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Quad Cities Generating Station
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ComEd

SVP-00-018

March 23, 2000

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

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

Subject: Quad Cities Nuclear Power Station's Radioactive Effluent Report for January through December 1999

Reference: Letter from R. M. Krich (ComEd) to USNRC, "Offsite Dose Calculation Manual Changes for 1999," dated March 21, 2000.

In accordance with the Quad Cities Technical Specifications Section 6.9.4 and 10 CFR 50.36a, we are submitting the Quad Cities Nuclear Power Station's Radioactive Effluent Report for January through December 1999. A copy of procedure RW-AA-10, "Process Control Program for Radioactive Wastes," Revision 1, dated 07/15/99, is also included as required by the Offsite Dose Calculation Manual (ODCM) Section 12.6.1, "Radioactive Effluent Release Report."

ODCM Section 12.6.3.3. requires that a new revision of the ODCM be submitted as part of or concurrent with the Radioactive Effluent Report. The referenced letter, dated March 22, 1999, submitted the required ODCM revision.

IE48

Should you have any questions concerning this letter, please contact Mr. C.C. Peterson at (309) 654-2241, extension 3609.

Respectfully,

Joel P. Dimmette, Jr.
Site Vice President
Quad Cities Nuclear Power Station

Attachments:

A. Effluent and Waste Disposal Semiannual Report Supplemental Information, Quad Cities Nuclear Power Station, January–June 1999
B. Effluent and Waste Disposal Semiannual Report Supplemental Information, Quad Cities Nuclear Power Station, July-December 1999
C. Quad Cities Station Meteorological Site Quarterly Joint-Frequency Wind Rose Tables for 1999
D. Solid Waste Disposition Summary
E. RW-AA-10, Revision 1, Process Control Program for Radioactive Wastes at Quad Cities Nuclear Power Station

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

Attachment A
Effluent and Waste Disposal Semiannual Report Supplemental Information, Quad Cities Nuclear Power Station, January–June 1999
SVP-00-018

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

Supplemental Information

Facility: Quad Cities Nuclear Power Station January – June 1999

Licensee: Commonwealth Edison 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 I-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.

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 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 Calculations Manual. The MPC values used for the monitors were as follows:

Radwaste Discharge	4.96E-05 uCi/ml
Service Water	1.0 E-05 uCi/ml

3. Average Energy

The average gamma energy used to calculate the alarm setpoints for the noble gas monitors was 0.368 MeV for the first quarter, and 0.357 MeV for the second quarter.

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 collected every 7 days and analyzed by gamma isotopic. The particulate filter papers are composited every 31 days and sent to a vendor for Sr-89/90 and gross alpha analysis. Noble gas grab samples are collected and analyzed by gamma isotopic weekly. Tritium samples are collected and analyzed every month.

The reported Sr-89/90 and gross alpha curies released values are actual. The portion of the "percent of applicable limit" for these contributors is based on projections that are used in the monthly ODCM calculations. The actual results are not available when the ODCM calculations are performed.

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 performed 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 by gamma isotopic before discharge. 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. 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.

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 are 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. The estimated total error percent for the solid waste radwaste curies is 12.3%.

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, <LLD is reported.

5. Batch Releases

a. Liquid

1. Number of releases:	12
2. Total time:	12,413 minutes
3. Maximum time:	1,236 minutes
4. Average time:	1,034 minutes
5. Minimum time:	405 minutes
6. Average stream flow:	46.5 gpm (discharge)
	2.93E+05 gpm (dilution)

b. Gaseous

NONE

6. Abnormal releases

a. Gaseous

NONE

b. Liquid

NONE

ATTACHMENT A (Page 1 of 5)

EFFLUENT & WASTE DISPOSABLE SEMI-ANNUAL REPORT

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

Period: January through June 1999

A. FISSION & ACTIVATION GASES	UNIT	FIRST QUARTER	SECOND QUARTER	Est.Total Error %
1. Total Release	Ci	1.51E+01	1.74E+01	12.4
2. Average release rate for the period	μCi/sec	1.94E+00	2.21E+00	
3. *Percent of ODCM limit Chimney & Stack	%	5.65E-03	6.66E-03	
		2.86E-04	3.13E-04	

B. IODINE				
1. Total Iodine-131	Ci	3.81E-04	4.38E-04	40.0
2. Average release rate for the period	μCi/sec	4.90E-05	5.57E-05	

C. PARTICULATES				
1. Particulates with half-lives >8 days	Ci	5.75E-04	5.73E-04	30.1
2. Average release rate for the period	μCi/sec	7.39E-05	7.29E-05	
3. Gross alpha radioactivity	Ci	3.96E-06	2.96E-06	

D. TRITIUM				
1. Total Release	Ci	1.96E+01	2.50E+01	8.0
2. Average release rate for the period	μCi/sec	2.52E+00	3.18E+00	
E.Iodine 131 & 133,Tritium & Particulate				
1. Percent of ODCM limit Chimney & Stack	%	7.00E-02	2.64E-01	

*NOBLE GAS GAMMA/NOBLE GAS BETA DOSE LIMITS

ATTACHMENT A (Page 2 of 5)
EFFLUENT & WASTE DISPOSABLE SEMI-ANNUAL REPORT
MAIN CHIMNEY GASEOUS EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED 1. Fission gases	UNIT	FIRST QUARTER	SECOND QUARTER	FIRST QUARTER	SECOND QUARTER
Kr-85	Ci	<LLD	<LLD	NA	NA
Kr-85m	Ci	3.74E-01	3.65E-01	NA	NA
Kr-87	Ci	6.54E-01	5.55E-01	NA	NA
Kr-88	Ci	4.63E-01	7.75E-01	NA	NA
Xe-133	Ci	6.13E-01	5.53E-01	NA	NA
Xe-135	Ci	2.09E+00	5.81E-01	NA	NA
Xe-135m	Ci	2.19E+00	4.22E+00	NA	NA
Xe-138	Ci	8.21E+00	1.02E+01	NA	NA
Ar-41		4.90E-01	1.78E-01	NA	NA
Total for Period	Ci	**1.51E+01**	**1.74E+01**	**NA**	**NA**
NUCLIDES RELEASED 2. Iodines	UNIT	FIRST QUARTER	SECOND QUARTER	FIRST QUARTER	SECOND QUARTER
I-131	Ci	3.81E-04	4.38E-04	NA	NA
I-133	Ci	2.17E-03	2.73E-03	NA	NA
I-135	Ci	<LLD	<LLD	NA	NA
Total for period	Ci	**2.55E-03**	**3.17E-03**	**NA**	**NA**
NUCLIDES RELEASED 3. Particulates	UNIT	FIRST QUARTER	SECOND QUARTER	FIRST QUARTER	SECOND QUARTER
Sr-89	Ci	6.35E-05	8.25E-05	NA	NA
Sr-90	Ci	<LLD	<LLD	NA	NA
Cs-134	Ci	<LLD	<LLD	NA	NA
Cs-137	Ci	<LLD	2.68E-05	NA	NA
Ba-140	Ci	2.85E-05	<LLD	NA	NA
La-140	Ci	<LLD	<LLD	NA	NA
Cr-51	Ci	<LLD	<LLD	NA	NA
Mn-54	Ci	<LLD	<LLD	NA	NA
Co-58	Ci	<LLD	<LLD	NA	NA
Co-60	Ci	9.09E-05	6.13-05	NA	NA
Mo-99	Ci	<LLD	<LLD	NA	NA
Ag-110m	Ci	<LLD	<LLD	NA	NA
Total for Period	Ci	**1.83E-04**	**1.71E-04**	**NA**	**NA**

ATTACHMENT A (Page 3 of 5)

EFFLUENT & WASTE DISPOSABLE SEMI-ANNUAL REPORT

REACTOR VENTILATION GASEOUS EFFLUENTS

CONTINUOUS MODE BATCH MODE

NUCLIDES RELEASED 1. Fission gases	UNIT	FIRST QUARTER	SECOND QUARTER	FIRST QUARTER	SECOND QUARTER
Kr-85	Ci	<LLD	<LLD	NA	NA
Kr-85m	Ci	<LLD	<LLD	NA	NA
Kr-87	Ci	<LLD	2.10E-02	NA	NA
Kr-88	Ci	<LLD	<LLD	NA	NA
Xe-133	Ci	<LLD	<LLD	NA	NA
Xe-135	Ci	<LLD	<LLD	NA	NA
Xe-135m	Ci	<LLD	<LLD	NA	NA
Xe-138	Ci	<LLD	<LLD	NA	NA
AR-41		<LLD	<LLD	NA	NA
Total for Period	Ci	**<LLD**	**2.10E-02**	**NA**	**NA**
NUCLIDES RELEASED 2. Iodines	UNIT	FIRST QUARTER	SECOND QUARTER	FIRST QUARTER	SECOND QUARTER
I-131	Ci	<LLD	<LLD	NA	NA
I-133	Ci	<LLD	2.27E-05	NA	NA
I-135	Ci	<LLD	<LLD	NA	NA
Total for period	Ci	**<LLD**	**2.27E-05**	**NA**	**NA**
NUCLIDES RELEASED 3. Particulates	UNIT	FIRST QUARTER	SECOND QUARTER	FIRST QUARTER	SECOND QUARTER
Sr-89	Ci	<LLD	1.55E-06	NA	NA
Sr-90	Ci	<LLD	<LLD	NA	NA
Cs-134	Ci	<LLD	<LLD	NA	NA
Cs-137	Ci	8.62E-06	<LLD	NA	NA
Ba-140	Ci	<LLD	<LLD	NA	NA
La-140	Ci	<LLD	<LLD	NA	NA
Cr-51	Ci	4.92E-06	<LLD	NA	NA
Mn-54	Ci	5.49E-06	1.34E-05	NA	NA
Co-58	Ci	<LLD	<LLD	NA	NA
Co-60	Ci	3.73E-04	3.87E-04	NA	NA
Mo-99	Ci	<LLD	<LLD	NA	NA
Ag-110m	Ci	<LLD	<LLD	NA	NA
Total for Period	Ci	**3.92E-04**	**4.02E-04**	**NA**	**NA**

ATTACHMENT A (Page 4 of 5)

EFFLUENT & WASTE DISPOSABLE SEMI-ANNUAL REPORT

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

A. FISSION & ACTIVATION GASES	UNIT	FIRST QUARTER	SECOND QUARTER	Est.Total Error %
1. Total Release (not including tritium, gases & alpha)	Ci	1.79E-03	1.31E-02	5.6
2. Average diluted concentration during batch discharges for the period	μCi/mL	2.58E-10	1.79E-09	
3. Percent of applicable limit	WB % O %	2.46E-03 1.04E-03	7.42E-03 3.25E-03	
4. Maximum diluted concentration during batch discharges	μCi/mL	6.27E-10	9.00E-10	
B. TRITIUM				
1. Total Release	Ci	7.06E+00	5.76E+00	4.0
2. Average diluted concentration during batch discharges for the period	μCi/mL	1.02E-06	7.85E-07	
3. Percent of applicable limit	%	3.39E-02	2.62E-02	
C. DISSOLVED & ENTRAINED GASES				
1. Total Release	Ci	5.97E-05	2.09E-04	5.6
2. Average diluted concentration during batch discharges for the period	μCi/mL	8.59E-12	2.85E-11	
3. Percent of applicable limit	%	4.30E-06	1.43E-05	
D. GROSS ALPHA ACTIVITY				
1. Total Release	Ci	<LLD	<LLD	14.5
2. Average diluted concentration during batch discharges for the period	μCi/mL	<LLD	<LLD	
E. VOLUME OF WASTE RELEASED (prior to dilution)	Liters	1.32E+06	8.59E+05	
F. VOLUME OF DILUTION WATER USED DURING BATCH DISCHARGES	Liters	6.95E+09	7.34E+09	
G. TOTAL VOLUME OF DILUTION WATER USED DURING PERIOD (quarter)	Liters	3.22E+11	4.27E+11	

ATTACHMENT A (Page 5 of 5)

EFFLUENT & WASTE DISPOSABLE SEMI-ANNUAL REPORT

LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNIT	FIRST QUARTER	SECOND QUARTER	FIRST QUARTER	SECOND QUARTER
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	4.41E-04	1.73E-03
I-131	Ci	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	9.13E-04	1.00E-03
Co-58	Ci	<LLD	<LLD	<LLD	1.10E-04
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	1.79E-05	4.88E-04
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	1.22E-05	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD
Fe-55	Ci	<LLD	<LLD	<LLD	9.79E-03
Sb-124	Ci	<LLD	<LLD	2.91E-04	<LLD
Sb-125	Ci	<LLD	<LLD	1.13E-04	<LLD
Zn-69m	Ci	<LLD	<LLD	<LLD	2.48E-05
Total for Period (above)	Ci	**<LLD**	**<LLD**	**1.79E-03**	**1.31E-02**
Xe-133	Ci	<LLD	<LLD	4.84E-05	1.35E-04
Xe-135	Ci	<LLD	<LLD	1.13E-05	7.39E-05

Prepared by: _____ Date: 03-16-00

Approved by: _____ Date: 3/16/00

Attachment B
Effluent and Waste Disposal Semiannual Report Supplemental Information, Quad Cities Nuclear Power Station, July-December 1999
SVP-00-018

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

Supplemental Information

Facility: Quad Cities Nuclear Power Station July – December 1999

Licensee: Commonwealth Edison 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 I-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.

