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SVP-11-029

10 CFR 50.36a

April 27, 2011

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

Quad Cities Nuclear Power Station, Units 1 and 2  
Renewed Facility Operating License Nos. DPR-29 and DPR-30  
NRC Docket Nos. 50-254 and 50-265

Subject:      Radioactive Effluent Release Report for 2010

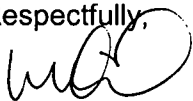
Reference:    Letter from Timothy J. Tulon (Exelon Generation Company, LLC) to U. S. NRC,  
"Radioactive Effluent Release Report for 2009," dated April 28, 2010

Pursuant to Technical Specifications Section 5.6.3 and 10 CFR 50.36a, enclosed is the Quad Cities Nuclear Power Station Radioactive Effluent Release Report for January through December 2010. There was one abnormal release that occurred during 2010. This release resulted in a minor contribution to normal plant radioactive effluents and is discussed in detail in the report.

In addition, enclosed (Attachment 2) is a correction to the Radioactive Effluent Release Report for 2009 which was submitted by the referenced letter.

Should you have any questions concerning this letter, please contact Mr. Wally J. Beck at (309) 227-2800.

Respectfully,



William R. Gideon  
Site Vice President  
Quad Cities Nuclear Power Station

Attachments:

1. 2010 Annual Radioactive Effluent Release Report
2. Errata/Correction to the 2009 Annual Radioactive Effluent Release Report

cc:      Regional Administrator – NRC Region III  
          NRC Senior Resident Inspector – Quad Cities Nuclear Power Station

JE48  
NRR

**Attachment 1**

**2010 Annual Radioactive Effluent Release Report**

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Effluent & Waste Disposable Summary**

Gaseous Effluents – Summation of all Releases

Period: January – December 2010

Unit: 1 & 2

<b>A. Fission &amp; Activation Gases</b>	<b>Unit</b>	<b>Quarter 1</b>	<b>Quarter 2</b>	<b>Quarter 3</b>	<b>Quarter 4</b>	<b>Total</b>	<b>Est. Total Error %</b>
1. Total Release	Ci	7.72E+01	9.43E+01	1.14E+02	1.16E+02	4.02E+02	13.1
2. Average release rate for the period	μCi/sec	9.93E+00	1.20E+01	1.44E+01	1.46E+01		
3. Percent of ODCM limit <sup>(1)</sup>	%γ	7.69E-03	1.11E-02	1.54E-02	1.22E-02		
	%β	1.99E-03	3.38E-03	4.13E-03	3.20E-03		

<b>B. Iodine</b>							
1. Total Iodine – 131	Ci	1.60E-03	2.32E-03	2.03E-03	1.92E-03	7.87E-03	41.6
2. Average release rate for the period	μCi/sec	2.06E-04	2.95E-04	2.56E-04	2.41E-04		
3. Percent of ODCM limit	%	N/A	N/A	N/A	N/A		

<b>C. Particulates</b>							
1. Total particulates	Ci	5.06E-04	4.87E-04	1.43E-03	1.43E-03	3.85E-03	32.1
2. Average release rate for the period	μCi/sec	6.51E-05	6.19E-05	1.79E-04	1.80E-04		
3. Percent of ODCM limit	%	N/A	N/A	N/A	N/A		
4. Gross alpha radioactivity	Ci	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>		

<b>D. Tritium</b>							
1. Total Release	Ci	2.06E+01	2.12E+01	2.20E+01	1.56E+01	7.94E+01	6.3
2. Average release rate for the period	μCi/sec	2.65E+00	2.70E+00	2.76E+00	1.96E+00		
3. Percent of ODCM limit	%	N/A	N/A	N/A	N/A		

<b>E. Carbon - 14</b>							
1. Total Release	Ci	6.61E+00	6.66E+00	7.25E+00	7.48E+00	2.80E+01	N/A
2. Average release rate for the period	μCi/sec	8.50E-01	8.47E-01	9.12E-01	9.41E-01		
3. Percent of ODCM limit	%	N/A	N/A	N/A	N/A		

<b>F. Iodine 131 &amp; 133, Tritium, Particulate, and C-14</b>							
1. Percent of ODCM limit	%	3.52	5.09	4.64	4.28		

(1) % Noble gas gamma/noble gas beta dose limits

(2) Gross alpha LLD reported on page 6 of 72

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Effluent & Waste Disposable Summary**

Gaseous Effluents Release Point           Main Chimney (Elevated)          

Period:           January – December 2010           Unit:           1 & 2          

Nuclides Released	Unit	Continuous Mode					Batch Mode				
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
<b>1. Fission gases</b>											
Kr-85	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Kr-85m	Ci	3.78E-01	1.25E+00	4.72E-01	4.98E-01	2.60E+00	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Kr-87	Ci	2.38E+00	2.52E+00	3.05E+00	3.31E+00	1.13E+01	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Kr-88	Ci	1.53E+00	1.75E+00	1.93E+00	2.04E+00	7.26E+00	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Xe-133	Ci	5.37E-01	2.02E+00	6.26E-01	6.20E-01	3.80E+00	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Xe-135	Ci	1.94E+00	2.04E+00	2.53E+00	3.28E+00	9.79E+00	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Xe-135m	Ci	1.42E+01	1.64E+01	1.93E+01	2.15E+01	7.15E+01	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Xe-138	Ci	5.59E+01	6.23E+01	7.77E+01	8.25E+01	2.78E+02	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Ar-41	Ci	1.90E-01	8.89E-01	1.80E-01	1.15E-01	1.37E+00	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Total for Period	Ci	7.71E+01	8.92E+01	1.06E+02	1.14E+02	3.86E+02	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
<b>2. Iodines</b>											
I-131	Ci	1.60E-03	2.32E-03	1.96E-03	1.91E-03	7.79E-03	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
I-133	Ci	7.48E-03	1.32E-02	1.17E-02	1.21E-02	4.46E-02	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
I-135	Ci	1.50E-03	5.52E-03	4.16E-03	<LLD <sup>(1)</sup>	1.12E-02	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Total for Period	Ci	1.06E-02	2.11E-02	1.78E-02	1.40E-02	6.35E-02	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
<b>3. Particulates</b>											
Sr-89	Ci	1.28E-04	1.42E-04	3.93E-04	4.22E-04	2.01E-03	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Sr-90	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Cs-134	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Cs-137	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	6.51E-06	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Ba-140	Ci	1.82E-04	6.13E-05	9.18E-04	8.54E-04	2.01E-03	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
La-140	Ci	2.46E-05	1.48E-04	4.78E-04	6.24E-04	1.28E-03	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Cr-51	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Mn-54	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Co-58	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Co-60	Ci	2.13E-05	<LLD <sup>(1)</sup>	4.52E-05	4.95E-05	1.16E-04	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Mo-99	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Ag-110m	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Ce-141	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Ce-144	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Total for Period	Ci	3.56E-04	3.52E-04	1.84E-03	4.50E-03	5.42E-03	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>

- (1) Gaseous LLD's reported on page 6 of 72
- (2) No gaseous batch releases

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Effluent & Waste Disposable Summary**

Gaseous Effluents Release Point Reactor Vents (Mixed Mode)

Period: January – December 2010

Unit: 1 & 2

Nuclides Released	Unit	Continuous Mode					Batch Mode				
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
<b>1. Fission gases</b>											
Kr-85	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Kr-85m	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Kr-87	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Kr-88	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Xe-133	Ci	2.28E-02	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	1.17E-01	1.39E-01	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Xe-133m	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Xe-135	Ci	9.47E-02	4.03E+00	4.03E+00	8.79E-01	9.03E+00	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Xe-135m	Ci	3.08E-02	1.08E+00	4.43E+00	9.03E-01	6.45E+00	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Xe-138	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Ar-41	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Total for Period	Ci	1.48E-01	5.12E+00	8.46E+00	1.90E+00	1.56E+01	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
<b>2. Iodines</b>											
I-131	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	7.53E-05	7.69E-06	8.30E-05	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
I-133	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	2.33E-04	<LLD <sup>(1)</sup>	2.33E-04	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
I-135	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Total for Period	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	3.08E-04	7.69E-06	3.16E-04	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
<b>3. Particulates</b>											
Sr-89	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Sr-90	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Cs-134	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Cs-137	Ci	<LLD <sup>(1)</sup>	2.80E-06	9.99E-06	3.62E-06	1.64E-05	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Ba-140	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
La-140	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Cr-51	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Mn-54	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Co-58	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Co-60	Ci	1.75E-04	2.80E-04	5.30E-05	1.03E-04	6.11E-04	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Mo-99	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Ag-110m	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Ce-141	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Ce-144	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Zn-65	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>
Total for Period	Ci	1.75E-04	2.83E-04	6.29E-05	1.06E-04	6.27E-04	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>

(1) Gaseous LLD's reported on page 6 of 72

(2) No gaseous batch releases

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Effluent & Waste Disposal Summary**

Liquid Effluents – Summation of all Releases

Period: January – December 2010

Unit: 1 & 2

<b>A. Fission &amp; Activation Products</b>	<b>Unit</b>	<b>Quarter 1</b>	<b>Quarter 2</b>	<b>Quarter 3</b>	<b>Quarter 4</b>	<b>Total</b>	<b>Est. Total Error %</b>
1. Total Release (not including tritium, gases & alpha)	Ci	4.77E-04	3.27E-03	1.79E-02	<LLD <sup>(2)</sup>	2.17E-02	4.1
2. Average diluted concentration during period	μCi/mL	3.09E-10	1.27E-08	5.79E-09	<LLD <sup>(2)</sup>		
3. Percent of applicable limit <sup>(1)</sup>	WB	2.77E-02	3.01E-01	9.10E-02	<LLD <sup>(2)</sup>		
	Organ	2.26E-02	1.51E-01	5.73E-02	<LLD <sup>(2)</sup>		
4. Maximum diluted concentration during batch discharges	μCi/mL	3.24E-10	1.27E-08	6.39E-09	<LLD <sup>(2)</sup>		

<b>B. Tritium</b>							
1. Total Release <sup>(3)</sup>	Ci	6.06E+00	3.82E+00	4.89E+00	3.35E+00	1.81E+01	4.1
2. Average diluted concentration during period	μCi/mL	3.94E-06	1.48E-05	1.58E-06	8.98E-09		
3. Percent of applicable limit	%	6.03E-02	6.63E-02	1.66E-02	2.99E-04		

