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SVP-13-031 10 CFR 50.36a

April 26, 2013

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 2012

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 2012. There was one abnormal release that occurred during 2012. This release resulted in a minor contribution to normal plant radioactive effluents and is discussed in detail in the report.

In addition, pursuant to Section 12.7.3.4 of the Off-Site Dose Calculation Manual (ODCM), enclosed (Attachment 2) is a copy of the Process Control Program for Radioactive Wastes (RW-AA-100, Revision 8) which was revised in 2012.

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

Respectfully,

Wally J. Beck FOR

Tim Hanley
Site Vice President
Quad Cities Nuclear Power Station

Attachments:

1. 2012 Annual Radioactive Effluent Release Report
2. RW-AA-100, Revision 8, Process Control Program for Radioactive Wastes

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

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Attachment 1

2012 Annual Radioactive Effluent Release Report

Quad Cities Nuclear Power Station
2012 Annual Radioactive Effluent Release Report

Effluent & Waste Disposable Summary

Gaseous Effluents – Summation of all Releases

Period: January – December 2012 Unit: 1 & 2

A. Fission & Activation Gases	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total	Est. Total Error %
1. Total Release	Ci	3.07E+01	3.07E+01	2.98E+01	3.18E+01	1.23E+02	12.7
2. Average release rate for the period	µCi/sec	3.91E+00	3.91E+00	3.74E+00	4.00E+00		
3. Percent of ODCM limit[1]	%γ	3.01E-03	3.02E-03	2.89E-03	3.11E-03		
	%β	7.70E-04	7.72E-04	7.42E-04	7.95E-04		
B. Iodine							
1. Total Iodine – 131	Ci	4.12E-04	3.68E-04	1.51E-04	9.35E-05	1.02E-03	41.7
2. Average release rate for the period	µCi/sec	5.24E-05	4.68E-05	1.90E-05	1.18E-05		
3. Percent of ODCM limit	%	N/A[2]	N/A[2]	N/A[2]	N/A[2]		
C. Particulates[3]							
1. Particulates with half-lives >8 days	Ci	4.67E-04	5.27E-04	2.16E-04	2.86E-04	1.50E-03	32.2
2. Average release rate for the period	µCi/sec	5.94E-05	6.70E-05	2.72E-05	3.60E-05		
3. Percent of ODCM limit	%	N/A[2]	N/A[2]	N/A[2]	N/A[2]		
4. Gross alpha radioactivity	Ci	<LLD[4]	<LLD[4]	<LLD[4]	<LLD[4]		
D. Tritium							
1. Total Release	Ci	1.47E+01	2.26E+01	2.58E+01	2.00E+01	8.32E+01	6.3
2. Average release rate for the period	µCi/sec	1.88E+00	2.87E+00	3.24E+00	2.52E+00		
3. Percent of ODCM limit	%	N/A[2]	N/A[2]	N/A[2]	N/A[2]		
E. Carbon - 14							
1. Total Release	Ci	6.93E+00	6.65E+00	7.57E+00	7.58E+00	2.88E+01	N/A
2. Average release rate for the period	µCi/sec	8.81E-01	8.46E-01	9.52E-01	9.53E-01		
3. Percent of ODCM limit	%	N/A[2]	N/A[2]	N/A[2]	N/A[2]		
F. Iodine 131 & 133, Tritium, Particulate >8 day, and C-14							
1. Percent of ODCM limit	%	1.01E+00	9.16E-01	7.10E-01	7.13E-01		

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

(2) Percent of ODCM Limit is captured in aggregate in section F

(3) Nuclides with less than 8-day half-lives are not included per the ODCM, with the exception of those with regulatory required LLDs (La-140 and Mo-99)

(4) Gaseous LLDs reported on page 6 of 75

Quad Cities Nuclear Power Station
2012 Annual Radioactive Effluent Release Report

Effluent & Waste Disposable Summary

Gaseous Effluents Release Point Main Chimney (Elevated)

Period: January – December 2012 Unit: 1 & 2

Nuclides Released		Continuous Mode					Batch Mode				
1. Fission gases	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
Kr-85	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Kr-85m	Ci	1.34E-01	1.32E-01	1.34E-01	1.49E-01	5.49E-01	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Kr-87	Ci	8.65E-01	8.28E-01	8.03E-01	8.59E-01	3.36E+00	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Kr-88	Ci	5.26E-01	5.06E-01	4.85E-01	5.21E-01	2.04E+00	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Xe-133	Ci	2.31E-01	2.54E-01	3.48E-01	3.61E-01	1.19E+00	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Xe-135	Ci	7.90E-01	7.62E-01	9.61E-01	7.72E-01	3.29E+00	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Xe-135m	Ci	5.87E+00	5.79E+00	5.55E+00	5.94E+00	2.32E+01	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Xe-138	Ci	2.22E+01	2.23E+01	2.13E+01	2.29E+01	8.87E+01	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Ar-41	Ci	1.20E-01	1.29E-01	2.19E-01	2.62E-01	7.30E-01	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Total for Period	Ci	3.07E+01	3.07E+01	2.98E+01	3.18E+01	1.23E+02	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
2. Iodines											
I-131	Ci	4.12E-04	3.68E-04	1.51E-04	9.35E-05	1.02E-03	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
I-133	Ci	1.96E-03	2.29E-03	2.07E-03	1.72E-03	8.04E-03	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
I-135	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Total for Period	Ci	2.37E-03	2.66E-03	2.22E-03	1.82E-03	9.06E-03	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
3. Particulates											
Fe-55	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Ni-63	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Sr-89	Ci	1.74E-04	1.69E-04	1.46E-04	1.25E-04	6.14E-04	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Sr-90	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Cs-134	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Cs-137	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Ba-140	Ci	<LLD(1)	1.35E-04	3.66E-05	4.96E-05	2.21E-04	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
La-140(3)	Ci	<LLD(1)	1.35E-04	3.66E-05	4.96E-05	2.21E-04	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Cr-51	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Mn-54	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Co-58	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Co-60	Ci	8.35E-05	3.89E-05	<LLD(1)	3.82E-05	1.61E-04	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Mo-99	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Ag-110m	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Ce-141	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Ce-144	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Total for Period	Ci	2.58E-04	3.43E-04	1.90E-04	2.12E-04	1.00E-03	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)

(1) Gaseous LLD's reported on page 6 of 75

(2) No gaseous batch releases

(3) Not included on summary page due to half-life <8 days

Quad Cities Nuclear Power Station
2012 Annual Radioactive Effluent Release Report

Effluent & Waste Disposable Summary

Gaseous Effluents Release Point Reactor Vents (Mixed Mode)

Period: January – December 2012 Unit: 1 & 2

Nuclides Released		Continuous Mode					Batch Mode				
1. Fission gases	**Unit**	**Quarter 1**	**Quarter 2**	**Quarter 3**	**Quarter 4**	**Total**	**Quarter 1**	**Quarter 2**	**Quarter 3**	**Quarter 4**	**Total**
Kr-85	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Kr-85m	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Kr-87	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Kr-88	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Xe-133	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Xe-133m	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Xe-135	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Xe-135m	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Xe-138	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Ar-41	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Total for Period	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
2. Iodines											
I-131	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
I-133	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
I-135	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Total for Period	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
3. Particulates											
Fe-55	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Ni-63	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Sr-89	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Sr-90	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Cs-134	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Cs-137	Ci	2.12E-06	4.65E-06	5.21E-06	9.84E-06	2.18E-05	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Ba-140	Ci	<LLD[1]	4.10E-05	<LLD[1]	<LLD[1]	4.10E-05	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
La-140 [3]	Ci	<LLD[1]	4.10E-05	<LLD[1]	<LLD[1]	4.10E-05	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Cr-51	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Mn-54	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Co-58	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Co-60	Ci	2.07E-04	1.38E-04	2.12E-05	6.38E-05	4.30E-04	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Mo-99	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Ag-110m	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Ce-141	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Ce-144	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Zn-65	Ci	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	<LLD[1]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Total for Period	Ci	2.09E-04	1.84E-04	2.64E-05	7.36E-05	4.93E-04	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]

(1) Gaseous LLD's reported on page 6 of 75

(2) No gaseous batch releases

(3) Not included on summary page due to half-life <8 days

Quad Cities Nuclear Power Station
2012 Annual Radioactive Effluent Release Report

Effluent & Waste Disposal Summary

Liquid Effluents – Summation of all Releases

Period: January – December 2012 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, D&E gases & alpha) [4]	Ci	6.67E-03	2.25E-04	2.39E-04	3.01E-05	7.16E-03	4.8
2 Average diluted concentration during period	µCi/mL	2.34E-11	5.07E-13	4.83E-13	8.57E-14		
3. Percent of applicable limit[1]	WB	1.79E-05	4.02E-05	4.63E-05	7.62E-07		
	Organ	8.92E-04	2.09E-05	2.44E-05	1.62E-06		
4. Maximum diluted concentration during batch discharges	µCi/mL	NA[3]	NA[3]	NA[3]	NA[3]		

B. Tritium							
1. Total Release [4]	Ci	8.13E-02	2.05E-03	4.33E-03	3.94E-04	8.81E-02	4.1
2. Average diluted concentration during period	µCi/mL	2.86E-10	4.62E-12	8.76E-12	1.12E-12		
3. Percent of applicable limit	%	9.53E-06	1.54E-07	2.92E-07	3.73E-08		

C. Dissolved & Entrained Gases							
1. Total Release	Ci	<LLD[2]	<LLD[2]	<LLD[2]	<LLD[2]	<LLD[2]	4.8
2. Average diluted concentration during period	µCi/mL	<LLD[2]	<LLD[2]	<LLD[2]	<LLD[2]		
3. Percent of applicable limit	%	N/A	N/A	N/A	N/A		

D. Gross Alpha Activity							
1. Total Release	Ci	<LLD[2]	<LLD[2]	<LLD[2]	<LLD[2]	<LLD[2]	14.8

E. Volume Of Waste Released (prior to dilution)	Liters	9.23E+04	4.95E+04	4.95E+04	5.57E+04	2.47E+05

F. Volume Of Dilution Water Used During Period	Liters	2.85E+11	4.43E+11	4.95E+11	3.51E+11	1.57E+12

(1) Whole body/organ (ODCM)

(2) Liquid LLD's reported on page 7 of 75

(3) No Batch dicharges in 2012

(4) Total Ci's are those reported as the Abnormal Liquid Release

Quad Cities Nuclear Power Station
2012 Annual Radioactive Effluent Release Report

