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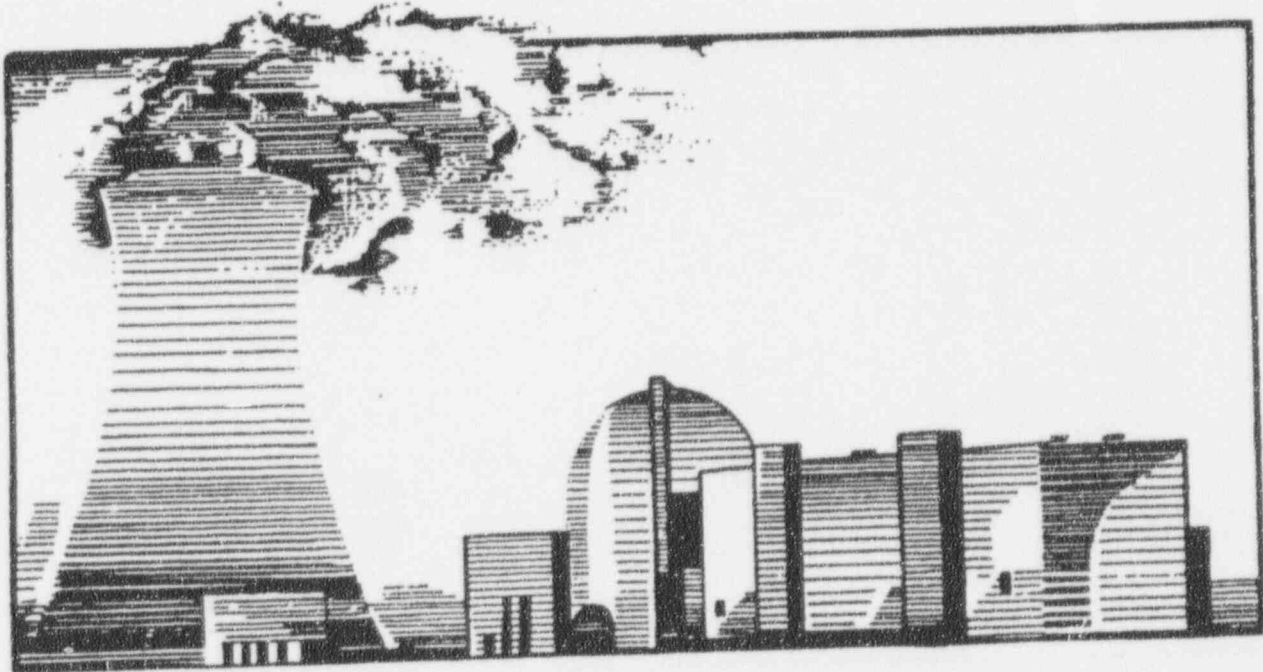
## CALLAWAY PLANT

# SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

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JULY — DECEMBER 1993 (ADDENDUM)



SEMIANNUAL RADIOACTIVE EFFLUENT  
RELEASE REPORT

CALLAWAY PLANT

UNION ELECTRIC COMPANY

LICENSE NPF - 30

JULY - DECEMBER 1993 (ADDENDUM)



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## 1.0 INTRODUCTION

This addendum report to the Semiannual Radioactive Release Report is submitted in accordance with Section 6.9.1.7 of the Callaway Plant Technical Specifications.

This addendum report contains fourth quarter composite analyses results, meteorological data and doses to the public from gaseous effluents not available at the time of initial submittal. A summary description of the information provided in this addendum report is provided below

Table 1A      The changes to this table are due to the corrections made in Table 1B.

Table 1B      This table includes fourth quarter quarterly composite analysis results that were not available from the offsite contractor for the original report.

The iodine activities for several release permits were corrected after the original submittal date.

Table 2A      Changes in this table were the result of incorporating the quarterly composite analysis results into Table 2B.

Table 2B      This table was revised to incorporate results of quarterly composite sample analysis that were not available from the offsite contractor for the initial submittal.

Table 4, 5, 6, and 7      This data was not included in the original submittal due to the ongoing verification and validation of the new meteorological programs at the time of the original submittal.

Table 8      The dose reported in this table changed due to the change in activity reported in Table 2B.

It should be noted that the revised data did not result in significant changes in the assessed offsite doses. All effluent discharges during the reporting period were verified to be in compliance with federal regulations and the limits of Union Electric Administrative Procedure, APA-ZZ-01003, Offsite Dose Calculation Manual (ODCM).

TABLE 1A

SEMIANNUAL SUMMATION OF GASEOUS RELEASES  
ALL AIRBORNE EFFLUENTS

QUARTERS 3 AND 4, 1993

TYPE OF EFFLUENT	UNITS	THIRD QUARTER	FOURTH QUARTER	EST TOTAL ERROR % (a)
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## A. FISSION AND ACTIVATION GASES

1. TOTAL RELEASE	CURIES	1.42E+02	3.98E+02	20
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/SEC	1.78E+01	5.01E+01	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	

## B. RADIOIODINES

1. TOTAL IODINE-131	CURIES	4.19E-04	5.92E-04	23
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/SEC	5.28E-05	7.45E-05	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	

## C. PARTICULATES

1. PARTICULATE (HALF-LIVES > 8 DAYS)	CURIES	1.27E-07	4.07E-06	30
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/SEC	1.60E-08	5.12E-07	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	
4. GROSS ALPHA RADIOACTIVITY	CURIES	2.93E-07	4.52E-07	

## D. TRITIUM

1. TOTAL RELEASE	CURIES	1.72E+01	3.74E+01	14
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/SEC	2.16E+00	4.71E+00	
3. PERCENT OF TECH SPEC LIMIT	%	N/A	N/A	

(a) Safety Analysis Calculation 87-063-00, January 6, 1988

TABLE 1B

SEMIANNUAL AIRBORNE CONTINUOUS AND BATCH RELEASES  
GROUND LEVEL RELEASES  
FISSION GASES, IODINES, AND PARTICULATES

QUARTERS 3 AND 4, 1993

NUCLIDE	UNITS	CONTINUOUS RELEASES		BATCH RELEASES	
		THIRD QUARTER	FOURTH QUARTER	THIRD QUARTER	FOURTH QUARTER

## 1. FISSION GASES

XE-133	CURIES	1.99E+02	7.07E+02	6.04E+01	6.64E+01
XE-135	CURIES	1.31E+01	1.24E-01	2.83E-01	3.82E-01
AR-41	CURIES	0.00E+00	0.00E+00	3.15E-01	5.87E-01
XE-131M	CURIES	0.00E+00	1.20E+01	1.18E+00	1.46E+00
XE-133M	CURIES	0.00E+00	8.04E+00	3.60E-01	4.58E-01
KR-85	CURIES	0.00E+00	0.00E+00	7.10E+00	0.00E+00
KR-85M	CURIES	6.22E-01	0.00E+00	3.59E-03	0.00E+00
KR-88	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
XE-135M	CURIES	7.78E-01	0.00E+00	0.00E+00	0.00E+00
TOTAL FOR PERIOD	CURIES	2.14E+02	7.27E+02	6.96E+01	6.93E+01

## 2. IODINES

I-131	CURIES	4.19E-04	5.14E-04	2.79E-07	7.83E-05
I-133	CURIES	6.36E-04	2.12E-05	4.31E-07	0.00E+00
BR-82	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
I-132	CURIES	4.09E-05	4.13E-04	4.04E-08	0.00E+00
I-135	CURIES	1.09E-04	0.00E+00	0.00E+00	0.00E+00
TOTAL FOR PERIOD	CURIES	1.20E-03	9.48E-04	7.51E-07	7.83E-05

## 3. PARTICULATES

RB-88	CURIES	0.00E+00	0.00E+00	2.54E-07	0.00E+00
CS-138	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CO-58	CURIES	0.00E+00	6.30E-06	0.00E+00	0.00E+00
CO-60	CURIES	0.00E+00	3.19E-07	0.00E+00	0.00E+00
CR-51	CURIES	0.00E+00	1.25E-06	0.00E+00	0.00E+00
NB-95	CURIES	0.00E+00	2.72E-07	0.00E+00	0.00E+00
ALPHA	CURIES	5.83E-07	9.03E-07	2.98E-09	1.00E-10
TOTAL FOR PERIOD	CURIES	5.83E-07	9.04E-06	2.57E-07	1.00E-10

## 4. TRITIUM

H-3	CURIES	3.27E+01	7.26E+01	1.66E+00	2.18E+00
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TABLE 2A

SEMIANNUAL SUMMATION OF LIQUID RELEASES  
ALL LIQUID EFFLUENTS

QUARTERS 3 AND 4, 1993

TYPE OF EFFLUENT	UNITS	THIRD QUARTER	FOURTH QUARTER	EST TOTAL ERROR % (a)
<b>A. FISSION AND ACTIVATION PRODUCTS</b>				
1. TOTAL RELEASE [NOT INCLUDING TRITIUM, GASES, ALPHA]	CURIES	1.43E-03	2.70E-03	20
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	2.31E-09	6.04E-09	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
<b>B. TRITIUM</b>				
1. TOTAL RELEASE	CURIES	4.16E+02	1.12E+02	14
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	6.73E-04	2.51E-04	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
<b>C. DISSOLVED AND ENTRAINED GASES</b>				
1. TOTAL RELEASE	CURIES	7.88E-01	3.01E-02	27
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	1.28E-06	6.73E-08	
<b>D. GROSS ALPHA RADIOACTIVITY</b>				
1. TOTAL RELEASE	CURIES	0.00E+00	1.78E-03	29
<b>E. WASTE VOLUME RELEASED (PRE-DILUTION)</b>				
	GAL	6.69E+06	5.12E+06	10
<b>F. VOLUME OF DILUTION WATER USED</b>				
	GAL	1.56E+08	1.13E+08	10

(a) Safety Analysis Calculation 87-063-00, January 6, 1988



TABLE 2B

SEMIANNUAL LIQUID CONTINUOUS AND BATCH RELEASES  
TOTALS FOR EACH NUCLIDE RELEASED

QUARTERS 3 AND 4, 1993

NUCLIDE	UNITS	CONTINUOUS RELEASES		BATCH RELEASES	
		THIRD QUARTER	FOURTH QUARTER	THIRD QUARTER	FOURTH QUARTER
1. ALL NUCLIDES					
ALPHA	CURIES	0.00E+00	0.00E+00	0.00E+00	3.54E-03
CO-60	CURIES	0.00E+00	0.00E+00	1.83E-03	1.85E-03
H-3	CURIES	0.00E+00	0.00E+00	8.31E+02	2.25E+02
XE-133	CURIES	0.00E+00	0.00E+00	1.54E+00	5.88E-02
CO-58	CURIES	0.00E+00	0.00E+00	2.18E-05	1.84E-03
CS-134	CURIES	0.00E+00	0.00E+00	3.49E-04	3.17E-04
CS-137	CURIES	0.00E+00	0.00E+00	4.87E-04	2.51E-04
XE-133M	CURIES	0.00E+00	0.00E+00	1.92E-02	2.82E-04
MN-54	CURIES	0.00E+00	0.00E+00	1.19E-04	1.81E-04
CE-141	CURIES	0.00E+00	0.00E+00	0.00E+00	6.68E-06
SB-125	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CE-144	CURIES	0.00E+00	0.00E+00	0.00E+00	1.01E-04
XE-135	CURIES	0.00E+00	0.00E+00	7.46E-03	0.00E+00
FE-55	CURIES	0.00E+00	0.00E+00	1.03E-02	4.34E-03
XE-131M	CURIES	0.00E+00	0.00E+00	9.85E-03	1.06E-03
I-131	CURIES	0.00E+00	0.00E+00	4.76E-05	6.99E-05
SB-124	CURIES	0.00E+00	0.00E+00	0.00E+00	7.22E-08
TC-99M	CURIES	0.00E+00	0.00E+00	4.25E-06	0.00E+00
SR-89	CURIES	0.00E+00	0.00E+00	8.65E-03	9.11E-03
SR-90	CURIES	0.00E+00	0.00E+00	5.60E-04	5.46E-04
CO-57	CURIES	0.00E+00	0.00E+00	0.00E+00	5.56E-06
XE-127	CURIES	0.00E+00	0.00E+00	0.00E+00	9.08E-06
FE-59	CURIES	0.00E+00	0.00E+00	0.00E+00	2.88E-05
NB-95	CURIES	0.00E+00	0.00E+00	0.00E+00	3.96E-04
ZR-95	CURIES	0.00E+00	0.00E+00	0.00E+00	2.69E-04
ZN-65	CURIES	0.00E+00	0.00E+00	0.00E+00	9.23E-05
CD-109	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BA-133M	CURIES	0.00E+00	0.00E+00	0.00E+00	1.82E-07
CR-51	CURIES	0.00E+00	0.00E+00	0.00E+00	3.18E-05
TOTALS FOR PERIOD	CURIES	0.00E+00	0.00E+00	8.33E+02	2.25E+02

TABLE 4

CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS  
1993

Union Electric - Callaway Plant

Report Date/Time: 20-APR-1994 13:20:16.21

Meteorological Data  
Averages Using Hourly Averaged Data

1-JAN-1993 00:00:00.00 to 31-DEC-1993 23:00:00.00

		UNITS	VALUES	% GOOD DATA
Stability Class		A-G	E	97%
Total Precipitation		CM.	3.40E+02	100%
10 Meter Level:	Wind Speed	Meter/Sec	2.85E+00	90%
	Wind Direction	Degrees	2.10E+02	82%
	Wind Direction Variability	Degrees	1.12E+01	98%
	Reference Temperature	Degrees C	1.11E+01	96%
	Dewpoint	DegreesC	2.71E+00	97%
60 Meter Level:	Wind Speed	Meter/Sec	4.78E+00	98%
	Wind Direction	Degrees	2.12E+02	97%
	Wind Direction Variability	Degrees	7.93E+00	99%
	Dewpoint	Degrees C	NONE	0%
	Temperature Difference 60 - 10	Degrees C	5.98E-01	97%

TABLE 4 (Cont.)

CUMULATIVE JOINT FREQUENCY DISTRIBUTION  
1993

Union Electric - Callaway Plant

Report Date/Time: 20-APR-1994 13:20:36.76

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1993 00:00:00.00 to 31-DEC-1993 23:00:00.00

Stability Class: A

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	1	4	2	0	0	0	7
NNE	1	3	0	0	0	0	4
NE	1	0	0	0	0	0	1
ENE	0	0	0	0	0	0	0
E	0	3	0	0	0	0	3
ESE	1	5	3	0	0	0	9
SE	3	10	13	3	0	0	29
SSE	8	24	6	8	0	0	46
S	6	26	18	0	0	0	50
SSW	3	29	20	2	0	0	54
SW	1	8	4	0	0	0	13
WSW	0	3	2	0	0	0	5
W	2	7	4	0	0	0	13
WN	0	7	4	2	0	0	13
NW	0	0	9	4	0	0	13
NNW	2	8	9	0	0	0	19
TOT	29	137	94	19	0	0	279

Hours of Calm Data: 0

Hours of Invalid Data: 6

TABLE 4 (Cont.)

CUMULATIVE JOINT FREQUENCY DISTRIBUTION  
1993

Union Electric - Callaway Plant

Report Date/Time: 20-APR-1994 13:20:36.76

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1993 00:00:00.00 to 31-DEC-1993 23:00:00.00

Stability Class: B

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	1	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	4	0	0	0	0	4
ESE	2	4	0	0	0	0	6
SE	1	8	2	0	0	0	11
SSE	1	10	7	2	0	0	20
S	1	9	15	1	0	0	26
SSW	6	12	13	1	0	0	32
SW	1	10	4	0	0	0	15
WSW	3	1	1	0	0	0	5
W	1	4	4	0	0	0	9
WN	1	1	8	1	0	0	11
NW	0	0	2	2	0	0	4
NNW	0	2	0	0	0	0	2
TOT	17	65	57	7	0	0	146

Hours of Calm Data: 0

Hours of Invalid Data: 3



TABLE 4 (Cont.)

CUMULATIVE JOINT FREQUENCY DISTRIBUTION  
1993

Union Electric - Callaway Plant

Report Date/Time: 20-APR-1994 13:20:36.76

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1993 00:00:00.00 to 31-DEC-1993 23:00:00.00

Stability Class: C

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1	1	0	0	0	2
NNE	0	1	0	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	2	7	0	0	0	0	9
E	0	5	1	0	0	0	6
ESE	0	4	0	0	0	0	4
SE	0	9	5	0	0	0	14
SSE	1	12	8	1	0	0	22
S	3	18	13	1	0	0	35
SSW	2	26	13	1	0	0	42
SW	0	9	4	1	0	0	14
WSW	1	8	1	0	0	0	10
W	1	6	10	1	0	0	18
WN	2	6	9	1	1	0	19
NW	0	6	9	3	0	0	18
NNW	1	1	5	1	0	0	8
TOT	13	119	79	10	1	0	222

Hours of Calm Data: 0

Hours of Invalid Data: 21



TABLE 4 (Cont.)

CUMULATIVE JOINT FREQUENCY DISTRIBUTION  
1993

Union Electric - Callaway Plant

Report Date/Time: 20-APR-1994 13:20:36.76

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1993 00:00:00.00 to 31-DEC-1993 23:00:00.00

Stability Class: D

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	11	6	2	0	0	19
NNE	8	39	24	1	0	0	72
NE	12	30	10	0	0	0	52
ENE	12	32	9	0	0	0	53
E	10	43	23	1	0	0	77
ESE	14	34	19	1	0	0	68
SE	20	29	13	0	0	0	62
SSE	18	52	30	8	0	0	108
S	28	69	62	2	0	0	161
SSW	10	78	31	7	1	0	127
SW	17	53	36	8	0	0	114
WSW	16	32	34	3	0	0	85
W	16	45	29	11	0	0	101
WN	16	51	52	20	4	0	143
NW	11	66	67	15	1	0	160
NNW	7	50	65	5	0	0	127
TOT	215	714	510	84	6	0	1529

Hours of Calm Data: 9

Hours of Invalid Data: 466

TABLE 4 (Cont.)