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 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 Calculations Manual. The MPC values used for the monitors were as follows:

Radwaste Discharge	1.18E-05 uCi/ml
Service Water	1.0 E-05 uCi/ml

3. Average Energy

The average gamma energy used to calculate the alarm setpoints for the noble gas monitors was 0.355 MeV for the third quarter, and 0.642 MeV for the fourth quarter.

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 collected every 7 days and analyzed by gamma isotopic. The particulate filter papers are composited every 31 days and sent to a vendor for Sr-89/90 and gross alpha analysis. Noble gas grab samples are collected and analyzed by gamma isotopic weekly. Tritium samples are collected and analyzed every month.

The reported Sr-89/90 and gross alpha curies released values are actual. The portion of the "percent of applicable limit" for these contributors is based on projections that are used in the monthly ODCM calculations. The actual results are not available when the ODCM calculations are performed.

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 performed 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 by gamma isotopic before discharge. 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. 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.

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 are 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. The estimated total error percent for the solid waste radwaste curies is 12.2%.

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, <LLD is reported.

5. Batch Releases

a. Liquid

1. Number of releases:	14
2. Total time:	15,437 minutes
3. Maximum time:	1,205 minutes
4. Average time:	1,103 minutes
5. Minimum time:	905 minutes
6. Average stream flow:	47.4 gpm (discharge)
	4.17E+05 gpm (dilution)

b. Gaseous

NONE

6. Abnormal releases

a. Gaseous

1. On 11/8/99 a small reactor fuel leak developed in Unit Two. Initially, recombiner offgas activity increased by a factor of 2. Flux tilt monitoring was successful in identifying which fuel bundle was leaking and suppression techniques were utilized to reduce recombiner offgas activity levels to near normal conditions. Unit Two continued to run until its refuel outage began in January 2000. Grab samples were obtained at the gaseous effluent release points immediately following identification of the fuel leak. The small amounts of activity identified in these samples were added to the normal monthly effluents for Unit Two.

b. Liquid

NONE

ATTACHMENT A (Page 1 of 5)

EFFLUENT & WASTE DISPOSABLE SEMI-ANNUAL REPORT

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

Period: July through December 1999

A. FISSION & ACTIVATION GASES	UNIT	THIRD QUARTER	FOURTH QUARTER	Est.Total Error %
1. Total Release	Ci	2.28E+01	4.15E+01	12.3
2. Average release rate for the period	μCi/sec	2.87E+00	5.22E+00	
3. *Percent of ODCM limit Chimney & Stack	%	8.74E-03	1.32E-02	
		4.05E-04	6.65E-04	

B. IODINE				
1. Total Iodine-131	Ci	7.75E-04	1.14E-03	40.0
2. Average release rate for the period	μCi/sec	9.75E-05	1.43E-04	

C. PARTICULATES				
1. Particulates with half-lives >8 days	Ci	1.26E-03	7.23E-04	30.0
2. Average release rate for the period	μCi/sec	1.59E-04	9.10E-05	
3. Gross alpha radioactivity	Ci	2.91E-06	6.27E-06	

D. TRITIUM				
1. Total Release	Ci	3.27E+01	2.77E+01	8.1
2. Average release rate for the period	μCi/sec	4.11E+00	3.48E+00	
E.Iodine 131 & 133,Tritium & Particulate				
1. Percent of ODCM limit Chimney & Stack	%	4.04E-01	1.11E-01	

*NOBLE GAS GAMMA/NOBLE GAS BETA DOSE LIMITS

ATTACHMENT A (Page 2 of 5)
EFFLUENT & WASTE DISPOSABLE SEMI-ANNUAL REPORT
MAIN CHIMNEY GASEOUS EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED 1. Fission gases	UNIT	THIRD QUARTER	FOURTH QUARTER	THIRD QUARTER	FOURTH QUARTER
Kr-85	Ci	<LLD	4.09E+00	NA	NA
Kr-85m	Ci	7.61E-01	8.61E-01	NA	NA
Kr-87	Ci	6.59E-01	1.04E+00	NA	NA
Kr-88	Ci	7.83E-01	8.91E-01	NA	NA
Xe-133	Ci	1.79E+00	4.48E+00	NA	NA
Xe-135	Ci	9.41E-01	1.35E+00	NA	NA
Xe-135m	Ci	3.93E+00	7.53E+00	NA	NA
Xe-138	Ci	1.37E+01	2.10E+01	NA	NA
Ar-41	Ci	2.70E-01	1.34E-01	NA	NA
Xe-131m	Ci	<LLD	1.51E-01	NA	NA
Xe-133m	Ci	<LLD	6.58E-03	NA	NA
Total for Period	Ci	**2.28E+01**	**4.15E+01**	**NA**	**NA**
NUCLIDES RELEASED 2. Iodines	UNIT	THIRD QUARTER	FOURTH QUARTER	THIRD QUARTER	FOURTH QUARTER
I-131	Ci	7.75E-04	1.14E-03	NA	NA
I-133	Ci	4.56E-03	5.81E-03	NA	NA
I-135	Ci	<LLD	2.60E-03	NA	NA
Total for period	Ci	**5.34E-03**	**9.55E-03**	**NA**	**NA**
NUCLIDES RELEASED 3. Particulates	UNIT	THIRD QUARTER	FOURTH QUARTER	THIRD QUARTER	FOURTH QUARTER
Sr-89	Ci	2.32E-04	1.09E-04	NA	NA
Sr-90	Ci	7.39E-07	<LLD	NA	NA
Cs-134	Ci	<LLD	<LLD	NA	NA
Cs-137	Ci	<LLD	<LLD	NA	NA
Ba-140	Ci	3.45E-04	5.25E-05	NA	NA
La-140	Ci	1.68E-04	<LLD	NA	NA
Cr-51	Ci	<LLD	<LLD	NA	NA
Mn-54	Ci	<LLD	2.47E-05	NA	NA
Co-58	Ci	<LLD	<LLD	NA	NA
Co-60	Ci	1.10E-04	1.75E-04	NA	NA
Mo-99	Ci	<LLD	<LLD	NA	NA
Ag-110m	Ci	<LLD	<LLD	NA	NA
Total for Period	Ci	**8.56E-04**	**3.61E-04**	**NA**	**NA**

ATTACHMENT A (Page 3 of 5)

EFFLUENT & WASTE DISPOSABLE SEMI-ANNUAL REPORT

REACTOR VENTILATION GASEOUS EFFLUENTS

CONTINUOUS MODE BATCH MODE

NUCLIDES RELEASED 1. Fission gases	UNIT	THIRD QUARTER	FOURTH QUARTER	THIRD QUARTER	FOURTH QUARTER
Kr-85	Ci	<LLD	<LLD	NA	NA
Kr-85m	Ci	<LLD	<LLD	NA	NA
Kr-87	Ci	<LLD	<LLD	NA	NA
Kr-88	Ci	<LLD	<LLD	NA	NA
Xe-133	Ci	<LLD	<LLD	NA	NA
Xe-135	Ci	<LLD	<LLD	NA	NA
Xe-135m	Ci	<LLD	<LLD	NA	NA
Xe-138	Ci	<LLD	<LLD	NA	NA
AR-41		<LLD	<LLD	NA	NA
Total for Period	Ci	**<LLD**	**<LLD**	**NA**	**NA**
NUCLIDES RELEASED 2. Iodines	UNIT	THIRD QUARTER	FOURTH QUARTER	THIRD QUARTER	FOURTH QUARTER
I-131	Ci	<LLD	<LLD	NA	NA
I-133	Ci	<LLD	<LLD	NA	NA
I-135	Ci	<LLD	<LLD	NA	NA
Total for period	Ci	**<LLD**	**<LLD**	**NA**	**NA**
NUCLIDES RELEASED 3. Particulates	UNIT	THIRD QUARTER	FOURTH QUARTER	THIRD QUARTER	FOURTH QUARTER
Sr-89	Ci	<LLD	<LLD	NA	NA
Sr-90	Ci	<LLD	<LLD	NA	NA
Cs-134	Ci	<LLD	<LLD	NA	NA
Cs-137	Ci	5.93E-06	<LLD	NA	NA
Ba-140	Ci	<LLD	<LLD	NA	NA
La-140	Ci	<LLD	<LLD	NA	NA
Cr-51	Ci	<LLD	<LLD	NA	NA
Mn-54	Ci	<LLD	5.77E-06	NA	NA
Co-58	Ci	<LLD	<LLD	NA	NA
Co-60	Ci	3.99E-04	3.19E-04	NA	NA
Mo-99	Ci	<LLD	2.49E-05	NA	NA
Ag-110m	Ci	<LLD	<LLD	NA	NA
Sb-125	Ci	<LLD	1.25E-05	NA	NA
Total for Period	Ci	**4.05E-04**	**3.62E-04**	**NA**	**NA**

ATTACHMENT A (Page 4 of 5)

EFFLUENT & WASTE DISPOSABLE SEMI-ANNUAL REPORT

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

A. FISSION & ACTIVATION GASES	UNIT	THIRD QUARTER	FOURTH QUARTER	Est.Total Error %
1. Total Release (not including tritium, gases & alpha)	Ci	6.92E-03	2.53E-03	5.2
2. Average diluted concentration during batch discharges for the period	μCi/mL	5.01E-10	2.46E-10	
3. Percent of applicable limit*	WB % O %	1.25E-02 5.54E-03	1.52E-03 6.39E-04	
4. Maximum diluted concentration during batch discharges	μCi/mL	1.18E-09	4.59E-10	
B. TRITIUM				
1. Total Release	Ci	8.04E+00	5.70E+00	4.1
2. Average diluted concentration during batch discharges for the period	μCi/mL	5.83E-07	5.53E-07	
3. Percent of applicable limit	%	1.94E-02	1.84E-02	
C. DISSOLVED & ENTRAINED GASES				
1. Total Release	Ci	9.35E-04	<LLD	5.2
2. Average diluted concentration during batch discharges for the period	μCi/mL	6.78E-11	<LLD	
3. Percent of applicable limit	%	3.39E-05	NA	
D. GROSS ALPHA ACTIVITY				
1. Total Release	Ci	<LLD	<LLD	14.8
2. Average diluted concentration during batch discharges for the period	μCi/mL	<LLD	<LLD	
E. VOLUME OF WASTE RELEASED (prior to dilution)	Liters	1.32E+06	1.44E+06	
F. VOLUME OF DILUTION WATER USED DURING BATCH DISCHARGES	Liters	1.38E+10	1.03E+10	
G. TOTAL VOLUME OF DILUTION WATER USED DURING PERIOD (quarter)	Liters	4.94E+11	3.75E+11	

*Whole Body/Organ (ODCM)

ATTACHMENT A (Page 5 of 5)

EFFLUENT & WASTE DISPOSABLE SEMI-ANNUAL REPORT

LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNIT	THIRD QUARTER	FOURTH QUARTER	THIRD QUARTER	FOURTH QUARTER
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	2.96E-03	2.34E-04
I-131	Ci	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	2.91E-03	1.79E-03
Co-58	Ci	<LLD	<LLD	7.16E-05	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	8.48E-04	4.27E-04
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD
Fe-55	Ci	<LLD	<LLD	1.17E-04	7.21E-05
Sb-124	Ci	<LLD	<LLD	9.88E-06	<LLD
Sb-122	Ci	<LLD	<LLD	<LLD	6.91E-06
Total for Period (above)	Ci	**<LLD**	**<LLD**	**6.92E-03**	**2.53E-03**
Xe-133	Ci	<LLD	<LLD	7.11E-04	<LLD
Xe-135	Ci	<LLD	<LLD	2.24E-04	<LLD

Prepared by: _____ Date: 03-16-00

Approved by: _____ Date: 3-16-00

Attachment C
Quad Cities Station Meteorological Site Quarterly Joint-Frequency Wind Rose Tables for 1999
SVP-00-018