<b>C. Dissolved &amp; Entrained Gases</b>							
1. Total Release	Ci	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	2.73E-04	<LLD <sup>(2)</sup>	2.73E-04	4.1
2. Average diluted concentration during period	μCi/mL	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	8.85E-11	<LLD <sup>(2)</sup>		
3. Percent of applicable limit	%	N/A	N/A	4.43E-05	N/A		

<b>D. Gross Alpha Activity</b>							
1. Total Release	Ci	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	14.8

<b>E. Volume Of Waste Released (prior to dilution)</b>	Liters	4.04E+05	1.01E+05	4.06E+05	0.00E+00	9.10E+05	
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<b>F. Volume Of Dilution Water Used During Period</b>	Liters	2.38E+11	4.26E+11	4.90E+11	3.73E+11	1.53E+12	
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- (1) Whole body/organ (ODCM)
- (2) Liquid LLD's reported on page 7 of 72
- (3) Total Ci's include those considered in Abnormal Release

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Effluent & Waste Disposal Summary**

Liquid Effluents Release Point Mississippi River

Period: January – December 2010

Unit: 1 & 2

Nuclides Released	Unit	Continuous Mode					Batch Mode				
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
Sr-89	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	2.21E-05	6.79E-05	N/A <sup>(2)</sup>	8.99E-05
Sr-90	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	3.81E-07	1.64E-06	1.11E-06	N/A <sup>(2)</sup>	3.14E-06
Cs-134	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	<LLD <sup>(1)</sup>
Cs-137	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	2.51E-05	1.08E-04	7.33E-05	N/A <sup>(2)</sup>	2.06E-04
I-131	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	<LLD <sup>(1)</sup>
Co-58	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	1.88E-04	5.74E-04	N/A <sup>(2)</sup>	7.62E-04
Co-60	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	4.33E-05	6.83E-04	7.09E-03	N/A <sup>(2)</sup>	7.82E-03
Fe-55	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	1.15E-04	1.82E-03	5.15E-03	N/A <sup>(2)</sup>	7.08E-03
Fe-59	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	<LLD <sup>(1)</sup>
Zn-65	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	1.53E-04	8.11E-04	N/A <sup>(2)</sup>	9.64E-04
Mn-54	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	1.08E-04	3.84E-03	N/A <sup>(2)</sup>	3.94E-03
Cr-51	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	<LLD <sup>(1)</sup>
Mo-99	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	N/A <sup>(2)</sup>	<LLD <sup>(1)</sup>
Ag-110m	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	1.20E-04	3.05E-05	N/A <sup>(2)</sup>	1.51E-04
Ni-63	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	2.93E-04	7.31E-05	2.94E-04	N/A <sup>(2)</sup>	6.60E-04
Total for Period	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	4.77E-04	3.27E-03	1.79E-02	N/A <sup>(2)</sup>	2.17E-02
Xe-133	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	2.23E-04	N/A <sup>(2)</sup>	2.23E-04
Xe-135	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	4.98E-05	N/A <sup>(2)</sup>	4.98E-05

- (1) Liquid LLD's reported on page 7 of 72
- (2) No batch releases during 4<sup>th</sup> Quarter 2010

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Effluent & Waste Disposable Summary**

**GASEOUS EFFLUENT LLD's (Most Restrictive)  
CONTINUOUS MODE**

NUCLIDE LOWER LIMITS OF DETECTION (LLD's) 1. Fission gases	UNIT	LLD Value	ODCM Required LLD
Kr-85	uCi/cc	3.02E-06	None
Kr-85m	uCi/cc	1.35E-08	None
Kr-87	uCi/cc	5.33E-08	1E-04
Kr-88	uCi/cc	5.57E-08	1E-04
Xe-133	uCi/cc	2.89E-08	1E-04
Xe-133m	uCi/cc	9.51E-08	1E-04
Xe-135	uCi/cc	1.12E-08	1E-04
Xe-135m	uCi/cc	1.24E-06	None
Xe-138	uCi/cc	3.12E-06	1E-04
Ar-41	uCi/cc	3.14E-08	None
NUCLIDE LOWER LIMITS OF DETECTION (LLD's) 2. Iodines	UNIT	LLD Value	ODCM Required LLD*
I-131	uCi/cc	5.85E-13	1E-12
I-133	uCi/cc	7.54E-12	1E-10
I-135	uCi/cc	1.29E-08	None
NUCLIDE LOWER LIMITS OF DETECTION (LLD's) 3. Particulates and Tritium	UNIT	LLD Value	ODCM Required LLD*
H-3	uCi/cc	1.01E-11	1E-06
Sr-89	uCi/cc	6.85E-13	1E-11
Sr-90	uCi/cc	1.26E-13	1E-11
Cs-134	uCi/cc	5.04E-13	1E-11
Cs-137	uCi/cc	6.14E-13	1E-11
Ba-140	uCi/cc	1.79E-12	None
La-140	uCi/cc	2.61E-12	None
Mn-54	uCi/cc	4.19E-13	1E-11
Co-58	uCi/cc	5.42E-13	1E-11
Fe-59	uCi/cc	9.97E-13	1E-11
Co-60	uCi/cc	8.54E-13	1E-11
Zn-65	uCi/cc	9.33E-13	1E-11
Mo-99	uCi/cc	8.34E-12	1E-11
Ce-141	uCi/cc	5.71E-13	1E-11
Ce-144	uCi/cc	2.17E-12	1E-11
Ag-110m	uCi/cc	4.06E-13	None
Cr-51	uCi/cc	2.83E-12	None
Gross Alpha	uCi/cc	2.72E-12	1E-11

\* ODCM REC LLD's for weekly samples. These may be increased by a factor of 10 for daily samples



**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Effluent & Waste Disposable Summary**

**LIQUID EFFLUENT LLD's (Most Restrictive)  
BATCH MODE**

NUCLIDE LOWER LIMITS OF DETECTION (LLD's)	UNIT	LLD Value	ODCM Required LLD
<b>3. Liquids</b>			
H-3	uCi/cc	1.06E-06	1E-05
Sr-89	uCi/cc	1.86E-08	5E-08
Sr-90	uCi/cc	8.09E-09	5E-08
Fe-55	uCi/cc	3.80E-07	1E-06
Kr-85	uCi/cc	1.65E-05	None
Kr-87	uCi/cc	1.93E-07	1E-05
Kr-88	uCi/cc	2.01E-07	1E-05
Xe-133	uCi/cc	1.36E-07	1E-05
Xe-133m	uCi/cc	4.17E-07	1E-05
Xe-135	uCi/cc	5.90E-08	1E-05
Xe-138	uCi/cc	5.87E-06	1E-05
Mn-54	uCi/cc	6.98E-08	5E-07
Co-58	uCi/cc	6.60E-08	5E-07
Co-60	uCi/cc	7.85E-08	5E-07
Zn-65	uCi/cc	1.05E-07	5E-07
Mo-99	uCi/cc	3.78E-07	5E-07
I-131	uCi/cc	5.85E-08	1E-06
Cs-134	uCi/cc	9.75E-08	5E-07
Cs-137	uCi/cc	9.95E-08	5E-07
Ce-141	uCi/cc	8.38E-08	5E-07
Ce-144	uCi/cc	3.62E-07	5E-06
Gross Alpha	uCi/cc	9.90E-08	1E-07
Fe-59	uCi/cc	1.28E-07	5E-07
Ni-63	uCi/cc	7.70E-08	None
Cr-51	uCi/cc	3.88E-07	None
Ag-110m	uCi/cc	6.46E-08	None

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Supplemental Information**

Facility: Quad Cities Nuclear Power Station (QCNPS) January – December 2010

Licensee: Exelon Generation Company

1. Regulatory Limits

a. For Noble Gases:

Dose rate (per site)

1. Less than 500 mrem/year to the whole body
2. Less than 3000 mrem/year to the skin.

Dose Gamma Radiation (per unit)

1. Less than or equal to 5 mrad/quarter.
2. Less than or equal to 10 mrad/year.

Beta Radiation (per unit)

1. Less than or equal to 10 mrad/quarter.
2. Less than or equal to 20 mrad/year.

b,c. For Iodine-131, Iodine-133, Carbon-14, and for all radionuclides in particulate form with half-lives greater than 8 days.

Dose Rate

1. Less than 1500 mrem/year. (per site)

Dose (per unit)

1. Less than or equal to 7.5 mrem/quarter.
2. Less than or equal to 15 mrem/year.

d. For Liquid: (per unit)

Less than or equal to 1.5 mrem to the whole body during any calendar quarter.  
Less than or equal to 5 mrem to any organ during any calendar quarter.  
Less than or equal to 3 mrem to the whole body during any calendar year.  
Less than or equal to 10 mrem to any organ during any calendar year.

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Supplemental Information**

**2. Maximum Permissible Concentration**

- a,b,c. For fission and activation gases, iodines, and particulates with half-lives greater than 8 days, allowable release limits are calculated by solving equations 2.0-5 and 2.0-6 from the Offsite Dose Calculation Manual Part II Chapter 2. The alarm setpoint is conservatively set at approximately 10% of the 10CFR20 limit.
- d. For liquid effluents, with the exception of tritium and dissolved & entrained noble gases, allowable release limits are calculated by solving equations 2.0-1 and 2.0-2 from the Offsite Dose Calculation Manual Part II Chapter 2. The MPC values used for the monitors were as follows:

Radwaste discharge	1.55E-05 $\mu\text{Ci/ml}$
Service water	1.00E-05 $\mu\text{Ci/ml}$

The allowable release limits for tritium and dissolved & entrained noble gases are as follows :

Tritium : 3.00E-03 uCi/mL taken from Reg Guide 1.21

Dissolved & Entrained noble gases: 2.00E-04 uCi/mL taken from NUREG 1302

**3. Average Energy**

The average gamma energy used to calculate the alarm setpoints for the noble gas monitors was:

- 9.67E-01 MeV for Quarter 1
- 9.42E-01 MeV for Quarter 2
- 9.74E-01 MeV for Quarter 3
- 9.73E-01 MeV for Quarter 4

**4. Measurements and Approximations of Total Radioactivity**

- a. Fission and Activation Gases
- b. Iodines
- c. Particulates
- d. Carbon-14

a,b,c. The main chimney and reactor building ventilation exhaust systems are continually monitored for iodines and particulates. These samples are pulled every 7 days and analyzed by gamma isotopic. The particulate papers are composited every 31 days and sent to a vendor for Sr-89/90 and gross alpha analysis. Noble gas grab samples are pulled and analyzed by gamma isotopic weekly. Tritium samples are pulled and analyzed every month.

