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Quad Cities Nuclear Power Station
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Exelon Nuclear

SVP-05-027

April 29, 2005

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: Quad Cities Nuclear Power Station Radioactive Effluent Report for January through December 2004

The attached Quad Cities Nuclear Power Station Radioactive Effluent Report for January through December 2004 is submitted in accordance with the Quad Cities Technical Specifications Section 5.6.3 and 10 CFR 50.36a. A copy of the Process Control Program for Radioactive Wastes (RW-AA-100), which underwent a revision during 2004, is also included as required by the Offsite Dose Calculation Manual Section 12.6.1.

Four abnormal releases occurred during 2004. These abnormal releases resulted in minor increases to normal plant radioactive effluents and are discussed in detail in this report.

It has recently been discovered that the Unit 2 off-gas flow element is not situated in the sample flow as designed (IR 322879). This situation has the potential to have caused over-reporting of fission and activation gas releases from the site. At this time, the extent of the error introduced by this situation is unknown. Pending the outcome of the investigation, errata data for this report may be submitted under separate cover at a later date.

IE48

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

Respectfully,

Timothy J. Tulon
Site Vice President
Quad Cities Nuclear Power Station

Attachments:

1. Quad Cities Nuclear Power Station 2004 Annual Radioactive Effluent Release Report.
2. RW-AA-100, Rev. 3, Process Control Program for Radioactive Wastes

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

Attachment 1
Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report
SVP-05-027

Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report

Effluent & Waste Disposable Summary

Gaseous Effluents – Summation Of All Releases

Period: January – December 2004 Unit: 1 & 2

A. Fission & Activation Gases***	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Est. Total Error %
1. Total Release	Ci	1.46E+02	1.19E+02	1.19E+02	1.16E+02	12.5
2. Average release rate for the period	µCi/sec	1.88E+01	1.52E+01	1.50E+01	1.46E+01	
3. *Percent of limit	% γ	1.59E-02	1.31E-02	1.37E-02	1.55E-02	
	% β	4.13E-03	3.43E-03	3.51E-03	3.76E-03	

B. Iodine						
1. Total Iodine – 131.	Ci	2.72E-03	1.74E-03	2.13E-03	1.72E-03	41.6
2. Average release rate for the period	µCi/sec	3.46E-04	2.22E-04	2.69E-04	2.16E-04	
3. Percent of limit	%	NA	NA	NA	NA	

C. Particulates						
1. Particulates with half-lives > 8 days	Ci	3.18E-03	1.60E-03	2.06E-03	2.03E-03	32.1
2. Average release rate for the period	µCi/sec	4.04E-04	2.03E-04	2.59E-04	2.55E-04	
3. Percent of limit	%	NA	NA	NA	NA	
3. Gross alpha radioactivity	Ci	<LLD**	<LLD**	<LLD**	<LLD**	

D. Tritium						
1. Total Release	Ci	4.94E+01	4.32E+01	5.00E+01	6.23E+01	6.3
2. Average release rate for the period	µCi/sec	6.28E+00	5.50E+00	6.29E+00	7.84E+00	
3. Percent of limit	%	NA	NA	NA	NA	

E. Iodine 131 & 133, Tritium & Particulate					
1. Percent of ODCM limit	%	4.32E+00	2.76E+00	3.61E+00	2.76E+00

* % Noble gas gamma/noble gas beta dose limits

** Gross alpha LLD reported on page 6 of 70

*** It has recently been discovered that the U-2 off-gas flow element is not situated in the sample flow as designed (IR 322879). This situation has the potential to have caused over-reporting of fission and activation gas releases from the site. At this time, the extent of the error introduced by this situation is unknown. Pending the outcome of the investigation, errata data for this report may be submitted under separate cover at a later date.

Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report

Effluent & Waste Disposable Summary

Gaseous Effluents Release Point Main Chimney (elevated)

Period: January – December 2004 Unit: 1 & 2

Nuclides Released		Continuous Mode				Batch Mode			
1. Fission gases	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Kr-85	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Kr-85m	Ci	1.41E+00	7.25E-01	5.15E-01	5.06E-01	NA	NA	NA	NA
Kr-87	Ci	4.66E+00	4.67E+00	3.42E+00	3.08E+00	NA	NA	NA	NA
Kr-88	Ci	3.29E+00	3.08E+00	2.24E+00	2.00E+00	NA	NA	NA	NA
Xe-133	Ci	2.48E+00	4.23E-01	4.31E-01	1.04E+00	NA	NA	NA	NA
Xe-133m	Ci	7.54E-03	1.07E-02	1.12E-02	<LLD*	NA	NA	NA	NA
Xe-135	Ci	3.24E+00	3.29E+00	2.43E+00	2.55E+00	NA	NA	NA	NA
Xe-135m	Ci	2.03E+01	1.64E+01	1.62E+01	1.53E+01	NA	NA	NA	NA
Xe-138	Ci	1.11E+02	9.05E+01	9.31E+01	8.84E+01	NA	NA	NA	NA
Ar-41	Ci	2.61E-01	2.66E-02	1.69E-02	1.13E-02	NA	NA	NA	NA
Total for Period	Ci	1.47E+02	1.19E+02	1.18E+02	1.13E+02	NA	NA	NA	NA
2. Iodines									
I-131	Ci	2.68E-03	1.73E-03	2.00E-03	1.69E-03	NA	NA	NA	NA
I-133	Ci	6.10E-03	6.58E-03	7.93E-03	6.13E-03	NA	NA	NA	NA
I-135	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Total for Period	Ci	8.78E-03	8.31E-03	9.93E-03	7.82E-03	NA	NA	NA	NA
3. Particulates									
Sr-89	Ci	6.94E-04	4.99E-04	4.81E-04	3.98E-04	NA	NA	NA	NA
Sr-90	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Cs-134	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Cs-137	Ci	<LLD*	<LLD*	4.56E-05	<LLD*	NA	NA	NA	NA
Ba-140	Ci	6.06E-04	4.73E-04	8.64E-04	8.50E-04	NA	NA	NA	NA
La-140	Ci	6.27E-04	5.46E-04	5.75E-04	5.96E-04	NA	NA	NA	NA
Cr-51	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Mn-54	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Co-58	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Co-60	Ci	2.24E-04	2.32E-04	9.12E-05	7.06E-05	NA	NA	NA	NA
Mo-99	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Ag-110m	Ci	<LLD*	<LLD*	<LLD*	9.88E-06	NA	NA	NA	NA
Ce-141	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Ce-144	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Total for Period	Ci	2.15E-03	1.75E-03	2.06E-03	1.92E-03	NA	NA	NA	NA

* Gaseous LLD's reported on page 6 of 70

Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report

Effluent & Waste Disposable Summary

Gaseous Effluents Release Point Reactor Vent (mixed mode)

Period: January – December 2004 Unit: 1 & 2

Nuclides Released		Continuous Mode				Batch Mode			
1. Fission gases	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Kr-85	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Kr-85m	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Kr-87	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Kr-88	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Xe-133	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Xe-135	Ci	<LLD*	<LLD*	1.49E-01	6.19E-01	NA	NA	NA	NA
Xe-135m	Ci	<LLD*	<LLD*	4.47E-01	2.56E+00	NA	NA	NA	NA
Xe-138	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Ar-41	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Total for Period	Ci	<LLD*	<LLD*	5.96E-01	3.18E+00	NA	NA	NA	NA
2. Iodines									
I-131	Ci	4.02E-05	1.24E-05	1.32E-04	2.85E-05	NA	NA	NA	NA
I-133	Ci	3.50E-05	1.12E-05	5.07E-04	1.19E-04	NA	NA	NA	NA
I-135	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Total for Period	Ci	7.52E-05	2.36E-05	6.39E-04	1.48E-04	NA	NA	NA	NA
3. Particulates									
Sr-89	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Sr-90	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Cs-134	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Cs-137	Ci	<LLD*	9.53E-06	7.50E-06	<LLD*	NA	NA	NA	NA
Ba-140	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
La-140	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Cr-51	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Mn-54	Ci	1.39E-04	4.21E-06	<LLD*	4.07E-06	NA	NA	NA	NA
Co-58	Ci	<LLD*	<LLD*	<LLD*	3.45E-06	NA	NA	NA	NA
Fe-59	Ci	<LLD*	<LLD*	<LLD*	1.94E-06	NA	NA	NA	NA
Co-60	Ci	1.31E-03	3.82E-04	5.72E-04	6.88E-04	NA	NA	NA	NA
Zn-65	Ci	1.44E-04	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Mo-99	Ci	<LLD*	<LLD*	<LLD*	1.72E-04	NA	NA	NA	NA
Ag-110m	Ci	6.03E-05	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Ce-141	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Ce-144	Ci	<LLD*	<LLD*	<LLD*	<LLD*	NA	NA	NA	NA
Total for Period	Ci	1.65E-03	3.96E-04	5.80E-04	8.69E-04	NA	NA	NA	NA

