrem/year
Skin Dose Rate (Noble Gases)	2.28E-04	mrem/year
Gamma Air Dose	1.63E-04	mrad
Beta Air Dose	5.74E-05	mrad
Total Body Dose (Particulates)	2.03E-04	mrem
Skin Dose (Particulates) [1]	1.38E-05	mrem

[1] DOSE includes the dose values resulting from the release of iodines, particulates (with half lives >8 days) tritium, and carbon-14 in gaseous effluents.

Highest Organ Dose by Age Group:

Adult Bone	7.49E-04	mrem
Teen Bone	N/A [2]	mrem
Child Bone	N/A [2]	mrem
Infant Bone	N/A [2]	mrem

[2] Dose calculated only for the age groups likely to be in the field.

SECTION 7

METEOROLOGICAL DATA AND DISPERSION ESTIMATES

On 13 April 1972, the meteorological monitoring program commenced at the Clinton Power Station site. The meteorological system consists of a tower 199 feet high with two (2) levels of instrumentation at the 10-meter and 60-meter elevations. A combined cup and vane sensor measures wind direction and wind speed[s] at the 10-meter and 60-meter levels. An aspirated dual temperature sensor senses the temperatures at these levels. One-half of the dual sensors at each elevation are used for ambient temperature while the other half is used to provide a differential temperature between the 10-meter and 60-meter levels.

Meteorological monitoring instruments have been placed on the Clinton Power Station microwave tower at the 10-meter level to serve as a backup to the primary meteorological tower.

Clinton Power Station meteorological data is transmitted to the Main Control Room [MCR] via a dedicated communication link. Once the signals are received at the MCR, they are then converted to a 4 to 20 milliamp signal and fed individually to a microprocessor and chart recorders. The microprocessor is part of the Clinton Power Station Radiation Monitoring System [RMS]. Meteorological data is available via the microprocessors in the Main Control Room and the Technical Support Center [TSC].

Dispersion modeling for effluents for normal operation of Clinton Power Station is a straight-line, sector-averaged Gaussian plume model designed to estimate average relative concentration at various receptor points. The model was developed in accordance with routine release analysis procedures specified in Regulatory Guide 1.111. For joint frequency input data, periods of calm are distributed in accordance with a directional distribution. For hourly input data, periods of calm are the previous hour's wind direction. Periods of calm are assigned a wind speed value of half the specified instrument threshold value. Reference Table 18 for more detailed information on meteorology and dispersion data.

TABLE 16

METEOROLOGICAL DATA AVAILABILITY

Data Period: 01 January 2011 – 31 December 2011

PARAMETER	PERCENT OF VALID PARAMETER HOURS			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1. Wind Speed				
a. 10-Meter sensor	99.9%	99.9%	100.0%	99.7%
b. 60 Meter sensor	99.9%	99.9%	100.0%	99.7%
2. Wind Direction				
a. 10-Meter sensor	99.9%	99.9%	100.0%	99.7%
b. 60 Meter sensor	99.9%	99.9%	100.0%	99.7%
3. Temperature				
a. 10-Meter sensor	99.9%	99.9%	100.0%	99.7%
b. 60 Meter sensor	99.9%	99.9%	100.0%	99.7%
c. Temperature Difference (10m-60m)	99.9%	99.9%	100.0%	99.7%
4. Percent of hours for which valid 10-meter Wind Speed, Wind Direction, and Delta Temperature were available	99.9%	99.9%	100.0%	99.7%
5. Percent of hours for which valid 60-meter Wind Speed, Wind Direction, and Delta Temperature were available	99.9%	99.9%	100.0%	99.7%

Clinton Power Station was able to achieve 99.9% Meteorological Recoverable Data during 2011 exceeding the minimum criteria of 90% as delineated within Regulatory Guide 1.23.

TABLE 17

CLASSIFICATION OF ATMOSPHERIC STABILITY

Stability Classification	Pasquill Category	Defining Conditions
Extremely unstable	A	------ $<\Delta T \leq$ -1.042
Moderately unstable	B	-1.042 $<\Delta T \leq$ -0.933
Slightly unstable	C	-0.933 $<\Delta T \leq$ -0.823
Neutral	D	-0.823 $<\Delta T \leq$ -0.274
Slightly stable	E	-0.274 $<\Delta T \leq$ 0.823
Moderately stable	F	0.823 $<\Delta T \leq$ 2.195
Extremely stable	G	2.195 $<\Delta T \leq$ ------

ΔT = temperature difference in degrees Fahrenheit per 100 feet

TABLE 18

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Reporting Period: 01 January 2011 through 31 December 2011

The following table contains the joint wind frequency tables for CPS. The tables are segregated by sensor elevation and calendar quarter. All tabled values are in hours.

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: January - March 2011
Stability Class - Extremely Unstable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	0	3	0	0	4
NNE	0	1	0	2	0	0	3
NE	0	3	7	3	0	0	13
ENE	0	3	19	5	0	0	27
E	0	2	6	0	0	0	8
ESE	0	0	2	0	0	0	2
SE	0	0	3	0	0	0	3
SSE	0	0	1	1	0	0	2
S	0	1	3	1	0	0	5
SSW	0	0	4	3	0	0	7
SW	0	1	1	2	0	0	4
WSW	0	0	1	0	0	0	1
W	0	0	0	9	0	0	9
WNW	0	2	2	3	4	0	11
NW	0	1	0	2	0	0	3
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	15	49	34	4	0	102

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: January - March 2011
Stability Class - Moderately Unstable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	3	2	0	0	6
NNE	0	0	2	0	0	0	2
NE	0	3	1	0	0	0	4
ENE	0	4	4	1	0	0	9
E	0	3	2	0	0	0	5
ESE	0	0	4	0	0	0	4
SE	0	1	5	0	0	0	6
SSE	0	1	2	2	0	0	5
S	0	0	4	2	0	0	6
SSW	0	2	1	1	0	0	4
SW	0	1	2	0	0	0	3
WSW	0	2	2	1	2	0	7
W	0	2	1	0	1	0	4
WNW	0	3	0	7	0	0	10
NW	0	0	2	4	1	0	7
NNW	0	1	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	0	24	35	20	4	0	83

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: January - March 2011
Stability Class - Slightly Unstable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	3	3	2	0	0	8
NNE	0	5	4	1	0	0	10
NE	1	4	8	2	0	0	15
ENE	0	2	4	2	0	0	8
E	0	0	1	0	0	0	1
ESE	0	3	5	0	0	0	8
SE	0	0	5	0	0	0	5
SSE	0	2	4	2	0	0	8
S	0	0	2	0	0	0	2
SSW	1	1	4	6	1	0	13
SW	0	2	2	0	0	0	4
WSW	0	0	6	0	1	0	7
W	0	2	5	0	0	0	7
WNW	1	5	8	4	0	0	18
NW	0	3	4	3	0	0	10
NNW	0	1	5	1	0	0	7
Variable	0	0	0	0	0	0	0
Total	3	33	70	23	2	0	131

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: January - March 2011
Stability Class - Neutral - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	20	41	49	2	0	112
NNE	1	12	17	6	2	1	39
NE	0	26	54	37	8	3	128
ENE	1	14	50	9	0	0	74
E	1	14	17	0	0	0	32
ESE	3	28	22	1	0	0	54
SE	0	15	34	1	0	0	50
SSE	2	15	57	3	0	0	77
S	2	13	46	8	2	0	71
SSW	1	23	51	21	1	0	97
SW	5	10	31	1	0	0	47
WSW	3	20	13	7	2	0	45
W	4	26	20	20	0	0	70
WNW	1	21	54	58	4	0	138
NW	1	23	57	44	11	0	136
NNW	0	15	43	13	1	0	72
Variable	0	0	0	0	0	0	0
Total	25	295	607	278	33	4	1242