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Supplemental Information**

The Sr-89/90 and gross alpha curies released values reported are actual. On a real time basis, the portion of the “percent of applicable limit” for these contributors is reported based on projections using the previous available data. The actual results are obtained by editing the ODCM software inputs when the vendor results become available. Therefore, the “percent of applicable limits” in this report are actual.

The continuous strip chart recorders for the monitors on the release points are reviewed for spikes and the activity released is calculated. An additional calculated activity for noble gases is added to the main chimney release each month. This calculation is done because most of the grab samples show less than the lower limit of detection due to the low amount of activity and the large dilution flow at the sample point. The calculation takes into account the normal offgas train and the gland steam contribution to the release.

The average flow at the release points is used to calculate the curies released.

There are no ground level releases from QCNPS. All monitored releases are considered either elevated or mixed mode.

d. Carbon-14

Quad Cities has estimated its Carbon-14 generation and release in accordance with EPRI Technical Report 1021106, “Estimation of Carbon-14 in Nuclear Power Plant Gaseous Effluents”. The Quad Cities estimate of  $2.80\text{E}+01$  Ci of Carbon-14 and the resultant  $2.80\text{E}+01$  Ci  $^{14}\text{CO}_2$  released is based upon a normalized Carbon-14 production rate of  $5.10\text{E}+00$  Ci/GWTh-yr, a gaseous release fraction of 1.00, a Carbon-14  $\text{CO}_2$  fraction of 1.00, a reactor power rating of 2957 MWTh/unit for 2 units, and a calculated Effective Full Power days based upon Total Core Therms data.

e. Liquid Effluents

The River Discharge Tanks are analyzed before discharge by gamma isotopic. A composite representative portion of this sample is saved. This is composited with other discharges that occurred every 31 days and is analyzed for tritium and gross alpha. The monthly composites are composited quarterly and sent to a vendor for Sr-89/90 and Fe-55 analyses. The discharge bay is sampled every 31 days and analyzed by gamma isotopic for tritium and gross alpha. It is sampled quarterly and sent to a vendor for Sr-89/90 and Fe-55 analysis. On a real time basis, the portion of the “percent of applicable limit” for these contributors is based on projections using scaling factors. The actual results are obtained by editing the ODCM software inputs when the vendor results become available. Therefore, the “percent of applicable limits” in this report are actual.

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Supplemental Information**

The tank volumes and activities are used to calculate the curies released for the River Discharge Tank. The total water released during the quarter and the activity is used to calculate the diluted activity released at the discharge bay, from batch discharges.

f. Estimated Total Error Percent

The estimated total error percents were calculated by taking the square root of the sum of the squares of errors for sampling and measurement parameters.

g. Less than the Lower Limit of Detection (<LLD)

Samples are analyzed such that the Technical Specification LLD requirements are met. When a nuclide is not detected during the quarter, then <LLD is reported. The most conservative LLD's used for counting effluent samples are included in this report.

5. Batch Releases

a. Liquid

1.	Number of releases:	5
2.	Total time:	3.73E+03 minutes
3.	Maximum time:	8.80E+02 minutes
4.	Average time:	7.45E+02 minutes
5.	Minimum time:	3.99E+02 minutes
6.	Average stream flow:	64.7 gpm (discharge) 3.29E+05 gpm (dilution)

b. Gaseous

1. NONE

6. Abnormal Releases

a. Liquid

1. A report received in June 2010 from Quad Cities' hydrology vendor provided an estimate of the remaining tritium activity in the groundwater plume as a result of the RHR suction line leak discovered in late May 2008. There have been no indications of any measurable radioactivity leaving the site through the periphery groundwater monitoring wells. Tritium inputs into the groundwater plume from the time that the leak was identified through the end of 2008 were included in the 2008 ARERR. Based on the most current report, it has been conservatively assumed that the entirety of the estimated

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Supplemental Information**

13.3 curies of tritium present in the groundwater plume have been released through the station's continuous liquid release pathway. This abnormal release has been divided evenly throughout the 12 months and included in the 2010 monthly effluent calculations.

b. Gaseous

1. NONE

7. Radiological Impact on Man

a. Liquid Dose to a Member of the Public for 2010

Total Body: 5.72E-03 mrem

Organ: 1.05E-02 mrem

b. Gaseous Dose to a Member of the Public for 2010

Total Body: 4.30E-02 mrem

Skin: 1.27E-03 mrem

Organ (Particulate/Iodine): 1.32E+00 mrem

The Quad Cities calculated annual dose from Carbon-14 releases have been calculated using the methodologies outlined in the ODCM. The resultant estimated releases of Carbon-14 resulted in a dose contribution of 3.63E-02 mrem/yr to organ dose (2.75%) and 3.87E-02 mrem/yr to total body dose (90%). The maximum expected annual dose contribution from Carbon-14 has been calculated to be 2.08E-01 mrem/yr Organ Dose and 4.15E-02 mrem/yr Total Body dose. This was obtained using maximum gross thermal capacity maintained for 365 days for both units.

c. Direct Radiation Dose to a Member of the Public for 2010

Total Body: 7.43E+00 mrem

29.7% of 40 CFR 190 Limit of 25 mrem/year (Whole Body and Organ). Thyroid dose of 1.76% of 40 CFR 190 Limit (75 mrem).

d. Total Body Doses to the Population and Average Doses to Individuals in the Population from All Receiving-Water-Related-Pathways:

Not applicable for QCNPS

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Supplemental Information**

- e. Total Body Doses to the Population and Average Doses to Individuals in the Population from Gaseous Effluents to a Distance of 50 Miles:

Not applicable for QCNPS

- f. Doses From Liquid and Gaseous Effluent to Members of the Public Due to Their Activities Inside the Site Boundary for the Report Period:

Not applicable for QCNPS. Any member of the public that is onsite for a significant period will be issued a Thermo Luminescent Dosimeter (TLD).

- g. Liquid and Gaseous Effluent Radiation Monitors and Instrumentation Unavailability for the Period Beyond the Requirements of the ODCM, Including Sampling Deviation:

No ODCM monitors were unavailable for greater than 30 days in 2010.

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**10CFR20.1301(a)(1) Compliance Assessment**

Quad Cities Station Unit One and Unit Two

Assessment Period 01/01/2010 THROUGH 12/31/2010

10CFR20.1301(a)(1) Limit 100.0 mrem/year

**Quad Cities Unit 1**

	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Year Total	% of Limit
TEDE (mrem)	1.03E+00	1.16E+00	1.11E+00	1.13E+00	4.43E+00	<b>4.43</b>

**Quad Cities Unit 2**

	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Year Total	% of Limit
TEDE (mrem)	8.52E-01	9.98E-01	1.13E+00	1.20E+00	4.18E+00	<b>4.18</b>

Submitted by: \_\_\_\_\_

*BASHAM, DAVID C.*  
David C. Basham

Date: 21 APR 2011

Reviewed by: \_\_\_\_\_

*James G. Woodridge*  
James G. Woodridge

Date: 4-21-11



**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Maximum Doses Resulting From Airborne Releases/Compliance Status**

*Quad Cities Station - Unit One/Unit Two*

Type of Dose	Unit One Annual	Unit Two Annual	10 CFR 50 APP. I Yearly Objective	Unit One % of APP. I	Unit Two % of APP. I
Gamma Air (mrad)	9.95E-04	9.95E-04	10.0	9.95E-02	9.95E-02
Beta Air (mrad)	5.45E-04	5.45E-04	20.0	2.73E-03	2.73E-03
Organ (mrem)	1.45E-01	1.45E-01	15.0	9.67E-01	9.67E-01
Critical Person	Infant	Infant		Infant	Infant
Critical Organ	Thyroid	Thyroid		Thyroid	Thyroid

The calculation of the above doses was done by an independent contractor utilizing GASPAR, an NRC approved program. The calculation was done with current year meteorological data and equation multipliers outlined in Reg Guide 1.109 and NUREG 0133.

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: January - March 2010  
Stability Class - Extremely Unstable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	1	0	0	0	1
NNE	0	0	4	4	0	0	8
NE	0	0	7	8	0	0	15
ENE	0	0	4	1	0	0	5
E	0	0	2	3	0	0	5
ESE	0	0	1	0	0	0	1
SE	0	1	9	0	0	0	10
SSE	0	1	2	0	0	0	3
S	0	1	7	0	0	0	8
SSW	0	2	5	0	0	0	7
SW	0	5	6	0	0	0	11
WSW	0	0	2	0	0	0	2
W	0	1	3	0	0	0	4
WNW	0	0	1	0	0	0	1
NW	0	0	1	0	0	0	1
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	11	55	16	0	0	82

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 1  
Hours of missing stability measurements in all stability classes: 49

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: January - March 2010  
Stability Class - Moderately Unstable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

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

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 1  
Hours of missing stability measurements in all stability classes: 49

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: January - March 2010  
Stability Class - Slightly Unstable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	1	2	0	0	3
NE	0	0	6	1	0	0	7
ENE	0	1	0	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	1	1	0	0	0	2
SE	0	3	2	0	0	0	5
SSE	0	0	0	0	0	0	0
S	0	1	0	0	0	0	1
SSW	0	1	0	0	0	0	1
SW	0	0	1	0	0	0	1
WSW	0	1	0	0	0	0	1
W	0	6	13	3	0	0	22
WNW	0	3	15	0	0	0	18
NW	0	8	22	0	0	0	30
NNW	0	4	5	0	0	0	9
Variable	0	0	0	0	0	0	0
Total	0	29	66	6	0	0	101

