

May 21, 2004

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
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ULNRC-5002



Ladies and Gentlemen:

**DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
FACILITY OPERATING LICENSE NPF-30
1997 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT**

Enclosed are revised sections of the 1997 Annual Radioactive Effluent Release Report (ARERR). This submittal includes revised Meteorological data tables and recalculated doses to the public from gaseous releases in 1997. These tables were revised due to intermittent electrical interferences that affected the Primary Meteorological Tower 10 and 60 meter wind speed transmitters. These errors resulted in a slight increase in the calculated dose to the public. However, the calculated dose is still only a small percentage of the regulatory limits.

Sincerely,

A handwritten signature in black ink that reads "Keith D. Young".

Keith D. Young
Manager, Regulatory Affairs

DJW/hao

Enclosure

JE48

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5/21/04

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cc: U.S. Nuclear Regulatory Commission (Original and 1 copy)
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TABLE 5

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

| ORGAN | UNITS | SITE BOUNDARY | | NEAREST RESIDENT | |
|-------|-------|-----------------------|------------|-----------------------|------------|
| | | LOCATION: 1.40 km SSW | | LOCATION: 3.04 km NNW | |
| | | AGE GROUP: CHILD | | AGE GROUP: CHILD | |
| | | DOSE | % LIMIT(a) | DOSE | % LIMIT(b) |

| | | | | | |
|---------------------|------|----------|------|----------|------|
| 1. GAMMA AIR DOSE * | MRAD | 4.69E-03 | 0.05 | 2.59E-03 | N/A |
| 2. BETA AIR DOSE * | MRAD | 1.26E-02 | 0.06 | 6.96E-03 | N/A |
| 3. WHOLE BODY *** | MREM | 4.00E-03 | N/A | 2.22E-03 | N/A |
| 4. SKIN *** | MREM | 9.43E-03 | N/A | 5.22E-03 | N/A |
| 5. BONE ** | MREM | 8.63E-07 | N/A | 3.95E-06 | 0.00 |
| 6. LIVER ** | MREM | 2.22E-03 | N/A | 1.05E-02 | 0.07 |
| 7. TOTAL BODY ** | MREM | 2.22E-03 | N/A | 1.05E-02 | 0.07 |
| 8. THYROID ** | MREM | 2.23E-03 | N/A | 1.16E-02 | 0.08 |
| 9. KIDNEY ** | MREM | 2.22E-03 | N/A | 1.05E-02 | 0.07 |
| 10. LUNG ** | MREM | 2.22E-03 | N/A | 1.05E-02 | 0.07 |
| 11. GI-LLI ** | MREM | 2.22E-03 | N/A | 1.05E-02 | 0.07 |

* 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 | 2.24E-03 | N/A | N/A | 2.24E-03 |
| 2. BONE | MREM | 2.49E-07 | 8.79E-03 | 9.59E-05 | 8.89E-03 |
| 3. LIVER | MREM | 6.75E-04 | 8.79E-03 | 9.59E-05 | 9.56E-03 |
| 4. TOTAL BODY | MREM | 1.63E-03 | 8.79E-03 | 9.59E-05 | 1.05E-02 |
| 5. THYROID | MREM | 6.76E-04 | 8.79E-03 | 9.59E-05 | 9.56E-03 |
| 6. KIDNEY | MREM | 6.75E-04 | 8.79E-03 | 9.59E-05 | 9.56E-03 |
| 7. LUNG | MREM | 6.75E-04 | 8.79E-03 | 9.59E-05 | 9.56E-03 |
| 8. GI-LLI | MREM | 6.75E-04 | 8.79E-03 | 9.59E-05 | 9.56E-03 |

