UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2466

JUN 22 1995

Ref: 8ART-TO

Mr. Daniel E. Harman, Manager
Air Quality Monitoring
Division of Environmental Engineering
1200 Missouri Avenue
P.O. Box 5520
Bismarck, North Dakota 58506-5520

Dear Dan:

Thank you for the submittal of your 1994 Annual Network Review (NR). We have completed the review process and would like to give you a few comments.

COMMENT 1:
The organization of the NR, by pollutant, is excellent. It makes the report easy to follow and understand as well as provide ease in locating desired information.

COMMENT 2:
Your current and future goals and objectives are clearly stated. The associated maps, lists of major sources, and data summaries further help to support these analyses. In addition, no superfluous information is included in the NR, further aiding in its readability.

COMMENT 3:
As per your conversation with Sharon Eller on Monday, June 12, future NRs should also reflect any trends in development, population, data values, etcetera, that may indicate upcoming needed changes in your network.

If you have any further questions or comments, please do not hesitate to contact Gordon MacRae (303-293-0968) or Sharon Eller (303-293-0969) of my staff for assistance.

Sincerely,

Larry Svoboda, Chief
Assessment, Modeling, and
Emissions Section
Air Programs Branch

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NORTH DAKOTA
STATE DEPARTMENT OF HEALTH
AND CONSOLIDATED LABORATORIES

ENVIRONMENTAL HEALTH SECTION

1200 Missouri Avenue
P.O. Box 5520
Bismarck, North Dakota 58506-5520
Fax #701-328-5200
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May 24, 1995

Mr. Gordon MacRae
Assessment, Modeling &
Emission Section
Air Programs Branch
U.S. EPA - Region VIII (8ART-AQ)
One Denver Place
999 18th Street
Denver, CO 80202-1229

Re: FY '95 Air Quality Media
Workplan, Monitoring, Item C

Dear Mr. MacRae:

Enclosed are two copies of the North Dakota Annual Network Review for FY' 95 as required by the reference. Please note that each 'Monitoring Network' subsection contains a brief justification for each site move and/or modification. The basic problem faced in relocating PM_{10} sites, as well as establishing a continuous site in Fargo, is the availability of locations that meet our requirements for population exposure and specific siting criteria for maximum concentration monitoring.

If you have any questions, please call me at 701-328-5188.

Sincerely,

Daniel E. Harman
Manager
Air Quality Monitoring
Div. Of Environmental Engineering

DEH:saj
Enc:

NORTH DAKOTA STATE DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL ENGINEERING

AMBIENT AIR QUALITY MONITORING
ANNUAL NETWORK REVIEW
1994

May 1995

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1.0 INTRODUCTION

The North Dakota Department of Health, Division of Environmental Engineering, has the primary responsibility of protecting the health and welfare of North Dakotans from the detrimental effects of air pollution. Toward that end, the Division of Environmental Engineering ensures that the ambient air quality in North Dakota is maintained in accordance with the levels established by the State and Federal Ambient Air Quality Standards (AAQS) and the Prevention of Significant Deterioration of Air Quality (PSD) Rules. To carry out this responsibility, the Division of Environmental Engineering operates and maintains a network of ambient air quality monitors and requires five major industrial pollution sources to conduct source specific ambient air quality monitoring.

To evaluate the effectiveness of the State's air quality monitoring effort, the U.S. Environmental Protection Agency (EPA) requires the Division of Environmental Engineering to conduct an annual review of the State's ambient air quality monitoring (AAQM) network. EPA's requirements, as set forth in 40 CFR 58.20, are to (1) determine if the system meets the monitoring objectives defined in 40 CFR 58, Appendix D, and (2) identify network modifications such as termination or relocation of unnecessary sites or establishment of new sites which are necessary. 40 CFR 58.25 requires the State to annually develop and implement a schedule to modify the AAQM network to eliminate any unnecessary sites or correct any inadequacies indicated as a result of the annual review required by 40 CFR 58.20(d). This document and subsequent revisions satisfy those annual requirements.

1.1 Network Review Process

The locations of sites in a monitoring program are established to meet certain objectives. The May 10, 1979, Federal Register (40 CFR 58), "Air Quality Monitoring, Data Reporting, and Surveillance Provisions," as amended, has specified a minimum of four basic monitoring objectives. These objectives are as follows:

1. To determine the highest pollutant concentrations expected to occur in an area covered by the network.

2. To determine representative concentrations in areas of high population density.

3. To determine the impact on ambient pollution levels by a significant source or class of sources.

4. To determine the general/background concentration levels.

The link between basic monitoring objectives and the physical location of a particular monitoring site involves the concept of spatial scale of representativeness. This spatial scale is determined by the physical dimensions of the air parcel nearest a monitoring site throughout which actual pollutant concentrations are reasonably similar. The goal in locating sites is to match the spatial scale represented by the sample of monitored air with a spatial scale most appropriate for the monitoring objective. Spatial scales of representativeness, as specified by EPA, are described as follows:

Microscale - dimensions ranging from several meters up to about 100 meters.

Middle Scale - areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 km.

Neighborhood Scale - city areas of relatively uniform land use with dimensions of 0.5 to 4.0 km.

Urban Scale - overall, city-wide dimensions on the order of 4.0 to 50.0 km. (Usually requires more than one site for definition.)

Regional Scale - rural areas of reasonably homogeneous geography covering from 50 km to hundreds of km.

The relationships between monitoring objectives and spatial scales of representativeness, as specified by EPA, are as follows:

Monitoring Objective	Appropriate Siting Scales
Highest Concentration	Micro, middle, neighborhood
Population Exposure	Neighborhood, urban
Source Impact	Micro, middle, neighborhood
General/Background	Urban, regional

Recommended scales of representativeness appropriate to the criteria pollutants monitored in North Dakota are shown below:

Criteria Pollutant	Spatial Scales
Inhalable Particulate (PM_{10})	micro, middle, neighborhood, urban, regional
Sulfur Dioxide (SO_2)	middle, neighborhood, urban, regional
Ozone (O_3)	middle, neighborhood, urban, regional
Nitrogen Dioxide (NO_2)	middle, neighborhood, urban
Carbon Monoxide (CO)	micro, middle, neighborhood

Using this physical basis to locate sites allows for an objective approach, ensures compatibility among sites, and provides a common basis for data interpretation and

application. The annual review process involves an examination of existing sites to evaluate their monitoring objectives and spatial scale with sites deleted, added, or modified accordingly. Further details on network design can be found in 40 CFR 58, Appendix D.