Effluent & Waste Disposal Summary

Liquid Effluents Release Point Mississippi River

Period: January – December 2012 Unit: 1 & 2

Nuclides Released		Continuous Mode					Batch Mode				
	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
Sr-89	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Sr-90	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Cs-134	Ci	6.53E-06	<LLD(1)	<LLD(1)	<LLD(1)	6.53E-06	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Cs-137	Ci	1.43E-04	4.87E-06	6.36E-06	<LLD(1)	1.54E-04	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
I-131	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Co-58	Ci	2.16E-04	2.37E-06	<LLD(1)	<LLD(1)	2.18E-04	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Co-60	Ci	5.06E-03	1.76E-04	1.95E-04	2.48E-05	5.45E-03	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Fe-55	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Fe-59	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Zn-65	Ci	2.25E-04	6.25E-06	4.41E-06	<LLD(1)	2.35E-04	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Mn-54	Ci	1.02E-03	3.47E-05	3.35E-05	5.24E-06	1.10E-03	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Cr-51	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Mo-99	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Ag-110m	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Ni-63	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Total for Period	Ci	6.67E-03	2.25E-04	2.39E-04	3.01E-05	7.16E-03	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Kr-85	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Kr-85m	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Kr-87	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Kr-88	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Xe-133	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Xe-133m	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Xe-135	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Xe-135m	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Xe-138	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Ar-41	Ci	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	<LLD(1)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)

(1) Liquid LLD's reported on page 7 of 75

(2) *No batch releases during 2012*

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	3.70E-06	None
Kr-85m	uCi/cc	1.38E-08	None
Kr-87	uCi/cc	3.40E-08	1E-04
Kr-88	uCi/cc	5.41E-08	1E-04
Xe-133	uCi/cc	2.70E-08	1E-04
Xe-133m	uCi/cc	8.71E-08	1E-04
Xe-135	uCi/cc	1.26E-08	1E-04
Xe-135m	uCi/cc	1.03E-06	None
Xe-138	uCi/cc	2.43E-06	1E-04
Ar-41	uCi/cc	9.00e-09	None
NUCLIDE LOWER LIMITS OF DETECTION (LLD's) **2. Iodines**	**UNIT**	**LLD Value**	**ODCM Required LLD***
I-131	uCi/cc	8.27E-13	1E-12
I-133	uCi/cc	1.11E-11	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
Fe-55	uCi/cc	7.76E-13	None
Ni-63	uCi/cc	1.83e-14	None
Sr-89	uCi/cc	4.63E-14	1E-11
Sr-90	uCi/cc	1.26E-13	1E-11
Cs-134	uCi/cc	4.72E-13	1E-11
Cs-137	uCi/cc	5.09E-13	1E-11
Ba-140	uCi/cc	1.63E-12	None
La-140	uCi/cc	2.79E-12	None
Mn-54	uCi/cc	2.97E-13	1E-11
Co-58	uCi/cc	4.38E-13	1E-11
Fe-59	uCi/cc	8.77E-13	1E-11
Co-60	uCi/cc	8.85E-13	1E-11
Zn-65	uCi/cc	9.42E-13	1E-11
Mo-99	uCi/cc	8.44E-12	1E-11
Ce-141	uCi/cc	5.87E-13	1E-11
Ce-144	uCi/cc	2.43E-12	1E-11
Ag-110m	uCi/cc	3.25E-13	None
Cr-51	uCi/cc	2.95E-12	None
Gross Alpha	uCi/cc	2.24E-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
2012 Annual Radioactive Effluent Release Report

Effluent & Waste Disposable Summary

LIQUID EFFLUENT LLD's (Most Restrictive)
BATCH MODE

NUCLIDE LOWER LIMITS OF DETECTION (LLD's) **3. Liquids**	**UNIT**	**LLD Value**	**ODCM Required LLD**
H-3	uCi/cc	1.06E-06	1E-05
Sr-89	uCi/cc	5.00E-08	5E-08
Sr-90	uCi/cc	2.58E-08	5E-08
Fe-55	uCi/cc	6.78E-07	1E-06
Ar-41	uCi/cc	9.55E-08	None
Kr-85	uCi/cc	1.33E-05	None
Kr-85m	uCi/cc	6.29E-08	None
Kr-87	uCi/cc	1.84E-07	1E-05
Kr-88	uCi/cc	1.79E-07	1E-05
Xe-133	uCi/cc	1.49E-07	1E-05
Xe-133m	uCi/cc	4.34E-07	1E-05
Xe-135	uCi/cc	4.64E-08	1E-05
Xe-135m	uCi/cc	1.84E-06	None
Xe-138	uCi/cc	6.65E-06	1E-05
Mn-54	uCi/cc	4.88E-08	5E-07
Co-58	uCi/cc	4.87E-08	5E-07
Co-60	uCi/cc	1.05E-07	5E-07
Zn-65	uCi/cc	1.29E-07	5E-07
Mo-99	uCi/cc	4.66E-07	5E-07
I-131	uCi/cc	5.10E-08	1E-06
Cs-134	uCi/cc	5.59E-08	5E-07
Cs-137	uCi/cc	7.46E-08	5E-07
Ce-141	uCi/cc	7.95E-08	5E-07
Ce-144	uCi/cc	3.61E-07	5E-06
Gross Alpha	uCi/cc	9.68E-08	1E-07
Fe-59	uCi/cc	1.18E-07	5E-07
Ni-63	uCi/cc	5.87E-07	None
Cr-51	uCi/cc	4.75E-07	None
Ag-110m	uCi/cc	6.13E-08	None

Supplemental Information

Discussion of Radiation and Radioactivity [1]

Radiation and Radioactivity

All matter is made of atoms. An atom is the smallest part into which matter can be broken down and still maintain all its chemical properties. Nuclear radiation is energy, in the form of waves or particles that is given off by unstable, radioactive atoms. Radioactive material exists naturally and has always been a part of our environment. The earth's crust, for example, contains radioactive uranium, radium, thorium, and potassium. Some radioactivity is a result of nuclear weapons testing. Examples of radioactive fallout that is normally present in environmental samples are cesium-137 and strontium-90. Some examples of radioactive materials released from a nuclear power plant are cesium-137, iodine-131, strontium-90, and cobalt-60. Radiation is measured in units of millirem; much like temperature is measured in degrees. A millirem is a measure of the biological effect of the energy deposited in tissue. The natural and man-made radiation dose received in one year by the average American is 300 to 400 mrem (References 2, 3, 4 in Table - 1 below). Radioactivity is measured in curies. A curie is that amount of radioactive material needed to produce 37,000,000,000 nuclear disintegrations per second. This is an extremely large amount of radioactivity in comparison to environmental radioactivity. That is why radioactivity in the environment is measured in picocuries. One picocurie is equal to one trillionth of a curie.

Sources of Radiation

As mentioned previously, naturally occurring radioactivity has always been a part of our environment. Table - 1 shows the sources and doses of radiation from natural and man-made sources.

(1) This section adapted with permission of Ken Sejkora, Pilgrim Nuclear Power Station

Supplemental Information

Table - 1

Radiation Sources and Corresponding Doses [1]

NATURAL		MAN-MADE	
Source	Radiation Dose (millirem/year)	Source	Radiation Dose (millirem/year)
Internal, inhalation [2]	228	Medical [3]	300
External, space	33	Consumer [4]	13
Internal, ingestion	29	Industrial[5]	0.3
External, terrestrial	21	Occupational	0.5
		Weapons Fallout	<1
		Nuclear Power Plants	<1
Approximate Total	311	Approximate Total	314

(1) Information from NCRP Reports 160 and 94

(2) Primarily from airborne radon and its radioactive progeny

(3) Includes CT (147 mrem), nuclear medicine (77 mrem), interventional fluoroscopy (43 mrem) and conventional radiography and fluoroscopy (33 mrem)

(4) Primarily from cigarette smoking (4.6 mrem), commercial air travel (3.4 mrem), building materials (3.5 mrem), and mining and agriculture (0.8 mrem)

(5) Industrial, security, medical, educational, and research

Cosmic radiation from the sun and outer space penetrates the earth's atmosphere and continuously interacts with us via rays and charged particles. Some of this cosmic radiation interacts with gases and particles in the atmosphere, making them radioactive in turn. These radioactive byproducts from cosmic ray interaction are referred to as cosmogenic radionuclides. Isotopes such as beryllium-7 and carbon-14 are formed in this way. Exposure to cosmic and cosmogenic sources of radioactivity results in about 33 mrem of radiation dose per year.

Additionally, natural radioactivity is in our body and in the food we eat (about 29 millirem/yr), the ground we walk on (about 21 millirem/yr) and the air we breathe (about 228 millirem/yr). The majority of a person's annual dose results from exposure to radon and thoron in the air we

breathe. These gases and their radioactive decay products arise from the decay of naturally occurring uranium, thorium and radium in the soil and building products such as brick, stone, and concrete. Radon and thoron levels vary greatly with location, primarily due to changes in the concentration of uranium and thorium in the soil. Residents at some locations in Colorado, New York, Pennsylvania, and New Jersey have a higher annual dose as a result of higher levels of radon/thoron gases in these areas. In total, these various sources of naturally-occurring radiation and radioactivity contribute to a total dose of about 311 mrem per year.

In addition to natural radiation, we are normally exposed to radiation from a number of man-made sources. The single largest doses from man-made sources result from therapeutic and diagnostic applications of x-rays and radiopharmaceuticals. The annual dose to an individual in the U.S. from medical and dental exposure is about 300 mrem. Consumer products, such as televisions and smoke detectors, contribute about 13 mrem/yr. Much smaller doses result from weapons fallout (less than 1 mrem/yr) and nuclear power plants. Typically, the average person in the United States receives about 314 mrem per year from man-made sources.

Supplemental Information

Facility: Quad Cities Nuclear Power Station (QCNPS) January – December 2012

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, Tritium, 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.

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 gasses, 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	3.03E-07 μCi/ml
Service water	1.00E-05 μCi/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:

9.63E-01 MeV for Quarter 1
9.64E-01 MeV for Quarter 2
9.65E-01 MeV for Quarter 3
9.56E-01 MeV for Quarter 4

4. Measurements and Approximations of Total Radioactivity

a. Fission and Activation Gases
b. Iodines
c. Particulates

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.

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 2.88E+01 Ci of Carbon-14 and the resultant 2.88E+01 Ci $^{14}CO2$ released is based upon a normalized Carbon-14 production rate of 5.10E+00 Ci/GWTh-yr, a gaseous release fraction of 1.00, a Carbon-14 CO2 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.

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:	0
2.	Total time:	N/A
3.	Maximum time:	N/A
4.	Average time:	N/A
5.	Minimum time:	N/A
6.	Average stream flow:	N/A

b. Gaseous

1. NONE

6. Abnormal Releases

Abnormal Releases

a. Liquid

A leak into the 1A RHR (Residual Heat Removal) heat exchanger, service water side, developed in May 2011. This leak has been subsequently repaired during Q1R22 in March of 2013. This produced a monitored liquid effluent release via the continuous liquid release pathway each time that the "A" loop of the Unit-1 RHR system was started. The activity identified from the leak was included in the monthly effluent calculations and is included in the "continuous" liquid section of this report. A temporary modification to pressurize the service water side of the affected heat exchanger was installed in September 2011, which significantly reduced the leakage rate.

