A REPORT FROM

# *The State Hygienic Laboratory*

MEDICAL LABORATORIES BUILDING

THE UNIVERSITY OF IOWA

IOWA CITY, IOWA 52240

# AIR QUALITY SURVEY
# COUNCIL BLUFFS, IOWA

10 April through 21 April, 1972

#72-55

Report on the
Air Quality in Council Bluffs during
an Twelve-Day Period in April

By

I A Schwabbauer — Chief, Air Pollution Section

D V Vernon — Air Pollution Technician

Submitted to the Iowa Air Pollution Control Commission by the
State Hygienic Laboratory
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# COUNCIL BLUFFS AIR QUALITY SURVEY

On 10 April 1972, the mobile air pollution control laboratory, operated by personnel of the State Hygienic Laboratory was transported to Council Bluffs, Iowa for a survey of the ambient air quality. The survey was conducted during a 12-day period from 10 April through 21 April, 1972. Three sampling sites were utilized with each site chosen to be as representative as possible of the general surrounding area, without unduly maximizing or minimizing the effect of any point source of pollution within that area.

Site selections were made with the advice and cooperation of local city officials, who provided us with the information necessary to choose appropriate areas within the city. The first collection site, Fire Station #2, is located in an industrial area and near a commercial area. The second site, Fire Station #6, is representative primarily of the residential area, with a commercial area being nearby. The third site, Dodge Park, was chosen to be representative of commercial and light industrial areas, as well as being the high traffic area and receptor of much of the air coming from the Nebraska side of the river.

Data from hi-volume sampling for the total survey period indicates that primary standards are exceeded on many occasions in the Council Bluffs area. A geometric mean of 120 micrograms per cubic meter ($\mu g/m^3$) for suspended particulates was obtained during this survey. This value is approximately 60% in excess of the primary standard of 75 $\mu g/m^3$. No individual sample exceeded the 24-hour primary standard of 260 $\mu g/m^3$, but two samples were in excess of 200 $\mu g/m^3$.

Coefficient of haze (COH) data agreed with hi-volume sampling results for suspended particulates. The geometric mean of 0.16 COH is well below the St Louis standard of 0.4 COH/1000 lineal feet, which is used for comparison purposes, since there are no applicable Federal or Iowa standards. COH values show the same trends, as do the high-vol samples, but the relative values are lower for COH. This is due to the fact that different size particles collected by the two methods.

Sulfur dioxide ($SO_2$) was detected on only one date during our sampling survey. During that time, the primary standards were not exceeded for sulfur dioxide. By comparing wind rose

information with sulfur dioxide data, it can be shown that the source was a power generating station on the Nebraska side of the Missouri River. Even though primary standards for $SO_2$ were not exceeded at the time of our survey, it is quite reasonable to assume that $SO_2$ would be a problem in Council Bluffs during the peak heating season when fossil fuel is burned by the Nebraska station, especially during adverse meteorological conditions.

Carbon monoxide (CO) data were within the expected ranges with higher values being obtained in the commercial areas and near major traffic arteries. All recorded levels were somewhat lower than they might have been had the wind speed not been as great. Natural ventilation produced by higher than average wind speeds tended to sweep the carbon monoxide out of the area, thereby holding the averages at a lower value. The highest 1-hour average of 11 ppm is approximately 1/3 the 1-hour 35 ppm primary standard. The highest 8-hour average of 5.9 ppm is approximately 2/3 of the Environmental Protection Agency's (EPA) 9 ppm limit for an 8-hour average concentration. Both 1-hour and 8-hour averages for CO were well below established standards.

In summary, the air quality parameters at each sampling site under existing weather conditions appeared to be satisfactorily below the established standards for all pollutants, except particulate materials. Subsequent surveys at other times of the year will undoubtedly produce different results. If a thermal inversion should occur, all pollutant parameters would be expected to increase significantly.

This report is not to be considered a comprehensive treatment of the overall air quality in Council Bluffs, but rather as an evaluation of specific parameters under prevailing conditions that existed during the period of our survey.

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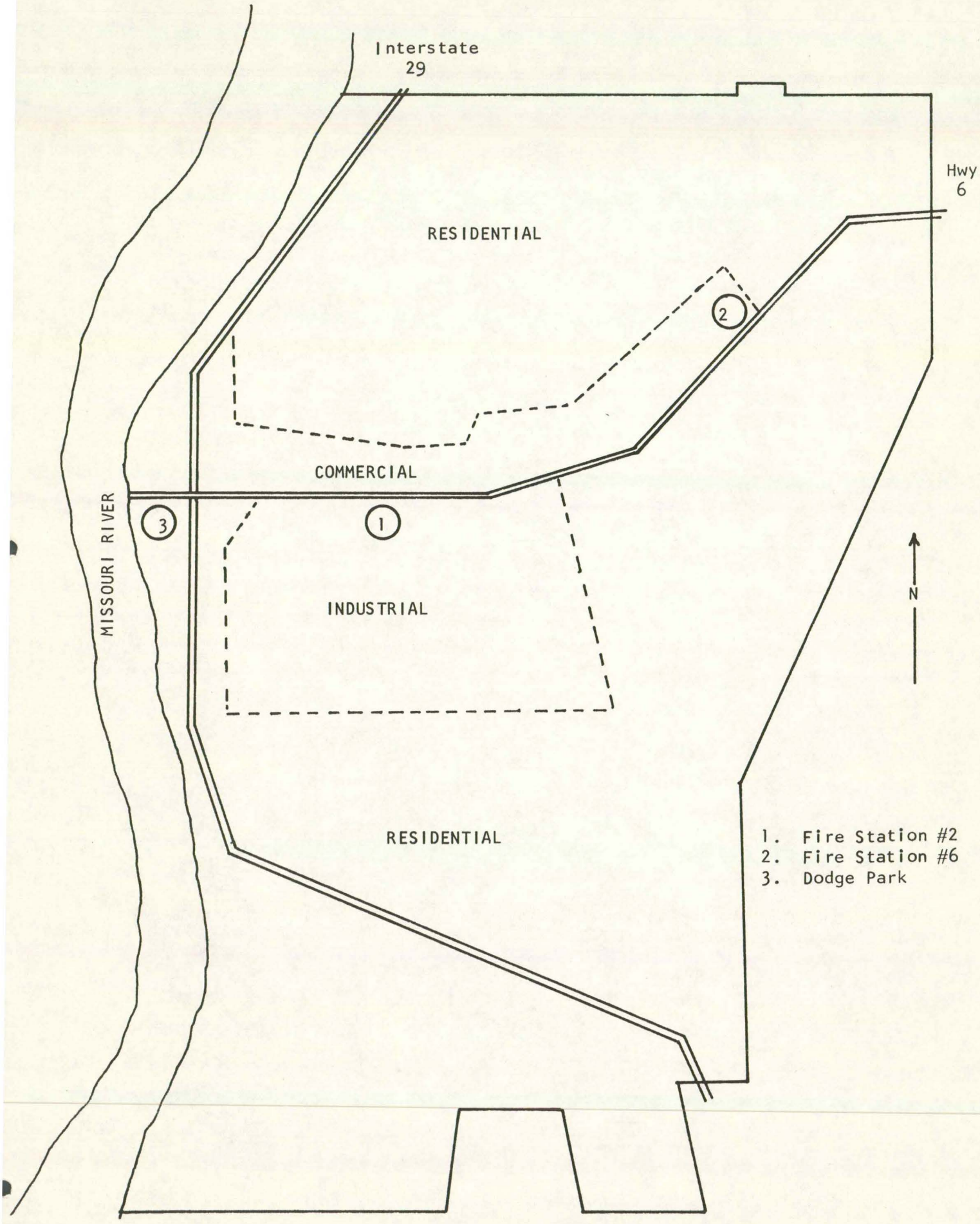
COUNCIL BLUFFS