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 | 3.04E-03 | 2.24E-03 | 5.29E-03 | 0.02 |
| 2. BONE | MREM | 9.31E-07 | 8.89E-03 | 8.89E-03 | 0.04 |
| 3. LIVER | MREM | 3.65E-03 | 9.56E-03 | 1.32E-02 | 0.05 |
| 4. TOTAL BODY | MREM | 4.94E-03 | 1.05E-02 | 1.55E-02 | 0.06 |
| 5. THYROID | MREM | 3.93E-03 | 9.56E-03 | 1.35E-02 | 0.02 |
| 6. KIDNEY | MREM | 3.65E-03 | 9.56E-03 | 1.32E-02 | 0.05 |
| 7. LUNG | MREM | 3.65E-03 | 9.56E-03 | 1.32E-02 | 0.05 |
| 8. GI-LLI | MREM | 3.65E-03 | 9.56E-03 | 1.32E-02 | 0.05 |

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

Meteorological Data
Averages Using Hourly Averaged Data

1-JAN-1997 00:00:00.00 to 31-DEC-1997 23:00:00.00

| | | UNITS | VALUES | % GOOD DATA |
|---------------------|--------------------------------|-----------|----------|-------------|
| Stability Class | | A - G | E | 98% |
| Total Precipitation | | CM. | 1.01E+02 | 99% |
| 10 Meter Level: | Wind Speed | Meter/Sec | 3.10E+00 | 100% |
| | Wind Direction | Degrees | 2.51E+02 | 99% |
| | Wind Direction Variability | Degrees | 1.30E+01 | 99% |
| | Reference Temperature | Degrees C | 1.20E+01 | 100% |
| | Dewpoint | Degrees C | 5.39E+00 | 99% |
| 60 Meter Level: | Wind Speed | Meter/Sec | 5.17E+00 | 99% |
| | Wind Direction | Degrees | 2.41E+02 | 97% |
| | Wind Direction Variability | Degrees | 8.69E+00 | 98% |
| | Dewpoint | Degrees C | NONE | 0% |
| | Temperature Difference 60 - 10 | Degrees C | 1.20E-01 | 98% |

Meteorological Data
Totals of Hours at Each Wind Speed & Direction

1-JAN-1997 00:00:00.00 to 31-DEC-1997 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 | 2 | 1 | 0 | 0 | 0 | 3 |
| NE | 0 | 3 | 1 | 0 | 0 | 0 | 4 |
| ENE | 0 | 3 | 0 | 0 | 0 | 0 | 3 |
| E | 0 | 4 | 3 | 0 | 0 | 0 | 7 |
| ESE | 0 | 6 | 5 | 0 | 0 | 0 | 11 |
| SE | 2 | 19 | 18 | 0 | 0 | 0 | 39 |
| SSE | 5 | 27 | 15 | 3 | 0 | 0 | 50 |
| S | 2 | 38 | 25 | 4 | 0 | 0 | 69 |
| SSW | 3 | 42 | 32 | 1 | 0 | 0 | 78 |
| SW | 3 | 37 | 27 | 8 | 0 | 0 | 75 |
| WSW | 1 | 12 | 4 | 3 | 0 | 0 | 20 |
| W | 2 | 11 | 3 | 0 | 0 | 0 | 16 |
| WNW | 0 | 10 | 17 | 8 | 0 | 0 | 35 |
| NW | 0 | 4 | 5 | 11 | 0 | 0 | 20 |
| NNW | 3 | 1 | 2 | 0 | 0 | 0 | 6 |
| TOT | 21 | 219 | 159 | 38 | 0 | 0 | 437 |

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

Meteorological Data
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1997 00:00:00.00 to 31-DEC-1997 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 | 1 | 11 | 4 | 2 | 0 | 0 | 18 |
| NNE | 1 | 5 | 3 | 0 | 0 | 0 | 9 |
| NE | 0 | 5 | 7 | 0 | 0 | 0 | 12 |
| ENE | 1 | 4 | 5 | 0 | 0 | 0 | 10 |
| E | 1 | 5 | 1 | 0 | 0 | 0 | 7 |
| ESE | 1 | 4 | 7 | 3 | 0 | 0 | 15 |
| SE | 2 | 12 | 4 | 1 | 0 | 0 | 19 |
| SSE | 3 | 19 | 7 | 0 | 0 | 0 | 29 |
| S | 2 | 13 | 10 | 4 | 0 | 0 | 29 |
| SSW | 2 | 9 | 17 | 2 | 0 | 0 | 30 |
| SW | 2 | 14 | 13 | 2 | 0 | 0 | 31 |
| WSW | 0 | 14 | 7 | 1 | 0 | 0 | 22 |
| W | 2 | 16 | 6 | 4 | 1 | 0 | 29 |
| WNW | 3 | 21 | 11 | 3 | 0 | 0 | 38 |
| NW | 0 | 10 | 21 | 6 | 0 | 0 | 37 |
| NNW | 0 | 3 | 10 | 3 | 0 | 0 | 16 |
| TOT | 21 | 165 | 133 | 31 | 1 | 0 | 351 |

