

Evaluation of the Control
Strategy for Attainment
of National Ambient Air
Quality Standards for
Total Suspended Particulates

Southern Tier West

AQCR (#164)

Prepared by
Environmental Protection Agency
Region II
Air Branch
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I. AQCR Characteristics

The Southern Tier West AQCR is comprised of seven counties in the southwestern corner of New York State (see Figure 1). Five of these counties border on the State of Pennsylvania. The area is bounded to the north by the lake plain of Lake Ontario, to the east by the channel of Seneca Lake, and to the west by the lake plain of Lake Erie. The area represents the northern end of the Appalachian Plateau, which extends to the southwest into Pennsylvania. Its principle cities include Elmira, Corning and Jamestown. The Bureau of Census estimates that in 1973, 582,884 persons lived in the AQCR.

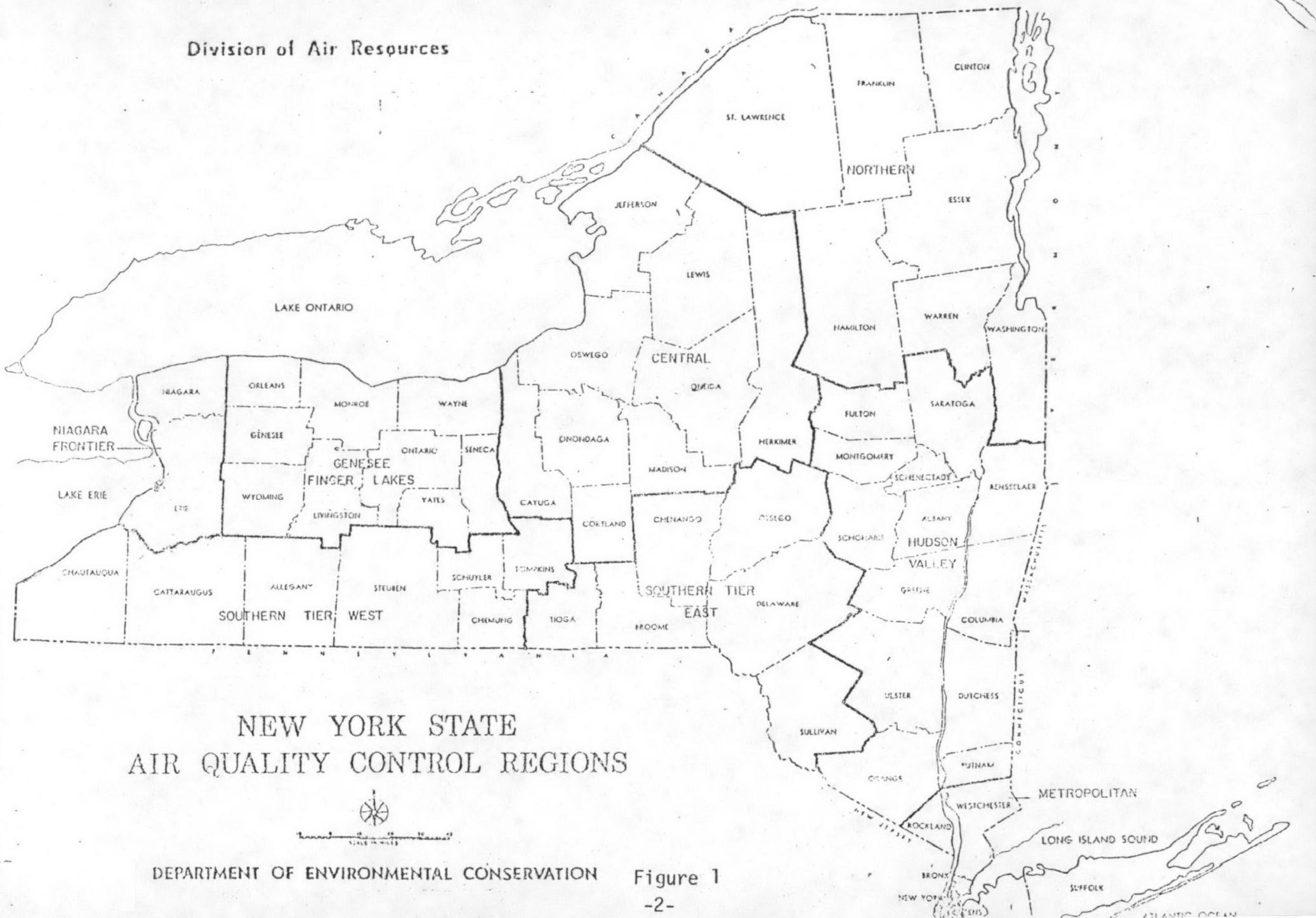
The Southern Tier West AQCR is subject to frequent storm passages and changes of air masses. Consequently, protracted periods of general poor ventilation are relatively infrequent. However, terrain features often cause accumulation of pollutants, especially in valley locations. Greater wind persistence caused by channeled winds and increased frequency of poor ventilation in valley locations may result in elevated pollutant concentrations from valley sited sources. The dispersion potential of the Jamestown area is influenced by its valley location.