Supplemental Information

b. Gaseous

1. NONE

8. Radiological Impact on Man

a. Liquid Dose to a Member of the Public for 2012

Total Body: 2.78E-05 mrem

Organ: 4.55E-05 mrem

b. Gaseous Dose to a Member of the Public for 2012

Total Body: 4.32E-02 mrem

Skin: 6.02E-04 mrem

Organ (Particulate/Iodine/Tritium/C-14): 2.07E-01 mrem

The Quad Cities calculated annual doses from Carbon-14 releases have been calculated using the conservative bounding methodologies outlined in the ODCM. The resultant estimated releases of Carbon-14 resulted in a dose contribution of 3.71E-02 mrem/yr to organ dose (17.9%) and 3.96E-02 mrem/yr to total dose (91.7%). 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. Uranium Fuel Cycle Dose to a Member of the Public for 2012 (40CFR190)

The main component (7.74 mrem or 99.5%) of the Uranium Fuel Cycle dose for Quad Cities Station is BWR skyshine from N-16 within the turbine building. BWR skyshine at Quad Cities Station is conservatively determined to the hypothetical maximally exposed member of the public.

Total Body: 7.78E+00 mrem (Skyshine + Total Body component of gaseous and liquid effluents)

31.1% of 40 CFR 190 Limit of 25 mrem/year (Whole Body and Organ).

Thyroid dose of 2.76E-01% of 40 CFR 190 Limit (75 mrem).

Supplemental Information

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

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 dosimeter.

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 2012.

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

Quad Cities Station Unit One and Unit Two

Assessment Period 01/01/2012 THROUGH 12/31/2012

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

Quad Cities Unit 1

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year Total	% of Limit
TEDE (mrem)	1.06E+00	7.21E-01	1.03E+00	1.05E+00	3.86E+00	**3.86**

Quad Cities Unit 2

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year Total	% of Limit
TEDE (mrem)	9.12E-01	8.10E-01	1.03E+00	1.05E+00	3.80E+00	**3.80**

Submitted by: _____ Date: 26APR2013
David C. Basham

Reviewed by: _____ Date: 4-26-13
James G. Wooldridge

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)	4.60E-04	4.60E-04	10.0	4.60E-03	4.60E-03
Beta Air (mrad)	2.36E-04	2.36E-04	20.0	1.18E-03	1.18E-03
Organ (mrem)	2.21E-01	2.21E-01	15.0	1.47E+00	1.47E+00
Critical Person	Child	Child			
Critical Organ	Bone	Bone			

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.

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: January - March 2012
Stability Class - Extremely Unstable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	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	5	0	0	0	5
SE	0	1	7	1	0	0	9
SSE	0	7	7	0	0	0	14
S	0	11	17	0	0	0	28
SSW	0	11	5	0	0	0	16
SW	0	4	13	0	0	0	17
WSW	0	0	1	0	0	0	1
W	0	2	2	0	0	0	4
WNW	0	0	5	0	0	0	5
NW	0	0	6	10	0	0	16
NNW	0	0	3	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	0	36	71	11	0	0	118

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: 5

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: January - March 2012
Stability Class - Moderately Unstable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: January - March 2012
Stability Class - Slightly Unstable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	4	0	0	0	6
NNE	0	1	0	0	0	0	1
NE	0	2	0	0	0	0	2
ENE	0	1	0	0	0	0	1
E	0	1	0	0	0	0	1
ESE	0	4	2	0	0	0	6
SE	0	1	1	0	0	0	2
SSE	0	8	0	0	0	0	8
S	0	4	0	0	0	0	4
SSW	0	4	4	0	0	0	8
SW	0	1	3	0	0	0	4
WSW	0	1	4	2	0	0	7
W	0	1	8	0	0	0	9
WNW	0	1	5	2	0	0	8
NW	0	3	12	2	0	0	17
NNW	0	1	2	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	0	36	45	6	0	0	87

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: 5

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: January - March 2012
Stability Class - Neutral - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	24	8	5	0	0	38
NNE	0	14	3	2	0	0	19
NE	1	7	18	0	0	0	26
ENE	3	13	8	0	0	0	24
E	3	14	17	0	0	0	34
ESE	3	16	17	1	0	0	37
SE	5	16	15	0	0	0	36
SSE	2	17	4	0	0	0	23
S	3	17	3	0	0	0	23
SSW	2	2	4	0	0	0	8
SW	0	28	13	3	0	0	44
WSW	0	19	14	4	0	0	37
W	2	41	54	25	0	0	122
WNW	1	29	74	33	0	0	137
NW	1	32	81	18	0	0	132
NNW	0	16	14	1	0	0	31
Variable	1	0	0	0	0	0	1
Total	28	305	347	92	0	0	772

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: 5

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: January - March 2012
Stability Class - Slightly Stable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	13	15	4	0	0	0	32
NNE	7	13	3	0	0	0	23
NE	6	15	10	0	0	0	31
ENE	9	29	9	0	0	0	47
E	9	21	4	0	0	0	34
ESE	8	25	11	0	0	0	44
SE	15	43	34	0	0	0	92
SSE	17	36	15	0	0	0	68
S	15	37	3	0	0	0	55
SSW	4	19	4	0	0	0	27
SW	17	33	16	1	0	0	67
WSW	10	47	12	1	0	0	70
W	6	57	23	4	0	0	90
WNW	10	68	7	1	0	0	86
NW	6	35	17	2	0	0	60
NNW	8	13	4	0	0	0	25
Variable	0	0	0	0	0	0	0
Total	160	506	176	9	0	0	851

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: 5

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: January - March 2012
Stability Class - Moderately Stable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	5	1	0	0	0	0	6
NNE	3	0	0	0	0	0	3
NE	8	0	0	0	0	0	8
ENE	4	1	0	0	0	0	5
E	8	2	0	0	0	0	10
ESE	16	18	0	0	0	0	34
SE	16	10	0	0	0	0	26
SSE	25	14	0	0	0	0	39
S	16	8	0	0	0	0	24
SSW	2	2	1	0	0	0	5
SW	6	5	0	0	0	0	11
WSW	6	1	0	0	0	0	7
W	1	0	0	0	0	0	1
WNW	5	1	0	0	0	0	6
NW	5	1	0	0	0	0	6
NNW	1	0	0	0	0	0	1
Variable	1	0	0	0	0	0	1
Total	128	64	1	0	0	0	193

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: 5

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: January - March 2012
Stability Class - Extremely Stable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	4	0	0	0	0	0	4
NNE	4	0	0	0	0	0	4
NE	2	0	0	0	0	0	2
ENE	7	0	0	0	0	0	7
E	11	0	0	0	0	0	11
ESE	18	16	0	0	0	0	34
SE	13	1	0	0	0	0	14
SSE	10	0	0	0	0	0	10
S	8	0	0	0	0	0	8
SSW	1	1	0	0	0	0	2
SW	4	0	0	0	0	0	4
WSW	0	0	0	0	0	0	0
W	4	0	0	0	0	0	4
WNW	4	0	0	0	0	0	4
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	90	18	0	0	0	0	108

Hours of calm in this stability class: 16
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 5

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: January - March 2012
Stability Class - Extremely Unstable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	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	2	0	0	2
SE	0	0	0	2	3	0	5
SSE	0	0	1	2	5	1	9
S	0	0	5	11	6	7	29
SSW	0	0	0	2	7	1	10
SW	0	0	0	0	1	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	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	19	22	9	56

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: 5

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: January - March 2012
Stability Class - Moderately Unstable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	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	1	0	0	1
ESE	0	1	0	2	0	0	3
SE	0	0	1	0	1	0	2
SSE	0	0	4	3	0	1	8
S	0	0	3	2	1	1	7
SSW	0	0	2	1	2	1	6
SW	0	0	0	0	0	1	1
WSW	0	0	4	0	0	0	4
W	0	0	0	0	2	0	2
WNW	0	0	0	6	1	1	8
NW	0	0	1	2	4	1	8
NNW	0	0	4	0	0	0	4
Variable	0	0	0	0	0	0	0
Total	0	1	19	17	11	6	54

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: 5

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: January - March 2012
Stability Class - Slightly Unstable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	1	1	0	0	4
NNE	0	1	2	0	0	0	3
NE	0	0	1	0	0	0	1
ENE	0	0	1	0	0	0	1
E	0	1	0	0	1	0	2
ESE	0	3	1	5	1	0	10
SE	0	1	0	1	0	1	3
SSE	0	0	2	2	2	0	6
S	0	2	2	0	1	1	6
SSW	0	0	1	0	0	1	2
SW	0	1	2	0	1	0	4
WSW	0	1	3	1	1	0	6
W	0	0	0	4	1	4	9
WNW	0	0	2	6	5	3	16
NW	0	0	6	7	2	3	18
NNW	0	1	0	3	0	0	4
Variable	0	0	0	0	0	0	0
Total	0	13	24	30	15	13	95

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: 5

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: January - March 2012
Stability Class - Neutral - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	10	19	6	9	1	46
NNE	3	5	11	14	4	0	37
NE	2	10	10	22	10	0	54
ENE	3	11	26	23	4	0	67
E	4	3	13	9	9	1	39
ESE	4	8	6	8	12	1	39
SE	0	9	10	28	19	5	71
SSE	2	5	7	13	8	2	37
S	0	4	10	16	13	5	48
SSW	1	6	8	13	8	11	47
SW	0	2	13	24	10	8	57
WSW	0	4	21	27	10	7	69
W	5	8	38	40	53	20	164
WNW	3	3	36	52	81	27	202
NW	2	13	16	29	46	10	116
NNW	1	14	13	9	6	1	44
Variable	1	0	0	0	0	0	1
Total	32	115	257	333	302	99	1138

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: 5

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: January - March 2012
Stability Class - Slightly Stable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	1	6	6	0	0	14
NNE	0	1	8	6	0	0	15
NE	0	3	2	5	0	0	10
ENE	1	2	2	3	0	0	8
E	1	3	3	4	0	0	11
ESE	0	2	3	8	8	2	23
SE	0	3	7	19	11	1	41
SSE	1	0	12	23	16	19	71
S	1	1	14	43	23	11	93
SSW	0	2	3	13	14	17	49
SW	0	1	7	15	17	2	42
WSW	2	1	4	22	9	0	38
W	2	6	8	31	8	0	55
WNW	0	4	7	38	8	0	57
NW	3	5	8	14	1	0	31
NNW	1	3	16	4	0	0	24
Variable	0	0	0	0	0	0	0
Total	13	38	110	254	115	52	582

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: 5

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: January - March 2012
Stability Class - Moderately Stable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	5	2	2	0	0	9
NNE	0	3	1	1	0	0	5
NE	1	4	0	2	0	0	7
ENE	0	0	0	0	0	0	0
E	0	10	2	0	0	0	12
ESE	0	6	9	7	3	0	25
SE	1	2	4	13	4	0	24
SSE	0	2	5	12	7	0	26
S	1	1	6	12	4	0	24
SSW	0	3	3	11	8	0	25
SW	4	1	3	1	0	0	9
WSW	2	2	1	2	0	0	7
W	1	1	4	4	0	0	10
WNW	1	1	0	1	0	0	3
NW	0	0	1	1	0	0	2
NNW	1	0	2	2	0	0	5
Variable	0	0	0	0	0	0	0
Total	12	41	43	71	26	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: 5