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

Meteorological Data
 Totals of Hours at Each Wind Speed & Direction

1-JAN-1997 00:00:00.00 to 31-DEC-1997 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 | 2 | 14 | 17 | 5 | 0 | 0 | 38 |
| NNE | 1 | 13 | 5 | 0 | 0 | 0 | 19 |
| NE | 5 | 6 | 14 | 0 | 0 | 0 | 25 |
| ENE | 2 | 5 | 8 | 0 | 0 | 0 | 15 |
| E | 0 | 6 | 2 | 0 | 0 | 0 | 8 |
| ESE | 0 | 5 | 6 | 2 | 0 | 0 | 13 |
| SE | 0 | 16 | 9 | 0 | 0 | 0 | 25 |
| SSE | 6 | 13 | 8 | 1 | 0 | 0 | 28 |
| S | 2 | 11 | 9 | 9 | 0 | 0 | 31 |
| SSW | 5 | 18 | 20 | 3 | 0 | 0 | 46 |
| SW | 3 | 15 | 10 | 3 | 0 | 0 | 31 |
| WSW | 6 | 10 | 8 | 1 | 2 | 0 | 27 |
| W | 3 | 20 | 5 | 3 | 2 | 0 | 33 |
| WNW | 4 | 15 | 16 | 5 | 0 | 0 | 40 |
| NW | 4 | 17 | 20 | 5 | 0 | 0 | 46 |
| NNW | 2 | 9 | 20 | 1 | 0 | 0 | 32 |
| TOT | 45 | 193 | 177 | 38 | 4 | 0 | 457 |

Hours of Calm Data: 1
 Hours of Invalid Data: 5

Meteorological Data
Totals of Hours at Each Wind Speed & Direction

1-JAN-1997 00:00:00.00 to 31-DEC-1997 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 | 17 | 83 | 115 | 11 | 0 | 0 | 226 |
| NNE | 25 | 79 | 60 | 7 | 0 | 0 | 171 |
| NE | 18 | 74 | 37 | 1 | 0 | 0 | 130 |
| ENE | 8 | 56 | 50 | 4 | 0 | 0 | 118 |
| E | 8 | 63 | 66 | 2 | 0 | 0 | 139 |
| ESE | 14 | 60 | 43 | 5 | 0 | 0 | 122 |
| SE | 15 | 65 | 27 | 7 | 1 | 0 | 115 |
| SSE | 19 | 52 | 33 | 9 | 3 | 0 | 116 |
| S | 12 | 44 | 40 | 8 | 1 | 0 | 105 |
| SSW | 19 | 66 | 42 | 18 | 1 | 0 | 146 |
| SW | 22 | 55 | 25 | 8 | 1 | 0 | 111 |
| WSW | 16 | 50 | 36 | 4 | 2 | 3 | 111 |
| W | 21 | 87 | 86 | 42 | 4 | 0 | 240 |
| WNW | 21 | 94 | 153 | 59 | 1 | 0 | 328 |
| NW | 26 | 83 | 105 | 33 | 1 | 0 | 248 |
| NNW | 30 | 96 | 92 | 12 | 0 | 0 | 230 |
| TOT | 291 | 1107 | 1010 | 230 | 15 | 3 | 2656 |