(Not to Scale)




1. Fire Station #2
2. Fire Station #6
3. Dodge Park

## NATIONAL PRIMARY AND SECONDARY AMBIENT AIR QUALITY STANDARDS

Sulfur Oxides (primary)

a. 80 $\mu g/m^3$ (0.03 ppm) - annual arithmetic mean

b. 365 $\mu g/m^3$ (0.14 ppm) - maximum 24-hour concentration not to be exceeded more than once per year

Sulfur Oxides (secondary)

a. 60 $\mu g/m^3$ (0.02 ppm) - annual arithmetic mean

b. 260 $\mu g/m^3$ (0.1 ppm) - maximum 24-hour concentration not to be exceeded more than once per year.

c. 1,300 $\mu g/m^3$ (0.5 ppm) - maximum 3-hour concentration not to be exceeded more than once per year.

Particulate Matter (primary)

a. 75 $\mu g/m^3$ - annual geometric mean

b. 260 $\mu g/m^3$ - maximum 24-hour concentration not to be exceeded more than once per year.

Particulate Matter (secondary)

a. 60 $\mu g/m^3$ - annual geometric mean

b. 150 $\mu g/m^3$ - maximum 24-hour concentration not to be exceeded more than once per year.

Carbon Monoxide (primary and secondary)

a. 10 $mg/m^3$ (9 ppm) - maximum 8-hour concentration not to be exceeded more than once per year.

b. 40 $mg/m^3$ (35 ppm) - maximum 1-hour concentration not to be exceeded more than once per year.

Primary Standard - level of air quality necessary, with an adequate margin of safety, to protect the public health.

Secondary Standard - levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

SUSPENDED PARTICULATES
(24-Hour Samples)

| DATE | LOCATION | SUSPENDED PARTICULATE ($\mu g/m^3$) |
|---|---|---|
| 4/10/72 | Fire Station #2 | 230 |
| 4/11/72 | | 121 |
| 4/12/72 | | 165 |
| 4/14/72 | Fire Station #6 | 101 |
| 4/17/72 | Dodge Park | 210 |
| 4/19/72 | | 66.8 |
| 4/20/72 | | 54.1 |

AVERAGE 134
GEOMETRIC MEAN 120

Particulate Matter (Primary)

a. 75 $\mu g/m^3$ - annual geometric mean

b. 260 $\mu g/m^3$ - maximum 24-hour concentration not to be exceeded more than once per year.

Particulate Matter (secondary)

a. 60 $\mu g/m^3$ - annual geometric mean

b. 150 $\mu g/m^3$ - maximum 24-hour concentration not to be exceeded more than once per year.

SULFUR DIOXIDE
COUNCIL BLUFFS

(Values in Parts per Million)

| DATE | LOCATION | TIME | PEAK | AVERAGE MAXIMUM CONCENTRATION 3 Hours | 24 Hours |
|---|---|---|---|---|---|
| 4/17/72 | Dodge Park | 1400-1500 | 0.040 | --- | ---- |
| | | -1800 | 0.165 | 0.082 | ---- |
| | | -2100 | 0.090 | 0.017 | ---- |
| | | -2400 | Nil | Nil | ---- |

Sulfur Oxides (primary)

a. 80 $\mu g/m^3$ (0.03 ppm) - annual arithmetic mean.

b. 365 $\mu g/m^3$ (0.14 ppm) - maximum 24-hour concentration not to be exceeded more than once per year.

Sulfur Oxides (secondary)

a. 60 $\mu g/m^3$ (0.02 ppm) - annual arithmetic mean.

b. 260 $\mu g/m^3$ (0.1 ppm) - maximum 24-hour concentration not to be exceeded more than once per year.

c. 1,300 $\mu g/m^3$ (0.5 ppm) - maximum 3-hour concentration not to be exceeded more than once per year.