* Gaseous LLD's reported on page 6 of 70

Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report

Effluent & Waste Disposable Summary

Liquid Effluents – Summation Of All Releases

Period: January – December 2004 Unit: 1 & 2

A. Fission & Activation Products	Unit		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Est. Total Error %
1. Total Release (not including tritium, gases & alpha)	Ci		4.43E-02	2.48E-02	1.94E-03	9.39E-04	4.1
2 Average diluted concentration during period	µCi/mL		8.93E-09	2.57E-09	4.06E-10	2.12E-10	
3. Percent of applicable limit*	%	WB	8.06E-02	1.19E-01	3.27E-02	7.07E-02	
		O	4.38E-02	5.75E-02	1.60E-02	3.36E-02	
4. Maximum diluted concentration during batch discharges	µCi/mL		2.74E-08	3.86E-09	3.59E-10	1.45E-10	

B. Tritium						
1. Total Release	Ci	1.69E+01	1.57E+01	3.63E+00	7.19E+00	4.1
2. Average diluted concentration during period	µCi/mL	3.41E-06	1.63E-06	7.59E-07	1.62E-06	
3. Percent of applicable limit	%	1.14E-01	5.43E-02	2.52E-02	5.40E-02	

C. Dissolved & Entrained Gases						
1. Total Release	Ci	9.45E-05	4.15E-04	<LLD*	<LLD*	4.1
2. Average diluted concentration during period	µCi/mL	1.91E-11	4.30E-11	NA	NA	
3. Percent of applicable limit	%	9.55E-06	2.15E-05	NA	NA	

D. Gross Alpha Activity						
1. Total Release	Ci	<LLD**	<LLD**	<LLD**	<LLD**	14.8

E. Volume Of Waste Released (prior to dilution)	Liters	1.62E+06	1.42E+06	6.15E+05	8.24E+05

F. Volume Of Dilution Water Used During Period	Liters	2.18E+11	4.49E+11	4.91E+11	3.36E+11

* Whole Body/Organ (ODCM)
** Liquid LLD's reported on page 7 of 70

Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report

Effluent & Waste Disposable Summary

Liquid Effluents Release Point Mississippi River

Period: January – December 2004 Unit: 1 & 2

Nuclides Released		Continuous Mode				Batch Mode			
	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Sr-89	Ci	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*
Sr-90	Ci	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*
Cs-134	Ci	4.87E-05	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*
Cs-137	Ci	2.75E-04	6.86E-05	1.27E-05	2.22E-05	1.82E-04	7.23E-04	8.94E-05	1.85E-04
I-131	Ci	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*
Co-58	Ci	1.12E-05	<LLD*	<LLD*	<LLD*	4.21E-05	<LLD*	<LLD*	<LLD*
Co-60	Ci	1.24E-03	2.25E-04	1.53E-04	2.80E-04	1.74E-03	6.84E-04	1.49E-04	2.71E-04
Fe-59	Ci	<LLD*	<LLD*	<LLD*	<LLD*	2.48E-04	<LLD*	<LLD*	<LLD*
Zn-65	Ci	1.24E-03	2.41E-04	7.48E-05	1.05E-04	6.29E-04	1.09E-04	7.38E-05	3.97E-05
Mn-54	Ci	3.68E-04	2.99E-05	2.32E-05	2.38E-05	1.86E-04	6.35E-05	<LLD*	<LLD*
Cr-51	Ci	<LLD*	<LLD*	<LLD*	<LLD*	2.82E-03	<LLD*	<LLD*	<LLD*
Zr-95	Ci	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*
Nb-95	Ci	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*
Mo-99	Ci	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*
Tc-99m	Ci	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*
Ba-140	Ci	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*
La-140	Ci	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*
Ce-141	Ci	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*
Ag-110m	Ci	<LLD*	<LLD*	<LLD*	<LLD*	3.67E-04	2.00E-04	<LLD*	1.33E-05
Fe-55	Ci	<LLD*	<LLD*	<LLD*	<LLD*	3.49E-02	2.24E-02	1.37E-03	<LLD*
Total for Period	Ci	3.18E-03	5.65E-04	2.64E-04	4.31E-04	4.11E-02	2.42E-02	1.68E-03	5.09E-04
Xe-133	Ci	<LLD*	<LLD*	<LLD*	<LLD*	9.45E-05	3.92E-04	<LLD*	<LLD*
Xe-135	Ci	<LLD*	<LLD*	<LLD*	<LLD*	<LLD*	2.29E-05	<LLD*	<LLD*

* Liquid LLD's reported on page 7 of 70

Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report

Effluent & Waste Disposable Summary

GASEOUS EFFLUENT LLD's (Most Restrictive)
CONTINUOUS MODE

NUCLIDE LOWER LIMITS OF DETECTION (LLD's) 1. Fission gases	UNIT	LLD Value	ODCM Required LLD
Kr-85	uCi/cc	3.71E-06	None
Kr-85m	uCi/cc	1.25E-08	None
Kr-87	uCi/cc	2.99E-08	1E-04
Kr-88	uCi/cc	4.11E-08	1E-04
Xe-133	uCi/cc	3.34E-08	1E-04
Xe-133m	uCi/cc	9.21E-08	1E-04
Xe-135	uCi/cc	1.02E-08	1E-04
Xe-135m	uCi/cc	5.33E-08	None
Xe-131m	uCi/cc	4.35E-07	None
Xe-138	uCi/cc	1.66E-07	1E-04
Ar-41	uCi/cc	2.31E-08	None
NUCLIDE LOWER LIMITS OF DETECTION (LLD's) 2. Iodines	UNIT	LLD Value	ODCM Required LLD*
I-131	uCi/cc	6.94E-13	1E-12
I-133	uCi/cc	7.56E-12	1E-10
I-135	uCi/cc	3.98E-09	None
NUCLIDE LOWER LIMITS OF DETECTION (LLD's) 3. Particulates and Tritium	UNIT	LLD Value	ODCM Required LLD*
H-3	uCi/cc	3.21E-11	1E-06
Sr-89	uCi/cc	2.96E-14	1E-11
Sr-90	uCi/cc	4.46E-14	1E-11
Cs-134	uCi/cc	4.85E-13	1E-11
Cs-137	uCi/cc	7.76E-13	1E-11
Ba-140	uCi/cc	1.77E-12	None
La-140	uCi/cc	2.29E-12	None
Mn-54	uCi/cc	5.84E-13	1E-11
Co-58	uCi/cc	5.02E-13	1E-11
Fe-59	uCi/cc	1.17E-12	1E-11
Co-60	uCi/cc	1.09E-12	1E-11
Zn-65	uCi/cc	1.27E-12	1E-11
Mo-99	uCi/cc	1.00E-11	1E-11
Ce-141	uCi/cc	6.89E-13	1E-11
Ce-144	uCi/cc	2.65E-12	1E-11
Ag-110m	uCi/cc	3.47E-13	None
Ba-133	uCi/cc	6.29E-13	None
Cr-51	uCi/cc	3.61E-12	None
Gross Alpha	uCi/cc	1.48E-14	1E-11

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

Quad Cities Nuclear Power Station
2004 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	3.46E-06	1E-05
Sr-89	uCi/cc	4.00E-08	5E-08
Sr-90	uCi/cc	1.00E-08	5E-08
Fe-55	uCi/cc	1.00E-06	1E-06
Kr-85	uCi/cc	1.73E-05	None*
Kr-87	uCi/cc	1.55E-07	1E-05
Kr-88	uCi/cc	2.12E-07	1E-05
Xe-133	uCi/cc	1.40E-07	1E-05
Xe-133m	uCi/cc	4.16E-07	1E-05
Xe-135	uCi/cc	5.22E-08	1E-05
Xe-138	uCi/cc	7.43E-07	1E-05
Mn-54	uCi/cc	6.61E-08	5E-07
Co-58	uCi/cc	6.67E-08	5E-07
Co-60	uCi/cc	1.23E-07	5E-07
Zn-65	uCi/cc	1.77E-07	5E-07
Mo-99	uCi/cc	4.69E-07	5E-07
I-131	uCi/cc	5.38E-08	1E-06
Cs-134	uCi/cc	5.80E-08	5E-07
Cs-137	uCi/cc	7.31E-08	5E-07
Ce-141	uCi/cc	8.89E-08	5E-07
Ce-144	uCi/cc	4.14E-07	5E-06
Gross Alpha	uCi/cc	8.88E-08	1E-07
Fe-59	uCi/cc	1.41E-07	5E-07
Cr-51	uCi/cc	3.75E-07	None
Ag-110m	uCi/cc	4.56E-08	None

* Kr-85 required by UFSAR section 9.1.3.3.

Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report

Supplemental Information

Facility: Quad Cities Nuclear Power Station January – December 2004

Licensee: Exelon Generation Company

1. Regulatory Limits

   a. For Noble Gases: (per unit)

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

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

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

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

      Dose Rate
      1. Less than 1500 mrem/year.