Hours of Calm Data: 9
Hours of Invalid Data: 10

Meteorological Data
Totals of Hours at Each Wind Speed & Direction

1-JAN-1997 00:00:00.00 to 31-DEC-1997 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 | 29 | 111 | 28 | 4 | 0 | 0 | 172 |
| NNE | 39 | 91 | 16 | 0 | 0 | 0 | 146 |
| NE | 26 | 71 | 9 | 1 | 0 | 0 | 107 |
| ENE | 21 | 75 | 29 | 8 | 2 | 0 | 135 |
| E | 21 | 86 | 46 | 3 | 0 | 0 | 156 |
| ESE | 22 | 96 | 36 | 5 | 0 | 0 | 159 |
| SE | 23 | 140 | 93 | 3 | 1 | 0 | 260 |
| SSE | 27 | 136 | 69 | 17 | 0 | 0 | 249 |
| S | 31 | 99 | 90 | 27 | 0 | 0 | 247 |
| SSW | 26 | 82 | 69 | 9 | 0 | 0 | 186 |
| SW | 23 | 71 | 42 | 4 | 0 | 0 | 140 |
| WSW | 31 | 58 | 20 | 1 | 1 | 0 | 111 |
| W | 29 | 77 | 59 | 7 | 0 | 0 | 172 |
| WNW | 32 | 110 | 66 | 16 | 0 | 0 | 224 |
| NW | 46 | 112 | 62 | 15 | 1 | 0 | 236 |
| NNW | 39 | 149 | 65 | 8 | 1 | 0 | 262 |
| TOT | 465 | 1564 | 799 | 128 | 6 | 0 | 2962 |

Hours of Calm Data: 26
Hours of Invalid Data: 21

Meteorological Data
Totals of Hours at Each Wind Speed & Direction

1-JAN-1997 00:00:00.00 to 31-DEC-1997 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 | 22 | 28 | 0 | 0 | 0 | 0 | 50 |
| NNE | 19 | 27 | 1 | 1 | 0 | 0 | 48 |
| NE | 16 | 13 | 0 | 0 | 0 | 0 | 29 |
| ENE | 28 | 12 | 2 | 0 | 0 | 0 | 42 |
| E | 17 | 9 | 3 | 0 | 0 | 0 | 29 |
| ESE | 37 | 19 | 0 | 0 | 0 | 0 | 56 |
| SE | 44 | 79 | 8 | 0 | 0 | 0 | 131 |
| SSE | 28 | 150 | 8 | 0 | 0 | 0 | 186 |
| S | 23 | 101 | 12 | 0 | 0 | 0 | 136 |
| SSW | 26 | 63 | 6 | 0 | 0 | 0 | 95 |
| SW | 35 | 59 | 5 | 0 | 0 | 0 | 99 |
| WSW | 20 | 16 | 0 | 0 | 0 | 0 | 36 |
| W | 14 | 39 | 7 | 0 | 0 | 0 | 60 |
| WNW | 33 | 34 | 0 | 0 | 0 | 0 | 67 |
| NW | 26 | 40 | 1 | 0 | 0 | 0 | 67 |
| NNW | 14 | 44 | 0 | 0 | 0 | 0 | 58 |
| TOT | 402 | 733 | 53 | 1 | 0 | 0 | 1189 |

Hours of Calm Data:
Hours of Invalid Data:

21
5

Meteorological Data
Totals of Hours at Each Wind Speed & Direction

1-JAN-1997 00:00:00.00 to 31-DEC-1997 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 | 20 | 14 | 0 | 0 | 0 | 0 | 34 |
| NNE | 25 | 10 | 0 | 0 | 0 | 0 | 35 |
| NE | 19 | 2 | 1 | 0 | 0 | 0 | 22 |
| ENE | 9 | 4 | 0 | 0 | 0 | 0 | 13 |
| E | 11 | 0 | 1 | 0 | 0 | 0 | 12 |
| ESE | 11 | 6 | 0 | 0 | 0 | 0 | 17 |
| SE | 16 | 26 | 3 | 0 | 0 | 0 | 45 |
| SSE | 26 | 89 | 8 | 0 | 0 | 0 | 123 |
| S | 35 | 27 | 3 | 0 | 0 | 0 | 65 |
| SSW | 23 | 16 | 0 | 0 | 0 | 0 | 39 |
| SW | 21 | 14 | 0 | 0 | 0 | 0 | 35 |
| WSW | 5 | 1 | 0 | 0 | 0 | 0 | 6 |
| W | 10 | 6 | 0 | 0 | 0 | 0 | 16 |
| WNW | 19 | 8 | 0 | 0 | 0 | 0 | 27 |
| NW | 9 | 38 | 0 | 0 | 0 | 0 | 47 |
| NNW | 6 | 9 | 0 | 0 | 0 | 0 | 15 |
| TOT | 265 | 270 | 16 | 0 | 0 | 0 | 551 |

