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A REPORT FROM


*The State Hygienic
Laboratory*



MEDICAL LABORATORIES BUILDING

THE UNIVERSITY OF IOWA

IOWA CITY, IOWA 52240

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AIR QUALITY SURVEY
OTTUMWA, IOWA

January and February 1972

#72-45

Report on the
Air Quality in Ottumwa during
a Thirteen-Day Period in January and February

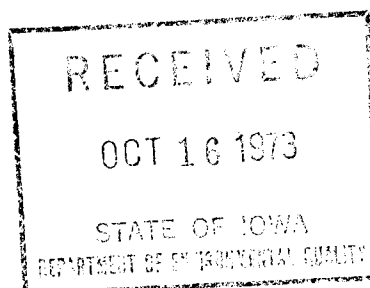
By

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Submitted to the Iowa Air Pollution Control Commission by the
State Hygienic Laboratory
13 April 1972

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OTTUMWA AIR QUALITY SURVEY

On 24 January 1972 the mobile air pollution control laboratory operated by personnel of the State Hygienic Laboratory was taken to Ottumwa, Iowa, for an ambient air quality survey. This survey was conducted during a 12-day period from 24 January through 4 February 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 from any point source of pollution within that area. Site selection was made with the advice and cooperation of local city officials, especially Mr Glen Jackson, Deputy Health Commissioner. Mr Jackson was able to provide us with the information necessary to choose appropriate areas within the city. Our first collection site, Municipal Building, is representative of primarily commercial areas but also would include some small contribution from the industrial area. The second site, Memorial Park, is located in a residential area. The third location, Lift Station, is located in the industrial area of Ottumwa.

Data from hi-vol sampling indicates suspended particulate levels below ambient air quality standards established by the Federal Environmental Protection Agency. The $70.7 \mu\text{g}/\text{m}^3$ geometric mean for suspended particulates is among the lowest value encountered by the mobile laboratory surveys in other surveys in Iowa.

Sulfur dioxide was detected in all parts of Ottumwa during the survey, but at no time did sulfur dioxide levels reach the standard values established by EPA. Maximum concentration of sulfur dioxide during the survey was 0.0237 ppm which is approximately one-fourth the limit established as a primary standard.

Carbon Monoxide data was somewhat lower than expected readings, especially for the commercial area. These values were probably lower than normal because of natural ventilation provided by the high winds encountered during that portion of the air quality survey. All carbon monoxide values are within the limits established by EPA with the highest 1-hour value of 15 parts per million being approximately one-half the established limits.

Coefficient of Haze data correlates well with high volume data, with slightly lower readings than those found in other cities in Iowa. COH values were below the St Louis standard which is being

Ottumwa Air Quality
13 April 1972
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used as a reference because there are no federal standards for coefficient of haze.

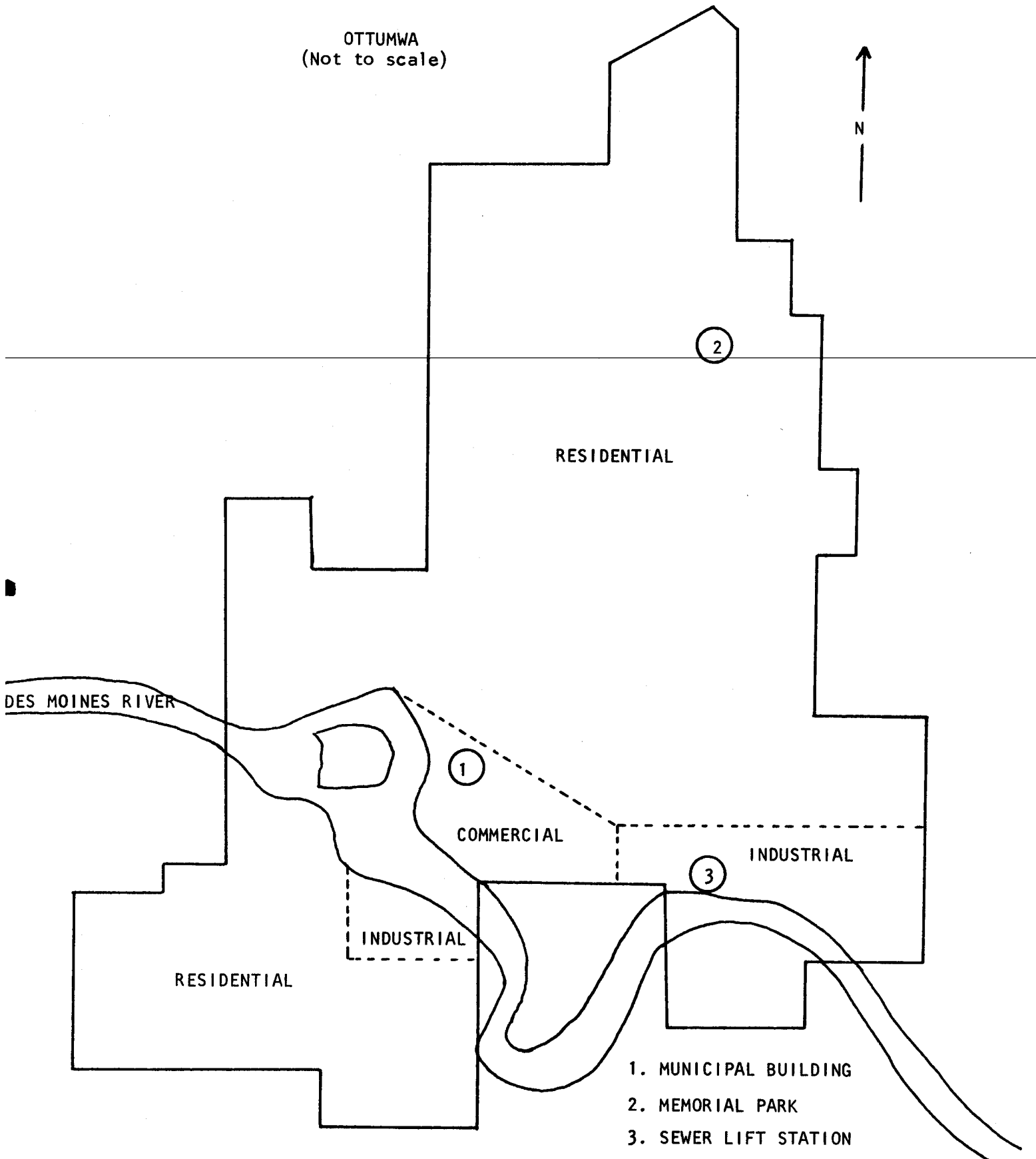
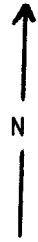
It could be expected that the values obtained for sulfur dioxide will tend to improve during future surveys. A prime reason for this expectation is that one of the major industries in Ottumwa has been granted a long-term natural gas supply increase during the cold weather months which will eliminate approximately 50% of the solid fossil fuel now being burned to provide heat for that industry.