ComEd QUAD CITIES STATION
33 ft. WIND SPEED and WIND DIRECTION

January-March 1999
196-33 ft. DIFFERENTIAL TEMPERATURE

NUMBER OF OBSERVATIONS = 2153
VALUES ARE PERCENT OCCURRENCE

SPEED	WIND DIRECTION CLASSES																	STABILITY CLASSES							
CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
C SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
A N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
L SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
M MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.05						.05		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.05
EU	.00	.00	.00	.00	.00	.00	.00	.09	.00	.00	.00	.00	.00	.00	.00	.00	.09	.09							
MU	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05		.05						
1 SU	.00	.00	.05	.00	.14	.05	.00	.05	.00	.00	.00	.09	.05	.00	.00	.00	.42			.42					
- N	.37	.33	.33	.33	.33	.60	.70	.51	.19	.28	.14	.60	.60	.33	.09	.19	5.90				5.90				
3 SS	.33	.23	.70	.79	.70	.65	.75	.56	.47	.42	.51	.47	.65	.47	.42	.42	8.55					8.55			
MS	.28	.62	.14	.57	.57	1.04	.76	.38	.28	.05	.24	.28	.38	.33	.47	.38	6.78						6.78		
ES	.05	.00	.05	.14	.95	.85	.43	.24	.14	.09	.14	.05	.33	.57	.09	.14	4.27							4.27	
																									26.06
EU	.33	.51	.09	.28	.05	.23	.05	.23	.05	.23	.28	.09	.51	.28	.33	.09	3.62	3.62							
MU	.19	.05	.09	.23	.05	.23	.05	.05	.00	.00	.00	.09	.14	.09	.09	.05	1.39		1.39						
4 SU	.19	.19	.33	.14	.23	.33	.23	.28	.00	.05	.09	.14	.33	.05	.19	.14	2.88			2.88					
- N	.65	.65	1.81	1.95	1.58	.60	.79	.79	.56	.46	.37	.79	2.37	2.65	1.16	.60	17.79				17.79				
7 SS	.74	.70	1.30	.79	.56	.98	.33	.51	.98	.60	.70	.70	.93	1.02	1.02	1.07	12.91					12.91			
MS	.05	.05	.14	.37	.23	.42	.33	.23	.42	.23	.00	.05	.05	.00	.00	.00	2.55						2.55		
ES	.00	.00	.00	.00	.05	.33	.05	.05	.05	.00	.00	.00	.00	.00	.00	.00	.51							.51	
																									41.66
EU	.14	.14	.19	.05	.09	.09	.42	.14	.33	.74	.00	.05	.46	.46	.93	.28	4.51	4.51							
MU	.05	.00	.09	.05	.05	.05	.09	.00	.00	.09	.00	.09	.14	.28	.05	.05	1.07		1.07						
8 SU	.19	.05	.23	.37	.14	.05	.23	.00	.09	.00	.05	.00	.09	.42	.23	.00	2.14			2.14					
- N	.60	.93	1.25	1.44	1.44	1.16	.46	.28	.42	.19	.23	.84	2.42	4.04	1.53	.56	17.79				17.79				
1 SS	.00	.05	.28	.88	.28	.28	.05	.33	.37	.51	.42	.05	.05	.09	.28	.00	3.90					3.90			
2 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.05						.05		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									29.45
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
1 MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.05	.00	.00	.09		.09						
3 SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.14	.05	.00	.00	.19			.19					
- N	.09	.00	.00	.05	.33	.33	.00	.00	.00	.00	.00	.05	.84	.79	.05	.00	2.51				2.51				
1 SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
8 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									2.79

ConEd QUAD CITIES STATION
33 ft. WIND SPEED and WIND DIRECTION

January-March 1999
196-33 ft. DIFFERENTIAL TEMPERATURE

SPEED CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	STABILITY CLASSES EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
1 MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
9 SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
- N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
2 SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
4 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.00
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
G MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
T SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
2 SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
4 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.00
TOT	4.24	4.52	7.07	8.43	7.75	8.26	5.70	4.71	4.33	4.00	3.17	4.42	10.52	11.96	6.93	4.01	100.00	8.22	2.60	5.62	43.99	25.36	9.43	4.78	100.00

Wind Direction by Stability

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-STABILITY CLASSES-
.46	.65	.28	.33	.14	.33	.46	.46	.37	.98	.28	.14	.98	.74	1.25	.37	8.22	Extremely Unstable
.23	.09	.19	.28	.09	.28	.14	.05	.00	.09	.00	.19	.33	.42	.14	.09	2.60	Moderately Unstable
.37	.23	.60	.51	.51	.42	.46	.33	.09	.05	.14	.23	.60	.51	.42	.14	5.62	Slightly Unstable
1.72	1.90	3.39	3.76	3.67	2.69	1.95	1.58	1.16	.93	.74	2.28	6.22	7.80	2.83	1.35	43.99	Neutral
1.07	.98	2.28	2.47	1.54	1.91	1.12	1.40	1.81	1.54	1.63	1.21	1.63	1.58	1.72	1.49	25.36	Slightly Stable
.33	.66	.28	.94	.80	1.46	1.08	.61	.70	.33	.24	.33	.43	.33	.47	.43	9.43	Moderately Stable
.05	.00	.05	.14	1.00	1.18	.47	.28	.19	.09	.14	.05	.33	.57	.09	.14	4.78	Extremely Stable

Wind Direction by Wind Speed

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-WIND SPEED CLASSES-
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.05	C A L M
1.03	1.22	1.26	1.83	2.68	3.20	2.63	1.83	1.08	.84	1.03	1.50	2.02	1.69	1.08	1.13	26.06	0.9 - 3.5 mph
2.14	2.14	3.76	3.76	2.74	3.11	1.81	2.14	2.04	1.58	1.44	1.86	4.32	4.09	2.79	1.95	41.66	3.6 - 7.5 mph
.98	1.16	2.04	2.79	2.00	1.63	1.25	.74	1.21	1.58	.70	1.02	3.16	5.29	3.02	.88	29.45	7.6 - 12.5 mph
.09	.00	.00	.05	.33	.33	.00	.00	.00	.00	.00	.05	1.02	.88	.05	.00	2.79	12.6 - 18.5 mph
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	18.6 - 24.5 mph
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	> 24.5 mph

ComEd QUAD CITIES STATION
296 ft. WIND SPEED and WIND DIRECTION

January-March 1999
296-33 ft. DIFFERENTIAL TEMPERATURE

NUMBER OF OBSERVATIONS = 2139
VALUES ARE PERCENT OCCURRENCE

SPEED	WIND DIRECTION CLASSES																STABILITY CLASSES							
CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
C SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
A N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
L SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
M MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.00
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
1 SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
- N	.09	.00	.05	.14	.19	.09	.19	.09	.05	.14	.14	.14	.09	.00	.09	.05	1.54				1.54				
3 SS	.00	.05	.00	.00	.05	.05	.00	.00	.05	.05	.00	.05	.05	.00	.05	.00	.37					.37			
MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.05	.09						.09		
ES	.00	.05	.00	.00	.05	.00	.00	.00	.00	.09	.00	.00	.00	.00	.00	.05	.23							.23	
																									2.24
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
MU	.09	.09	.00	.00	.00	.09	.09	.00	.00	.00	.00	.00	.05	.05	.05	.00	.51		.51						
4 SU	.00	.09	.14	.05	.00	.00	.05	.14	.00	.05	.00	.14	.09	.00	.05	.23	1.03			1.03					
- N	.23	.37	.51	.51	.98	.56	.94	.70	.23	.23	.14	.51	.37	.09	.09	.14	6.64				6.64				
7 SS	.23	.09	.00	.42	.47	.56	.23	.00	.23	.00	.14	.05	.37	.14	.09	.14	3.18					3.18			
MS	.14	.05	.00	.33	.19	.09	.09	.00	.05	.00	.00	.05	.00	.05	.00	.14	1.17						1.17		
ES	.05	.09	.09	.14	.00	.09	.00	.00	.00	.23	.00	.00	.00	.00	.00	.00	.70							.70	
																									13.23
EU	.00	.05	.00	.00	.00	.00	.00	.00	.00	.09	.14	.00	.14	.09	.05	.09	.65	.65							
MU	.14	.23	.14	.05	.00	.00	.00	.05	.00	.00	.09	.05	.23	.14	.09	.23	1.45		1.45						
8 SU	.23	.37	.23	.19	.05	.05	.19	.14	.00	.00	.00	.19	.23	.09	.14	.09	2.20			2.20					
- N	.56	.61	1.36	.84	.61	.65	.47	.56	.09	.09	.05	.42	.89	1.08	.33	.19	8.79				8.79				
1 SS	.47	.56	.42	.75	.65	.42	.65	.47	.37	.56	.33	.33	.28	.14	.47	.09	6.97					6.97			
2 MS	.00	.19	.33	.23	.28	.33	.23	.33	.37	.09	.09	.09	.05	.09	.05	.00	2.76						2.76		
ES	.00	.14	.19	.00	.00	.05	.14	.09	.23	.05	.05	.09	.14	.00	.00	.05	1.22							1.22	
																									24.03
EU	.00	.00	.05	.00	.00	.00	.23	.14	.14	.14	.00	.05	.19	.09	.33	.00	1.36	1.36							
1 MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09	.00	.05	.28	.05	.14	.05	.65		.65						
3 SU	.19	.00	.23	.19	.19	.05	.19	.09	.00	.00	.14	.09	.19	.33	.23	.00	2.10			2.10					
- N	.37	.84	1.59	1.59	1.40	.42	.84	.56	.51	.37	.28	.56	1.73	3.55	1.68	.79	17.11				17.11				
1 SS	.79	.51	.98	.98	.42	.37	.47	.51	1.22	.61	.47	.42	.56	.61	.94	.47	10.33					10.33			
8 MS	.14	.09	.09	.14	.05	.09	.65	.47	.70	.47	.14	.09	.05	.28	.05	.00	3.51						3.51		
ES	.00	.00	.00	.00	.00	.09	.14	.28	.14	.05	.05	.05	.00	.00	.14	.00	.94							.94	
																									36.00

ComEd QUAD CITIES STATION
296 ft. WIND SPEED and WIND DIRECTION

January-March 1999
296-33 ft. DIFFERENTIAL TEMPERATURE

SPEED CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.05	.00	.09	.33	.00	.00	.05	.00	.37	.09	.98	.98							
1 MU	.00	.00	.00	.00	.00	.00	.05	.00	.14	.05	.00	.00	.00	.05	.09	.05	.42		.42						
9 SU	.00	.00	.05	.00	.00	.00	.05	.05	.05	.05	.05	.00	.05	.19	.14	.05	.70			.70					
- N	.14	.23	.84	.79	.42	.89	.33	.42	.51	.23	.19	.42	1.50	2.06	1.45	.42	10.85				10.85				
2 SS	.00	.00	.19	.65	.09	.47	.23	.23	.94	.84	.56	.19	.00	.05	.09	.00	4.53					4.53			
4 MS	.00	.00	.05	.09	.00	.05	.05	.09	.00	.05	.05	.00	.00	.00	.00	.00	.42						.42		
ES	.00	.00	.00	.00	.05	.09	.09	.00	.05	.05	.00	.00	.00	.00	.00	.00	.33							.33	
																									18.23
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.23	.00	.00	.00	.00	.00	.00	.23	.23							
6 MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
T SU	.00	.00	.00	.00	.00	.00	.00	.00	.05	.05	.00	.00	.09	.09	.00	.00	.28			.28					
N	.05	.00	.00	.28	.05	.05	.00	.05	.33	.09	.05	.28	1.50	1.78	.33	.09	4.91				4.91				
2 SS	.00	.00	.05	.05	.00	.00	.00	.14	.33	.28	.00	.00	.00	.00	.00	.00	.84					.84			
4 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									6.26
TOT	3.93	4.72	7.57	8.42	6.17	5.61	6.64	5.61	6.87	5.66	3.13	4.30	9.16	11.13	7.53	3.55	100.00	3.23	3.04	6.31	49.84	26.23	7.95	3.41	100.00

Wind Direction by Stability

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-STABILITY CLASSES-
.00	.05	.05	.00	.00	.00	.28	.14	.23	.79	.14	.05	.37	.19	.75	.19	3.23	Extremely Unstable
.23	.33	.14	.05	.00	.09	.14	.05	.14	.14	.09	.09	.56	.28	.37	.33	3.04	Moderately Unstable
.42	.47	.65	.42	.23	.09	.47	.42	.09	.14	.19	.42	.65	.70	.56	.37	6.31	Slightly Unstable
1.45	2.06	4.35	4.16	3.65	2.66	2.76	2.38	1.73	1.17	.84	2.34	6.08	8.56	3.97	1.68	49.84	Neutral
1.50	1.22	1.64	2.85	1.68	1.87	1.59	1.36	3.13	2.34	1.50	1.03	1.26	.94	1.64	.70	26.23	Slightly Stable
.28	.33	.47	.79	.51	.56	1.03	.89	1.12	.61	.28	.23	.09	.47	.09	.19	7.95	Moderately Stable
.05	.28	.28	.14	.09	.33	.37	.37	.42	.47	.09	.14	.14	.00	.14	.09	3.41	Extremely Stable