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: January - March 2011
Stability Class - Slightly Stable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	9	2	1	0	0	14
NNE	0	7	2	0	0	0	9
NE	0	11	11	0	0	0	22
ENE	2	16	1	0	0	0	19
E	1	14	3	0	0	0	18
ESE	3	12	4	0	0	0	19
SE	0	8	2	0	0	0	10
SSE	0	11	9	0	0	0	20
S	2	12	41	7	0	0	62
SSW	2	14	35	26	2	0	79
SW	2	14	31	13	1	0	61
WSW	0	9	17	7	1	0	34
W	1	12	29	13	4	0	59
WNW	1	18	36	1	2	0	58
NW	1	6	8	1	0	0	16
NNW	2	6	6	0	0	0	14
Variable	0	0	0	0	0	0	0
Total	19	179	237	69	10	0	514

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: January - March 2011
Stability Class - Moderately Stable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	1	0	0	0	0	3
NNE	2	5	0	0	0	0	7
NE	2	4	0	0	0	0	6
ENE	0	3	0	0	0	0	3
E	1	3	0	0	0	0	4
ESE	0	0	0	0	0	0	0
SE	0	2	0	0	0	0	2
SSE	0	1	0	0	0	0	1
S	0	3	3	0	0	0	6
SSW	0	0	1	0	0	0	1
SW	0	5	0	0	0	0	5
WSW	0	5	0	0	0	0	5
W	1	6	1	0	0	0	8
WNW	4	4	0	0	0	0	8
NW	1	11	0	0	0	0	12
NNW	2	6	0	0	0	0	8
Variable	0	0	0	0	0	0	0
Total	15	59	5	0	0	0	79

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: January - March 2011
Stability Class - Extremely Stable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	1	0	0	0	0	2
NNE	0	2	0	0	0	0	2
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	1	0	0	0	0	1
NW	0	1	0	0	0	0	1
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	1	5	0	0	0	0	6

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: January - March 2011
Stability Class - Extremely Unstable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	2	0	0	2
NNE	0	1	1	2	0	0	4
NE	0	1	2	4	0	0	7
ENE	0	2	7	14	7	0	30
E	0	0	6	4	0	0	10
ESE	0	0	0	4	0	0	4
SE	0	0	0	3	0	0	3
SSE	0	0	0	1	0	1	2
S	0	0	1	2	1	0	4
SSW	0	0	3	4	1	0	8
SW	0	1	1	2	0	0	4
WSW	0	0	0	1	0	0	1
W	0	0	0	2	0	0	2
WNW	0	1	0	5	7	3	16
NW	0	1	1	3	0	0	5
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	7	22	53	16	4	102

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: January - March 2011
Stability Class - Moderately Unstable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	1	4	1	0	6
NNE	0	0	0	1	0	0	1
NE	0	1	4	0	0	0	5
ENE	0	0	3	1	3	0	7
E	0	1	3	1	1	0	6
ESE	0	0	1	3	0	0	4
SE	0	0	3	4	0	0	7
SSE	0	0	1	3	0	1	5
S	0	0	0	4	2	0	6
SSW	0	0	1	0	0	1	2
SW	0	1	3	1	0	0	5
WSW	0	1	2	2	1	1	7
W	0	3	0	0	0	1	4
WNW	0	1	1	2	3	0	7
NW	0	1	2	1	3	1	8
NNW	0	1	0	0	2	0	3
Variable	0	0	0	0	0	0	0
Total	0	10	25	27	16	5	83

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: January - March 2011
Stability Class - Slightly Unstable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	3	2	1	0	6
NNE	0	2	7	1	0	0	10
NE	0	2	4	5	0	0	11
ENE	0	2	3	4	3	0	12
E	0	0	0	1	1	1	3
ESE	0	0	2	5	1	0	8
SE	0	0	3	3	0	0	6
SSE	0	2	1	2	2	1	8
S	0	0	0	1	0	0	1
SSW	1	1	2	5	0	2	11
SW	0	1	1	5	0	0	7
WSW	0	0	2	4	0	1	7
W	0	2	1	1	0	0	4
WNW	0	3	2	9	2	0	16
NW	1	3	3	5	1	0	13
NNW	0	2	3	2	1	0	8
Variable	0	0	0	0	0	0	0
Total	2	20	37	55	12	5	131

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: January - March 2011
Stability Class - Neutral - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	9	35	40	35	2	121
NNE	0	6	22	6	9	5	48
NE	0	6	19	26	23	8	82
ENE	0	5	15	25	48	8	101
E	0	1	10	22	13	0	46
ESE	1	6	14	20	3	0	44
SE	0	9	15	31	10	0	65
SSE	0	4	18	33	9	1	65
S	2	8	23	39	11	2	85
SSW	0	8	18	31	8	5	70
SW	2	3	24	32	7	0	68
WSW	4	6	27	7	2	1	47
W	2	15	22	6	12	1	58
WNW	1	13	26	29	35	3	107
NW	0	14	32	49	45	8	148
NNW	0	7	32	27	15	6	87
Variable	0	0	0	0	0	0	0
Total	12	120	352	423	285	50	1242

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: January - March 2011
Stability Class - Slightly Stable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	4	5	5	1	0	15
NNE	0	1	7	1	0	0	9
NE	0	1	2	13	1	0	17
ENE	0	0	7	11	0	0	18
E	0	1	6	9	2	0	18
ESE	0	2	3	16	1	0	22
SE	0	3	1	8	0	0	12
SSE	0	3	6	12	0	0	21
S	0	0	2	21	22	0	45
SSW	0	0	5	22	17	15	59
SW	1	2	9	31	29	2	74
WSW	0	1	6	29	11	3	50
W	0	0	9	13	13	5	40
WNW	0	0	12	33	12	4	61
NW	0	0	16	18	1	1	36
NNW	0	2	10	5	0	0	17
Variable	0	0	0	0	0	0	0
Total	1	20	106	247	110	30	514

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: January - March 2011
Stability Class - Moderately Stable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	2	0	0	0	3
NNE	0	2	2	1	0	0	5
NE	0	4	2	2	0	0	8
ENE	0	0	1	5	0	0	6
E	0	1	1	1	0	0	3
ESE	1	0	1	1	0	0	3
SE	0	0	3	0	0	0	3
SSE	1	0	0	1	1	0	3
S	0	0	0	0	0	0	0
SSW	0	0	0	5	1	0	6
SW	0	0	1	3	0	0	4
WSW	0	0	3	1	0	0	4
W	0	0	3	1	0	0	4
WNW	0	0	5	1	0	0	6
NW	0	0	7	3	0	0	10
NNW	0	2	6	3	0	0	11
Variable	0	0	0	0	0	0	0
Total	2	10	37	28	2	0	79

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: January - March 2011
Stability Class - Extremely Stable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	1	0	0	0	1
NE	0	0	1	2	0	0	3
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	1	0	0	1
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	1	0	0	1
Variable	0	0	0	0	0	0	0
Total	0	0	2	4	0	0	6

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: April - June 2011
Stability Class - Extremely Unstable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	4	14	4	0	0	22
NNE	0	3	9	9	0	0	21
NE	0	4	7	3	0	0	14
ENE	0	0	2	0	0	0	2
E	0	4	6	0	0	0	10
ESE	0	2	9	0	0	0	11
SE	0	4	2	0	0	0	6
SSE	0	4	1	1	0	0	6
S	0	2	5	2	0	0	9
SSW	0	0	1	2	2	0	5
SW	0	0	1	3	0	0	4
WSW	0	1	3	3	0	0	7
W	0	1	13	3	0	0	17
WNW	0	0	8	15	2	0	25
NW	0	2	5	3	1	0	11
NNW	0	0	2	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	0	31	88	48	5	0	172

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: April - June 2011
Stability Class - Moderately Unstable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	2	0	0	0	4
NNE	0	5	2	1	0	0	8
NE	0	3	4	1	0	0	8
ENE	0	1	1	0	0	0	2
E	0	2	2	0	0	0	4
ESE	0	3	3	0	0	0	6
SE	0	5	1	0	0	0	6
SSE	0	2	0	0	2	0	4
S	1	5	4	4	0	0	14
SSW	1	0	3	5	1	2	12
SW	0	0	2	4	2	0	8
WSW	0	1	4	3	1	0	9
W	0	0	5	2	2	0	9
WNW	2	3	7	1	1	0	14
NW	0	1	0	2	0	0	3
NNW	0	4	1	0	0	0	5
Variable	0	0	0	0	0	0	0
Total	4	37	41	23	9	2	116