Carbon monoxide and suspended particulate data will probably show an upward excursion on future surveys. The high velocity winds encountered during most of the survey provided Ottumwa with an atypical amount of natural ventilation which kept concentrations of carbon monoxide and suspended particulates from building up.

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

js

OTTUMWA
(Not to scale)



RESIDENTIAL

DES MOINES RIVER

1

COMMERCIAL

2

INDUSTRIAL

3

INDUSTRIAL

RESIDENTIAL

- 1. MUNICIPAL BUILDING
- 2. MEMORIAL PARK
- 3. SEWER LIFT STATION

NATIONAL PRIMARY AND SECONDARY
AMBIENT AIR QUALITY STANDARDS

Sulfur Oxides (primary)

- a. $80 \mu\text{g}/\text{m}^3$ (0.03 ppm) - annual arithmetic mean
 - b. $365 \mu\text{g}/\text{m}^3$ (0.14 ppm) - maximum 24-hour concentration not to be exceeded more than once per year
-

Sulfur Oxides (secondary)

- a. $60 \mu\text{g}/\text{m}^3$ (0.02 ppm) - annual arithmetic mean
- b. $260 \mu\text{g}/\text{m}^3$ (0.1 ppm) - maximum 24-hour concentration not to be exceeded more than once per year.
- c. $1,300 \mu\text{g}/\text{m}^3$ (0.5 ppm) - maximum 3-hour concentration not to be exceeded more than once per year.

Particulate Matter (primary)

- a. $75 \mu\text{g}/\text{m}^3$ - annual geometric mean
- b. $260 \mu\text{g}/\text{m}^3$ - maximum 24-hour concentration not to be exceeded more than once per year.

Particulate Matter (secondary)

- a. $60 \mu\text{g}/\text{m}^3$ - annual geometric mean
- b. $150 \mu\text{g}/\text{m}^3$ - maximum 24-hour concentration not to be exceeded more than once per year.

Carbon Monoxide (primary and secondary)

- a. $10 \text{mg}/\text{m}^3$ (9 ppm) - maximum 8-hour concentration not to be exceeded more than once per year.
- b. $40 \text{mg}/\text{m}^3$ (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

<u>DATE</u>	<u>LOCATION</u>	<u>SUSPENDED PARTICULATES ($\mu\text{g}/\text{m}^3$)</u>
1/25/72	Municipal Building	88
1/26/72		135
1/27/72	Memorial Park	71.3
1/28/72		67.4
1/31/72	Lift Station	35.8
2/1/72		91.5
2/2/72		49.4
2/3/72		66.1

AVERAGE 75.6
GEOMETRIC MEAN 70.7

Particulate Matter (primary)

- a. $75 \mu\text{g}/\text{m}^3$ - annual geometric mean
- b. $260 \mu\text{g}/\text{m}^3$ - maximum 24-hour concentration not to be exceeded more than once per year.

Particulate Matter (secondary)

- a. $60 \mu\text{g}/\text{m}^3$ - annual geometric mean
- b. $150 \mu\text{g}/\text{m}^3$ - maximum 24-hour concentration not to be exceeded more than once per year.