Wind Direction by Wind Speed

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-WIND SPEED CLASSES-
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	C A L M
.09	.09	.05	.14	.28	.14	.19	.09	.09	.28	.14	.19	.14	.05	.14	.14	2.24	0.9 - 3.5 mph
.75	.79	.75	1.45	1.64	1.40	1.40	.84	.51	.51	.28	.75	.89	.33	.28	.65	13.23	3.6 - 7.5 mph
1.40	2.15	2.66	2.06	1.59	1.50	1.68	1.64	1.08	.89	.75	1.17	1.96	1.64	1.12	.75	24.03	7.6 - 12.5 mph
1.50	1.45	2.95	2.90	2.06	1.03	2.52	2.06	2.71	1.73	1.08	1.31	2.99	4.91	3.51	1.31	36.00	12.6 - 18.5 mph
.14	.23	1.12	1.54	.56	1.50	.84	.79	1.78	1.59	.84	.61	1.59	2.34	2.15	.61	18.23	18.6 - 24.5 mph
.05	.00	.05	.33	.05	.05	.00	.19	.70	.65	.05	.28	1.59	1.87	.33	.09	6.26	> 24.5 mph

ComEd QUAD CITIES STATION
33 ft. WIND SPEED and WIND DIRECTION

April-June 1999
196-33 ft. DIFFERENTIAL TEMPERATURE

NUMBER OF OBSERVATIONS = 2171
VALUES ARE PERCENT OCCURRENCE

SPEED	WIND DIRECTION CLASSES																STABILITY CLASSES							
CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
C SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
A N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
L SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
M MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.00
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
1 SU	.00	.00	.00	.00	.00	.09	.00	.00	.00	.00	.09	.05	.09	.00	.09	.00	.41			.41					
- N	.28	.18	.18	.28	.28	.14	.23	.09	.18	.18	.60	.37	.32	.14	.09	.00	3.55				3.55				
3 SS	.32	.32	.74	.51	1.06	.28	1.06	1.02	.46	.28	.51	.60	.51	.56	.97	.37	9.58					9.58			
MS	.75	.24	.38	.71	1.65	1.23	1.04	.61	.24	.47	.38	.14	.38	.66	.33	.47	9.67						9.67		
ES	.15	.53	.34	.78	1.80	1.21	.44	.19	.05	.05	.29	.34	.24	.34	.24	.24	7.23							7.23	
																									30.45
EU	.14	.14	.46	.32	.28	.18	.92	.46	.23	.88	.51	.32	.32	.41	.32	.14	6.03	6.03							
MU	.05	.05	.09	.23	.00	.09	.28	.28	.05	.05	.00	.14	.05	.05	.00	.00	1.38		1.38						
4 SU	.32	.05	.41	.23	.41	.28	.60	.32	.32	.64	.41	.23	.23	.23	.14	.09	4.93			4.93					
- N	.37	.41	.41	.92	1.24	1.43	1.57	1.20	.41	.78	1.43	.74	1.11	1.75	1.24	.37	15.38				15.38				
7 SS	.51	.37	.74	1.93	1.52	1.43	1.57	.74	1.01	.78	.74	.64	.97	.51	.74	.46	14.65					14.65			
MS	.00	.00	.09	.05	.14	.97	.37	.05	.00	.05	.23	.00	.00	.00	.05	.00	1.98						1.98		
ES	.00	.00	.00	.00	.05	.32	.00	.00	.00	.00	.00	.00	.00	.09	.00	.00	.46							.46	
																									44.82
EU	.18	.28	.37	.51	.14	.74	.41	.46	.18	.41	.28	.00	.09	.69	.64	.14	5.53	5.53							
MU	.00	.00	.05	.09	.09	.05	.09	.00	.00	.14	.00	.05	.05	.05	.18	.00	.83		.83						
8 SU	.09	.05	.32	.18	.05	.09	.09	.00	.00	.18	.00	.00	.14	.09	.18	.05	1.52			1.52					
- N	.28	.23	1.75	1.70	1.24	.37	.32	.14	.18	.28	1.29	.37	.69	.83	.88	.46	11.01				11.01				
1 SS	.05	.09	.32	.41	.32	.18	.23	.14	.00	.28	.28	.05	.09	.23	.23	.23	3.13					3.13			
2 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									22.02
EU	.00	.05	.05	.18	.00	.14	.05	.00	.00	.05	.00	.00	.05	.05	.05	.00	.64	.64							
1 MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.05	.00	.00	.09		.09						
3 SU	.00	.00	.00	.00	.05	.00	.05	.00	.00	.00	.05	.00	.14	.00	.00	.00	.28			.28					
- N	.00	.09	.18	.00	.09	.28	.09	.00	.00	.00	.14	.18	.14	.18	.00	.00	1.38				1.38				
1 SS	.00	.00	.00	.05	.14	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.23					.23			
8 MS	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05						.05		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									2.67

ComEd QUAD CITIES STATION
33 ft. WIND SPEED and WIND DIRECTION

April-June 1999
196-33 ft. DIFFERENTIAL TEMPERATURE

SPEED CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.05							
I MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
9 SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
- N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
2 SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
4 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.05
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
G MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
T SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
2 SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
4 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.00
TOT	3.48	3.07	6.89	9.09	10.55	9.63	9.40	5.69	3.33	5.50	7.21	4.22	5.64	6.90	6.38	3.02	100.00	12.25	2.30	7.14	31.32	27.59	11.70	7.69	100.00

Wind Direction by Stability

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-STABILITY CLASSES-
.32	.46	.88	1.01	.41	1.11	1.38	.92	.41	1.34	.78	.32	.46	1.15	1.01	.28	12.25	Extremely Unstable
.05	.05	.14	.32	.09	.14	.37	.28	.05	.18	.00	.18	.14	.14	.18	.00	2.30	Moderately Unstable
.41	.09	.74	.41	.51	.46	.74	.32	.32	.83	.55	.28	.60	.32	.41	.14	7.14	Slightly Unstable
.92	.92	2.53	2.90	2.86	2.21	2.21	1.43	.78	1.24	3.45	1.66	2.26	2.90	2.21	.83	31.32	Neutral
.88	.78	1.80	2.90	3.05	1.94	2.86	1.89	1.48	1.34	1.52	1.29	1.57	1.29	1.94	1.06	27.59	Slightly Stable
.75	.24	.47	.75	1.79	2.24	1.41	.66	.24	.52	.61	.14	.38	.66	.38	.47	11.70	Moderately Stable
.15	.53	.34	.78	1.84	1.54	.44	.19	.05	.05	.29	.34	.24	.43	.24	.24	7.69	Extremely Stable

Wind Direction by Wind Speed

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-WIND SPEED CLASSES-
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	C A L M
1.50	1.28	1.64	2.27	4.79	2.95	2.77	1.92	.93	.98	1.87	1.50	1.54	1.69	1.73	1.08	30.45	0.9 - 3.5 mph
1.38	1.01	2.21	3.68	3.64	4.70	5.30	3.04	2.03	3.18	3.32	2.07	2.67	3.04	2.49	1.06	44.82	3.6 - 7.5 mph
.60	.64	2.81	2.90	1.84	1.43	1.15	.74	.37	1.29	1.84	.46	1.06	1.89	2.12	.88	22.02	7.6 - 12.5 mph
.00	.14	.23	.23	.28	.51	.18	.00	.00	.05	.18	.18	.37	.28	.05	.00	2.67	12.6 - 18.5 mph
.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	18.6 - 24.5 mph
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	> 24.5 mph

ComEd QUAD CITIES STATION
296 ft. WIND SPEED and WIND DIRECTION

April-June 1999
296-33 ft. DIFFERENTIAL TEMPERATURE

NUMBER OF OBSERVATIONS = 2056
VALUES ARE PERCENT OCCURRENCE

SPEED	WIND DIRECTION CLASSES																	STABILITY CLASSES							
CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
C SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
A N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
L SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
M MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.00
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
1 SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.05	.00	.00	.00	.10			.10					
- N	.00	.10	.10	.05	.15	.00	.05	.05	.15	.10	.15	.05	.10	.00	.00	.05	1.07				1.07				
3 SS	.05	.00	.05	.05	.00	.05	.00	.00	.00	.05	.05	.00	.05	.00	.00	.00	.34					.34			
MS	.10	.05	.10	.00	.00	.05	.00	.00	.00	.05	.00	.10	.00	.00	.05	.05	.54						.54		
ES	.05	.10	.05	.05	.00	.10	.05	.10	.00	.05	.00	.05	.05	.00	.00	.00	.63							.63	
																									2.68
EU	.00	.05	.10	.05	.00	.00	.05	.10	.00	.05	.00	.10	.10	.05	.24	.05	.92	.92							
MU	.19	.19	.15	.10	.05	.10	.24	.10	.15	.34	.10	.05	.10	.15	.10	.00	2.09		2.09						
4 SU	.19	.00	.05	.10	.29	.19	.05	.10	.10	.34	.34	.05	.15	.15	.10	.05	2.24			2.24					
- N	.24	.10	.29	.39	.49	.29	.39	.10	.24	.49	.15	.34	.15	.05	.19	.15	4.04				4.04				
7 SS	.19	.10	.15	.19	.24	.29	.19	.10	.05	.15	.15	.29	.15	.19	.05	.39	2.87					2.87			
MS	.10	.19	.00	.10	.19	.05	.05	.24	.00	.00	.05	.10	.00	.05	.10	.19	1.41						1.41		
ES	.05	.05	.00	.05	.10	.05	.15	.00	.00	.05	.05	.00	.00	.00	.00	.15	.68							.68	
																									14.25
EU	.10	.00	.29	.39	.24	.10	.49	.19	.05	.49	.39	.05	.34	.10	.10	.19	3.50	3.50							
MU	.10	.10	.24	.19	.24	.05	.63	.49	.24	.15	.15	.15	.05	.19	.05	.00	3.02		3.02						
8 SU	.00	.10	.10	.10	.29	.05	.15	.19	.10	.19	.10	.10	.00	.10	.10	.00	1.65			1.65					
- N	.15	.49	.44	.29	.78	.92	.78	.92	.39	.29	.39	.29	.29	.68	1.02	.19	8.32				8.32				
1 SS	.34	.49	.54	.19	.63	.78	.24	1.26	.44	.49	.29	.49	.34	.15	.39	.44	7.49					7.49			
2 MS	.10	.15	.24	.19	.19	.58	.29	.88	.44	.34	.10	.10	.05	.00	.19	.24	4.09						4.09		
ES	.05	.00	.05	.00	.15	.24	.15	.19	.24	.19	.00	.05	.19	.05	.05	.00	1.61							1.61	
																									29.67
EU	.05	.15	.15	.00	.00	.15	.68	.19	.39	.58	.00	.10	.00	.15	.15	.19	2.92	2.92							
1 MU	.05	.05	.00	.10	.10	.10	.24	.19	.15	.19	.00	.10	.05	.19	.05	.00	1.56		1.56						
3 SU	.00	.00	.15	.15	.05	.15	.15	.19	.15	.29	.05	.15	.10	.00	.15	.10	1.80			1.80					
- N	.24	.44	.88	1.02	1.31	.68	.97	.73	.83	.44	.73	.73	.68	1.90	.92	.73	13.23				13.23				
1 SS	.49	.15	.24	1.46	.49	2.09	.73	1.07	1.90	.83	.54	.34	.49	.24	.34	.24	11.62					11.62			
8 MS	.00	.05	.05	.24	.00	.78	1.36	1.41	.39	.10	.24	.24	.05	.10	.00	.15	5.16						5.16		
ES	.00	.00	.10	.00	.00	.15	.15	.10	.05	.05	.10	.00	.00	.05	.05	.00	.78							.78	
																									37.06