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: 49

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: January - March 2010  
Stability Class - Neutral - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	23	27	1	0	0	52
NNE	8	17	52	10	0	0	87
NE	8	17	28	7	0	0	60
ENE	7	17	10	0	0	0	34
E	12	49	6	2	0	0	69
ESE	9	53	20	3	0	0	85
SE	15	23	4	0	0	0	42
SSE	7	3	0	0	0	0	10
S	4	5	0	0	0	0	9
SSW	4	10	1	0	0	0	15
SW	2	17	5	0	0	0	24
WSW	7	27	17	0	0	0	51
W	4	87	80	14	0	0	185
WNW	8	61	65	11	0	0	145
NW	6	73	48	0	0	0	127
NNW	10	49	15	0	0	0	74
Variable	0	0	0	0	0	0	0
Total	112	531	378	48	0	0	1069

Hours of calm in this stability class: 2  
Hours of missing wind measurements in this stability class: 42  
Hours of missing stability measurements in all stability classes: 49

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: January - March 2010  
Stability Class - Slightly Stable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	12	12	3	0	0	0	27
NNE	11	13	2	0	0	0	26
NE	8	22	4	0	0	0	34
ENE	9	21	1	0	0	0	31
E	7	11	0	0	0	0	18
ESE	13	34	14	0	0	0	61
SE	6	6	3	0	0	0	15
SSE	10	7	3	0	0	0	20
S	2	7	0	0	0	0	9
SSW	4	8	0	0	0	0	12
SW	6	11	0	0	0	0	17
WSW	8	10	2	0	0	0	20
W	13	81	5	0	0	0	99
WNW	23	91	5	0	0	0	119
NW	9	33	6	0	0	0	48
NNW	5	11	1	0	0	0	17
Variable	1	0	0	0	0	0	1
Total	147	378	49	0	0	0	574

Hours of calm in this stability class: 9  
Hours of missing wind measurements in this stability class: 6  
Hours of missing stability measurements in all stability classes: 49

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: January - March 2010  
Stability Class - Moderately Stable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	6	10	0	0	0	0	16
NNE	1	2	0	0	0	0	3
NE	2	4	0	0	0	0	6
ENE	5	4	0	0	0	0	9
E	11	2	0	0	0	0	13
ESE	6	11	2	0	0	0	19
SE	2	4	0	0	0	0	6
SSE	0	0	0	0	0	0	0
S	9	2	0	0	0	0	11
SSW	7	4	0	0	0	0	11
SW	0	3	0	0	0	0	3
WSW	1	0	0	0	0	0	1
W	2	10	0	0	0	0	12
WNW	6	16	0	0	0	0	22
NW	8	2	0	0	0	0	10
NNW	1	3	0	0	0	0	4
Variable	0	0	0	0	0	0	0
Total	67	77	2	0	0	0	146

Hours of calm in this stability class: 3  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 49

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: January - March 2010  
Stability Class - Extremely Stable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	1	0	0	0	0	1
NNE	2	0	0	0	0	0	2
NE	2	1	0	0	0	0	3
ENE	3	3	0	0	0	0	6
E	2	0	0	0	0	0	2
ESE	13	7	0	0	0	0	20
SE	4	0	0	0	0	0	4
SSE	0	0	0	0	0	0	0
S	1	0	0	0	0	0	1
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	2	0	0	0	0	0	2
W	2	1	0	0	0	0	3
WNW	0	2	0	0	0	0	2
NW	1	0	0	0	0	0	1
NNW	0	0	0	0	0	0	0
Variable	1	0	0	0	0	0	1
Total	33	15	0	0	0	0	48

Hours of calm in this stability class: 6  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 49



**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: January - March 2010  
Stability Class - Extremely Unstable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

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

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: 9

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: January - March 2010  
Stability Class - Moderately Unstable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

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

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 2  
Hours of missing stability measurements in all stability classes: 9

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: January - March 2010  
Stability Class - Slightly Unstable - 296Ft-333Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	1	0	1
NNE	0	0	5	0	2	0	7
NE	0	0	0	3	1	0	4
ENE	0	0	1	0	0	0	1
E	0	0	0	1	2	0	3
ESE	0	0	1	0	0	0	1
SE	0	0	4	1	1	0	6
SSE	0	0	0	0	1	0	1
S	0	0	0	0	0	0	0
SSW	0	1	1	1	2	0	5
SW	0	0	0	3	0	0	3
WSW	0	0	1	2	1	0	4
W	0	0	1	1	1	0	3
WNW	0	0	2	3	0	0	5
NW	0	0	13	10	0	0	23
NNW	0	0	2	2	0	0	4
Variable	0	0	0	0	0	0	0
Total	0	1	31	27	12	0	71

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 1  
Hours of missing stability measurements in all stability classes: 9

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: January - March 2010  
Stability Class - Neutral - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	4	16	12	8	0	40
NNE	4	6	17	31	32	5	95
NE	1	3	7	33	16	2	62
ENE	3	10	11	17	0	0	41
E	1	7	23	13	2	0	46
ESE	0	9	30	30	11	3	83
SE	2	18	16	4	3	0	43
SSE	1	9	8	3	0	1	22
S	3	6	1	2	1	0	13
SSW	3	4	5	12	2	0	26
SW	2	6	6	10	4	0	28
WSW	2	8	14	24	3	0	51
W	2	18	52	47	26	10	155
WNW	3	16	56	68	16	6	165
NW	2	25	57	53	23	0	160
NNW	2	17	36	25	9	0	89
Variable	1	0	0	0	0	0	1
Total	32	166	355	384	156	27	1120

Hours of calm in this stability class: 1  
Hours of missing wind measurements in this stability class: 70  
Hours of missing stability measurements in all stability classes: 9

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: January - March 2010  
Stability Class - Slightly Stable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	1	11	7	2	0	21
NNE	0	1	17	11	2	0	31
NE	2	6	19	20	2	0	49
ENE	1	3	15	8	0	0	27
E	1	5	8	6	0	0	20
ESE	1	2	8	19	11	5	46
SE	0	1	12	26	8	3	50
SSE	2	3	4	5	4	1	19
S	1	3	1	3	7	1	16
SSW	3	0	5	14	3	0	25
SW	1	3	5	10	1	0	20
WSW	2	3	0	11	0	0	16
W	3	5	5	6	1	0	20
WNW	1	7	32	51	0	0	91
NW	5	9	27	48	7	0	96
NNW	2	6	18	9	0	0	35
Variable	0	0	0	0	0	0	0
Total	25	58	187	254	48	10	582

Hours of calm in this stability class: 0  
Hours of missing wind measurements in this stability class: 9  
Hours of missing stability measurements in all stability classes: 9

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: January - March 2010  
Stability Class - Moderately Stable - 296Ft-333Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	4	11	0	0	17
NNE	0	2	2	6	1	0	11
NE	0	0	4	4	0	0	8
ENE	0	1	0	3	0	0	4
E	0	2	10	3	1	0	16
ESE	0	2	2	3	0	1	8
SE	1	1	6	13	0	0	21
SSE	0	0	2	5	0	0	7
S	0	0	0	3	0	0	3
SSW	0	1	0	2	0	0	3
SW	1	0	0	2	0	0	3
WSW	0	0	0	2	1	0	3
W	0	1	4	2	0	0	7
WNW	0	1	0	6	0	0	7
NW	1	4	16	14	0	0	35
NNW	0	3	15	13	0	0	31
Variable	0	0	0	0	0	0	0
Total	3	20	65	92	3	1	184

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: 9

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: January - March 2010  
Stability Class - Extremely Stable - 296Ft-333Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	1	0	0	0	0	1
E	0	5	0	0	0	0	5
ESE	0	0	1	4	0	0	5
SE	0	0	4	3	0	0	7
SSE	0	1	0	2	0	0	3
S	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	1	2	3	0	0	6
NNW	0	0	5	5	0	0	10
Variable	0	0	0	0	0	0	0
Total	1	8	12	17	0	0	38

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: 9

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: April - June 2010  
Stability Class - Extremely Unstable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	4	4	0	0	0	8
NNE	0	7	5	0	0	0	12
NE	0	2	6	0	0	0	8
ENE	0	2	9	0	0	0	11
E	0	3	3	0	0	0	6
ESE	0	0	0	0	0	0	0
SE	0	2	6	0	0	0	8
SSE	0	14	4	0	0	0	18
S	1	3	7	0	0	0	11
SSW	0	17	13	0	0	0	30
SW	1	29	14	0	0	0	44
WSW	0	4	10	1	0	0	15
W	0	0	9	0	0	0	9
WNW	0	2	8	0	0	0	10
NW	0	0	7	0	0	0	7
NNW	0	0	6	0	0	0	6
Variable	0	0	0	0	0	0	0
Total	2	89	111	1	0	0	203

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



**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: April - June 2010  
Stability Class - Moderately Unstable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	8	1	0	0	0	9
NNE	0	2	0	0	0	0	2
NE	0	0	3	0	0	0	3
ENE	0	6	1	0	0	0	7
E	0	3	2	0	0	0	5
ESE	0	2	0	0	0	0	2
SE	0	3	5	0	0	0	8
SSE	0	6	0	0	0	0	6
S	1	2	1	0	0	0	4
SSW	0	3	1	0	0	0	4
SW	0	6	2	0	0	0	8
WSW	0	3	1	0	0	0	4
W	0	3	5	1	0	0	9
WNW	0	1	4	0	0	0	5
NW	0	4	3	0	0	0	7
NNW	0	5	1	0	0	0	6
Variable	0	0	0	0	0	0	0
Total	1	57	30	1	0	0	89

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: April - June 2010  
Stability Class - Slightly Unstable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	11	2	0	0	0	13
NNE	0	11	1	0	0	0	12
NE	0	2	1	0	0	0	3
ENE	0	4	3	0	0	0	7
E	1	8	2	0	0	0	11
ESE	0	8	1	1	0	0	10
SE	0	9	4	0	0	0	13
SSE	2	8	1	0	0	0	11
S	1	4	0	0	0	0	5
SSW	0	1	1	0	0	0	2
SW	0	15	4	0	0	0	19
WSW	1	3	2	0	0	0	6
W	0	15	6	1	0	0	22
WNW	0	3	10	0	0	0	13
NW	0	7	8	0	0	0	15
NNW	1	7	1	0	0	0	9
Variable	0	0	0	0	0	0	0
Total	6	116	47	2	0	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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: April - June 2010  
Stability Class - Neutral - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	26	16	2	0	0	45
NNE	2	14	13	1	0	0	30
NE	8	23	19	3	0	0	53
ENE	8	24	14	1	0	0	47
E	9	50	20	2	0	0	81
ESE	4	41	37	11	0	0	93
SE	7	23	14	5	0	0	49
SSE	5	20	0	0	0	0	25
S	6	17	4	0	0	0	27
SSW	8	14	6	0	0	0	28
SW	5	36	10	0	0	0	51
WSW	2	19	9	0	0	0	30
W	7	21	16	6	0	0	50
WNW	4	20	21	5	0	0	50
NW	5	32	21	0	0	0	58
NNW	1	20	8	0	0	0	29
Variable	1	1	0	0	0	0	2
Total	83	401	228	36	0	0	748