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: January - March 2012
Stability Class - Extremely Stable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	4	0	0	0	0	4
E	0	2	2	0	0	0	4
ESE	0	0	0	2	0	0	2
SE	0	1	1	3	1	0	6
SSE	0	1	0	1	0	0	2
S	0	6	0	1	2	0	9
SSW	1	1	6	12	0	0	20
SW	0	1	5	0	0	0	6
WSW	0	2	3	0	0	0	5
W	0	1	0	0	0	0	1
WNW	1	0	0	0	0	0	1
NW	1	0	0	0	0	0	1
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	3	19	17	19	3	0	61

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: 5

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: April - June 2012
Stability Class - Extremely Unstable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	9	2	0	0	13
NNE	0	5	17	1	0	0	23
NE	0	6	13	0	0	0	19
ENE	0	12	20	0	0	0	32
E	0	5	5	2	0	0	12
ESE	0	2	6	9	0	0	17
SE	0	7	12	1	0	0	20
SSE	0	28	12	0	0	0	40
S	0	16	8	0	0	0	24
SSW	0	24	8	0	0	0	32
SW	0	44	26	0	0	0	70
WSW	0	4	5	0	0	0	9
W	0	11	10	2	0	0	23
WNW	0	7	6	3	0	0	16
NW	0	2	17	4	0	0	23
NNW	0	3	13	0	0	0	16
Variable	0	0	0	0	0	0	0
Total	0	178	187	24	0	0	389

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: 0

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: April - June 2012
Stability Class - Moderately Unstable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	4	0	0	0	4
NNE	0	2	1	0	0	0	3
NE	0	3	3	0	0	0	6
ENE	0	2	3	0	0	0	5
E	0	1	3	0	0	0	4
ESE	0	2	3	1	0	0	6
SE	0	4	2	0	0	0	6
SSE	0	2	1	0	0	0	3
S	0	0	0	0	0	0	0
SSW	0	2	1	0	0	0	3
SW	0	5	1	0	0	0	6
WSW	0	5	4	0	0	0	9
W	0	7	1	0	0	0	8
WNW	0	2	2	2	0	0	6
NW	0	3	1	0	0	0	4
NNW	0	0	0	1	0	0	1
Variable	0	0	0	0	0	0	0
Total	0	40	30	4	0	0	74

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: April - June 2012
Stability Class - Slightly Unstable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	3	1	0	0	0	4
NNE	0	8	5	0	0	0	13
NE	0	5	1	0	0	0	6
ENE	0	6	2	0	0	0	8
E	0	1	4	0	0	0	5
ESE	0	8	2	0	0	0	10
SE	0	6	7	0	0	0	13
SSE	0	9	0	0	0	0	9
S	0	4	0	0	0	0	4
SSW	2	8	1	0	0	0	11
SW	1	13	4	0	0	0	18
WSW	2	10	3	0	0	0	15
W	0	6	0	2	0	0	8
WNW	0	4	5	3	0	0	12
NW	0	5	2	0	0	0	7
NNW	0	6	2	0	0	0	8
Variable	0	0	0	0	0	0	0
Total	5	102	39	5	0	0	151

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: April - June 2012
Stability Class - Neutral - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	10	16	2	0	0	28
NNE	2	11	5	1	0	0	19
NE	3	12	16	0	0	0	31
ENE	1	20	11	0	0	0	32
E	6	29	39	2	0	0	76
ESE	4	11	11	1	0	0	27
SE	1	21	10	0	0	0	32
SSE	2	20	0	0	0	0	22
S	3	9	2	0	0	0	14
SSW	4	14	4	0	0	0	22
SW	4	29	9	0	0	0	42
WSW	3	16	8	2	0	0	29
W	6	13	6	4	3	0	32
WNW	4	13	10	0	0	0	27
NW	0	16	11	2	0	0	29
NNW	2	4	4	0	0	0	10
Variable	0	0	0	0	0	0	0
Total	45	248	162	14	3	0	472

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: April - June 2012
Stability Class - Slightly Stable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	3	20	7	1	0	0	31
NNE	6	10	1	0	0	0	17
NE	8	14	3	0	0	0	25
ENE	5	44	7	0	0	0	56
E	9	34	13	2	0	0	58
ESE	15	40	7	0	0	0	62
SE	18	39	2	0	0	0	59
SSE	18	21	2	0	0	0	41
S	9	31	3	0	0	0	43
SSW	4	32	6	0	0	0	42
SW	10	25	5	0	0	0	40
WSW	10	24	2	0	0	0	36
W	5	20	3	0	0	0	28
WNW	14	35	3	0	0	0	52
NW	13	44	2	0	0	0	59
NNW	5	27	1	0	0	0	33
Variable	0	0	0	0	0	0	0
Total	152	460	67	3	0	0	682

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: April - June 2012
Stability Class - Moderately Stable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	2	0	0	0	0	3
NNE	12	0	0	0	0	0	12
NE	6	2	0	0	0	0	8
ENE	9	3	0	0	0	0	12
E	22	1	0	0	0	0	23
ESE	38	21	0	0	0	0	59
SE	30	3	1	0	0	0	34
SSE	14	0	0	0	0	0	14
S	6	1	0	0	0	0	7
SSW	12	2	0	0	0	0	14
SW	10	2	0	0	0	0	12
WSW	5	1	0	0	0	0	6
W	9	1	0	0	0	0	10
WNW	10	3	1	0	0	0	14
NW	2	2	0	0	0	0	4
NNW	4	0	0	0	0	0	4
Variable	0	1	0	0	0	0	1
Total	190	45	2	0	0	0	237

Hours of calm in this stability class: 8
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: April - June 2012
Stability Class - Extremely Stable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	0	0	0	0	0	2
NNE	8	0	0	0	0	0	8
NE	8	0	0	0	0	0	8
ENE	4	0	0	0	0	0	4
E	12	0	0	0	0	0	12
ESE	30	2	0	0	0	0	32
SE	13	1	0	0	0	0	14
SSE	4	0	0	0	0	0	4
S	0	0	0	0	0	0	0
SSW	1	0	0	0	0	0	1
SW	9	0	0	0	0	0	9
WSW	9	0	0	0	0	0	9
W	3	0	0	0	0	0	3
WNW	9	2	0	0	0	0	11
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	115	5	0	0	0	0	120

Hours of calm in this stability class: 46
Hours of missing wind measurements in this stability class: 2
Hours of missing stability measurements in all stability classes: 0

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: April - June 2012
Stability Class - Extremely Unstable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	3	3	0	0	6
NNE	0	0	3	4	2	0	9
NE	0	0	2	9	4	0	15
ENE	0	0	1	4	1	0	6
E	0	0	0	0	0	0	0
ESE	0	0	0	0	4	0	4
SE	0	0	0	5	0	0	5
SSE	0	0	5	9	3	6	23
S	0	0	1	12	15	6	34
SSW	0	0	8	21	13	3	45
SW	0	0	3	1	1	0	5
WSW	0	0	0	0	0	0	0
W	0	0	2	1	1	0	4
WNW	0	0	4	1	1	0	6
NW	0	0	3	12	3	0	18
NNW	0	0	2	5	0	0	7
Variable	0	0	0	0	0	0	0
Total	0	0	37	87	48	15	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: 0

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: April - June 2012
Stability Class - Moderately Unstable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	5	2	2	0	9
NNE	0	0	7	7	0	0	14
NE	0	1	7	4	1	0	13
ENE	0	0	8	2	2	0	12
E	0	1	11	2	0	1	15
ESE	0	0	3	0	4	1	8
SE	0	0	2	4	2	1	9
SSE	0	3	4	2	1	0	10
S	0	0	2	5	2	1	10
SSW	0	2	7	5	5	5	24
SW	0	1	4	4	2	0	11
WSW	0	0	3	0	0	0	3
W	0	2	3	3	3	0	11
WNW	0	1	5	3	2	2	13
NW	0	0	2	2	2	0	6
NNW	0	0	1	10	1	0	12
Variable	0	0	0	0	0	0	0
Total	0	11	74	55	29	11	180

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: 0

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: April - June 2012
Stability Class - Slightly Unstable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	2	3	2	1	0	8
NNE	0	3	7	3	1	0	14
NE	0	1	6	0	0	0	7
ENE	0	2	3	0	1	0	6
E	0	2	2	2	2	0	8
ESE	0	0	6	1	4	2	13
SE	0	0	7	2	2	0	11
SSE	0	1	5	2	2	1	11
S	0	4	2	1	2	1	10
SSW	0	11	5	6	2	3	27
SW	0	6	7	5	2	0	20
WSW	0	6	1	3	0	0	10
W	0	3	2	0	4	2	11
WNW	0	8	0	4	1	2	15
NW	0	3	4	3	1	0	11
NNW	0	2	5	2	0	0	9
Variable	0	0	0	0	0	0	0
Total	0	54	65	36	25	11	191

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: April - June 2012
Stability Class - Neutral - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	9	6	14	7	0	36
NNE	0	7	7	10	3	0	27
NE	0	5	9	25	8	0	47
ENE	1	5	15	29	3	0	53
E	1	7	20	32	21	5	86
ESE	3	4	8	17	9	1	42
SE	1	4	15	8	9	1	38
SSE	0	2	5	8	10	4	29
S	0	3	5	14	13	6	41
SSW	1	12	8	11	17	9	58
SW	1	6	6	2	8	5	28
WSW	2	14	5	8	3	1	33
W	2	4	8	10	9	12	45
WNW	2	6	10	14	3	1	36
NW	3	2	4	17	10	2	38
NNW	2	0	4	11	6	0	23
Variable	0	0	0	0	0	0	0
Total	19	90	135	230	139	47	660

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: April - June 2012
Stability Class - Slightly Stable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	10	12	1	0	24
NNE	0	3	7	4	1	0	15
NE	0	3	9	8	2	0	22
ENE	0	4	15	22	3	0	44
E	0	2	12	11	1	0	26
ESE	0	1	7	23	9	0	40
SE	0	5	6	27	3	1	42
SSE	0	1	12	23	8	1	45
S	0	6	8	35	26	7	82
SSW	1	2	8	21	32	7	71
SW	1	1	5	10	1	0	18
WSW	1	1	13	12	1	0	28
W	0	5	8	7	1	1	22
WNW	0	2	10	26	0	0	38
NW	1	4	9	35	3	0	52
NNW	0	3	16	20	0	0	39
Variable	0	0	0	0	0	0	0
Total	4	44	155	296	92	17	608

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 4
Hours of missing stability measurements in all stability classes: 0