SULFUR DIOXIDE
OTTUMWA

(Values in Parts per Million)

AVERAGE
MAXIMUM CONCENTRATION

<u>DATE</u>	<u>LOCATION</u>	<u>TIME</u>	<u>PEAK</u>	<u>3 Hours</u>	<u>24 Hours</u>
1/24/72	Municipal Building	2000-2100	Nil	---	---
		2100-2400	Nil	Nil	---
1/25/72	Municipal Building	0001-0300	Nil	Nil	---
		-0600	0.02	0.005	---
		-0900	Nil	Nil	---
		-1200	Nil	Nil	---
		-1500	0.02	0.005	---
		-1800	Nil	Nil	---
		-2100	Nil	Nil	0.0012
		-2400	Nil	Nil	0.0012
1/26/72	Municipal Building	0001-0300	Nil	Nil	0.0012
		-0600	Nil	Nil	0.0006
		-0900	0.02	0.01	0.0019
		-1200	Nil	Nil	0.0019
		-1500	Nil	Nil	0.0012
		-1800	Nil	Nil	0.0012
		-2100	Nil	Nil	0.0012
		-2400	Nil	Nil	0.0012
1/27/72	Municipal Building	0001-0300	Nil	Nil	0.0012
		-0600	0.01	0.005	0.0012
		-0900	0.02	0.015	0.0019
1/27/72	Memorial Park	1015-1200	0.02	0.01	0.0031
		-1500	Nil	Nil	0.0031
		-1800	0.03	0.01	0.0044
		-2100	0.02	0.01	0.0056
		-2400	Nil	Nil	0.0056
1/28/72	Memorial Park	0001-0300	Nil	Nil	0.0056
		-0600	0.04	0.02	0.0075
		-0900	0.11	0.06	0.0137
		-1200	0.06	0.03	0.0162
		-1500	0.05	0.01	0.0175
		-1800	0.02	0.01	0.0175
		-2100	Nil	Nil	0.0162
		-2400	0.08	0.05	0.0225
1/29/72	Memorial Park	0001-0300	0.05	0.01	0.0237
		-0600	0.02	0.005	0.0219
		-0900	0.05	0.02	0.0169
		-1200	0.12	0.02	0.0156
		-1500	Nil	Nil	0.0144
		-1800	Nil	Nil	0.0131
		-2100	0.08	0.04	0.0181
		-2400	0.08	0.04	0.0169

AVERAGE
MAXIMUM CONCENTRATION

<u>DATE</u>	<u>LOCATION</u>	<u>TIME</u>	<u>PEAK</u>	<u>3 Hours</u>	<u>24 Hours</u>
1/30/72	Memorial Park	0001-0300	0.08	0.04	0.0206
		-0600	0.06	0.02	0.0225
		-0900	Nil	Nil	0.0200
		-1200	0.05	0.02	0.0200
		-1500	Nil	Nil	0.0200
		-1800	0.01	0.005	0.0206
		-2100	0.06	0.02	0.0181
		-2400	0.06	0.04	0.0181
1/31/72	Memorial Park	0001-0300	0.07	0.03	0.0169
		-0600	0.01	0.005	0.0150
		-0900	Nil	Nil	0.0150
		-1200	Nil	Nil	0.0125
1/31/72	Lift Station	1300-1500	Nil	Nil	0.0125
		-1800	0.02	0.005	0.0125
		-2100	0.02	0.005	0.0106
		-2400	Nil	Nil	0.0056
2/1/72	Lift Station	0001-0300	Nil	Nil	0.0019
		-0600	Nil	Nil	0.0012
		-0900	0.02	0.005	0.0019
		-1200	Nil	Nil	0.0019
		-1500	0.04	0.01	0.0031
		-1800	Nil	Nil	0.0025
		-2100	Nil	Nil	0.0019
		-2400	Nil	Nil	0.0020
2/2/72	Lift Station	0001-0300	0.02	0.005	0.0025
		-0600	0.02	0.01	0.0037
		-0900	0.06	0.03	0.0067
		-1200	0.02	0.005	0.0075
		-1500	0.04	0.01	0.0075
		-1800	0.05	0.01	0.0087
		-2100	0.02	0.005	0.0094
		-2400	0.02	0.005	0.0100
2/3/72	Lift Station	0001-0300	Nil	Nil	0.0094
		-0600	0.04	0.01	0.0094
		-0900	Nil	Nil	0.0056
		-1200	Nil	Nil	0.0050
		-1500	0.02	0.005	0.0044
		-1800	Nil	Nil	0.0031
		-2100	Nil	Nil	0.0025
		-2400	Nil	Nil	0.0019
2/4/72	Lift Station	0001-0300	Nil	Nil	0.0019
		-0600	Nil	Nil	0.0006
		-0830	Nil	Nil	0.0006

Sulfur Oxides (primary): a. 80 $\mu\text{g}/\text{m}^3$ (0.03 ppm) - annual arithmetic mean
 b. 365 $\mu\text{g}/\text{m}^3$ (0.14 ppm) - maximum 24-hour concentration not to be exceeded more than once per year.

Sulfur Oxides (secondary): a. 60 $\mu\text{g}/\text{m}^3$ (0.02 ppm) - annual arithmetic mean
 b. 260 $\mu\text{g}/\text{m}^3$ (0.1 ppm) - maximum 24-hour concentration not to be exceeded more than once per year.
 c. 1,300 $\mu\text{g}/\text{m}^3$ (0.5 ppm) - maximum 3-hour concentration not to be exceeded more than once per year.