ComEd QUAD CITIES STATION
296 ft. WIND SPEED and WIND DIRECTION

April-June 1999
296-33 ft. DIFFERENTIAL TEMPERATURE

SPEED	WIND DIRECTION CLASSES																STABILITY CLASSES							
CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	NS	ES	TOTAL
EU	.00	.00	.05	.29	.00	.15	.00	.24	.05	.15	.00	.00	.00	.24	.34	.00	1.51	1.51							
1 MU	.10	.00	.10	.10	.00	.00	.00	.15	.00	.15	.00	.00	.05	.05	.34	.00	1.02		1.02						
9 SU	.00	.00	.15	.15	.00	.00	.00	.10	.00	.19	.10	.00	.05	.05	.19	.00	.97			.97					
- N	.10	.39	1.41	1.02	.29	.49	.05	.15	.15	.39	1.02	.19	.73	.15	1.17	.39	8.07				8.07				
2 SS	.00	.00	.29	.19	.00	.34	.19	.15	.05	.19	.05	.00	.00	.00	.05	.00	1.51					1.51			
4 NS	.00	.00	.00	.00	.00	.05	.05	.05	.00	.00	.00	.00	.00	.00	.00	.00	.15						.15		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									13.23
EU	.00	.00	.00	.00	.00	.05	.00	.05	.00	.05	.00	.00	.00	.15	.05	.00	.34	.34							
G MU	.00	.00	.00	.00	.00	.05	.05	.00	.00	.10	.05	.00	.00	.00	.00	.00	.24		.24						
T SU	.00	.00	.00	.00	.00	.05	.00	.00	.05	.10	.05	.05	.00	.05	.00	.00	.34			.34					
N	.00	.05	.24	.00	.00	.19	.19	.39	.24	.15	.05	.05	.00	.24	.24	.00	2.04				2.04				
2 SS	.00	.00	.00	.00	.00	.05	.10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.15					.15			
4 NS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									3.11
TOT	3.02	3.50	6.71	7.20	6.27	9.39	8.85	10.17	6.96	7.78	5.40	4.28	4.33	5.45	6.76	3.94	100.00	9.19	7.93	7.10	36.77	23.98	11.33	3.70	100.00

Wind Direction by Stability

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-STABILITY CLASSES-
.15	.19	.58	.73	.24	.44	1.22	.78	.49	1.31	.39	.24	.44	.68	.88	.44	9.19	Extremely Unstable
.44	.34	.49	.49	.39	.29	1.17	.92	.54	.92	.29	.29	.24	.58	.54	.00	7.93	Moderately Unstable
.19	.10	.44	.49	.63	.44	.34	.58	.39	1.17	.63	.34	.34	.34	.54	.15	7.10	Slightly Unstable
.73	1.56	3.36	2.77	3.02	2.58	2.43	2.33	1.99	1.85	2.48	1.65	1.95	3.02	3.55	1.51	36.77	Neutral
1.07	.73	1.26	2.09	1.36	3.60	1.46	2.58	2.43	1.70	1.07	1.12	1.02	.58	.83	1.07	23.98	Slightly Stable
.29	.44	.39	.54	.39	1.51	1.75	2.58	.83	.49	.39	.54	.10	.15	.34	.63	11.33	Moderately Stable
.15	.15	.19	.10	.24	.54	.49	.39	.29	.34	.15	.10	.24	.10	.10	.15	3.70	Extremely Stable

Wind Direction by Wind Speed

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-WIND SPEED CLASSES-
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	C A L M
.19	.24	.29	.15	.15	.19	.10	.15	.15	.29	.19	.19	.24	.00	.05	.10	2.68	0.9 - 3.5 mph
.97	.68	.73	.97	1.36	.97	1.12	.73	.54	1.41	.83	.92	.63	.63	.78	.97	14.25	3.6 - 7.5 mph
.83	1.31	1.90	1.36	2.53	2.72	2.72	4.13	1.90	2.14	1.41	1.22	1.26	1.26	1.90	1.07	29.67	7.6 - 12.5 mph
.83	.83	1.56	2.97	1.95	4.09	4.28	3.89	3.84	2.48	1.65	1.65	1.36	2.63	1.65	1.41	37.06	12.6 - 18.5 mph
.19	.39	1.99	1.75	.29	1.02	.29	.83	.24	1.07	1.17	.19	.83	.49	2.09	.39	13.23	18.6 - 24.5 mph
.00	.05	.24	.00	.00	.39	.34	.44	.29	.39	.15	.10	.00	.44	.29	.00	3.11	> 24.5 mph

ComEd QUAD CITIES STATION
33 ft. WIND SPEED and WIND DIRECTION

July-September 1999
196-33 ft. DIFFERENTIAL TEMPERATURE

NUMBER OF OBSERVATIONS = 2204
VALUES ARE PERCENT OCCURRENCE

SPEED	WIND DIRECTION CLASSES																	STABILITY CLASSES							
CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
C SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
A N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
L SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
M MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.05	.00	.05	.05	.00	.00	.00	.00	.00	.05	.05	.05	.00	.00	.27							.27	
																									.27
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
1 SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.05	.00	.21	.00	.00	.05	.36			.36					
- N	.09	.00	.05	.14	.14	.41	.18	.18	.18	.27	.36	.68	.86	.45	.18	.14	4.31				4.31				
3 SS	.27	.05	.18	.41	.41	.50	.68	.55	.59	.64	.91	1.05	.87	1.09	.73	.50	9.44					9.44			
MS	.23	.46	.60	.42	1.34	.88	.83	1.39	1.20	.83	.65	.65	2.08	1.16	.56	.32	13.61						13.61		
ES	.00	.32	.69	.53	2.99	2.72	.96	.43	.32	.43	.75	.59	1.01	1.12	.43	.43	13.70							13.70	
																									41.42
EU	.45	.45	.23	.18	.05	.05	.27	.54	.18	1.13	.36	.45	.68	.59	.50	.54	6.67	6.67							
MU	.14	.09	.09	.14	.05	.05	.09	.36	.18	.23	.23	.41	.27	.32	.05	.14	2.81		2.81						
4 SU	.23	.36	.27	.23	.09	.14	.23	.50	.09	.73	.73	.73	.50	.36	.36	.18	5.72			5.72					
- N	1.23	.86	.68	.54	.45	.77	.36	.73	.91	1.36	1.86	1.50	1.00	.82	1.13	.68	14.88				14.88				
7 SS	1.32	.32	.82	.64	.45	.32	.59	.54	1.63	1.54	2.54	1.45	1.00	.86	2.13	2.18	18.33					18.33			
MS	.05	.00	.00	.00	.00	.05	.18	.09	.27	.36	.09	.09	.05	.09	.14	.05	1.50						1.50		
ES	.00	.00	.00	.00	.00	.00	.09	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09							.09	
																									50.00
EU	.18	.23	.09	.23	.00	.00	.05	.05	.00	.41	.32	.09	.45	.45	.14	.50	3.18	3.18							
MU	.00	.05	.09	.05	.00	.14	.00	.00	.00	.05	.05	.00	.09	.00	.05	.09	.64		.64						
8 SU	.09	.00	.00	.05	.00	.05	.00	.00	.00	.14	.09	.00	.14	.00	.00	.09	.64			.64					
- N	.54	.05	.00	.09	.00	.00	.05	.09	.09	.45	.27	.09	.41	.05	.23	.14	2.54				2.54				
1 SS	.05	.00	.00	.00	.00	.00	.05	.00	.14	.23	.50	.00	.00	.09	.05	.14	1.23					1.23			
2 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									8.21
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
1 MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.05		.05						
3 SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
- N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
1 SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.05					.05			
8 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.09

ComEd QUAD CITIES STATION
33 ft. WIND SPEED and WIND DIRECTION

July-September 1999
196-33 ft. DIFFERENTIAL TEMPERATURE

SPEED	WIND DIRECTION CLASSES																	STABILITY CLASSES							
CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
1 MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
9 SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
- N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
2 SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
4 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.00
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
G MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
T SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
2 SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
4 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.00
TOT	4.86	3.23	3.84	3.63	6.01	6.10	4.61	5.45	5.79	8.85	9.75	7.86	9.66	7.50	6.66	6.20	100.00	9.85	3.49	6.72	21.73	29.04	15.11	14.07	100.00

Wind Direction by Stability

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-STABILITY CLASSES-
.64	.68	.32	.41	.05	.05	.32	.59	.18	1.54	.68	.54	1.13	1.04	.64	1.04	9.85	Extremely Unstable
.14	.14	.18	.18	.05	.18	.09	.36	.18	.27	.27	.45	.36	.32	.09	.23	3.49	Moderately Unstable
.32	.36	.27	.27	.09	.18	.23	.50	.09	.91	.87	.73	.84	.36	.36	.32	6.72	Slightly Unstable
1.86	.91	.73	.77	.59	1.18	.59	1.00	1.18	2.09	2.50	2.27	2.27	1.32	1.54	.95	21.73	Neutral
1.63	.36	1.00	1.05	.86	.82	1.32	1.09	2.36	2.41	3.95	2.50	1.86	2.05	2.91	2.86	29.04	Slightly Stable
.28	.46	.60	.42	1.34	.93	1.01	1.48	1.48	1.20	.74	.74	2.13	1.25	.69	.37	15.11	Moderately Stable
.00	.32	.74	.53	3.03	2.76	1.05	.43	.32	.43	.75	.63	1.06	1.17	.43	.43	14.07	Extremely Stable

Wind Direction by Wind Speed

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-WIND SPEED CLASSES-
.00	.00	.05	.00	.05	.05	.00	.00	.00	.00	.00	.05	.05	.05	.00	.00	.27	C A L M
.60	.83	1.52	1.50	4.87	4.51	2.66	2.54	2.30	2.22	2.72	2.96	5.03	3.83	1.89	1.44	41.42	0.9 - 3.5 mph
3.40	2.09	2.09	1.72	1.09	1.36	1.81	2.77	3.27	5.35	5.81	4.63	3.49	3.04	4.31	3.77	50.00	3.6 - 7.5 mph
.86	.32	.18	.41	.00	.18	.14	.14	.23	1.27	1.23	.18	1.09	.59	.45	.95	8.21	7.6 - 12.5 mph
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.05	.09	12.6 - 18.5 mph
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	18.6 - 24.5 mph
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	> 24.5 mph

ComEd QUAD CITIES STATION
296 ft. WIND SPEED and WIND DIRECTION

July-September 1999
296-33 ft. DIFFERENTIAL TEMPERATURE

NUMBER OF OBSERVATIONS = 2203
VALUES ARE PERCENT OCCURRENCE

SPEED	WIND DIRECTION CLASSES																STABILITY CLASSES							
CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
C SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
A N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
L SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
M MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.00
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.05	.05	.00	.00	.14		.14						
1 SU	.00	.00	.00	.00	.00	.00	.00	.05	.00	.05	.00	.00	.05	.05	.00	.00	.18			.18					
- N	.09	.00	.00	.05	.00	.05	.14	.00	.00	.00	.00	.00	.09	.00	.18	.00	.59				.59				
3 SS	.00	.14	.05	.05	.00	.00	.05	.00	.05	.05	.00	.00	.00	.00	.00	.00	.36					.36			
MS	.00	.09	.05	.00	.05	.00	.00	.00	.14	.00	.05	.05	.05	.09	.09	.00	.64						.64		
ES	.09	.00	.00	.14	.00	.09	.00	.00	.09	.05	.00	.05	.18	.00	.05	.05	.77							.77	
																									2.68
EU	.05	.05	.05	.00	.00	.00	.00	.00	.00	.09	.05	.32	.32	.32	.18	.14	1.54	1.54							
MU	.05	.14	.09	.14	.14	.05	.00	.14	.05	.36	.50	.45	.41	.36	.18	.23	3.27		3.27						
4 SU	.05	.05	.09	.14	.23	.09	.14	.14	.14	.18	.41	.18	.27	.27	.23	.00	2.59			2.59					
- N	.14	.05	.05	.05	.27	.41	.18	.32	.32	.14	.36	.36	.32	.36	.27	.23	3.81				3.81				
7 SS	.18	.18	.14	.09	.05	.14	.09	.09	.05	.23	.32	.41	.27	.09	.32	.32	2.95					2.95			
MS	.18	.18	.14	.14	.18	.05	.00	.18	.23	.09	.05	.05	.23	.23	.23	.18	2.32						2.32		
ES	.23	.41	.00	.05	.05	.23	.27	.05	.23	.18	.18	.18	.14	.41	.14	.36	3.09							3.09	
																									19.56
EU	.45	.54	.18	.09	.00	.09	.09	.59	.23	.59	.36	.59	.32	.41	.45	.64	5.63	5.63							
MU	.32	.41	.36	.05	.05	.05	.18	.54	.18	.23	.23	.41	.23	.09	.23	.27	3.81		3.81						
8 SU	.05	.09	.23	.09	.05	.05	.05	.23	.14	.05	.14	.36	.14	.14	.09	.18	2.04			2.04					
- N	.82	.68	.36	.45	.45	.32	.32	.41	.27	.59	.73	.36	.32	.45	.36	.50	7.40				7.40				
1 SS	.59	.41	.14	.23	.27	.23	.23	.68	.54	.68	.95	.64	.77	.27	.82	.82	8.26					8.26			
2 MS	.32	.09	.18	.23	.09	.36	.50	.64	.50	.36	.54	.64	.14	.41	.41	.32	5.72						5.72		
ES	.27	.18	.14	.09	.18	.05	.68	.86	.45	.18	.45	.18	.18	.09	.09	.09	4.18							4.18	
																									37.04
EU	.05	.05	.05	.18	.00	.00	.00	.18	.27	1.00	.32	.18	.41	.36	.36	.36	3.77	3.77							
1 MU	.05	.05	.09	.09	.00	.09	.09	.09	.14	.32	.32	.05	.18	.23	.09	.18	2.04		2.04						
3 SU	.05	.09	.00	.09	.00	.05	.00	.14	.09	.23	.23	.14	.23	.05	.14	.00	1.50			1.50					
- N	1.32	.50	.41	.09	.00	.05	.27	.27	.59	.95	.54	.41	.91	.54	.77	.54	8.17				8.17				
1 SS	1.04	.50	.64	.23	.23	.18	.32	.59	1.04	2.18	1.59	1.13	.82	.50	.59	1.32	12.89					12.89			
8 MS	.27	.09	.05	.18	.00	.68	.41	.54	.86	.64	.32	.18	.18	.18	.68	.27	5.54						5.54		
ES	.05	.00	.00	.00	.00	.00	.59	.64	.18	.18	.09	.00	.00	.05	.00	.00	1.77							1.77	
																									35.68