CUMULATIVE JOINT FREQUENCY DISTRIBUTION  
1993

Union Electric - Callaway Plant

Report Date/Time: 20-APR-1994 13:20:36.76

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1993 00:00:00.00 to 31-DEC-1993 23:00:00.00

Stability Class: E

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	7	18	4	3	0	0	32
NNE	32	62	28	0	0	0	122
NE	40	62	31	0	0	0	133
ENE	26	58	10	0	0	0	94
E	29	74	20	0	0	0	123
ESE	32	63	29	4	0	0	128
SE	26	112	42	2	0	1	183
SSE	23	87	72	4	0	0	186
S	35	104	117	8	0	0	264
SSW	23	66	52	3	0	0	144
SW	25	55	33	0	0	0	113
WSW	22	42	32	0	0	0	96
W	28	72	47	11	0	0	158
WN	30	99	58	4	0	0	191
NW	24	93	68	13	0	0	198
NNW	15	51	52	12	0	0	130
TOT	417	1118	695	64	0	1	2295

Hours of Calm Data: 46

Hours of Invalid Data: 522

TABLE 4 (Cont.)

CUMULATIVE JOINT FREQUENCY DISTRIBUTION  
1993

Union Electric - Callaway Plant

Report Date/Time: 20-APR-1994 13:20:36.76

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1993 00:00:00.00 to 31-DEC-1993 23:00:00.00

Stability Class: F

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	12	17	3	4	0	0	36
NNE	35	32	7	0	0	0	74
NE	24	13	3	0	0	0	40
ENE	23	18	6	1	0	0	48
E	44	24	15	1	0	0	84
ESE	45	39	6	1	0	0	91
SE	48	137	42	0	0	0	227
SSE	47	172	37	4	0	0	260
S	49	134	30	1	0	0	214
SSW	40	106	19	0	0	0	165
SW	28	42	12	0	0	0	82
WSW	24	27	8	0	0	0	59
W	33	42	14	3	0	0	92
WN	43	34	7	0	0	0	84
NW	39	81	18	3	0	0	141
NNW	23	47	14	1	0	0	85
TOT	557	965	241	19	0	0	1782

Hours of Calm Data: 69

Hours of Invalid Data: 289

TABLE 4 (Cont.)

CUMULATIVE JOINT FREQUENCY DISTRIBUTION  
1993

Union Electric - Callaway Plant

Report Date/Time: 20-APR-1994 13:20:36.76

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1993 00:00:00.00 to 31-DEC-1993 23:00:00.00

Stability Class: G

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	5	4	4	1	0	0	14
NNE	16	4	2	0	0	0	22
NE	20	7	1	0	0	0	28
ENE	7	4	8	0	0	0	19
E	13	2	6	1	0	0	22
ESE	11	11	1	0	0	0	23
SE	13	28	16	2	0	0	59
SSE	37	71	6	1	0	0	115
S	36	37	13	2	0	0	88
SSW	25	15	3	0	0	0	43
SW	24	21	1	0	0	0	46
WSW	19	7	2	0	0	0	28
W	23	23	20	0	0	0	66
WN	30	26	6	0	0	0	62
NW	25	32	14	0	0	0	71
NNW	34	26	14	2	0	0	76
TOT	338	318	117	9	0	0	782

Hours of Calm Data: 41  
 Hours of Invalid Data: 219  
 Hours of Good Data: 7200 = 82.2% of Total Hours



TABLE 4 (Cont.)

CUMULATIVE JOINT FREQUENCY DISTRIBUTION  
1993

Union Electric - Callaway Plant

Report Date/Time: 20-APR-1994 13:20:54.77

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1993 00:00:00.00 to 31-DEC-1993 23:00:00.00

Stability Class: A

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	2	4	0	0	0	6
NNE	0	5	1	0	0	0	6
NE	0	1	0	0	0	0	1
ENE	1	0	0	0	0	0	1
E	1	2	1	0	0	0	4
ESE	1	2	3	2	0	0	8
SE	1	6	1	13	4	0	25
SSE	1	22	8	13	3	0	47
S	1	20	19	6	0	0	46
SSW	0	16	36	6	1	0	59
SW	0	5	7	3	0	0	15
WSW	0	2	2	1	0	0	5
W	0	0	7	2	0	0	9
WN	0	0	5	10	1	0	16
NW	0	0	7	5	2	0	14
NNW	0	1	13	5	0	0	19
TOT	6	84	114	66	11	0	281

Hours of Calm Data: 0

Hours of Invalid Data: 4



TABLE 4 (Cont.)

CUMULATIVE JOINT FREQUENCY DISTRIBUTION  
1993

Union Electric - Callaway Plant

Report Date/Time: 20-APR-1994 13:20:54.77

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1993 00:00:00.00 to 31-DEC-1993 23:00:00.00

Stability Class: B

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	1	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	2	1	0	0	0	3
ESE	0	6	3	1	0	0	10
SE	0	8	3	1	0	0	12
SSE	0	11	3	3	2	0	19
S	4	4	15	10	1	0	34
SSW	1	9	12	3	1	0	26
SW	0	3	6	5	0	0	14
WSW	3	0	1	1	0	0	5
W	1	3	2	4	1	0	11
WN	0	1	1	7	0	0	9
NW	0	0	0	1	2	0	3
NNW	0	0	2	0	0	0	2
TOT	9	47	50	36	7	0	149

Hours of Calm Data: 0

Hours of Invalid Data: 0

TABLE 4 (Cont.)

CUMULATIVE JOINT FREQUENCY DISTRIBUTION  
1993

Union Electric - Callaway Plant

Report Date/Time: 20-APR-1994 13:20:54.77

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1993 00:00:00.00 to 31-DEC-1993 23:00:00.00

Stability Class: C

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	1	0	0	0	1
NNE	0	2	1	0	0	0	3
NE	0	0	1	0	0	0	1
ENE	1	6	2	0	0	0	9
E	0	4	1	1	0	0	6
ESE	1	7	2	2	0	0	12
SE	1	7	4	2	0	0	14
SSE	0	6	14	2	1	0	23
S	3	8	18	6	0	0	35
SSW	1	10	19	10	1	0	41
SW	0	4	13	2	0	0	19
WSW	1	1	5	3	0	0	10
W	0	3	6	7	3	0	19
WN	1	2	6	7	0	1	17
NW	0	0	12	7	3	0	22
NNW	1	0	1	3	1	0	6
TOT	10	60	106	52	9	1	238

Hours of Calm Data: 0  
Hours of Invalid Data: 5

TABLE 4 (Cont.)

CUMULATIVE JOINT FREQUENCY DISTRIBUTION  
1993

Union Electric - Callaway Plant

Report Date/Time: 20-APR-1994 13:20.54.77

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1993 00:00:00.00 to 31-DEC-1993 23:00:00.00

Stability Class: D

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	9	14	2	0	0	25
NNE	5	26	42	4	1	0	78
NE	8	35	19	1	0	0	63
ENE	6	33	18	4	0	0	61
E	9	30	46	14	0	0	99
ESE	13	31	32	7	0	0	83
SE	16	47	26	10	0	1	100
SSE	13	34	33	24	5	0	109
S	10	44	92	55	3	0	204
SSW	13	61	64	32	9	3	182
SW	10	35	39	24	4	0	112
WSW	10	29	24	33	2	0	98
W	7	26	47	27	12	4	123
WN	5	28	74	44	19	11	181
NW	5	26	86	52	19	1	189
NNW	3	21	45	34	6	0	109
TOT	133	515	701	367	80	20	1816

Hours of Calm Data: 1  
Hours of Invalid Data: 187

TABLE 4 (Cont.)

CUMULATIVE JOINT FREQUENCY DISTRIBUTION  
1993

Union Electric - Callaway Plant

Report Date/Time: 20-APR-1994 13:20:54.77

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1993 00:00:00.00 to 31-DEC-1993 23:00:00.00

Stability Class: E

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	7	22	4	2	0	35
NNE	13	26	75	9	0	0	123
NE	12	77	84	17	0	0	190
ENE	5	52	51	6	0	0	114
E	10	55	87	21	0	0	173
ESE	10	47	98	27	2	1	185
SE	8	54	105	49	2	0	218
SSE	10	26	87	66	9	2	200
S	10	45	115	144	14	2	330
SSW	7	34	82	58	8	1	190
SW	11	25	49	47	4	0	136
WSW	7	25	42	39	8	0	121
W	5	21	66	63	14	7	176
WN	3	24	121	72	17	3	240
NW	6	28	125	90	22	0	271
NNW	4	30	70	32	12	0	148
TOT	121	576	1279	744	114	16	2850

Hours of Calm Data: 8

Hours of Invalid Data: 5



TABLE 4 (Cont.)

CUMULATIVE JOINT FREQUENCY DISTRIBUTION  
1993

Union Electric - Callaway Plant

Report Date/Time: 20-APR-1994 13:20:54.77

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1992 00:00:00.00 to 31-DEC-1993 23:00:00.00

Stability Class: F

Wind Speed at 60.00 Meter Level (MPH)

	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	12	23	6	4	0	45
NNE	4	25	30	18	0	0	77
NE	2	30	47	1	0	0	80
ENE	6	17	36	14	0	0	73
E	11	27	53	12	0	0	103
ESE	7	30	94	7	1	0	139
SE	4	29	110	62	3	0	208
SSE	8	41	130	62	5	0	246
S	7	47	135	77	6	1	273
SSW	5	27	113	89	4	0	238
SW	6	22	50	44	4	0	126
WSW	3	20	32	13	0	0	68
W	4	16	39	50	8	1	118
WN	6	15	52	25	1	0	99
NW	2	18	75	35	2	1	133
NNW	2	9	56	30	3	0	100
TOT	77	385	1075	545	41	3	2126

Hours of Calm Data: 1  
Hours of Invalid Data: 13



TABLE 4 (Cont.)

CUMULATIVE JOINT FREQUENCY DISTRIBUTION  
1993

Union Electric - Callaway Plant

Report Date/Time: 20-APR-1994 13:20:54.77

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1993 00:00:00.00 to 31-DEC-1993 23:00:00.00

Stability Class: G

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	3	25	8	1	0	37
NNE	1	14	20	4	0	0	39
NE	3	14	36	2	0	0	55
ENE	1	10	22	6	0	0	39
E	2	15	8	12	1	0	38
ESE	6	12	27	3	0	0	48
SE	3	16	20	19	3	0	61
SSE	4	13	35	13	3	1	69
S	6	30	69	18	1	0	124
SSW	6	19	73	14	1	0	113
SW	5	18	24	14	1	0	62
WSW	3	9	14	3	0	0	29
W	3	12	35	24	3	0	77
WN	2	14	26	19	2	0	63
NW	1	15	37	25	0	0	78
NNW	5	20	34	33	2	0	94
TOT	51	234	505	217	18	1	1026

Hours of Calm Data: 5  
 Hours of Invalid Data: 11  
 Hours of Good Data: 8501 = 97.0% of Total Hours

TABLE 5

DOSE AT THE SITE BOUNDARY AND TO THE NEAREST RESIDENT  
FROM GASEOUS EFFLUENTS

		SITE BOUNDARY		NEAREST RESIDENT	
		LOCATION: 1.80 km SE		LOCATION: 2.87 km NNW	
		AGE GROUP: CHILD		AGE GROUP: CHILD	
ORGAN	UNITS	DOSE	% LIMIT(a)	DOSE	% LIMIT(b)
1. GAMMA AIR DOSE *	MRAD	2.95E-02	0.29	1.89E-02	N/A
2. BETA AIR DOSE *	MRAD	7.02E-02	0.35	4.50E-02	N/A
3. WHOLE BODY ***	MREM	2.56E-02	N/A	1.65E-02	N/A
4. SKIN ***	MREM	5.81E-02	N/A	3.73E-02	N/A
5. BONE **	MREM	7.77E-06	N/A	3.04E-04	0.00
6. LIVER **	MREM	6.68E-03	N/A	3.78E-02	0.25
7. TOTAL BODY **	MREM	6.68E-03	N/A	3.77E-02	0.25
8. THYROID **	MREM	7.44E-03	N/A	1.38E-01	0.92
9. KIDNEY **	MREM	6.68E-03	N/A	3.80E-02	0.25
10. LUNG **	MREM	6.68E-03	N/A	3.75E-02	0.25
11. GI-LLI **	MREM	6.68E-03	N/A	3.75E-02	0.25

\* Dose from Noble Gases only

\*\* Dose from Tritium, Radioiodines, and Particulates only

\*\*\* Dose from Noble Gases plus Ground Plane dose

(a) Annual dose limits of Offsite Dose Calculation Manual (APA-ZZ-01003) of 10 mrad gamma air dose and 20 mrad beta air dose.

(b) Annual dose limits of Offsite Dose Calculation Manual (APA-ZZ-01003) of 15 mrem to any organ from I-131, I-133, H-3 and particulate radionuclides with halflives greater than 8 days.

TABLE 6

DOSE TO THE MEMBER OF THE PUBLIC FROM ACTIVITIES  
WITHIN THE SITE BOUNDARY

ORGAN	UNITS	EFFLUENT DOSE WITHIN THE SITE BOUNDARY	DIRECT RADIATION FROM THE UNIT	DIRECT RADIATION FROM OUTSIDE TANKS	TOTAL DOSE FOR THE YEAR
1. SKIN	MREM	5.81E-03	N/A	N/A	5.81E-03
2. BONE	MREM	5.30E-04	9.00E-03	1.06E-03	1.06E-02
3. LIVER	MREM	1.28E-03	9.00E-03	1.06E-03	1.13E-02
4. TOTAL BODY	MREM	3.84E-03	9.00E-03	1.06E-03	1.39E-02
5. THYROID	MREM	1.33E-03	9.00E-03	1.06E-03	1.14E-02
6. KIDNEY	MREM	1.28E-03	9.00E-03	1.06E-03	1.13E-02
7. LUNG	MREM	1.28E-03	9.00E-03	1.06E-03	1.13E-02
8. GI-LLI	MREM	1.28E-03	9.00E-03	1.06E-03	1.13E-02

TABLE 7

TOTAL DOSE DUE TO THE URANIUM FUEL CYCLE  
(MEMBER OF THE PUBLIC)

ORGAN	UNITS	DOSE AT THE RESIDENCE LOCATION	DOSE FROM ACTIVITIES WITHIN SITE BOUNDARY	TOTAL DOSE TO THE MEMBER OF THE PUBLIC	% LIMITS *
1. SKIN	MREM	1.91E-02	5.81E-03	2.50E-02	0.10
2. BONE	MREM	1.05E-04	1.06E-02	1.07E-02	0.04
3. LIVER	MREM	1.30E-02	1.13E-02	2.43E-02	0.10
4. TOTAL BODY	MREM	2.14E-02	1.39E-02	3.53E-02	0.14
5. THYROID	MREM	5.09E-02	1.14E-02	6.23E-02	0.08
6. KIDNEY	MREM	1.31E-02	1.13E-02	2.44E-02	0.10
7. LUNG	MREM	1.29E-02	1.13E-02	2.42E-02	0.10
8. GI-LLI	MREM	1.29E-02	1.13E-02	2.42E-02	0.10

\* Annual dose limits from 40CFR190.10(a) of 25 mrem whole body, 75 mrem to the thyroid, and 25 mrem to any other organ.



TABLE 8

DOSE DUE TO LIQUID EFFLUENTS  
(MEMBER OF THE PUBLIC)

1993

ORGAN	UNITS	DOSE	LIMIT *	% LIMIT
1. BONE	MREM	1.82E-02	10.00	1.82E-01
2. LIVER	MREM	2.10E-02	10.00	2.10E-01
3. TOTAL BODY	MREM	1.85E-02	3.00	6.16E-01
4. THYROID	MREM	6.07E-03	10.00	6.07E-02
5. KIDNEY	MREM	1.10E-02	10.00	1.10E-01
6. LUNG	MREM	7.67E-03	10.00	7.67E-02
7. GI-LLI	MREM	1.31E-02	10.00	1.31E-01

\* Annual dose limits of APA-ZZ-01003, Section 9.4.1.1.