1.2 General Monitoring Needs

As can be gathered from the prior discussion, each air pollutant has certain characteristics which must be considered when establishing a monitoring site. These characteristics may result from 1) variations in the number and types of sources and emissions in question; 2) reactivity of a particular pollutant with other constituents in the air; 3) local site influences such as terrain and land use; and 4) climatology. The State AAQM network is designed to monitor air quality data for three basic conditions: 1) background monitoring; 2) population exposure; and 3) highest concentration. The industrial AAQM network sites are designed to monitor air quality data for source specific highest concentration impacts on a neighborhood scale.

The primary function of the department operated continuous sites is to collect background data to determine if and when there is any change in background concentrations. Beulah and Fargo - SPM are exceptions to this primary function. Beulah is population exposure because of the major sources in the vicinity. Fargo - SPM is for highest concentration on a microscale for carbon monoxide and population exposure for ozone. PM_{10} sites, except for Sharon, are population exposure sites: Sharon collects background data for the eastern part of the state.

Background sites are chosen to determine concentrations of air contaminants in areas remote from urban sources and generally are sited using the regional spatial scale. This is true for NO_2 despite the fact that the regional spatial scale is not normally

used for NO_2 monitoring. Once general locations are established, all monitoring sites are established in accordance with the specific probe siting criteria specified in 40 CFR 58, Appendix E.

Since all industrial AAQM network sites are source specific, all the pollutants at industry sites are source oriented on a neighborhood scale. Industrial sites are selected using dispersion modeling results and meteorological data to select the most likely locations to have elevated ambient concentrations.

1.3 Monitoring Objectives

The monitoring objectives of the Department are to track those pollutants that are judged to have the potential for violating either State or Federal Ambient Air Quality Standards and to ensure that those pollutants do not cause significant deterioration of our existing air quality. To accomplish these objectives, the Department operates 12 AAQM sites around the State. Ten are SLAMS/NAMS sites, and two are special purpose monitoring (SPM) sites. There are also five industries that report ambient air quality data to this Department. Table 1 lists each site's type and the parameters monitored. Figure 1 shows the approximate site locations. For the industry networks, each network is represented by a single circle whether there is a single site or multiple sites.

The numbers in the Site Name/Company columns in Table 1 and in the '#' column in Tables 2, 4, 6, 8, and 10 correspond to the numbers on the figures. The numbers in the circles correspond to the monitoring sites and the squares correspond to the major sources for that particular pollutant.

TABLE 1

AAQM Network Description

Site Name	Type Station	Parameter Monitored[1]	Operating Schedule	Monitoring Objective[2]	Spatial Scale[2]	Date Site Began
1 Fargo - Commercial	NAMS	PM_{10} PM_{10}	6th Day 6th Day	Population Exposure Collocated SSI	Neighborhood N/A	6/85
2 Fargo - Commercial[3]	SPM	CO, MET O_3	cont. cont.	Highest Concentration Population Exposure	Micro Regional	11/90 4/93
3 Beulah - Residential	SLAMS	SO_2, NO_2, O_3, MET	cont.	Population Exposure	Urban	4/80
4 Bismarck - Commercial	SLAMS	PM_{10}	6th Day	Population Exposure	Neighborhood	4/85
5 Dickinson - Residential	SLAMS	PM_{10}	6th Day	Population Exposure	Neighborhood	7/89
6 Dunn Center - Rural	SLAMS	SO_2, MET	cont.	General Background	Regional	10/79
7 Grand Forks - Commercial	SLAMS	PM_{10}	6th Day	Population Exposure	Neighborhood	7/89
8 Grand Forks UND - SPM Residential[4]	SPM	PM_{10}	6th Day	Source Impact	Middle	1/90
9 Hannover - Rural	SLAMS	SO_2, NO_2, O_3, MET	cont.	General Background	Regional	10/84
10 Sharon	SLAMS	SO_2, NO_X O_3, MET PM_{10}	cont. 6th Day	General Background	Regional	7/94
11 TRNP(NU) - Rural	SLAMS	SO_2, O_3, H_2S, MET	cont.	General Background	Regional	2/80
12 Williston - Commercial	SLAMS	PM_{10}	6th Day	Population Exposure	Neighborhood	5/85
Company	**Site Name**					
13 Amerada Hess Corporation	TIOGA #1 TIOGA #2 TIOGA #3	SO_2 H_2S, MET SO_2	cont. cont. cont.	Source Source Source	Neighborhood Neighborhood Neighborhood	7/87 7/87 11/87
14 Coteau Properties Company	COTEAU #5 COTEAU #6 COTEAU #7 COTEAU #8	PM_{10} PM_{10} PM_{10} PM_{10}	6th Day 6th Day 6th Day 6th Day	Source Source Source Source	Neighborhood Neighborhood Neighborhood Neighborhood	5/93 5/93 5/93 5/93
15 Dakota Gasification Company	DGC #11 DGC #12 DGC #13 DGC #14 DGC #15	SO_2 SO_2, NO_2, MET H_2S SO_2 SO_2, NO_2	cont. cont. cont. cont. cont.	Source Source Source Source Source	Neighborhood Neighborhood Neighborhood Neighborhood Neighborhood	7/84 1/80 2/85 1/89 1/80
16 Koch Hydrocarbon Company	KOCH #1[5] KOCH #3[6] KOCH #4[7]	SO_2, MET SO_2, MET H_2S, MET	cont. cont. cont.	Source Source Source	Neighborhood Neighborhood Neighborhood	10/81 11/94 5/94
17 W. H. Hunt Estate	HUNT #5	SO_2, H_2S, MET	cont.	Source	Neighborhood	11/92

1. MET refers to meteorological and indicates wind speed and wind direction monitoring equipment.
2. Not applicable to MET.
3. Shut down on May 17.
4. Shut down on May 14.
5. Terminated November 21.
6. Began November 21.
7. Began May 14.