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: April - June 2011
Stability Class - Slightly Unstable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	3	0	0	0	4
NNE	0	8	2	0	0	0	10
NE	0	2	5	1	0	0	8
ENE	0	3	3	0	0	0	6
E	0	2	1	0	0	0	3
ESE	1	6	0	0	0	0	7
SE	0	4	5	0	0	0	9
SSE	1	3	2	1	0	0	7
S	2	7	8	1	4	0	22
SSW	0	3	8	3	2	0	16
SW	0	3	13	0	1	0	17
WSW	0	1	7	7	1	0	16
W	0	1	4	7	2	0	14
WNW	1	1	12	2	1	0	17
NW	0	3	1	2	0	0	6
NNW	0	2	1	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	5	50	75	24	11	0	165

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: April - June 2011
Stability Class - Neutral - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	22	28	10	0	0	61
NNE	2	13	19	26	0	0	60
NE	2	19	32	12	0	0	65
ENE	1	22	19	6	1	0	49
E	5	23	18	12	0	0	58
ESE	3	24	19	5	0	0	51
SE	3	29	27	3	0	0	62
SSE	8	26	26	11	0	0	71
S	7	18	32	9	1	0	67
SSW	0	13	35	24	11	1	84
SW	2	20	41	16	0	0	79
WSW	4	15	25	15	3	0	62
W	2	4	15	8	1	0	30
WNW	2	4	20	17	9	0	52
NW	1	12	20	17	3	0	53
NNW	1	15	23	3	0	0	42
Variable	0	0	0	0	0	0	0
Total	44	279	399	194	29	1	946

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: April - June 2011
Stability Class - Slightly Stable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	10	7	0	0	0	17
NNE	2	14	7	3	0	0	26
NE	6	17	11	2	0	0	36
ENE	4	15	6	0	0	0	25
E	6	14	4	0	0	0	24
ESE	5	29	8	0	0	0	42
SE	4	38	10	0	0	0	52
SSE	5	30	19	3	0	0	57
S	4	30	41	4	0	0	79
SSW	5	34	36	8	9	1	93
SW	3	15	22	3	1	0	44
WSW	3	14	18	0	0	0	35
W	3	11	8	5	1	0	28
WNW	2	8	12	4	0	0	26
NW	2	9	5	0	0	0	16
NNW	0	15	3	1	0	0	19
Variable	0	0	0	0	0	0	0
Total	54	303	217	33	11	1	619

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: April - June 2011
Stability Class - Moderately Stable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	0	0	0	0	0	1
NNE	2	6	1	0	0	0	9
NE	4	2	1	0	0	0	7
ENE	3	6	0	0	0	0	9
E	2	3	0	0	0	0	5
ESE	4	3	0	0	0	0	7
SE	4	1	0	0	0	0	5
SSE	1	8	0	0	0	0	9
S	2	2	0	0	0	0	4
SSW	2	3	0	0	0	0	5
SW	2	4	1	0	0	0	7
WSW	2	7	2	0	0	0	11
W	6	4	3	0	0	0	13
WNW	4	4	4	0	0	0	12
NW	5	4	0	0	0	0	9
NNW	1	2	0	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	45	59	12	0	0	0	116

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: April - June 2011
Stability Class - Extremely Stable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	3	0	0	0	0	0	3
NE	3	3	0	0	0	0	6
ENE	4	2	0	0	0	0	6
E	4	2	0	0	0	0	6
ESE	3	1	0	0	0	0	4
SE	0	0	0	0	0	0	0
SSE	2	0	0	0	0	0	2
S	2	0	0	0	0	0	2
SSW	0	0	0	0	0	0	0
SW	1	0	0	0	0	0	1
WSW	0	0	0	0	0	0	0
W	7	0	0	0	0	0	7
WNW	6	1	0	0	0	0	7
NW	2	0	0	0	0	0	2
NNW	1	0	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	38	9	0	0	0	0	47

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: April - June 2011
Stability Class - Extremely Unstable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	8	8	0	0	16
NNE	0	2	5	10	3	0	20
NE	0	1	4	5	6	0	16
ENE	0	1	1	3	0	0	5
E	0	1	2	7	0	0	10
ESE	0	0	4	8	1	0	13
SE	0	0	6	0	0	0	6
SSE	0	4	0	1	0	1	6
S	0	1	4	2	1	0	8
SSW	0	0	1	1	2	2	6
SW	0	0	0	2	1	0	3
WSW	0	0	2	3	2	0	7
W	0	0	7	7	1	0	15
WNW	0	0	4	13	6	2	25
NW	0	1	2	2	6	1	12
NNW	0	0	4	0	0	0	4
Variable	0	0	0	0	0	0	0
Total	0	11	54	72	29	6	172

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: April - June 2011
Stability Class - Moderately Unstable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	3	1	0	0	5
NNE	0	0	4	1	0	0	5
NE	0	2	2	2	0	0	6
ENE	0	0	4	1	1	0	6
E	0	0	1	2	1	0	4
ESE	0	0	2	3	0	0	5
SE	0	3	4	1	0	0	8
SSE	0	3	0	0	0	2	5
S	0	3	6	1	4	0	14
SSW	0	0	1	4	1	4	10
SW	0	0	2	2	3	2	9
WSW	0	0	1	4	2	1	8
W	0	0	3	2	3	1	9
WNW	0	1	3	6	1	1	12
NW	0	3	1	1	0	0	5
NNW	0	2	2	1	0	0	5
Variable	0	0	0	0	0	0	0
Total	0	18	39	32	16	11	116

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: April - June 2011
Stability Class - Slightly Unstable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	3	0	0	0	4
NNE	0	3	5	1	0	0	9
NE	0	1	2	3	1	0	7
ENE	0	3	2	1	0	0	6
E	0	1	1	3	1	0	6
ESE	0	3	2	0	0	0	5
SE	1	2	5	5	0	0	13
SSE	0	1	1	1	1	0	4
S	1	6	4	6	2	4	23
SSW	1	2	5	3	2	2	15
SW	0	3	5	4	0	0	12
WSW	0	1	4	7	6	2	20
W	0	0	1	7	5	2	15
WNW	1	0	3	9	0	2	15
NW	0	2	0	5	1	0	8
NNW	0	2	1	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	4	31	44	55	19	12	165

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: April - June 2011
Stability Class - Neutral - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	11	20	27	5	0	63
NNE	0	6	12	15	24	2	59
NE	1	1	9	12	3	4	30
ENE	1	6	12	28	14	11	72
E	0	7	14	20	15	12	68
ESE	1	5	12	17	9	5	49
SE	2	7	22	25	16	0	72
SSE	5	3	25	21	10	6	70
S	4	8	17	21	17	5	72
SSW	1	4	9	24	18	20	76
SW	1	9	7	36	13	0	66
WSW	2	8	16	26	15	3	70
W	0	4	11	16	5	0	36
WNW	1	1	2	15	10	10	39
NW	0	3	14	21	22	5	65
NNW	0	4	14	17	3	1	39
Variable	0	0	0	0	0	0	0
Total	19	87	216	341	199	84	946

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: April - June 2011
Stability Class - Slightly Stable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	7	7	0	1	17
NNE	0	1	7	12	4	0	24
NE	0	2	9	10	10	0	31
ENE	1	1	8	12	1	0	23
E	0	4	9	11	3	0	27
ESE	0	4	9	20	2	0	35
SE	0	5	26	19	1	0	51
SSE	0	3	24	23	13	2	65
S	0	3	14	32	26	1	76
SSW	0	5	6	46	16	12	85
SW	0	3	16	25	2	2	48
WSW	1	4	13	15	0	0	33
W	0	4	12	16	6	1	39
WNW	0	4	4	17	4	0	29
NW	1	1	9	8	2	0	21
NNW	0	2	8	4	1	0	15
Variable	0	0	0	0	0	0	0
Total	3	48	181	277	91	19	619