II. Problem Defined

The problem monitoring sites for suspended particulate matter in the Southern Tier West AQCR are the Jamestown monitor (333320002F01) which is located at Jamestown High School and the Silver Creek monitoring site located in Chautauqua County.

In 1970 the Jamestown monitoring site recorded an annual geometric mean of 72 ug/m³. This value was below the primary National

Division of Air Resources



NEW YORK STATE AIR QUALITY CONTROL REGIONS



DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Figure 1

Ambient Air Quality Standard (NAAQS) of 75 ug/m^3 . The second highest 24-hour maximum concentration for 1970 was 168 ug/m^3 , which is below the primary NAAQS of 260 ug/m^3 but above the secondary standard of 150 ug/m^3 . During 1971 and 1972 the second highest 24-hour concentrations continued to attain the primary standard and contravene the secondary standard. During 1973, the annual geometric mean concentration was 91 ug/m^3 , an increase of 26% over the 1970 value. The second highest 24-hour concentration remained below the primary standard but exhibited a 30% increase over the 1970 second highest 24-hour concentration. In 1974, the annual geometric mean declined by 23% from 1973 to 71 ug/m^3 . The second highest 24-hour concentration remained below the primary standard but above the secondary standard. However, the second highest 24-hour concentration was reduced by 26% during the same period. In 1975, the annual geometric mean decreased to 67 ug/m^3 . The 1975 second highest 24-hour concentration was approximately 175 ug/m^3 which is still above the secondary standard. Table 1 presents the annual geometric mean and second highest 24-hour concentrations recorded at the Jamestown High School site.

At the Silver Creek monitoring site in Chautauqua County, a second highest 24-hour concentration of 390 ug/m^3 was observed during the first quarter of 1974. The highest 24-hour concentration recorded six days later was 718 ug/m^3 . After recording these high concentrations the operator of the monitoring site noted that the time those concentrations were being recorded, the roof on which the monitor is located was being resurfaced. Therefore, the operator concluded that these values were directly related to this resurfacing work and the values recorded were not representative of ambient air quality concentrations in the area.

In 1973 the maximum 24-hour concentration at the Silver Creek site was 139 ug/m^3 and the second highest concentration was 130 ug/m^3 . Both of these values are below the national secondary standard of 150 ug/m^3 . These latter values are more representative of the air quality at Silver Creek. The annual geometric means for 1973 and 1974 were 50 ug/m^3 and 51 ug/m^3 respectively. These air quality monitoring values point out the typical nature of the 24-hour observation made on consecutive samplings in the first quarter of 1974.

A tabulation of air quality concentrations for all monitoring sites in the AQCR is presented in Table 2 while Table 3 presents a statistical evaluation of the monitoring sites.

III. Network Adequacy

The network of monitoring sites for particulate matter is more than adequate to meet the EPA regulatory requirement of three monitors as set forth in 40 CFR 51.17.

The Jamestown High School monitoring site was evaluated in May 1975 and it was reported by the Surveillance and Analysis Division that the site was representative of population exposure to particulate matter as well as sensitive to emissions from major point sources.

The statistical evaluation presented in Table 3 includes a combined index which describes the overall trend of particulate matter in the AQCR. This combined index compensates for monitoring stations terminating and new stations starting during the period of analysis. The trend of this index is shown in Figure 3. The normalized combined index is the ratio of the base year (1970) and the periods delineated.

Table 1
Ambient Air Quality Data for Particulate Matter
Recorded at the Jamestown High School
Monitoring Station

Year	Annual Geometric Mean (ug/m ³)	2nd. Highest 24-hr. Concentration (ug/m ³)
1970	72	168
1971	*	167
1972	*	171
1973	91	243
1974	71	179
1975	67	175**

* Number of samples not sufficient to meet averaging criteria.