CARBON MONOXIDE
OTTUMWA

(Values in Parts per Million)

AVERAGE
MAXIMUM CONCENTRATION

<u>DATE</u>	<u>LOCATION</u>	<u>TIME</u>	<u>PEAK</u>	<u>1 Hour</u>	<u>8 Hour</u>
1/24/72	Municipal Building	2000-2100	9	4	--
		-2200	4	2	--
		-2300	3	2	--
		-2400	5	2	--
1/25/72	Municipal Building	0001-0100	7	2	--
		-0200	6	2	--
		-0300	7	3	--
		-0400	6	4	2.1
		-0500	7	4	2.1
		-0600	8	5	2.5
		-0700	8	6	3.5
		-0800	12	8	4.2
		-0900	14	7	4.8
		-1000	13	5	5.2
		-1100	8	5	5.5
		-1200	11	5	5.6
		-1300	11	5	5.7
		-1400	12	5	5.7
		-1500	9	4	5.5
		-1600	--	--	4.5
		-1700	14	6	4.4
		-1800	36	9	4.9
		-1900	7	4	4.7
		-2000	9	4	4.6
		-2100	9	4	4.5
		-2200	10	3	4.2
		-2300	6	3	4.0
		-2400	4	2	4.4
1/26/72	Municipal Building	0001-0100	10	3	4.0
		-0200	4	2.5	3.2
		-0300	4	2.5	3.0
		-0400	4	2.5	2.8
		-0500	3	2	2.6
		-0600	7	3	2.6
		-0700	8	3	2.6
		-0800	9	5	2.9
		-0900	12	4	3.1
		-1000	14	3	3.1
		-1100	22	5	3.4
		-1200	9	5	3.8
		-1300	15	5	4.1
		-1400	7	4	4.2
-1500	7	4	4.1		

AVERAGE
MAXIMUM CONCENTRATION

<u>DATE</u>	<u>LOCATION</u>	<u>TIME</u>	<u>PEAK</u>	<u>1 Hour</u>	<u>8 Hour</u>			
1/26/72	Municipal Building	1500-1600	--	--	Instrument Malfunction			
		-1700	--	--				
		-1800	--	--				
		-1900	--	--				
		-2000	3	1				
		-2100	5	2				
		-2200	4	2				
		-2300	4	2				
		-2400	7	1				
		1/27/72	Municipal Building	0001-0100		4	1	--
				-0200		--	--	--
		-0300	--	--	--			
		-0400	--	--	--			
		-0500	--	--	--			
		-0600	--	--	--			
		-0700	--	--	--			
		-0800	--	--	--			
		-0900	--	--	--			
		-1000	--	--	--			
1/27/72	Memorial Park	-1100	--	--	--			
		-1200	7	2	--			
		-1300	2	1.5	--			
		-1400	77	2	--			
		-1500	12	2	--			
		-1600	--	--	--			
		-1700	--	--	--			
		-1800	35	5	--			
		-1900	12	4	--			
		-2000	7	2	--			
		-2100	6	3	--			
-2200	7	3	--					
-2300	4	1	--					
-2400	2	1	--					
1/28/72	Memorial Park	0001-0100	1	0.5	2.4			
		-0200	1	0.5	1.9			
		-0300	1	0.5	1.4			
		-0400	1	0.5	1.2			
		-0500	1	0.5	0.9			
		-0600	1	0.5	0.6			
		-0700	10	0.5	0.6			
		-0800	1	0.5	0.5			
		-0900	5	1	0.6			
		-1000	2	1	0.6			
		-1100	--	--	0.6			
-1200	19	4	1.0					
-1300	6	2	1.2					
-1400	13	1.5	1.3					
-1500	6	1.5	1.4					

AVERAGE
MAXIMUM CONCENTRATION

<u>DATE</u>	<u>LOCATION</u>	<u>TIME</u>	<u>PEAK</u>	<u>1 Hour</u>	<u>8 Hour</u>		
1/28/72	Memorial Park	1500-1600	1	0.5	1.4		
		-1700	1	0.5	1.4		
		-1800	2	1	1.4		
		-1900	4	1	1.5		
		-2000	2	1	1.1		
		-2100	8	1.5	1.1		
		-2200	2	1.5	1.1		
		-2300	5	1	1.0		
		-2400	2	1	1.1		
		1/29/72	Memorial Park	0001-0100	2	1	1.1
				-0200	2	1	1.1
				-0300	1	1	1.1
				-0400	1	1	1.1
				-0500	1	1	1.1
-0600	2			1	1.0		
-0700	2			1	1.0		
-0800	5			2	1.1		
-0900	1.5			1	1.1		
-1000	2			1	1.1		
-1100	2			1	1.1		
-1200	2			1	1.1		
-1300	2			1	1.1		
-1400	5			1	1.1		
-1500	3	1	1.1				
-1600	8	2	1.1				
-1700	7	3	1.4				
-1800	6	3	1.6				
-1900	55	15	3.4				
-2000	2	2	3.5				
-2100	2	1	3.5				
-2200	1	1	3.5				
-2300	1	1	3.5				
-2400	1	1	3.4				
1/30/72	Memorial Park	0001-0100	1	1	3.1		
		-0200	1	0.5	2.8		
		-0300	1	0.5	1.0		
		-0400	1	0.5	0.8		
		-0500	1	0.5	0.7		
		-0600	1	0.5	0.7		
		-0700	1	0.5	0.6		
		-0800	16	2	0.7		
		-0900	2	1	0.7		
		-1000	--	--	Instrument Malfunction		
		-1100	--	--	---		
		-1200	--	--	---		
		-1300	--	--	---		
		-1400	1	0.5	---		
-1500	2	1	---				
-1600	6	2	---				
-1700	5	2	---				