METEOROLOGICAL  
CUMULATIVE JOINT FREQUENCY DISTRIBUTIONS

1985 - 1992

Meteorological Data  
Averages Using Hourly Averaged Data

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

		UNITS	VALUES	% GOOD DATA
Stability Class		A - G	E	90%
Total Precipitation		CM.	3.83E+01	91%
10 Meter Level:	Wind Speed	Meter/Sec	3.48E+00	98%
	Wind Direction	Degrees	2.27E+02	94%
	Wind Direction Variability	Degrees	1.34E+01	94%
	Reference Temperature	Degrees C	1.11E+01	3%
	Dewpoint	Degrees C	2.68E+00	88%
60 Meter Level:	Wind Speed	Meter/Sec	5.24E+00	89%
	Wind Direction	Degrees	2.30E+02	87%
	Wind Direction Variability	Degrees	1.04E+01	87%
	Dewpoint	Degrees C	NONE	0%
	Temperature Difference 60 - 10	Degrees C	1.86E-01	90%

Meteorological Data  
Averages Using Hourly Averaged Data

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

		UNITS	VALUES	% GOOD DATA
Stability Class		A - G	E	90%
Total Precipitation		CM.	3.83E+01	91%
10 Meter Level:	Wind Speed	Meter/Sec	3.48E+00	98%
	Wind Direction	Degrees	2.27E+02	94%
	Wind Direction Variability	Degrees	1.34E+01	94%
	Reference Temperature	Degrees C	1.11E+01	3%
	Dewpoint	Degrees C	2.68E+00	88%
60 Meter Level:	Wind Speed	Meter/Sec	5.24E+00	89%
	Wind Direction	Degrees	2.30E+02	87%
	Wind Direction Variability	Degrees	1.04E+01	87%
	Dewpoint	Degrees C	NONE	0%
	Temperature Difference 60 - 10	Degrees C	1.86E-01	90%



Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

Stability Class: A

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0	0	0	0
NNE	1	5	0	0	0	0	6
NE	2	3	0	0	0	0	5
ENE	0	2	0	0	0	0	2
E	0	2	0	0	0	0	2
ESE	0	3	0	0	0	0	3
SE	0	3	4	1	0	0	8
SSE	0	1	2	0	0	0	3
S	0	1	1	0	0	0	2
SSW	0	4	1	1	0	0	6
SW	1	2	1	0	0	0	4
WSW	0	2	2	0	0	0	4
W	0	2	2	1	0	0	5
WNW	0	4	9	1	0	0	14
NW	1	4	2	2	0	0	9
NNW	0	1	1	0	0	0	2
TOT	5	39	25	6	0	0	75

Hours of Calm Data: 13  
 Hours of Invalid Data: 90

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

Stability Class: B

Wind Speed at 10.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	5	1	0	0	0	6
NNE	0	2	2	0	0	0	4
NE	0	2	0	0	0	0	2
ENE	0	1	0	0	0	0	1
E	0	2	0	0	0	0	2
ESE	0	1	2	0	0	0	3
SE	0	2	2	0	0	0	4
SSE	0	1	1	0	0	0	2
S	0	2	8	0	0	0	10
SSW	0	5	3	0	0	0	8
SW	0	1	2	0	0	0	3
WSW	0	0	0	0	0	0	0
W	0	1	8	3	4	0	16
WNW	0	4	11	6	0	0	21
NW	0	2	4	4	0	0	10
NNW	0	4	1	4	1	0	10
TOT	0	35	45	17	5	0	102

Hours of Calm Data: 1  
Hours of Invalid Data: 1

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

Stability Class: C

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1	1	0	0	0	2
NNE	0	2	2	0	0	0	4
NE	2	0	1	0	0	0	3
ENE	0	3	2	0	0	0	5
E	1	2	0	0	0	0	3
ESE	0	6	5	0	0	0	11
SE	2	2	9	0	0	0	13
SSE	2	7	3	4	0	0	16
S	2	7	6	3	0	0	18
SSW	1	2	14	5	0	0	22
SW	0	2	6	0	0	0	8
WSW	1	1	2	1	0	0	5
W	0	2	12	4	1	0	19
WNW	0	4	25	9	2	0	40
NW	1	7	13	3	0	0	24
NNW	0	2	10	2	0	0	14
TOT	12	50	111	31	3	0	207

Hours of Calm Data: 1  
Hours of Invalid Data: 9

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

Stability Class: D

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	5	66	77	12	0	0	160
NNE	7	78	52	4	0	1	142
NE	6	49	40	6	0	0	101
ENE	5	55	44	7	0	0	111
E	7	39	29	2	0	0	77
ESE	4	37	43	4	0	0	88
SE	6	59	80	11	1	1	158
SSE	9	67	100	22	2	0	200
S	4	69	144	61	6	1	285
SSW	3	50	85	39	3	1	181
SW	5	45	78	49	7	3	187
WSW	7	29	38	28	6	4	112
W	5	62	78	46	16	1	208
WNW	6	103	133	44	5	0	291
NW	16	87	107	57	2	0	269
NNW	11	93	106	22	7	0	239
TOT	106	988	1234	414	55	12	2809

Hours of Calm Data: 11  
Hours of Invalid Data: 122



Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

Stability Class: E

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	17	116	54	12	0	0	199
NNE	17	99	36	3	0	0	155
NE	42	123	37	1	0	0	203
ENE	29	85	47	0	0	0	161
E	26	82	35	0	0	0	143
ESE	17	93	56	3	0	0	169
SE	11	150	125	3	0	0	289
SSE	11	167	137	26	2	0	343
S	18	135	139	24	4	1	321
SSW	14	74	76	1	1	0	166
SW	11	56	62	4	0	0	133
WSW	17	65	46	12	1	0	141
W	17	104	107	44	0	0	272
WNW	27	108	90	24	3	0	252
NW	20	111	74	13	0	0	218
NNW	22	115	55	3	0	0	195
TOT	316	1683	1176	173	11	1	3360

Hours of Calm Data: 15  
 Hours of Invalid Data: 83

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

Stability Class: F

Wind Speed at 10.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	8	37	2	0	0	0	47
NNE	13	24	1	0	0	0	38
NE	19	34	0	0	0	0	53
ENE	24	24	2	0	0	0	50
E	21	18	9	0	0	0	48
ESE	16	45	14	0	0	0	75
SE	21	133	18	1	0	0	173
SSE	13	165	28	1	0	0	207
S	8	102	33	0	0	0	143
SSW	8	52	11	1	0	0	72
SW	9	43	8	0	0	0	60
WSW	8	28	5	1	0	0	42
W	17	26	5	1	0	0	49
WNW	21	37	1	0	0	0	59
NW	10	56	1	0	0	0	67
NNW	8	32	2	0	0	0	42
TOT	224	856	140	5	0	0	1225

Hours of Calm Data: 26  
Hours of Invalid Data: 35

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

Stability Class: G

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	4	14	1	0	0	0	19
NNE	9	19	1	0	0	0	29
NE	11	3	0	0	0	0	14
ENE	5	6	1	0	0	0	12
E	7	2	1	0	0	0	10
ESE	9	8	1	0	0	0	18
SE	7	50	8	0	0	0	65
SSE	9	47	0	0	0	0	65
S	10	15	3	0	0	0	28
SSW	12	13	0	0	0	0	25
SW	8	24	1	0	0	0	33
WSW	6	5	0	0	0	0	11
W	5	4	2	1	0	0	12
WNW	10	4	0	0	0	0	14
NW	5	15	0	0	0	0	20
NNW	10	12	0	0	0	0	22
TOT	127	241	28	1	0	0	397

Hours of Calm Data: 14  
 Hours of Invalid Data: 16  
 Hours of Good Data: 8256 = 94.2% of Total Hours

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

Stability Class: A

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0	0	0	0	0
NNE	0	2	0	0	0	0	2
NE	2	18	0	0	0	0	20
ENE	8	16	0	0	0	0	24
E	2	0	0	0	0	0	2
ESE	0	1	0	0	0	0	1
SE	3	3	2	3	0	0	11
SSE	3	1	1	2	0	0	7
S	0	1	1	0	0	0	2
SSW	4	1	0	2	0	0	7
SW	5	4	1	1	0	0	11
WSW	7	4	0	3	0	0	14
W	3	0	1	2	0	1	7
WNW	1	2	4	9	0	0	16
NW	1	2	3	4	0	0	10
NNW	1	1	0	1	0	0	3
TOT	40	56	13	27	0	1	137

Hours of Calm Data: 3  
Hours of Invalid Data: 38



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

Stability Class: B

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	2	3	0	0	0	5
NNE	0	0	1	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	1	0	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	1	1	0	0	0	2
SE	0	2	1	1	0	0	4
SSE	0	0	3	0	0	0	3
S	0	0	3	4	0	0	7
SSW	0	0	2	1	0	0	3
SW	0	0	1	1	0	0	2
WSW	0	0	0	0	0	0	0
W	0	0	2	2	2	4	10
WNW	0	1	5	11	4	0	21
NW	0	0	3	5	2	0	10
NNW	0	2	2	2	4	1	11
TOT	0	9	27	27	12	5	80

Hours of Calm Data: 0  
Hours of Invalid Data: 24

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

Stability Class: C

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	1	1	0	0	2
NNE	0	1	1	0	0	0	2
NE	0	1	0	0	0	0	1
ENE	0	2	1	0	0	0	3
E	1	0	1	0	0	0	2
ESE	0	1	5	1	0	0	7
SE	0	1	7	0	0	0	8
SSE	1	4	6	2	3	0	16
S	0	6	5	4	0	0	15
SSW	0	3	4	5	0	0	12
SW	0	0	7	4	0	0	11
WSW	1	0	2	0	1	0	4
W	0	0	0	7	1	3	11
WNW	0	2	8	17	9	1	37
NW	0	2	8	8	4	1	23
NNW	0	0	5	6	0	0	11
TOT	3	23	61	55	18	5	165

Hours of Calm Data: 0  
Hours of Invalid Data: 52

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

Stability Class: D

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	5	36	88	41	3	0	173
NNE	2	42	79	17	1	0	141
NE	6	46	47	2	0	0	101
ENE	7	34	44	13	0	0	98
E	1	36	27	13	0	0	77
ESE	6	27	32	9	0	0	74
SE	4	32	73	27	1	0	137
SSE	5	31	78	41	3	1	159
S	2	35	107	79	23	4	250
SSW	4	33	73	37	8	4	159
SW	2	33	46	66	8	0	155
WSW	1	12	28	23	17	3	79
W	4	16	46	33	17	20	136
WNW	4	47	71	89	30	15	256
NW	5	41	75	95	39	5	260
NNW	4	38	92	68	12	7	221
TOT	62	539	1006	653	157	59	2476

Hours of Calm Data: 2  
Hours of Invalid Data: 464

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

Stability Class: E

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	2	28	98	38	2	0	168
NNE	9	42	110	23	6	1	191
NE	10	55	86	7	0	0	158
ENE	3	53	103	25	1	0	185
E	4	46	80	9	0	0	139
ESE	1	36	86	32	2	0	157
SE	6	37	131	77	2	0	253
SSE	2	32	123	123	8	5	293
S	0	19	122	134	23	11	309
SSW	2	20	65	99	5	0	191
SW	3	32	63	72	14	1	185
WSW	7	17	45	46	12	1	128
W	3	27	44	55	34	4	167
WNW	3	16	77	114	23	7	240
NW	3	21	104	99	15	4	246
NNW	1	27	87	45	2	0	162
TOT	59	508	1424	998	149	34	3172

Hours of Calm Data: 1  
Hours of Invalid Data: 285

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

Stability Class: F

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	1	2	22	12	0	0	37
NNE	2	6	26	13	0	0	47
NE	1	7	28	2	0	0	38
ENE	2	9	37	5	0	0	53
E	0	7	35	5	1	0	48
ESE	0	6	57	8	0	0	71
SE	2	18	69	30	1	0	120
SSE	1	11	85	42	0	0	139
S	0	13	104	74	1	0	192
SSW	0	12	62	74	2	0	150
SW	0	7	41	34	4	0	86
WSW	3	4	15	14	0	0	36
W	0	3	15	6	0	0	24
WNW	3	3	31	22	0	0	59
NW	1	9	27	14	1	0	52
NNW	0	5	24	18	0	0	47
TOT	16	122	678	373	10	0	1199

Hours of Calm Data: 14  
Hours of Invalid Data: 73



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1985 00:00:00.00 to 31-DEC-1985 23:00:00.00

Stability Class: G

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	11	11	0	0	22
NNE	0	4	15	8	0	0	27
NE	1	5	18	5	0	0	29
ENE	0	6	9	5	0	0	20
E	0	0	11	4	0	0	15
ESE	0	5	13	3	0	0	21
SE	0	9	19	6	0	0	34
SSE	0	6	20	13	0	0	39
S	0	3	43	12	0	0	58
SSW	0	6	20	7	1	0	34
SW	0	3	19	25	0	0	47
WSW	0	4	9	11	0	0	24
W	0	1	6	1	0	0	8
WNW	0	0	3	9	1	0	13
NW	0	1	3	1	0	0	5
NNW	0	0	5	6	0	0	11
TOT	1	53	224	127	2	0	407

Hours of Calm Data: 0  
 Hours of Invalid Data: 20  
 Hours of Good Data: 7656 = 87.4% of Total Hours

Meteorological Data  
Averages Using Hourly Averaged Data

1-JAN-1986 00:00:00.00 to 31-DEC-1986 23:00:00.00

	UNITS	VALUES	% GOOD DATA
Stability Class	A - G	E	96%
Total Precipitation	CM.	1.39E+02	99%
10 Meter Level:	Wind Speed	Meter/Sec	3.23E+00
	Wind Direction	Degrees	2.00E+02
	Wind Direction Variability	Degrees	1.44E+01
	Reference Temperature	Degrees C	1.29E+01
	Dewpoint	Degrees C	5.53E+00
60 Meter Level:	Wind Speed	Meter/Sec	4.95E+00
	Wind Direction	Degrees	2.07E+02
	Wind Direction Variability	Degrees	1.08E+01
	Dewpoint	Degrees C	NONE
	Temperature Difference 60 - 10	Degrees C	1.89E-01

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1986 00:00:00.00 to 31-DEC-1986 23:00:00.00

Stability Class: A

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	1	0	4	1	0	0	6
NNE	1	4	3	0	0	0	8
NE	2	6	1	0	0	0	9
ENE	1	3	1	0	0	0	5
E	0	1	2	1	0	0	4
ESE	0	5	1	1	0	0	7
SE	1	21	6	2	0	0	30
SSE	5	19	4	6	0	0	34
S	3	14	8	12	5	0	42
SSW	0	13	12	15	3	0	43
SW	1	9	5	10	0	0	25
WSW	0	7	4	3	2	0	16
W	0	14	10	1	2	0	27
WNW	0	8	8	0	0	0	16
NW	1	6	15	6	5	0	33
NNW	0	5	10	6	0	0	21
TOT	16	135	94	64	17	0	326

Hours of Calm Data: 2  
Hours of Invalid Data: 4

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1986 00:00:00.00 to 31-DEC-1986 23:00:00.00

Stability Class: B

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1	0	0	0	0	1
NNE	0	1	2	0	0	0	3
NE	0	5	0	0	0	0	5
ENE	0	1	0	0	0	0	1
E	1	2	1	0	0	0	4
ESE	0	3	3	3	0	0	9
SE	0	10	4	1	1	0	16
SSE	0	6	6	2	0	0	14
S	0	3	10	5	0	0	18
SSW	0	1	5	5	2	1	14
SW	1	1	3	3	0	0	8
WSW	0	3	1	0	0	0	4
W	1	6	9	2	0	0	18
WNW	0	5	4	0	0	0	9
NW	0	3	9	1	0	0	13
NNW	1	6	4	3	0	0	14
TOT	4	57	61	25	3	1	151

Hours of Calm Data: 0  
Hours of Invalid Data: 3

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1986 00:00:00.00 to 31-DEC-1986 23:00:00.00

Stability Class: C

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1	2	0	0	0	3
NNE	0	4	1	0	0	0	5
NE	0	3	6	0	0	0	9
ENE	0	6	0	0	0	0	6
E	0	1	5	1	0	0	7
ESE	0	3	4	4	0	0	11
SE	0	8	13	2	0	0	23
SSE	0	10	10	4	0	0	24
S	0	4	10	14	1	0	29
SSW	0	5	22	9	0	0	36
SW	1	9	15	2	0	0	27
WSW	0	2	8	6	1	0	17
W	0	9	7	4	0	0	20
WNW	0	5	9	1	0	0	15
NW	0	9	7	4	2	0	22
NNW	1	5	4	1	0	0	11
TOT	2	84	123	52	4	0	265

Hours of Calm Data: 0  
Hours of Invalid Data: 8



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1986 00:00:00.00 to 31-DEC-1986 23:00:00.00

Stability Class: D

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	7	30	63	6	0	0	106
NNE	15	67	30	1	0	0	113
NE	22	53	19	0	0	0	94
ENE	13	31	17	0	0	0	61
E	16	61	52	6	0	0	135
ESE	17	73	49	11	0	0	150
SE	11	105	67	11	0	0	194
SSE	17	77	66	15	1	0	176
S	21	111	92	32	1	0	257
SSW	18	75	83	32	1	0	209
SW	26	64	85	22	2	0	199
WSW	6	41	40	17	0	0	104
W	16	65	49	31	4	0	165
WNW	6	84	68	43	6	0	207
NW	14	104	92	29	1	0	240
NNW	7	94	135	17	0	0	253
TOT	232	1135	1007	273	16	0	2663

Hours of Calm Data: 0  
Hours of Invalid Data: 58

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1986 00:00:00.00 to 31-DEC-1986 23:00:00.00

Stability Class: E

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	8	44	25	4	0	0	81
NNE	26	75	22	1	0	0	124
NE	39	79	11	0	0	0	129
ENE	22	75	23	0	0	0	120
E	34	97	28	2	0	0	161
ESE	45	119	50	4	0	0	218
SE	36	189	88	12	1	0	326
SSE	40	173	85	18	0	0	316
S	29	182	194	24	2	0	431
SSW	19	79	84	17	2	0	201
SW	22	81	55	7	1	0	166
WSW	40	60	16	7	2	0	125
W	41	86	42	15	2	0	186
WNW	30	117	77	19	0	0	243
NW	27	91	61	17	0	0	196
NNW	28	88	78	5	0	0	199
TOT	486	1635	939	152	10	0	3222

Hours of Calm Data: 25  
Hours of Invalid Data: 63

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1986 00:00:00.00 to 31-DEC-1986 23:00:00.00