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: April - June 2010  
Stability Class - Slightly Stable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	7	10	1	0	0	0	18
NNE	7	9	0	0	0	0	16
NE	3	24	2	0	0	0	29
ENE	8	17	0	0	0	0	25
E	12	28	4	0	0	0	44
ESE	10	32	6	0	0	0	48
SE	15	38	7	0	0	0	60
SSE	22	14	2	0	0	0	38
S	11	20	5	0	0	0	36
SSW	11	24	3	0	0	0	38
SW	13	40	2	0	0	0	55
WSW	17	40	2	0	0	0	59
W	4	32	2	0	0	0	38
WNW	6	27	5	0	0	0	38
NW	11	32	3	0	0	0	46
NNW	5	21	1	0	0	0	27
Variable	0	0	0	0	0	0	0
Total	162	408	45	0	0	0	615

Hours of calm in this stability class: 9  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 6

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: April - June 2010  
Stability Class - Moderately Stable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	2	1	0	0	0	0	3
NNE	9	1	0	0	0	0	10
NE	8	4	0	0	0	0	12
ENE	11	1	0	0	0	0	12
E	19	2	0	0	0	0	21
ESE	25	8	0	0	0	0	33
SE	19	8	0	0	0	0	27
SSE	8	2	0	0	0	0	10
S	6	4	0	0	0	0	10
SSW	1	0	0	0	0	0	1
SW	9	2	0	0	0	0	11
WSW	6	1	0	0	0	0	7
W	5	2	0	0	0	0	7
WNW	5	0	0	0	0	0	5
NW	8	0	0	0	0	0	8
NNW	3	1	0	0	0	0	4
Variable	1	0	0	0	0	0	1
Total	145	37	0	0	0	0	182

Hours of calm in this stability class: 14  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 6

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: April - June 2010  
Stability Class - Extremely Stable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	3	0	0	0	0	0	3
NNE	11	0	0	0	0	0	11
NE	3	1	0	0	0	0	4
ENE	4	0	0	0	0	0	4
E	9	0	0	0	0	0	9
ESE	8	3	0	0	0	0	11
SE	9	1	0	0	0	0	10
SSE	4	0	0	0	0	0	4
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	2	0	0	0	0	0	2
WSW	1	0	0	0	0	0	1
W	4	0	0	0	0	0	4
WNW	14	0	0	0	0	0	14
NW	4	1	0	0	0	0	5
NNW	2	0	0	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	78	6	0	0	0	0	84

Hours of calm in this stability class: 63  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 6

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: April - June 2010  
Stability Class - Extremely Unstable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	1	0	0	0	1
NNE	0	0	2	2	0	0	4
NE	0	0	1	0	1	0	2
ENE	0	0	0	4	0	0	4
E	0	0	0	2	0	0	2
ESE	0	0	0	0	0	0	0
SE	0	0	0	3	0	0	3
SSE	0	0	0	5	2	1	8
S	0	0	2	3	1	9	15
SSW	0	1	9	5	7	2	24
SW	0	0	1	0	1	2	4
WSW	0	0	0	0	1	0	1
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	3	0	3
NNW	0	0	0	4	0	0	4
Variable	0	0	0	0	0	0	0
Total	0	1	16	28	16	14	75

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: April - June 2010  
Stability Class - Moderately Unstable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	4	2	1	0	9
NNE	0	0	8	2	0	0	10
NE	0	1	2	6	0	0	9
ENE	0	1	1	2	0	0	4
E	0	0	4	1	0	0	5
ESE	0	0	0	0	0	0	0
SE	0	0	1	1	0	0	2
SSE	0	0	6	2	1	0	9
S	0	0	2	0	1	2	5
SSW	0	2	12	3	2	3	22
SW	0	0	4	3	3	0	10
WSW	0	0	2	5	2	0	9
W	0	0	0	2	6	0	8
WNW	0	0	0	3	1	0	4
NW	0	0	0	1	1	0	2
NNW	0	0	0	2	0	0	2
Variable	0	0	0	0	0	0	0
Total	0	6	46	35	18	5	110

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



**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: April - June 2010  
Stability Class - Slightly Unstable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	5	10	2	0	0	17
NNE	0	3	8	3	0	0	14
NE	0	2	2	3	0	0	7
ENE	0	5	3	2	0	0	10
E	0	2	7	2	0	0	11
ESE	0	3	5	2	0	1	11
SE	0	4	3	0	4	0	11
SSE	0	7	5	2	4	1	19
S	0	3	3	3	2	1	12
SSW	0	3	9	3	3	3	21
SW	0	1	1	3	2	0	7
WSW	0	3	6	1	2	0	12
W	0	2	5	7	2	1	17
WNW	0	4	2	4	3	0	13
NW	0	6	2	4	2	0	14
NNW	0	6	6	0	2	0	14
Variable	0	0	0	0	0	0	0
Total	0	59	77	41	26	7	210

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: April - June 2010  
Stability Class - Neutral - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	2	8	12	16	6	1	45
NNE	0	3	10	15	6	0	34
NE	3	5	19	15	6	8	56
ENE	2	4	17	15	6	1	45
E	2	13	29	29	8	1	82
ESE	0	10	21	25	19	19	94
SE	1	10	11	5	10	12	49
SSE	0	8	12	5	5	2	32
S	0	13	9	15	8	5	50
SSW	1	6	12	16	9	6	50
SW	2	6	16	15	7	1	47
WSW	1	6	8	9	3	2	29
W	0	10	14	22	6	11	63
WNW	1	5	16	15	27	4	68
NW	1	10	22	23	14	0	70
NNW	1	4	16	10	6	0	37
Variable	1	1	0	0	0	0	2
Total	18	122	244	250	146	73	853

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: April - June 2010  
Stability Class - Slightly Stable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	12	10	2	0	26
NNE	0	6	8	6	0	0	20
NE	0	4	17	19	2	1	43
ENE	0	4	13	4	1	0	22
E	1	4	12	12	3	0	32
ESE	0	1	4	32	9	2	48
SE	0	4	13	24	8	0	49
SSE	1	1	13	22	15	3	55
S	0	2	5	23	21	6	57
SSW	0	4	16	23	15	4	62
SW	0	3	25	22	5	0	55
WSW	0	6	13	24	0	0	43
W	0	3	11	25	2	0	41
WNW	0	4	5	20	1	0	30
NW	0	1	10	24	1	0	36
NNW	0	1	9	14	1	0	25
Variable	0	0	0	0	0	0	0
Total	2	50	186	304	86	16	644

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: April - June 2010  
Stability Class - Moderately Stable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	6	5	3	0	0	15
NNE	0	0	5	3	0	0	8
NE	0	2	3	5	0	0	10
ENE	0	0	7	2	0	0	9
E	0	4	9	3	0	0	16
ESE	0	5	7	11	0	0	23
SE	0	7	6	10	0	0	23
SSE	0	1	5	13	1	0	20
S	0	1	3	12	3	0	19
SSW	0	1	4	4	3	0	12
SW	1	2	0	2	0	0	5
WSW	0	0	1	6	0	0	7
W	0	2	3	6	0	0	11
WNW	0	3	0	1	0	0	4
NW	0	3	1	2	0	0	6
NNW	0	4	0	1	0	0	5
Variable	0	0	0	0	0	0	0
Total	2	41	59	84	7	0	193

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: April - June 2010  
Stability Class - Extremely Stable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	3	0	0	0	5
NNE	0	1	5	1	0	0	7
NE	1	3	2	1	0	0	7
ENE	0	2	6	0	0	0	8
E	1	2	3	1	0	0	7
ESE	1	1	3	5	0	0	10
SE	0	1	1	2	0	0	4
SSE	0	2	4	1	1	0	8
S	0	2	1	2	0	0	5
SSW	0	6	2	4	0	0	12
SW	0	4	2	3	0	0	9
WSW	0	3	1	0	0	0	4
W	1	1	1	0	0	0	3
WNW	1	0	0	0	0	0	1
NW	0	0	0	0	0	0	0
NNW	3	0	0	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	8	30	34	20	1	0	93

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: July - September 2010  
Stability Class - Extremely Unstable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	4	6	0	0	0	10
NNE	0	3	2	0	0	0	5
NE	0	4	0	0	0	0	4
ENE	0	2	0	0	0	0	2
E	0	1	0	0	0	0	1
ESE	0	2	5	0	0	0	7
SE	0	8	8	0	0	0	16
SSE	0	12	0	0	0	0	12
S	0	23	3	0	0	0	26
SSW	0	14	2	0	0	0	16
SW	0	26	0	0	0	0	26
WSW	0	2	0	0	0	0	2
W	0	1	0	0	0	0	1
WNW	0	4	8	0	0	0	12
NW	0	5	6	0	0	0	11
NNW	0	6	1	0	0	0	7
Variable	0	0	0	0	0	0	0
Total	0	117	41	0	0	0	158

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: July - September 2010  
Stability Class - Moderately Unstable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	3	1	0	0	0	4
NNE	0	4	1	0	0	0	5
NE	0	0	1	0	0	0	1
ENE	0	1	0	0	0	0	1
E	0	2	0	0	0	0	2
ESE	0	2	2	0	0	0	4
SE	0	5	2	0	0	0	7
SSE	0	1	0	0	0	0	1
S	0	8	0	0	0	0	8
SSW	0	3	0	0	0	0	3
SW	0	5	0	0	0	0	5
WSW	0	4	1	0	0	0	5
W	0	2	2	3	0	0	7
WNW	0	2	1	3	0	0	6
NW	1	9	3	0	0	0	13
NNW	0	3	0	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	1	54	14	6	0	0	75