CARBON MONOXIDE
COUNCIL BLUFFS

(Values in Parts per Million)

| DATE | LOCATION | TIME | PEAK | AVERAGE MAXIMUM CONCENTRATION 1 Hour | 8 Hour |
|---|---|---|---|---|---|
| 4/10/72 | Fire Station #2 | 1600-1700 | 6 | 3 | -- |
| | | -1800 | 5 | 3 | -- |
| | | -1900 | 7 | 4 | -- |
| | | -2000 | 5 | 3 | -- |
| | | -2100 | 4 | 3 | -- |
| | | -2200 | 4 | 2 | -- |
| | | -2300 | 3 | 2 | -- |
| | | -2400 | 3 | 2 | 2.7 |
| 4/11/72 | Fire Station #2 | 0001-0100 | 3 | 2 | 2.6 |
| | | -0200 | 3 | 2 | 2.4 |
| | | -0300 | 3 | 2 | 2.2 |
| | | -0400 | 2 | 2 | 2.1 |
| | | -0500 | 2 | 2 | 2.0 |
| | | -0600 | 2 | 2 | 2.0 |
| | | -0700 | 3 | 2 | 2.0 |
| | | -0800 | 4 | 2 | 2.0 |
| | | -0900 | 4 | 2 | 2.0 |
| | | -1000 | 3 | 2 | 2.0 |
| | | -1100 | 10 | 3 | 2.1 |
| | | -1200 | 5 | 3 | 2.2 |
| | | -1300 | 3 | 2 | 2.1 |
| | | -1400 | 4 | 3 | 2.2 |
| | | -1500 | 5 | 4 | 2.5 |
| | | -1600 | 11 | 4 | 2.8 |
| | | -1700 | 4 | 3 | 3.0 |
| | | -1800 | 19 | 3 | 3.1 |
| | | -1900 | 3 | 2 | 3.0 |
| | | -2000 | 4 | 3 | 3.0 |
| | | -2100 | 4 | 3 | 3.1 |
| | | -2200 | 4 | 3 | 3.1 |
| | | -2300 | 4 | 3 | 3.0 |
| | | -2400 | 4 | 2 | 2.8 |
| 4/12/72 | Fire Station #2 | 0001-0100 | 4 | 3 | 2.8 |
| | | -0200 | 4 | 3 | 2.8 |
| | | -0300 | 4 | 3 | 2.9 |
| | | -0400 | 4 | 3 | 2.9 |
| | | -0500 | 4 | 3 | 2.9 |
| | | -0600 | 4 | 3 | 2.9 |
| | | -0700 | 7 | 4 | 3.0 |
| | | -0800 | 8 | 4 | 3.1 |
| | | -0900 | 5 | 4 | 3.4 |
| | | -1000 | 15 | 5 | 3.6 |

| DATE | LOCATION | TIME | PEAK | AVERAGE MAXIMUM CONCENTRATION 1 Hour | 8 Hour |
|---|---|---|---|---|---|
| 4/12/72 | Fire Station #2 | 1000-1100 | 10 | 5 | 3.9 |
| | | -1200 | 5 | 4 | 4.0 |
| | | -1300 | 14 | 4 | 4.1 |
| | | -1400 | 7 | 4 | 4.2 |
| | | -1500 | 6 | 5 | 4.4 |
| | | -1600 | 8 | 4 | 4.4 |
| | | -1700 | 10 | 5 | 4.5 |
| | | -1800 | 5 | 4 | 4.4 |
| | | -1900 | 40 | 5 | 4.4 |
| | | -2000 | 7 | 5 | 4.5 |
| | | -2100 | 12 | 6 | 4.8 |
| | | -2200 | 16 | 11 | 5.4 |
| | | -2300 | 11 | 7 | 5.6 |
| | | -2400 | 12 | 6 | 5.9 |
| 4/13/72 | Fire Station #2 | 0001-0100 | 4 | 3 | 5.6 |
| | | -0200 | 9 | 4 | 5.6 |
| | | -0300 | 6 | 3 | 5.5 |
| | | -0400 | 4 | 3 | 5.2 |
| | | -0500 | 6 | 3 | 5.0 |
| | | -0600 | 6 | 4 | 4.2 |
| | | -0700 | 12 | 6 | 4.1 |
| | | -0800 | 13 | 5 | 3.9 |
| | | -0900 | 9 | 3 | 3.9 |
| | | -1000 | 39 | 5 | 4.0 |
| | | -1100 | 7 | 4 | 4.1 |
| | | -1200 | 21 | 4 | 4.2 |
| | | -1300 | 7 | 3 | 4.2 |
| | | -1400 | 83 | 4 | 4.2 |
| | | -1500 | 4 | 3 | 3.9 |
| | | -1600 | 40 | 3 | 3.6 |
| | | -1700 | 5 | 2 | 3.5 |
| | | -1800 | 3 | 1 | 3.0 |
| 4/13/72 | Fire Station #6 | 1900-2000 | 5 | 3 | -- |
| | | -2100 | 3 | 1 | -- |
| | | -2200 | 3 | 1 | -- |
| | | -2300 | 2 | 1 | -- |
| | | -2400 | 3 | 1 | -- |
| 4/14/72 | Fire Station #6 | 0001-0100 | 3 | 1 | -- |
| | | -0200 | 4 | 2 | -- |
| | | -0300 | 3 | 1 | 1.4 |
| | | -0400 | 3 | 1 | 1.1 |
| | | -0500 | 4 | 1 | 1.1 |
| | | -0600 | 3 | 2 | 1.2 |
| | | -0700 | 6 | 2 | 1.4 |
| | | -0800 | 4 | 2 | 1.5 |
| | | -0900 | 3 | 2 | 1.6 |
| | | -1000 | 11 | 3 | 1.8 |