Stability Class: F

Wind Speed at 10.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	6	14	0	0	0	0	20
NNE	21	16	0	0	0	0	37
NE	30	16	1	0	0	0	47
ENE	44	29	3	0	0	0	76
E	33	30	0	0	0	0	63
ESE	38	39	2	0	0	0	79
SE	35	151	22	0	0	0	208
SSE	28	154	52	0	0	0	234
S	30	114	29	0	0	0	173
SSW	19	62	18	0	0	0	99
SW	27	46	12	0	0	0	85
WSW	20	21	9	0	0	0	50
W	32	19	4	0	0	0	55
WNW	29	32	5	0	0	0	66
NW	8	25	2	0	0	0	35
NNW	10	28	2	0	0	0	40
TOT	410	796	161	0	0	0	1367

Hours of Calm Data: 13  
 Hours of Invalid Data: 50

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1986 00:00:00.00 to 31-DEC-1986 23:00:00.00

Stability Class: G

Wind Speed at 10.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	10	2	0	0	0	0	12
NNE	20	7	0	0	0	0	27
NE	28	3	0	0	0	0	31
ENE	16	2	0	0	0	0	18
E	8	1	0	0	0	0	9
ESE	4	3	0	0	0	0	7
SE	15	19	5	0	0	0	39
SSE	16	35	11	0	0	0	62
S	24	22	1	0	0	0	47
SSW	13	30	2	0	0	0	45
SW	18	20	0	0	0	0	38
WSW	12	6	0	0	0	0	18
W	18	4	0	0	0	0	22
WNW	11	2	0	0	0	0	13
NW	8	13	0	0	0	0	21
NNW	10	12	0	0	0	0	22
TOT	231	181	19	0	0	0	431

Hours of Calm Data: 11  
 Hours of Invalid Data: 17  
 Hours of Good Data: 8476 = 96.8% of Total Hours

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1986 00:00:00.00 to 31-DEC-1986 23:00:00.00

Stability Class: A

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	2	0	1	0	3
NNE	1	2	5	2	0	0	10
NE	2	6	1	0	0	0	9
ENE	0	5	0	1	0	0	6
E	0	4	1	1	0	0	6
ESE	1	5	0	0	0	0	6
SE	0	13	7	6	0	0	26
SSE	0	13	10	7	2	0	32
S	1	8	12	12	3	4	40
SSW	0	6	14	10	11	4	45
SW	2	4	15	6	5	1	33
WSW	0	3	6	4	1	1	15
W	0	8	13	5	0	5	31
WNW	2	3	8	4	0	0	17
NW	0	5	12	7	0	5	29
NNW	1	2	12	1	7	1	24
TOT	10	87	118	66	30	21	332

Hours of Calm Data: 0  
Hours of Invalid Data: 0



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1986 00:00:00.00 to 31-DEC-1986 23:00:00.00

Stability Class: B

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	4	2	0	0	6
NNE	0	0	3	0	0	0	3
NE	0	4	0	0	0	0	4
ENE	0	3	0	0	0	0	3
E	0	1	1	1	0	0	3
ESE	0	0	0	2	0	0	2
SE	0	5	11	4	1	0	21
SSE	0	1	9	0	2	0	12
S	0	2	7	5	2	0	16
SSW	0	2	3	8	3	2	18
SW	0	2	2	6	2	0	12
WSW	0	0	2	0	0	0	2
W	0	4	6	5	0	2	17
WNW	0	2	3	1	0	0	6
NW	1	6	4	7	0	0	18
NNW	0	2	3	5	0	0	10
TOT	1	34	58	46	10	4	153

Hours of Calm Data: 0  
Hours of Invalid Data: 1

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1986 00:00:00.00 to 31-DEC-1986 23:00:00.00

Stability Class: C

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	1	0	0	0	1
NNE	0	1	1	1	0	0	3
NE	0	2	7	0	0	0	9
ENE	0	7	1	0	0	0	8
E	0	3	1	1	0	0	5
ESE	0	1	6	3	1	0	11
SE	0	4	18	3	1	0	26
SSE	0	4	12	2	2	0	20
S	1	8	9	15	4	1	38
SSW	0	5	16	9	4	0	34
SW	0	2	17	10	1	0	30
WSW	0	2	9	3	4	1	19
W	0	3	10	4	1	2	20
WNW	0	2	10	5	0	1	18
NW	0	2	8	7	0	2	19
NNW	0	1	7	1	2	1	12
TOT	1	47	133	64	20	8	273

Hours of Calm Data: 0  
Hours of Invalid Data: 0

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1986 00:00:00.00 to 31-DEC-1986 23:00:00.00

Stability Class: D

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	1	19	48	24	0	0	92
NNE	6	49	59	30	1	0	145
NE	20	43	38	1	1	1	104
ENE	12	31	28	1	0	0	72
E	9	37	64	15	3	0	128
ESE	6	48	55	19	1	0	129
SE	7	59	76	24	4	0	170
SSE	7	58	91	21	8	0	185
S	14	71	87	52	16	2	242
SSW	9	64	70	54	21	1	219
SW	11	53	89	61	12	2	228
WSW	7	34	41	26	11	5	124
W	5	32	46	27	12	15	137
WNW	3	34	70	38	32	16	193
NW	3	52	80	71	25	9	240
NNW	1	42	116	69	8	3	239
TOT	121	726	1058	533	155	54	2647

Hours of Calm Data: 0  
 Hours of Invalid Data: 74

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1986 00:00:00.00 to 31-DEC-1986 23:00:00.00

Stability Class: E

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	14	35	23	0	0	72
NNE	4	31	81	10	2	0	128
NE	14	55	69	4	0	0	142
ENE	13	35	68	14	0	0	130
E	12	29	93	14	2	0	150
ESE	12	57	108	29	3	2	211
SE	8	60	140	77	12	2	299
SSE	11	56	148	60	6	0	281
S	12	47	149	169	22	2	401
SSW	9	32	98	128	20	3	290
SW	15	39	77	67	12	3	213
WSW	9	35	40	24	6	4	118
W	10	40	59	38	8	6	161
WNW	9	33	92	83	13	11	241
NW	6	25	84	62	24	3	204
NNW	5	28	73	66	3	0	175
TOT	149	616	1414	868	133	36	3216

Hours of Calm Data: 4  
Hours of Invalid Data: 90

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1986 00:00:00.00 to 31-DEC-1986 23:00:00.00

Stability Class: F

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	1	2	12	9	0	0	24
NNE	3	7	24	3	0	0	37
NE	3	18	21	0	0	0	42
ENE	1	13	35	5	0	0	54
E	3	6	63	1	0	0	73
ESE	5	12	70	4	0	0	91
SE	2	19	86	16	0	0	123
SSE	1	32	103	53	7	0	196
S	3	26	114	58	7	0	208
SSW	1	17	99	66	5	0	188
SW	3	15	38	40	6	0	102
WSW	4	6	31	17	3	0	61
W	3	19	26	7	3	0	58
WNW	2	7	32	18	1	0	60
NW	1	7	24	10	1	0	43
NNW	0	10	13	11	0	0	34
TOT	36	216	791	318	33	0	1394

Hours of Calm Data: 2  
Hours of Invalid Data: 34



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1986 00:00:00.00 to 31-DEC-1986 23:00:00.00

Stability Class: G

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	1	9	1	0	0	12
NNE	0	5	10	3	0	0	18
NE	0	15	18	0	0	0	33
ENE	0	13	26	2	0	0	41
E	0	6	11	1	0	0	18
ESE	0	4	6	0	0	0	10
SE	2	6	9	1	0	0	18
SSE	0	3	16	5	0	0	24
S	2	8	24	12	0	0	46
SSW	3	9	30	9	1	0	52
SW	4	7	32	22	1	0	56
WSW	2	9	11	4	0	0	26
W	2	5	9	1	0	0	17
WNW	1	6	12	0	0	0	19
NW	1	7	8	1	0	0	17
NNW	0	2	1	4	0	0	7
TOT	18	106	232	66	2	0	424

Hours of Calm Data: 2  
 Hours of Invalid Data: 33  
 Hours of Good Data: 8447 = 96.4% of Total Hours

Meteorological Data  
Averages Using Hourly Averaged Data

1-JAN-1987 00:00:00.00 to 31-DEC-1987 23:00:00.00

		UNITS	VALUES	% GOOD DATA
Stability Class		A - G	E	99%
Total Precipitation		CM.	1.28E+02	100%
10 Meter Level:	Wind Speed	Meter/Sec	3.22E+00	100%
	Wind Direction	Degrees	2.06E+02	99%
	Wind Direction Variability	Degrees	1.43E+01	99%
	Reference Temperature	Degrees C	1.33E+01	100%
	Dewpoint	Degrees C	5.27E+00	100%
60 Meter Level:	Wind Speed	Meter/Sec	5.06E+00	100%
	Wind Direction	Degrees	2.20E+02	99%
	Wind Direction Variability	Degrees	1.07E+01	100%
	Dewpoint	Degrees C	NONE	0%
	Temperature Difference 60 - 10	Degrees C	3.26E-01	99%

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1987 00:00:00.00 to 31-DEC-1987 23:00:00.00

Stability Class: A

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	1	0	0	0	0	1
E	0	4	0	0	0	0	4
ESE	1	4	0	0	0	0	5
SE	0	10	3	0	0	0	13
SSE	0	9	4	0	0	0	13
S	0	13	20	5	0	0	38
SSW	0	8	22	1	0	0	31
SW	2	9	5	1	0	0	17
WSW	0	4	3	2	0	0	9
W	0	4	4	0	0	0	8
WNW	0	0	9	2	0	0	11
NW	0	0	8	4	0	0	12
NNW	0	0	0	1	0	0	1
TOT	3	66	78	16	0	0	163

Hours of Calm Data: 0  
Hours of Invalid Data: 2

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1987 00:00:00.00 to 31-DEC-1987 23:00:00.00

Stability Class: B

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0	0	0	0
NNE	1	1	0	0	0	0	2
NE	0	0	1	0	0	0	1
ENE	1	3	0	0	0	0	4
E	0	2	0	0	0	0	2
ESE	1	10	1	0	0	0	12
SE	0	11	3	0	0	0	14
SSE	0	5	3	2	0	0	10
S	0	9	20	3	0	0	32
SSW	0	14	25	4	0	0	43
SW	0	6	17	5	0	0	28
WSW	0	4	8	0	0	0	12
W	0	14	9	0	0	0	23
WNW	0	7	9	2	0	0	18
NW	0	5	12	2	0	0	19
NNW	0	0	2	1	0	0	3
TOT	3	91	110	19	0	0	223

Hours of Calm Data: 0  
 Hours of Invalid Data: 4

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1987 00:00:00.00 to 31-DEC-1987 23:00:00.00

Stability Class: C

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1	1	2	0	0	4
NNE	0	7	3	1	0	0	11
NE	0	6	3	0	0	0	9
ENE	0	3	0	0	0	0	3
E	0	8	9	0	0	0	17
ESE	2	3	2	0	0	0	7
SE	0	12	9	1	0	0	22
SSE	0	18	19	2	0	0	39
S	3	19	22	7	0	0	51
SSW	1	16	17	1	0	0	35
SW	0	18	30	3	0	0	51
WSW	0	11	5	4	0	0	20
W	0	18	11	0	0	0	29
WNW	1	18	7	6	0	0	32
NW	1	8	26	2	0	0	37
NNW	0	3	20	1	0	0	24
TOT	8	169	184	30	0	0	391

Hours of Calm Data: 0  
Hours of Invalid Data: 1



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1987 00:00:00.00 to 31-DEC-1987 23:00:00.00

Stability Class: D

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	4	12	34	6	0	0	56
NNE	3	54	81	3	0	0	141
NE	14	49	58	6	0	0	127
ENE	1	39	44	11	0	0	101
E	4	57	61	10	3	0	135
ESE	8	49	35	8	0	0	100
SE	5	62	45	10	0	0	122
SSE	7	68	41	9	0	0	125
S	21	62	95	17	0	0	195
SSW	15	93	65	6	1	0	180
SW	10	75	96	17	1	0	199
WSW	11	42	44	16	1	0	114
W	9	75	71	14	1	1	171
WNW	17	60	82	21	4	1	185
NW	8	65	92	12	1	0	178
NNW	5	63	74	25	5	0	172
TOT	148	925	1018	191	17	2	2301

Hours of Calm Data: 0  
Hours of Invalid Data: 20

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1987 00:00:00.00 to 31-DEC-1987 23:00:00.00

Stability Class: E

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	7	43	46	4	0	0	100
NNE	13	87	51	5	0	0	156
NE	24	80	37	5	0	0	146
ENE	26	67	48	0	0	0	141
E	25	95	55	14	4	1	194
ESE	22	108	62	17	0	0	209
SE	19	152	84	13	1	0	269
SSE	18	143	94	3	0	0	258
S	24	170	111	12	0	0	317
SSW	20	83	53	9	0	0	165
SW	11	72	81	13	0	0	177
WSW	39	62	54	11	0	0	166
W	24	93	96	14	0	0	227
WNW	28	113	73	15	2	0	231
NW	26	103	77	7	0	0	213
NNW	19	91	54	11	0	0	175
TOT	345	1562	1076	153	7	1	3144

Hours of Calm Data: 11  
Hours of Invalid Data: 2

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1987 00:00:00.00 to 31-DEC-1987 23:00:00.00

Stability Class: F

Wind Speed at 10.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	8	12	0	1	0	0	21
NNE	12	21	0	0	0	0	33
NE	36	31	0	0	0	0	67
ENE	29	25	8	0	0	0	62
E	31	35	7	4	0	0	77
ESE	36	42	7	4	2	0	91
SE	27	193	30	1	0	0	251
SSE	29	247	28	0	0	0	304
S	32	154	19	0	0	0	205
SSW	20	93	22	0	0	0	135
SW	24	83	39	0	0	0	146
WSW	31	50	6	0	0	0	87
W	34	54	4	1	1	0	94
WNW	41	56	9	2	4	0	112
NW	15	77	0	0	0	0	92
NNW	20	38	2	0	0	0	60
TOT	425	1211	181	13	7	0	1837

Hours of Calm Data: 10  
 Hours of Invalid Data: 5

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1987 00:00:00.00 to 31-DEC-1987 23:00:00.00

Stability Class: G

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	1	5	0	0	0	0	6
NNE	15	8	0	0	0	0	23
NE	13	6	0	0	0	0	19
ENE	11	2	0	0	0	0	13
E	12	3	0	0	0	0	15
ESE	10	3	0	0	0	0	13
SE	17	31	1	1	0	0	50
SSE	23	40	1	1	0	0	65
S	31	26	1	0	0	0	58
SSW	18	32	1	0	0	0	51
SW	32	54	4	0	0	0	90
WSW	19	7	2	0	0	0	28
W	21	9	0	0	0	0	30
WNW	35	32	0	3	0	0	70
NW	9	48	0	0	0	0	57
NNW	13	29	0	0	0	0	42
TOT	280	335	10	5	0	0	630

Hours of Calm Data:  
Hours of Invalid Data:  
Hours of Good Data:

7  
3  
8717 = 99.5% of Total Hours

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1987 00:00:00.00 to 31-DEC-1987 23:00:00.00

Stability Class: A

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0	0	0	0
NNE	0	1	0	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	1	1	0	0	0	2
E	0	3	0	0	0	0	3
ESE	0	3	0	0	0	0	3
SE	0	6	5	0	0	0	11
SSE	0	6	7	2	0	0	15
S	0	12	15	9	1	0	37
SSW	0	6	12	14	0	0	32
SW	1	8	6	4	0	0	19
WSW	0	0	5	0	2	0	7
W	0	1	4	4	0	0	9
WNW	0	1	2	7	1	0	11
NW	0	0	1	8	1	3	13
NNW	0	0	0	0	2	0	2
TOT	1	48	58	48	7	3	165

Hours of Calm Data: 0  
Hours of Invalid Data: 0



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1987 00:00:00.00 to 31-DEC-1987 23:00:00.00

Stability Class: B

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0	0	0	0	0
NNE	0	1	0	0	0	0	1
NE	0	1	1	0	0	0	2
ENE	1	1	0	0	0	0	2
E	0	4	2	0	0	0	6
ESE	1	6	2	0	0	0	9
SE	0	9	6	0	0	0	15
SSE	0	5	5	3	0	0	13
S	0	10	9	9	1	0	29
SSW	0	7	20	8	0	0	35
SW	0	5	16	14	4	0	39
WSW	0	3	8	1	0	0	12
W	0	2	16	3	0	0	21
WNW	0	1	13	5	1	0	20
NW	0	2	4	11	0	2	19
NNW	0	0	0	2	2	0	4
TOT	2	57	102	56	8	2	227

Hours of Calm Data: 0  
Hours of Invalid Data: 0

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1987 00:00:00.00 to 31-DEC-1987 23:00:00.00

Stability Class: C

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	1	1	0	0	2
NNE	0	4	7	6	0	0	17
NE	0	6	4	0	0	0	10
ENE	0	2	0	0	0	0	2
E	1	7	4	2	0	0	14
ESE	1	3	2	2	0	0	8
SE	0	9	10	2	0	0	21
SSE	1	10	22	7	0	0	40
S	0	16	21	11	1	0	49
SSW	1	9	18	10	0	0	38
SW	0	14	21	13	1	0	49
WSW	0	4	8	5	2	0	19
W	1	9	17	1	1	0	29
WNW	0	8	12	6	2	1	29
NW	0	2	18	12	3	0	35
NNW	0	2	8	19	1	0	30
TOT	5	105	173	97	11	1	392