AVERAGE
MAXIMUM CONCENTRATION

<u>DATE</u>	<u>LOCATION</u>	<u>TIME</u>	<u>PEAK</u>	<u>1 Hour</u>	<u>8 Hour</u>
1/30/72	Memorial Park	1700-1800	10	3	---
		-1900	3	2	---
		-2000	2	1	---
		-2100	3	1	1.6
		-2200	3	1	1.6
		-2300	2	1	1.6
		-2400	1	0.5	1.4
		1/31/72	Memorial Park	0001-0100	2
1/31/72	Lift Station	-0200	1	0.5	1.0
		-0300	1	1	0.9
		-0400	1	0.5	0.8
		-0500	1	0.5	0.7
		-0600	1	0.5	0.7
		-0700	33	2	0.8
		-0800	2	1	0.9
		-0900	5	1	0.9
		-1000	2	1	0.9
		-1100	1	1	0.9
		-1200	7	1	1.0
		-1300	--	--	0.9
		-1400	13	3	1.2
		-1500	22	2	1.2
		-1600	1	0.5	1.2
2/1/72	Lift Station	-1700	8	1	1.2
		-1800	3	1	1.2
		-1900	2	1	1.2
		-2000	2	1	1.2
		-2100	2	1	1.3
		-2200	1.5	1	1.1
		-2300	1	1	0.9
		-2400	1	1	1.0
		0001-0100	1	0.5	0.9
		-0200	1	0.5	0.9
		-0300	6	1	0.9
		-0400	1	0.5	0.8
-0500	1	0.5	0.7		
-0600	1	0.5	0.7		
-0700	1	0.5	0.6		
-0800	1	1	0.6		
-0900	1	1	0.7		
-1000	9	1	0.7		
-1100	23	2	0.9		
-1200	1	1	0.9		
-1300	1	1	1.0		
-1400	2	1	1.1		
-1500	2	1	1.1		
-1600	2	1	1.1		
-1700	5	3	1.4		
-1800	5	3	1.6		
-1900	2	1	1.5		
-2000	2	1	1.5		

AVERAGE
MAXIMUM CONCENTRATION

<u>DATE</u>	<u>LOCATION</u>	<u>TIME</u>	<u>PEAK</u>	<u>1 Hour</u>	<u>8 Hour</u>
2/1/72	Lift Station	2000-2100	2	1	1.5
		-2200	4	1	1.5
		-2300	2	1	1.5
		-2400	2	1	1.5
2/2/72	Lift Station	0001-0100	1	1	1.2
		-0200	1	1	1
		-0300	2	1	1
		-0400	1	1	1
		-0500	1	1	1
		-0600	2	1	1
		-0700	2	1	1
		-0800	2	1	1
		-0900	3	1	1
		-1000	13	2	1.1
		-1100	2	1	1.1
		-1200	2	1	1.1
		-1300	2	1	1.1
		-1400	16	2	1.2
		-1500	8	2	1.4
		-1600	2	1	1.4
-1700	10	2	1.5		
-1800	2	2	1.5		
-1900	3	1	1.5		
-2000	2	1	1.5		
-2100	2	1	1.5		
-2200	1	1	1.4		
-2300	2	1	1.2		
-2400	2	1	1.2		
2/3/72	Lift Station	0001-0100	2	1	1.1
		-0200	1	1	1
		-0300	2	1	1
		-0400	2	1	1
		-0500	2	1	1
		-0600	2	1	1
		-0700	0	0	0.9
		-0800	0	0	0.7
		-0900	0	0	0.6
		-1000	0	0	0.5
		-1100	6	2	0.6
		-1200	3	1	0.6
		-1300	4	2	0.7
		-1400	4	2	0.9
		-1500	3	1	1.0
		-1600	5	2	1.2
-1700	11	3	1.6		
-1800	8	2	1.9		
-1900	1	1	1.7		
-2000	2	1	1.7		
-2100	2	1	1.6		
-2200	2	1	1.5		

AVERAGE
MAXIMUM CONCENTRATION

<u>DATE</u>	<u>LOCATION</u>	<u>TIME</u>	<u>PEAK</u>	<u>1 Hour</u>	<u>8 Hour</u>
2/3/72	Lift Station	2200-2300	1	1	1.5
		-2400	1	1	1.4
2/4/72	Lift Station	-0100	0	0	1.0
		-0200	0	0	0.7
		-0300	0	0	0.6
		-0400	0	0	0.5
		-0500	0	0	0.4
		-0600	0	0	0.2
		-0700	13	2	0.3
2/3/72	Lift Station	0001-0100	1	1	0.3
		-0200	2	1	0.5
		-0300	1	1	0.7
		-0400	2	1	1
		-0500	2	1	1
		-0600	2	1	1
		-0700	1	1	1
		-0800	1	1	1
		-0900	1	1	1
		-1000	1	1	1
		-1100	2	1	1
		-1200	3	1	1
		-1300	3	1	1
		-1400	2	1	1
		-1500	3	1	1
		-1600	2	1	1
		-1700	1	1	1
		-1800	1	1	1
		-1900	1	1	1
		-2000	1	1	1
		-2100	1	1	1
		-2200	1	1	1
		-2300	1	1	1
		-2400	1	1	1
2/4/72	Lift Station	0001-0100	2	1	1
		-0200	2	1	1
		-0300	1	1	1
		-0400	2	1	1
		-0500	1	1	1
		-0600	1	1	1
		-0700	5	2	1.1
		-0800	7	3	1.4
		-0900	12	4	1.7

Carbon Monoxide (primary and secondary)

- a. 10 mg/m³ (9 ppm) - maximum 8-hour concentration not to be exceeded more than once per year.
- b. 40 mg/m³ (35 ppm) - maximum 1-hour concentration not to be exceeded more than once per year.