ComEd QUAD CITIES STATION
296 ft. WIND SPEED and WIND DIRECTION

July-September 1999
296-33 ft. DIFFERENTIAL TEMPERATURE

SPEED	WIND DIRECTION CLASSES																STABILITY CLASSES							
CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.14	.05	.00	.14	.23	.00	.00	.54	.54							
1 MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.05	.00	.00	.00	.00	.00	.09		.09						
9 SU	.00	.00	.00	.00	.00	.00	.00	.00	.05	.27	.00	.00	.09	.00	.05	.00	.45			.45					
- N	.05	.00	.00	.00	.00	.00	.00	.09	.23	.45	.18	.09	.00	.23	.00	.14	1.45				1.45				
2 SS	.00	.00	.00	.00	.00	.00	.05	.18	.36	.50	.45	.00	.05	.05	.05	.09	1.77					1.77			
4 MS	.00	.00	.00	.00	.00	.05	.00	.05	.09	.00	.14	.00	.05	.05	.00	.00	.41						.41		
ES	.00	.00	.00	.00	.00	.00	.00	.09	.00	.00	.00	.00	.00	.00	.00	.00	.09							.09	
																									4.81
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
6 MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.05		.05						
T SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.05				.05				
2 SS	.00	.00	.00	.00	.00	.00	.00	.00	.14	.00	.00	.00	.00	.00	.00	.00	.14					.14			
4 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.23
TOT	6.72	4.95	3.45	2.91	2.27	3.31	4.63	7.76	7.63	11.03	9.58	7.49	7.49	6.54	7.04	7.22	100.00	11.48	9.40	6.76	21.47	26.37	14.62	9.90	100.00

Wind Direction by Stability

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-STABILITY CLASSES-
.54	.64	.27	.27	.00	.09	.09	.77	.50	1.82	.77	1.09	1.18	1.32	1.00	1.13	11.48	Extremely Unstable
.41	.59	.54	.27	.18	.18	.27	.77	.36	.95	1.09	1.00	.86	.73	.50	.68	9.40	Moderately Unstable
.14	.23	.32	.32	.27	.18	.18	.54	.41	.77	.77	.68	.77	.50	.50	.18	6.76	Slightly Unstable
2.41	1.23	.82	.64	.73	.82	.91	1.09	1.41	2.18	1.82	1.23	1.63	1.59	1.59	1.41	21.47	Neutral
1.82	1.23	.95	.59	.54	.54	.73	1.54	2.18	3.63	3.31	2.18	1.91	.91	1.77	2.54	26.37	Slightly Stable
.77	.45	.41	.54	.32	1.13	.91	1.41	1.82	1.09	1.09	.91	.64	.95	1.41	.77	14.62	Moderately Stable
.64	.59	.14	.27	.23	.36	1.54	1.63	.95	.59	.73	.41	.50	.54	.27	.50	9.90	Extremely Stable

Wind Direction by Wind Speed

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-WIND SPEED CLASSES-
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	C A L M
.18	.23	.09	.23	.05	.14	.18	.05	.27	.14	.05	.14	.41	.18	.32	.05	2.68	0.9 - 3.5 mph
.86	1.04	.54	.59	.91	.95	.68	.91	1.00	1.27	1.86	1.95	1.95	2.04	1.54	1.45	19.56	3.6 - 7.5 mph
2.81	2.41	1.59	1.23	1.09	1.13	2.04	3.95	2.32	2.68	3.40	3.18	2.09	1.86	2.45	2.81	37.04	7.6 - 12.5 mph
2.81	1.27	1.23	.86	.23	1.04	1.68	2.45	3.18	5.49	3.40	2.09	2.72	1.91	2.63	2.68	35.68	12.6 - 18.5 mph
.05	.00	.00	.00	.00	.05	.05	.41	.73	1.41	.86	.09	.32	.54	.09	.23	4.81	18.6 - 24.5 mph
.00	.00	.00	.00	.00	.00	.00	.00	.14	.05	.00	.05	.00	.00	.00	.00	.23	> 24.5 mph

ComEd QUAD CITIES STATION
33 ft. WIND SPEED and WIND DIRECTION

October-December 1999
196-33 ft. DIFFERENTIAL TEMPERATURE

NUMBER OF OBSERVATIONS = 2184
VALUES ARE PERCENT OCCURRENCE

SPEED	WIND DIRECTION CLASSES																STABILITY CLASSES							
CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
	EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
	MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
C	SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
A	N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
L	SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
M	MS	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05						.05		
	ES	.00	.00	.00	.05	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.09							.09	
																									.14
	EU	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.09	.09						
	MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.05	.00	.09		.09					
1	SU	.00	.05	.05	.05	.00	.09	.00	.00	.00	.05	.00	.05	.00	.00	.00	.00	.32			.32				
-	N	.09	.09	.37	.46	.78	.37	.18	.37	.18	.60	.42	.69	.51	.32	.32	.05	5.82				5.82			
3	SS	.19	.14	.46	.65	.51	.46	.56	.28	.23	.42	.74	.83	1.62	.60	.42	.32	8.42					8.42		
	MS	.14	.27	.37	.55	1.05	1.14	1.51	.82	.32	.37	.37	.37	.50	1.24	.46	.05	9.52						9.52	
	ES	.15	.20	.29	.34	2.24	2.00	1.51	.78	.49	.10	.05	.10	.44	1.17	.24	.29	10.39							10.39	
																									34.66
	EU	.05	.00	.05	.00	.05	.05	.09	.32	.09	.64	.23	.23	.60	.23	.23	.09	2.93	2.93						
	MU	.00	.00	.05	.00	.00	.05	.09	.09	.00	.09	.05	.05	.09	.14	.18	.05	.92		.92					
4	SU	.00	.14	.27	.23	.18	.05	.09	.05	.00	.27	.55	.14	.37	.27	.46	.14	3.21			3.21				
-	N	1.05	.78	.87	.46	.32	.41	.50	.41	.41	.69	1.05	1.05	1.97	1.33	1.33	1.05	13.69				13.69			
7	SS	.41	.09	.64	.37	.18	.60	1.56	1.42	1.60	1.51	1.56	.55	1.79	2.11	1.69	1.28	17.35					17.35		
	MS	.00	.00	.05	.18	.46	.37	.64	.46	.46	.73	.05	.05	.55	.14	.09	.14	4.35						4.35	
	ES	.00	.00	.00	.00	.27	1.14	.23	.00	.00	.00	.00	.00	.00	.23	.00	.05	1.92							1.92
																									44.37
	EU	.05	.00	.00	.00	.00	.09	.32	.27	.46	.96	.37	.18	.32	.14	.23	.50	3.89	3.89						
	MU	.05	.00	.00	.00	.00	.09	.00	.00	.05	.00	.09	.09	.09	.00	.14	.14	.73		.73					
8	SU	.18	.05	.00	.00	.00	.05	.18	.05	.09	.18	.09	.09	.18	.05	.37	.27	1.83			1.83				
-	N	.82	.55	.32	.00	.00	.09	.14	.05	.32	.32	.78	.87	2.15	1.33	.92	.60	9.25				9.25			
1	SS	.00	.00	.00	.00	.09	.14	.14	.18	.37	.69	.60	.37	.18	.78	.18	.00	3.71					3.71		
2	MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00	
	ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00
																									19.41
	EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09	.05	.00	.00	.14	.14						
1	MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.05		.05					
3	SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09	.00	.00	.00	.09			.09				
-	N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09	.46	.37	.00	.92				.92			
1	SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.23	.00	.00	.23					.23		
8	MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00	
	ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00
																									1.42

ComEd QUAD CITIES STATION
33 ft. WIND SPEED and WIND DIRECTION

October-December 1999
196-33 ft. DIFFERENTIAL TEMPERATURE

SPEED	WIND DIRECTION CLASSES																	STABILITY CLASSES							
CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
1 MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
9 SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
- N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
2 SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
4 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.00
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
6 MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
T SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
2 SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
4 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.00
TOT	3.17	2.35	3.83	3.37	6.15	7.18	7.75	5.59	5.07	7.62	6.97	5.70	11.68	10.80	7.71	5.06	100.00	7.05	1.79	5.45	29.67	29.72	13.92	12.41	100.00

Wind Direction by Stability

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-STABILITY CLASSES-
.09	.00	.09	.00	.05	.14	.41	.60	.55	1.60	.60	.41	1.01	.41	.46	.64	7.05	Extremely Unstable
.05	.00	.05	.00	.00	.14	.09	.09	.05	.09	.14	.14	.23	.14	.41	.18	1.79	Moderately Unstable
.18	.23	.32	.27	.18	.18	.27	.09	.09	.50	.64	.27	.64	.32	.82	.41	5.45	Slightly Unstable
1.97	1.42	1.56	.92	1.11	.87	.83	.83	.92	1.61	2.25	2.62	4.72	3.44	2.93	1.69	29.67	Neutral
.60	.23	1.10	1.01	.78	1.20	2.25	1.88	2.20	2.61	2.89	1.75	3.59	3.72	2.29	1.61	29.72	Slightly Stable
.14	.27	.41	.78	1.51	1.51	2.15	1.28	.78	1.10	.41	.41	1.05	1.37	.55	.18	13.92	Moderately Stable
.15	.20	.29	.39	2.52	3.15	1.74	.83	.49	.10	.05	.10	.44	1.40	.24	.34	12.41	Extremely Stable

Wind Direction by Wind Speed

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-WIND SPEED CLASSES-
.00	.00	.00	.09	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.14	C A L M
.56	.75	1.58	2.05	4.59	4.07	3.76	2.25	1.22	1.53	1.57	2.04	3.12	3.33	1.49	.75	34.66	0.9 - 3.5 mph
1.51	1.01	1.92	1.24	1.47	2.66	3.21	2.75	2.56	3.94	3.48	2.06	5.36	4.44	3.98	2.79	44.37	3.6 - 7.5 mph
1.10	.60	.32	.00	.09	.46	.78	.55	1.28	2.15	1.92	1.60	2.93	2.29	1.83	1.51	19.41	7.6 - 12.5 mph
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.27	.73	.41	.00	1.42	12.6 - 18.5 mph
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	18.6 - 24.5 mph
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	> 24.5 mph