Hours of Calm Data: 0  
Hours of Invalid Data: 0

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1987 00:00:00.00 to 31-DEC-1987 23:00:00.00

Stability Class: D

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	3	31	28	2	1	65
NNE	2	40	84	34	0	0	160
NE	6	40	58	26	1	0	131
ENE	4	33	48	20	3	0	108
E	4	32	61	20	7	2	126
ESE	6	48	39	12	1	0	106
SE	4	45	44	13	1	0	107
SSE	5	45	58	27	5	0	140
S	8	49	85	40	5	0	187
SSW	8	49	82	37	2	0	178
SW	5	47	96	47	10	1	206
WSW	5	41	39	38	6	3	132
W	2	39	54	29	11	2	137
WNW	6	48	56	62	18	9	199
NW	2	40	50	69	8	5	174
NNW	4	29	61	52	12	6	164
TOT	71	628	946	554	92	29	2320

Hours of Calm Data: 0  
Hours of Invalid Data: 1

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1987 00:00:00.00 to 31-DEC-1987 23:00:00.00

Stability Class: E

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	11	51	22	1	0	86
NNE	5	26	126	44	2	0	203
NE	9	48	91	12	2	0	162
ENE	1	27	82	29	0	0	139
E	8	33	110	38	8	7	204
ESE	3	36	111	38	8	0	196
SE	3	32	113	83	12	1	244
SSE	5	37	109	87	4	0	242
S	3	37	130	105	9	0	284
SSW	5	24	94	78	4	0	205
SW	4	35	70	82	10	0	201
WSW	10	19	51	48	16	5	149
W	3	35	75	79	17	1	210
WNW	4	17	103	81	20	10	235
NW	2	22	78	80	11	0	193
NNW	0	31	99	62	10	1	203
TOT	66	470	1493	968	134	25	3156

Hours of Calm Data: 1  
 Hours of Invalid Data: 0

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1987 00:00:00.00 to 31-DEC-1987 23:00:00.00

Stability Class: F

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	2	4	17	4	0	0	27
NNE	3	5	27	15	0	0	50
NE	5	11	42	4	0	0	62
ENE	1	11	45	6	0	0	63
E	5	14	59	5	2	0	85
ESE	0	20	69	12	2	2	105
SE	3	10	88	28	0	0	129
SSE	3	27	122	78	0	0	230
S	1	25	171	63	0	0	260
SSW	1	12	104	86	0	0	203
SW	3	11	67	88	6	0	175
WSW	1	17	48	32	3	0	101
W	0	21	49	22	0	0	92
WNW	1	13	46	39	4	6	109
NW	1	8	33	27	0	1	70
LNW	1	12	25	34	0	0	72
TOT	31	221	1012	543	17	9	1833

Hours of Calm Data: 0  
Hours of Invalid Data: 19



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1987 00:00:00.00 to 31-DEC-1987 23:00:00.00

Stability Class: G

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	4	11	6	0	0	21
NNE	1	9	16	5	0	0	31
NE	1	8	15	2	0	0	26
ENE	1	7	13	8	0	0	29
E	0	7	7	6	0	0	20
ESE	2	10	5	1	0	0	18
SE	1	12	3	3	1	0	20
SSE	3	10	13	2	1	0	29
S	0	12	41	4	0	0	57
SSW	2	14	41	9	0	0	66
SW	0	12	35	37	1	0	85
WSW	1	16	13	19	1	0	50
W	1	14	21	6	0	0	42
WNW	1	5	8	13	1	2	30
NW	0	7	23	23	0	0	53
NNW	1	3	11	26	0	0	41
TOT	15	150	276	170	5	2	618

Hours of Calm Data: 1  
 Hours of Invalid Data: 21  
 Hours of Good Data: 8713 = 99.5% of Total Hours

Meteorological Data  
Averages Using Hourly Averaged Data

1-JAN-1988 00:00:00.00 to 31-DEC-1988 23:00:00.00

		UNITS	VALUES	% GOOD DATA
Stability Class		A - G	E	99%
Total Precipitation		CM.	1.08E+02	100%
10 Meter Level:	Wind Speed	Meter/Sec	3.46E+00	100%
	Wind Direction	Degrees	2.06E+02	99%
	Wind Direction Variability	Degrees	1.42E+01	99%
	Reference Temperature	Degrees C	1.25E+01	99%
	Dewpoint	Degrees C	2.81E+00	100%
60 Meter Level:	Wind Speed	Meter/Sec	5.33E+00	99%
	Wind Direction	Degrees	2.17E+02	99%
	Wind Direction Variability	Degrees	1.08E+01	99%
	Dewpoint	Degrees C	NONE	0%
	Temperature Difference 60 - 10	Degrees C	2.41E-01	99%

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1988 00:00:00.00 to 31-DEC-1988 23:00:00.00

Stability Class: A

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	2	1	0	0	0	3
NNE	0	4	1	1	0	0	6
NE	0	6	20	3	1	0	30
ENE	0	5	0	0	0	0	5
E	0	4	1	0	0	0	5
ESE	0	5	5	1	0	0	11
SE	1	29	36	1	0	0	67
SSE	0	33	44	7	1	0	85
S	1	46	35	7	1	0	90
SSW	0	41	48	3	0	0	92
SW	0	32	28	5	0	0	65
WSW	1	11	8	0	0	0	20
W	0	7	13	2	0	0	22
WNW	0	8	10	9	2	0	29
NW	0	2	3	0	0	0	5
NNW	0	2	4	0	0	0	6
TOT	3	237	257	39	5	0	541

Hours of Calm Data: 0  
Hours of Invalid Data: 0

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1988 00:00:00.00 to 31-DEC-1988 23:00:00.00

Stability Class: B

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	4	2	3	0	0	9
NNE	0	8	7	0	0	0	15
NE	0	13	7	0	0	0	20
ENE	0	6	2	0	0	0	8
E	0	8	6	3	0	0	17
ESE	0	7	4	1	0	0	12
SE	2	14	17	5	0	0	38
SSE	2	10	20	4	0	0	36
S	0	12	18	12	0	0	42
SSW	0	11	20	3	1	0	35
SW	1	12	14	9	0	0	36
WSW	0	8	6	5	0	0	19
W	0	5	10	4	0	0	19
WNW	0	5	17	15	3	0	40
NW	0	3	15	3	0	0	21
NNW	0	4	15	0	0	0	19
TOT	5	130	180	67	4	0	386

Hours of Calm Data: 0  
Hours of Invalid Data: 4

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1988 00:00:00.00 to 31-DEC-1988 23:00:00.00

Stability Class: C

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	5	7	1	0	0	13
NNE	2	18	11	1	0	0	32
NE	0	13	6	0	0	0	19
ENE	0	13	10	0	0	0	23
E	1	9	8	3	0	0	21
ESE	1	6	9	1	0	0	17
SE	3	9	17	1	0	0	30
SSE	2	16	18	2	0	0	38
S	2	22	15	5	4	0	48
SSW	1	13	23	4	3	0	44
SW	3	14	11	6	0	0	34
WSW	0	9	11	3	1	0	24
W	1	16	12	7	1	1	38
WNW	1	7	14	19	0	0	41
NW	0	13	19	12	0	0	44
NNW	1	14	20	1	0	0	36
TOT	18	197	211	66	9	1	502

Hours of Calm Data: 0  
 Hours of Invalid Data: 2



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1988 00:00:00.00 to 31-DEC-1988 23:00:00.00

Stability Class: D

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	2	25	34	25	1	0	87
NNE	12	65	33	7	0	0	117
NE	4	69	20	0	0	0	93
ENE	7	49	28	1	0	0	85
E	8	36	60	8	0	0	112
ESE	8	33	30	10	0	0	81
SE	9	74	67	11	0	0	161
SSE	13	51	77	14	3	0	158
S	15	63	67	23	5	0	173
SSW	4	35	74	29	10	0	152
SW	13	44	60	14	1	1	133
WSW	11	32	35	36	7	0	121
W	15	67	66	40	9	0	197
WNW	11	54	91	59	6	0	221
NW	12	48	61	31	5	0	157
NNW	12	55	79	21	2	0	169
TOT	156	800	882	329	49	1	2217

Hours of Calm Data: 0  
Hours of Invalid Data: 9

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1988 00:00:00.00 to 31-DEC-1988 23:00:00.00

Stability Class: E

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	7	25	31	5	0	0	68
NNE	12	46	17	4	0	0	79
NE	31	69	13	0	0	0	113
ENE	19	44	26	0	0	0	89
E	23	70	27	4	0	0	124
ESE	23	88	50	5	0	0	166
SE	30	116	94	22	0	0	262
SSE	24	118	81	46	2	0	271
S	23	132	113	60	3	0	331
SSW	18	66	49	23	7	0	163
SW	24	56	41	15	3	0	139
WSW	34	56	53	17	1	0	161
W	24	75	72	14	0	0	185
WNW	19	110	88	32	0	0	249
NW	12	91	75	12	5	0	195
NNW	17	94	49	6	1	0	167
TOT	340	1256	879	265	22	0	2762

Hours of Calm Data: 11  
Hours of Invalid Data: 11

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1988 00:00:00.00 to 31-DEC-1988 23:00:00.00

Stability Class: F

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	3	10	1	0	0	0	14
NNE	11	20	0	0	0	0	31
NE	39	20	0	0	0	0	59
ENE	34	19	0	0	0	0	53
E	23	45	0	0	0	0	68
ESE	43	43	1	0	0	0	87
SE	23	168	38	0	0	0	229
SSE	23	167	50	0	0	0	240
S	29	122	33	1	0	0	185
SSW	22	89	26	1	1	0	139
SW	10	64	29	0	0	0	103
WSW	20	42	12	0	0	0	74
W	28	44	21	0	0	0	93
WNW	34	50	1	0	0	0	85
NW	11	61	0	0	0	0	72
NNW	14	40	3	0	0	0	57
TOT	367	1004	215	2	1	0	1589

Hours of Calm Data: 6  
Hours of Invalid Data: 6

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1988 00:00:00.00 to 31-DEC-1988 23:00:00.00

Stability Class: G

Wind Speed at 10.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	7	6	0	0	0	0	13
NNE	11	12	0	0	0	0	23
NE	26	8	0	0	0	0	34
ENE	26	5	0	0	0	0	31
E	14	7	0	0	0	0	21
ESE	24	6	0	0	0	0	30
SE	24	83	8	0	0	0	115
SSE	26	99	16	0	0	0	141
S	22	32	1	0	0	0	55
SSW	8	16	3	0	0	0	27
SW	19	14	1	0	0	0	34
WSW	16	5	0	0	0	0	21
W	15	12	0	0	0	0	27
WNW	13	23	0	0	0	0	36
NW	10	42	0	0	0	0	52
NNW	10	28	0	0	0	0	38
TOT	271	398	29	0	0	0	698

Hours of Calm Data: 16  
 Hours of Invalid Data: 1  
 Hours of Good Data: 8728 = 99.4% of Total Hours

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1988 00:00:00.00 to 31-DEC-1988 23:00:00.00

Stability Class: A

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0	0	0	0
NNE	0	1	5	1	0	0	7
NE	0	0	13	12	0	0	25
ENE	0	5	4	0	0	0	9
E	0	3	2	2	0	0	7
ESE	0	6	6	4	0	0	16
SE	0	10	29	6	0	0	45
SSE	0	26	43	21	0	0	90
S	0	22	46	15	3	1	87
SSW	0	30	49	14	0	0	93
SW	0	24	39	13	2	0	78
WSW	1	7	10	3	0	0	21
W	0	2	6	10	0	0	18
WNW	0	6	7	11	2	6	32
NW	0	0	4	2	0	0	6
NNW	0	0	4	2	0	0	6
TOT	1	142	267	116	7	7	540

Hours of Calm Data: 0  
 Hours of Invalid Data: 1



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1988 00:00:00.00 to 31-DEC-1988 23:00:00.00

Stability Class: B

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	2	1	2	0	5
NNE	0	6	11	2	0	0	19
NE	0	2	10	3	0	0	15
ENE	0	6	6	0	0	0	12
E	0	4	6	1	1	0	12
ESE	1	7	5	2	0	0	15
SE	0	6	20	6	0	0	32
SSE	0	9	17	12	0	0	38
S	1	5	18	13	2	0	39
SSW	0	9	18	10	2	0	39
SW	0	11	14	8	6	0	39
WSW	0	4	5	5	5	0	19
W	0	4	9	3	2	0	18
WNW	0	0	9	22	4	3	38
NW	0	2	5	16	2	2	27
NNW	0	2	11	10	0	0	23
TOT	2	77	166	114	26	5	390

Hours of Calm Data: 0  
Hours of Invalid Data: 0

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1988 00:00:00.00 to 31-DEC-1988 23:00:00.00

Stability Class: C

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	2	3	1	0	0	6
NNE	0	13	18	4	2	0	37
NE	1	10	9	0	0	0	20
ENE	1	8	12	0	0	0	21
E	1	5	7	3	1	0	17
ESE	0	9	8	1	0	0	18
SE	0	6	15	3	0	0	24
SSE	2	10	19	6	0	0	37
S	2	18	17	7	5	1	50
SSW	0	9	17	11	0	5	42
SW	0	7	16	9	3	0	35
WSW	3	6	10	5	2	2	28
W	0	16	14	8	1	1	40
WNW	0	4	11	10	8	10	43
NW	0	9	11	22	8	0	50
NNW	0	5	20	7	2	0	34
TOT	10	137	207	97	32	19	502

Hours of Calm Data: 0  
Hours of Invalid Data: 2

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1988 00:00:00.00 to 31-DEC-1988 23:00:00.00

Stability Class: D

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	7	35	21	15	2	80
NNE	1	46	50	18	4	0	119
NE	7	49	44	1	0	0	101
ENE	3	37	40	7	0	0	87
E	6	38	53	21	4	0	122
ESE	2	28	31	19	1	0	81
SE	2	31	55	24	0	0	112
SSE	1	35	87	42	6	2	173
S	5	41	72	49	11	8	186
SSW	3	18	67	45	24	9	166
SW	4	30	61	36	6	3	140
WSW	4	22	37	29	23	9	124
W	5	44	45	34	23	19	170
WNW	4	31	43	65	45	18	206
NW	3	29	51	69	29	10	191
NNW	7	38	65	38	7	3	158
TOT	57	524	836	518	198	83	2216

Hours of Calm Data: 0  
Hours of Invalid Data: 10

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1988 00:00:00.00 to 31-DEC-1988 23:00:00.00

Stability Class: E

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	4	35	18	6	1	65
NNE	1	21	58	43	2	0	125
NE	5	37	64	3	0	0	109
ENE	3	23	57	15	0	0	98
E	7	26	69	21	2	0	125
ESE	6	41	73	38	1	0	159
SE	1	24	79	90	9	0	203
SSE	4	40	105	76	38	3	266
S	7	40	86	102	57	9	301
SSW	8	15	91	81	31	10	236
SW	1	24	53	55	10	6	149
WSW	2	26	45	40	20	5	138
W	2	30	47	81	18	0	178
WNW	4	12	64	107	33	5	225
NW	1	12	85	105	9	11	223
NNW	1	23	80	54	2	0	160
TOT	54	398	1091	929	238	50	2760

Hours of Calm Data: 3  
 Hours of Invalid Data: 21

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1988 00:00:00.00 to 31-DEC-1988 23:00:00.00

Stability Class: F

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	1	7	12	11	0	0	31
NNE	3	11	26	19	0	0	59
NE	2	12	18	3	0	0	35
ENE	3	5	33	4	0	0	45
E	2	18	47	4	0	0	71
ESE	3	18	60	18	0	0	99
SE	3	12	80	35	0	0	130
SSE	4	15	103	65	2	0	189
S	2	26	119	74	2	0	223
SSW	2	13	80	81	9	2	187
SW	1	8	40	81	11	0	141
WSW	1	7	32	38	1	0	79
W	3	19	27	46	1	0	96
WNW	3	12	26	36	0	0	77
NW	1	6	38	17	0	0	62
NNW	1	4	29	29	0	0	63
TOT	35	193	770	561	26	2	1587

Hours of Calm Data: 0  
Hours of Invalid Data: 14



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1988 00:00:00.00 to 31-DEC-1988 23:00:00.00

Stability Class: G

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	6	13	18	0	0	37
NNE	0	11	6	13	0	0	30
NE	1	4	23	5	0	0	33
ENE	1	5	21	14	0	0	41
E	1	7	12	4	0	0	24
ESE	1	6	31	0	0	0	38
SE	1	11	20	4	0	0	36
SSE	1	14	48	17	0	0	80
S	1	11	74	36	0	0	122
SSW	2	10	25	32	1	0	70
SW	2	9	14	15	1	0	41
WSW	3	13	11	5	0	0	32
W	0	14	7	3	0	0	24
WNW	2	3	11	6	0	0	22
NW	1	7	13	14	0	0	35
NNW	3	5	8	14	0	0	30
TOT	20	136	337	200	2	0	695

Hours of Calm Data: 1  
 Hours of Invalid Data: 19  
 Hours of Good Data: 8694 = 99.0% of Total Hours

Meteorological Data  
Averages Using Hourly Averaged Data

1-JAN-1989 00:00:00.00 to 31-DEC-1989 23:00:00.00

		UNITS	VALUES	% GOOD DATA
Stability Class		A - G	E	99%
Total Precipitation		CM.	1.05E+02	100%
10 Meter Level:	Wind Speed	Meter/Sec	3.15E+00	99%
	Wind Direction	Degrees	2.16E+02	99%
	Wind Direction Variability	Degrees	1.43E+01	99%
	Reference Temperature	Degrees C	1.15E+01	99%
	Dewpoint	Degrees C	2.97E+00	100%
60 Meter Level:	Wind Speed	Meter/Sec	5.00E+00	99%
	Wind Direction	Degrees	2.24E+02	98%
	Wind Direction Variability	Degrees	1.08E+01	98%
	Dewpoint	Degrees C	NONE	0%
	Temperature Difference 60 - 10	Degrees C	3.16E-01	99%