| DATE | LOCATION | TIME | PEAK | AVERAGE MAXIMUM CONCENTRATION 1 Hour | 8 Hour |
|---|---|---|---|---|---|
| 4/14/72 | Fire Station #6 | 1000-1100 | 4 | 2 | 1.9 |
| | | -1200 | 4 | 2 | 2.0 |
| | | -1300 | 5 | 3 | 2.2 |
| | | -1400 | 4 | 2 | 2.2 |
| | | -1500 | 4 | 2 | 2.2 |
| | | -1600 | 4 | 3 | 2.4 |
| | | -1700 | 4 | 2 | 2.4 |
| | | -1800 | 9 | 4 | 2.5 |
| | | -1900 | 7 | 4 | 2.8 |
| | | -2000 | 3 | 1 | 2.6 |
| | | -2100 | 4 | 2 | 2.5 |
| | | -2200 | 4 | 2 | 2.5 |
| | | -2300 | 5 | 2 | 2.5 |
| | | -2400 | 4 | 2 | 2.4 |
| 4/15/72 | Fire Station #6 | 0001-0100 | 6 | 2 | 2.4 |
| | | -0200 | 3 | 1 | 2.0 |
| | | -0300 | 3 | 1 | 1.6 |
| | | -0400 | 5 | 2 | 1.8 |
| | | -0500 | 5 | 2 | 1.8 |
| | | -0600 | 4 | 2 | 1.8 |
| | | -0700 | 27 | 4 | 2.0 |
| | | -0800 | 6 | 2 | 2.0 |
| | | -0900 | 4 | 2 | 2.0 |
| | | -1000 | 5 | 3 | 2.2 |
| | | -1100 | 4 | 3 | 2.5 |
| | | -1200 | 4 | 3 | 2.6 |
| | | -1300 | 4 | 2 | 2.6 |
| | | -1400 | 4 | 3 | 2.8 |
| | | -1500 | 6 | 3 | 2.6 |
| | | -1600 | 4 | 3 | 2.8 |
| | | -1700 | 4 | 3 | 2.9 |
| | | -1800 | 8 | 4 | 3.0 |
| | | -1900 | 7 | 4 | 3.1 |
| | | -2000 | 4 | 3 | 3.1 |
| | | -2100 | 4 | 2 | 3.0 |
| | | -2200 | 5 | 3 | 3.0 |
| | | -2300 | 4 | 2 | 2.9 |
| | | -2400 | 4 | 2 | 2.8 |
| 4/16/72 | Fire Station #6 | 0001-0100 | 6 | 3 | 2.8 |
| | | -0200 | 6 | 3 | 2.6 |
| | | -0300 | 3 | 2 | 2.4 |
| | | -0400 | 3 | 2 | 2.2 |
| | | -0500 | 3 | 1 | 2.1 |
| | | -0600 | 3 | 2 | 2.0 |
| | | -0700 | 8 | 2 | 2.0 |
| | | -0800 | 12 | 3 | 2.1 |
| | | -0900 | 4 | 3 | 2.2 |
| | | -1000 | 3 | 2 | 2.1 |

| DATE | LOCATION | TIME | PEAK | AVERAGE MAXIMUM CONCENTRATION 1 Hour | 8 Hour |
|---|---|---|---|---|---|
| 4/16/72 | Fire Station #6 | 1000-1100 | 3 | 2 | 2.1 |
| | | -1200 | 3 | 2 | 2.1 |
| | | -1300 | 12 | 2 | 2.2 |
| | | -1400 | 7 | 4 | 2.5 |
| | | -1500 | 3 | 2 | 2.5 |
| | | -1600 | 3 | 2 | 2.4 |
| | | -1700 | 3 | 2 | 2.2 |
| | | -1800 | 5 | 3 | 2.4 |
| | | -1900 | 11 | 5 | 2.8 |
| | | -2000 | 11 | 6 | 3.2 |
| | | -2100 | 8 | 7 | 3.9 |
| | | -2200 | 12 | 6 | 4.1 |
| | | -2300 | 7 | 5 | 4.5 |
| | | -2400 | 7 | 5 | 4.9 |
| 4/17/72 | Fire Station #6 | 0001-0100 | 11 | 4 | 5.1 |
| | | -0200 | 6 | 4 | 5.2 |
| | | -0300 | 5 | 4 | 5.1 |
| | | -0400 | 6 | 4 | 4.9 |
| | | -0500 | 6 | 4 | 4.5 |
| | | -0600 | 5 | 4 | 4.2 |
| | | -0700 | 7 | 4 | 4.1 |
| | | -0800 | 6 | 4 | 4.0 |
| | | -0900 | 5 | 4 | 4.0 |
| | | -1000 | 5 | 4 | 4.0 |
| | | -1100 | 6 | 4 | 4.0 |
| | | -1200 | 5 | 4 | 4.0 |
| 4/17/72 | Dodge Park | 1400-1500 | 10 | 5 | -- |
| | | -1600 | 11 | 7 | -- |
| | | -1700 | 9 | 7 | -- |
| | | -1800 | 8 | 4 | -- |
| | | -1900 | 4 | 3 | -- |
| | | -2000 | 6 | 3 | -- |
| | | -2100 | 4 | 3 | -- |
| | | -2200 | 4 | 3 | 4.4 |
| | | -2300 | 5 | 3 | 4.1 |
| | | -2400 | 5 | 4 | 3.8 |
| 4/18/72 | Dodge Park | 0001-0100 | 4 | 3 | 3.2 |
| | | -0200 | 3 | 3 | 3.1 |
| | | -0300 | 3 | 3 | 3.1 |
| | | -0400 | 3 | 3 | 3.1 |
| | | -0500 | 3 | 3 | 3.1 |
| | | -0600 | 3 | 3 | 3.1 |
| | | -0700 | 9 | 6 | 3.5 |
| | | -0800 | 7 | 5 | 3.6 |
| | | -0900 | 5 | 4 | 3.8 |
| | | -1000 | 6 | 4 | 3.9 |
| | | -1100 | 8 | 5 | 4.1 |