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: April - June 2012
Stability Class - Moderately Stable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	5	2	1	0	0	8
NNE	1	3	4	1	0	0	9
NE	2	3	2	0	0	0	7
ENE	0	5	2	0	0	0	7
E	1	2	5	5	0	0	13
ESE	0	2	3	11	5	0	21
SE	0	3	9	20	1	0	33
SSE	1	3	9	37	2	0	52
S	1	3	9	14	1	0	28
SSW	1	5	5	4	0	0	15
SW	1	1	5	5	1	0	13
WSW	0	4	1	2	0	0	7
W	1	1	1	4	0	0	7
WNW	0	1	1	7	0	0	9
NW	2	2	3	3	0	0	10
NNW	0	4	1	3	0	0	8
Variable	0	1	0	0	0	0	1
Total	11	48	62	117	10	0	248

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: 0

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: April - June 2012
Stability Class - Extremely Stable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	6	3	1	0	0	10
NNE	0	6	2	0	0	0	8
NE	0	3	2	0	0	0	5
ENE	0	5	2	0	0	0	7
E	0	0	6	0	0	0	6
ESE	0	3	1	1	0	0	5
SE	1	1	0	2	0	0	4
SSE	0	2	3	8	1	0	14
S	1	1	1	1	0	0	4
SSW	1	3	3	2	0	0	9
SW	1	1	4	1	0	0	7
WSW	0	0	4	2	0	0	6
W	0	1	0	4	0	0	5
WNW	0	0	3	2	0	0	5
NW	0	2	1	2	0	0	5
NNW	0	2	0	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	4	36	35	26	1	0	102

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: 0

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: July - September 2012
Stability Class - Extremely Unstable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	8	17	0	0	0	25
NNE	0	3	10	0	0	0	13
NE	0	4	3	0	0	0	7
ENE	0	11	14	0	0	0	25
E	0	6	6	0	0	0	12
ESE	0	5	2	0	0	0	7
SE	0	7	1	0	0	0	8
SSE	0	15	2	0	0	0	17
S	0	17	1	0	0	0	18
SSW	0	35	7	0	0	0	42
SW	0	73	10	0	0	0	83
WSW	0	42	4	0	0	0	46
W	0	14	3	0	0	0	17
WNW	0	11	11	0	0	0	22
NW	0	17	16	0	0	0	33
NNW	0	16	13	0	0	0	29
Variable	0	0	0	0	0	0	0
Total	0	284	120	0	0	0	404

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: July - September 2012
Stability Class - Moderately Unstable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	4	2	0	0	0	6
NNE	0	5	1	0	0	0	6
NE	0	3	0	0	0	0	3
ENE	0	2	0	0	0	0	2
E	0	2	0	0	0	0	2
ESE	0	4	0	0	0	0	4
SE	0	5	0	0	0	0	5
SSE	0	1	0	0	0	0	1
S	0	0	0	0	0	0	0
SSW	0	3	0	0	0	0	3
SW	0	16	1	0	0	0	17
WSW	0	11	2	0	0	0	13
W	0	7	1	0	0	0	8
WNW	0	4	3	0	0	0	7
NW	0	3	2	0	0	0	5
NNW	0	2	1	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	0	72	13	0	0	0	85

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: July - September 2012
Stability Class - Slightly Unstable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	4	2	0	0	0	6
NNE	0	7	1	0	0	0	8
NE	0	6	1	0	0	0	7
ENE	0	9	3	0	0	0	12
E	1	4	0	0	0	0	5
ESE	0	4	0	0	0	0	4
SE	1	6	0	0	0	0	7
SSE	0	5	0	0	0	0	5
S	0	3	0	0	0	0	3
SSW	0	7	0	0	0	0	7
SW	1	17	0	0	0	0	18
WSW	0	16	0	0	0	0	16
W	0	22	1	0	0	0	23
WNW	0	3	1	0	0	0	4
NW	0	17	2	0	0	0	19
NNW	0	7	2	0	0	0	9
Variable	0	1	0	0	0	0	1
Total	3	138	13	0	0	0	154

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: July - September 2012
Stability Class - Neutral - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	17	15	0	0	0	32
NNE	1	19	6	1	0	0	27
NE	6	35	10	0	0	0	51
ENE	10	25	14	0	0	0	49
E	5	14	2	0	0	0	21
ESE	7	12	0	0	0	0	19
SE	6	11	0	0	0	0	17
SSE	5	4	0	0	0	0	9
S	5	8	1	0	0	0	14
SSW	6	10	0	0	0	0	16
SW	6	12	2	0	0	0	20
WSW	3	18	0	0	0	0	21
W	8	23	4	0	0	0	35
WNW	6	13	3	0	0	0	22
NW	8	25	4	0	0	0	37
NNW	0	12	4	1	0	0	17
Variable	1	0	0	0	0	0	1
Total	83	258	65	2	0	0	408

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: July - September 2012
Stability Class - Slightly Stable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	9	2	0	0	0	13
NNE	2	5	0	0	0	0	7
NE	13	10	1	0	0	0	24
ENE	13	13	0	0	0	0	26
E	18	6	2	0	0	0	26
ESE	12	12	0	0	0	0	24
SE	9	11	1	0	0	0	21
SSE	15	8	0	0	0	0	23
S	9	9	0	0	0	0	18
SSW	11	14	1	0	0	0	26
SW	33	18	4	0	0	0	55
WSW	16	13	2	0	0	0	31
W	13	16	0	0	0	0	29
WNW	24	21	1	0	0	0	46
NW	17	49	1	0	0	0	67
NNW	5	16	3	0	0	0	24
Variable	0	0	0	0	0	0	0
Total	212	230	18	0	0	0	460

Hours of calm in this stability class: 5
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: July - September 2012
Stability Class - Moderately Stable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	7	0	0	0	0	0	7
NNE	10	1	0	0	0	0	11
NE	9	0	0	0	0	0	9
ENE	13	0	0	0	0	0	13
E	12	2	0	0	0	0	14
ESE	20	2	0	0	0	0	22
SE	37	2	0	0	0	0	39
SSE	18	2	0	0	0	0	20
S	13	3	0	0	0	0	16
SSW	9	0	0	0	0	0	9
SW	14	0	0	0	0	0	14
WSW	9	2	0	0	0	0	11
W	19	3	0	0	0	0	22
WNW	25	8	0	0	0	0	33
NW	17	8	0	0	0	0	25
NNW	12	1	0	0	0	0	13
Variable	1	2	0	0	0	0	3
Total	245	36	0	0	0	0	281

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: 3

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: July - September 2012
Stability Class - Extremely Stable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	12	0	0	0	0	0	12
NNE	14	0	0	0	0	0	14
NE	12	0	0	0	0	0	12
ENE	14	0	0	0	0	0	14
E	18	0	0	0	0	0	18
ESE	58	1	0	0	0	0	59
SE	40	0	0	0	0	0	40
SSE	22	0	0	0	0	0	22
S	7	0	0	0	0	0	7
SSW	10	0	0	0	0	0	10
SW	12	0	0	0	0	0	12
WSW	12	1	0	0	0	0	13
W	12	1	0	0	0	0	13
WNW	16	1	0	0	0	0	17
NW	12	0	0	0	0	0	12
NNW	2	0	0	0	0	0	2
Variable	1	0	0	0	0	0	1
Total	274	4	0	0	0	0	278

Hours of calm in this stability class: 121
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: July - September 2012
Stability Class - Extremely Unstable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	3	4	0	0	7
NNE	0	0	0	0	1	0	1
NE	0	0	1	2	0	0	3
ENE	0	0	10	4	0	0	14
E	0	0	2	0	0	0	2
ESE	0	0	4	0	0	0	4
SE	0	0	3	0	0	0	3
SSE	0	2	4	2	2	0	10
S	0	0	9	3	3	0	15
SSW	0	0	16	27	0	4	47
SW	0	1	11	6	4	0	22
WSW	0	1	15	3	0	0	19
W	0	0	1	0	0	0	1
WNW	0	0	4	1	2	0	7
NW	0	0	7	8	0	0	15
NNW	0	0	4	6	1	0	11
Variable	0	0	0	0	0	0	0
Total	0	4	94	66	13	4	181

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: July - September 2012
Stability Class - Moderately Unstable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	1	9	5	0	0	15
NNE	0	0	6	2	0	0	8
NE	0	1	3	1	0	0	5
ENE	0	2	6	2	0	0	10
E	0	1	7	0	0	0	8
ESE	0	1	4	0	0	0	5
SE	0	0	3	0	0	0	3
SSE	0	1	5	3	0	0	9
S	0	2	4	1	1	0	8
SSW	0	3	10	4	0	1	18
SW	0	14	7	5	1	0	27
WSW	0	8	13	0	0	0	21
W	0	0	4	0	0	0	4
WNW	0	1	7	4	0	0	12
NW	0	2	11	7	2	0	22
NNW	0	4	10	3	0	0	17
Variable	0	0	0	0	0	0	0
Total	0	41	109	37	4	1	192

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: July - September 2012
Stability Class - Slightly Unstable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	3	7	2	0	0	12
NNE	0	1	9	1	1	0	12
NE	0	3	6	0	0	0	9
ENE	0	1	6	3	0	0	10
E	0	1	3	0	0	0	4
ESE	0	3	0	0	0	0	3
SE	0	3	4	0	0	0	7
SSE	0	3	1	0	0	0	4
S	0	1	2	0	0	0	3
SSW	0	9	6	2	0	0	17
SW	0	27	6	3	1	0	37
WSW	0	16	10	3	0	0	29
W	0	5	5	4	0	0	14
WNW	0	6	3	4	2	0	15
NW	0	9	7	4	2	0	22
NNW	0	8	3	2	0	0	13
Variable	0	1	0	0	0	0	1
Total	0	100	78	28	6	0	212

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: July - September 2012
Stability Class - Neutral - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	10	7	16	6	0	40
NNE	2	6	12	9	4	1	34
NE	2	11	12	20	10	0	55
ENE	0	10	15	12	4	0	41
E	3	15	3	4	0	0	25
ESE	2	7	1	0	0	0	10
SE	1	5	3	0	0	0	9
SSE	0	5	6	4	0	0	15
S	0	4	10	3	2	0	19
SSW	2	5	14	4	0	2	27
SW	1	14	15	2	1	0	33
WSW	0	12	12	4	0	0	28
W	0	11	12	8	0	0	31
WNW	2	5	5	4	0	0	16
NW	1	9	12	10	5	0	37
NNW	1	10	10	6	2	2	31
Variable	1	0	0	0	0	0	1
Total	19	139	149	106	34	5	452

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: July - September 2012
Stability Class - Slightly Stable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	3	10	4	1	0	20
NNE	0	1	8	1	0	0	10
NE	0	7	8	7	2	0	24
ENE	0	8	14	4	1	0	27
E	0	5	12	7	0	0	24
ESE	0	1	8	18	0	0	27
SE	0	4	11	13	1	1	30
SSE	0	1	9	11	0	0	21
S	2	2	9	10	5	0	28
SSW	0	4	14	22	15	4	59
SW	0	6	19	20	3	1	49
WSW	0	5	14	7	0	1	27
W	0	3	8	10	0	0	21
WNW	0	6	5	10	1	0	22
NW	0	4	17	22	3	0	46
NNW	0	3	20	24	1	0	48
Variable	0	0	0	0	0	0	0
Total	4	63	186	190	33	7	483