COEFFICIENT OF HAZE
OTTUMWA

COH Values/1000 ft - 2 Hour Samples

<u>DATE</u>	<u>LOCATION</u>	<u>TIME</u>	<u>%T</u>	<u>COH</u>
1/24/72	3rd & Court	2000-2200	2.0	0.16
		-2400	0.5	<u>0.04</u>
				AVG 0.10
1/25/72	3rd & Court	0001-0200	2.0	0.16
		-0400	1.5	0.12
		-0600	1.5	0.12
		-0800	0.5	0.04
		-1000	11.0	0.91
		-1200	3.0	0.24
		-1400	3.0	0.24
		-1600	3.0	0.24
		-1800	1.5	0.12
		-2000	1.0	0.08
		-2200	2.5	0.20
		-2400	0.5	<u>0.04</u>
				AVG 0.21
1/26/72	3rd & Court	0001-0200	1.5	0.12
		-0400	0.5	0.04
		-0600	0.5	0.04
		-0800	1.0	0.08
		-1000	11.5	0.95
		-1200	6.5	0.53
		-1400	4.5	0.36
		-1600	3.5	0.28
		-1800	3.5	0.28
		-2000	4.0	0.32
		-2200	2.5	0.20
		-2400	2.0	<u>0.20</u>
				AVG 0.28
1/27/72	3rd & Court	0001-0200	0.5	0.04
		-0400	0.5	0.04
		-0600	2.0	0.16
		-0800	2.0	<u>0.16</u>
			AVG 0.10	
1/27/72	Memorial Park	1000-1200	10.0	0.82
		-1400	10.0	0.82
		-1600	1.0	0.08
		-1800	5.5	0.44
		-2000	1.0	0.08

<u>DATE</u>	<u>LOCATION</u>	<u>TIME</u>	<u>%T</u>	<u>COH</u>
1-27-72	Memorial Park	2000-2200	0.5	0.04
		-2400	0.0	0.00
				AVG 0.33
1/28-72	Memorial Park	0001-0200	0.0	0.00
		-0400	0.0	0.00
		-0600	0.5	0.04
		-0800	1.0	0.08
		-1000	2.5	0.20
		-1200	8.0	0.65
		-1400	13.0	1.09
		-1600	0.5	0.04
		-1800	0.5	0.04
		-2000	0.5	0.04
		-2200	0.5	0.04
		-2400	0.5	0.04
1/31/72	Lift Station	1400-1600	2.0	0.16
		-1800	2.0	0.16
		-2000	4.0	0.32
		-2200	1.0	0.08
		-2400	0.5	0.04
			AVG 0.15	
2/1/72	Lift Station	0001-0200	0.0	0.00
		-0400	0.5	0.04
		-0600	1.0	0.08
		-0800	1.5	0.12
		-1000	1.5	0.12
		-1200	1.0	0.08
		-1400	0.5	0.04
		-1600	1.0	0.08
		-1800	7.0	0.57
		-2000	1.5	0.12
		-2200	3.0	0.24
		-2400	2.0	0.16
			AVG 0.14	
2/2/72	Lift Station	0001-0200	1.5	0.12
		-0400	2.0	0.16
		-0600	2.0	0.16
		-0800	2.5	0.20
		-1000	4.0	0.32
		-1200	16.0	1.36
		-1400	10.0	0.82
		-1600	7.5	0.61
		-1800	3.0	0.24
		-2000	0.5	0.04
		-2200	0.5	0.04
-2400	0.5	0.04		
			AVG 0.34	

<u>DATE</u>	<u>LOCATION</u>	<u>TIME</u>	<u>%T</u>	<u>COH</u>
2/3/72	Lift Station	0001-0200	0.5	0.04
		-0400	0.5	0.04
		-0600	0.5	0.04
		-0800	1.0	0.08
		-1000	0.5	0.04
		-1200	4.0	0.32
		-1400	3.0	0.24
		-1600	1.5	0.12
		-1800	2.5	0.20
		-2000	1.5	0.12
		-2200	0.5	0.04
		-2400	0.5	0.04
			AVG	<u>0.11</u>
2/4/72	Lift Station	0001-0200	0.5	0.04
		-0400	0.5	0.04
		-0600	0.5	0.04
		-0800	0.5	0.04
				AVG