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: July - September 2010  
Stability Class - Slightly Unstable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	6	3	1	0	0	11
NNE	0	5	0	0	0	0	5
NE	0	3	0	0	0	0	3
ENE	1	5	0	0	0	0	6
E	0	7	0	0	0	0	7
ESE	0	7	0	0	0	0	7
SE	0	11	3	0	0	0	14
SSE	0	6	0	0	0	0	6
S	5	8	2	0	0	0	15
SSW	1	11	1	0	0	0	13
SW	2	14	1	0	0	0	17
WSW	1	12	1	1	0	0	15
W	2	12	4	4	0	0	22
WNW	0	4	3	2	0	0	9
NW	1	13	4	0	0	0	18
NNW	1	16	2	0	0	0	19
Variable	0	0	0	0	0	0	0
Total	15	140	24	8	0	0	187

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



**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: July - September 2010  
Stability Class - Neutral - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	7	23	3	0	0	0	33
NNE	2	11	0	0	0	0	13
NE	4	9	2	0	0	0	15
ENE	10	10	0	0	0	0	20
E	9	15	1	0	0	0	25
ESE	14	22	3	0	0	0	39
SE	11	28	2	0	0	0	41
SSE	11	25	1	0	0	0	37
S	14	21	4	0	0	0	39
SSW	17	17	3	0	0	0	37
SW	19	50	15	0	0	0	84
WSW	16	29	10	0	0	0	55
W	11	16	24	5	0	0	56
WNW	3	19	7	1	0	0	30
NW	9	24	21	0	0	0	54
NNW	6	22	6	0	0	0	34
Variable	0	0	0	0	0	0	0
Total	163	341	102	6	0	0	612

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: July - September 2010  
Stability Class - Slightly Stable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	9	9	0	0	0	0	18
NNE	3	6	0	0	0	0	9
NE	5	3	0	0	0	0	8
ENE	8	10	0	0	0	0	18
E	10	14	0	0	0	0	24
ESE	29	6	0	0	0	0	35
SE	27	16	0	0	0	0	43
SSE	38	11	0	0	0	0	49
S	19	27	4	0	0	0	50
SSW	17	37	6	0	0	0	60
SW	23	29	20	0	0	0	72
WSW	13	23	5	0	0	0	41
W	28	30	5	0	0	0	63
WNW	17	26	1	0	0	0	44
NW	20	42	4	0	0	0	66
NNW	8	35	0	0	0	0	43
Variable	0	0	0	0	0	0	0
Total	274	324	45	0	0	0	643

Hours of calm in this stability class: 15  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 3

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: July - September 2010  
Stability Class - Moderately Stable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	5	0	0	0	0	0	5
NNE	2	0	0	0	0	0	2
NE	12	0	0	0	0	0	12
ENE	16	0	0	0	0	0	16
E	24	0	0	0	0	0	24
ESE	40	5	0	0	0	0	45
SE	50	2	0	0	0	0	52
SSE	23	2	0	0	0	0	25
S	7	1	0	0	0	0	8
SSW	13	0	0	0	0	0	13
SW	11	1	0	0	0	0	12
WSW	7	0	1	0	0	0	8
W	11	1	0	0	0	0	12
WNW	11	2	0	0	0	0	13
NW	7	2	0	0	0	0	9
NNW	4	2	0	0	0	0	6
Variable	0	0	0	0	0	0	0
Total	243	18	1	0	0	0	262

Hours of calm in this stability class: 45  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 3

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: July - September 2010  
Stability Class - Extremely Stable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	7	0	0	0	0	0	7
NE	11	0	0	0	0	0	11
ENE	5	0	0	0	0	0	5
E	14	0	0	0	0	0	14
ESE	38	1	0	0	0	0	39
SE	20	0	0	0	0	0	20
SSE	6	0	0	0	0	0	6
S	4	0	0	0	0	0	4
SSW	2	1	0	0	0	0	3
SW	5	0	0	0	0	0	5
WSW	9	0	0	0	0	0	9
W	3	0	0	0	0	0	3
WNW	3	0	0	0	0	0	3
NW	1	0	0	0	0	0	1
NNW	2	0	0	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	130	2	0	0	0	0	132

Hours of calm in this stability class: 75  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 3

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: July - September 2010  
Stability Class - Extremely Unstable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
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	1	0	0	1
SE	0	0	1	0	1	0	2
SSE	0	0	0	1	1	0	2
S	0	0	3	6	0	0	9
SSW	0	0	3	7	0	0	10
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	0	0	0	0	0	0
NW	0	0	1	1	0	0	2
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	8	16	2	0	26

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: July - September 2010  
Stability Class - Moderately Unstable - 296Ft-333Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	3	0	2	0	7
NNE	0	1	5	1	0	0	7
NE	0	0	0	0	0	0	0
ENE	0	3	0	0	0	0	3
E	0	1	2	0	0	0	3
ESE	0	0	2	2	1	0	5
SE	0	1	6	2	1	0	10
SSE	0	1	5	1	0	0	7
S	0	1	2	12	5	0	20
SSW	0	0	11	8	1	0	20
SW	0	0	2	0	0	0	2
WSW	0	0	0	0	0	0	0
W	0	0	1	0	0	0	1
WNW	0	0	3	2	1	0	6
NW	0	0	2	5	1	0	8
NNW	0	1	0	2	1	0	4
Variable	0	0	0	0	0	0	0
Total	0	11	44	35	13	0	103

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: July - September 2010  
Stability Class - Slightly Unstable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	4	6	2	0	0	12
NNE	0	4	3	2	0	0	9
NE	0	4	1	0	0	0	5
ENE	0	3	0	0	0	0	3
E	0	4	3	0	0	0	7
ESE	0	3	6	1	0	0	10
SE	0	4	8	3	3	0	18
SSE	0	8	3	4	1	0	16
S	0	5	6	9	3	0	23
SSW	0	6	7	8	1	0	22
SW	0	8	2	2	0	0	12
WSW	0	0	5	1	0	1	7
W	0	4	3	2	0	3	12
WNW	0	4	2	5	2	0	13
NW	0	6	15	7	0	0	28
NNW	0	7	6	0	1	0	14
Variable	0	0	0	0	0	0	0
Total	0	74	76	46	11	4	211

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: July - September 2010  
Stability Class - Neutral - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	12	17	4	0	1	34
NNE	0	6	6	2	0	0	14
NE	2	5	6	4	0	1	18
ENE	1	15	8	1	0	0	25
E	1	8	13	1	1	0	24
ESE	1	8	14	5	1	0	29
SE	3	11	17	5	2	0	38
SSE	3	16	11	13	0	1	44
S	2	6	24	24	7	5	68
SSW	7	24	17	22	18	5	93
SW	3	24	30	14	17	0	88
WSW	0	9	14	8	2	3	36
W	1	11	20	18	19	12	81
WNW	1	13	11	21	7	4	57
NW	2	12	13	20	5	1	53
NNW	0	10	19	11	7	0	47
Variable	0	0	0	0	0	0	0
Total	27	190	240	173	86	33	749

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



**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: July - September 2010  
Stability Class - Slightly Stable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	3	16	9	1	0	29
NNE	4	1	5	4	0	0	14
NE	0	2	7	2	0	0	11
ENE	1	6	4	6	0	0	17
E	0	5	15	7	0	0	27
ESE	2	3	7	4	0	0	16
SE	0	11	16	14	0	0	41
SSE	0	6	20	33	4	1	64
S	0	7	27	34	15	6	89
SSW	0	8	14	41	20	14	97
SW	1	6	9	17	10	0	43
WSW	0	6	15	13	4	0	38
W	2	6	17	11	3	1	40
WNW	0	2	12	16	0	0	30
NW	1	4	27	18	1	0	51
NNW	1	2	18	20	2	0	43
Variable	0	0	0	0	0	0	0
Total	12	78	229	249	60	22	650

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: July - September 2010  
Stability Class - Moderately Stable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	4	2	1	2	0	10
NNE	1	5	2	8	0	0	16
NE	1	6	4	4	0	0	15
ENE	2	4	3	5	0	0	14
E	0	7	8	8	0	0	23
ESE	0	3	10	10	0	0	23
SE	2	7	7	12	0	0	28
SSE	1	3	19	24	4	0	51
S	1	2	13	29	2	0	47
SSW	0	1	13	14	0	1	29
SW	0	4	6	5	0	1	16
WSW	1	5	8	2	0	0	16
W	0	4	7	10	0	0	21
WNW	3	0	9	9	0	0	21
NW	1	5	14	1	0	0	21
NNW	0	6	0	1	0	0	7
Variable	0	0	0	0	0	0	0
Total	14	66	125	143	8	2	358

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: July - September 2010  
Stability Class - Extremely Stable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	2	1	0	0	3
NNE	0	0	0	0	0	0	0
NE	1	0	2	1	0	0	4
ENE	1	1	1	0	0	0	3
E	0	1	2	1	0	0	4
ESE	0	1	0	1	0	0	2
SE	0	3	1	3	0	0	7
SSE	0	0	0	16	0	0	16
S	1	2	3	14	0	0	20
SSW	2	2	13	5	0	0	22
SW	0	1	6	4	0	0	11
WSW	0	2	4	0	0	0	6
W	0	0	2	1	0	0	3
WNW	0	2	0	2	0	0	4
NW	0	0	1	0	0	0	1
NNW	0	1	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	5	16	37	49	0	0	107

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: October - December 2010  
Stability Class - Extremely Unstable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	2	0	0	0	2
NNE	0	3	6	0	0	0	9
NE	0	1	0	0	0	0	1
ENE	0	2	4	0	0	0	6
E	0	2	0	0	0	0	2
ESE	0	2	1	0	0	0	3
SE	0	0	3	0	0	0	3
SSE	0	13	4	0	0	0	17
S	0	1	0	0	0	0	1
SSW	0	9	1	0	0	0	10
SW	0	20	4	0	0	0	24
WSW	0	3	1	0	0	0	4
W	0	1	16	0	0	0	17
WNW	0	1	1	0	0	0	2
NW	0	0	5	0	0	0	5
NNW	0	0	8	0	0	0	8
Variable	0	0	0	0	0	0	0
Total	0	58	56	0	0	0	114