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: July - September 2012
Stability Class - Moderately Stable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	6	15	10	0	0	31
NNE	0	1	13	4	0	0	18
NE	1	4	8	0	1	0	14
ENE	3	7	4	2	0	0	16
E	0	11	15	4	0	0	30
ESE	0	1	10	6	0	0	17
SE	0	5	6	3	0	0	14
SSE	1	3	3	17	5	0	29
S	3	3	9	21	3	0	39
SSW	2	4	17	33	0	0	56
SW	1	1	20	15	0	0	37
WSW	1	0	6	4	0	0	11
W	0	5	6	2	0	0	13
WNW	1	6	10	11	0	0	28
NW	0	2	9	8	0	0	19
NNW	0	5	14	4	0	0	23
Variable	0	0	0	0	0	0	0
Total	13	64	165	144	9	0	395

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: July - September 2012
Stability Class - Extremely Stable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	2	2	0	0	0	6
NNE	1	1	7	0	0	0	9
NE	1	4	12	1	0	0	18
ENE	0	5	11	1	0	0	17
E	1	10	8	3	0	0	22
ESE	0	7	3	2	0	0	12
SE	2	4	12	2	0	0	20
SSE	1	1	7	13	0	0	22
S	2	5	10	10	0	0	27
SSW	0	9	16	23	1	0	49
SW	1	7	15	11	0	0	34
WSW	3	3	9	0	0	0	15
W	1	3	4	1	0	0	9
WNW	1	5	9	2	0	0	17
NW	1	4	1	0	0	0	6
NNW	1	3	1	1	0	0	6
Variable	0	0	0	0	0	0	0
Total	18	73	127	70	1	0	289

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

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: October - December 2012
Stability Class - Extremely Unstable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	2	0	0	0	2
NNE	0	2	0	0	0	0	2
NE	0	0	2	0	0	0	2
ENE	0	1	1	0	0	0	2
E	0	1	2	0	0	0	3
ESE	0	3	5	0	0	0	8
SE	0	4	4	0	0	0	8
SSE	0	14	2	0	0	0	16
S	3	10	7	0	0	0	20
SSW	2	11	5	0	0	0	18
SW	2	3	13	0	0	0	18
WSW	1	0	3	0	0	0	4
W	0	4	3	0	0	0	7
WNW	0	3	2	0	0	0	5
NW	0	1	6	0	0	0	7
NNW	0	0	7	0	0	0	7
Variable	0	0	0	0	0	0	0
Total	8	57	64	0	0	0	129

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: 1

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: October - December 2012
Stability Class - Moderately Unstable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	2	1	0	0	3
NNE	0	3	0	0	0	0	3
NE	0	4	1	0	0	0	5
ENE	0	0	0	0	0	0	0
E	0	2	1	0	0	0	3
ESE	0	1	4	0	0	0	5
SE	0	3	0	0	0	0	3
SSE	0	3	0	0	0	0	3
S	0	2	0	0	0	0	2
SSW	0	4	2	0	0	0	6
SW	0	1	5	0	0	0	6
WSW	0	1	0	0	0	0	1
W	1	3	0	0	0	0	4
WNW	0	0	2	2	0	0	4
NW	0	0	2	0	0	0	2
NNW	0	0	2	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	1	27	21	3	0	0	52

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: 1

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: October - December 2012
Stability Class - Slightly Unstable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	4	1	1	0	0	6
NNE	0	1	0	0	0	0	1
NE	0	6	0	0	0	0	6
ENE	0	4	0	0	0	0	4
E	1	1	1	0	0	0	3
ESE	0	2	1	0	0	0	3
SE	0	5	1	0	0	0	6
SSE	0	3	0	0	0	0	3
S	0	4	0	0	0	0	4
SSW	0	9	2	0	0	0	11
SW	0	7	1	0	0	0	8
WSW	0	1	4	2	0	0	7
W	1	8	6	0	0	0	15
WNW	0	2	0	2	0	0	4
NW	0	5	6	0	0	0	11
NNW	0	4	2	0	0	0	6
Variable	0	0	0	0	0	0	0
Total	2	66	25	5	0	0	98

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: 1

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: October - December 2012
Stability Class - Neutral - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	6	36	28	3	1	0	74
NNE	4	18	9	2	0	0	33
NE	9	18	3	0	0	0	30
ENE	7	41	8	2	0	0	58
E	6	22	4	0	0	0	32
ESE	5	31	6	0	0	0	42
SE	1	24	9	0	0	0	34
SSE	5	26	1	0	0	0	32
S	8	35	5	0	0	0	48
SSW	3	19	12	0	0	0	34
SW	9	29	11	0	0	0	49
WSW	9	22	17	0	0	0	48
W	3	39	51	6	0	0	99
WNW	7	67	67	28	0	0	169
NW	13	71	32	10	0	0	126
NNW	10	17	4	3	0	0	34
Variable	0	0	0	0	0	0	0
Total	105	515	267	54	1	0	942

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: 1

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: October - December 2012
Stability Class - Slightly Stable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	30	0	0	0	0	32
NNE	3	8	0	0	0	0	11
NE	5	8	3	0	0	0	16
ENE	11	17	0	0	0	0	28
E	8	7	0	0	0	0	15
ESE	15	32	0	0	0	0	47
SE	14	31	2	0	0	0	47
SSE	21	31	1	0	0	0	53
S	13	42	7	0	0	0	62
SSW	7	37	6	0	0	0	50
SW	11	26	6	0	0	0	43
WSW	10	12	2	0	0	0	24
W	8	36	3	0	0	0	47
WNW	11	44	4	0	0	0	59
NW	9	41	0	0	0	0	50
NNW	4	23	2	0	0	0	29
Variable	0	0	0	0	0	0	0
Total	152	425	36	0	0	0	613

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: 1

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: October - December 2012
Stability Class - Moderately Stable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	7	2	0	0	0	0	9
NNE	9	0	0	0	0	0	9
NE	7	1	0	0	0	0	8
ENE	4	3	0	0	0	0	7
E	9	2	0	0	0	0	11
ESE	25	37	0	0	0	0	62
SE	29	12	0	0	0	0	41
SSE	11	5	0	0	0	0	16
S	1	8	0	0	0	0	9
SSW	1	1	0	0	0	0	2
SW	1	0	0	0	0	0	1
WSW	2	0	0	0	0	0	2
W	2	3	0	0	0	0	5
WNW	3	3	0	0	0	0	6
NW	3	5	0	0	0	0	8
NNW	9	4	0	0	0	0	13
Variable	0	0	0	0	0	0	0
Total	123	86	0	0	0	0	209

Hours of calm in this stability class: 4
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: October - December 2012
Stability Class - Extremely Stable - 196Ft-33Ft Delta-T (F)
Winds Measured at 33 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	4	0	0	0	0	0	4
NNE	8	0	0	0	0	0	8
NE	3	0	0	0	0	0	3
ENE	3	0	0	0	0	0	3
E	17	2	0	0	0	0	19
ESE	25	33	0	0	0	0	58
SE	21	2	0	0	0	0	23
SSE	10	0	0	0	0	0	10
S	1	0	0	0	0	0	1
SSW	1	0	0	0	0	0	1
SW	2	0	0	0	0	0	2
WSW	2	0	0	0	0	0	2
W	1	0	0	0	0	0	1
WNW	5	1	0	0	0	0	6
NW	8	2	0	0	0	0	10
NNW	3	0	0	0	0	0	3
Variable	1	0	0	0	0	0	1
Total	115	40	0	0	0	0	155

Hours of calm in this stability class: 4
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 1

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: October - December 2012
Stability Class - Extremely Unstable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	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	0	0	0	0
SE	0	0	0	2	0	0	2
SSE	0	0	1	1	0	2	4
S	0	1	0	7	3	1	12
SSW	0	0	0	3	4	2	9
SW	0	0	0	2	0	0	2
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	2	0	0	2
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	1	1	18	7	5	32

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: 97

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: October - December 2012
Stability Class - Moderately Unstable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	1	1	0	0	2
ENE	0	0	0	0	0	0	0
E	0	0	3	0	0	0	3
ESE	0	0	2	1	0	0	3
SE	0	0	2	0	0	0	2
SSE	0	0	3	0	1	0	4
S	0	2	1	4	2	1	10
SSW	0	1	2	1	1	0	5
SW	0	0	0	2	2	0	4
WSW	0	0	0	1	1	0	2
W	0	0	2	1	0	0	3
WNW	0	0	1	1	1	0	3
NW	0	0	2	5	0	0	7
NNW	0	0	0	0	3	0	3
Variable	0	0	0	0	0	0	0
Total	0	3	19	17	11	1	51

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: 97

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: October - December 2012
Stability Class - Slightly Unstable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	0	0	1	1	0	0	2
NNE	0	1	5	0	0	0	6
NE	0	4	5	1	0	0	10
ENE	0	1	0	0	0	0	1
E	0	0	4	0	0	0	4
ESE	0	0	3	3	0	0	6
SE	0	0	4	2	0	0	6
SSE	0	1	7	0	0	0	8
S	0	0	5	1	2	0	8
SSW	0	5	6	0	7	1	19
SW	1	0	0	2	0	0	3
WSW	0	2	1	1	1	0	5
W	0	1	4	1	1	0	7
WNW	0	0	1	0	2	2	5
NW	0	0	5	2	0	0	7
NNW	0	0	4	3	2	0	9
Variable	0	0	0	0	0	0	0
Total	1	15	55	17	15	3	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: 97

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: October - December 2012
Stability Class - Neutral - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	2	11	27	25	3	3	71
NNE	3	3	19	12	2	1	40
NE	5	9	18	9	1	0	42
ENE	1	14	28	6	5	1	55
E	2	4	18	8	0	0	32
ESE	2	5	13	8	2	1	31
SE	0	7	17	9	6	1	40
SSE	0	4	11	13	4	1	33
S	1	3	17	27	9	8	65
SSW	0	9	16	16	11	8	60
SW	3	8	6	11	2	0	30
WSW	3	13	6	16	11	1	50
W	2	12	11	31	27	2	85
WNW	3	11	31	60	29	24	158
NW	1	16	47	48	13	9	134
NNW	1	12	17	13	2	3	48
Variable	0	0	0	0	0	0	0
Total	29	141	302	312	127	63	974

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: 97

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: October - December 2012
Stability Class - Slightly Stable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	1	13	22	0	0	37
NNE	0	0	10	8	0	0	18
NE	0	4	10	5	3	0	22
ENE	1	1	8	1	0	0	11
E	1	3	11	6	0	0	21
ESE	0	0	2	12	0	0	14
SE	0	0	8	25	5	0	38
SSE	0	4	12	38	5	2	61
S	1	4	18	28	39	7	97
SSW	1	6	8	28	42	1	86
SW	1	2	4	9	11	0	27
WSW	1	1	12	2	1	1	18
W	0	2	17	14	4	0	37
WNW	0	1	14	25	2	0	42
NW	1	3	7	21	0	0	32
NNW	0	7	14	21	5	0	47
Variable	0	0	0	0	0	0	0
Total	8	39	168	265	117	11	608