| DATE | LOCATION | TIME | PEAK | AVERAGE MAXIMUM CONCENTRATION 1 Hour | 8 Hour |
|---|---|---|---|---|---|
| 4/18/72 | Dodge Park | 1100-1200 | 5 | 4 | 4.2 |
| | | -1300 | 5 | 4 | 4.4 |
| | | -1400 | 6 | 5 | 4.6 |
| | | -1500 | 6 | 4 | 4.4 |
| | | -1600 | 5 | 4 | 4.2 |
| | | -1700 | 5 | 4 | 4.2 |
| | | -1800 | 5 | 4 | 4.2 |
| | | -1900 | 5 | 4 | 4.1 |
| | | -2000 | 5 | 4 | 4.1 |
| | | -2100 | 5 | 4 | 4.1 |
| | | -2200 | 4 | 3 | 3.9 |
| | | -2300 | 7 | 4 | 3.9 |
| | | -2400 | 6 | 3 | 3.8 |
| 4/19/72 | Dodge Park | 0001-0100 | 5 | 3 | 3.6 |
| | | -0200 | 5 | 3 | 3.5 |
| | | -0300 | 6 | 3 | 3.4 |
| | | -0400 | 6 | 3 | 3.2 |
| | | -0500 | 8 | 4 | 3.2 |
| | | -0600 | 7 | 4 | 3.4 |
| | | -0700 | 5 | 4 | 3.4 |
| | | -0800 | 7 | 4 | 3.4 |
| | | -0900 | 9 | 4 | 3.5 |
| | | -1000 | 8 | 4 | 3.6 |
| | | -1100 | 33 | 5 | 4.0 |
| | | -1200 | 15 | 6 | 4.2 |
| | | -1300 | 12 | 4 | 4.2 |
| | | -1400 | 8 | 4 | 4.2 |
| | | -1500 | 21 | 5 | 4.4 |
| | | -1600 | 9 | 5 | 4.5 |
| | | -1700 | 8 | 4 | 4.5 |
| | | -1800 | 9 | 4 | 4.5 |
| | | -1900 | 6 | 3 | 4.2 |
| | | -2000 | 9 | 3 | 4.0 |
| | | -2100 | 5 | 3 | 3.9 |
| | | -2200 | 7 | 4 | 3.9 |
| | | -2300 | 8 | 3 | 3.6 |
| | | -2400 | | INSTRUMENT MALFUNCTION | |
| 4/20/72 | Dodge Park | 0001-0100 | | " | " |
| | | -0200 | | " | " |
| | | -0300 | | " | " |
| | | -0400 | | " | " |
| | | -0500 | | " | " |
| | | -0600 | | " | " |
| | | -0700 | | " | " |
| | | -0800 | | " | " |

| DATE | LOCATION | TIME | PEAK | AVERAGE MAXIMUM CONCENTRATION 1 Hour | 8 Hour |
|---|---|---|---|---|---|
| 4/20/72 | Dodge Park | 0800-0900 | | INSTRUMENT MALFUNCTION | |
| | | -1100 | 7 | 4 | -- |
| | | -1200 | 2 | 1 | -- |
| | | -1300 | 2 | 1 | -- |
| | | -1400 | 2 | 1 | -- |
| | | -1500 | 2 | 1 | -- |
| | | -1600 | 3 | 1 | -- |
| | | -1700 | 3 | 1 | 1.5 |
| | | -1800 | 2 | 1 | 1.1 |
| | | -1900 | 3 | 1 | 1.0 |
| | | -2000 | 2 | 1 | 1.0 |
| | | -2100 | 2 | 1 | 1.0 |
| | | -2200 | 4 | 2 | 1.1 |
| | | -2300 | 3 | 1 | 1.1 |
| | | -2400 | 4 | 2 | 1.2 |
| 4/21/72 | Dodge Park | 0001-0100 | 4 | 2 | 1.4 |
| | | -0200 | 3 | 1 | 1.4 |
| | | -0300 | 4 | 1 | 1.4 |
| | | -0400 | 7 | 3 | 1.6 |
| | | -0500 | 6 | 4 | 2.0 |
| | | -0600 | 4 | 3 | 2.1 |
| | | -0700 | 9 | 3 | 2.4 |
| | | -0800 | 10 | 4 | 2.6 |
| | | -0900 | 11 | 4 | 2.9 |

Carbon Monoxide (primary and secondary)

a. 10 $mg/m^3$ (9 ppm) - maximum 8-hour concentration not to be exceeded more than once per year.

b. 40 $mg/m^3$ (35 ppm) - maximum 1-hour concentration not to be exceeded more than once per year.

COEFFICIENT OF HAZE
COUNCIL BLUFFS

COH Values - 2-Hour Samples

| DATE | LOCATION | TIME | | COH |
|---|---|---|---|---|
| 4/10/72 | Fire Station #2 | 1500-1600 | | 0.16 |
| | | -1800 | | 0.32 |
| | | -2000 | | 0.40 |
| | | -2200 | | 0.36 |
| | | -2400 | | 0.24 |
| | | | AVG | 0.29 |
| 4/11/72 | Fire Station #2 | 0001-0200 | | 0.20 |
| | | -0400 | | 0.24 |
| | | -0600 | | 0.36 |
| | | -0800 | | 0.16 |
| | | -1000 | | 0.24 |
| | | -1200 | | 0.28 |
| | | -1400 | | 0.32 |
| | | -1600 | | 0.36 |
| | | -1800 | | 0.40 |
| | | -2000 | | 0.40 |
| | Instrument | -2200 | | |
| | Malfunction | -2400 | | |
| | | | AVG | 0.29 |
| | | 0001-0200 | | |
| | Instrument | -0400 | | |
| | Malfunction | -0600 | | |
| | | -0800 | | |
| 4/12/72 | Fire Station #2 | 0830-1000 | | 0.24 |
| | | -1200 | | 0.28 |
| | | -1400 | | 0.20 |
| | | -1600 | | 0.32 |
| | | -1800 | | 0.24 |
| | | -2000 | | 0.61 |
| | | -2200 | | 0.53 |
| | | -2400 | | 0.61 |
| | | | AVG | 0.38 |
| 4/13/72 | Fire Station #2 | 0001-0200 | | 0.15 |
| | | -0400 | | 0.44 |
| | | -0600 | | 0.40 |
| | | -0800 | | 0.36 |
| | | -1000 | | 0.12 |