ComEd QUAD CITIES STATION
296 ft. WIND SPEED and WIND DIRECTION

October-December 1999
296-33 ft. DIFFERENTIAL TEMPERATURE

NUMBER OF OBSERVATIONS = 2201
VALUES ARE PERCENT OCCURRENCE

SPEED	WIND DIRECTION CLASSES																	STABILITY CLASSES							
CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
C SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
A N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00				
L SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00			
M MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									.00
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
1 SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			.00					
- N	.00	.05	.05	.18	.18	.09	.18	.23	.09	.05	.18	.14	.14	.09	.27	.00	1.91				1.91				
3 SS	.05	.00	.00	.05	.14	.05	.00	.14	.18	.14	.05	.05	.00	.00	.00	.00	.82					.82			
MS	.00	.00	.05	.05	.00	.00	.05	.05	.00	.00	.00	.00	.05	.09	.00	.05	.36						.36		
ES	.09	.05	.00	.00	.05	.05	.14	.05	.00	.05	.00	.00	.09	.05	.00	.05	.64							.64	
																									3.73
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.09	.05	.00	.00	.18	.18							
MU	.05	.00	.00	.14	.00	.09	.00	.00	.00	.00	.00	.09	.09	.09	.09	.14	.77		.77						
4 SU	.09	.14	.14	.23	.09	.00	.00	.00	.00	.14	.32	.09	.27	.23	.50	.23	2.45			2.45					
- N	.23	.14	.41	.27	.45	.50	.14	.18	.14	.23	.55	.45	.64	.32	.45	.27	5.36				5.36				
7 SS	.18	.00	.00	.14	.09	.23	.18	.23	.09	.00	.18	.14	.18	.18	.14	.05	2.00					2.00			
MS	.14	.18	.14	.18	.00	.00	.09	.14	.14	.05	.05	.05	.05	.00	.05	.23	1.45						1.45		
ES	.14	.05	.09	.14	.14	.18	.14	.05	.14	.18	.09	.05	.09	.05	.05	.05	1.59							1.59	
																									13.81
EU	.00	.00	.05	.00	.00	.05	.00	.05	.00	.14	.14	.00	.45	.14	.14	.14	1.27	1.27							
MU	.05	.00	.05	.00	.00	.05	.09	.09	.05	.14	.27	.14	.18	.09	.09	.00	1.27		1.27						
8 SU	.05	.00	.05	.05	.09	.09	.05	.18	.00	.09	.14	.05	.14	.27	.09	.05	1.36			1.36					
- N	.82	.41	.36	.41	.09	.18	.32	.41	.14	.45	.91	.36	.64	.77	.86	.50	7.63				7.63				
1 SS	.32	.18	.45	.27	.32	.32	.36	.50	.36	.27	.41	.18	.45	.50	.55	.55	6.00					6.00			
2 MS	.50	.32	.32	.18	.36	.23	.09	.59	.23	.36	.27	.18	.05	.14	.27	.95	5.04						5.04		
ES	.45	.18	.05	.00	.09	.05	.18	.36	.32	.41	.36	.09	.05	.00	.05	.18	2.82							2.82	
																									25.40
EU	.05	.00	.00	.00	.00	.00	.05	.36	.32	.45	.23	.18	.09	.05	.18	.41	2.36	2.36							
1 MU	.00	.00	.00	.00	.00	.00	.14	.14	.00	.09	.27	.14	.14	.00	.18	.32	1.41		1.41						
3 SU	.09	.00	.00	.00	.00	.09	.05	.05	.09	.14	.23	.14	.18	.18	.18	.41	1.82			1.82					
- N	1.04	.91	.45	.32	.00	.00	.18	.18	.59	.45	.45	.68	1.18	1.09	1.54	1.18	10.27				10.27				
1 SS	.55	.32	.23	.23	.18	.27	.86	1.23	1.68	1.09	1.54	.27	.36	1.41	1.64	1.36	13.22					13.22			
8 MS	.32	.09	.18	.00	.27	.23	.73	1.00	1.27	1.14	.09	.05	.18	.14	.50	.18	6.36						6.36		
ES	.18	.05	.00	.00	.00	.05	.18	.45	.45	1.09	.32	.05	.00	.00	.00	.00	2.82							2.82	
																									38.26

ComEd QUAD CITIES STATION
296 ft. WIND SPEED and WIND DIRECTION

October-December 1999
296-33 ft. DIFFERENTIAL TEMPERATURE

SPEED	WIND DIRECTION CLASSES																STABILITY CLASSES							
CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.14	.00	.18	.41	.00	.00	.00	.00	.05	.00	.77	.77							
1 MU	.00	.00	.00	.00	.00	.00	.00	.00	.09	.18	.09	.00	.14	.00	.05	.00	.55		.55						
9 SU	.05	.00	.00	.00	.00	.00	.05	.09	.18	.18	.00	.05	.09	.00	.27	.14	1.09			1.09					
- N	.09	.14	.05	.00	.00	.00	.14	.14	.50	1.00	.41	.50	.95	1.18	.68	.23	6.00				6.00				
2 SS	.05	.00	.05	.05	.05	.14	.14	.45	1.54	1.32	1.09	.18	.27	.09	.32	.09	5.82					5.82			
4 MS	.00	.00	.00	.00	.00	.14	.23	.05	.09	.18	.05	.00	.05	.05	.05	.00	.86						.86		
ES	.05	.00	.00	.00	.00	.05	.05	.09	.00	.00	.00	.00	.00	.00	.00	.00	.23							.23	
																									15.31
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
G MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.09	.00	.14		.14						
T SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.18	.00	.05	.00	.23			.23					
N	.00	.00	.00	.00	.00	.00	.00	.09	.09	.09	.09	.09	.32	.50	1.09	.00	2.36				2.36				
2 SS	.00	.00	.00	.00	.00	.00	.05	.05	.27	.09	.09	.09	.05	.09	.00	.00	.77					.77			
4 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00						.00		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00	
																									3.50
TOT	5.59	3.18	3.13	2.86	2.59	3.09	4.95	7.59	9.22	10.59	8.86	4.50	7.86	7.81	10.45	7.72	100.00	4.59	4.13	6.95	33.53	28.62	14.08	8.09	100.00

Wind Direction by Stability

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-STABILITY CLASSES-
.05	.00	.05	.00	.00	.05	.18	.41	.50	1.00	.36	.23	.64	.23	.36	.55	4.59	Extremely Unstable
.09	.00	.05	.14	.00	.14	.23	.23	.14	.41	.64	.36	.59	.18	.50	.45	4.13	Moderately Unstable
.27	.14	.18	.27	.18	.18	.14	.32	.27	.55	.68	.32	.86	.68	1.09	.82	6.95	Slightly Unstable
2.18	1.64	1.32	1.18	.73	.77	.95	1.23	1.54	2.27	2.59	2.23	3.86	3.95	4.91	2.18	33.53	Neutral
1.14	.50	.73	.73	.77	1.00	1.59	2.59	4.13	2.91	3.36	.91	1.32	2.27	2.64	2.04	28.62	Slightly Stable
.95	.59	.68	.41	.64	.59	1.18	1.82	1.73	1.73	.45	.27	.36	.41	.86	1.41	14.08	Moderately Stable
.91	.32	.14	.14	.27	.36	.68	1.00	.91	1.73	.77	.18	.23	.09	.09	.27	8.09	Extremely Stable

Wind Direction by Wind Speed

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-WIND SPEED CLASSES-
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	C A L M
.14	.09	.09	.27	.36	.18	.36	.45	.27	.23	.23	.18	.27	.23	.27	.09	3.73	0.9 - 3.5 mph
.82	.50	.77	1.09	.77	1.00	.55	.59	.50	.59	1.18	.91	1.41	.91	1.27	.95	13.81	3.6 - 7.5 mph
2.18	1.09	1.32	.91	.95	.95	1.09	2.18	1.09	1.86	2.50	1.00	1.95	1.91	2.04	2.36	25.40	7.6 - 12.5 mph
2.23	1.36	.86	.55	.45	.64	2.18	3.41	4.41	4.45	3.13	1.50	2.14	2.86	4.23	3.86	38.26	12.6 - 18.5 mph
.23	.14	.09	.05	.05	.32	.73	.82	2.59	3.27	1.64	.73	1.50	1.32	1.41	.45	15.31	18.6 - 24.5 mph
.00	.00	.00	.00	.00	.00	.05	.14	.36	.18	.18	.18	.59	.59	1.23	.00	3.50	> 24.5 mph

Attachment D
Solid Waste Disposition Summary
SVP-00-018

Solid Radwaste Annual Quantities for NRC Reg. Guide 1.21 Report

*** Solid Waste Disposition Summary ***
During Period From 01/01/99 through 12/31/99

(1) Annual total quantity of solid radwaste - 5.14E+02 cubic meters

Annual total radioactivity of solid waste - 2.44E+04 Ci

(2) Obtain an estimate of major radionuclide composition of solid waste:

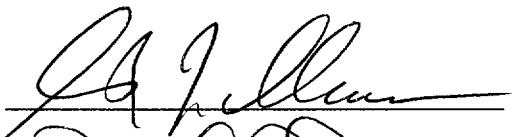
Mn-54	5.59E+05 mCi
Fe-55	1.26E+07 mCi
Ni-59	4.29E+03 mCi
Fe-59	5.26E+03 mCi
Co-60	1.02E+07 mCi
Ni-63	8.76E+05 mCi
Cs-137	2.73E+04 mCi

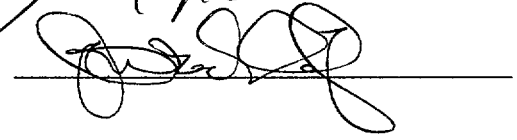
(3) Disposition of solid waste shipments

a) Shipments to Barnwell SC - 4
b) Shipments to Memphis TN - 2
c) Shipments to Oak Ridge TN - 13
d) Shipments to Richland WA - 12

(4) Disposition of irradiated fuel shipments

None

Submitted By: 

Reviewed By: 

Attachment E
RW-AA-10, Revision 1, Process Control Program for Radioactive Wastes, Quad Cities Nuclear Power Station
SVP-00-018

PROCESS CONTROL PROGRAM FOR RADIOACTIVE WASTES

1. PURPOSE

1.1. The purpose of the Process Control Program (PCP) is to establish the process parameters which will provide a reasonable assurance all Low Level Radioactive Wastes (LLRW) processed by the in-plant waste process systems, or vendor supplied waste process systems, or off-site vendor processing are used as applicable to meet or exceed any and all acceptance criteria for processing, packaging, on-site storage, shipment or disposal at a Licensed Burial Facility as required by Technical Specifications.

1.2. The PCP delineates the limitations on the process to the extent necessary to:

1.2.1. Provide reasonable assurance to a reviewer that the process will be operated as necessary to meet the technical requirements, and provide an inspector an appropriate basis for assessing the adequacy of the procedures, even though the inspector may not be a qualified Radwaste specialist.

1.2.2. The criteria for the ComEd NGG PCP include all NRC, Department of Transportation (DOT), State, and Licensed Burial Facility's rules and regulations for the processing, packaging, on-site storage, and shipping of Low level radioactive waste.

2. TERMS AND DEFINITIONS

2.1. **Process Control Program** (PCP): The program which contains the current formulas, sampling, analysis, tests and determination 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 compliance with 10CFR Parts 20,61 and 71, state regulations, burial ground requirements, and other requirements governing the disposal of solid radioactive waste.

2.2. **Solidification:** Liquid waste processed to form either a stable or unstable freestanding monolith.

2.2.1. Currently all solidification is performed by vendors. The vendor process control procedures contain the formulas, sampling, analysis, test and documentation required to be made to ensure that processing and packaging of waste is accomplished to assure compliance with the required regulations.

2.3. **Dewatering:** The removal of liquids from liquid waste streams to produce a waste form that meets the requirements of 10CFR Part 61 and applicable burial site criteria.

2.4. **High Integrity Container:** (HIC): A disposable container which can be utilized to package dewatered liquid wastes, filter cartridges or dry active waste requiring stability for disposal. The use of HICs is an alternative to solidification or encapsulation for burial stability.

2.5. **Encapsulation:** The process of placing 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.

2.6. **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.)

2.7. **Waste Streams:**

2.7.1. Filter media (powdered, bead resin and fiber), filter cartridges, pre-coat body feed material, and contaminated charcoal. Fuel pool activated hardware, sump sludge's, tank residue, high activity filter cartridges, concentrated liquids, contaminated waste oil, dried sewage or wastewater treatment plant waste, and other waste from cleanup of inadvertent contamination's.

2.7.2. Dry Active Waste (DAW): Waste such as 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.

3. **RESPONSIBILITIES** – None.

4. **MAIN BODY**

4.1. Changes to Radioactive Waste Treatment Systems may be made provided that the change is reported in the Annual Operating Report for the period in which the evaluation was reviewed by the Plant Operations Review Committee (PORC).

4.2. Changes to the PCP shall be documented and records of reviews performed shall be retained for the duration of the unit-operating license. This documentation shall contain:

4.2.1. Sufficient information to support the change together with the appropriate analyses or evaluations justifying the change.

4.2.2. A determination that the change will maintain the overall conformance of the solidified waste product to existing requirements of Federal, State, or other applicable regulations.

4.3. The changes shall become effective upon review and acceptance by the PORC.

4.4. The changes may be made by submitting this information as part of the semiannual or annual radioactive effluent release report, NUREG 1301.

4.5. Waste sent directly to burial will comply with the following10CFR criteria through the Chemical Control Program, procedures and/or processing.