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: 97

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: October - December 2012
Stability Class - Moderately Stable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	1	2	3	2	0	9
NNE	0	1	5	13	0	0	19
NE	1	1	8	5	0	0	15
ENE	1	3	5	2	0	0	11
E	2	7	3	2	0	0	14
ESE	0	2	2	3	1	0	8
SE	0	2	3	23	6	0	34
SSE	0	4	15	31	1	0	51
S	0	3	10	16	3	0	32
SSW	0	1	4	19	2	0	26
SW	0	0	2	2	0	0	4
WSW	0	0	0	0	0	0	0
W	1	1	2	0	0	0	4
WNW	0	2	2	1	0	0	5
NW	1	0	1	6	0	0	8
NNW	0	1	0	1	0	0	2
Variable	0	0	0	0	0	0	0
Total	7	29	64	127	15	0	242

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: 97

Joint Frequency Tables

Quad Cities Generating Station

Period of Record: October - December 2012
Stability Class - Extremely Stable - 296Ft-33Ft Delta-T (F)
Winds Measured at 296 Feet

Wind Direction	Wind Speed (in mph) 1-3	4-7	8-12	13-18	19-24	> 24	Total
N	1	0	2	1	0	0	4
NNE	0	3	3	1	0	0	7
NE	0	4	0	0	0	0	4
ENE	0	2	1	1	0	0	4
E	0	0	1	1	0	0	2
ESE	0	0	2	2	0	0	4
SE	0	0	0	1	0	0	1
SSE	0	1	3	12	3	0	19
S	0	2	2	16	0	0	20
SSW	0	0	6	16	0	0	22
SW	0	0	2	4	0	0	6
WSW	1	0	0	0	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	1	1	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	2	13	23	55	3	0	96

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: 97

Quad Cities Nuclear Power Station
2012 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^3)	Total Activity (Ci)	Period	Est. Total Error %
a. Spent resins, filter sludges, evaporator bottoms, etc	1.37E+02	1.19E+03	2012	2.50E+01
b. Dry compressible waste, contaminated equip, etc	1.30E+03	1.45E+01	2012	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	6.64E+01
Fe-55	2.69E+01
Cs-137	4.00E+00
Ni-63	1.22E+00
b. Mn-54	8.01E+00
Fe-55	2.08E+01
Co-60	4.27E+01
Zn-65	1.24E+01
Co-58	6.33E+00
Cr-51	3.00E+00
Ag-110m	1.06E+00
c. N/A	N/A
d. N/A	N/A

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
31	Highway	Processor
31	Highway	Disposal

B. Irradiated Fuel Shipments (disposition)

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

C. Changes to the Process Control Program

- Submitted with this report, as Attachment 2, is Revision 8 of RW-AA-100, Process Control Program for Radioactive Wastes. All changes made to the document are denoted by "Revision Bars" in the right hand margin.

Attachment 2

RW-AA-100, Revision 8, Process Control Program for Radioactive Wastes

PROCESS CONTROL PROGRAM FOR RADIOACTIVE WASTES

1. PURPOSE

1.1. The purpose of the Process Control Program (PCP) is to:

1.1.1. Establish the process and boundary conditions for the preparation of specific procedures for processing, sampling, analysis, packaging, storage, and shipment of solid radwaste in accordance with local, state, and federal requirements. **(CM-1)**

1.1.2. Establish parameters which will provide reasonable assurance that all Low Level Radioactive Wastes (LLRW), processed by the in-plant waste process systems on-site OR by on-site vendor supplied waste processing systems, meet the acceptance criteria to a Licensed Burial Facility, as required by 10CFR Part 20, 10CFR Part 61, 10CFR Part 71, 49CFR Parts 171-172, "Technical Position on Waste Form (Revision 1)" [1/91], "Low-Level Waste Licensing Branch Technical Position on Radioactive Waste Classification" [5/83], and the Station Technical Specifications, as applicable.

1.1.3. Provide reasonable assurance that waste placed in "on-site storage" meets the requirements as addressed within the Safety Analysis Reports for the low level radwaste storage facilities for dry and/or processed wet waste.

2. TERMS AND DEFINITIONS

2.1. **Process Control Program (PCP):** The program which contains the current formulas, sampling, analysis, tests, and determinations to be made to ensure that processing and packaging of solid radioactive waste based on demonstrated processing of actual or simulated wet solid wastes will be accomplished in such a way as to assure the waste meets the stabilization criteria specified in 10CFR Parts 20, 61 and 71, state regulations, and burial site requirements.

2.2. **Solidification:** Liquid waste processed to either an unstable or stable form per 10CFR61 requirements. Waste solidified does not have to meet the 300-year free standing monolith criteria. Approved formulas, samples and tests do not have to meet NRC approval for wastes solidified in a container meeting stability criteria (e.g. High Integrity Container).

2.3. **Stabilization:** Liquid waste processed to a "stable state" per 10CFR61 Requirements. Established formulas, samples, and tests shall be approved by the NRC in order to meet solidification "stabilization" criteria. This processing method is currently not available, because the NRC recognizes that waste packed in a High Integrity Container meets the 300-year stabilization criteria. In the event that this processing method becomes an acceptable method, then the NRC shall approve the stabilization formulas, samples, tests, etc.

2.4. **Solidification Media:** An approved media (e.g. Barnwell - vinyl ester styrene, cement, bitumen) when waste containing nuclides with greater than 5-year half lives is solidified in a container with activity greater than 1 micro curie/cc. Waste solidified in a HIC is approved by the commission meeting the 10CFR61 stabilization criteria, including 1% free standing liquids by volume when the waste is packaged to a "stable" form and ≤ 0.5% when waste is packaged to an "unstable" form. The formulas, sampling, analysis, and test do not require NRC approval, because the HIC meets the stability criteria.

2.4.1. Solidification to an unstable or stable state is performed by vendors, when applicable. Liquid waste solidified to meet stabilization criteria (10CFR61 and 01-91 Branch Technical Requirements) shall have documentation available that demonstrates that the process is approved by the NRC or disposal facility.

2.5. **Dewatering:** The process of removing fluids from liquid waste streams to produce a waste form that meets the requirements of 10CFR Part 61 and applicable burial site criteria, ≤0.5% by volume when the waste is packaged to an "unstable" state, or ≤1% by volume when the waste is packaged to a "stable" form.

2.6. **High Integrity Container (HIC):** A disposable container that is approved to the Requirements of 10CFR61. The use of HIC's is an alternative to solidification or encapsulation in a steel container to meet burial stability. HIC's are used to package dewatered liquid wastes, (e.g. filter cartridges, filter media, resin, sludges, etc), or dry active waste.

2.7. **Encapsulation:** The process of placing a component (e.g. cartridge filters or mechanical components) into a special purpose disposable container and then completely surrounding the waste material with an approved stabilization media, such as cement.

2.8. **Liquid Waste Processing Systems:** In-plant or vendor supplied processing systems consisting of equipment utilized for evaporation, filtration, demineralization, dewatering, compression dewatering, solidification, or reverse osmosis (RO) for the treatment of liquid wastes (such as Floor Drains, Chemical Drains and Equipment Drain inputs).

2.9. **Incineration, RVR, and/or Glass Vitrification of Liquid or Solid:** Dry or wet waste processed via incineration and/or thermal processing where the volume is reduced by thermal means meets 10CFR61 requirements.

2.10. **Compaction:** When dry wastes such as paper, wood, plastic, cardboard, incinerator ash, and etc. are volume reduced through the use of a compactor.

2.11. **Waste Streams:** Consist of but are not limited to

- Filter media (powdered, bead resin and fiber),
- Filter cartridges,
- Pre-coat body feed material,
- Contaminated charcoal,

- Fuel pool activated hardware,
- Oil Dry absorbent material added to a container to absorb liquids
- Fuel Pool Crud
- Sump and tank sludges,
- High activity filter cartridges,
- Concentrated liquids,
- Contaminated waste oil,
- Dried sewage or wastewater plant waste,
- Dry Active Waste (DAW): Waste such as filters, air filters, low activity cartridge filters, paper, wood, glass, plastic, cardboard, hoses, cloth, and metals, etc, which have become contaminated as a consequence of normal operating, housekeeping and maintenance activities.
- Other radioactive waste generated from cleanup of inadvertent contamination.

3. RESPONSIBILITIES

3.1. Implementation of this Process Control Program (PCP) is described in procedures at each station and is the responsibility of the each site to implement.

4. MAIN BODY

4.1. Process Control Program Requirements

4.1.1. A change to this PCP (Radioactive Waste Treatment Systems) may be made provided that the change is reported as part of the annual radioactive effluent release report, Regulatory Guide 1.21, and is approved by the Plant Operations Review Committee (PORC).

4.1.2. Changes become effective upon acceptance per station requirements.

4.1.3. A solidification media, approved by the burial site, may be **REQUIRED when** liquid radwaste is solidified to a stable/unstable state.

4.1.4. **When** processing liquid radwaste to meet solidification stability using a vendor supplied solidification system:

1. **If** the vendor has its own Quality Assurance (QA) Program, **then** the vendor shall **ADHERE** to its own QA Program and shall have **SUBMITTED** its process system topical report to the NRC or agreement state.

2. **If** the vendor does **not HAVE** its own Quality Assurance Program, **then** the vendor shall **ADHERE** to an approved Quality Assurance Topical Report standard belonging to the Station or to another approved vendor.

4.1.5. The vendor processing system(s) is/are controlled per the following:

1. A commercial vendor supplied processing system(s) may be **USED** for the processing of LLRW streams.

2. Vendors that process liquid LLRW at the sites shall **MEET** applicable Quality Assurance Topical Report and Augmented Quality Requirements.

4.1.6. Vendor processing system(s) operated at the site shall be **OPERATED and CONTROLLED** in accordance with vendor approved procedures or station procedures based upon vendor approved documents.

4.1.7. All waste streams processed for burial or long term on-site storage shall **MEET** the waste classification and characteristics specified in 10CFR Part 61.55, Part 61.56, the 5-83 Branch Technical Position for waste classification, and the applicable burial site acceptance criteria (for any burial site operating at the time the waste was processed).

4.1.8. An Exelon Nuclear plant may store waste at another Exelon Nuclear plant, provided formal NRC approval has been **RECEIVED** for the transfer of waste.

4.2. General Waste Processing Requirements

NOTE: On-site resin processing involves tank mixing and settling, transferring to the station or vendor processing system via resin water slurry or vacuuming into approved waste containers, and, when applicable, dewatering for burial.

4.2.1. Vendor resin beds may be **USED** for decontamination of plant systems, such as, SFP (Spent Fuel Pool), RWCU (reactor water cleanup), and SDC (Shut Down Cooling). These resins are **then PROCESSED** via the station or vendor processing system.

4.2.2. Various drains and sump discharges will be **COLLECTED** in tanks or suitable containers for processing treatment. Water from these tanks may be **SENT** through a filter, demineralizer, concentrator or vendor supplied processing systems.