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

   d. For Liquid: (per site)

      Less than or equal to 3 mrem to the whole body during any calendar quarter.
      Less than or equal to 10 mrem to any organ during any calendar quarter.
      Less than or equal to 6 mrem to the whole body during any calendar year.
      Less than or equal to 20 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 10.1 and 10.2 from the Offsite Dose Calculation Manual. The alarm setpoint is conservatively set at approximately 10% of the 10CFR20 limit.

d. For liquid effluents allowable release limits are calculated by solving equations 10.3 and 10.4 from the Offsite Dose Calculation Manual. The MPC values used for the monitors were as follows:

Radwaste discharge	1.32E-05 μCi/ml
Service water	1.00E-05 μCi/ml

3. Average Energy

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

9.94E-01 MeV for Quarter 1
9.92E-01 MeV for Quarter 2
1.01E+00 MeV for Quarter 3
1.01E+00 MeV for Quarter 4

4. Measurements and Approximations of Total Radioactivity

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

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.

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 six (6) months 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.

Supplemental Information

The continuous strip chart recorders for the monitors on the release points are reviewed monthly 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.

d. 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.

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.

e. 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.

f. 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.

Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report

Supplemental Information

5. Batch Releases

   a. Liquid

1.	Number of releases:	22
2.	Total time:	1.84E+04 minutes
3.	Maximum time:	8.80E+02 minutes
4.	Average time:	8.37E+02 minutes
5.	Minimum time:	7.54E+02 minutes
6.	Average stream flow:	64.4 gpm (discharge) 3.42E+05 gpm (dilution)

   b. Gaseous

      NONE.

6. Abnormal Releases

   a. Liquid

      1. A leak into the 1A RHR heat exchanger service water side was repaired in June 2002. There continued to be a small amount of residual radioactivity identified in the service water side of the heat exchanger throughout 2004. The relatively small amount of radioactivity identified was included in the normal monthly effluents for 2004 and is also included in the "continuous" liquid section of this report. As of 12/31/2004, this residual activity is no longer a significant source of radioactivity and as such will no longer be trended for radioactivity.

      2. A leak into the 2A RHR heat exchanger service water side developed in October 2002. The heat exchanger was repaired in March 2004 during refuel outage Q2R17. The relatively small amount of residual radioactivity identified from the leak continues to be included in the normal monthly effluents and is also included in the "continuous" liquid section of this report.

      3. A leak into the 1B RHR heat exchanger service water side developed in September 2004. The activity identified from the leak is included in the normal monthly effluents and is also included in the "continuous" liquid section of this report. A temporary modification was performed December 2004 that greatly reduced the leakage. The heat exchanger was repaired in March 2005 during refuel outage Q1R18. It is anticipated that radioactivity will need to be trended and included in the normal monthly effluents for a period after the repair, until which time it is no longer a significant source of activity.

b. Gaseous

1. An abnormal release occurred on 2/23/2004 when vault plugs were removed from an underground vault containing piping from the Offgas Filter Building. The radioactivity release to the environment was insignificant to overall station releases and ceased once the reactor unit was shutdown for Q2R17. The radioactivity was accounted for in normal monthly effluents for the station and is included in the "continuous" gaseous section of this report. The release was abnormal because the release occurred from a point other than the normal ODCM defined release point.

7. Radiological Impact on Man

a. Liquid Dose to a member of the public for 2004:

Total Body: 4.76E-03 mrem

Organ: 7.89E-03 mrem

b. Gaseous Dose to a member of the public for 2004:

Total Body: 1.45E-02 mrem

Skin: 1.48E-03 mrem

Organ (Particulate/Iodine): 1.01 mrem

c. Direct Radiation Dose to a member of the public for 2004:

Total Body: 6.32 mrem

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

Not Applicable for QCNPS

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

Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report

Supplemental Information

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

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

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

No ODCM monitors were unavailable for more than or greater than 30 days (ODCM) in 2004.

Submitted by: _____ Date: 04-11-05

Reviewed by: _____ Date: 4-13-05

Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: January - March 2004
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	1	7	2	0	0	10
NNE	0	0	1	0	0	0	1
NE	0	2	2	0	0	0	4
ENE	0	0	3	0	0	0	3
E	0	0	2	1	0	0	3
ESE	0	0	4	0	0	0	4
SE	0	1	0	0	0	0	1
SSE	0	3	13	0	0	0	16
S	0	7	2	0	0	0	9
SSW	0	15	4	0	0	0	19
SW	0	6	2	0	0	0	8
WSW	0	1	4	1	0	0	6
W	0	5	17	0	0	0	22
WNW	0	2	21	0	0	0	23
NW	0	3	9	0	0	0	12
NNW	0	5	9	0	0	0	14
Variable	0	0	0	0	0	0	0
Total	0	51	100	4	0	0	155

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 Data

Quad Cities Nuclear Station

Period of Record: January - March 2004
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	3	0	0	0	0	3
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	3	0	0	0	3
E	0	0	1	2	0	0	3
ESE	1	3	4	0	0	0	8
SE	0	2	0	0	0	0	2
SSE	0	2	1	0	0	0	3
S	0	6	0	0	0	0	6
SSW	0	1	0	0	0	0	1
SW	0	3	2	0	0	0	5
WSW	0	1	3	0	0	0	4
W	0	6	8	1	0	0	15
WNW	0	2	3	4	0	0	9
NW	0	1	3	1	0	0	5
NNW	0	3	0	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	1	33	28	8	0	0	70

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 Data

Quad Cities Nuclear Station

Period of Record: January - March 2004
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	1	2	0	0	0	0	3
NNE	0	0	1	0	0	0	1
NE	0	2	1	0	0	0	3
ENE	1	9	3	0	0	0	13
E	0	4	1	2	0	0	7
ESE	1	4	10	0	0	0	15
SE	1	5	0	0	0	0	6
SSE	0	6	2	0	0	0	8
S	0	3	1	0	0	0	4
SSW	0	2	0	0	0	0	2
SW	0	4	4	0	0	0	8
WSW	0	3	7	0	0	0	10
W	0	11	12	1	0	0	24
WNW	0	8	10	8	0	0	26
NW	0	7	5	1	0	0	13
NNW	0	4	2	0	0	0	6
Variable	0	0	0	0	0	0	0
Total	4	74	59	12	0	0	149

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 Data

Quad Cities Nuclear Station

Period of Record: January - March 2004
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	5	27	28	2	0	0	62
NNE	4	13	21	2	0	0	40
NE	11	31	17	0	0	0	59
ENE	5	23	29	0	0	0	57
E	6	29	40	2	0	0	77
ESE	8	31	42	0	0	0	81
SE	2	27	6	0	0	0	35
SSE	2	13	5	0	0	0	20
S	3	13	4	0	0	0	20
SSW	2	13	3	0	0	0	18
SW	4	19	19	1	0	0	43
WSW	1	33	45	3	2	0	84
W	7	82	61	12	0	0	162
WNW	3	70	66	24	0	0	163
NW	4	60	43	6	2	0	115
NNW	5	32	18	2	0	0	57
Variable	0	0	0	0	0	0	0
Total	72	516	447	54	4	0	1093

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 Data

Quad Cities Nuclear Station

Period of Record: January - March 2004
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	8	0	0	0	0	11
NNE	6	5	2	0	0	0	13
NE	5	10	1	0	0	0	16
ENE	9	20	1	0	0	0	30
E	7	17	3	0	0	0	27
ESE	7	17	6	0	0	0	30
SE	8	20	10	0	0	0	38
SSE	9	18	2	0	0	0	29
S	10	32	3	0	0	0	45
SSW	2	21	4	2	0	0	29
SW	11	20	12	2	0	0	45
WSW	4	30	14	0	0	0	48
W	16	18	11	0	0	0	45
WNW	4	9	4	0	0	0	17
NW	4	13	1	0	0	0	18
NNW	9	13	2	0	0	0	24
Variable	0	0	0	0	0	0	0
Total	114	271	76	4	0	0	465

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

Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: January - March 2004
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	0	1	0	0	0	0	1
NNE	0	1	0	0	0	0	1
NE	8	0	0	0	0	0	8
ENE	1	7	0	0	0	0	8
E	9	1	0	0	0	0	10
ESE	16	12	2	0	0	0	30
SE	6	4	0	0	0	0	10
SSE	10	2	0	0	0	0	12
S	7	1	0	0	0	0	8
SSW	5	5	0	0	0	0	10
SW	7	1	0	0	0	0	8
WSW	2	0	0	0	0	0	2
W	5	0	0	0	0	0	5
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	1	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	76	36	2	0	0	0	114

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

Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: January - March 2004
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	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	2	0	0	0	0	0	2
ENE	3	0	0	0	0	0	3
E	10	3	0	0	0	0	13
ESE	20	24	0	0	0	0	44
SE	6	0	0	0	0	0	6
SSE	3	0	0	0	0	0	3
S	2	0	0	0	0	0	2
SSW	3	0	0	0	0	0	3
SW	1	0	0	0	0	0	1
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	50	27	0	0	0	0	77