Hours of Calm Data: 24
 Hours of Invalid Data: 5
 Hours of Good Data: 8684 = 99.1% of Total Hours

Meteorological Data
Totals of Hours at Each Wind Speed & Direction

1-JAN-1997 00:00:00.00 to 31-DEC-1997 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 | 1 | 0 | 0 | 0 | 0 | 1 |
| NNE | 1 | 3 | 1 | 1 | 0 | 0 | 6 |
| NE | 0 | 0 | 3 | 0 | 0 | 0 | 3 |
| ENE | 0 | 2 | 1 | 0 | 0 | 0 | 3 |
| E | 0 | 3 | 3 | 0 | 0 | 0 | 6 |
| ESE | 0 | 5 | 9 | 0 | 0 | 0 | 14 |
| SE | 1 | 10 | 24 | 2 | 0 | 0 | 37 |
| SSE | 1 | 20 | 24 | 9 | 0 | 0 | 54 |
| S | 0 | 17 | 31 | 17 | 1 | 0 | 66 |
| SSW | 0 | 30 | 30 | 21 | 0 | 1 | 82 |
| SW | 0 | 17 | 27 | 17 | 8 | 0 | 69 |
| WSW | 1 | 5 | 10 | 1 | 2 | 0 | 19 |
| W | 1 | 10 | 8 | 2 | 0 | 0 | 21 |
| WNW | 0 | 3 | 13 | 10 | 5 | 3 | 34 |
| NW | 1 | 3 | 3 | 4 | 8 | 0 | 19 |
| NNW | 0 | 0 | 2 | 0 | 0 | 0 | 2 |
| TOT | 6 | 129 | 189 | 84 | 24 | 4 | 436 |

Hours of Calm Data: 1
Hours of Invalid Data: 10

Meteorological Data
Totals of Hours at Each Wind Speed & Direction

1-JAN-1997 00:00:00.00 to 31-DEC-1997 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 | 4 | 6 | 4 | 0 | 0 | 14 |
| NNE | 0 | 11 | 1 | 2 | 0 | 0 | 14 |
| NE | 0 | 6 | 9 | 1 | 0 | 0 | 16 |
| ENE | 0 | 0 | 5 | 2 | 0 | 0 | 7 |
| E | 0 | 3 | 2 | 0 | 0 | 0 | 5 |
| ESE | 1 | 2 | 8 | 4 | 0 | 0 | 15 |
| SE | 2 | 13 | 5 | 1 | 0 | 0 | 21 |
| SSE | 1 | 15 | 9 | 1 | 0 | 0 | 26 |
| S | 1 | 9 | 7 | 8 | 3 | 0 | 28 |
| SSW | 1 | 4 | 19 | 9 | 1 | 2 | 36 |
| SW | 1 | 11 | 10 | 8 | 0 | 0 | 30 |
| WSW | 2 | 3 | 15 | 4 | 0 | 1 | 25 |
| W | 1 | 8 | 15 | 5 | 3 | 2 | 34 |
| WNW | 2 | 9 | 17 | 6 | 3 | 2 | 39 |
| NW | 2 | 4 | 14 | 10 | 3 | 0 | 33 |
| NNW | 2 | 3 | 3 | 5 | 1 | 0 | 14 |
| TOT | 16 | 105 | 145 | 70 | 14 | 7 | 357 |