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: April - June 2011
Stability Class - Moderately Stable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	1	0	0	0	3
NNE	0	1	2	2	0	0	5
NE	0	1	0	2	2	0	5
ENE	1	3	2	2	0	0	8
E	2	0	3	3	0	0	8
ESE	1	2	1	1	0	0	5
SE	4	2	1	1	0	0	8
SSE	0	3	1	0	0	0	4
S	0	2	7	3	0	0	12
SSW	0	0	1	3	0	0	4
SW	0	3	2	0	1	0	6
WSW	1	1	6	7	0	0	15
W	0	0	4	1	0	0	5
WNW	0	1	8	4	5	0	18
NW	0	2	3	0	0	0	5
NNW	0	1	3	1	0	0	5
Variable	0	0	0	0	0	0	0
Total	9	24	45	30	8	0	116

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: April - June 2011
Stability Class - Extremely Stable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	3	0	0	0	0	4
NNE	1	0	0	0	0	0	1
NE	0	1	0	0	0	0	1
ENE	0	2	0	0	0	0	2
E	0	1	5	2	0	0	8
ESE	0	2	5	2	0	0	9
SE	0	2	1	0	0	0	3
SSE	0	0	1	0	0	0	1
S	0	1	1	0	0	0	2
SSW	1	0	1	0	0	0	2
SW	2	1	0	0	0	0	3
WSW	0	0	0	0	0	0	0
W	2	1	1	0	0	0	4
WNW	0	1	0	0	0	0	1
NW	0	1	2	0	0	0	3
NNW	0	2	0	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	7	18	17	4	0	0	46

Hours of calm in this stability class: 1
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: July - September 2011
Stability Class - Extremely Unstable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	18	28	11	0	0	57
NNE	0	8	17	17	0	0	42
NE	0	11	4	3	0	0	18
ENE	1	6	3	0	0	0	10
E	0	1	0	0	0	0	1
ESE	0	3	0	0	0	0	3
SE	0	19	0	0	0	0	19
SSE	0	15	2	0	0	0	17
S	0	14	11	0	0	0	25
SSW	0	10	17	0	0	0	27
SW	0	11	19	2	0	0	32
WSW	1	8	21	1	0	0	31
W	0	9	17	5	0	0	31
WNW	0	7	10	1	0	0	18
NW	0	14	9	0	0	0	23
NNW	0	17	8	5	0	0	30
Variable	0	0	0	0	0	0	0
Total	2	171	166	45	0	0	384

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: July - September 2011
Stability Class - Moderately Unstable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	5	7	2	0	0	14
NNE	1	5	5	0	0	0	11
NE	1	8	2	0	0	0	11
ENE	3	4	2	0	0	0	9
E	2	5	0	0	0	0	7
ESE	0	6	0	0	0	0	6
SE	4	11	0	0	0	0	15
SSE	1	6	2	0	0	0	9
S	1	6	2	0	0	0	9
SSW	0	7	11	0	0	0	18
SW	1	5	7	0	0	0	13
WSW	0	6	3	1	0	0	10
W	0	5	1	1	0	0	7
WNW	0	3	2	1	0	0	6
NW	0	5	4	0	0	0	9
NNW	0	2	4	1	0	0	7
Variable	0	0	0	0	0	0	0
Total	14	89	52	6	0	0	161

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: July - September 2011
Stability Class - Slightly Unstable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	3	4	1	0	0	8
NNE	0	4	1	2	0	0	7
NE	2	13	0	0	0	0	15
ENE	2	4	1	0	0	0	7
E	0	5	0	0	0	0	5
ESE	3	9	0	0	0	0	12
SE	1	6	0	0	0	0	7
SSE	1	7	0	0	0	0	8
S	2	7	3	0	0	0	12
SSW	2	4	5	0	0	0	11
SW	0	4	4	0	0	0	8
WSW	0	3	5	1	0	0	9
W	0	4	3	0	0	0	7
WNW	0	3	0	1	0	0	4
NW	0	11	1	0	0	0	12
NNW	0	2	1	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	13	89	28	5	0	0	135

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: July - September 2011
Stability Class - Neutral - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	14	25	1	1	0	43
NNE	1	12	10	4	0	0	27
NE	2	15	6	0	0	0	23
ENE	3	22	2	0	0	0	27
E	4	12	1	0	0	0	17
ESE	10	19	0	0	0	0	29
SE	6	16	8	0	0	0	30
SSE	5	18	13	1	0	0	37
S	4	15	9	0	0	0	28
SSW	0	12	17	5	0	0	34
SW	1	23	14	1	0	0	39
WSW	1	11	14	1	0	0	27
W	2	9	10	3	0	0	24
WNW	1	10	7	4	0	0	22
NW	2	14	16	5	1	0	38
NNW	0	11	10	1	0	0	22
Variable	0	0	0	0	0	0	0
Total	44	233	162	26	2	0	467

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: July - September 2011
Stability Class - Slightly Stable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	19	19	0	0	0	39
NNE	2	26	21	0	0	0	49
NE	14	33	3	0	0	0	50
ENE	14	19	1	0	0	0	34
E	11	12	0	0	0	0	23
ESE	21	23	0	0	0	0	44
SE	15	21	0	0	0	0	36
SSE	11	28	1	0	0	0	40
S	2	38	6	0	0	0	46
SSW	8	51	37	2	0	0	98
SW	6	38	22	0	0	0	66
WSW	6	7	9	0	0	0	22
W	8	14	1	1	0	0	24
WNW	7	28	5	1	0	0	41
NW	2	22	9	0	0	0	33
NNW	4	20	3	0	0	0	27
Variable	0	0	0	0	0	0	0
Total	132	399	137	4	0	0	672

Hours of calm in this stability class: 1
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: July - September 2011
Stability Class - Moderately Stable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	8	6	0	0	0	0	14
NNE	11	19	1	0	0	0	31
NE	19	26	0	0	0	0	45
ENE	10	3	0	0	0	0	13
E	11	0	0	0	0	0	11
ESE	7	3	0	0	0	0	10
SE	2	2	0	0	0	0	4
SSE	2	8	0	0	0	0	10
S	5	0	0	0	0	0	5
SSW	5	17	1	0	0	0	23
SW	7	10	0	0	0	0	17
WSW	4	7	0	0	0	0	11
W	8	3	0	0	0	0	11
WNW	11	6	0	0	0	0	17
NW	8	8	0	0	0	0	16
NNW	3	1	0	0	0	0	4
Variable	0	0	0	0	0	0	0
Total	121	119	2	0	0	0	242

Hours of calm in this stability class: 2
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: July - September 2011
Stability Class - Extremely Stable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	10	0	0	0	0	0	10
NNE	23	2	0	0	0	0	25
NE	40	16	0	0	0	0	56
ENE	9	4	0	0	0	0	13
E	1	0	0	0	0	0	1
ESE	0	1	0	0	0	0	1
SE	0	0	0	0	0	0	0
SSE	2	0	0	0	0	0	2
S	0	0	0	0	0	0	0
SSW	1	1	0	0	0	0	2
SW	2	3	0	0	0	0	5
WSW	5	0	0	0	0	0	5
W	3	2	0	0	0	0	5
WNW	3	1	0	0	0	0	4
NW	5	3	0	0	0	0	8
NNW	4	0	0	0	0	0	4
Variable	1	0	0	0	0	0	1
Total	109	33	0	0	0	0	142

Hours of calm in this stability class: 2
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: July - September 2011
Stability Class - Extremely Unstable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	8	24	18	10	0	60
NNE	0	2	7	13	15	0	37
NE	0	9	10	6	6	0	31
ENE	0	8	1	2	0	0	11
E	0	0	0	0	0	0	0
ESE	0	2	3	0	0	0	5
SE	0	10	6	0	0	0	16
SSE	0	10	3	0	0	0	13
S	0	11	12	7	0	0	30
SSW	0	5	14	7	0	0	26
SW	0	3	16	11	1	0	31
WSW	0	4	13	12	0	0	29
W	0	5	15	13	0	0	33
WNW	0	1	13	5	1	0	20
NW	0	6	8	2	0	0	16
NNW	0	8	11	5	2	0	26
Variable	0	0	0	0	0	0	0
Total	0	92	156	101	35	0	384