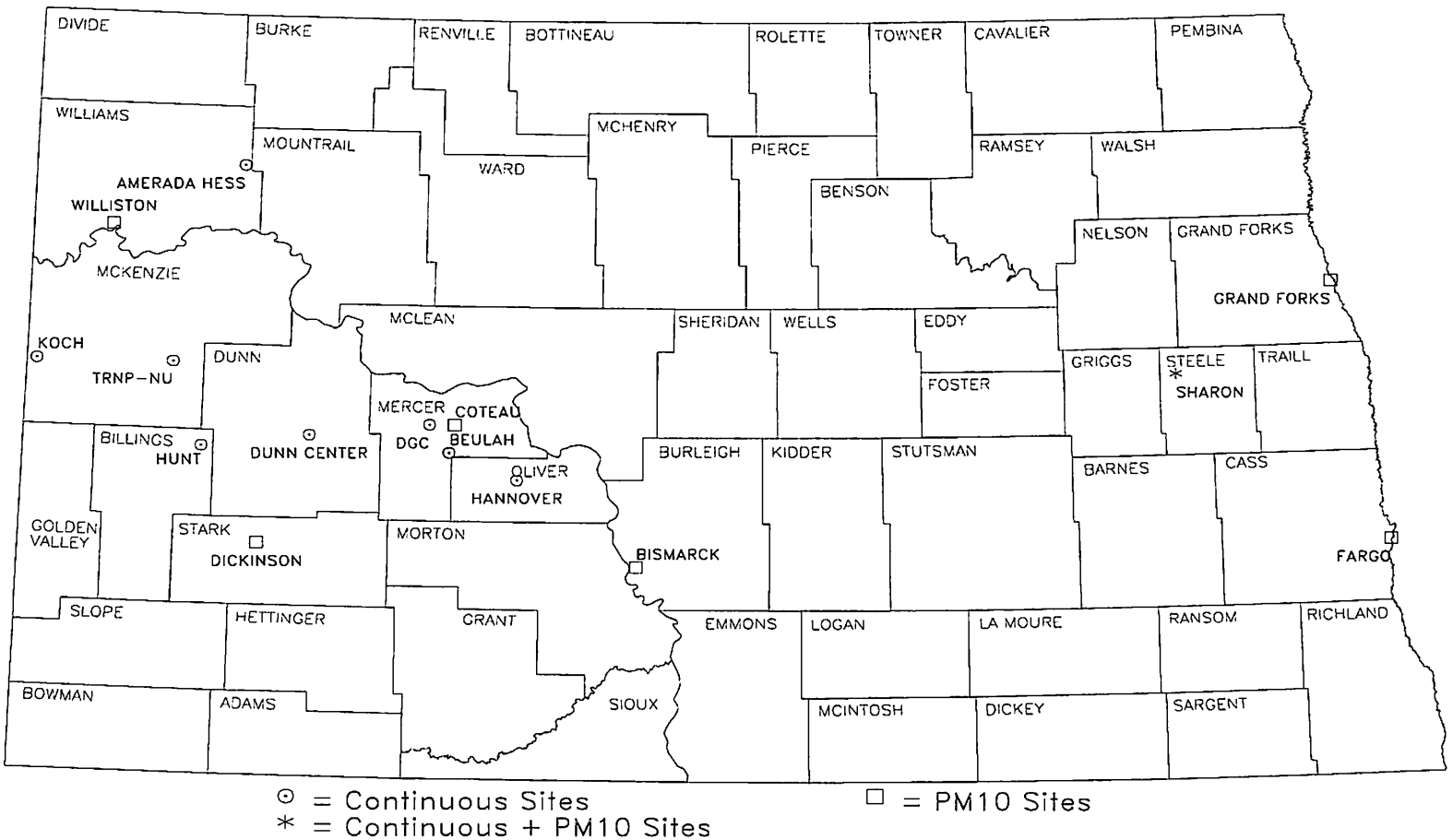

Figure 1 North Dakota Ambient Air Quality Monitoring Sites

2.0 AMBIENT AIR MONITORING NETWORK COVERAGE

The entire State of North Dakota is attainment for all of the criteria pollutants. As such, there are no "problem areas" in the general sense of the term. However, there are areas of concern where the Department has established monitoring sites to track the emissions of specific pollutants from area sources. Also, five major sources maintain monitoring networks in the vicinity of their plants (see Table 1 and Figure 1).

2.1 Sulfur Dioxide

Energy development in the west and west-central portions of North Dakota has produced a number of sources of sulfur dioxide (SO_2). These sources include coal-fired steam-powered electrical generating facilities, a coal gasification plant, natural gas processing plants, an oil refinery, and flaring at oil/gas well sites. As a result, SO_2 is one of the Department's major concerns in regard to ambient air quality monitoring.

2.1.1 Point Sources

The major SO_2 point sources (>100 TPY) are listed in Table 2 along with their emissions calculated from the emissions inventories reported to the department as of April 17. Figure 2 shows the approximate locations of these facilities (the numbers correspond to the respective positions in the site and source tables).

TABLE 2

Major SO_2 Sources
(>100 TPY)

1994

#	Name of Company	Type of Source	Location	County	SO_2 Emissions Ton/Yr
1	CPA/UPA (Coal Creek)	Steam Electric Gen. Facility	Underwood	Mc Lean	50242
2	Minnkota Power Coop.	Steam Electric Gen. Facility	Center	Oliver	40143
3	Dakota Gasification Co.	Synthetic Fuel Plant	Beulah	Mercer	36595
4	Basin Electric Power Cooperative (Leland Olds)	Steam Electric Gen. Facility	Stanton	Mercer	28214
5	Montana Dakota Utilities (Coyote Station)	Steam Electric Gen. Facility	Beulah	Mercer	14656
6	Basin Electric Power Cooperative (AVS)	Steam Electric Gen. Facility	Beulah	Mercer	14409
7	United Power Association	Steam Electric Gen. Facility	Stanton	Mercer	7651
8	Amoco Oil Company	Oil Refinery	Mandan	Morton	6280
9	Montana Dakota Utilities (Heskett)	Steam Electric Gen. Facility	Mandan	Morton	2633
10	W. H. Hunt Trust Estate	Natural Gas Processing Plant	---	Billings	2129
11	Amerada-Hess Corporation (Tioga Gas Plant)	Natural Gas Processing Plant	Tioga	Williams	1388
12	Koch Hydrocarbon	Natural Gas Processing Plant	---	McKenzie	843
13	American Crystal Sugar	Sugar Beet Processing Plant	Drayton	Pembina	608

#	Name of Company	Type of Source	Location	County	SO_2 Emissions Ton/Yr
14	Univ. of North Dakota	Steam Heat	Grand Forks	Grand Forks	596
15	Minn-Dak Farmers Cooperative	Sugar Beet Processing Plant	Wahpeton	Richland	559
16	American Crystal Sugar	Sugar Beet Processing Plant	Hillsboro	Traill	486
17	Archer-Daniels-Midland	Corn Processing	Walhalla		408
18	Interenergy Sheffield	Natural Gas Processing Plant	Lignite	Burke	336
19	North Dakota State	Steam Heat	Fargo	Cass	229
20	Western Gas Resources	Natural Gas Processing Plant	McGregor	Williams	211