** 99 percentile of Arithmetic Mean used to approximate Second Highest 24-Hour Concentration.

Table 2 Environmental Quality Report

AQCR: Southern Tier West (164)
 Attainment Date: May, 1975

Pollutant: Total Suspended Particulates
 National Ambient Air Quality Standards

Primary 75 ug/m³
 Secondary 60 ug/m³

Monitoring Station Location				Annual Geometric Mean (ug/m ³)					
EPA ID # (State ID #)	County	Municipality	Site Description	1970	1971	1972	1973	1974	1975
330100001F01 (0220-01)	Allegany	Alfred	Rural-Agricultural					20	23
330120001F01 (0227-01)	Allegany	Friendship	Suburban-Residential			I*	43	34	29
337280001F01 (0228-01)	Allegany	Wellsville	Suburban-Industrial			I	42**t		
337280002F01 (0228-02)	Allegany	Wellsville	Suburban-Residential					30	36
330840003F01 (0426-01)	Cattaraugus	Cattaraugus		38	I	39	27	22	32
330840003F01 (0469-01)	Cattaraugus	Machias	Remote	41	I	40	40	32	36
330840004F01 (0478-01)	Cattaraugus	Randolph	Remote	37	I	36	26	21	30

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 Secondary 60 ug/m³

Monitoring Station Location				Annual Geometric Mean (ug/m ³)					
EPA ID # (State ID #)	County	Municipality	Site Description	1970	1971	1972	1973	1974	1975
335020001F01 (0401-03)	Cattaraugus	Olean	Center City-Commercial	53	I	48	47	51	41
331600001F01 (0601-02)	Chautauqua	Dunkirk	Center City-Commercial	53	56	71	49	42	42
331600002F01 (0601-03)	Chautauqua	Dunkirk	Center City-Residential			I*	62	56	52
331865001F01 (0659-01)	Chautauqua	Ellicott	Suburban-Residential		47	37	39	30	28
333320001F01 (0602-04)	Chautauqua	Jamestown	Center City-Residential	63	78	83	60	66	46
333320002F01 (0602-05)	Chautauqua	Jamestown	Center City-Residential	72	I	I	91	71	61
333320003F01 (0602-03)	Chautauqua	Jamestown	Center City-Commercial	66	60	54	46	I	67

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 National Ambient Air Quality Standards

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 Secondary 60 ug/m³

Monitoring Station Location				Annual Geometric Mean (ug/m ³)					
EPA ID # (State ID #)	County	Municipality	Site Description	1970	1971	1972	1973	1974	1975
336240001F01 (0627-01)	Chautauqua	Silver Creek	Suburban-Residential			I	50	52	
331060002F01 (0752-01)	Chemung	Big Flats	Suburban-Industrial	49	49	46	45	35	40
331880002F01 (0701-02)	Chemung	Elmira	Center City-Industrial	56	56	73	72	65	71
333120001F01 (0722-01)	Chemung	Horseheads	Suburban-Commercial	57	61	54	48	43	43
337200001F01 (4821-01)	Schuyler	Watkins Glen	Suburban-Commercial			I*	I	46	50

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 National Ambient Air Quality Standards

Primary 75 ug/m³
 Secondary 60 ug/m³

Monitoring Station Location				Annual Geometric Mean (ug/m ³)					
EPA ID # (State ID #)	County	Municipality	Site Description	1970	1971	1972	1973	1974	1975
331320001F01 (5001-03)	Steuben	Corning	Center City-Commercial	64	74	I	74	59	51
333100001F01 (5002-02)	Steuben	Hornell	Center City-Commercial	56	71	69	68	I	
333300001F01 (5401-03)	Tompkins	Ithaca	Center City-Commercial	55	57	53	I	I	

* I = failed to meet average criteria
 ** t = station terminated in 1973

Table 3 Air Quality Status Report

AQCR: Southern Tier West (164)
 Attainment Date: May, 1975

Pollutant: TSP

Criteria	1975	1974	1973	1972	1971	1970	Comments
Sites Reporting Complete Data		18	18	13	10	14	
No. & (percent) above 75 ug/m ³		0 (0.0)	1 (5.6)	1 (7.7)	2 (20.0)	0 (0.0)	
No. & (percent) above 60 ug/m ³		3 (16.7)	6 (33.3)	4 (30.8)	5 (50.0)	4 (28.6)	
Maximum ug/m ³		71	91	83	78	72	
Minimum ug/m ³		20	26	36	47	37	
Combined Index		43.1	51.7	59.3	58.8	54.3	
Combined Index (normalized)		79.4	95.2	109.2	108.3	100.0	

IV. Data Adequacy

The instruments used to sample particulate matter in the AQCR are in good condition and satisfactory quality control is assured. During 1971 and 1972 the minimum number of observations necessary for computation of the annual geometric mean was not collected at the Jamestown High School monitoring site.