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: July - September 2011
Stability Class - Moderately Unstable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	4	4	1	0	10
NNE	0	2	5	2	1	0	10
NE	0	6	5	1	0	0	12
ENE	0	6	3	1	0	0	10
E	1	4	3	0	0	0	8
ESE	0	4	4	0	0	0	8
SE	1	9	3	0	0	0	13
SSE	1	8	3	0	0	0	12
S	0	4	0	3	0	0	7
SSW	0	4	9	4	1	0	18
SW	0	2	6	3	0	0	11
WSW	0	5	4	0	1	0	10
W	0	4	1	2	0	0	7
WNW	0	2	1	1	0	1	5
NW	0	6	4	2	0	0	12
NNW	0	3	2	2	1	0	8
Variable	0	0	0	0	0	0	0
Total	3	70	57	25	5	1	161

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: July - September 2011
Stability Class - Slightly Unstable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	2	2	0	0	6
NNE	0	3	3	1	2	0	9
NE	0	4	3	0	1	0	8
ENE	0	6	4	1	0	0	11
E	0	5	1	0	0	0	6
ESE	0	9	4	0	0	0	13
SE	2	5	2	0	0	0	9
SSE	0	5	2	0	0	0	7
S	2	1	5	4	0	0	12
SSW	1	2	4	2	0	0	9
SW	0	4	5	0	0	0	9
WSW	0	2	4	2	1	0	9
W	0	0	4	1	0	0	5
WNW	0	2	2	1	0	0	5
NW	0	12	1	0	1	0	14
NNW	0	1	1	1	0	0	3
Variable	0	0	0	0	0	0	0
Total	5	63	47	15	5	0	135

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: July - September 2011
Stability Class - Neutral - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	10	22	1	1	35
NNE	0	3	8	10	2	0	23
NE	1	9	9	6	3	0	28
ENE	0	9	7	6	1	0	23
E	3	4	14	6	0	0	27
ESE	2	10	10	3	0	0	25
SE	3	10	12	6	0	0	31
SSE	3	10	15	10	3	0	41
S	2	4	9	13	0	0	28
SSW	0	1	15	9	7	0	32
SW	3	7	18	6	2	0	36
WSW	0	5	13	12	1	0	31
W	0	4	4	7	3	0	18
WNW	1	4	11	6	6	0	28
NW	0	2	14	12	3	1	32
NNW	1	4	12	7	1	4	29
Variable	0	0	0	0	0	0	0
Total	19	87	181	141	33	6	467

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: July - September 2011
Stability Class - Slightly Stable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	12	31	2	0	45
NNE	1	4	8	28	0	0	41
NE	1	7	11	13	4	0	36
ENE	2	4	22	14	0	0	42
E	1	6	12	11	0	0	30
ESE	2	10	15	4	0	0	31
SE	2	15	22	2	0	0	41
SSE	3	17	17	8	0	0	45
S	1	7	40	15	0	0	63
SSW	2	5	18	45	5	0	75
SW	1	8	24	46	2	0	81
WSW	2	5	9	7	1	0	24
W	2	2	10	7	1	0	22
WNW	1	4	22	8	0	0	35
NW	2	7	23	4	0	1	37
NNW	0	2	12	9	2	0	25
Variable	0	0	0	0	0	0	0
Total	23	103	277	252	17	1	673

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: July - September 2011
Stability Class - Moderately Stable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	6	2	2	0	0	10
NNE	0	1	6	10	0	0	17
NE	2	3	9	13	0	0	27
ENE	3	0	11	6	0	0	20
E	0	5	10	2	0	0	17
ESE	4	7	8	0	0	0	19
SE	4	6	8	0	0	0	18
SSE	2	1	3	1	0	0	7
S	0	4	8	0	0	0	12
SSW	0	4	7	8	1	0	20
SW	1	1	3	10	0	0	15
WSW	1	2	5	2	0	0	10
W	1	3	4	6	0	0	14
WNW	0	3	9	0	0	0	12
NW	0	5	7	0	0	0	12
NNW	1	6	4	3	0	0	14
Variable	0	0	0	0	0	0	0
Total	19	57	104	63	1	0	244

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: July - September 2011
Stability Class - Extremely Stable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	0	1	0	0	0	2
NNE	1	6	4	0	0	0	11
NE	4	2	12	0	0	0	18
ENE	1	5	6	4	0	0	16
E	1	10	15	4	0	0	30
ESE	1	4	8	2	0	0	15
SE	1	8	2	0	0	0	11
SSE	2	3	0	0	0	0	5
S	1	1	0	0	0	0	2
SSW	0	1	0	1	0	0	2
SW	1	1	2	1	0	0	5
WSW	1	0	3	0	0	0	4
W	0	1	4	0	0	0	5
WNW	0	1	2	0	0	0	3
NW	1	2	3	0	0	0	6
NNW	2	2	4	1	0	0	9
Variable	0	0	0	0	0	0	0
Total	18	47	66	13	0	0	144

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: October - December2011
Stability Class - Extremely Unstable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	7	2	0	0	11
NNE	0	0	0	0	0	0	0
NE	0	0	4	0	0	0	4
ENE	0	1	0	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	4	0	0	0	0	4
SSE	0	4	2	0	0	0	6
S	0	5	12	0	0	0	17
SSW	0	2	13	6	0	0	21
SW	0	0	2	0	0	0	2
WSW	0	0	0	0	0	0	0
W	0	2	4	6	0	0	12
WNW	0	5	10	15	1	0	31
NW	1	7	10	3	0	0	21
NNW	0	7	3	0	0	0	10
Variable	0	0	0	0	0	0	0
Total	1	39	67	32	1	0	140

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 6

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: October - December2011
Stability Class - Moderately Unstable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	3	1	0	0	4
NNE	0	0	1	0	0	0	1
NE	0	0	1	0	0	0	1
ENE	1	1	0	0	0	0	2
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	1	3	2	1	0	0	7
S	0	3	11	3	1	0	18
SSW	0	1	5	6	1	0	13
SW	0	1	4	0	0	0	5
WSW	1	6	4	2	0	0	13
W	0	5	2	3	0	0	10
WNW	0	1	5	1	1	0	8
NW	1	5	3	3	0	0	12
NNW	0	1	1	1	0	0	3
Variable	0	0	0	0	0	0	0
Total	4	27	42	21	3	0	97

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 6

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: October - December2011
Stability Class - Slightly Unstable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	2	1	0	0	4
NNE	0	0	2	3	0	0	5
NE	0	2	6	0	0	0	8
ENE	0	1	0	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	1	1	0	0	0	2
SSE	1	3	5	1	0	0	10
S	0	3	6	4	3	0	16
SSW	0	1	5	8	0	0	14
SW	0	2	4	0	0	0	6
WSW	0	6	1	2	0	0	9
W	0	1	3	3	1	0	8
WNW	0	0	1	5	1	0	7
NW	0	4	4	2	1	0	11
NNW	0	4	1	0	0	0	5
Variable	0	0	0	0	0	0	0
Total	1	29	41	29	6	0	106

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 6

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: October - December2011
Stability Class - Neutral - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	13	77	17	5	0	112
NNE	0	1	14	20	6	0	41
NE	1	2	24	3	1	0	31
ENE	1	6	33	0	0	0	40
E	1	9	2	0	0	0	12
ESE	0	11	0	0	0	0	11
SE	2	7	1	0	0	0	10
SSE	4	19	21	5	0	0	49
S	1	38	53	50	4	0	146
SSW	0	13	41	59	15	2	130
SW	0	11	23	13	4	2	53
WSW	1	11	17	6	2	0	37
W	2	10	24	15	5	0	56
WNW	1	10	25	33	5	0	74
NW	1	11	25	29	3	0	69
NNW	2	19	55	20	1	0	97
Variable	0	0	0	0	0	0	0
Total	17	191	435	270	51	4	968

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 6

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: October - December2011
Stability Class - Slightly Stable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	5	5	0	0	0	10
NNE	3	5	4	0	0	0	12
NE	3	4	3	0	0	0	10
ENE	1	2	0	0	0	0	3
E	0	5	0	0	0	0	5
ESE	6	8	2	0	0	0	16
SE	6	37	7	0	0	0	50
SSE	8	45	28	1	0	0	82
S	2	35	60	4	0	0	101
SSW	3	29	28	12	0	0	72
SW	1	28	34	3	0	0	66
WSW	4	20	19	0	0	0	43
W	4	14	27	9	0	0	54
WNW	4	21	36	2	0	0	63
NW	3	11	10	0	0	0	24
NNW	1	6	2	0	0	0	9
Variable	0	0	0	0	0	0	0
Total	49	275	265	31	0	0	620