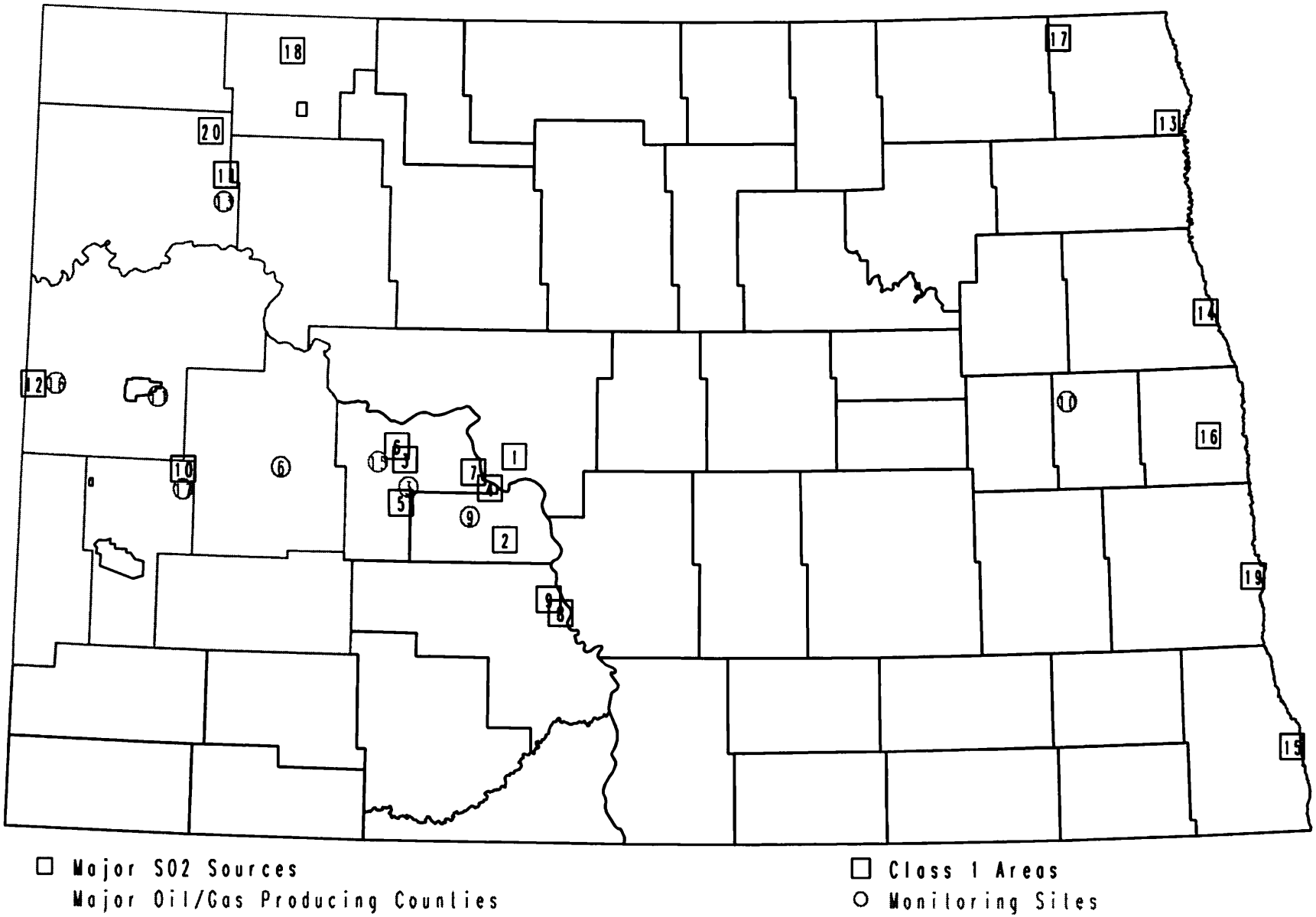

Figure 2 Major Sulfur Dioxide Sources

2.1.2 Other Sources

The western part of the State has a number of potential SO_2 sources associated with the development of oil and gas. These sources include individual oil/gas wells, oil storage facilities, and compressor stations. Emissions from such sources can create two problems. First, these sources may directly emit significant amounts of hydrogen sulfide (H_2S) to the ambient air (see Section 2.7). Second, flaring the H_2S from these sources can create significant concentrations of SO_2 in the ambient air. The primary counties for such sources in western North Dakota are outlined in green on Figure 2.

2.1.3 Monitoring Network

The SO_2 monitoring sites are shown on Figure 2. As can be seen, these monitoring sites are concentrated in the vicinity of the oil and gas development in the west and the coal-fired steam electrical generating plants in the central part of the State. Table 3 shows the latest SO_2 data summaries for these sites. There were no exceedances of either State or Federal SO_2 standards.

A rural background site in Sharon, in the east central part of the State, began operation on July 1. This location was selected because it is centrally located between Fargo, Devils Lake, Grand Forks, and Jamestown and is designed to collect background data. These data will be used for input to dispersion models in evaluating permits to construct in the eastern part of the State.

An urban population exposure site is planned for Fargo to begin operation in late spring or early summer of 1995. The major sources in the Fargo-Moorhead, Minnesota, area are American Crystal Sugar (MN), Busch Agricultural Resources (MN), and North Dakota State University (ND). This data will be used to evaluate urban and suburban expansion projects in the eastern part of the State. The site is planned for the northwestern part of the city on the edge of town. This location is in