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 Data

Quad Cities Nuclear Station

Period of Record: January - March 2004
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	0	0	0	0
SSE	0	0	0	1	4	0	5
S	0	0	1	3	1	0	5
SSW	0	0	9	0	0	0	9
SW	0	0	2	0	0	0	2
WSW	0	0	1	1	0	0	2
W	0	0	2	2	0	0	4
WNW	0	0	1	2	0	0	3
NW	0	0	0	3	0	0	3
NNW	0	0	0	3	0	0	3
Variable	0	0	0	0	0	0	0
Total	0	0	16	15	5	0	36

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: 7

Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: January - March 2004
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	2	0	0	0	2
NNE	0	0	0	0	0	0	0
NE	0	0	2	0	0	0	2
ENE	0	0	1	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	0	2	0	0	0	2
SE	0	0	0	0	0	0	0
SSE	0	0	1	2	0	0	3
S	0	0	0	2	1	2	5
SSW	0	0	3	2	0	0	5
SW	0	0	3	2	0	0	5
WSW	0	0	3	0	1	0	4
W	0	0	4	5	4	0	13
WNW	0	0	5	6	4	0	15
NW	0	0	2	4	0	0	6
NNW	0	0	3	5	0	0	8
Variable	0	0	0	0	0	0	0
Total	0	0	31	28	10	2	71

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: 7

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: January - March 2004
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	4	1	0	0	5
NNE	0	0	0	0	0	0	0
NE	0	0	2	0	0	0	2
ENE	0	0	4	1	0	0	5
E	0	0	3	0	0	0	3
ESE	0	0	2	2	2	0	6
SE	0	0	2	0	0	0	2
SSE	0	1	0	3	1	2	7
S	0	0	3	0	2	0	5
SSW	0	2	0	1	0	0	3
SW	0	0	0	2	0	0	2
WSW	0	1	2	2	7	0	12
W	0	3	5	7	5	0	20
WNW	0	0	4	5	2	2	13
NW	0	0	2	4	3	2	11
NNW	0	0	7	1	0	0	8
Variable	0	0	0	0	0	0	0
Total	0	7	40	29	22	6	104

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: 7

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: January - March 2004
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	3	6	16	24	4	0	53
NNE	1	7	8	21	6	0	43
NE	0	8	22	31	1	0	62
ENE	1	11	16	19	24	1	72
E	1	14	25	20	14	0	74
ESE	1	8	14	40	14	0	77
SE	0	15	16	11	4	0	46
SSE	0	11	11	13	7	2	44
S	0	2	5	18	16	3	44
SSW	0	3	10	9	1	1	24
SW	1	3	9	24	14	2	53
WSW	0	2	15	24	32	5	78
W	1	2	35	60	22	10	130
WNW	3	4	45	75	34	36	197
NW	1	8	35	59	35	17	155
NNW	0	14	34	40	3	2	93
Variable	0	0	0	0	0	0	0
Total	13	118	316	488	231	79	1245

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 6
Hours of missing stability measurements in all stability classes: 7

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: January - March 2004
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	7	9	0	0	17
NNE	0	4	11	10	0	0	25
NE	0	5	3	4	0	0	12
ENE	0	3	11	4	0	0	18
E	1	7	24	14	1	0	47
ESE	3	1	2	11	6	0	23
SE	0	3	10	15	14	1	43
SSE	0	5	13	14	9	1	42
S	0	3	6	27	15	2	53
SSW	0	1	8	18	13	7	47
SW	0	0	9	17	9	1	36
WSW	0	2	3	35	6	0	46
W	1	5	7	15	12	0	40
WNW	0	10	6	12	2	0	30
NW	0	3	3	10	0	0	16
NNW	0	3	10	10	0	0	23
Variable	0	0	0	0	0	0	0
Total	5	56	133	225	87	12	518

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: 7

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: January - March 2004
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	1	1	0	0	0	2
NNE	0	1	0	1	0	0	2
NE	0	0	1	0	0	0	1
ENE	0	0	0	0	0	0	0
E	0	4	7	1	0	0	12
ESE	0	0	3	2	0	0	5
SE	0	2	4	6	2	0	14
SSE	0	6	11	12	0	0	29
S	1	3	7	11	0	0	22
SSW	1	4	4	10	0	0	19
SW	2	1	6	3	1	0	13
WSW	0	4	3	0	0	0	7
W	0	0	1	0	0	0	1
WNW	1	3	2	0	0	0	6
NW	0	1	1	0	0	0	2
NNW	0	1	2	1	0	0	4
Variable	0	0	0	0	0	0	0
Total	5	31	53	47	3	0	139

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: 7

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: January - March 2004
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	1	0	0	0	0	0	1
E	0	0	0	1	0	0	1
ESE	0	1	0	1	0	0	2
SE	0	0	1	6	1	0	8
SSE	0	0	4	7	0	0	11
S	0	0	9	6	0	0	15
SSW	0	1	5	2	0	0	8
SW	0	1	3	1	0	0	5
WSW	0	0	2	0	0	0	2
W	0	0	2	0	0	0	2
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	1	3	26	24	1	0	55

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: 7

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: April - June 2004
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	4	13	2	0	0	19
NNE	0	13	6	0	0	0	19
NE	0	5	5	0	0	0	10
ENE	0	7	0	0	0	0	7
E	0	4	3	0	0	0	7
ESE	0	7	8	0	0	0	15
SE	0	9	4	0	0	0	13
SSE	0	8	0	0	0	0	8
S	0	7	2	0	0	0	9
SSW	0	19	14	0	0	0	33
SW	0	21	10	2	0	0	33
WSW	0	2	7	0	0	0	9
W	0	16	5	0	0	0	21
WNW	0	9	10	2	0	0	21
NW	0	13	10	2	0	0	25
NNW	0	8	7	2	0	0	17
Variable	0	0	0	0	0	0	0
Total	0	152	104	10	0	0	266

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 Data

Quad Cities Nuclear Station

Period of Record: April - June 2004
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	1	0	0	0	5
NNE	0	1	1	0	0	0	2
NE	0	0	0	0	0	0	0
ENE	0	0	2	0	0	0	2
E	0	1	1	0	0	0	2
ESE	0	5	0	0	0	0	5
SE	0	2	0	0	0	0	2
SSE	0	1	1	0	0	0	2
S	0	1	0	0	0	0	1
SSW	0	4	1	0	0	0	5
SW	0	15	2	0	0	0	17
WSW	0	8	2	0	0	0	10
W	0	6	1	0	0	0	7
WNW	0	4	1	3	0	0	8
NW	0	1	1	0	0	0	2
NNW	0	2	2	0	0	0	4
Variable	0	0	0	0	0	0	0
Total	0	55	16	3	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 Data

Quad Cities Nuclear Station

Period of Record: April - June 2004
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	9	0	0	0	0	9
NNE	0	5	3	0	0	0	8
NE	1	5	0	0	0	0	6
ENE	0	4	1	0	0	0	5
E	0	4	6	1	0	0	11
ESE	0	12	0	0	0	0	12
SE	0	3	1	0	0	0	4
SSE	0	3	0	0	0	0	3
S	0	2	0	0	0	0	2
SSW	0	13	4	0	0	0	17
SW	0	13	6	0	0	0	19
WSW	0	8	2	0	0	0	10
W	0	7	3	0	0	0	10
WNW	0	14	2	2	0	0	18
NW	0	4	0	0	0	0	4
NNW	0	8	2	1	0	0	11
Variable	0	0	0	0	0	0	0
Total	1	114	30	4	0	0	149

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 Data

Quad Cities Nuclear Station

Period of Record: April - June 2004
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	4	26	6	1	0	0	37
NNE	5	14	5	0	0	0	24
NE	8	10	6	0	0	0	24
ENE	7	23	11	0	0	0	41
E	3	11	17	0	0	0	31
ESE	2	19	16	1	0	0	38
SE	2	24	3	0	0	0	29
SSE	5	9	0	0	0	0	14
S	5	18	1	0	0	0	24
SSW	4	20	14	0	0	0	38
SW	9	44	26	3	0	0	82
WSW	17	31	16	1	0	0	65
W	8	19	20	3	0	0	50
WNW	10	19	20	0	0	0	49
NW	7	40	5	1	0	0	53
NNW	5	24	8	1	0	0	38
Variable	0	0	0	0	0	0	0
Total	101	351	174	11	0	0	637