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 6

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: October - December2011
Stability Class - Moderately Stable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	3	0	0	0	0	3
NNE	0	2	0	0	0	0	2
NE	3	3	0	0	0	0	6
ENE	3	1	0	0	0	0	4
E	0	3	0	0	0	0	3
ESE	3	7	0	0	0	0	10
SE	2	26	0	0	0	0	28
SSE	6	23	1	0	0	0	30
S	4	11	7	0	0	0	22
SSW	1	11	1	0	0	0	13
SW	4	6	1	0	0	0	11
WSW	0	7	4	0	0	0	11
W	1	9	2	0	0	0	12
WNW	2	8	0	0	0	0	10
NW	0	3	0	0	0	0	3
NNW	1	1	0	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	30	124	16	0	0	0	170

Hours of calm in this stability class: 1
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 6

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: October - December2011
Stability Class - Extremely Stable - 60m-10m Delta-T (F)
Winds Measured at 10 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	0	0	0	0	0	1
NNE	2	0	0	0	0	0	2
NE	13	3	0	0	0	0	16
ENE	5	0	0	0	0	0	5
E	4	2	0	0	0	0	6
ESE	5	2	0	0	0	0	7
SE	4	2	0	0	0	0	6
SSE	10	3	0	0	0	0	13
S	1	1	0	0	0	0	2
SSW	5	0	0	0	0	0	5
SW	4	0	0	0	0	0	4
WSW	4	0	0	0	0	0	4
W	0	0	0	0	0	0	0
WNW	8	0	0	0	0	0	8
NW	6	12	0	0	0	0	18
NNW	2	1	0	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	74	26	0	0	0	0	100

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 6

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: October - December2011
Stability Class - Extremely Unstable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	3	5	1	0	9
NNE	0	0	0	3	0	0	3
NE	0	0	0	0	0	0	0
ENE	0	0	3	1	0	0	4
E	0	0	1	0	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	1	2	0	0	0	3
SSE	0	0	6	2	0	0	8
S	0	0	8	7	1	0	16
SSW	0	0	8	10	2	1	21
SW	0	0	0	2	0	0	2
WSW	0	0	0	0	0	0	0
W	0	0	4	2	2	1	9
WNW	0	0	6	4	15	4	29
NW	0	3	10	6	1	0	20
NNW	1	4	9	1	0	0	15
Variable	0	0	0	0	0	0	0
Total	1	8	60	43	22	6	140

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 6

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: October - December2011
Stability Class - Moderately Unstable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	1	2	1	0	4
NNE	0	0	0	1	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	0	1	1	0	0	2
E	0	0	0	0	0	0	0
ESE	0	1	0	0	0	0	1
SE	0	0	0	0	0	0	0
SSE	1	2	1	1	0	0	5
S	0	1	4	8	3	1	17
SSW	0	2	2	8	5	1	18
SW	0	2	1	2	0	0	5
WSW	0	3	4	1	1	1	10
W	0	5	0	4	0	0	9
WNW	0	1	4	1	2	1	9
NW	0	4	3	2	2	0	11
NNW	1	1	1	1	1	0	5
Variable	0	0	0	0	0	0	0
Total	2	22	22	32	15	4	97

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 6

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: October - December2011
Stability Class - Slightly Unstable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	1	2	1	0	5
NNE	0	0	3	2	1	0	6
NE	0	0	2	2	0	0	4
ENE	0	0	2	3	0	0	5
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	1	0	1	0	0	0	2
SSE	0	1	3	5	0	0	9
S	0	0	4	4	3	5	16
SSW	0	0	4	7	3	1	15
SW	0	2	4	1	0	0	7
WSW	0	4	2	0	2	0	8
W	0	1	1	1	2	1	6
WNW	0	0	0	2	4	1	7
NW	0	0	4	2	3	1	10
NNW	0	3	2	1	0	0	6
Variable	0	0	0	0	0	0	0
Total	1	12	33	32	19	9	106

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 6

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: October - December2011
Stability Class - Neutral - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	6	32	74	14	12	138
NNE	0	2	6	12	15	5	40
NE	0	0	3	10	7	6	26
ENE	1	0	1	38	1	0	41
E	1	0	4	17	1	0	23
ESE	1	1	6	2	0	0	10
SE	1	3	9	0	1	0	14
SSE	1	7	10	10	8	2	38
S	1	4	31	29	54	34	153
SSW	0	7	11	31	41	33	123
SW	0	4	14	21	11	10	60
WSW	0	5	6	15	4	2	32
W	0	7	8	20	11	7	53
WNW	0	4	10	23	18	18	73
NW	1	5	14	21	21	9	71
NNW	0	6	17	33	8	9	73
Variable	0	0	0	0	0	0	0
Total	7	61	182	356	215	147	968

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 6

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: October - December2011
Stability Class - Slightly Stable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	1	3	5	0	0	10
NNE	0	1	6	5	0	0	12
NE	0	0	2	3	3	0	8
ENE	1	0	1	1	0	0	3
E	0	3	0	1	0	0	4
ESE	0	2	2	5	2	0	11
SE	2	3	23	4	1	0	33
SSE	0	4	24	44	12	0	84
S	0	2	22	58	31	1	114
SSW	0	2	15	24	19	6	66
SW	0	4	16	28	14	2	64
WSW	0	3	12	22	4	0	41
W	0	3	9	24	24	0	60
WNW	1	4	9	28	13	0	55
NW	0	6	15	24	0	0	45
NNW	0	2	7	1	0	0	10
Variable	0	0	0	0	0	0	0
Total	5	40	166	277	123	9	620

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 6

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: October - December2011
Stability Class - Moderately Stable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	1	2	0	0	4
NNE	0	0	0	2	0	0	2
NE	0	1	1	1	0	0	3
ENE	0	1	3	2	0	0	6
E	0	2	1	2	0	0	5
ESE	0	0	1	1	0	0	2
SE	0	0	10	1	0	0	11
SSE	1	2	14	15	2	0	34
S	0	2	10	17	4	0	33
SSW	0	3	8	5	0	0	16
SW	1	0	1	5	0	0	7
WSW	0	0	5	10	0	0	15
W	0	2	6	4	0	0	12
WNW	0	0	6	11	0	0	17
NW	0	0	3	0	0	0	3
NNW	0	0	1	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	2	14	71	78	6	0	171

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 6

TABLE 18 (continued)

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

Clinton Power Station

Period of Record: October - December2011
Stability Class - Extremely Stable - 60m-10m Delta-T (F)
Winds Measured at 60 Meters

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	2	1	0	0	3
NNE	0	1	4	0	0	0	5
NE	0	1	1	1	0	0	3
ENE	0	1	3	3	0	0	7
E	1	1	2	2	0	0	6
ESE	0	0	4	0	0	0	4
SE	2	1	4	0	0	0	7
SSE	0	0	10	2	0	0	12
S	0	3	5	2	0	0	10
SSW	0	0	6	0	0	0	6
SW	0	0	4	0	0	0	4
WSW	0	1	6	1	0	0	8
W	0	3	2	0	0	0	5
WNW	0	3	0	0	0	0	3
NW	0	1	1	0	0	0	2
NNW	0	2	10	3	0	0	15
Variable	0	0	0	0	0	0	0
Total	3	18	64	15	0	0	100

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 6

SECTION 8

ODCM OPERATIONAL REMEDIAL REQUIREMENT REPORTS

During the course of 2011, there was one (1) occurrance where Surveillance requirements were not met. The event is documented below.

October 25, 2011 IR 1281881
Per ODCM Table 3.4-1 B.1, Standby Gas Treatment System (SGTS) exhaust is to be sampled and analyzed for noble gas and tritium upon initiation of flow for each release. Contrary to this requirement, Chemistry did not obtain a valid analysis of noble gas for the SGTS train A surveillance run that started at 18:22 on 10/25/11.