| DATE | LOCATION | TIME | | COH |
|---|---|---|---|---|
| 4/13/72 | Fire Station #2 | 1000-1200 | | 0.08 |
| | | -1400 | | 0.04 |
| | | -1600 | | 0.12 |
| | | -1800 | | 0.12 |
| | | | AVG | 0.20 |
| 4/13/72 | Fire Station #6 | 1845-2000 | | 0.16 |
| | | -2200 | | 0.12 |
| | | -2400 | | 0.16 |
| | | | AVG | 0.14 |
| 4/14/72 | Fire Station #6 | 0001-0200 | | 0.12 |
| | | -0400 | | 0.04 |
| | | -0600 | | 0.00 |
| | | -0800 | | 0.04 |
| | | -1000 | | 0.12 |
| | | -1200 | | 0.12 |
| | | -1400 | | 0.12 |
| | | -1600 | | 0.08 |
| | | -1800 | | 0.12 |
| | | -2000 | | 0.08 |
| | | -2200 | | 0.08 |
| | | -2400 | | 0.12 |
| | | | AVG | 0.08 |
| 4/15/72 | Fire Station #6 | 0001-0200 | | 0.08 |
| | | -0400 | | 0.04 |
| | | -0600 | | 0.08 |
| | | -0800 | | 0.16 |
| | | -1000 | | 0.12 |
| | | -1200 | | 0.08 |
| | | -1400 | | 0.04 |
| | | -1600 | | 0.08 |
| | | -1800 | | 0.20 |
| | | -2000 | | 0.16 |
| | | -2200 | | 0.16 |
| | | -2400 | | 0.12 |
| | | | AVG | 0.11 |
| 4/16/72 | Fire Station #6 | 0001-0200 | | 0.04 |
| | | -0400 | | 0.12 |
| | | -0600 | | 0.08 |
| | | -0800 | | 0.04 |
| | | -1000 | | 0.08 |
| | | -1200 | | 0.04 |
| | | -1400 | | 0.08 |
| | | -1600 | | 0.04 |

| DATE | LOCATION | TIME | | COH |
|---|---|---|---|---|
| 4/16/72 | Fire Station #6 | 1600-1800 | | 0.08 |
| | | -2000 | | 0.32 |
| | | -2200 | | 0.32 |
| | | -2400 | | 0.16 |
| | | | AVG | 0.11 |
| 4/17/72 | Fire Station #6 | 0001-0200 | | 0.16 |
| | | -0400 | | 0.08 |
| | | -0600 | | 0.08 |
| | | -0800 | | 0.20 |
| | | -1000 | | 0.20 |
| | | -1200 | | 0.12 |
| | | | AVG | 0.14 |
| 4/17/72 | Dodge Park | 1400-1600 | | 0.32 |
| | | -1800 | | 0.20 |
| | | -2000 | | 0.08 |
| | | | AVG | 0.20 |
| 4/18/72 | Dodge Park | 1000-1200 | | 0.16 |
| | | -1400 | | 0.32 |
| | | -1600 | | 0.28 |
| | | -1800 | | 0.24 |
| | | -2000 | | 0.24 |
| | | -2200 | | 0.16 |
| | | -2400 | | 0.08 |
| | | | AVG | 0.21 |
| 4/19/72 | Dodge Park | 0001-0200 | | 0.08 |
| | | -0400 | | 0.08 |
| | | -0600 | | 0.16 |
| | | -0800 | | 0.20 |
| | | -1000 | | 0.16 |
| | | -1200 | | 0.24 |
| | | -1400 | | 0.16 |
| | | -1600 | | 0.16 |
| | | -1800 | | 0.16 |
| | | -2000 | | 0.12 |
| | | -2200 | | 0.12 |
| | | -2400 | | 0.12 |
| | | | AVG | 0.14 |
| 4/20/72 | Dodge Park | 0001-0200 | | 0.08 |
| | | -0400 | | 0.12 |
| | | -0600 | | 0.16 |
| | | -0800 | | 0.08 |
| | | -1000 | | 0.08 |

| DATE | LOCATION | TIME | | COH |
|---|---|---|---|---|
| 4/20/72 | Dodge Park | 1000-1200 | | 0.12 |
| | | -1400 | | 0.16 |
| | | -1600 | | 0.12 |
| | | -1800 | | 0.16 |
| | | -2000 | | 0.12 |
| | | -2200 | | 0.12 |
| | | -2400 | | 0.16 |
| | | | AVG | 0.12 |
| 4/21/72 | Dodge Park | 0001-0200 | | 0.16 |
| | | -0400 | | 0.12 |
| | | -0600 | | 0.20 |
| | | -0800 | | 0.08 |
| | | | AVG | 0.14 |