TABLE 3

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Sulfur Dioxide (PPB)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MAXIMA 1-HOUR 1ST MM/DD/HH	MAXIMA 1-HOUR 2ND MM/DD/HH	MAXIMA 3-HOUR 1ST MM/DD/HH	MAXIMA 3-HOUR 2ND MM/DD/HH	24-HOUR 1ST MM/DD	24-HOUR 2ND MM/DD	ARITH MEAN	1HR #>273	24HR #>99	% >MDV
AMERADA HESS - TIOGA #1	1994	JAN-DEC	8690	39 11/30/13	28 11/20/07	27 11/30/14	15 01/09/02	8 11/30	7 12/13	1.4			11.3
AMERADA HESS - TIOGA #3	1994	JAN-DEC	8688	113 07/20/10	92 07/13/13	53 07/20/11	46 03/09/14	19 07/20	15 07/13	2.4			28.3
BEULAH	1994	JAN-DEC	8709	77 06/24/10	71 06/24/07	47 06/24/11	42 05/13/08	14 12/12	13 06/24	2.7			35.8
DGC #11	1994	JAN-DEC	8626	128 05/06/14	124 06/22/11	64 05/06/14	55 08/25/14	26 04/26	21 10/12	4.0			68.1
DGC #12	1994	JAN-DEC	8688	102 08/12/12	91 11/13/15	79 08/12/14	60 11/13/17	25 11/13	19 11/21	3.6			50.8
DGC #14	1994	JAN-DEC	8659	185 11/22/08	142 10/20/11	111 10/22/08	105 11/22/08	43 11/22	25 10/22	3.3			45.9
DGC #15	1994	JAN-DEC	8486	128 08/10/13	113 10/15/00	108 10/15/02	104 08/10/14	22 08/10	19 10/15	3.1			43.3
DUNN CENTER	1994	JAN-DEC	8705	43 01/23/23	39 01/23/21	39 01/23/23	18 02/28/14	7 01/23	6 02/28	1.4			10.4
HANNOVER	1994	JAN-DEC	8706	68 05/15/21	58 08/26/07	37 05/15/23	34 04/04/11	11 04/27	9 12/06	2.3			28.4
HUNT #5	1994	JAN-DEC	8714	477 11/08/09	114 08/13/03	184 11/08/11	55 08/13/05	27 11/08	12 08/13	1.4	1		11.7
KOCH - MGP #1	1994	JAN-NOV	7469	160 08/29/08	84 08/29/11	55 08/29/11	54 08/29/08	16 08/29	6 08/01	1.6			16.9
KOCH - MGP #3	1994	NOV-DEC	139 ***	9 11/28/09	9 11/25/16	6 11/25/17	4 11/24/17	2 11/24	2 11/25	1.3			12.9
SHARON	1994	JUL-DEC	3796 ***	5 12/16/20	4 12/16/19	4 12/16/20	2 12/30/02	2 12/16	1 12/31	1.0			1.0
TRNP - NU	1994	JAN-DEC	8705	49 01/23/23	39 11/09/08	24 01/23/23	23 01/24/02	8 01/24	8 02/21	1.3			11.1

* THE AIR QUALITY STANDARDS ARE: 1) THE MAXIMUM ALLOWABLE 1-HOUR CONCENTRATION IS 273 ppb (715 µg/m3).
2) THE MAXIMUM ALLOWABLE 24-HOUR CONCENTRATION IS 99 ppb (260 µg/m3).
3) THE MAXIMUM ALLOWABLE ANNUAL MEAN IS 23 ppb (60 µg/m3).

*** LESS THAN 80% OF THE POSSIBLE SAMPLES (DATA) WERE COLLECTED

the vicinity of the predicted maximum concentrations for major sources in the area. Since this site is on the edge of town, we will be able to separate the data into two categories: from a rural influence and from an urban influence. By separating the data into these two categories we should be able to identify the relative amounts of pollution added by the urban activities in Fargo-Moorhead area. The ambient data collected at this site may be used to evaluate permits to construct in or near eastern populations centers

A source specific site is planned in the vicinity of the Milton R. Young power plant southeast of the city of Center, in Oliver County, to begin operation in late summer, 1995. Modeling results have indicated possible exceedances of the State 1-hour and 24-hour standards. This site will evaluate the operation of the plant in regard to these standards This site is not expected to be active more than two years. If an SO_2 problem does exist, then Minnkota Power Company will be required to establish at least one SO_2 site.

The National Park Service has raised questions about possible exceedances of the PSD Class 1 increment in the T. R. Roosevelt National Park - South Unit and has requested a monitoring site be established either in the park or somewhere along the northern border of the park. Since there are four oil fields with relatively sour gas (1 - 8 % H_2S) just north of the park with some sour gas flaring, and considering some of the problems the department has encountered in these four oil fields, it was decided that a monitoring site was justified. A monitoring site will be established in the Whiskey Joe oil field on the northeast side of the park as soon as the U. S. Forest Service completes a botanical survey and power is available.

2.2 Oxides of Nitrogen

Oxides of Nitrogen (NO_x) is the term used to represent both nitric oxide (NO) and nitrogen dioxide (NO_2). NO_2 is formed when NO is oxidized in the ambient air. There are no ambient air quality standards for NO.

2.2.1 Point Sources

The major NO_x stationary point sources (>100 TPY) are listed in Table 4 along with their emissions as calculated from the most recent emission inventories reported to the department as of April 17. Figure 3 shows the approximate locations of these facilities (the numbers correspond to the respective positions in the site and source tables). The larger NO_x point sources in North Dakota are associated with coal-fired steam-powered electrical generating plants in the west-central portion of the State and large internal combustion compressor engines in the natural gas fields in the western part of the State.

2.2.2 Area Sources

Another source of NO_X is automobile emissions. North Dakota has no significant urbanized areas with regard to oxides of nitrogen; the entire population of the State is less than the 1,000,000 population figure that EPA specifies in the NO_2 requirement for NAMS monitoring.

2.2.3 Monitoring Network

The Department currently operates three $NO/NO_2/NO_x$ analyzers. These are located at Sharon, Beulah, and Hannover. The Dakota Gasification Company (DGC) network also operates analyzers at sites DGC #12 and DGC #15. The NO_2 data summary is shown in Table 5 The measured NO_2 values are quite low, particularly the annual means. From Figure 3 it can be seen that $NO/NO_2/NO_x$ analyzers are well placed with respect to the major NO_x sources.

TABLE 4

Major NO_x Sources
(> 100 TPY)

1994

#	Name of Company	Type of Source	Location	County	NO_x Emissions Ton/Yr
1	Minnkota Power Coop.	Steam Electric Gen. Facility	Center	Oliver	28035
2	CPA/UPA (Coal Creek)	Steam Electric Gen. Facility	Underwood	McLean	26415
3	Basin Electric Power Cooperative (Leland Olds)	Steam Electric Gen. Facility	Stanton	Mercer	18311
4	Basin Electric Power Cooperative (AVS)	Steam Electric Gen. Facility	Beulah	Mercer	11458
5	United Power Association	Steam Electric Gen. Facility	Stanton	Mercer	4601
6	Dakota Gasification Co.	Synthetic Fuel Plant	Beulah	Mercer	3354
7	Amoco Oil Company	Oil Refinery	Mandan	Morton	2013
8	Amerada Hess Corporation (Tioga Gas Plant)	Natural Gas Processing Plant	Tioga	Williams	1816
9	Montana Dakota Utilities (Coyote Station)	Steam Electric Gen. Facility	Beulah	Mercer	1428
10	MDU - Heskett	Steam Electric Gen. Facility	Mandan	Morton	968
11	American Crystal - Drayton	Sugar Beet Processing	Drayton	Pembina	728
12	MINN-DAK Farmers	Sugar Beet Processing	Wahpeton	Richland	689