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1989 00:00:00.00 to 31-DEC-1989 23:00:00.00

Stability Class: A

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	3	4	0	0	7
NNE	0	3	0	0	0	0	3
NE	0	5	0	0	0	0	5
ENE	0	3	0	0	0	0	3
E	0	2	0	0	0	0	2
ESE	0	7	0	0	0	0	7
SE	0	18	3	0	0	0	21
SSE	3	18	4	0	0	0	25
S	1	20	20	4	0	0	45
SSW	1	21	12	1	0	0	35
SW	2	16	10	1	0	0	29
WSW	2	3	7	1	0	0	13
W	3	2	24	2	0	0	31
WNW	0	4	15	7	0	0	26
NW	0	1	3	2	0	0	6
NNW	0	0	2	2	0	0	4
TGT	12	123	103	24	0	0	262

Hours of Calm Data: 2  
Hours of Invalid Data: 2

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1989 00:00:00.00 to 31-DEC-1989 23:00:00.00

Stability Class: B

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	5	2	0	0	7
NNE	0	1	2	0	0	0	3
NE	0	2	0	0	0	0	2
ENE	3	7	2	0	0	0	12
E	0	4	2	0	0	0	6
ESE	0	9	1	0	0	0	10
SE	3	19	6	0	0	0	28
SSE	0	20	8	2	0	0	30
S	2	15	19	8	1	0	45
SSW	2	10	14	5	0	0	31
SW	1	16	14	0	0	0	31
WSW	0	2	1	0	0	0	3
W	3	7	9	0	0	0	19
WNW	0	5	13	6	0	0	24
NW	0	2	10	5	0	0	17
NNW	1	1	5	0	0	0	7
TOT	15	120	111	28	1	0	275

Hours of Calm Data: 0  
 Hours of Invalid Data: 2

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1989 00:00:00.00 to 31-DEC-1989 23:00:00.00

Stability Class: C

Wind Speed at 10.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	5	2	0	0	7
NNE	0	7	8	0	0	0	15
NE	0	18	4	0	0	0	22
ENE	1	9	3	0	0	0	13
E	0	11	3	0	0	0	14
ESE	0	14	10	0	0	0	24
SE	3	13	13	0	0	0	29
SSE	4	18	16	2	0	0	40
S	3	20	29	4	1	0	57
SSW	5	16	21	4	0	0	46
SW	6	17	10	0	0	0	33
WSW	4	9	6	2	0	0	21
W	3	12	7	3	0	0	25
WNW	1	15	12	5	0	0	33
NW	0	5	23	7	0	0	35
NNW	2	5	23	0	0	0	30
TOT	32	189	193	29	1	0	444

Hours of Calm Data: 0  
Hours of Invalid Data: 2



Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1989 00:00:00.00 to 31-DEC-1989 23:00:00.00

Stability Class: D

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	4	12	33	26	0	0	75
NNE	13	65	36	7	0	0	121
NE	7	60	25	0	0	0	92
ENE	8	60	28	0	0	0	96
E	8	47	51	4	0	0	110
ESE	8	51	29	2	0	0	90
SE	9	69	29	8	0	0	115
SSE	11	68	38	11	0	0	128
S	17	56	83	26	0	0	182
SSW	11	45	72	32	0	0	160
SW	21	55	40	13	4	0	133
WSW	23	44	23	12	2	0	104
W	18	71	49	12	1	0	151
WNW	13	86	76	32	3	0	210
NW	11	70	91	25	0	0	197
NNW	11	72	122	26	0	0	231
TOT	193	931	825	236	10	0	2195

Hours of Calm Data: 5  
 Hours of Invalid Data: 16

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1989 00:00:00.00 to 31-DEC-1989 23:00:00.00

Stability Class: E

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	3	54	67	17	0	2	143
NNE	27	90	35	1	0	0	153
NE	38	88	13	2	0	0	141
ENE	30	65	18	1	0	0	114
E	27	101	37	8	0	0	173
ESE	29	109	53	2	0	0	193
SE	27	123	86	4	0	0	240
SSE	22	111	93	17	0	0	243
S	28	107	152	13	0	0	300
SSW	11	65	57	4	0	0	137
SW	18	72	55	3	0	0	148
WSW	38	73	36	8	2	1	158
W	33	90	60	17	3	0	203
WNW	29	105	43	15	3	0	195
NW	42	89	80	12	1	0	224
NNW	24	129	107	19	0	0	279
TOT	426	1471	992	143	9	3	3044

Hours of Calm Data: 10  
Hours of Invalid Data: 7

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1989 00:00:00.00 to 31-DEC-1989 23:00:00.00

Stability Class: F

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	7	14	9	0	0	0	30
NNE	25	26	0	0	0	0	51
NE	42	19	0	0	0	0	61
ENE	39	20	0	0	0	0	59
E	43	26	1	0	0	0	70
ESE	65	60	5	0	0	0	130
SE	42	191	40	0	0	0	273
SSE	27	179	36	2	0	0	244
S	27	84	39	4	0	0	154
SSW	19	71	31	1	0	0	122
SW	16	73	36	4	1	0	130
WSW	34	39	12	1	0	0	86
W	49	56	8	4	2	0	119
WNW	30	38	8	1	0	0	77
NW	29	41	9	3	1	0	83
NNW	18	34	7	0	0	0	59
TOT	512	971	241	20	4	0	1748

Hours of Calm Data: 18  
Hours of Invalid Data: 5

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1989 00:00:00.00 to 31-DEC-1989 23:00:00.00

Stability Class: G

Wind Speed at 10.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4	6	0	0	0	0	10
NNE	22	13	0	0	0	0	35
NE	27	1	0	0	0	0	28
ENE	17	1	0	0	0	0	18
E	32	2	0	0	0	0	34
ESE	15	8	1	0	0	0	24
SE	33	53	16	0	0	0	102
SSE	30	50	3	0	0	0	83
S	28	31	2	0	0	0	61
SSW	17	33	3	0	0	0	53
SW	17	45	5	0	0	0	67
WSW	19	10	3	0	0	0	32
W	23	11	0	0	0	0	34
WNW	17	7	0	0	0	0	24
NW	5	15	0	0	0	0	20
NNW	15	23	0	0	0	0	38
TOT	321	309	33	0	0	0	663

Hours of Calm Data: 23  
 Hours of Invalid Data: 1  
 Hours of Good Data: 8689 = 99.2% of Total Hours

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1989 00:00:00.00 to 31-DEC-1989 23:00:00.00

Stability Class: A

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0	3	1	0	4
NNE	0	2	1	1	0	0	4
NE	0	4	1	0	0	0	5
ENE	0	4	0	0	0	0	4
E	0	2	0	0	0	0	2
ESE	0	4	2	0	0	0	6
SE	0	12	5	0	0	0	17
SSE	0	13	6	1	0	0	20
S	0	14	11	11	0	0	42
SSW	0	13	11	7	0	0	31
SW	2	10	24	7	1	0	44
WSW	0	1	3	2	2	0	8
W	1	2	5	21	1	0	30
WNW	0	0	5	21	6	0	32
NW	0	0	3	5	2	0	10
NNW	0	0	2	0	0	0	2
TOT	3	81	85	79	13	0	261

Hours of Calm Data: 1  
Hours of Invalid Data: 4



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1989 00:00:00.00 to 31-DEC-1989 23:00:00.00

Stability Class: B

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	1	2	4	1	0	9
NNE	0	1	5	2	0	0	8
NE	0	1	0	0	0	0	1
ENE	0	4	2	0	0	0	6
E	0	7	4	0	0	0	11
ESE	0	5	3	0	0	0	8
SE	0	9	8	1	0	0	18
SSE	2	12	10	2	0	0	26
S	0	14	17	13	6	0	50
SSW	1	8	11	11	0	0	31
SW	1	6	14	10	1	0	32
WSW	1	8	5	1	0	0	15
W	0	4	3	4	0	0	11
WNW	0	2	9	11	1	0	23
NW	0	1	8	6	3	1	19
NNW	0	0	3	3	1	0	7
TOT	6	83	104	68	13	1	275

Hours of Calm Data: 0  
Hours of Invalid Data: 2

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1989 00:00:00.00 to 31-DEC-1989 23:00:00.00

Stability Class: C

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	1	6	1	0	8
NNE	0	4	12	4	0	0	20
NE	0	10	10	1	0	0	21
ENE	0	7	4	0	0	0	11
E	0	9	5	3	0	0	17
ESE	1	14	6	2	0	0	23
SE	1	12	14	4	0	0	31
SSE	1	15	15	3	0	0	34
S	2	10	20	15	3	0	50
SSW	2	12	18	8	2	0	42
SW	1	15	16	11	1	0	44
WSW	3	9	3	2	1	0	18
W	1	6	10	5	1	0	23
WNW	1	9	8	10	4	0	32
NW	1	8	11	12	5	0	37
NNW	0	5	18	8	1	0	32
TOT	14	145	171	94	19	0	443

Hours of Calm Data: 0  
Hours of Invalid Data: 3

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1989 00:00:00.00 to 31-DEC-1989 23:00:00.00

Stability Class: D

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	16	25	36	5	0	82
NNE	3	45	68	30	9	1	156
NE	4	54	54	0	0	0	112
ENE	5	47	43	8	0	0	103
E	2	39	48	14	2	0	105
ESE	10	31	40	6	0	0	87
SE	5	35	47	13	1	0	101
SSE	10	41	52	15	6	0	124
S	10	38	73	49	9	0	179
SSW	4	22	49	44	14	1	134
SW	4	31	60	45	13	7	160
WSW	5	36	32	17	7	6	103
W	12	42	37	36	8	3	138
WNW	7	51	54	42	18	10	182
NW	4	37	80	69	14	1	205
NNW	3	41	93	81	11	2	231
TOT	88	606	855	505	117	31	2202

Hours of Calm Data: 1  
Hours of Invalid Data: 13

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1989 00:00:00.00 to 31-DEC-1989 23:00:00.00

Stability Class: E

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	2	24	105	43	13	1	188
NNE	4	35	137	37	4	0	217
NE	4	44	98	3	0	0	149
ENE	5	40	66	11	0	0	122
E	4	42	76	23	5	0	150
ESE	6	47	98	33	2	0	186
SE	6	24	103	66	2	0	201
SSE	5	24	92	71	5	0	197
S	5	43	106	154	15	0	323
SSW	2	22	56	106	5	0	191
SW	0	26	63	55	11	0	155
WSW	6	27	51	31	8	2	125
W	7	43	72	80	8	6	216
WNW	9	31	50	48	14	4	156
NW	2	30	75	65	18	6	196
NNW	4	35	97	91	15	0	242
TOT	71	537	1345	917	125	19	3014

Hours of Calm Data:  
Hours of Invalid Data:

7  
40

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1989 00:00:00.00 to 31-DEC-1989 23:00:00.00

Stability Class: F

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	1	7	21	13	0	0	42
NNE	3	12	27	16	0	0	58
NE	5	20	31	2	0	0	58
ENE	0	14	37	5	0	0	56
E	4	15	54	7	0	0	80
ESE	3	22	54	8	0	0	87
SE	3	22	117	30	2	0	174
SSE	4	24	106	70	1	0	205
S	0	27	138	69	8	1	243
SSW	2	19	60	73	3	3	160
SW	1	12	36	78	14	0	141
WSW	1	23	42	37	2	1	106
W	1	22	36	29	4	2	94
WNW	1	22	18	27	0	1	69
NW	4	19	32	23	4	3	85
NNW	2	16	31	21	2	0	72
TOT	35	296	840	508	40	11	1730

Hours of Calm Data: 3  
Hours of Invalid Data: 38

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1989 00:00:00.00 to 31-DEC-1989 23:00:00.00

Stability Class: G

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	1	2	5	10	0	0	18
NNE	1	4	14	9	0	0	28
NE	1	11	24	3	0	0	39
ENE	0	6	14	5	0	0	25
E	3	2	21	2	0	0	28
ESE	2	14	22	2	1	0	41
SE	2	7	17	3	1	0	30
SSE	0	17	28	16	0	0	61
S	0	21	43	18	1	0	83
SSW	1	15	27	21	0	0	64
SW	2	14	20	36	3	0	75
WSW	2	11	21	22	4	0	60
W	1	16	17	9	1	0	44
WNW	1	6	14	5	0	0	26
NW	1	4	7	6	0	0	18
NNW	2	6	2	5	0	0	15
TOT	20	156	296	172	11	0	655

Hours of Calm Data: 1  
 Hours of Invalid Data: 31  
 Hours of Good Data: 8593 = 98.1% of Total Hours



Meteorological Data  
Averages Using Hourly Averaged Data

1-JAN-1990 00:00:00.00 to 31-DEC-1990 23:00:00.00

	UNITS	VALUES	% GOOD DATA
Stability Class	A - G	E	95%
Total Precipitation	CM.	1.58E+02	97%
10 Meter Level:			
Wind Speed	Meter/Sec	3.28E+00	98%
Wind Direction	Degrees	1.90E+02	97%
Wind Direction Variability	Degrees	1.36E+01	97%
Reference Temperature	Degrees C	1.32E+01	95%
Dewpoint	Degrees C	6.15E+00	94%
60 Meter Level:			
Wind Speed	Meter/Sec	5.15E+00	97%
Wind Direction	Degrees	2.00E+02	95%
Wind Direction Variability	Degrees	1.00E+01	93%
Dewpoint	Degrees C	NONE	0%
Temperature Difference 60 - 10	Degrees C	2.97E-01	95%

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1990 00:00:00.00 to 31-DEC-1990 23:00:00.00

Stability Class: A

Wind Speed at 10.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1	0	0	0	0	1
NNE	1	3	0	0	0	0	4
NE	0	1	0	0	0	0	1
ENE	0	0	0	0	0	0	0
E	1	0	0	0	0	0	1
ESE	0	5	2	0	0	0	7
SE	0	18	5	3	0	0	26
SSE	1	31	28	2	0	0	62
S	4	30	42	17	0	0	93
SSW	2	27	35	12	0	0	76
SW	1	12	18	5	1	0	37
WSW	1	8	11	2	3	0	25
W	1	6	10	8	2	0	27
WNW	3	4	19	22	2	0	50
NW	2	4	11	12	0	0	29
NNW	0	4	8	0	0	0	12
TOT	17	154	189	83	8	0	451

Hours of Calm Data: 3  
Hours of Invalid Data: 4

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1990 00:00:00.00 to 31-DEC-1990 23:00:00.00

Stability Class: B

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1	1	0	0	0	2
NNE	0	1	1	0	0	0	2
NE	2	1	0	0	0	0	3
ENE	1	0	0	0	0	0	1
E	1	1	4	1	0	0	7
ESE	1	7	2	2	0	0	12
SE	1	10	6	1	0	0	18
SSE	5	20	28	7	0	0	60
S	1	16	20	12	0	0	49
SSW	0	18	19	8	0	0	45
SW	5	13	20	2	0	0	40
WSW	1	8	9	2	1	0	21
W	1	5	2	5	2	0	15
WNW	2	7	9	10	0	0	28
NW	0	8	15	7	0	0	30
NNW	0	4	9	0	0	0	13
TOT	21	120	145	57	3	0	346

Hours of Calm Data: 0  
Hours of Invalid Data: 1

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1990 00:00:00.00 to 31-DEC-1990 23:00:00.00

Stability Class: C

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	2	0	0	0	2
NNE	0	9	2	1	0	0	12
NE	1	3	1	0	0	0	5
ENE	0	3	1	0	0	0	4
E	0	6	12	0	0	0	18
ESE	2	10	4	1	0	0	17
SE	1	15	10	0	0	0	26
SSE	2	7	17	3	0	0	29
S	2	17	21	8	0	0	48
SSW	1	16	12	4	0	0	33
SW	3	15	28	3	2	0	51
WSW	1	6	9	1	2	0	19
W	2	14	14	6	0	0	36
WNW	2	4	8	3	0	0	17
NW	2	3	10	6	0	0	21
NNW	1	12	16	2	0	0	31
TOT	20	140	167	38	4	0	369

Hours of Calm Data: 0  
Hours of Invalid Data: 3

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1990 00:00:00.00 to 31-DEC-1990 23:00:00.00

Stability Class: D

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	5	18	24	1	0	0	48
NNE	7	38	30	0	0	0	75
NE	17	31	8	0	0	0	56
ENE	13	30	24	12	0	0	79
E	7	61	49	18	1	0	136
ESE	11	52	40	4	0	0	107
SE	15	68	59	1	0	0	143
SSE	15	58	67	17	1	0	158
S	9	66	99	36	1	0	211
SSW	8	86	67	33	4	0	198
SW	13	48	54	18	0	0	133
WSW	10	24	26	15	3	0	78
W	11	46	51	28	2	0	138
WNW	20	40	52	30	0	0	142
NW	10	48	73	15	1	0	147
NNW	8	81	85	7	0	0	181
TOT	179	795	808	235	13	0	2030

Hours of Calm Data: 13  
Hours of Invalid Data: 9

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1990 00:00:00.00 to 31-DEC-1990 23:00:00.00