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

Meteorological Data
Totals of Hours at Each Wind Speed & Direction

1-JAN-1997 00:00:00.00 to 31-DEC-1997 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 | 9 | 13 | 7 | 1 | 0 | 30 |
| NNE | 0 | 8 | 9 | 5 | 0 | 0 | 22 |
| NE | 0 | 4 | 16 | 4 | 0 | 0 | 24 |
| ENE | 3 | 5 | 11 | 0 | 0 | 0 | 19 |
| E | 0 | 1 | 5 | 0 | 0 | 0 | 6 |
| ESE | 0 | 3 | 10 | 2 | 1 | 0 | 16 |
| SE | 0 | 12 | 9 | 3 | 0 | 0 | 24 |
| SSE | 2 | 11 | 9 | 5 | 0 | 0 | 27 |
| S | 2 | 5 | 8 | 6 | 6 | 0 | 27 |
| SSW | 3 | 13 | 16 | 14 | 3 | 0 | 49 |
| SW | 2 | 7 | 8 | 9 | 1 | 0 | 27 |
| WSW | 2 | 9 | 10 | 6 | 3 | 3 | 33 |
| W | 0 | 12 | 10 | 4 | 3 | 1 | 30 |
| WNW | 1 | 11 | 19 | 10 | 6 | 0 | 47 |
| NW | 0 | 10 | 12 | 12 | 2 | 0 | 36 |
| NNW | 2 | 9 | 15 | 4 | 1 | 0 | 31 |
| TOT | 17 | 129 | 180 | 91 | 27 | 4 | 448 |

Hours of Calm Data: 2
Hours of Invalid Data: 13

Meteorological Data
Totals of Hours at Each Wind Speed & Direction

1-JAN-1997 00:00:00.00 to 31-DEC-1997 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 | 10 | 48 | 78 | 64 | 5 | 0 | 205 |
| NNE | 14 | 51 | 69 | 27 | 3 | 0 | 164 |
| NE | 10 | 53 | 68 | 27 | 1 | 1 | 160 |
| ENE | 9 | 29 | 63 | 28 | 0 | 0 | 129 |
| E | 4 | 36 | 64 | 30 | 0 | 0 | 134 |
| ESE | 0 | 27 | 61 | 21 | 0 | 0 | 109 |
| SE | 5 | 47 | 42 | 9 | 4 | 0 | 107 |
| SSE | 5 | 26 | 42 | 26 | 7 | 3 | 109 |
| S | 6 | 25 | 39 | 31 | 4 | 3 | 108 |
| SSW | 7 | 40 | 53 | 30 | 23 | 3 | 156 |
| SW | 10 | 35 | 43 | 11 | 5 | 4 | 108 |
| WSW | 13 | 20 | 45 | 29 | 12 | 6 | 125 |
| W | 8 | 27 | 93 | 70 | 47 | 21 | 266 |
| WNW | 2 | 36 | 89 | 108 | 43 | 24 | 302 |
| NW | 12 | 38 | 75 | 76 | 16 | 8 | 225 |
| NNW | 13 | 39 | 98 | 38 | 8 | 2 | 198 |
| TOT | 128 | 577 | 1022 | 625 | 178 | 75 | 2605 |

Hours of Calm Data:
Hours of Invalid Data:

8
62

Meteorological Data
Totals of Hours at Each Wind Speed & Direction

1-JAN-1997 00:00:00.00 to 31-DEC-1997 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 | 4 | 34 | 110 | 45 | 5 | 0 | 198 |
| NNE | 3 | 23 | 105 | 9 | 0 | 0 | 140 |
| NE | 3 | 38 | 79 | 10 | 0 | 0 | 130 |
| ENE | 2 | 23 | 89 | 28 | 3 | 7 | 152 |
| E | 1 | 15 | 77 | 38 | 2 | 0 | 133 |
| ESE | 1 | 27 | 110 | 41 | 2 | 0 | 181 |
| SE | 5 | 17 | 111 | 84 | 4 | 0 | 221 |
| SSE | 4 | 24 | 93 | 86 | 13 | 3 | 223 |
| S | 6 | 30 | 59 | 114 | 24 | 5 | 238 |
| SSW | 7 | 21 | 57 | 119 | 32 | 2 | 238 |
| SW | 4 | 18 | 43 | 51 | 14 | 1 | 131 |
| WSW | 6 | 26 | 39 | 32 | 5 | 2 | 110 |
| W | 3 | 26 | 56 | 80 | 32 | 1 | 198 |
| WNW | 5 | 24 | 83 | 55 | 22 | 5 | 194 |
| NW | 1 | 24 | 102 | 75 | 13 | 4 | 219 |
| NNW | 4 | 41 | 99 | 63 | 7 | 0 | 214 |
| TOT | 59 | 411 | 1312 | 930 | 178 | 30 | 2920 |