#	Name of Company	Type of Source	Location	County	NO_x Emissions Ton/Yr
13	American Crystal - Hillsboro	Sugar Beet Processing	Hillsboro	Traill	400
14	UND	Heating Plant	Grand Forks	Grand Forks	382
15	Amerada Hess - Antelope #2	Compressor Station	---	McKenzie	326
16	Interenergy Sheffield Processing Co.	Natural Gas Processing	Lignite	Burke	256
17	Amerada Hess - Hawkeye	Compressor Station	---	McKenzie	221
18	Northern Border Pipeline - CS #8	Compressor Station	---	McIntosh	201
19	Amerada Hess - Antelope #1	Compressor Station	---	McKenzie	198
20	Archer-Daniels-Midland	Corn Processing	Walhalla	Pembina	186
21	Koch Hydrocarbon - Alexander	Compressor Station	---	McKenzie	169
22	Northern Border Pipeline - CS #4	Compressor Station	---	McKenzie	167
23	Northern Border Pipeline - CS #6	Compressor Station	Glen Ullin	Morton	166
24	Koch Hydrocarbon-Tree Top	Compressor Station	---	Billings	150
25	Amerada Hess-Cherry Creek	Compressor Station	---	McKenzie	147
26	True Oil - Red Wing Gas Plant	Compressor Station	---	McKenzie	140
27	Western Gas Resources Temple Gas Plant	Natural Gas Processing Plant	McGregor	Williams	136
28	Northern Sun	Oil Seed Crushing	Enderlin	Ransom	135
29	NDSU	Heating Plant	Fargo	Cass	112
30	Williston Basin IPC	Compressor Station	Williston	Williams	107

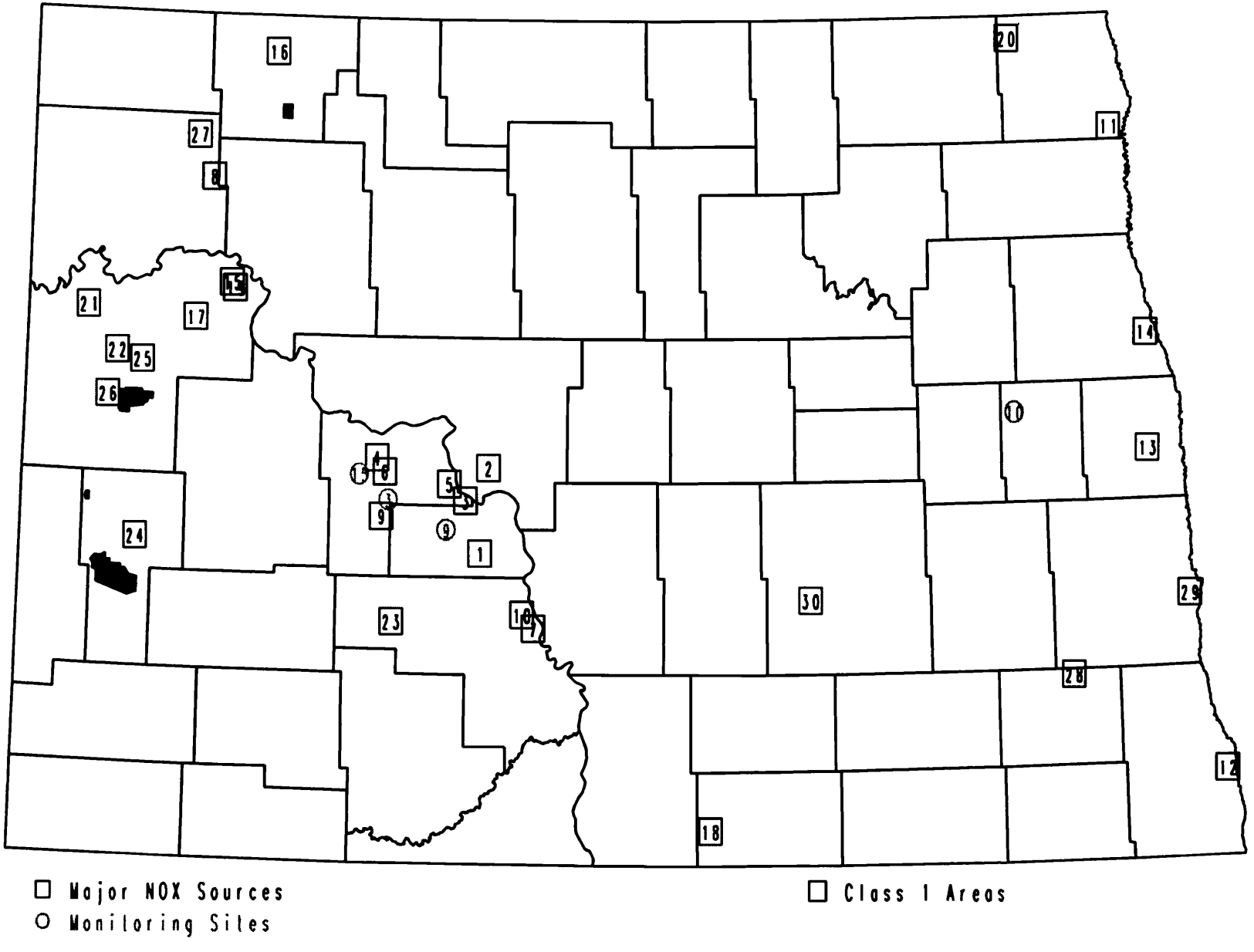

Figure 3 Major Nitrogen Dioxide Sources

TABLE 5

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Nitrogen Dioxide (PPB)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MAXIMA 1 - HOUR 1ST MM/DD/HH	MAXIMA 1 - HOUR 2ND MM/DD/HH	ARITH MEAN	% >MDV
BEULAH	1994	JAN-DEC	7668	31 12/18/16	30 02/09/06	4.0	72.1
DGC #12	1994	JAN-DEC	8660	40 05/11/20	32 09/13/18	4.0	92.3
DGC #15	1994	JAN-DEC	8433	103 12/19/04	70 08/15/00	4.9	88.5
HANNOVER	1994	JAN-DEC	8113	34 05/15/21	26 03/19/01	2.4	56.1
SHARON	1994	JUL-DEC	4382 ***	20 09/02/21	14 12/14/17	1.4	17.8

* THE AIR QUALITY STANDARDS ARE: 1) 50 ppb (100 µg/m3) MAXIMUM ANNUAL ARITHMETIC MEAN.
2) 100 ppb (200 µg/m3) MAXIMUM 1-HOUR CONCENTRATION NOT TO BE EXCEEDED OVER 1 PERCENT OF THE TIME IN ANY CALENDAR QUARTER.
(Repealed December 1, 1994.)