V. Impacting Sources and Control

The Jamestown High School monitoring site is located in the major core area of Jamestown. The location of the monitor is shown in Figure 2 along with the major impacting point sources. Table 4 presents a listing of those sources which impact directly on the Jamestown monitor along with a description of their characteristics and relative location to the monitor.

In 1970, the Maddox Table Co. emitted 16.6 tons of particulate matter. In 1971, the source came into compliance with State requirements and reduced its particulate emissions to 16.4 tons/year.

Since 1968, the Jamestown Power and Light Company has operated electrostatic precipitators (ESP) at 85% efficiency in order to reduce particulate matter emissions. The source is required to install new ESP's by January 1976. These are rated at 99.95% efficiency. During 1972 the source emitted 1,364 tons of particulate matter. When the source is in full compliance in 1976 the emissions from this source will be reduced to 45 tons per year. This represents a 97% reduction in emissions from 1972.

FIGURE 2: Point Sources with Impact on Monitor

Source - Numbers Monitor - Letter M
 Prevailing Wind Directions - Shown by arrows

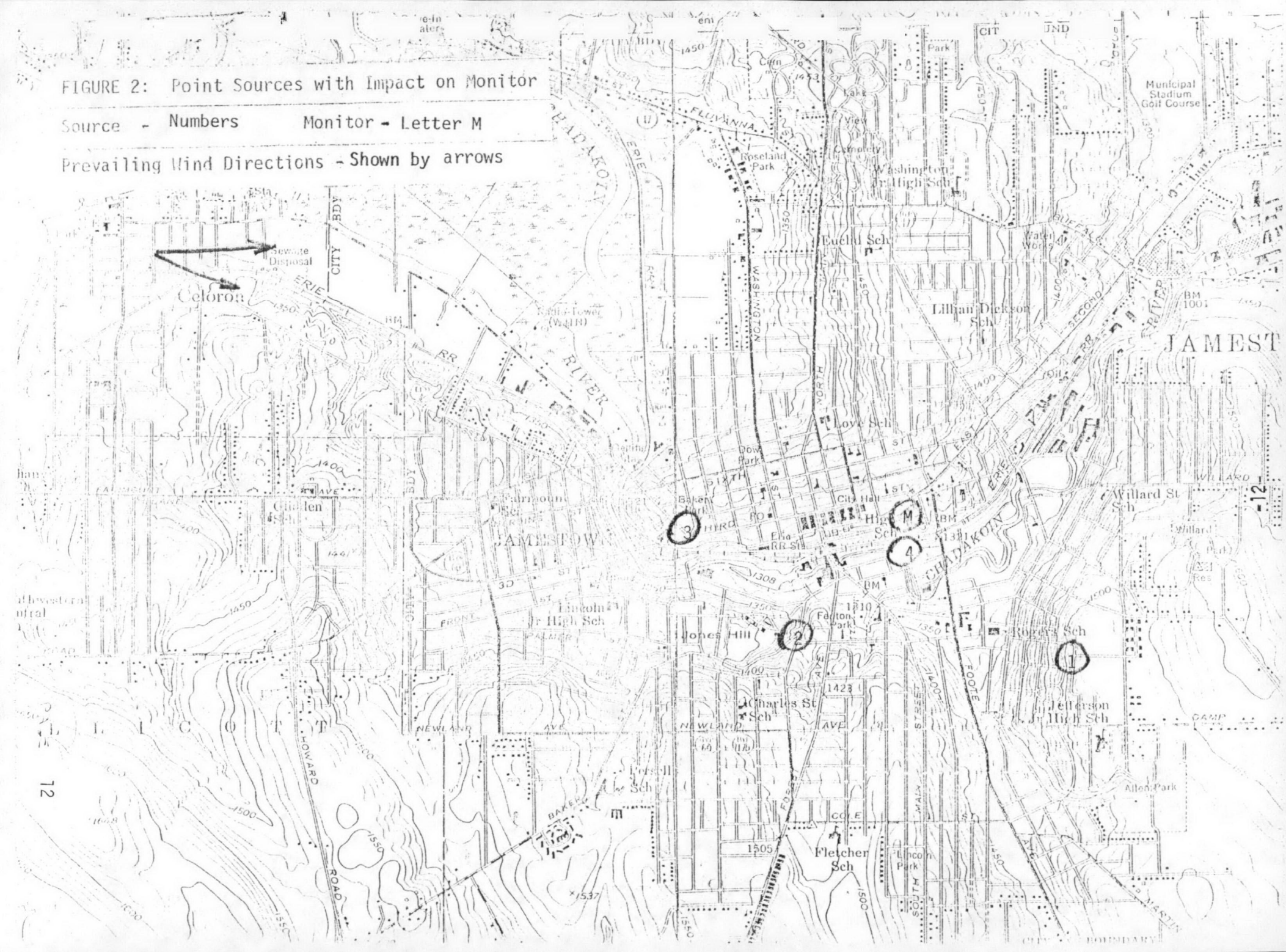


Table 4
Sources Impacting on Site

Source	Approx. Stack Height	Distance from site	Direction from site
1. Crescent Mfg. Company 200 Harrison Street Jamestown, New York	30 feet (numerous stacks)	0.7 mi.	SE
2. AVM Company 15 West 2nd Street Jamestown, New York	30 feet	0.5 mi.	SW
3. Jamestown Light & Power Jamestown, New York	150 feet Twin Stacks	0.7 mi.	W
4. Maddox Table Company	100 feet*	450 ft.	S
5. Jamestown Iron Foundry Jamestown, New York	Eliminated in 1974		

* Stack situated downgrade at an elevation approximately equal to hi-vol.

Table 5

Particulate Matter Emissions for Sources Impacting on