Stability Class: E

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	6	41	41	4	1	0	93
NNE	34	67	14	1	0	0	116
NE	31	34	10	0	0	0	75
ENE	19	74	34	1	0	0	128
E	35	94	36	3	1	0	169
ESE	32	99	40	0	0	0	171
SE	31	161	108	3	0	0	303
SSE	21	131	162	36	0	0	350
S	36	127	215	39	0	0	417
SSW	20	68	51	10	3	0	152
SW	11	54	37	5	1	1	109
WSW	29	32	30	9	1	0	101
W	22	61	50	10	0	0	143
WNW	22	84	42	10	2	0	160
NW	29	73	44	8	3	0	157
NNW	18	101	69	6	0	0	194
TOT	396	1301	983	145	12	1	2838

Hours of Calm Data: 50  
Hours of Invalid Data: 2



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1990 00:00:00.00 to 31-DEC-1990 23:00:00.00

Stability Class: F

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	7	14	19	0	0	0	40
NNE	18	22	6	0	0	0	46
NE	29	28	2	0	0	0	59
ENE	36	9	1	0	0	0	46
E	31	31	18	0	0	0	80
ESE	48	37	10	2	0	0	97
SE	54	200	26	1	0	0	281
SSE	41	215	38	1	0	0	295
S	34	183	66	3	0	0	286
SSW	17	65	23	2	0	0	107
SW	21	56	22	1	0	0	100
WSW	21	19	8	0	0	0	48
W	31	48	11	0	0	0	90
WNW	28	29	4	2	0	0	63
NW	23	57	12	0	0	0	92
NNW	11	49	19	2	0	0	81
TOT	450	1062	285	14	0	0	1811

Hours of Calm Data: 39  
Hours of Invalid Data: 3

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1990 00:00:00.00 to 31-DEC-1990 23:00:00.00

Stability Class: G

Wind Speed at 10.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	0	0	0	0	0	1
NNE	10	0	0	0	0	0	10
NE	7	0	0	0	0	0	7
ENE	14	1	0	0	0	0	15
E	15	2	0	0	0	0	17
ESE	18	3	1	0	0	0	22
SE	32	45	8	1	0	0	86
SSE	37	71	6	0	0	0	114
S	18	22	0	0	0	0	40
SSW	13	33	3	0	0	0	49
SW	19	25	10	0	0	0	54
WSW	9	6	3	0	0	0	18
W	1	5	1	0	0	0	23
WNW	36	8	0	0	0	0	44
NW	13	31	3	0	0	0	47
NNW	8	12	1	1	0	0	22
TOT	267	264	36	2	0	0	569

Hours of Calm Data: 35  
 Hours of Invalid Data: 0  
 Hours of Good Data: 8554 = 97.6% of Total Hours

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1990 00:00:00.00 to 31-DEC-1990 23:00:00.00

Stability Class: A

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	2	0	0	0	2
NNE	1	0	1	0	0	0	2
NE	0	0	0	0	0	0	0
ENE	0	1	0	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	2	2	1	0	0	5
SE	1	6	7	4	1	0	19
SSE	1	19	21	8	0	0	49
S	5	12	38	32	8	0	95
SSW	2	7	28	21	4	0	62
SW	0	2	22	16	4	1	45
WSW	1	2	12	8	0	2	25
W	2	3	9	5	0	4	23
WNW	1	3	10	10	14	8	46
NW	0	3	8	14	9	3	37
NNW	0	2	10	1	0	1	14
TOT	14	62	170	120	40	19	425

Hours of Calm Data: 5  
Hours of Invalid Data: 28

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1990 00:00:00.00 to 31-DEC-1990 23:00:00.00

Stability Class: B

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	2	1	0	0	3
NNE	0	1	2	0	0	0	3
NE	1	3	0	0	0	0	4
ENE	1	0	0	0	0	0	1
E	0	2	2	0	0	0	4
ESE	0	0	5	4	0	0	9
SE	2	7	9	1	0	0	19
SSE	1	11	20	7	2	0	41
S	1	13	22	17	5	0	58
SSW	1	5	27	9	5	0	47
SW	1	13	9	18	3	0	44
WSW	0	10	9	4	1	1	25
W	1	5	4	0	5	1	16
WNW	1	2	11	1	9	2	26
NW	0	5	3	17	5	0	30
NNW	0	2	7	5	1	0	15
TOT	10	79	132	84	36	4	345

Hours of Calm Data: 0  
Hours of Invalid Data: 2

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1990 00:00:00.00 to 31-DEC-1990 23:00:00.00

Stability Class: C

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	3	6	1	0	0	10
NNE	0	6	8	1	1	0	16
NE	0	2	1	0	0	0	3
ENE	0	2	1	0	0	0	3
E	1	4	7	2	0	0	14
ESE	1	6	6	3	0	0	16
SE	0	10	13	2	0	0	25
SSE	1	5	20	6	0	0	32
S	0	7	18	10	2	0	37
SSW	2	9	16	4	3	0	34
SW	3	12	22	15	3	2	57
WSW	1	4	6	8	1	2	22
W	2	7	9	4	2	2	26
WNW	1	2	7	5	4	3	22
NW	0	6	5	6	4	1	22
NNW	0	5	19	5	0	0	29
TOT	12	90	164	72	20	10	368

Hours of Calm Data: 0  
Hours of Invalid Data: 4

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1990 00:00:00.00 to 31-DEC-1990 23:00:00.00

Stability Class: D

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	16	38	16	1	1	72
NNE	3	32	39	13	1	0	88
NE	5	31	12	5	4	1	58
ENE	10	18	27	14	2	6	77
E	4	33	53	21	5	1	117
ESE	11	38	52	9	0	0	110
SE	8	35	68	11	3	1	126
SSE	6	36	67	30	6	0	145
S	9	52	73	63	17	1	215
SSW	2	38	55	56	20	1	172
SW	6	57	48	56	11	5	183
WSW	2	18	28	14	12	3	77
W	8	22	41	17	22	7	117
WNW	5	24	28	31	28	8	124
NW	2	27	59	39	16	6	149
NNW	3	31	94	37	7	0	172
TOT	84	508	782	432	155	41	2002

Hours of Calm Data: 14  
Hours of Invalid Data: 36



Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1990 00:00:00.00 to 31-DEC-1990 23:00:00.00

Stability Class: E

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3	20	59	33	2	0	117
NNE	3	30	83	21	2	0	139
NE	4	27	45	3	0	0	79
ENE	3	28	65	21	0	0	117
E	4	32	88	20	5	1	150
ESE	3	32	113	26	0	0	174
SE	6	32	125	88	2	0	253
SSE	5	36	119	122	13	1	296
S	4	36	106	221	41	0	408
SSW	3	24	68	92	15	3	205
SW	5	18	51	40	5	2	121
WSW	4	22	37	36	10	1	110
W	8	13	48	46	6	0	121
WNW	3	12	55	46	17	12	145
NW	6	19	80	44	8	5	162
NNW	3	28	103	44	3	2	183
TOT	67	409	1245	903	129	27	2780

Hours of Calm Data: 34  
 Hours of Invalid Data: 76

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1990 00:00:00.00 to 31-DEC-1990 23:00:00.00

Stability Class: F

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	4	42	15	0	0	62
NNE	4	20	24	5	0	0	53
NE	2	18	37	0	0	0	57
ENE	2	16	30	4	0	0	52
E	3	13	45	17	0	0	78
ESE	3	20	51	22	1	0	97
SE	5	22	106	34	2	0	169
SSE	2	24	144	68	4	0	242
S	3	24	148	94	6	0	275
SSW	2	20	96	122	3	0	243
SW	2	15	51	54	0	0	122
WSW	2	14	20	22	2	0	60
W	1	12	36	17	0	0	66
WNW	1	7	40	21	3	0	72
NW	1	7	41	18	0	0	67
NNW	2	14	36	33	2	0	87
TOT	36	250	947	546	23	0	1802

Hours of Calm Data: 17  
Hours of Invalid Data: 34

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1990 00:00:00.00 to 31-DEC-1990 23:00:00.00

Stability Class: G

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	5	7	8	0	0	22
NNE	2	5	4	2	0	0	13
NE	0	10	6	0	0	0	16
ENE	1	4	6	1	0	0	12
E	1	4	9	3	0	0	17
ESE	2	5	15	7	0	0	29
SE	2	15	10	13	0	0	40
SSE	2	17	27	9	1	0	56
S	2	19	59	12	0	0	92
SSW	1	17	26	16	0	0	60
SW	1	6	23	37	2	0	69
WSW	0	4	13	12	0	0	29
W	0	5	21	3	0	0	29
WNW	0	3	19	3	0	0	25
NW	0	3	24	8	0	0	35
NNW	2	1	18	18	0	0	39
TOT	18	123	287	152	3	0	583

Hours of Calm Data: 0  
 Hours of Invalid Data: 21  
 Hours of Good Data: 8375 = 95.6% of Total Hours

Meteorological Data  
Averages Using Hourly Averaged Data

1-JAN-1991 00:00:00.00 to 31-DEC-1991 23:00:00.00

	UNITS	VALUES	% GOOD DATA	
Stability Class	A - G	E	94%	
Total Precipitation	CM.	4.02E+02	94%	
10 Meter Level:	Wind Speed	Meter/Sec	3.00E+00	93%
	Wind Direction	Degrees	1.91E+02	93%
	Wind Direction Variability	Degrees	1.46E+01	94%
	Reference Temperature	Degrees C	1.29E+01	94%
	Dewpoint	Degrees C	4.52E+00	92%
60 Meter Level:	Wind Speed	Meter/Sec	4.75E+00	94%
	Wind Direction	Degrees	2.03E+02	94%
	Wind Direction Variability	Degrees	1.06E+01	92%
	Dewpoint	Degrees C	NONE	0%
	Temperature Difference 60 - 10	Degrees C	5.03E-01	94%

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1991 00:00:00.00 to 31-DEC-1991 23:00:00.00

Stability Class: A

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	1	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	1	0	0	0	0	1
E	0	1	1	0	0	0	2
ESE	1	1	2	0	0	0	4
SE	0	7	3	0	0	0	10
SSE	0	7	5	0	0	0	12
S	0	8	5	0	0	0	13
SSW	0	8	12	2	0	0	22
SW	1	0	5	1	0	0	7
WSW	1	0	1	0	0	0	2
W	0	2	4	0	0	0	6
WNW	0	1	2	4	0	0	7
NW	0	3	0	3	0	0	6
NNW	0	0	0	0	0	0	0
TOT	3	39	41	10	0	0	93

Hours of Calm Data: 1  
Hours of Invalid Data: 7

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1991 00:00:00.00 to 31-DEC-1991 23:00:00.00

Stability Class: B

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1	0	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	1	0	0	0	1
ENE	0	1	0	0	0	0	1
E	2	1	0	0	0	0	3
ESE	1	3	2	0	0	0	6
SE	2	14	11	0	0	0	27
SSE	2	19	7	0	0	0	28
S	5	7	18	1	1	0	32
SSW	0	16	13	2	0	0	31
SW	0	18	18	1	0	0	37
WSW	1	0	2	0	0	0	3
W	0	1	5	2	0	0	8
WNW	0	1	7	1	0	0	9
NW	0	1	6	2	0	0	9
NNW	0	0	0	0	0	0	0
TOT	13	83	90	9	1	0	196

Hours of Calm Data: 0  
Hours of Invalid Data: 3



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1991 00:00:00.00 to 31-DEC-1991 23:00:00.00

Stability Class: C

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	4	1	0	0	0	5
NNE	1	0	0	0	0	0	1
NE	0	7	1	0	0	0	8
ENE	0	2	5	0	0	0	7
E	1	9	3	1	0	0	14
ESE	1	12	3	0	0	0	16
SE	0	22	5	2	0	0	29
SSE	2	10	6	1	0	0	19
S	2	16	16	12	1	0	47
SSW	7	26	31	3	0	0	67
SW	2	13	12	6	0	0	33
WSW	2	3	3	0	0	0	8
W	4	5	5	6	0	0	20
WNW	0	6	9	5	0	0	20
NW	1	3	6	4	3	0	17
NNW	1	2	2	0	0	0	5
TOT	24	140	108	40	4	0	316

Hours of Calm Data: 0  
Hours of Invalid Data: 5

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1991 00:00:00.00 to 31-DEC-1991 23:00:00.00

Stability Class: D

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	1	35	62	6	0	0	104
NNE	8	57	24	3	0	0	92
NE	13	54	3	0	0	0	70
ENE	11	47	29	0	0	0	87
E	18	71	52	3	0	0	144
ESE	20	64	36	0	0	0	120
SE	20	65	36	5	2	0	128
SSE	20	61	36	7	1	0	125
S	28	79	83	27	3	0	220
SSW	18	78	74	27	2	0	199
SW	13	52	41	15	0	0	121
WSW	13	41	10	4	0	0	68
W	18	62	58	30	3	0	171
WNW	16	49	70	22	6	0	163
NW	8	40	51	23	2	0	124
NNW	9	37	49	0	0	0	95
TOT	234	892	714	172	19	0	2031

Hours of Calm Data: 2  
Hours of Invalid Data: 47

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1991 00:00:00.00 to 31-DEC-1991 23:00:00.00

Stability Class: E

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	4	45	44	6	0	0	99
NNE	15	67	20	0	0	0	102
NE	31	63	6	0	0	0	100
ENE	24	56	20	0	0	0	100
E	25	88	46	5	1	0	165
ESE	36	112	53	10	0	0	211
SE	22	123	38	8	0	0	191
SSE	23	104	77	12	1	0	217
S	24	129	140	21	0	0	314
SSW	17	71	61	12	0	0	161
SW	9	56	13	5	0	0	83
WSW	31	51	29	8	0	0	119
W	30	70	59	22	0	0	181
WNW	30	109	61	13	1	0	214
NW	33	69	30	7	3	0	142
NNW	18	94	43	3	0	0	158
TOT	372	1307	740	132	6	0	2557

Hours of Calm Data: 34  
Hours of Invalid Data: 57

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1991 00:00:00.00 to 31-DEC-1991 23:00:00.00

Stability Class: F

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	4	22	28	2	0	0	56
NNE	22	23	7	0	0	0	52
NE	39	15	2	1	0	0	57
ENE	45	31	8	0	0	0	84
E	55	39	15	1	0	0	110
ESE	42	43	11	1	0	0	97
SE	53	157	33	3	0	0	246
SSE	42	235	27	5	0	0	309
S	43	215	50	6	0	0	314
SSW	27	99	35	0	0	0	161
SW	35	46	14	0	0	0	95
WSW	28	33	10	0	0	0	71
W	32	47	10	1	0	0	90
WNW	45	51	10	0	0	0	106
NW	23	44	5	2	0	0	74
NNW	18	61	19	1	0	0	99
TOT	553	1161	284	23	0	0	2021

Hours of Calm Data: 43  
Hours of Invalid Data: 8

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1991 00:00:00.00 to 31-DEC-1991 23:00:00.00

Stability Class: G

Wind Speed at 10.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	12	8	4	0	0	0	24
NNE	37	3	1	0	0	0	41
NE	22	6	0	0	0	0	28
ENE	6	4	2	0	0	0	12
E	30	4	17	0	0	0	51
ESE	29	6	11	0	0	0	46
SE	20	47	10	3	0	0	80
SSE	25	93	11	0	0	0	129
S	30	46	3	0	0	0	79
SSW	23	30	2	0	0	0	55
SW	23	35	1	0	0	0	59
WSW	20	6	0	0	0	0	26
W	26	6	1	0	0	0	33
WNW	14	12	7	0	0	0	33
NW	15	19	4	1	0	0	39
NNW	41	21	6	0	0	0	68
TOT	373	346	80	4	0	0	803

Hours of Calm Data: 33  
 Hours of Invalid Data: 0  
 Hours of Good Data: 8130 = 92.8% of Total Hours

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1991 00:00:00.00 to 31-DEC-1991 23:00:00.00

Stability Class: A

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0	0	1	0	1
NNE	0	0	0	0	0	0	0
NE	1	0	0	0	0	0	1
ENE	0	0	0	0	0	0	0
E	0	1	2	1	0	0	4
ESE	0	0	2	1	0	0	3
SE	1	4	2	1	0	0	8
SSE	0	2	6	0	0	0	8
S	0	5	7	1	1	0	14
SSW	0	3	10	2	0	0	15
SW	1	3	6	9	0	0	19
WSW	1	1	0	1	0	0	3
W	0	0	0	1	0	0	1
WNW	0	1	0	3	5	0	9
NW	0	1	3	1	3	0	8
NNW	0	0	1	0	0	0	1
TOT	4	21	39	21	10	0	95

Hours of Calm Data: 3  
 Hours of Invalid Data: 3



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1991 00:00:00.00 to 31-DEC-1991 23:00:00.00

Stability Class: B

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	1	5	0	0	6
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	1	1	0	0	0	2
E	0	0	5	1	0	0	6
ESE	1	2	1	0	0	0	4
SE	0	9	5	1	0	0	15
SSE	1	11	17	2	0	0	31
S	5	11	15	6	1	1	39
SSW	0	10	7	4	0	0	21
SW	1	9	19	5	1	0	35
WSW	1	3	2	0	0	0	6
W	0	0	2	4	0	0	6
WNW	0	0	2	6	2	0	10
NW	0	1	0	3	1	0	5
NNW	0	0	2	1	0	0	3
TOT	9	57	79	38	5	1	189

Hours of Calm Data: 8  
Hours of Invalid Data: 2

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1991 00:00:00.00 to 31-DEC-1991 23:00:00.00