4.5.1. No waste sent to burial may be packaged in a cardboard or fiberboard box.

4.5.2. Liquid waste must be solidified, dried or processed to a solid form.

1. Waste containers shall be controlled to contain <1% free standing liquid when stability is provided by the container or <0.5% when stability is provided by the waste form.

2. Waste will not be capable of detonation or explosive decomposition/reaction.

3. Non-gaseous waste will be controlled such that no waste container contains or is capable of generating toxic gases, vapors or fumes harmful to people.

4. Waste will be non flammable.

5. Gaseous waste will not exceed 1.5 atmosphere pressure at 20 degrees centigrade or 100 Curies per container.

6. Waste containing hazardous, biological, pathogenic, or infectious material will be treated using vendor processes to reduce the potential hazard from non-radiological materials.

4.6. All shipping containers will be inspected for compliance with DOT, station, on-site storage, and/or burial site requirements prior to and during use per the following:

4.6.1. When applicable, containers of concentrated waste, spent resin and sludge's will be inspected for quality of solidification and/or dewatering requirements.

4.6.2. Adherence to the station/burial site dewatering requirements.

4.6.3. If free standing water or poor solidification is observed, **then** samples of the particular series of batches will be taken for root cause determination.

4.6.4. Additional samples will be taken, as warranted, to ensure freestanding water and solidification requirements are maintained.

4.6.5. Process parameters in use during the production of these containers will be investigated and corrective actions taken as warranted.

4.7. All wastes shipped off site will be packaged in DOT approved shipping containers per the following:

4.7.1. All transport vehicles must meet the appropriate DOT and NRC requirements prior to shipping.

4.7.2. Packages will be inspected and shipments (vehicles) will be inspected for compliance with DOT, and NRC regulations prior to leaving the site.

4.7.3. Shipments that are being sent to an burial will be inspected to ensure that the burial site criterion is adhered to.

4.7.4. Shipments that are being sent to off site processor will be inspected to ensure that the vendor waste acceptance criteria and license is adhered to.

4.8. On-site vendors will be required to meet the following:

4.8.1. All the on-site vendor procedures require onsite review prior to initial implementation.

4.8.2. **If** onsite vendor does solidification/stabilization, **then** the licensed burial sites must approve encapsulation media.

4.8.3. **If** a burial site is not open, **then** the ComEd Radwaste Management Department must approve the solidification media.

4.8.4. **If** liquids are to be solidified for stability **then** ComEd requires that all vendors used to process liquid LLRW at NGG **or** at a vendor off-site liquid LLRW processing facility must meet all applicable ComEd augmented quality standards and shall have submitted a Process System Topical Report to the NRC.

4.9. Vendor Process System(s) are controlled per the following:

4.9.1. ComEd NGG may use commercial, vendor supplied, processing systems for the processing of the primary LLRW streams generated by the station for disposal.

4.9.2. All vendors used to process liquid LLRW at ComEd NGG must meet applicable Commonwealth Edison Co. Augmented Quality Standards and shall be approved by the ComEd Radwaste Management Department.

4.9.3. Vendor procedures and procedure changes shall be reviewed and approved per NGG procedure, Review and Approval process of Non-Station Work Group Procedures.

4.10. Vendor's Process System(s) operations at ComEd NGG will be performed and controlled in accordance with vendor approved procedures.

4.11. Liquid Radwaste processing will consist of the following types of processing:

4.11.1. De-watering,

4.11.2. Solidification,

4.11.3. Vendor supplied filter/process system,

4.11.4. Evaporation or filtration process to treat the following waste streams:

1. Spent resin,
2. Concentrated liquids,
3. Sludge's,
4. Filter media,
5. Filter cartridges,
6. Contaminated Oil.

4.12. Spent resin may originate from any one of the following systems:

4.12.1. Condensate/Blowdown.

4.12.2. Fuel Pool.

4.12.3. Reactor Water Clean Up, Chemical and Volume Control System, Boric Acid Recycling System.

4.12.4. Floor Drain Processing Systems.

4.12.5. Equipment Drain Processing Systems.

4.12.6. Vendor Liquid Radwaste Processing Systems.

4.13. Resins will be allowed to settle in the Spent Resin Tank or directly discharged to the Vendor Processing System via resin water slurry or vacuumed out of the resin vessel into approved containers.

4.14. Vendor resin beds may be used for decontamination of plant systems such as the Spent Fuel Pool, RWCU (reactor water cleanup), and SDC (Shut Down Cooling). These resins are then handled by the Vendor Processing System.

4.15. Various drains and sump discharges will be collected in tanks for treatment.

4.15.1. Water from these tanks can be sent through a filter or demineralizer or a concentrator or vendor supplied processing systems.

4.15.2. Process waste will be periodically discharged to the vendor processing system for onsite waste treatment or packaged in containers for shipment to offsite vendor for volume reduction processing.

4.15.3. Process water may be sent to the waste process systems for further filtration, demineralization for plant re-use or discharged.

4.16. All de-watering and solidification/stabilization will be performed by NGG, on-site vendors or at a vendor off-site liquid LLRW processing facility.

The Process Control Procedures contain the formulas, sampling, analysis, tests and determinations required to ensure that processing and packaging of waste is accomplished assuring compliance with the required regulations, current operating burial site license and burial site criteria. Vendors' procedures are reviewed and approved per the station's Non-Station Work Group Procedures meeting the requirements of the ComEd Quality Assurance Program - Topical Report (Quality Assurance Manual). The Vendor Process Control program must be in accordance with and approved by the Office of Nuclear Material Safety and Safeguards (NMSS) topical reports.

4.17. Dry Active Waste (DAW) will be handled and processed per the following:

4.17.1. DAW will be collected and surveyed and may be sorted for compactible and non-compactible wastes.

4.17.2. DAW may be packaged in containers to facilitate on-site pre-compaction and/or off-site super-compaction, incineration, or offsite volume reduction processes.

4.17.3. DAW items may be surveyed for release onsite or offsite when applicable.

4.18. Contaminated filter cartridges will be placed into a High Integrity Container(s) (HIC) or will be encapsulated in an In-situ liner for disposal or shipped to an off site waste processor in drums, boxes or steel liners per the vendor site criteria for processing and disposal.

4.19. Filtering devices using pre-coat media may be used at ComEd NGG in a variety of Process streams as follows:

4.19.1. These devices are used primarily for the removal of suspended solids from the liquid waste streams.

4.19.2. The pre-coat material from these devices may be routinely removed from the filter vessel and discharged to a Filter Sludge Tank or Liner/HIC.

4.19.3. 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.

4.20. Activated hardware stored in the Spent Fuel Pools will be handled as follows:

4.20.1. These items may be processed periodically using remote underwater handling equipment.

4.20.2. The waste may then be put into a container for shipment and/or storage.

4.21. 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.

4.22. Vendors who supply HIC's to the station must provide a handling procedure, which provides 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.

4.23. All waste streams processed for burial or long term on-site storage shall be classified and meet the waste characteristics as required by 10CFR Part 61.55, Part 61.56, currently operating burial site license and burial site criteria.

4.24. Lubricants and oils contaminated as a consequence of normal operating and maintenance activities will be processed for treatment on an as needed basis using a vendor or sent to an off site processor.

4.25. All references to use of the GE or Stock in-plant Solidification System for waste processing have been deleted from the PCP, except for the use of the drum transfer cart and drum storage lines, which may be used for higher dose DAW storage at Quad Cities, Braidwood and Byron and the use of the Decanting Tank at LaSalle station. The use of contract vendor services proved to be cost effective over use of the GE or Stock in-plant cement system and additionally provided means for reduced personnel radiation expose during waste processing and waste container handling.

4.26. The Station procedures for processing, radiological controls, waste classification, manifesting and shipping are contained in the following series of procedures:

4.26.1. (BYRON) BOP WX-103 series, Radwaste Operating Procedures.

4.26.2. (BYRON) BRP 5600 series, Radiation Protection Procedures.

4.26.3. (Braidwood) BwOP WX-103 series, Radwaste Operating Procedures.

4.26.4. (Braidwood) BwRP 5600 series, Radiation Protection Procedures.

4.26.5. (LaSalle) LAP-100-16, Radioactive Waste/Material Shipment.

4.26.6. (LaSalle) LAP-100-27, Guidelines for Radioactive Waste/Material Shipments.

4.26.7. (LaSalle) LAP-900-25, Solid Radioactive Waste (DAW) Volume Reduction Program.

4.26.8. (LaSalle) LAP-1600-12, Waste Oil Program.

4.26.9. (LaSalle) LAP- 1700-14,Radioactive Waste Shipment Inspection and Documentation.

4.26.10. (LaSalle) LRP series, Radiation Protection Procedures.

4.26.11. (Dresden) DOP 2000 series, Radwaste Operating Procedures.

4.26.12. (Dresden) DRP 5600 series, Radiation Protection Procedures.

4.26.13. (Quad Cities) QOP and QCOP 2000 series, Radwaste Operating Procedures.

4.26.14. (Quad Cities) QCRP 5600 series, Radiation Protection Procedures.

5. **DOCUMENTATION** - None

6. **REFERENCES**

6.1. Technical Specifications(Braidwood & Byron):

6.1.1. ITS 5.6.3 Radioactive Effluent Release Report.

6.1.2. (Byron) ITS TRM 3.11.j Solid Radioactive Waste System.

6.1.3. (Braidwood) ITS TRM 5.2.a Process Control Program.

6.2. Technical Specifications(Dresden & Quad Cities):

6.2.1. TS Section 1.0, Definitions.

6.2.2. TS Section 6.8.A.5, Procedures and Programs.

6.2.3. TS Section 6.9.A.4, Radioactive Effluent Release Report.

6.2.4. TS Section 6.13, Process Control Program.

6.3. Technical Specifications(LaSalle):

6.3.1. TS Section 1.33, Process Control Program.

6.3.2. TS Section 6.6.A.4, Radioactive Effluent Release Report

6.3.3. TS Section 6.2.A.e, Procedures and Programs.

6.3.4. TS Section 6.7.1, Process Control Program.

6.3.5. Offsite dose calculation manual (ODCM) (LaSalle), section 12.62.

6.4. Commitments – None.

7. ATTACHMENTS

7.1. Attachment A, Lasalle County Station Solid Radioactive Waste System Limiting Condition For Operation.

7.2. Attachment B, LaSalle County Station Surveillance Program.

Attachment A

LaSalle County Station Solid

Radioactive Waste System

Limiting Condition for Operation

The Solid Radwaste System shall be operable and used, for the solidification and packaging of radioactive wastes to ensure meeting the requirements of 10 CFR Part 20 and 10 CFR Part 71 prior to shipment of radioactive wastes from the site.

Applicability

At all times

Actions

1. With the packaging requirements of 10 CFR Part 20 and/or 10 CFR Part 71 not satisfied, suspend shipments of defectively packaged solid radioactive wastes from the site.

2. With the solid Radwaste Handling System inoperable for more than 31 days, in lieu of any other report required by Technical Specifications 6.6 A. Prepare and submit to the commission within 30 days, pursuant to Technical Specifications 6.6 C., a special report which includes the following information:

   A. Identification of the inoperable equipment or subsystems and the reason inoperable,

   B. action(s) taken to restore the inoperable equipment to operable status,

   C. a description of the alternative used for solidification and packaging of radioactive wastes, and

   D. summary description of actions(s) taken to prevent a recurrence.

3. The provisions of Technical Specifications 3.03 and 3.04 are not applicable.

Attachment B

LaSalle County Station

Surveillance Requirements

1. The Solid Radwaste Handling System shall be demonstrated operable at least once per 92 days by:

   A. Operating the solid Radwaste system at least once in the previous 92 days in accordance with the Process Control Program, or

   B. verification of the existence of a valid contract for solidification to be performed by a contractor in accordance with a Process Control Program.

2. The Process Control Program shall be used to verify the solidification of at least one representative test specimen from at least every tenth batch of each type of wet radioactive waste (e.g., filter sludge's, RWCU phase separators powdered resins, spent resins, and evaporator bottoms.

   A. **If** any specimen fails to verify solidification, **then** the solidification of the batch under test shall be suspended until such time as additional test specimens can be obtained, alternative solidification parameters can be determined in accordance with the lab test solidification and the PCP, and a subsequent test verifies solidification. Solidification of the batch may then be resumed using the alternative solidification parameters determined by the Lab Test Solidification Procedure.

   B. **If** the additional test specimen from a batch of waste fails to verify solidification, **then** the PCP shall provide for the collection and testing of representative test specimens from each consecutive batch of the same type of wet waste until at least 3 consecutive initial test specimens demonstrate solidification. The Process Control Program shall be modified as required, as provided in Technical Specifications 6.7, to assure solidification of subsequent batches of waste.