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 Data

Quad Cities Nuclear Station

Period of Record: April - June 2004
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	9	16	7	0	0	0	32
NNE	4	21	3	0	0	0	28
NE	7	11	2	0	0	0	20
ENE	8	21	4	0	0	0	33
E	9	12	2	0	0	0	23
ESE	19	23	11	0	0	0	53
SE	27	24	9	0	0	0	60
SSE	18	24	4	0	0	0	46
S	15	24	2	0	0	0	41
SSW	18	45	3	0	0	0	66
SW	23	76	16	6	0	0	121
WSW	14	28	3	1	0	0	46
W	14	14	2	0	0	0	30
WNW	21	21	2	1	0	0	45
NW	17	25	1	0	0	0	43
NNW	5	18	1	0	0	0	24
Variable	0	0	0	0	0	0	0
Total	228	403	72	8	0	0	711

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 Data

Quad Cities Nuclear Station

Period of Record: April - June 2004
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	2	0	0	0	0	0	2
NNE	9	2	0	0	0	0	11
NE	4	0	0	0	0	0	4
ENE	6	5	0	0	0	0	11
E	10	0	0	0	0	0	10
ESE	9	4	1	0	0	0	14
SE	7	3	0	0	0	0	10
SSE	8	6	0	0	0	0	14
S	9	1	0	0	0	0	10
SSW	13	4	0	0	0	0	17
SW	10	0	0	0	0	0	10
WSW	12	0	0	0	0	0	12
W	17	5	0	0	0	0	22
WNW	1	3	0	0	0	0	4
NW	10	5	0	0	0	0	15
NNW	10	1	0	0	0	0	11
Variable	0	0	0	0	0	0	0
Total	137	39	1	0	0	0	177

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 Data

Quad Cities Nuclear Station

Period of Record: April - June 2004
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	1	0	0	0	0	0	1
NNE	4	0	0	0	0	0	4
NE	2	0	0	0	0	0	2
ENE	1	0	0	0	0	0	1
E	1	0	0	0	0	0	1
ESE	3	0	0	0	0	0	3
SE	2	0	0	0	0	0	2
SSE	6	0	0	0	0	0	6
S	6	0	0	0	0	0	6
SSW	6	0	0	0	0	0	6
SW	4	0	0	0	0	0	4
WSW	0	0	0	0	0	0	0
W	8	3	0	0	0	0	11
WNW	11	1	0	0	0	0	12
NW	3	0	0	0	0	0	3
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	58	4	0	0	0	0	62

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 Data

Quad Cities Nuclear Station

Period of Record: April - June 2004
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	8	0	0	8
NNE	0	0	1	1	0	0	2
NE	0	0	0	3	0	0	3
ENE	0	0	0	1	0	0	1
E	0	0	0	0	0	0	0
ESE	0	0	1	0	1	0	2
SE	0	0	3	1	0	0	4
SSE	0	0	8	3	0	0	11
S	0	0	4	5	0	1	10
SSW	0	0	15	21	5	1	42
SW	0	1	8	4	1	3	17
WSW	0	1	5	1	0	0	7
W	0	1	7	7	0	0	15
WNW	0	1	6	10	1	0	18
NW	0	1	4	6	3	0	14
NNW	0	0	0	3	1	0	4
Variable	0	0	0	0	0	0	0
Total	0	5	62	74	12	5	158

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: 33

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: April - June 2004
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	2	3	3	0	0	8
NNE	0	1	1	2	0	0	4
NE	0	1	1	0	0	0	2
ENE	0	2	4	1	0	0	7
E	0	1	0	0	0	0	1
ESE	0	3	8	3	1	0	15
SE	0	0	7	2	0	0	9
SSE	0	0	3	0	0	0	3
S	0	1	2	2	1	0	6
SSW	0	3	9	5	2	2	21
SW	0	2	5	2	1	0	10
WSW	0	7	3	3	3	0	16
W	0	1	4	3	0	0	8
WNW	0	2	6	2	1	1	12
NW	0	0	7	3	1	1	12
NNW	0	2	10	1	1	1	15
Variable	0	0	0	0	0	0	0
Total	0	28	73	32	11	5	149

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 3
Hours of missing stability measurements in all stability classes: 33

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: April - June 2004
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	4	2	0	0	8
NNE	0	9	3	1	0	0	13
NE	0	2	0	0	0	0	2
ENE	0	1	0	0	1	0	2
E	0	0	5	1	0	0	6
ESE	0	4	6	2	1	0	13
SE	0	5	1	2	0	0	8
SSE	0	3	3	2	1	0	9
S	0	2	0	1	2	2	7
SSW	0	4	10	7	3	2	26
SW	0	6	2	1	2	0	11
WSW	0	6	1	3	0	0	10
W	0	0	4	2	1	0	7
WNW	0	5	5	4	1	3	18
NW	0	6	4	1	0	1	12
NNW	0	6	4	2	2	0	14
Variable	0	0	0	0	0	0	0
Total	0	61	52	31	14	8	166

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 3
Hours of missing stability measurements in all stability classes: 33

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: April - June 2004
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	5	20	10	1	1	37
NNE	1	13	13	7	0	0	34
NE	0	13	8	5	2	0	28
ENE	0	14	14	12	3	0	43
E	1	6	9	20	7	0	43
ESE	0	8	10	11	9	1	39
SE	0	3	9	7	6	0	25
SSE	1	4	9	10	4	0	28
S	0	4	6	19	12	0	41
SSW	3	7	25	13	10	15	73
SW	2	7	18	19	10	7	63
WSW	2	9	8	18	5	5	47
W	0	6	12	6	12	11	47
WNW	2	9	14	12	19	0	56
NW	0	12	20	21	3	3	59
NNW	0	11	21	14	1	1	48
Variable	0	0	0	0	0	0	0
Total	12	131	216	204	104	44	711

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 17
Hours of missing stability measurements in all stability classes: 33

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: April - June 2004
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	4	16	19	2	0	42
NNE	0	5	18	10	0	0	33
NE	0	3	12	8	0	0	23
ENE	0	2	17	9	0	0	28
E	0	3	12	5	0	0	20
ESE	0	4	14	12	8	0	38
SE	0	2	15	11	8	0	36
SSE	0	3	15	19	12	1	50
S	2	2	20	39	14	2	79
SSW	0	2	27	53	18	8	108
SW	0	3	17	24	10	1	55
WSW	2	2	11	14	1	1	31
W	0	2	10	17	1	0	30
WNW	2	4	6	8	0	0	20
NW	1	7	14	16	1	0	39
NNW	1	2	11	8	0	1	23
Variable	0	0	0	0	0	0	0
Total	9	50	235	272	75	14	655

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 27
Hours of missing stability measurements in all stability classes: 33

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: April - June 2004
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	5	8	1	0	0	15
NNE	1	6	3	1	0	0	11
NE	0	1	7	2	0	0	10
ENE	0	4	5	2	0	0	11
E	0	1	6	1	0	0	8
ESE	0	4	4	2	0	0	10
SE	1	0	5	6	1	0	13
SSE	0	2	7	7	0	0	16
S	0	0	6	13	4	0	23
SSW	0	1	5	10	1	0	17
SW	0	0	2	3	0	0	5
WSW	0	0	4	7	0	0	11
W	0	3	1	1	0	0	5
WNW	0	5	2	1	0	0	8
NW	2	3	1	3	1	0	10
NNW	0	2	4	4	0	0	10
Variable	0	0	0	0	0	0	0
Total	5	37	70	64	7	0	183

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 3
Hours of missing stability measurements in all stability classes: 33

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: April - June 2004
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	2	2	1	0	0	5
NNE	1	3	1	0	0	0	5
NE	0	2	1	0	0	0	3
ENE	0	3	0	1	0	0	4
E	0	2	4	0	0	0	6
ESE	0	1	0	0	0	0	1
SE	0	0	0	0	0	0	0
SSE	0	1	0	0	0	0	1
S	0	0	0	2	1	0	3
SSW	0	1	1	5	0	0	7
SW	0	4	2	1	0	0	7
WSW	0	0	1	0	0	0	1
W	1	2	6	0	0	0	9
WNW	0	3	0	0	0	0	3
NW	1	1	0	3	0	0	5
NNW	0	0	3	6	0	0	9
Variable	0	0	0	0	0	0	0
Total	3	25	21	19	1	0	69

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 5
Hours of missing stability measurements in all stability classes: 33

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: July - September 2004
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	7	0	0	0	15
NNE	0	6	7	0	0	0	13
NE	0	6	12	0	0	0	18
ENE	0	8	3	0	0	0	11
E	0	5	0	0	0	0	5
ESE	0	2	4	0	0	0	6
SE	0	6	2	0	0	0	8
SSE	0	9	3	0	0	0	12
S	0	14	0	0	0	0	14
SSW	0	23	2	0	0	0	25
SW	0	21	2	0	0	0	23
WSW	0	2	0	0	0	0	2
W	0	8	3	0	0	0	11
WNW	0	9	0	0	0	0	9
NW	0	13	3	0	0	0	16
NNW	0	13	2	0	0	0	15
Variable	0	0	0	0	0	0	0
Total	0	153	50	0	0	0	203