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: October - December 2010  
Stability Class - Moderately Unstable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	1	0	0	0	1
NNE	0	2	0	0	0	0	2
NE	0	2	0	0	0	0	2
ENE	0	0	3	0	0	0	3
E	0	0	0	0	0	0	0
ESE	0	4	0	0	0	0	4
SE	0	0	1	0	0	0	1
SSE	0	2	1	0	0	0	3
S	0	2	0	0	0	0	2
SSW	0	2	0	0	0	0	2
SW	0	5	0	0	0	0	5
WSW	0	3	0	0	0	0	3
W	0	3	3	1	0	0	7
WNW	0	2	0	0	0	0	2
NW	0	1	5	0	0	0	6
NNW	0	2	1	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	0	30	15	1	0	0	46

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: October - December 2010  
Stability Class - Slightly Unstable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	1	0	0	0	3
NNE	0	1	0	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	4	3	0	0	0	7
E	0	2	1	0	0	0	3
ESE	0	2	0	0	0	0	2
SE	0	0	0	0	0	0	0
SSE	0	2	1	0	0	0	3
S	0	3	0	0	0	0	3
SSW	0	4	1	0	0	0	5
SW	0	4	3	0	0	0	7
WSW	2	6	5	3	0	0	16
W	0	8	9	1	0	0	18
WNW	0	0	3	0	0	0	3
NW	0	9	5	0	0	0	14
NNW	0	6	1	0	0	0	7
Variable	0	0	0	0	0	0	0
Total	2	53	33	4	0	0	92

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: October - December 2010  
Stability Class - Neutral - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	3	22	21	9	1	0	56
NNE	3	16	4	0	0	0	23
NE	3	11	0	0	0	0	14
ENE	1	18	5	0	0	0	24
E	2	24	19	2	0	0	47
ESE	5	24	28	9	0	0	66
SE	1	13	12	1	0	0	27
SSE	1	7	2	0	0	0	10
S	2	11	2	0	0	0	15
SSW	3	2	2	0	0	0	7
SW	4	16	8	2	0	0	30
WSW	9	22	29	16	0	0	76
W	12	55	55	23	4	0	149
WNW	3	42	71	13	0	0	129
NW	5	54	71	1	0	0	131
NNW	1	44	6	6	0	0	57
Variable	0	0	0	0	0	0	0
Total	58	381	335	82	5	0	861

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: October - December 2010  
Stability Class - Slightly Stable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	8	13	5	0	0	0	26
NNE	5	7	0	0	0	0	12
NE	6	16	0	0	0	0	22
ENE	5	10	1	0	0	0	16
E	4	7	4	0	0	0	15
ESE	7	17	6	0	0	0	30
SE	8	36	15	0	0	0	59
SSE	9	29	9	0	0	0	47
S	4	19	2	0	0	0	25
SSW	9	16	0	0	0	0	25
SW	10	21	13	0	0	0	44
WSW	9	20	2	0	0	0	31
W	11	38	8	0	0	0	57
WNW	13	53	3	0	0	0	69
NW	9	37	23	0	0	0	69
NNW	15	30	1	0	0	0	46
Variable	0	0	0	0	0	0	0
Total	132	369	92	0	0	0	593

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



**Quad Cities Nuclear Power Station  
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**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: October - December 2010  
Stability Class - Moderately Stable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	4	2	0	0	0	0	6
NNE	7	1	0	0	0	0	8
NE	9	1	0	0	0	0	10
ENE	13	3	0	0	0	0	16
E	6	1	0	0	0	0	7
ESE	13	9	0	0	0	0	22
SE	8	4	0	0	0	0	12
SSE	15	10	0	0	0	0	25
S	5	1	0	0	0	0	6
SSW	5	0	0	0	0	0	5
SW	7	2	0	0	0	0	9
WSW	10	1	0	0	0	0	11
W	6	2	0	0	0	0	8
WNW	14	23	0	0	0	0	37
NW	10	8	0	0	0	0	18
NNW	3	6	0	0	0	0	9
Variable	0	0	0	0	0	0	0
Total	135	74	0	0	0	0	209

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: October - December 2010  
Stability Class - Extremely Stable - 196Ft-33Ft Delta-T (F)  
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	2	0	0	0	0	0	2
NNE	4	0	0	0	0	0	4
NE	7	0	0	0	0	0	7
ENE	9	0	0	0	0	0	9
E	17	0	0	0	0	0	17
ESE	46	42	0	0	0	0	88
SE	37	6	0	0	0	0	43
SSE	12	1	0	0	0	0	13
S	9	0	0	0	0	0	9
SSW	3	0	0	0	0	0	3
SW	5	0	0	0	0	0	5
WSW	12	0	0	0	0	0	12
W	16	0	0	0	0	0	16
WNW	14	2	0	0	0	0	16
NW	5	0	0	0	0	0	5
NNW	3	0	0	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	201	51	0	0	0	0	252

Hours of calm in this stability class: 38  
Hours of missing wind measurements in this stability class: 0  
Hours of missing stability measurements in all stability classes: 0

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: October - December 2010  
Stability Class - Extremely Unstable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	2	0	2
NNE	0	0	0	0	2	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	2	9	1	0	12
S	0	0	2	0	0	0	2
SSW	0	0	3	2	1	0	6
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	0	0	0	0	0	0
NW	0	0	0	1	0	0	1
NNW	0	0	0	2	0	0	2
Variable	0	0	0	0	0	0	0
Total	0	0	7	14	6	0	27

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: October - December 2010  
Stability Class - Moderately Unstable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	1	1	1	0	3
NNE	0	1	2	0	1	0	4
NE	0	0	1	0	0	0	1
ENE	0	0	3	2	0	0	5
E	0	0	1	0	0	0	1
ESE	0	0	1	1	0	0	2
SE	0	0	0	1	1	0	2
SSE	0	0	0	1	1	0	2
S	0	0	0	0	0	0	0
SSW	0	0	7	5	1	0	13
SW	0	0	4	2	0	0	6
WSW	0	0	1	2	0	0	3
W	0	0	2	5	1	0	8
WNW	0	0	1	3	0	0	4
NW	0	0	0	2	0	0	2
NNW	0	0	0	7	0	0	7
Variable	0	0	0	0	0	0	0
Total	0	1	24	32	6	0	63

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: October - December 2010  
Stability Class - Slightly Unstable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	1	1	1	0	0	3
NNE	0	0	2	0	0	0	2
NE	0	1	2	0	0	0	3
ENE	0	1	4	5	0	0	10
E	0	0	3	1	0	0	4
ESE	0	0	3	1	0	0	4
SE	0	0	0	1	0	0	1
SSE	0	0	0	2	1	1	4
S	0	1	1	3	1	0	6
SSW	0	3	7	2	2	0	14
SW	0	0	1	2	2	1	6
WSW	0	1	3	3	1	2	10
W	0	0	3	8	3	1	15
WNW	0	0	3	2	0	0	5
NW	0	5	7	1	0	0	13
NNW	0	2	2	0	2	0	6
Variable	0	0	0	0	0	0	0
Total	0	15	42	32	12	5	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: 0

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: October - December 2010  
Stability Class - Neutral - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	5	5	12	6	7	36
NNE	2	6	3	8	1	0	20
NE	1	1	10	7	0	0	19
ENE	0	2	16	11	0	0	29
E	1	5	17	17	5	1	46
ESE	0	5	13	22	14	12	66
SE	0	7	1	5	7	1	21
SSE	1	0	1	11	9	1	23
S	0	3	2	5	12	1	23
SSW	2	4	4	8	5	2	25
SW	2	10	9	8	6	10	45
WSW	5	10	18	32	27	14	106
W	6	18	30	34	29	24	141
WNW	4	9	23	70	48	2	156
NW	2	12	35	35	26	5	115
NNW	0	8	17	45	5	6	81
Variable	0	0	0	0	0	0	0
Total	27	105	204	330	200	86	952

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: October - December 2010  
Stability Class - Slightly Stable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	5	17	14	2	0	39
NNE	1	3	11	3	0	0	18
NE	0	1	4	17	0	0	22
ENE	2	1	6	8	0	0	17
E	0	4	9	5	1	0	19
ESE	1	2	3	7	0	4	17
SE	1	1	3	11	10	2	28
SSE	1	1	2	25	17	14	60
S	0	3	7	17	13	2	42
SSW	1	1	5	20	11	1	39
SW	1	4	5	22	9	7	48
WSW	0	0	9	5	0	1	15
W	1	3	5	34	8	0	51
WNW	2	0	17	21	0	0	40
NW	0	5	14	17	23	0	59
NNW	1	1	14	27	5	0	48
Variable	0	0	0	0	0	0	0
Total	13	35	131	253	99	31	562

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: October - December 2010  
Stability Class - Moderately Stable - 296Ft-333Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	1	7	4	4	0	16
NNE	0	3	4	4	0	0	11
NE	1	1	6	3	0	0	11
ENE	1	3	2	2	0	0	8
E	0	2	16	2	0	0	20
ESE	0	1	6	5	0	0	12
SE	1	0	4	3	3	0	11
SSE	0	2	2	16	1	1	22
S	0	1	10	18	10	1	40
SSW	0	1	3	13	2	0	19
SW	0	2	4	7	0	0	13
WSW	0	1	4	5	0	0	10
W	0	2	1	15	0	0	18
WNW	0	0	2	5	0	0	7
NW	0	1	3	9	0	0	13
NNW	2	1	10	16	2	0	31
Variable	0	0	0	0	0	0	0
Total	5	22	84	127	22	2	262

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



**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Joint Frequency Tables**

Quad Cities Generating Station

Period of Record: October - December 2010  
Stability Class - Extremely Stable - 296Ft-33Ft Delta-T (F)  
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	3	6	0	0	0	10
NNE	0	2	2	0	0	0	4
NE	0	4	1	0	0	0	5
ENE	1	0	0	0	0	0	1
E	0	3	5	2	0	0	10
ESE	0	3	3	2	0	0	8
SE	0	1	7	8	6	0	22
SSE	0	3	6	18	0	0	27
S	0	3	4	17	0	0	24
SSW	1	6	11	17	1	0	36
SW	0	1	7	11	2	0	21
WSW	0	5	10	6	0	0	21
W	0	5	7	11	0	0	23
WNW	0	1	0	1	0	0	2
NW	2	2	5	8	0	0	17
NNW	0	0	1	4	0	0	5
Variable	0	0	0	0	0	0	0
Total	5	42	75	105	9	0	236

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

**Quad Cities Nuclear Power Station  
2010 Annual Radioactive Effluent Release Report**

**Solid Waste and Irradiated Fuel Shipments**

**A. Solid Waste Shipped Offsite for Burial or Disposal (Not irradiated fuel)**

**1. Types of Waste**

Types of Waste	Total Quantity (m <sup>3</sup> )	Total Activity (Ci)	Period	Est. Total Error %
a. Spent resins, filter sludges, evaporator bottoms, etc	1.08E+02	4.77E+02	2010	2.50E+01
b. Dry compressible waste, contaminated equip, etc	1.94E+03	3.20E+01	2010	2.50E+01
c. Irradiated components, control rods, etc	N/A	N/A	N/A	N/A
d. Other (describe) Combined Packages of a. and b.	N/A	N/A	N/A	N/A

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

Major Nuclide Composition	%
a. Co-60	6.04E+01
Fe-55	2.71E+01
Cs-137	7.49E+00
Zn-65	2.46E+00
Ni-63	1.11E+00
Mn-54	1.11E+00
b. Mn-54	2.92E+00
Fe-55	2.06E+01
Co-60	2.07E+01
Zn-65	5.26E+01
Cs-137	2.10E+00
c. N/A	N/A
d. N/A	N/A

**3. Solid Waste Disposition**

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
25	Highway	Processor
3	Rail	Processor
28	Highway	Disposal
18	Rail	Disposal

**B. Irradiated Fuel Shipments (disposition)**

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
N/A	Highway	Disposal

**C. Changes to the Process Control Program**

No changes made.