Average COH for Survey 0.23
Geometric mean for Survey 0.16

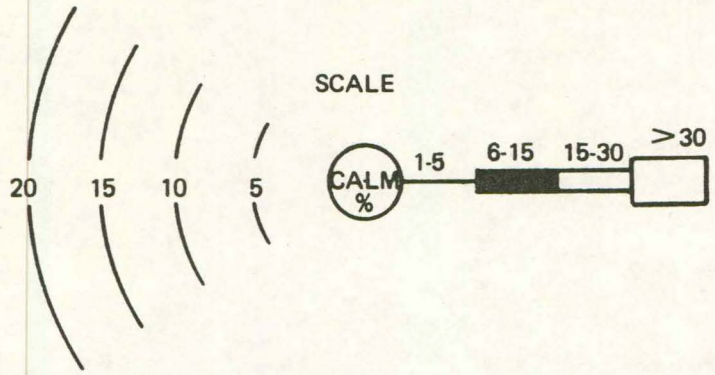
Soiling Index

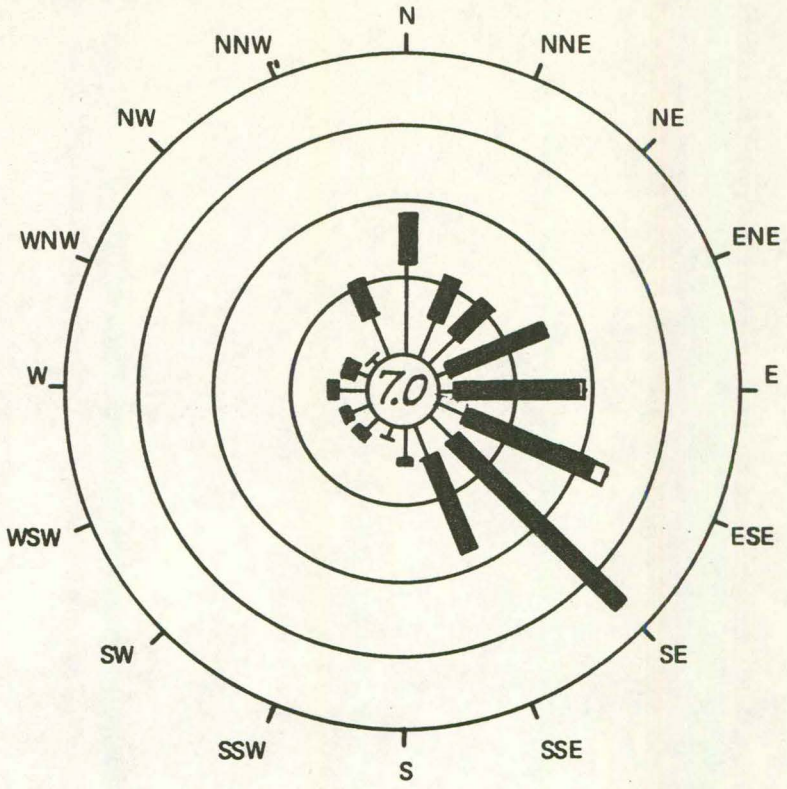
St Louis 0.4 COH/1000 lineal feet, annual geometric mean

DATE April 10-13, 1972

CITY Council Bluffs

LOCATION Fire Station #2
27th St. & First Ave.



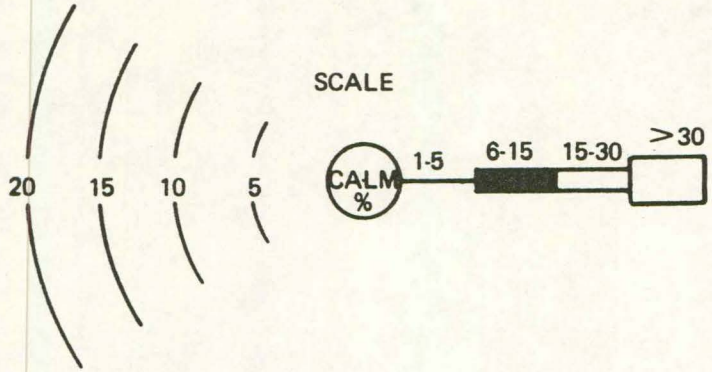



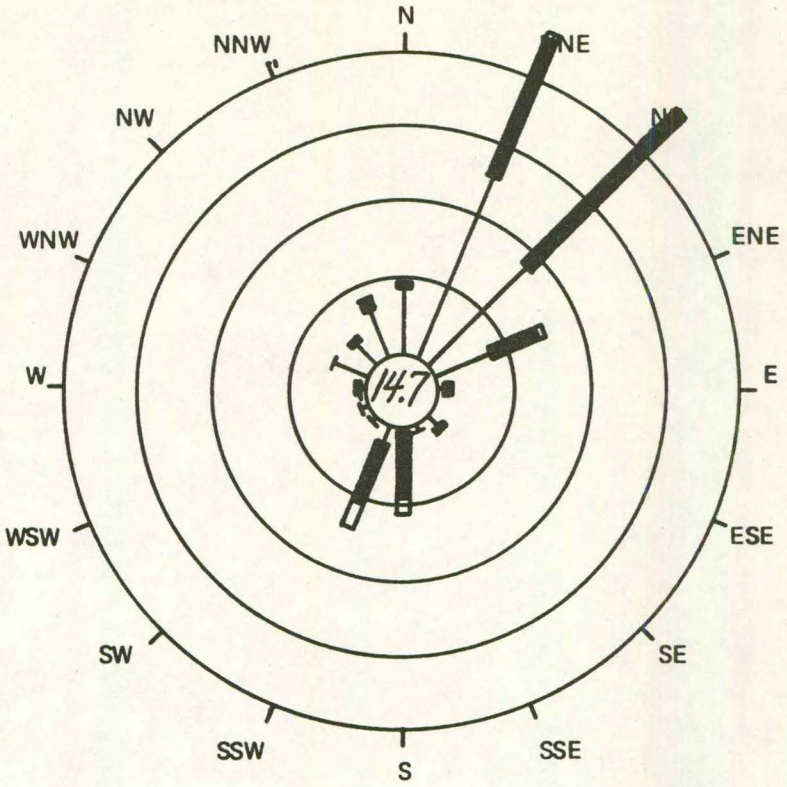

| SPEED (MPH) | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-5.9 | 6.3 | 2.7 | 2.7 | 0.7 | 1.0 | 2.3 | 2.3 | 2.7 | 2.3 | 0.7 | 1.0 | 1.3 | 2.0 | 0.7 | 0.3 | 3.0 | 31.9 |
| 6-14.9 | 3.0 | 3.0 | 3.0 | 7.0 | 8.3 | 9.3 | 15.6 | 6.3 | 0.3 | | 0.7 | 0.3 | 0.7 | 0.7 | | 2.3 | 60.5 |
| 15-29.9 | | | | | 0.3 | 0.3 | | | | | | | | | | | 0.7 |
| >30 | | | | | | | | | | | | | | | | | |
| TOTAL | 9.3 | 5.6 | 5.6 | 7.6 | 9.6 | 11.9 | 17.9 | 9.0 | 2.7 | 0.7 | 1.7 | 1.7 | 2.7 | 1.3 | 0.3 | 5.3 | 93.0 |
| | | | | | | | | | | | | | | | | MISSING | 0.0 |
| | | | | | | | | | | | | | | | | CALM | 7.0 |
| | | | | | | | | | | | | | | | | TOTAL | 100.0 |