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

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Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: July - September 2004
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	1	3	0	0	0	0	4
NNE	0	0	1	0	0	0	1
NE	0	2	1	0	0	0	3
ENE	0	3	0	0	0	0	3
E	0	2	0	0	0	0	2
ESE	0	2	1	0	0	0	3
SE	0	3	1	0	0	0	4
SSE	0	3	0	0	0	0	3
S	0	3	0	0	0	0	3
SSW	0	13	0	0	0	0	13
SW	0	11	0	0	0	0	11
WSW	0	3	2	0	0	0	5
W	0	4	1	0	0	0	5
WNW	0	4	0	0	0	0	4
NW	1	5	1	0	0	0	7
NNW	0	6	1	0	0	0	7
Variable	0	0	0	0	0	0	0
Total	2	67	9	0	0	0	78

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 Data

Quad Cities Nuclear Station

Period of Record: July - September 2004
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	1	8	2	0	0	0	11
NNE	0	2	1	0	0	0	3
NE	0	8	0	0	0	0	8
ENE	0	3	0	0	0	0	3
E	0	7	0	0	0	0	7
ESE	0	6	0	0	0	0	6
SE	0	3	0	0	0	0	3
SSE	0	11	0	0	0	0	11
S	1	10	1	0	0	0	12
SSW	1	14	0	0	0	0	15
SW	0	13	0	0	0	0	13
WSW	0	7	2	0	0	0	9
W	2	13	3	0	0	0	18
WNW	0	8	1	0	0	0	9
NW	2	11	2	0	0	0	15
NNW	1	9	0	0	0	0	10
Variable	0	0	0	0	0	0	0
Total	8	133	12	0	0	0	153

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 Data

Quad Cities Nuclear Station

Period of Record: July - September 2004
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	3	14	1	0	0	0	18
NNE	4	6	7	0	0	0	17
NE	6	17	5	0	0	0	28
ENE	6	24	1	0	0	0	31
E	3	21	0	0	0	0	24
ESE	5	17	2	0	0	0	24
SE	4	22	0	0	0	0	26
SSE	14	24	0	0	0	0	38
S	10	19	1	0	0	0	30
SSW	11	22	1	0	0	0	34
SW	9	38	3	0	0	0	50
WSW	13	21	2	0	0	0	36
W	11	26	6	0	0	0	43
WNW	10	25	6	0	0	0	41
NW	14	17	2	0	0	0	33
NNW	5	11	1	0	0	0	17
Variable	0	0	0	0	0	0	0
Total	128	324	38	0	0	0	490

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 Data

Quad Cities Nuclear Station

Period of Record: July - September 2004
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	10	19	1	0	0	0	30
NNE	5	11	2	0	0	0	18
NE	19	13	1	0	0	0	33
ENE	10	13	0	0	0	0	23
E	12	10	0	0	0	0	22
ESE	8	9	0	0	0	0	17
SE	18	7	0	0	0	0	25
SSE	25	18	0	0	0	0	43
S	12	31	1	0	0	0	44
SSW	13	10	3	0	0	0	26
SW	25	30	1	0	0	0	56
WSW	28	27	0	0	0	0	55
W	18	32	2	0	0	0	52
WNW	29	14	0	0	0	0	43
NW	9	17	2	0	0	0	28
NNW	9	12	0	0	0	0	21
Variable	0	0	0	0	0	0	0
Total	250	273	13	0	0	0	536

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 Data

Quad Cities Nuclear Station

Period of Record: July - September 2004
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	10	0	0	0	0	0	10
NNE	6	3	0	0	0	0	9
NE	7	1	0	0	0	0	8
ENE	4	1	0	0	0	0	5
E	15	1	0	0	0	0	16
ESE	23	2	0	0	0	0	25
SE	22	1	0	0	0	0	23
SSE	13	0	0	0	0	0	13
S	12	0	0	0	0	0	12
SSW	8	0	0	0	0	0	8
SW	2	1	0	0	0	0	3
WSW	6	0	0	0	0	0	6
W	6	2	0	0	0	0	8
WNW	22	2	0	0	0	0	24
NW	10	2	0	0	0	0	12
NNW	9	1	0	0	0	0	10
Variable	0	0	0	0	0	0	0
Total	175	17	0	0	0	0	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: 0

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: July - September 2004
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	11	0	0	0	0	0	11
NNE	4	0	0	0	0	0	4
NE	6	0	0	0	0	0	6
ENE	3	0	0	0	0	0	3
E	24	2	0	0	0	0	26
ESE	77	6	0	0	0	0	83
SE	17	0	0	0	0	0	17
SSE	11	0	0	0	0	0	11
S	8	0	0	0	0	0	8
SSW	2	0	0	0	0	0	2
SW	0	0	0	0	0	0	0
WSW	3	0	0	0	0	0	3
W	3	0	0	0	0	0	3
WNW	14	0	0	0	0	0	14
NW	6	0	0	0	0	0	6
NNW	6	0	0	0	0	0	6
Variable	0	0	0	0	0	0	0
Total	195	8	0	0	0	0	203

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

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: July - September 2004
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	7	0	0	7
NE	0	0	1	3	0	0	4
ENE	0	0	0	1	0	0	1
E	0	0	0	0	0	0	0
ESE	0	0	0	1	0	0	1
SE	0	0	1	1	0	0	2
SSE	0	0	4	6	0	0	10
S	0	1	9	7	3	0	20
SSW	0	2	23	5	1	0	31
SW	0	0	1	1	0	0	2
WSW	0	0	2	0	0	0	2
W	0	0	0	1	0	0	1
WNW	0	2	3	1	0	0	6
NW	0	2	5	4	0	0	11
NNW	0	0	5	1	0	0	6
Variable	0	0	0	0	0	0	0
Total	0	7	54	39	4	0	104

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: 36

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: July - September 2004
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	8	2	0	0	11
NNE	0	2	3	0	1	0	6
NE	0	1	4	7	0	0	12
ENE	0	3	3	1	0	0	7
E	0	1	4	0	0	0	5
ESE	0	1	6	4	0	0	11
SE	0	1	2	3	0	0	6
SSE	0	5	4	7	0	0	16
S	0	4	4	3	0	0	11
SSW	0	3	16	5	0	0	24
SW	0	4	6	3	0	0	13
WSW	1	2	2	1	1	0	7
W	0	5	1	4	1	0	11
WNW	0	9	1	7	0	0	17
NW	0	3	5	1	0	0	9
NNW	0	6	9	2	0	0	17
Variable	0	0	0	0	0	0	0
Total	1	51	78	50	3	0	183

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: 36

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: July - September 2004
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	7	3	1	0	0	11
NNE	0	2	2	2	0	0	6
NE	0	2	3	3	0	0	8
ENE	0	2	3	0	0	0	5
E	0	3	1	0	0	0	4
ESE	0	2	4	0	0	0	6
SE	0	2	1	1	0	0	4
SSE	0	3	3	3	1	0	10
S	0	5	9	3	3	0	20
SSW	0	7	12	2	1	0	22
SW	0	8	1	0	0	0	9
WSW	1	0	5	1	0	0	7
W	0	6	9	2	2	0	19
WNW	0	6	1	5	0	0	12
NW	0	10	2	3	0	0	15
NNW	0	8	4	2	0	0	14
Variable	0	0	0	0	0	0	0
Total	1	73	63	28	7	0	172

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: 36

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: July - September 2004
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	12	2	0	0	25
NNE	0	11	7	6	5	0	29
NE	1	8	15	11	2	0	37
ENE	1	6	19	3	1	0	30
E	1	11	13	5	0	0	30
ESE	0	8	6	9	1	0	24
SE	3	9	9	3	0	0	24
SSE	5	7	9	11	4	0	36
S	1	10	14	15	2	5	47
SSW	3	8	19	3	2	0	35
SW	1	5	13	8	1	0	28
WSW	3	6	13	14	0	0	36
W	4	6	11	24	4	0	49
WNW	1	6	13	20	5	0	45
NW	3	6	13	7	0	0	29
NNW	3	7	11	1	0	0	22
Variable	0	0	0	0	0	0	0
Total	31	124	197	142	27	5	526

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: 36

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: July - September 2004
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	3	6	13	0	0	22
NNE	0	8	13	8	1	0	30
NE	1	2	13	18	0	0	34
ENE	1	5	12	5	0	0	23
E	1	6	6	5	1	0	19
ESE	1	1	5	8	0	0	15
SE	2	1	12	4	0	0	19
SSE	2	4	14	13	7	0	40
S	0	5	19	27	17	0	68
SSW	2	4	33	11	4	0	54
SW	1	4	14	18	2	0	39
WSW	0	6	16	11	1	0	34
W	0	3	18	14	0	0	35
WNW	0	3	16	10	0	0	29
NW	0	2	13	23	3	0	41
NNW	1	5	6	4	0	0	16
Variable	0	0	0	0	0	0	0
Total	12	62	216	192	36	0	518