the Jamestown High School Monitor

Source	Location	Emissions (tons/yr) 1972	Controlled	% Reduction
Maddox Table Company		16.4	16.4	0
Crescent Manuf. Company	200 Harrison Street Jamestown, New York	N/A	N/A	N/A
AVM Company	15 West 2nd Street Jamestown, New York	N/A	N/A	N/A
Jamestown Light and Power	Jamestown, New York	1,364.0	45.0	97.0
Jamestown Iron Foundry ¹	Jamestown, New York	<u>70.0</u>	<u>0</u>	<u>100.0</u>
Total		1,450.4	61.4	95.0

¹ source ceased operation in 1974

During 1972 the Jamestown Iron Foundry emitted 70 tons of particulate matter. The source ceased operation in 1974 to allow for urban renewal. Emissions from the Crescent Manufacturing Company and the AVM Company are currently not available. These sources are extremely small and not expected to have any significant impact on the monitoring site.

The control strategy selected by the State to reduce particulate matter emissions in this AQCR is through strict enforcement of the following state regulations:

1. Part 212 - Processes and Exhaust and/or Ventilation Systems
2. Part 213 - Contaminant Emissions from Ferrous Jobbing
Foundaries
3. Part 215 - Open Fires
4. Part 219 - Incinerators

The elevated 1973 annual geometric mean can be directly attributed to fugitive dust from an urban renewal project. In the early part of 1973 a large urban renewal demolition project was initiated in Jamestown. The project was completed during the first quarter of 1974 and included the demolition of the Jamestown Iron Foundry. This demolition and urban renewal activity greatly increased the emission of fugitive dust in the area. The level of emissions from point sources in the area has remained constant since 1972 and the 26% increase in annual geometric mean observed in 1973 was followed by a nearly equal decrease after completion of the urban renewal and demolition project.