Hours of Calm Data: 8
Hours of Invalid Data: 81

Meteorological Data
Totals of Hours at Each Wind Speed & Direction

1-JAN-1997 00:00:00.00 to 31-DEC-1997 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 | 5 | 20 | 24 | 0 | 0 | 50 |
| NNE | 2 | 3 | 28 | 12 | 1 | 0 | 46 |
| NE | 0 | 7 | 27 | 4 | 0 | 0 | 38 |
| ENE | 2 | 6 | 24 | 13 | 0 | 0 | 45 |
| E | 1 | 3 | 27 | 5 | 0 | 0 | 36 |
| ESE | 4 | 9 | 37 | 7 | 0 | 0 | 57 |
| SE | 2 | 12 | 47 | 28 | 1 | 0 | 90 |
| SSE | 1 | 22 | 56 | 32 | 2 | 0 | 113 |
| S | 5 | 19 | 96 | 61 | 1 | 0 | 182 |
| SSW | 1 | 7 | 42 | 76 | 9 | 0 | 135 |
| SW | 1 | 11 | 31 | 45 | 5 | 0 | 93 |
| WSW | 3 | 16 | 21 | 26 | 2 | 0 | 68 |
| W | 1 | 7 | 9 | 29 | 4 | 0 | 50 |
| WNW | 1 | 6 | 24 | 28 | 3 | 0 | 62 |
| NW | 3 | 9 | 24 | 10 | 0 | 0 | 46 |
| NNW | 1 | 12 | 29 | 20 | 0 | 0 | 62 |
| TOT | 29 | 154 | 542 | 420 | 28 | 0 | 1173 |

Hours of Calm Data: 1
Hours of Invalid Data: 41

Meteorological Data
Totals of Hours at Each Wind Speed & Direction

1-JAN-1997 00:00:00.00 to 31-DEC-1997 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 | 2 | 1 | 12 | 0 | 0 | 16 |
| NNE | 0 | 3 | 9 | 6 | 0 | 0 | 18 |
| NE | 1 | 4 | 18 | 4 | 0 | 0 | 27 |
| ENE | 1 | 2 | 22 | 7 | 0 | 0 | 32 |
| E | 0 | 6 | 15 | 5 | 0 | 0 | 26 |
| ESE | 0 | 1 | 7 | 5 | 0 | 0 | 13 |
| SE | 1 | 6 | 16 | 2 | 0 | 0 | 25 |
| SSE | 2 | 5 | 32 | 18 | 1 | 0 | 58 |
| S | 0 | 12 | 58 | 25 | 0 | 0 | 95 |
| SSW | 1 | 9 | 19 | 29 | 4 | 0 | 62 |
| SW | 2 | 6 | 25 | 23 | 8 | 0 | 64 |
| WSW | 2 | 6 | 5 | 2 | 0 | 0 | 15 |
| W | 1 | 3 | 4 | 2 | 2 | 0 | 12 |
| WNW | 1 | 3 | 6 | 4 | 2 | 0 | 16 |
| NW | 0 | 3 | 8 | 12 | 0 | 0 | 23 |
| NNW | 0 | 5 | 23 | 13 | 1 | 0 | 42 |
| TOT | 13 | 76 | 268 | 169 | 18 | 0 | 544 |

Hours of Calm Data: 1
 Hours of Invalid Data: 35
 Hours of Good Data: 8504 = 97.1% of Total Hours