Operations informed Chemistry that an SGTS run had started, and Chemistry sampled for noble gas at 19:29 on 10/25/11. The sample was analysed, but an analysis error resulted in non-representative result generation. A review of logbook and software data indicated that the sample was placed in the C detector, but a count was mistakenly started on the D detector.

Although valid SGTS effluent noble gas grab data was not obtained, review of plant parameters at the time of the SGTS run indicates that there were no conditions that would indicate any abnormal releases beyond the normally measured SGTS noble gas activity.

SECTION 9

CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS

In accordance with Section 7.2 of the CPS ODCM, licensee-initiated changes to the liquid, gaseous or solid radioactive waste treatment systems shall be reported in the Annual Radioactive Effluent Release Report.

The Process Control Program (PCP) for radioactive wastes is controlled by Radioactive Wastes procedure, RW-AA-100, with revision (7) as the last revision. No Changes were made in the procedure in 2011.

There were no permanent changes to the Solid Radioactive Waste Treatment System during the course of the 2011 reporting period.

SECTION 10

NEW LOCATIONS FOR DOSE CALCULATION AND / OR ENVIRONMENTAL MONITORING

The following is a summary of the 2011 Annual Land Use Census. It shows changes in locations for dose calculations and / or environmental monitoring identified by the Annual Land Use Census. The distance of the receptor is being listed in the report in lieu of the name of the resident. This is being done to maintain and respect the privacy of the residents.

1.0 Nearest Residence

The nearest residents identified in each of the sixteen (16) sectors are shown below. An asterisk notes any changes from the previous year below (*)

	SECTOR	2011 RESIDENT (miles)	AGE GROUP	2010 RESIDENT (miles)	AGE GROUP
	N	0.9	A	0.9	A
	NNE	0.9	A	0.9	A
	NE	1.3	A	1.3	A
	ENE	1.8	C, A	1.8	C, A
	E	1.0	A	1.0	A
	ESE	3.2	A	3.2	A
*	SE	2.4	T, A	2.4	A
	SSE	1.8	A	1.8	A
	S	3.0	A	3.0	A
	SSW	2.9	A	2.9	A
	SW	0.7	A	0.7	A
*	WSW	2.2	A	2.2	T,A
*	W	1.2	C, T, A	1.2	C, A
	WNW	1.6	A	1.6	A
	NW	1.6	A	1.6	A
	NNW	1.3	A	1.3	A

(**I**)nfant (**C**)hild (**T**)een (**A**)dult

2.0 Broadleaf Garden Census

Eighty-seven (87) gardens within a five (5) mile radius were located in the sixteen (16) geographical sectors surrounding CPS. Twenty-three (23) gardens contained broad leaf vegetation. Although other crops were identified within these areas, they are not addressed as part of this report.

The nearest gardens greater than fifty (50) square-meters and producing broadleaf vegetation identified in each of the sixteen (16) geographical sectors are shown below. An asterisk notes any changes from the previous year below (*).

	SECTOR	2011 GARDENS (miles)	AGE GROUPS	2010 GARDENS (miles)	AGE GROUPS
	N	0.9	A	0.9	A
*	NNE	3.0	T, A	3.0	C, T, A
	NE	2.1	A	2.1	A
*	ENE	1.8	C, A	2.7	A
*	E	2.5	C, A	1.0	A
	ESE	3.3	A	3.3	A
*	SE	4.4	C, A	2.4	A
*	SSE	2.8	A	>5	
*	S	4.1	A	3.0	A
	SSW	>5		> 5	
*	SW	3.6	C, A	3.5	T, A
	WSW	2.3	A	2.3	A
*	W	2.0	C, A	2.1	A
*	WNW	1.6	A	>5	
	NW	>5		>5	
	NNW	1.3	A	1.3	A

(**I**)nfant (**C**)hild (**T**)een (**A**)dult

3.0 Milking Animal Census

Milking animals within the sixteen (16) geographical sectors were located within five (5) miles surrounding CPS. These milking animals were either used for the nursing of their offspring or used for meat production for their own personal use and sold commercially. There were no residents that milked their animals for human consumption.

Milking animals were specifically identified for this report. Although other livestock were identified within these areas, they are not addressed as part of this report.

The nearest milking animals identified in each of the sixteen (16) geographical sectors are shown below. An asterisk notes any changes from the previous year below (*).

	SECTOR	2011 MILKING ANIMALS (miles)	AGE GROUPS	2010 MILKING ANIMALS (miles)	AGE GROUPS
	N	0.9	A	0.9	A
*	NNE	2.3	A	2.3	C, T, A
	NE	>5		> 5	
	ENE	>5		> 5	
	E	>5		> 5	
	ESE	>5		> 5	
	SE	>5		> 5	
*	SSE	2.8	T, A	> 5	
	S	>5		> 5	
	SSW	>5		>5	
	SW	>5		>5	
	WSW	3.4	A	3.4	A
	W	>5		> 5	
	WNW	>5		> 5	
	NW	>5		> 5	
	NNW	1.3	A	1.3	A

(**I**)nfant (**C**)hild (**T**)een (**A**)dult

SECTION 11

CORRECTIONS TO DATA REPORTED IN PREVIOUS REPORTS

1. 2010 Errata Data

A transposition error during creation of a gaseous effluent permit lead to I-131 activity being quantified when no I-131 was detected. The error was rectified, yielding the following corrected data for pages 17 – 19 of the 2010 Annual Radioactive Effluent Release Report (ARERR). Additionally, C-14 release data was reported with a carbon dioxide fraction of 1.00, rather than the 0.95 factor described in the text on page 15 of the 2010 ARERR. This has been corrected to reflect the appropriate 0.95 factor. A bolded value indicates an edited field.

RADIOACTIVE EFFLUENT DATA

TABLE 1
GASEOUS EFFLUENTS - Summation Of All Releases
Data Period: 01 January 2010 – 31 December 2010
Continuous Mixed Mode

	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Est. Total Error, %
A. Fission & Activation Gases						
1. Total Release	Ci	1.11E+00	0.00E+01	0.00E+01	0.00E+01	30
2. Average release rate for period	µCi/sec	1.42E-01	0.00E+01	0.00E+01	0.00E+01	
3. Percent of ODCM Limit	%	*	*	*	*	
B. Iodines						
1. Total Iodine-131	Ci	1.71E-05	0.00E+01	**1.99E-06**	9.19E-07	31
2. Average release rate for period	µCi/sec	2.20E-06	0.00E+01	**2.50E-07**	1.16E-07	
3. Percent of ODCM Limit	%	*	*	*	*	
C. Particulates						
1. Particulates with half-lives >8 days	Ci	8.37E-05	0.00E+01	0.00E+01	0.00E+01	24
2. Average release rate for period	µCi/sec	1.08E-05	0.00E+01	0.00E+01	0.00E+01	
3. Percent of ODCM Limit	%	*	*	*	*	
4. Gross alpha radioactivity	Ci	7.70E-07	3.08E-09	6.27E-07	9.35E-07	
D. Tritium						
1. Total Release	Ci	5.03E+00	4.95E+00	4.91E+00	3.83E+00	21
2. Average release rate for period	µCi/sec	6.47E-01	6.29E-01	6.18E-01	4.81E-01	
3. Percent of ODCM Limit	%	*	*	*	*	
E. Carbon-14						
1. Total Release	Ci	**2.66E+00**	**4.02E+00**	**4.07E+00**	**4.07E+00**	
2. Average release Rate for period	µCi/sec	**3.42E-01**	**5.12E-01**	**5.11E-01**	**5.12E-01**	

* Applicable limits are expressed in terms of dose. See Tables 1A and 1B of this report.