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: 36

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: July - September 2004
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	1	2	3	0	0	6
NNE	0	3	13	12	0	0	28
NE	0	6	17	13	0	0	36
ENE	1	4	12	2	0	0	19
E	0	5	9	2	0	0	16
ESE	1	3	3	8	0	0	15
SE	1	4	13	17	3	0	38
SSE	2	0	11	8	0	0	21
S	1	2	17	24	3	0	47
SSW	1	7	18	27	0	0	53
SW	2	4	5	2	0	0	13
WSW	1	0	4	1	0	0	6
W	1	5	6	1	1	0	14
WNW	0	0	6	5	0	0	11
NW	1	2	5	5	0	0	13
NNW	0	1	7	6	1	0	15
Variable	0	0	0	0	0	0	0
Total	12	47	148	136	8	0	351

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: 36

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: July - September 2004
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	1	3	0	0	0	4
NNE	1	3	4	0	0	0	8
NE	1	6	3	1	0	0	11
ENE	2	2	4	2	0	0	10
E	3	6	4	0	0	0	13
ESE	1	2	1	4	1	0	9
SE	2	2	4	12	3	0	23
SSE	0	3	15	21	0	0	39
S	0	8	35	33	0	0	76
SSW	0	4	20	15	1	0	40
SW	0	9	16	5	0	0	30
WSW	2	4	8	0	0	0	14
W	1	5	1	0	0	0	7
WNW	1	5	8	1	0	0	15
NW	2	0	0	0	0	0	2
NNW	3	0	2	2	0	0	7
Variable	0	0	0	0	0	0	0
Total	19	60	128	96	5	0	308

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: 36

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: October - December 2004
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	1	0	0	0	0	1
NNE	0	3	1	0	0	0	4
NE	0	1	3	1	0	0	5
ENE	0	0	1	0	0	0	1
E	0	1	0	0	0	0	1
ESE	0	0	2	0	0	0	2
SE	0	0	0	0	0	0	0
SSE	0	9	2	0	0	0	11
S	0	6	1	0	0	0	7
SSW	0	6	1	0	0	0	7
SW	0	9	8	0	0	0	17
WSW	0	1	0	0	0	0	1
W	0	6	0	0	0	0	6
WNW	0	4	0	0	0	0	4
NW	0	0	0	0	0	0	0
NNW	0	1	3	0	0	0	4
Variable	0	0	0	0	0	0	0
Total	0	48	22	1	0	0	71

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 Data

Quad Cities Nuclear Station

Period of Record: October - December 2004
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	1	0	0	0	0	1
E	0	1	0	0	0	0	1
ESE	0	0	2	0	0	0	2
SE	0	0	0	0	0	0	0
SSE	0	1	1	0	0	0	2
S	0	0	0	0	0	0	0
SSW	0	1	0	0	0	0	1
SW	0	1	2	0	0	0	3
WSW	0	1	0	0	0	0	1
W	0	3	1	0	0	0	4
WNW	0	2	0	0	0	0	2
NW	0	1	0	0	0	0	1
NNW	0	1	3	0	0	0	4
Variable	0	0	0	0	0	0	0
Total	0	13	11	0	0	0	24

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 Data

Quad Cities Nuclear Station

Period of Record: October - December 2004
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	1	3	0	0	0	4
NNE	0	3	0	0	0	0	3
NE	0	3	1	0	0	0	4
ENE	0	2	0	0	0	0	2
E	0	5	2	0	0	0	7
ESE	0	6	2	0	0	0	8
SE	0	1	0	0	0	0	1
SSE	0	8	0	0	0	0	8
S	0	3	0	0	0	0	3
SSW	0	5	1	0	0	0	6
SW	0	6	1	0	0	0	7
WSW	0	4	1	0	0	0	5
W	0	7	4	0	0	0	11
WNW	0	3	2	0	0	0	5
NW	0	4	0	0	0	0	4
NNW	0	3	1	0	0	0	4
Variable	0	0	0	0	0	0	0
Total	0	64	18	0	0	0	82

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 Data

Quad Cities Nuclear Station

Period of Record: October - December 2004
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	23	34	1	0	0	59
NNE	6	25	11	2	0	0	44
NE	2	36	14	3	0	0	55
ENE	5	37	7	0	0	0	49
E	2	43	23	0	0	0	68
ESE	1	26	3	0	0	0	30
SE	5	13	10	0	0	0	28
SSE	5	12	1	0	0	0	18
S	7	11	0	0	0	0	18
SSW	5	22	6	0	0	0	33
SW	9	26	9	2	0	0	46
WSW	5	25	12	6	0	0	48
W	5	18	34	8	0	0	65
WNW	6	29	57	18	0	0	110
NW	7	27	12	6	0	0	52
NNW	7	19	16	0	0	0	42
Variable	0	0	0	0	0	0	0
Total	78	392	249	46	0	0	765

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

Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: October - December 2004
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	4	16	5	3	0	0	28
NNE	12	8	2	0	0	0	22
NE	12	23	1	0	0	0	36
ENE	6	31	1	0	0	0	38
E	5	29	8	1	0	0	43
ESE	12	37	6	0	0	0	55
SE	14	21	8	0	0	0	43
SSE	4	22	4	0	0	0	30
S	14	22	6	0	0	0	42
SSW	11	32	9	0	0	0	52
SW	12	60	22	1	0	0	95
WSW	17	37	8	1	0	0	63
W	15	47	6	0	0	0	68
WNW	16	44	32	3	0	0	95
NW	12	38	14	0	0	0	64
NNW	8	16	3	3	0	0	30
Variable	0	0	0	0	0	0	0
Total	174	483	135	12	0	0	804

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

Quad Cities Nuclear Power Station
2004 Annual Radioactive Effluent Release Report

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: October - December 2004
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	8	3	0	0	0	0	11
NNE	11	4	0	0	0	0	15
NE	4	3	0	0	0	0	7
ENE	9	2	0	0	0	0	11
E	12	1	0	0	0	0	13
ESE	13	6	0	0	0	0	19
SE	4	4	0	0	0	0	8
SSE	3	1	0	0	0	0	4
S	3	0	0	0	0	0	3
SSW	2	5	0	0	0	0	7
SW	8	1	1	0	0	0	10
WSW	3	0	0	0	0	0	3
W	9	1	0	0	0	0	10
WNW	9	0	0	0	0	0	9
NW	3	1	0	0	0	0	4
NNW	3	1	0	0	0	0	4
Variable	0	0	0	0	0	0	0
Total	104	33	1	0	0	0	138

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 Data

Quad Cities Nuclear Station

Period of Record: October - December 2004
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	6	0	0	0	0	0	6
NNE	3	0	0	0	0	0	3
NE	7	0	0	0	0	0	7
ENE	3	1	0	0	0	0	4
E	20	0	0	0	0	0	20
ESE	22	10	0	0	0	0	32
SE	3	1	0	0	0	0	4
SSE	4	0	0	0	0	0	4
S	8	0	0	0	0	0	8
SSW	4	0	0	0	0	0	4
SW	2	0	0	0	0	0	2
WSW	4	0	0	0	0	0	4
W	10	0	0	0	0	0	10
WNW	4	0	0	0	0	0	4
NW	3	0	0	0	0	0	3
NNW	2	0	0	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	105	12	0	0	0	0	117

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 Data

Quad Cities Nuclear Station

Period of Record: October - December 2004
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	0	0	0	0
SSE	0	0	0	1	0	0	1
S	0	0	0	3	2	0	5
SSW	0	0	7	5	0	0	12
SW	0	0	1	0	0	0	1
WSW	0	0	0	0	0	0	0
W	0	0	2	0	0	0	2
WNW	0	0	3	0	0	0	3
NW	0	0	0	0	0	0	0
NNW	0	0	1	1	0	0	2
Variable	0	0	0	0	0	0	0
Total	0	0	14	10	2	0	26

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 120

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: October - December 2004
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	1	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	0	1	2	0	3
ENE	0	0	0	0	1	0	1
E	0	0	1	0	0	0	1
ESE	0	0	2	0	0	0	2
SE	0	0	0	2	0	0	2
SSE	0	0	1	0	0	0	1
S	0	0	1	3	0	0	4
SSW	0	0	2	3	0	0	5
SW	0	0	2	4	2	0	8
WSW	0	0	2	0	0	0	2
W	0	0	2	1	0	0	3
WNW	0	0	3	0	0	0	3
NW	0	0	0	0	0	0	0
NNW	0	0	4	0	0	0	4
Variable	0	0	0	0	0	0	0
Total	0	0	21	14	5	0	40