DATE April 13-17, 1972

CITY Council Bluffs

LOCATION Fire Station #6



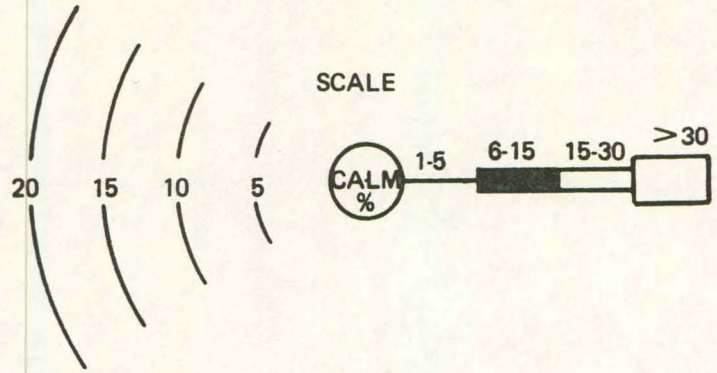



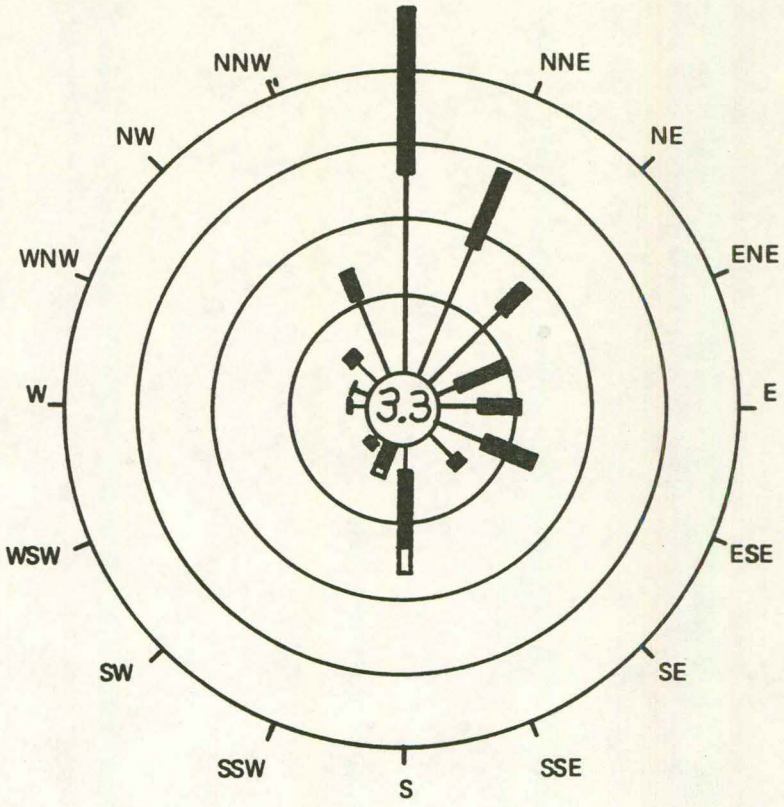

| SPEED (MPH) | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-5.9 | 4.4 | 13.6 | 8.9 | 3.9 | 0.5 | | 0.8 | 0.5 | 0.3 | 1.1 | 0.3 | 0.5 | 0.3 | 2.5 | 1.9 | 3.3 | 43.1 |
| 6-14.9 | 0.3 | 9.2 | 14.4 | 3.3 | 1.4 | | 0.3 | | 4.4 | 4.4 | | | 0.3 | | 0.3 | 0.5 | 38.9 |
| 15-29.9 | | 0.3 | 0.3 | 0.3 | | | | | 0.8 | 1.7 | | | | | | | 3.3 |
| >30 | | | | | | | | | | | | | | | | | |
| TOTAL | 4.7 | 23.1 | 23.6 | 7.5 | 1.9 | | 1.1 | 0.5 | 5.6 | 7.2 | 0.3 | 0.5 | 0.5 | 2.5 | 2.2 | 3.9 | 85.3 |
| | | | | | | | | | | | | | | | MISSING | | 0.0 |
| | | | | | | | | | | | | | | | CALM | | 14.7 |
| | | | | | | | | | | | | | | | TOTAL | | 100.0 |

DATE April 17-21

CITY Council Bluffs

LOCATION Dodge Park




| SPEED (MPH) | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-5.9 | 13.0 | 8.8 | 6.6 | 1.9 | 2.5 | 3.3 | 2.2 | 5.0 | 1.6 | | 0.3 | | 0.8 | 1.1 | 1.9 | 5.2 | 54.4 |
| 6-14.9 | 11.0 | 5.8 | 2.2 | 3.0 | 2.8 | 3.6 | 0.6 | 0.8 | 5.0 | 1.6 | 0.6 | | 0.3 | | 0.6 | 2.2 | 40.1 |
| 15-29.9 | | | | | | | | | 1.6 | 0.6 | | | | | | | 2.2 |
| >30 | | | | | | | | | | | | | | | | | |
| TOTAL | 24.0 | 14.6 | 8.8 | 5.0 | 5.2 | 6.9 | 2.8 | 5.8 | 8.3 | 2.2 | 0.8 | | 1.1 | 1.1 | 2.5 | 7.4 | 96.7 |
| | | | | | | | | | | | | | | | | MISSING | 0.0 |
| | | | | | | | | | | | | | | | | CALM | 3.3 |
| | | | | | | | | | | | | | | | | TOTAL | 100.0 |