4.2.3. Process waste (e.g. filter media, sludges, resin, etc) will be periodically **DISCHARGED** to the station or vendor processing system for onsite waste treatment **or PACKAGED** in containers for shipment to offsite vendor for volume reduction processing.

4.2.4. Process water (e.g. chemical, floor drain, equipment drain, etc.) may be **SENT** to either the site waste processing systems or vendor waste processing systems for further filtration, demineralization for plant re-use, or discharge.

4.2.5. All dewatering and solidification/stabilization will be **PERFORMED** by either utility site personnel or by on-site vendors **or** will be **PACKAGED and SHIPPED** to an off-site vendor low-level radwaste processing facility.

4.2.6. Dry Active Waste (DAW) will be **HANDLED and PROCESSED** per the following:

1. DAW will be **COLLECTED and SURVEYED and** may be **SORTED** for compactable and non-compactable wastes.

2. DAW may be packaged in containers to facilitate on-site pre-compaction and/or off-site vendor contract requirements.

3. DAW items may be **SURVEYED** for release onsite or offsite when applicable.

4. Contaminated filter cartridges will be **PLACED** into a HIC **or** will be **ENCAPSULATED** in an in-situ liner for disposal **or SHIPPED** to an offsite waste processor in drums, boxes or steel liners per the vendor site criteria for processing and disposal.

4.2.7. Filtering devices using pre-coat media may be **USED** for the removal of suspended solids from liquid waste streams. The pre-coat material or cartridges from these devices may be routinely **REMOVED** from the filter vessel and discharged to a Filter Sludge Tank or Liner/HIC. Periodically, the filter sludge may be **DISCHARGED** to the vendor processing system for waste treatment onsite **or PACKAGED** in containers for shipment to offsite vendor for volume reduction processing.

4.2.8. Activated hardware stored in the Spent Fuel Pools will be **PROCESSED** periodically using remote handling equipment **and** may then be **PUT** into a container for shipment or storage in the pool or loading the processed activated hardware into the Dry Cask storage system.

4.2.9. High Integrity Containers (HIC):

1. For disposal at Barnwell, vendors supplying HIC's to the station shall **PROVIDE** a copy of the HIC Certificate of Compliance, which details specific limitations on use of the HIC.

2. For disposal at Clive, vendors supplying HIC's to the station shall **PROVIDE** a copy of the HIC Certificate of Conformance, which details specific limitations on use of the HIC.

3. Vendors supplying HIC's to the station shall **PROVIDE** a handling procedure which establishes guidelines for the utilization of the HIC. These guidelines serve to protect the integrity of the HIC and ensure the HIC is handled in accordance with the requirements of the Certificate of Compliance or Certificate of Conformance.

4.2.10. Lubricants and oils contaminated as a consequence of normal operating and maintenance activities may be **PROCESSED** on-site (by incineration, for oils meeting 10CFR20.2004 and applicable state requirements, or by an approved vendor process) **or SHIPPED** offsite (for incineration or other acceptable processing method).

4.2.11. Former in-plant systems GE or Stock Drum Transfer Cart and Drum Storage Areas may be **USED** for higher dose DAW storage at Clinton, Dresden, Quad Cities, Braidwood and Byron.

4.2.13 Certain waste, including flowable solids from holding pond, oily waste separator, cooling tower basin and emergency spray pond, may be disposed of onsite under the provisions of a 10CFR20.2002 permit. Specific requirements associated with the disposal shall be incorporated into station implementing procedures. **(CM-2)**

4.3. Burial Site Requirements

4.3.1. Waste sent directly to burial shall **COMPLY** with the applicable parts of 49CFR171-172, 10CFR61, 10CFR71, and the acceptance criteria for the applicable burial site.

4.4. Shipping and Inspection Requirements

4.4.1. All shipping/storage containers shall be **INSPECTED**, as required by station procedures, for compliance with applicable requirements (Department of Transportation (DOT), Nuclear Regulatory Commission (NRC), station, on-site storage, and/or burial site requirements) prior to use.

4.4.2. Containers of solidified liquid waste shall be **INSPECTED** for solidification quality and/or dewatering requirements per the burial site, offsite vendor acceptance, or station acceptance criteria, as applicable.

4.4.3. Shipments sent to an off site processor shall be **INSPECTED** to ensure that the applicable processor's waste acceptance criteria are being met.

4.4.4. Shipments sent for off site storage shall **MEET** the storage site's waste acceptance criteria.

4.5. Inspection and Corrective Action

4.5.1. Inspection results that indicate non-compliance with applicable NRC, State, vendor, or site requirements shall be **IDENTIFIED and TRACKED** through the Corrective Action Program.

4.5.2. Administrative controls for preventing unsatisfactory waste forms from being released for shipment are described in applicable station procedures. **If** the provisions of the Process Control Program are not satisfied, **then SUSPEND** shipments of defectively packaged radioactive waste from the site. **(CM-1)**

4.5.3. **If** freestanding water or solidification **not** meeting program requirements is observed, **then** samples of the particular series of batches shall be **TAKEN** to determine the cause. Additional samples shall be **TAKEN**, as warranted, to ensure that **no** freestanding water is present and solidification requirements are maintained.

4.6. Procedure and Process Reviews

4.6.1. The Exelon Nuclear Process Control Program and subsequent changes (other than editorial/minor changes) shall be **REVIEWED and APPROVED** in accordance with the station procedures, plant-specific Technical Specifications (Tech Spec), Technical Requirements Manual (T&RM), Operation Requirements Manual (ORM), as applicable, for the respective station and LS-AA-106. Changes to the Licensees Controlled Documents, UFSAR, ORM, or TRM are controlled by the provisions of 10CFR 50.59.

4.6.2. Any changes to the PCP shall be reviewed to determine if reportability is required in the Annual Radiological Effluent Release Report (ARERR). The Radwaste Specialist shall ensure correct information is **SUBMITTED** to the ODCM program owner prior to submittal of the ARERR.

4.6.3. Station processes, applicable site-specific cask manual procedures, or other vendor waste processing/operating procedures shall be approved per RM-AA-102-1006. Procedures related to waste manifests, shipment inspections, and container activity determinations are **CONTROLLED** by Radiation Protection Standard Procedures (RP-AA-600 Series).

1. Site waste processing **IS CONTROLLED** by site operating procedures.

2. Liquid processed by vendor equipment shall be **PERFORMED** in accordance with vendor procedures.

4.7. Waste Types, Point of Generation, and Processing Method

Methods of processing and individual vendors may **CHANGE** due to changing financial and regulatory options. The table below is a representative sample. It is **not** intended be all encompassing.

WASTE STREAM	POINTS OF GENERATION	AVAILABLE WASTE PROCESSING METHODS
Bead Resin	Systems - Fuel Pool, Condensate, Reactor Water Cleanup, Blowdown, Equipment Drain, Chemical and Volume Control Systems, Floor Drain, Maximum Recycle, Blowdown, Boric Acid Recycling System, Vendor Supplied Processing Systems, and Portable Demin System	Dewatering, solidification to an unstable/stable state Thermal Processing Free Release to a Land Fill
Powdered Resin	Systems - (Condensate System, Floor Drain/Equipment Drain filtration, Fuel Pool)	Dewatering, solidification to an unstable/stable state Thermal Processing
Concentrated Waste	Waste generated from Site Evaporators resulting typically from the Floor Drain and Equipment Drain Systems	Solidification to an unstable/stable state Thermal Processing
Sludge	Sedimentation resulting from various sumps, condensers, tanks, cooling tower, emergency spray pond, holding pond, and oily waste separators	Dewatering, solidification to an unstable/stable state Thermal Processing Evaporation on-site or at an offsite processor On-site disposal per 10CFR20.2002 permit

WASTE STREAM	POINTS OF GENERATION	AVAILABLE WASTE PROCESSING METHODS
Filter cartridges	Systems - Floor/Equipment Drains, Fuel Pool; cartridge filters are typically generated from clean up activities within the fuel pool, torus, etc	Dewatering, solidification to an unstable/stable state Processed by a vendor for volume reduction
Dry Active Waste	Paper, wood, plastic, rubber, glass, metal, and etc. resulting from daily plant activities	Decon/Sorting for Free Release Compaction/Super-compaction Thermal Processing by Incineration or glass vitrification Sorting for Free Release Metal melting to an ingot
Contaminated Oil	Oil contaminated with radioactive materials from any in-plant system.	Solidification unstable state Thermal Processing by Incineration Free Release for recycling
Drying Bed Sludge	Sewage Treatment and Waste Water Treatment Facilities	Free release to a landfill or burial
Metals	See DAW	See DAW
Irradiated Hardware	Fuel Pool, Reactor Components	Volume Reduction for packaging efficiencies

5. DOCUMENTATION

5.1.1. Records of reviews performed shall be retained for the duration of the unit operating license. This documentation shall contain:

1. Sufficient information to support the change together with the appropriate analyses or evaluations justifying the change, and

2. A determination which documents that the change will maintain the overall conformance of waste products to Federal (10CFR61 and the Branch Technical Position), State, or other applicable requirements, including applicable burial site criteria.

6. REFERENCES

6.1. Technical Specifications:

6.1.1. The details contained in Current Tech Specs (CTS) or Improved Technical Specifications (ITS), as applicable, in regard to the Process Control Program (PCP), are to be relocated to the Licensee Controlled Documents. Some facilities have elected to relocate these details into the Operational Requirements Manual (ORM). Relocation of the description of the PCP from the CTS or ITS does **not** affect the safe operation of the facility. Therefore, the relocation details are **not** required to be in the CTS or the ITS to provide adequate protection of the public health and safety.

6.2. Writers' References:

6.2.1. Code of Federal Regulations: 10 CFR Part 20, Part 61, Part 71, 49 CFR Parts 171-172

6.2.2. Low Level Waste Licensing Branch Technical Position on Radioactive Waste Classification, May 1983

6.2.3. Technical Position on Waste Form (Revision 1), January 1991

6.2.4. Branch Technical Position on Concentration Averaging and Encapsulation, January 1995

6.2.5. Regulatory Guide 1.21, Measuring Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants

6.2.6. I.E. Circular 80.18, 10CFR 50.59 Safety Evaluation for Changes to Radioactive Waste Treatment Systems

6.3. Users' References:

6.3.1. Quality Assurance Program (QATR)

6.3.2. LS-AA-106, Plant Operations Review Committee

6.3.3. RM-AA-102-1006, Processing Vendor Documents

6.3.4. RP-AA-600 Series, Radioactive Material/Waste Shipments

6.3.5. CY-AA-170-2000, Annual Radioactive Effluent Release Report

6.4. Station Commitments:

6.4.1. Peach Bottom

CM-1, T03819, Letter from G.A. Hunger, Jr., dated Sept. 29 1994, transmitting TSCR 93-16 (Improved Technical Specifications).

6.4.2. Limerick

CM-2, T03896, 10CFR20.2002 permit granted to Limerick via letter dated July 10, 1996.

7. **ATTACHMENTS** - None