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: 120

Quad Cities Nuclear Power Station
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Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: October - December 2004
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	0	1	1	0	2
NNE	0	1	2	0	0	0	3
NE	0	0	2	1	1	0	4
ENE	0	0	5	0	0	0	5
E	0	0	1	0	0	0	1
ESE	0	0	3	3	0	0	6
SE	0	0	1	0	0	0	1
SSE	0	0	1	4	0	0	5
S	0	0	2	1	0	0	3
SSW	0	0	3	1	0	0	4
SW	0	0	3	2	0	0	5
WSW	0	1	2	2	0	0	5
W	0	4	4	2	0	0	10
WNW	0	4	1	1	1	0	7
NW	0	0	0	0	0	0	0
NNW	0	2	1	2	2	0	7
Variable	0	0	0	0	0	0	0
Total	0	12	31	20	5	0	68

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: 120

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: October - December 2004
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	4	19	23	9	0	56
NNE	0	9	25	3	10	2	49
NE	1	8	38	8	12	1	68
ENE	0	2	33	15	5	0	55
E	0	1	36	26	5	0	68
ESE	2	7	22	10	2	0	43
SE	0	6	2	20	6	0	34
SSE	0	2	11	18	8	1	40
S	0	7	16	15	0	0	38
SSW	0	8	11	12	15	2	48
SW	0	6	21	17	5	4	53
WSW	0	3	15	18	3	6	45
W	1	5	13	25	15	10	69
WNW	0	6	11	20	49	19	105
NW	0	10	16	29	17	12	84
NNW	1	5	14	24	8	0	52
Variable	0	0	0	0	0	0	0
Total	6	89	303	283	169	57	907

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: 120

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: October - December 2004
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	2	16	6	5	1	31
NNE	0	1	10	16	1	0	28
NE	1	4	10	14	4	0	33
ENE	1	3	17	15	0	0	36
E	0	3	20	9	1	0	33
ESE	0	4	6	15	2	0	27
SE	0	4	14	21	4	0	43
SSE	0	8	18	18	7	1	52
S	1	2	8	18	11	8	48
SSW	1	1	12	34	29	7	84
SW	1	1	14	22	26	4	68
WSW	0	2	4	20	10	0	36
W	0	3	11	28	8	0	50
WNW	1	6	14	36	10	3	70
NW	0	4	20	32	12	2	70
NNW	0	6	13	16	5	3	43
Variable	0	0	0	0	0	0	0
Total	7	54	207	320	135	29	752

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: 120

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: October - December 2004
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	0	5	5	0	0	10
NNE	0	1	6	1	0	0	8
NE	0	2	5	3	0	0	10
ENE	0	5	7	4	1	0	17
E	0	5	9	4	0	0	18
ESE	0	2	8	17	0	0	27
SE	0	1	0	4	0	0	5
SSE	0	2	6	6	0	0	14
S	0	7	7	3	0	0	17
SSW	2	1	5	6	0	5	19
SW	0	2	2	3	0	0	7
WSW	0	0	1	3	0	0	4
W	0	1	2	3	0	0	6
WNW	0	0	2	3	1	0	6
NW	0	1	3	1	0	0	5
NNW	0	0	3	2	1	0	6
Variable	0	0	0	0	0	0	0
Total	2	30	71	68	3	5	179

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: 120

Joint Frequency Data

Quad Cities Nuclear Station

Period of Record: October - December 2004
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	1	1	1	0	0	3
NE	0	2	6	0	0	0	8
ENE	0	1	1	2	0	0	4
E	0	0	8	1	0	0	9
ESE	0	2	1	1	2	0	6
SE	0	0	3	3	0	0	6
SSE	0	2	5	20	0	0	27
S	1	0	3	10	0	0	14
SSW	0	0	3	8	0	0	11
SW	1	0	4	3	0	0	8
WSW	0	0	2	2	0	0	4
W	0	0	0	1	0	0	1
WNW	0	0	1	3	0	0	4
NW	0	1	2	2	0	0	5
NNW	0	1	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	2	10	40	57	2	0	111

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: 120

Quad Cities Nuclear Power Station
2004 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	9.05E+01	6.82E+03	2004	2.50E+01
b. Dry compressible waste, contaminated equip, etc	1.54E+03	2.73E+01	2004	2.50E+01
c. Irradiated components, control rods, etc	7.51E+00	9.61E+03	2004	2.50E+01
d. Other (describe)				

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

	Major Nuclide Composition	%
a.	Mn-54	2.17E+00
	Fe-55	6.97E+01
	Co-60	2.68E+01
b.	Mn-54	6.80E+00
	Fe-55	5.13E+01
	Co-60	3.68E+01
	Zn-65	1.24E+00
	Cs-137	1.21E+00
c.	Mn-54	1.24E+00
	Fe-55	3.90E+01
	Co-60	5.66E+01
	Ni-63	3.18E+00

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
29	Highway	Processor
32	Highway	Disposal

B. Irradiated Fuel Shipments (disposition)

Number of Shipments	Mode of Transportation	Destination
2	Highway	Disposal

C. Changes to the Process Control Program

Submitted with this report is Revision 3 of RW-AA-100, Process Control Program for Radioactive Wastes. No significant process changes made. Changes are administrative in nature.

Attachment 2
Quad Cities Nuclear Power Station
RW-AA-100 - Process Control Program for Radioactive Wastes
SVP-05-027

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 (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 greater than 5-year half lives is solidified in a container when the activity is 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 $\leq$ 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 are performed by vendors, when applicable. Liquid waste solidified to meet stabilization criteria (10CFR61 and 01-91 Branch Technical Requirements) must have documentation available that shows 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, $\leq$0.5% by volume when the waste is packaged to an "unstable" state, or $\leq$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 container's Certificate of Compliance 10CFR Part 61 Requirements for meeting stability. 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, 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,

- 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.

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. 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.

4.1.4. A solidification media, approved by the burial site, **MAY BE REQUIRED when** liquid radwaste is solidified to a stable/unstable state.

4.1.5. **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 vendor.

4.1.6. 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 must meet applicable QA Topical Report and Augmented Quality Requirements.

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

4.1.8. 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).

4.2. <u>General Waste Processing Requirements</u>

4.2.1. 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.

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

4.2.3. 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.

4.2.4. 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.

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

4.2.6. 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.

4.2.7. 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.

4.2.8. 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.

4.2.9. 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

4.2.10. High Integrity Containers (HIC):

1. Vendors who supply HIC's to the station **MUST PROVIDE** a copy of the HIC Certificate of Compliance, which details specific limitations on use of the HIC.

2. Vendors who supply HIC's to the station **MUST 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.

4.2.11. 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).

4.2.12. 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 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 **WILL COMPLY** with the applicable parts of 49CFR, 10CFR61, and 10CFR71, and the acceptance criteria for the applicable burial site.

4.4. Shipping and Inspection Requirements

4.4.1. All shipping/storage containers **WILL 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 **WILL 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 **WILL BE INSPECTED** to ensure that the applicable processor's waste acceptance criteria are being met.

4.5. Inspection and Corrective Action

4.5.1. Inspection results that indicate non-compliance with applicable NRC, State, vendor, or site requirements **WILL 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 **WILL BE TAKEN** to determine the cause. Additional samples **WILL 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 changes to it (other than editorial/minor changes) **SHALL BE APPROVED** in accordance with the station procedures and Technical Requirements Manual (TRM) or Operation Requirements Manual (ORM), as applicable, for the respective station. Changes to the Licensees Controlled Documents, UFSAR, ORM, or TRM are controlled by the provisions of 10CFR 50.59.

4.6.2. The station or vendor's implementing processing procedures for the purpose of this Process Control Program **SHALL BE REVIEWED and APPROVED** in accordance with the plant specific TRM or ORM (either CTS or ITS, as applicable for the respective stations). These include the following, when applicable:

1. procedures for set-up and operation of dewatering equipment (e.g., set-up and operation of RDS 1000 Unit).

2. solidification procedures affecting waste stabilization for waste processed in a steel container. (This processing method is <u>not</u> currently in use due to waste loading and volume reduction.)

3. High Integrity Container handling procedure.

4. operating waste sampling equipment for solidification and dewatering processes.

4.6.3. All other vendor waste processing procedures **SHALL BE** technically **REVIEWED**, as appropriate.

4.6.4. Station processes, including procedures related to waste manifests, shipment inspections, and container activity determination, **ARE CONTROLLED** by each station.

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

2. Liquid processed by vendor equipment **WILL BE DONE** in accordance with vendor procedures.

4.7. <u>Waste Types, Point of Generation, and Processing Method</u>

Methods of processing and individual vendors **MAY CHANGE** due to changing financial and regulatory options. The table below is a representative sample. It is <u>not</u> 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

Waste Stream	POINTS OF GENERATION	AVAILABLE WASTE PROCESSING METHODS
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
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** - None

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. Source Documents:

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

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

6.2.7. Quality Assurance Program

6.3. Station Commitments:

6.3.1. Peach Bottom

CM-1, T03819, Letter from G.A. Hunger, Jr., dated Sept. 29,94, transmitting TSCR 93-16 (Improved Technical Specifications).

6.3.2. Limerick

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

7. **ATTACHMENTS** - None