**Attachment 2**

**Errata/Correction to the 2009 Annual Radioactive Effluent Release Report**

## Errata/Correction to the 2009 ARERR

The following list identifies each piece of errata data that has been identified within the previous year. The following pages reflect the affected original submitted page and the edited page. The edited page contains revision bars to track the changes. At the top of each page, the year of the appropriate report is outlined.

Errata data from 2009 ARERR:

1. During the review of the 2009 Radiological Effluent Release Report, it was identified that the report contained incorrect data for the Liquid Effluent Total Tritium Value and Liquid Effluent Total for Period activity for continuous mode. The errors in the report are inconsequential. The quarterly totals required by Reg Guide 1.21 are correct and were used in the dose calculations. Issue Report 1069361 was originated to capture the deficiency and to provide a tracking mechanism to correct the data from the 2009 Radiological Effluent Release Report.
  - Liquid Effluents – Summation of all Releases Tritium Total Release:  
1.22E-01 reported value                      1.22E+01 corrected value
  - Liquid Effluents Release Point Mississippi River  
<LLD reported value                      1.54E-07 corrected value

# Quad Cities Nuclear Power Station 2009 Annual Radioactive Effluent Release Report

## Effluent & Waste Disposal Summary

Liquid Effluents – Summation of all Releases

Period: January – December 2009

Unit: 1 & 2

A. Fission & Activation Products	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total	Est. Total Error %
1. Total Release (not including tritium, gases & alpha)	Ci	9.18E-05	7.50E-03	<LLD <sup>(2)</sup>	7.66E-04	8.36E-03	5.4
2. Average diluted concentration during period	μCi/mL	3.28E-13	2.04E-11	N/A	2.35E-12		
3. Percent of applicable limit <sup>(1)</sup>	WB	2.90E-02	3.43E-01	N/A	3.43E-02		
	O	1.38E-02	1.53E-01	N/A	1.63E-02		
4. Maximum diluted concentration during batch discharges	μCi/mL	1.17E-10	2.61E-09	N/A	6.28E-10		

B. Tritium							
1. Total Release	Ci	7.75E-01	7.41E+00	<LLD <sup>(2)</sup>	4.05E+00	1.22E-01	4.1
2. Average diluted concentration during period	μCi/mL	2.76E-09	2.01E-08	N/A	1.24E-08		
3. Percent of applicable limit	%	3.29E-02	5.07E-02	N/A	4.33E-02		

C. Dissolved & Entrained Gases							
1. Total Release	Ci	<LLD <sup>(2)</sup>	1.50E-04	<LLD <sup>(2)</sup>	3.71E-04	5.21E-04	5.4
2. Average diluted concentration during period	μCi/mL	N/A	4.08E-13	N/A	1.14E-12		
3. Percent of applicable limit	%	N/A	1.95E-05	N/A	5.96E-05		

D. Gross Alpha Activity							
1. Total Release	Ci	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	14.8

E. Volume Of Waste Released (prior to dilution)	Liters	2.14E+05	1.05E+06	0.00E+00	6.42E+05	1.91E+06	
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F. Volume Of Dilution Water Used During Period	Liters	2.80E+11	3.68E+11	4.92E+11	3.26E+11	1.47E+12	
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- (1) Whole body/organ (ODCM)  
 (2) Liquid LLD's reported on page 7 of 71

# Quad Cities Nuclear Power Station 2009 Annual Radioactive Effluent Release Report

## Effluent & Waste Disposal Summary

Liquid Effluents – Summation of all Releases

Period: January – December 2009

Unit: 1 & 2

A. Fission & Activation Products	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total	Est. Total Error %
1. Total Release (not including tritium, gases & alpha)	Ci	9.18E-05	7.50E-03	<LLD <sup>(2)</sup>	7.66E-04	8.36E-03	5.4
2. Average diluted concentration during period	μCi/mL	3.28E-13	2.04E-11	N/A	2.35E-12		
3. Percent of applicable limit <sup>(1)</sup>	WB	2.90E-02	3.43E-01	N/A	3.43E-02		
	O	1.38E-02	1.53E-01	N/A	1.63E-02		
4. Maximum diluted concentration during batch discharges	μCi/mL	1.17E-10	2.61E-09	N/A	6.28E-10		

B. Tritium							
1. Total Release	Ci	7.75E-01	7.41E+00	<LLD <sup>(2)</sup>	4.05E+00	1.22E+01	4.1
2. Average diluted concentration during period	μCi/mL	2.76E-09	2.01E-08	N/A	1.24E-08		
3. Percent of applicable limit	%	3.29E-02	5.07E-02	N/A	4.33E-02		

C. Dissolved & Entrained Gases							
1. Total Release	Ci	<LLD <sup>(2)</sup>	1.50E-04	<LLD <sup>(2)</sup>	3.71E-04	5.21E-04	5.4
2. Average diluted concentration during period	μCi/mL	N/A	4.08E-13	N/A	1.14E-12		
3. Percent of applicable limit	%	N/A	1.95E-05	N/A	5.96E-05		

D. Gross Alpha Activity							
1. Total Release	Ci	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	<LLD <sup>(2)</sup>	14.8

E. Volume Of Waste Released (prior to dilution)							
	Liters	2.14E+05	1.05E+06	0.00E+00	6.42E+05	1.91E+06	

F. Volume Of Dilution Water Used During Period							
	Liters	2.80E+11	3.68E+11	4.92E+11	3.26E+11	1.47E+12	

<sup>(1)</sup> Whole body/organ (ODCM)  
<sup>(2)</sup> Liquid LLD's reported on page 7 of 71

**Quad Cities Nuclear Power Station  
2009 Annual Radioactive Effluent Release Report**

**Effluent & Waste Disposal Summary**

Liquid Effluents Release Point Mississippi River

Period: January – December 2009

Unit: 1 & 2

Nuclides Released	Unit	Continuous Mode					Batch Mode				
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
Sr-89	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Sr-90	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Cs-134	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Cs-137	Ci	<LLD <sup>(1)</sup>	6.37E-08	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	6.37E-08	5.50E-05	8.36E-04	<LLD <sup>(1)</sup>	2.24E-04	1.12E-03
I-131	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Co-58	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	2.38E-05	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	2.38E-05
Co-60	Ci	<LLD <sup>(1)</sup>	9.04E-08	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	9.04E-08	3.68E-05	1.16E-03	<LLD <sup>(1)</sup>	5.09E-04	1.71E-03
Fe-55	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	5.47E-03	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	5.47E-03
Fe-59	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Zn-65	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Mn-54	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	3.32E-05	3.32E-05
Cr-51	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Zr-95	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Nb-95	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Mo-99	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Tc-99m	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Ba-140	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
La-140	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Ce-141	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Ag-110m	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Sb-124	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Total for Period	Ci	<LLD <sup>(1)</sup>	1.54E-07	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	9.18E-05	7.49E-03	<LLD <sup>(1)</sup>	7.66E-04	8.35E-03
Xe-133	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	1.50E-04	<LLD <sup>(1)</sup>	3.71E-04	5.21E-04
Xe-135	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>

- (1) Liquid LLD's reported on page 7 of 71
- (2) No batch releases

**Quad Cities Nuclear Power Station  
2009 Annual Radioactive Effluent Release Report**

**Effluent & Waste Disposal Summary**

Liquid Effluents Release Point Mississippi River

Period: January – December 2009

Unit: 1 & 2

Nuclides Released	Unit	Continuous Mode					Batch Mode				
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
Sr-89	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Sr-90	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Cs-134	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Cs-137	Ci	<LLD <sup>(1)</sup>	6.37E-08	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	6.37E-08	5.50E-05	8.36E-04	<LLD <sup>(1)</sup>	2.24E-04	1.12E-03
I-131	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Co-58	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	2.38E-05	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	2.38E-05
Co-60	Ci	<LLD <sup>(1)</sup>	9.04E-08	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	9.04E-08	3.68E-05	1.16E-03	<LLD <sup>(1)</sup>	5.09E-04	1.71E-03
Fe-55	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	5.47E-03	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	5.47E-03
Fe-59	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Zn-65	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Mn-54	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	3.32E-05	3.32E-05
Cr-51	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Zr-95	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Nb-95	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Mo-99	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Tc-99m	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Ba-140	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
La-140	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Ce-141	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Ag-110m	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Sb-124	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>
Total for Period	Ci	<LLD <sup>(1)</sup>	1.54E-07	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	1.54E-07	9.18E-05	7.49E-03	<LLD <sup>(1)</sup>	7.66E-04	8.35E-03
Xe-133	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	1.50E-04	<LLD <sup>(1)</sup>	3.71E-04	5.21E-04
Xe-135	Ci	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>	<LLD <sup>(1)</sup>

- (1) Liquid LLD's reported on page 7 of 71
- (2) No batch releases