*** LESS THAN 80% OF THE POSSIBLE SAMPLES (DATA) WERE COLLECTED

A rural background site in Sharon, in the east central part of the State, began operation on July 1. This location was selected because it is centrally located between Fargo, Devils Lake, Grand Forks, and Jamestown and is designed to collect background data. These data will be used for input to dispersion models in evaluating permits to construct in the eastern part of the State.

An urban population exposure site is planned for Fargo to begin operation in late spring or early summer of 1995. The major sources in the Fargo-Moorhead, Minnesota, area are American Crystal Sugar (MN), Busch Agricultural Resources (MN), and North Dakota State University (ND). This data will be used to evaluate urban and suburban expansion projects in the eastern part of the State. The site is planned for the northwestern part of the city on the edge of town. This location is in the vicinity of the predicted maximum concentrations for major sources in the area. Since this site is on the edge of town, we will be able to separate the data into two categories: from a rural influence and from an urban influence. By separating the data into these two categories we should be able to identify the relative amounts of pollution added by the urban activities in Fargo-Moorhead area.

2.3 Ozone

Unlike most other pollutants, ozone (O_3) is not emitted directly into the atmosphere but results from a complex photochemical reaction between volatile organic compounds (VOC), oxides of nitrogen (NO_x), and solar radiation. Both VOC and NO_x are emitted directly into the atmosphere from sources within the State. Since solar radiation is a major factor in O_3 production, O_3 concentrations are known to peak in summer months. 40 CFR 58 defines the O_3 monitoring season for North Dakota as May 1 through September 30. However, at TRNP-NU, Beulah, and Fargo the O_3 analyzers are operated from April 1 through September 30 to collect two full quarters of data. The Department began operating the O_3 analyzers at Hannover and Sharon year round to collect data for use in NO_x dispersion models using the ozone limiting method.

2.3.1 Point Sources

The major stationary point sources (> 100 TPY) of VOC, as calculated from the most recent emission inventories reported to the department as of April 17, are listed in Table 6. Figure 4 shows the approximate locations of these facilities.

2.3.2 Area Sources

Point sources contribute only part of the total VOC and NO_x emissions. The remaining emissions are attributed to mobile sources in urban areas. The EPA has specified a design criteria for selecting NAMS locations for O_3 as any urbanized area having a population of more than 200,000. North Dakota has no urbanized areas large enough to warrant monitoring for ozone.

2.3.3 Monitoring Network

The State currently has five continuous ozone analyzers in operation. These are at Beulah, Hannover, Sharon, Theodore Roosevelt National Park -North Unit, and Fargo. The O_3 data summary is in Table 7. Figure 4 shows that the monitoring network is fairly well placed with respect to the major sources. However, most of the O_3 monitored seems to be unrelated to these sources since the values are quite consistent regardless of the monitoring location and wind direction.

A rural background site in Sharon, in the east central part of the State, began operation on July 1. This location was selected because it is centrally located between Fargo, Devils Lake, Grand Forks, and Jamestown and is designed to collect background data. These data will be used for input to dispersion models in evaluating permits to construct in the eastern part of the State.

An urban population exposure site is planned for Fargo to begin operation in late spring or early summer of 1995. This data will be used to evaluate urban

and suburban expansion projects in the eastern part of the State. The site is planned for the northwestern part of the city on the edge of town. This location is in the vicinity of the predicted maximum concentrations for major sources in the area. Since this site is on the edge of town, we will be able to separate the data into two categories: from a rural influence and from an urban influence. By separating the data into these two categories we should be able to identify the relative amounts of pollution added by the urban activities in Fargo-Moorhead area.

The Fargo - SPM site at West Acres Shopping Mall was removed May 17 at the request of the mall owners. The site would have had to be removed by fall in preparation for the road construction planned in the vicinity of the site.

TABLE 6

Major VOC Sources
(> 100 TPY)

1994

#	Name of Company	Type of Source	Location	County	VOC Emissions Ton/Year
1	Midwest Processing Inc.	Oil Seed Crushing	Velva	McHenry	438
2	Dakota Gasification Co.	Synthetic Fuel Plant	Beulah	Mercer	302
3	Basin Electric Power Cooperative (AVS)	Steam Electric Gen. Facility	Beulah	Mercer	282
4	Minnkota Power Coop.	Steam Electric Gen. Facility	Center	Oliver	235
5	CPA/UPA (Coal Creek)	Steam Electric Gen. Facility	Underwood	Mc Lean	214
6	Amoco Oil Company	Oil Refinery	Mandan	Morton	184
7	Basin Electric Power Cooperative (Leland Olds)	Steam Electric Gen. Facility	Stanton	Mercer	142
8	Montana-Dakota Utilities (Coyote Station)	Steam Electric Gen. Facility	Beulah	Mercer	115