Trend Line of Combined Index
Southern Tier West Intrastate AQCR

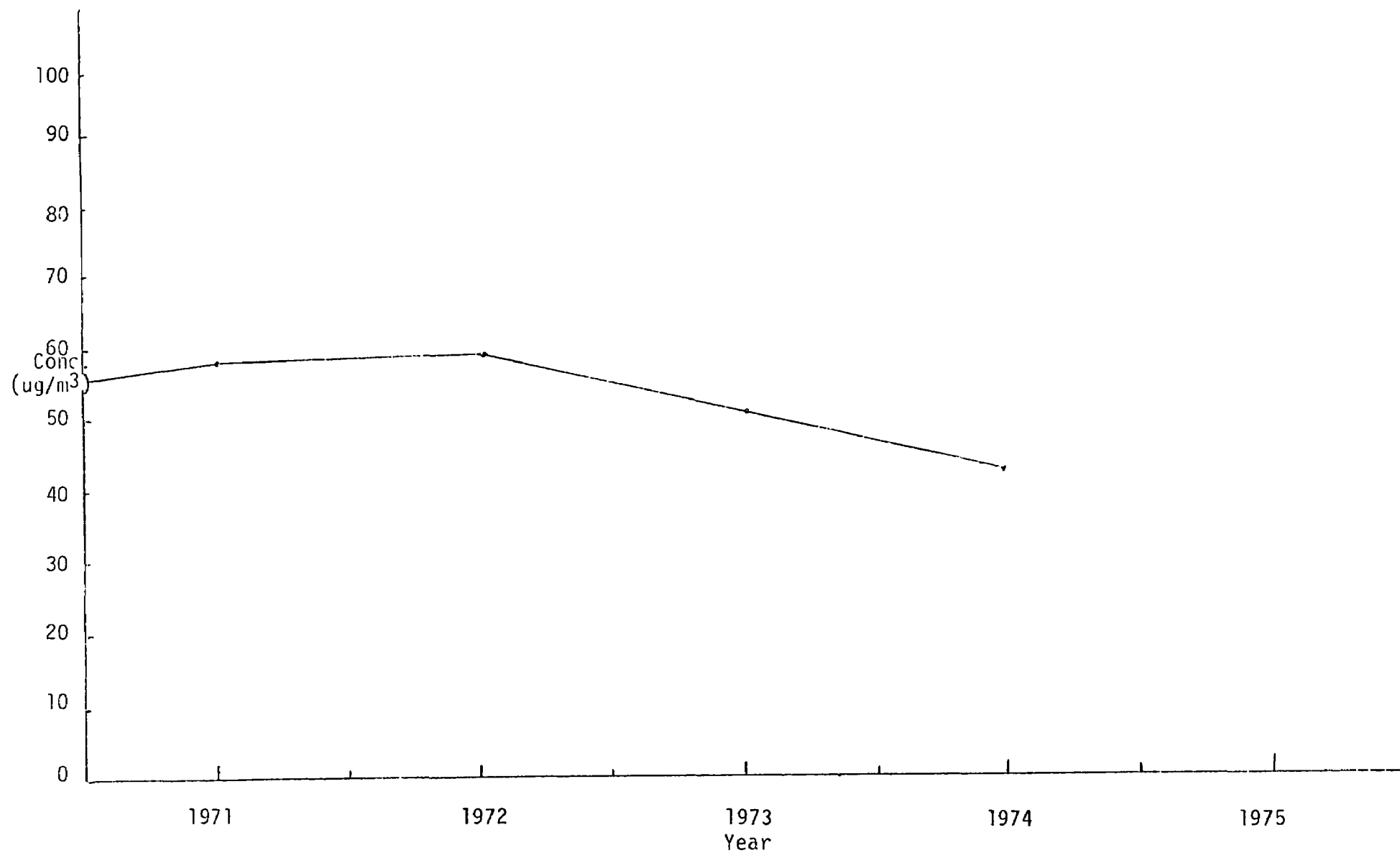


Figure 3

VI. Evaluation of Control Strategy

The control strategy in this AQCR appears to be adequate to provide for attainment of both primary and secondary standards for particulate matter. Past control activities and emissions of area and point sources can be directly related to past air quality levels. The adequacy of the control strategy for attainment of primary standards was verified by the fact that the Jamestown High School monitoring site attained the primary standard during 1974. Further emission reductions at the Jamestown Power and Light plant will provide for continued reduction in air quality and provide for attainment of the secondary standard by January 1976.

In 1974, the second highest 24-hour concentration for particulate matter was 179 ug/m³. In order to provide for attainment of the secondary standard of 150 ug/m³, a 19% reduction in emissions is required. (% reduction required = $179 - 150 / 179 - 30 \times 100 = 19\%$). Table 5 shows that a 95% reduction in emissions will be achieved by January 1976. This will be more than adequate to provide for the attainment of the secondary standard.