2010 Errata

TABLE 1A

Air Doses Due to Gaseous Releases

Doses per Quarter

Type of Radiation	ODCM Limit	1st Quarter	% of Limit	2nd Quarter	% of Limit	3rd Quarter	% of Limit	4th Quarter	% of Limit
Gamma	5 mrad	9.28E-06	1.86E-04	0.00E+01	0.00E+01	0.00E+01	0.00E+01	0.00E+01	0.00E+01
Beta	10 mrad	1.19E-05	1.19E-05	0.00E+01	0.00E+01	0.00E+01	0.00E+01	0.00E+01	0.00E+01

Doses per Year

Type of Radiation	ODCM Limit	Year	% of Limit
Gamma	10 mrad	9.28E-06	9.28E-05
Beta	20 mrad	1.19E-05	5.95E-05

TABLE 1B

Doses to a Member of the Public Due to Radioiodines, Tritium, Carbon-14, and Particulates in Gaseous Releases

Doses per Quarter

Type of Organ	ODCM Limit	Quarter 1	% of Limit	Quarter 2	% of Limit	Quarter 3	% of Limit	Quarter 4	% of Limit
Bone	7.5 mrem	6.03E-03	8.05E-02	9.12E-03	1.22E-01	9.22E-03	1.23E-01	9.23E-03	1.23E-01
Liver	7.5 mrem	7.28E-05	9.71E-04	7.06E-05	9.41E-04	7.00E-05	9.34E-04	5.45E-05	7.27E-04
TBody	7.5 mrem	1.31E-03	1.74E-02	1.89E-03	2.52E-02	1.91E-03	2.55E-02	1.90E-03	2.53E-02
Thyroid	7.5 mrem	1.16E-04	1.55E-03	7.06E-05	9.42E-04	**7.53E-05**	**1.00E-03**	5.70E-05	7.60E-04
Kidney	7.5 mrem	7.23E-05	9.63E-04	7.06E-05	9.42E-04	7.01E-05	9.35E-04	5.46E-05	7.28E-04
Lung	7.5 mrem	7.25E-05	9.66E-04	7.06E-05	9.42E-04	7.01E-05	9.34E-04	5.46E-05	7.28E-04
GI LLI	7.5 mrem	7.94E-05	1.06E-03	7.06E-05	9.42E-04	7.01E-05	9.34E-04	5.46E-05	7.28E-04

Doses per Year

Type of Organ	ODCM Limit	Year	% of Limit
Bone	15 mrem	3.36E-02	2.24E-01
Liver	15 mrem	2.68E-04	1.79E-03
TBody	15 mrem	7.00E-03	4.67E-02
Thyroid	15 mrem	**3.19E-04**	2.13E-03
Kidney	15 mrem	2.68E-04	1.78E-03
Lung	15 mrem	2.68E-04	1.79E-03
GI LLI	15 mrem	2.75E-04	1.83E-03

All dose calculations were performed using the methodology contained in the CPS ODCM, with the exception of dose due to C-14, which was calculated using methodology included in the EPRI Technical Report 1021106.

2010 Errata

TABLE 2

CLINTON POWER STATION
GASEOUS EFFLUENTS - Nuclides Released

YEAR:2010

Mixed Mode Release	**X**
Elevated Release	
Ground-Level Release	

Continuous Mode	**X**
Batch Mode	

	Units	**Quarter 1[2]**	**Quarter 2[2]**	**Quarter 3[2]**	**Quarter 4[2]**
A. Fission Gases [1]					
Xe-135		1.11E+00	0.00E+01	0.00E+01	0.00E+01
Total for Period	Ci	1.11E+00	0.00E+01	0.00E+01	0.00E+01
B. Iodines [1]					
I-131	Ci	1.71E-05	0.00E+01	**1.99E-06**	9.19E-07
I-133	Ci	0.00E+01	0.00E+01	0.00E+01	4.05E-06
Total for Period	Ci	1.71E-05	0.00E+01	**1.99E-06**	4.97E-06
C. Particulates [1]					
Co-60	Ci	2.11E-05	0.00E+01	0.00E+01	0.00E+01
Y-91M	Ci	1.10E-02	0.00E+01	0.00E+01	1.81E-03
Mo-99	Ci	7.46E-08	0.00E+01	0.00E+01	0.00E+01
Mn-54	Ci	2.96E-05	0.00E+01	0.00E+01	0.00E+01
Cs-138	Ci	0.00E+01	0.00E+01	1.51E-02	0.00E+01
Cr-51	Ci	3.31E-05	0.00E+01	0.00E+01	0.00E+01
Gross Alpha	Ci	7.70E-07	3.08E-09	6.27E-07	9.35E-07
Total for Period	Ci	1.10E-02	3.08E-09	1.51E-02	1.81E-03
D. Tritium [1]					
Total for Period	Ci	5.03E+00	4.95E+00	4.91E+00	3.83E+00
E. Carbon-14 [1]					
Total for Period	Ci	2.80E+00	4.23E+00	4.28E+00	4.28E+00

[1] Ten (10) times the values found in 10CFR20 Appendix B, Table 2, Column 1 are used for all Effluent Concentration Limit [ECL] calculations. For dissolved and entrained noble gases, the concentration is limited to 2.00E-04 µCi/cc total activity.

[2] The lower the value of the actual sample activity - with respect to background activity – the greater the counting error. Proportionally, large errors are reported for the various components of CPS gaseous effluents because of their consistent low sample activity.

An entry of 0.00E+01 indicates that the Minimum Detectable Activity (MDA) concentration of the radionuclide was below the LLD value listed in Table 6.

2. 2009 – 2010 Errata Data

An inconsistency in conversion factors used for converting kilometers to miles for the purpose of reporting nearest resident data lead to rounding issues that in some cases gave a false indication of a new census location as reported in the Annual Radioactive Effluent Release Report. Application of a consistent conversion factor yielded the following corrected data for page 105 of the 2010 and 2009 Annual Radioactive Effluent Release Reports, respectively. A bolded value indicates an edited field.

SECTION 10

NEW LOCATIONS FOR DOSE CALCULATION AND / OR ENVIRONMENTAL MONITORING

The following is a summary of the 2010 Annual Land Use Census. It shows changes in locations for dose calculations and / or environmental monitoring identified by the Annual Land Use Census. The distance of the receptor is being listed in the report in lieu of the name of the resident. This is being done to maintain and respect the privacy of the residents.

1.0 Nearest Residence

The nearest residents identified in each of the sixteen (16) sectors are shown below. An asterisk notes any changes from the previous year below (*)

	SECTOR	2010 RESIDENT (miles)	AGE GROUP	2009 RESIDENT (miles)	AGE GROUP
	N	0.9	A	0.9	A
	NNE	**0.9**	C, A	**0.9**	C, A
	NE	1.3	A	1.3	A
	ENE	1.8	C, A	1.8	C, A
	E	1.0	A	1.0	A
	ESE	3.2	A	3.2	A
*	SE	2.4	A	2.4	C, T, A
	SSE	**1.8**	A	**1.8**	A
	S	3.0	A	3.0	A
	SSW	2.9	A	2.9	A
	SW	0.7	A	0.7	A
*	WSW	2.2	T, A	1.6	A
	W	1.2	C, A	1.2	C, A
	WNW	1.6	A	1.6	A
	NW	1.6	A	1.6	A
	NNW	1.3	A	1.3	A

(**I**)nfant (**C**)hild (**T**)een (**A**)dult

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The nearest residents identified in each of the sixteen (16) sectors are shown below. An asterisk notes any changes from the previous year below (*)

	SECTOR	2009 RESIDENT (miles)	AGE GROUP	2008 RESIDENT (miles)	AGE GROUP
	N	0.9	A	0.9	A
	NNE	**0.9**	C, A	**0.9**	C, A
	NE	1.3	A	1.3	A
	ENE	**1.8**	C, A	1.8	C, A
	E	1.0	A	1.0	A
	ESE	3.2	A	3.2	A
	SE	2.4	C, T, A	2.4	C, T, A
	SSE	**1.8**	A	1.8	A
	S	3.0	A	3.0	A
	SSW	2.9	A	2.9	A
	SW	0.7	A	0.7	A
	WSW	1.6	A	1.6	A
	W	1.2	C, A	1.2	C, A
	WNW	1.6	A	1.6	A
	NW	1.6	A	1.6	A
*	NNW	**1.3**	A	1.7	A

(**I**)nfant (**C**)hild (**T**)een (**A**)dult

SECTION 12

CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL

There were no changes to the Offsite Dose Calculation Manual in 2011.