Stability Class: C

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	4	6	0	0	10
NNE	1	2	0	0	0	0	3
NE	0	2	2	0	0	0	4
ENE	0	2	4	0	0	0	6
E	0	2	9	1	0	0	12
ESE	1	4	10	1	0	0	16
SE	1	16	8	2	0	0	27
SSE	1	9	8	3	0	0	21
S	2	14	13	6	4	1	40
SSW	3	21	25	7	2	0	58
SW	2	10	20	13	3	2	50
WSW	2	2	6	0	0	0	10
W	2	5	3	3	1	0	14
WNW	0	1	5	6	7	0	19
NW	0	4	5	6	3	2	20
NNW	0	2	3	1	0	1	7
TOT	15	96	125	55	20	6	317

Hours of Calm Data: 3  
Hours of Invalid Data: 1

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1991 00:00:00.00 to 31-DEC-1991 23:00:00.00

Stability Class: D

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	5	37	53	8	2	0	105
NNE	7	73	76	19	1	0	176
NE	9	40	15	1	0	0	65
ENE	8	25	33	3	0	0	69
E	9	54	72	5	0	0	140
ESE	8	43	46	16	0	0	113
SE	12	46	35	12	1	0	106
SSE	11	44	38	15	3	3	114
S	9	58	77	47	11	1	203
SSW	13	56	69	37	10	5	190
SW	11	27	64	33	21	4	160
WSW	10	31	28	7	1	2	79
W	8	68	43	27	21	12	179
WNW	10	35	39	40	15	2	141
NW	3	22	39	32	17	13	126
NNW	4	24	34	19	0	2	83
TOT	137	683	761	321	103	44	2049

Hours of Calm Data: 16  
Hours of Invalid Data: 15

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1991 00:00:00.00 to 31-DEC-1991 23:00:00.00

Stability Class: E

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	1	13	73	39	7	0	133
NNE	1	26	84	23	2	1	137
NE	3	39	57	1	0	0	100
ENE	8	36	45	3	0	1	93
E	3	38	90	16	0	0	147
ESE	13	55	89	36	5	0	198
SE	9	44	94	44	6	0	197
SSE	15	35	63	64	6	2	185
S	10	42	104	114	13	0	283
SSW	4	41	64	86	14	1	210
SW	3	32	45	38	1	2	121
WSW	9	29	31	24	9	4	106
W	10	52	75	51	14	9	211
WNW	6	40	73	65	18	2	204
NW	6	38	39	40	8	8	139
NNW	4	33	67	30	5	0	139
TOT	105	593	1093	674	108	30	2603

Hours of Calm Data: 13  
Hours of Invalid Data: 32

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1991 00:00:00.00 to 31-DEC-1991 23:00:00.00

Stability Class: F

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	11	42	39	4	0	97
NNE	3	16	46	6	1	0	72
NE	3	19	37	1	0	0	60
ENE	7	18	32	4	0	0	61
E	4	33	74	9	0	0	120
ESE	6	37	51	6	1	0	101
SE	2	31	97	35	0	0	165
SSE	6	40	106	55	5	0	212
S	5	53	190	73	6	1	328
SSW	5	34	133	104	2	0	278
SW	2	24	56	61	6	0	149
WSW	3	24	33	14	0	0	74
W	4	25	48	35	1	0	113
WNW	2	30	43	24	0	0	99
NW	4	19	31	8	0	0	62
NNW	1	18	41	9	1	0	70
TOT	58	432	1060	483	27	1	2061

Hours of Calm Data: 8  
 Hours of Invalid Data: 3

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1991 00:00:00.00 to 31-DEC-1991 23:00:00.00

Stability Class: G

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	3	20	27	1	0	51
NNE	1	12	27	6	0	0	46
NE	4	18	21	1	0	0	44
ENE	2	6	29	8	0	0	45
E	1	7	35	11	0	1	55
ESE	2	19	34	12	0	0	67
SE	1	12	24	7	3	0	47
SSE	0	12	30	19	0	0	61
S	2	21	44	26	0	0	93
SSW	2	13	48	31	1	0	95
SW	1	6	25	17	1	0	50
WSW	3	8	26	10	0	0	47
W	2	15	22	11	0	0	50
WNW	0	5	16	3	0	0	24
NW	1	5	8	7	1	0	22
NNW	1	4	16	5	0	0	26
TOT	23	166	425	201	7	1	823

Hours of Calm Data: 13  
 Hours of Invalid Data: 0  
 Hours of Good Data: 8201 = 93.6% of Total Hours



Meteorological Data  
Averages Using Hourly Averaged Data

1-JAN-1992 00:00:00.00 to 31-DEC-1992 23:00:00.00

		UNITS	VALUES	% GOOD DATA
Stability Class		A - G	E	98%
Total Precipitation		CM.	2.90E+02	98%
10 Meter Level:	Wind Speed	Meter/Sec	3.21E+00	98%
	Wind Direction	Degrees	2.15E+02	96%
	Wind Direction Variability	Degrees	1.43E+01	98%
	Reference Temperature	Degrees C	1.19E+01	98%
	Dewpoint	Degrees C	2.53E+00	98%
60 Meter Level:	Wind Speed	Meter/Sec	5.03E+00	98%
	Wind Direction	Degrees	2.18E+02	96%
	Wind Direction Variability	Degrees	1.06E+01	98%
	Dewpoint	Degrees C	NONE	0%
	Temperature Difference 60 - 10	Degrees C	5.75E-01	98%

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1992 00:00:00.00 to 31-DEC-1992 23:00:00.00

Stability Class: A

Wind Speed at 10.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	1	1	0	0	0	2
ESE	0	3	1	0	0	0	4
SE	0	4	5	0	0	0	9
SSE	1	7	4	2	0	0	14
S	0	5	11	5	0	0	21
SSW	1	10	10	1	0	0	22
SW	0	4	7	0	0	1	12
WSW	0	2	0	0	0	0	2
W	1	0	1	0	0	2	4
WNW	0	1	2	1	0	0	4
NW	0	2	9	0	0	0	11
NNW	0	0	1	0	0	0	1
TOT	3	39	52	9	0	3	106

Hours of Calm Data: 46  
 Hours of Invalid Data: 0

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1992 00:00:00.00 to 31-DEC-1992 23:00:00.00

Stability Class: B

Wind Speed at 10.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	1	0	0	0	1
NNE	0	1	1	0	0	0	2
NE	0	1	0	0	0	0	1
ENE	0	1	0	0	0	0	1
E	0	1	3	0	0	0	4
ESE	0	5	0	1	0	1	7
SE	3	11	3	0	0	0	17
SSE	1	6	5	2	0	0	14
S	1	4	7	2	0	0	14
SSW	1	12	9	0	0	0	22
SW	0	7	3	0	0	0	10
WSW	0	2	6	0	0	3	11
W	0	4	4	0	0	0	8
WNW	0	2	7	0	0	0	9
NW	0	0	13	1	0	0	14
NNW	0	1	0	1	0	0	2
TOT	6	58	62	7	0	4	137

Hours of Calm Data: 4  
Hours of Invalid Data: 0

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1992 00:00:00.00 to 31-DEC-1992 23:00:00.00

Stability Class: C

Wind Speed at 10.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0	0	0	0	0
NNE	0	8	6	1	0	0	15
NE	0	3	5	0	0	0	8
ENE	0	0	1	0	0	1	2
E	1	2	5	0	0	0	8
ESE	2	16	5	0	0	0	23
SE	5	16	9	1	0	0	31
SSE	5	12	11	2	0	0	30
S	3	15	12	2	0	0	32
SSW	5	21	8	4	0	0	38
SW	1	11	10	0	0	0	22
WSW	2	10	5	0	0	1	18
W	0	5	5	0	0	0	10
WNW	1	5	12	3	0	0	21
NW	0	2	14	4	0	0	20
NNW	1	2	7	1	0	0	11
TOT	26	128	115	18	0	2	289

Hours of Calm Data: 3  
Hours of Invalid Data: 0

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1992 00:00:00.00 to 31-DEC-1992 23:00:00.00

Stability Class: D

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	15	22	1	0	0	38
NNE	5	60	28	1	0	0	94
NE	17	38	20	0	0	0	75
ENE	10	44	15	0	0	0	69
E	13	59	44	0	0	0	116
ESE	13	68	30	1	0	2	114
SE	11	58	60	12	0	0	141
SSE	20	47	51	13	0	0	131
S	30	64	69	12	0	0	175
SSW	20	64	51	22	1	0	158
SW	15	53	53	13	0	0	134
WSW	17	35	17	7	0	6	82
W	19	77	62	3	0	0	161
WNW	14	53	57	13	4	0	141
NW	15	40	59	28	0	0	142
NNW	8	50	64	6	1	0	129
TOT	227	825	702	132	6	8	1900

Hours of Calm Data: 17  
Hours of Invalid Data: 0

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1992 00:00:00.00 to 31-DEC-1992 23:00:00.00

Stability Class: E

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	2	29	31	4	0	0	66
NNE	23	55	14	0	0	0	92
NE	29	38	4	0	0	0	71
ENE	31	33	31	0	0	0	95
E	35	86	26	0	0	1	148
ESE	36	146	72	4	0	0	258
SE	28	110	82	5	0	0	225
SSE	70	104	87	11	0	0	272
S	28	96	96	15	0	0	235
SSW	16	59	55	5	0	1	136
SW	37	73	32	16	0	0	158
WSW	40	48	40	12	0	5	145
W	47	91	49	9	0	0	196
WNW	23	107	69	20	0	0	219
NW	26	97	31	32	0	0	186
NNW	19	82	57	15	0	0	173
TOT	490	1254	776	148	0	7	2675

Hours of Calm Data:  
Hours of Invalid Data:

227  
0



Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1992 00:00:00.00 to 31-DEC-1992 23:00:00.00

Stability Class: F

	Wind Speed at 10.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	6	27	4	1	0	0	38
NNE	25	34	11	5	1	0	76
NE	38	38	15	0	0	0	91
ENE	52	43	9	0	0	0	104
E	30	70	11	0	0	0	111
ESE	56	69	10	0	0	0	135
SE	55	185	42	0	0	0	282
SSE	32	179	33	0	0	0	244
S	55	182	32	0	0	0	269
SSW	38	130	17	3	0	1	189
SW	34	75	14	3	0	0	126
WSW	41	53	12	0	0	24	130
W	35	65	16	3	0	0	119
WNW	37	42	13	1	0	0	93
NW	23	60	14	0	0	0	97
NNW	24	52	31	0	0	0	107
TOT	581	1304	284	16	1	25	2211

Hours of Calm Data:  
Hours of Invalid Data:

66  
0

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1992 00:00:00.00 to 31-DEC-1992 23:00:00.00

Stability Class: G

Wind Speed at 10.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	21	14	6	4	0	0	45
NNE	30	5	3	0	0	0	38
NE	41	3	0	0	0	0	44
ENE	18	7	1	0	0	0	26
E	27	11	3	0	0	0	41
ESE	30	12	9	0	0	0	51
SE	37	50	6	0	0	0	93
SSE	48	77	3	0	0	0	128
S	48	41	6	0	0	0	95
SSW	40	27	2	1	0	0	70
SW	31	13	0	2	0	0	46
WSW	15	10	0	0	0	1	26
W	27	15	3	4	0	0	49
WNW	23	10	2	0	0	0	35
NW	14	24	9	5	0	0	52
NNW	24	19	25	7	0	0	75
TOT	474	338	78	23	0	1	914

Hours of Calm Data: 52  
 Hours of Invalid Data: 0  
 Hours of Good Data: 8647 = 98.4% of Total Hours

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1992 00:00:00.00 to 31-DEC-1992 23:00:00.00

Stability Class: A

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0	0	1	1
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	2	1	0	0	0	3
SE	0	2	3	3	0	0	8
SSE	0	2	4	3	0	1	10
S	0	6	11	3	1	0	21
SSW	0	4	5	8	3	0	20
SW	0	2	10	7	0	0	19
WSW	0	2	1	2	0	0	5
W	0	1	2	0	0	0	3
WNW	0	0	0	1	0	0	1
NW	0	0	4	5	0	0	9
NNW	0	0	0	4	0	2	6
TOT	0	21	41	36	4	4	106

Hours of Calm Data: 46  
 Hours of Invalid Data: 0

Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1992 00:00:00.00 to 31-DEC-1992 23:00:00.00

Stability Class: B

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0	0	0	0
NNE	0	0	2	0	0	0	2
NE	0	1	0	0	0	0	1
ENE	1	1	0	0	0	0	2
E	0	1	1	0	0	0	2
ESE	1	4	2	1	0	1	9
SE	1	5	9	1	0	0	16
SSE	0	5	6	2	0	0	13
S	0	4	7	3	1	0	15
SSW	0	3	11	4	0	0	18
SW	1	5	7	1	0	0	14
WSW	0	1	2	3	0	0	6
W	0	1	6	3	0	0	10
WNW	0	0	1	5	0	0	6
NW	0	1	14	2	0	0	17
NNW	0	1	0	0	1	4	6
TOT	4	33	68	25	2	5	137

Hours of Calm Data: 4  
 Hours of Invalid Data: 0

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1992 00:00:00.00 to 31-DEC-1992 23:00:00.00

Stability Class: C

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	0	0	0	0	0	0
NNE	0	2	5	4	1	0	12
NE	0	3	9	2	0	0	14
ENE	0	1	2	0	0	1	4
E	1	3	1	1	0	0	6
ESE	2	8	4	0	0	0	14
SE	0	9	11	4	0	0	24
SSE	2	20	6	8	0	0	36
S	3	13	7	9	1	0	33
SSW	0	12	15	6	2	0	35
SW	2	5	11	8	0	0	26
WSW	0	4	8	4	0	0	16
W	0	2	11	2	0	0	15
WNW	0	5	4	7	4	0	20
NW	0	3	6	10	4	0	23
NNW	0	1	6	4	1	2	14
TOT	10	91	106	69	13	3	292

Hours of Calm Data: 0  
Hours of Invalid Data: 0

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1992 00:00:00.00 to 31-DEC-1992 23:00:00.00

Stability Class: D

Wind Speed at 60.00 Meter Level (MPH)							
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	6	24	21	1	1	55
NNE	4	27	56	13	0	0	100
NE	12	58	31	10	0	0	111
ENE	7	33	25	6	0	0	71
E	4	36	42	7	0	0	89
ESE	12	32	53	9	0	0	106
SE	8	35	54	32	1	2	132
SSE	14	29	48	29	5	0	125
S	16	54	67	36	10	2	185
SSW	7	35	50	28	15	0	135
SW	6	39	41	43	15	2	146
WSW	13	30	22	17	5	1	88
W	8	47	65	30	4	0	154
WNW	7	25	49	51	15	6	153
NW	6	29	34	32	15	5	121
NNW	1	26	59	33	10	8	137
TOT	127	541	720	397	96	27	1908

Hours of Calm Data: 9  
Hours of Invalid Data: 0



Meteorological Data  
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1992 00:00:00.00 to 31-DEC-1992 23:00:00.00

Stability Class: E

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	1	10	37	21	2	0	71
NNE	2	24	69	27	0	0	122
NE	8	35	41	2	0	0	86
ENE	11	33	40	21	0	0	105
E	7	43	76	5	0	0	131
ESE	11	68	127	52	2	0	260
SE	7	56	109	65	6	0	243
SSE	10	33	81	72	7	0	208
S	7	46	85	86	9	0	235
SSW	9	15	51	75	8	0	161
SW	6	32	52	55	24	1	170
WSW	5	51	42	33	20	2	153
W	5	27	71	56	14	3	176
WNW	6	41	70	75	26	3	221
NW	8	26	83	32	8	2	159
NNW	3	23	84	50	36	5	201
TOT	106	568	1118	727	162	21	2702

Hours of Calm Data: 200  
 Hours of Invalid Data: 0

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1992 00:00:00.00 to 31-DEC-1992 23:00:00.00

Stability Class: F

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	3	30	27	0	0	60
NNE	3	20	67	30	3	2	125
NE	4	24	75	3	0	0	106
ENE	8	20	69	4	0	0	101
E	6	26	75	6	0	0	113
ESE	3	22	103	14	0	0	142
SE	9	32	115	42	1	0	199
SSE	6	25	130	72	0	0	233
S	13	25	119	54	0	0	211
SSW	7	22	166	77	2	1	275
SW	5	27	80	72	6	0	190
WSW	6	21	50	29	1	0	107
W	7	13	48	38	5	1	112
WNW	4	20	38	25	2	0	89
NW	5	11	41	29	2	0	88
NNW	3	13	46	30	0	24	116
TOT	89	324	1252	552	22	28	2267

Hours of Calm Data: 10  
Hours of Invalid Data: 0

Meteorological Data  
Totals of Hours at Each Wind Speed & Direction

1-JAN-1992 00:00:00.00 to 31-DEC-1992 23:00:00.00

Stability Class: G

	Wind Speed at 60.00 Meter Level (MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	1	7	39	3	0	50
NNE	0	2	20	24	0	0	46
NE	1	18	41	5	0	0	65
ENE	2	10	42	11	0	0	65
E	2	16	43	6	3	0	70
ESE	2	5	29	13	0	0	49
SE	4	14	34	7	0	0	59
SSE	7	22	48	9	0	0	86
S	3	23	55	17	0	0	98
SSW	2	12	61	17	0	1	93
SW	2	16	50	28	1	1	98
WSW	5	14	14	4	0	0	37
W	3	14	18	9	3	0	47
WNW	4	9	9	12	0	0	34
NW	1	2	9	11	11	2	36
NNW	1	4	10	11	3	1	30
TOT	39	182	490	223	24	5	963

Hours of Calm Data: 3

Hours of Invalid Data: 0

Hours of Good Data:

8647 = 98.4% of Total Hours