VII. Conclusions

Based on an analysis of the Southern Tier West AQCR the following can be concluded:

1. The primary standard for particulate matter was attained in 1974. Increased emission reduction will assure attainment of the primary standard.
2. The secondary standard for particulate matter will probably

Running Annual Geometric Mean for
Jamestown High School Monitoring Site

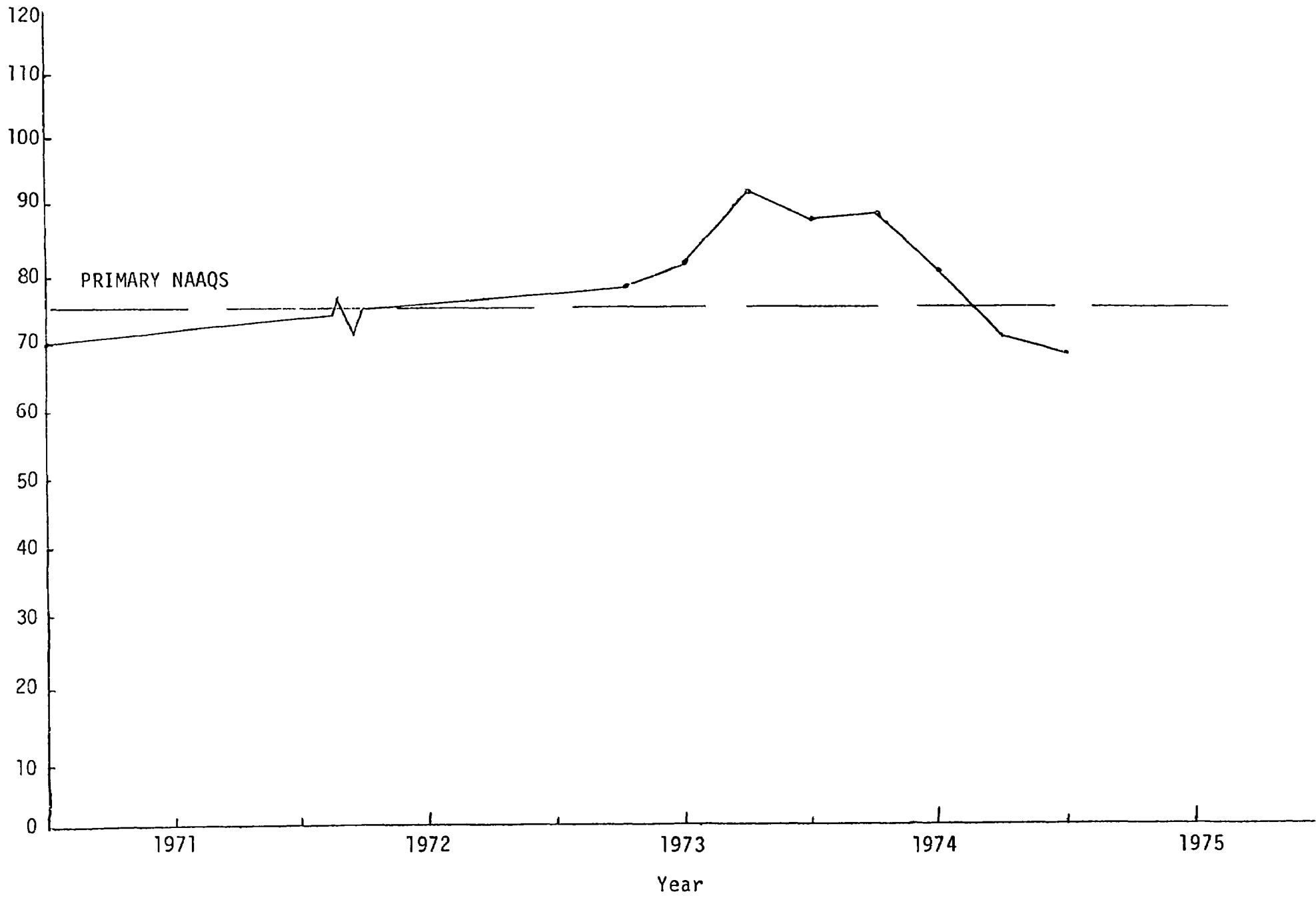


Figure #4

be attained by January 1976 when the Jamestown Power and Light Company is in full compliance with the applicable state regulation.

VIII. Recommendations

1. The development of an Air Quality Maintenance Plan should proceed as scheduled to assure continued attainment of standards.

2. The compliance status of the Jamestown Power and Light Co. should be closely monitored.