AVERAGE COH 0.18
 GEOMETRIC MEAN 0.15

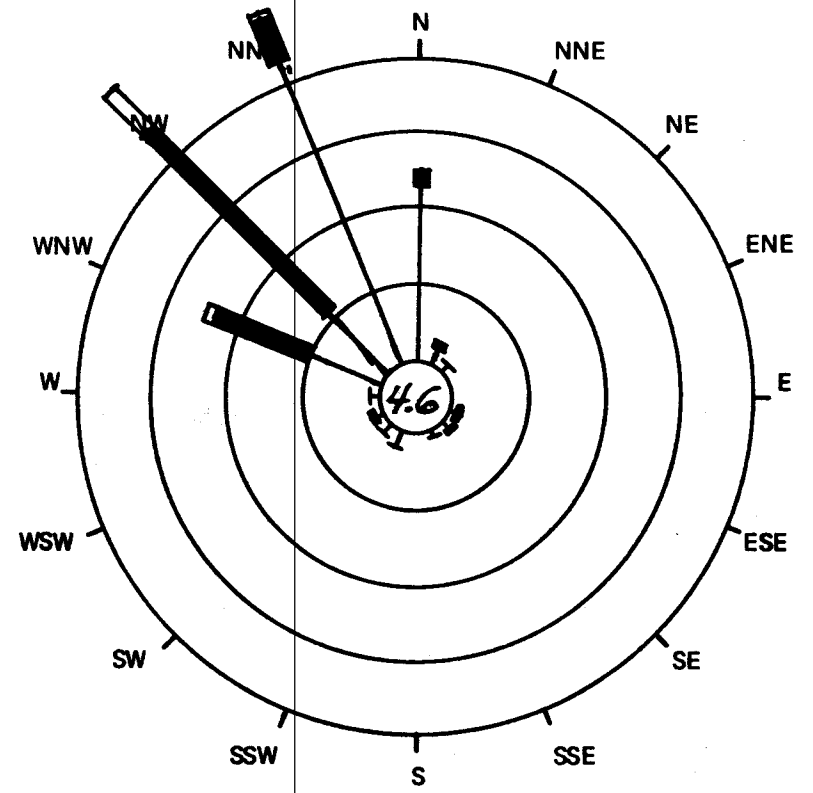
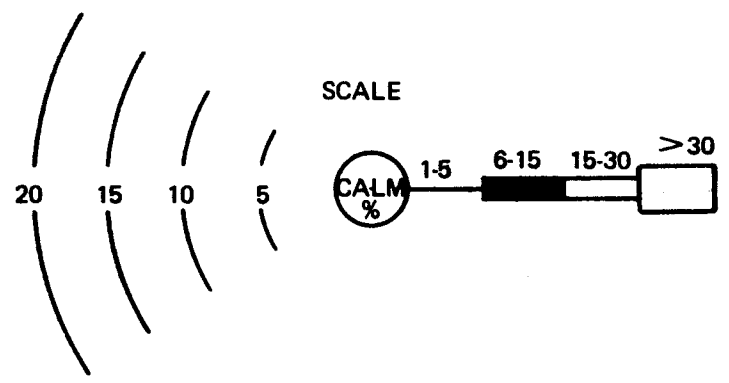
Soiling Index

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

DATE 24-27 January 1972

CITY Ottumwa

LOCATION 3rd & Court

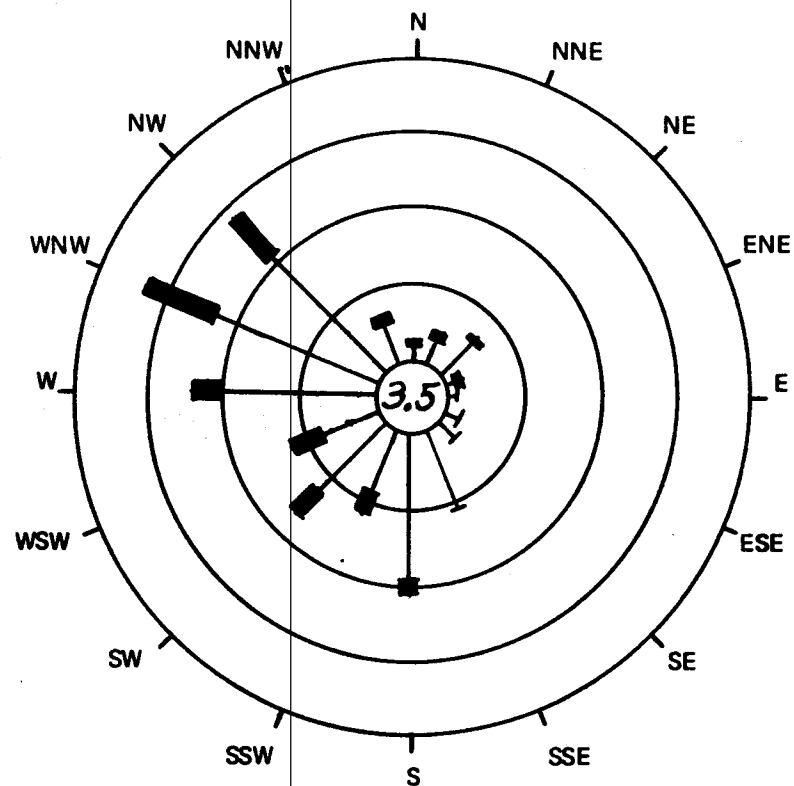
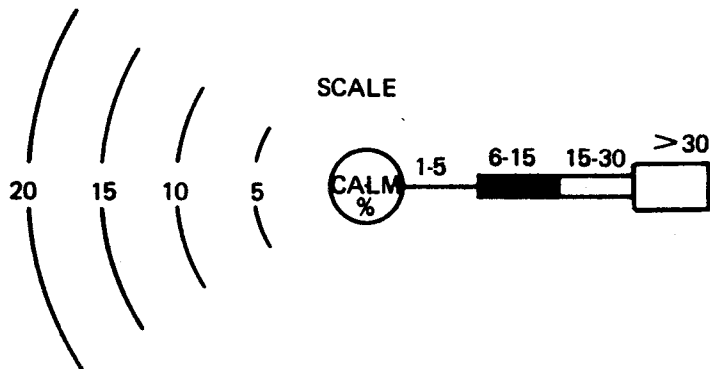


SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	
1-5.9	12.9	2.1	0.8			0.8	0.4	0.4		1.7	0.8	0.8	0.8	5.0	5.8	21.2	53.7	
6-14.9	1.7	0.8				0.4						0.4		6.7	16.7	8.3	35.0	
15-29.9														0.4	3.8	0.4	4.6	
>30																		
TOTAL	14.6	2.9	0.8			1.2	0.4	0.4		1.7	0.8	1.2	0.8	12.1	26.3	29.9	93.3	
																	MISSING	2.1
																	CALM	4.6
																	TOTAL	100.0

DATE 27-31 Jan 1972

CITY Ottumwa

LOCATION Memorial Park

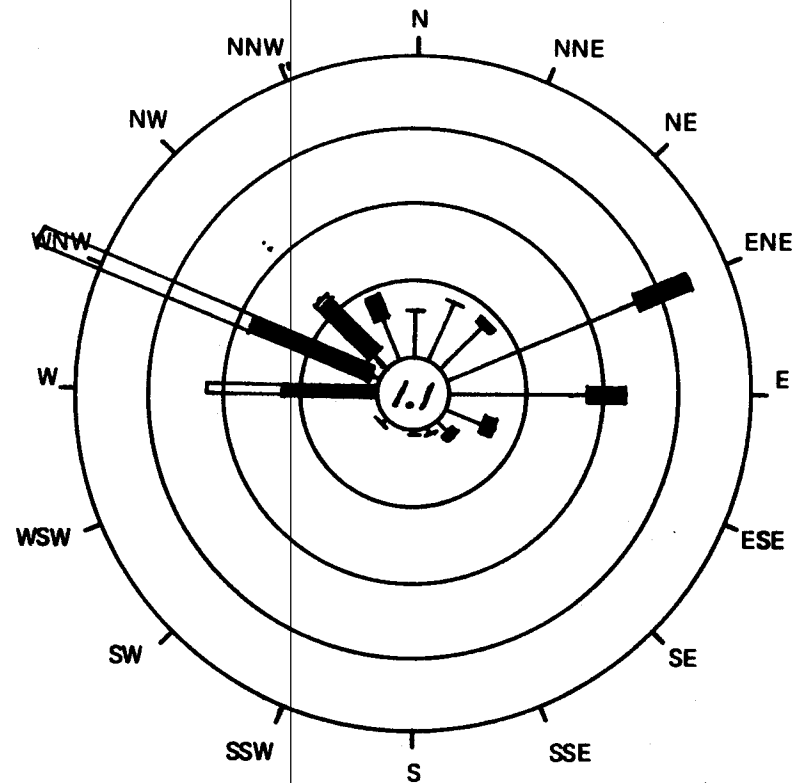
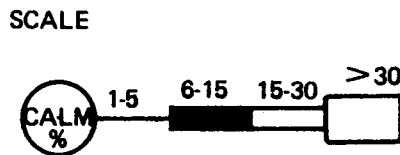
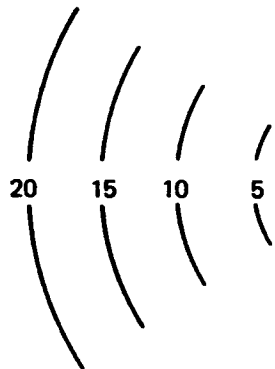


SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL			
1-5.9	1.1	1.9	3.0	0.5	0.5	1.1	1.9	5.4	9.8	4.9	6.8	4.1	10.0	11.7	10.6	2.7	76.1			
6-14.9	0.5	0.3	0.5	0.3					1.1	1.6	1.9	2.2	2.2	4.9	3.5	0.8	19.9			
15-29.9																				
>30																				
TOTAL	1.6	2.2	3.5	0.8	0.5	1.1	1.9	5.4	10.9	6.5	8.7	6.3	12.2	16.6	14.1	3.5	96.0			
																		MISSING	0.5	
																			CALM	3.5
																			TOTAL	100.0

DATE 31 Jan - 4 Feb 1972

CITY Ottumwa

LOCATION Sewer Lift Station



STATE LIBRARY COMMISSION OF IOWA
 Historical Building
 DES MOINES, IOWA 50319

WIND SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1-5.9	3.0	4.7	3.0	13.8	8.8	2.8	1.1	0.6	0.3					0.6	1.1	2.8	42.4
6-14.9			0.3	3.6	2.8	0.8	0.8				0.3		6.3	8.8	5.0	1.6	30.3
15-29.9													9.9	15.2	0.3		25.3
> 30																	
TOTAL	3.0	4.7	3.3	17.4	11.6	3.6	1.9	0.6	0.3		0.3		16.2	24.6	6.4	4.4	98.0
																	MISSING 0.9
																	CALM 1.1
																	TOTAL 100.0