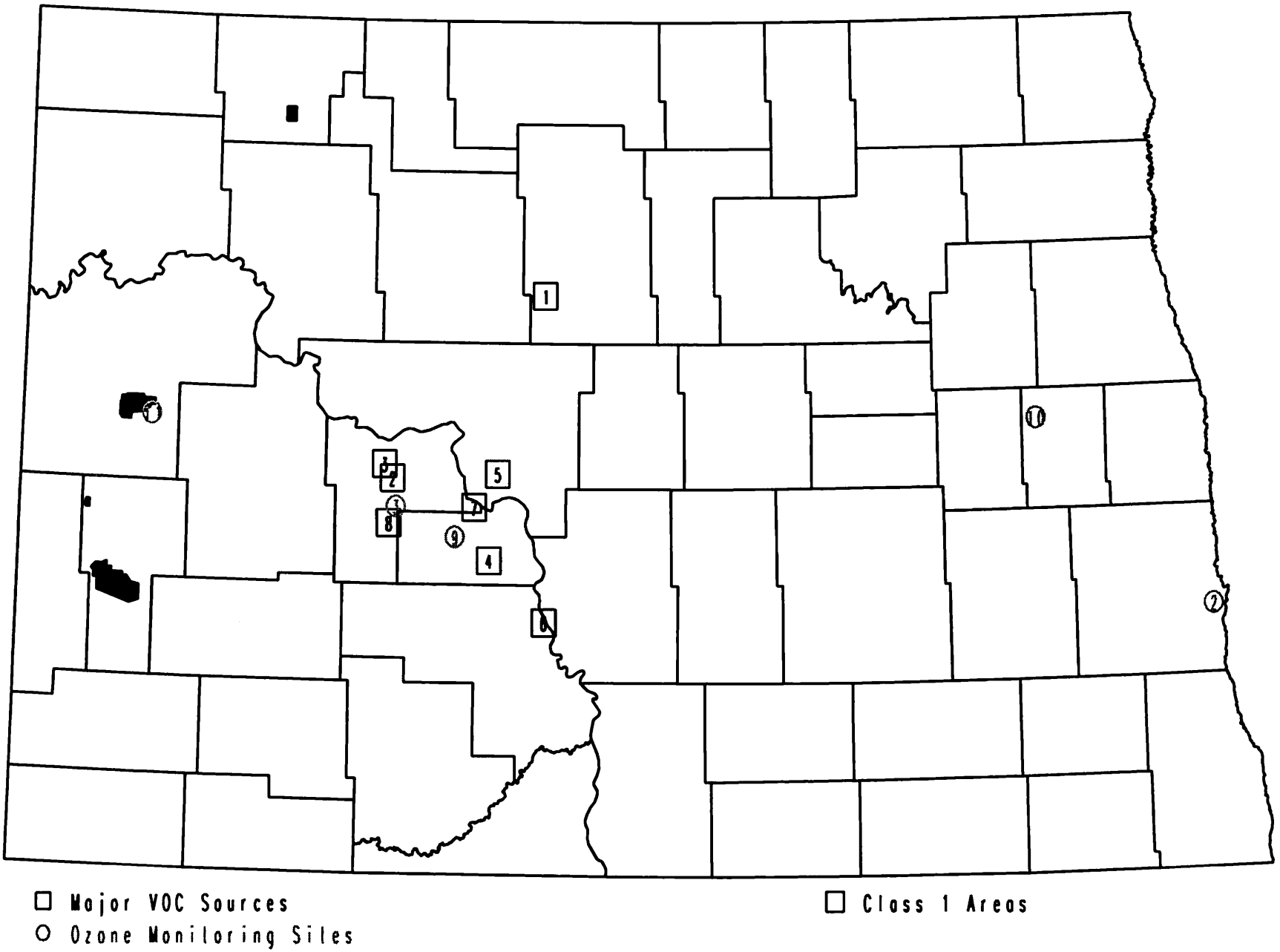

Figure 4 Major VOC Sources

TABLE 7

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Ozone (PPB)

LOCATION	YEAR	SAMPLING PERIOD	DAYS SAMPLED	NUM OBS	1 - H O U R M A X I M A 1ST	DATE MM/DD/HH	2ND	DATE MM/DD/HH	3RD	DATE MM/DD/HH	#HOURS >120	% >MDV
BEULAH	1994	APR-SEP	183	4280	62	8/17/13	62	9/ 9/17	59	5/15/12	0	99.1
FARGO - SPM	1994	APR-MAY	43	1008	59	4/11/14	59	5/13/13	56	4/22/14	0	92.5
HANNOVER	1994	APR-DEC	275	6560	64	5/15/13	63	8/17/15	61	4/12/15	0	100.0
SHARON	1994	JUL-DEC	184	4135	64	8/18/18	54	9/20/13	52	8/23/16	0	100.0
TRNP - NU	1994	APR-SEP	183	4369	79	8/ 4/16	68	8/17/14	60	5/15/15	0	99.9

* THE AIR QUALITY STANDARD FOR OZONE IS 120 ppb (235 $\mu g/m3$) MAXIMUM 1-HOUR CONCENTRATION NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR.

2.4 Inhalable Particulates

The inhalable particulate standard is designed to protect against those particulates that can be inhaled deep into the lungs and cause respiratory problems. These particulates have an aerodynamic diameter less than or equal to a nominal 10 microns and are designated as PM_{10}.

2.4.1 Sources

The Major PM10 point sources (>100 TPY) are listed in Table 8 along with their emissions as calculated from the most recent emissions inventories reported to the department as of April 17. Figure 5 shows the approximate locations of these facilities (the numbers correspond to the respective positions in the site and source tables). Most of these sources are large coal-fired facilities, and the PM_{10} particles are part of the boiler stack emissions; however, some of the emissions are the result of processing operations. Not included in this table are sources of fugitive dust such as coal mines, gravel pits, agricultural fields, and unpaved roads

2.4.2 Monitoring Network

The State operates seven PM_{10} samplers at six sites; the Fargo site has collocated samplers. Since PM_{10} is of concern mainly because of its effects on people, monitoring efforts are concentrated in the state's population centers. There is one industry network located at the Coteau Mine in central Mercer County. The inhalable particulate monitoring data for the network are shown in Table 9.

TABLE 8

Major PM_{10} Sources
(> 100 TPY)

1994

#	Name of Company	Type of Source	Location	County	PM_{10} Emissions Ton/Year
1	Basin Electric Power Cooperative (Leland Olds)	Steam Electric Gen. Facility	Stanton	Mercer	1191
2	Basin Electric Power Cooperative (AVS)	Steam Electric Gen. Facility	Beulah	Mercer	754
3	Montana Dakota Utilities (Coyote Station)	Steam Electric Gen. Facility	Beulah	Mercer	508
4	CPA/UPA (Coal Creek)	Steam Electric Gen. Facility	Underwood	Mc Lean	502
5	Minnkota Power Coop.	Steam Electric Gen. Facility	Center	Oliver	496
6	Dakota Gasification Co.	Synthetic Fuel Plant	Beulah	Mercer	281
7	Amoco Oil Company	Oil Refinery	Mandan	Morton	172
8	United Power Association	Steam Electric Gen. Facility	Stanton	Mercer	151
9	Minn-Dak Farmers Coop.	Sugar Beet Processing Plant	Wahpeton	Richland	124
10	American Crystal Sugar Co.	Sugar Beet Processing Plant	Drayton	Pembina	110
11	Montana Dakota Utilities (Heskett Plant)	Steam Electric Gen. Facility	Mandan	Morton	109
12	Northern Sun	Oil Seed Processing	Enderlin	Ransom	104

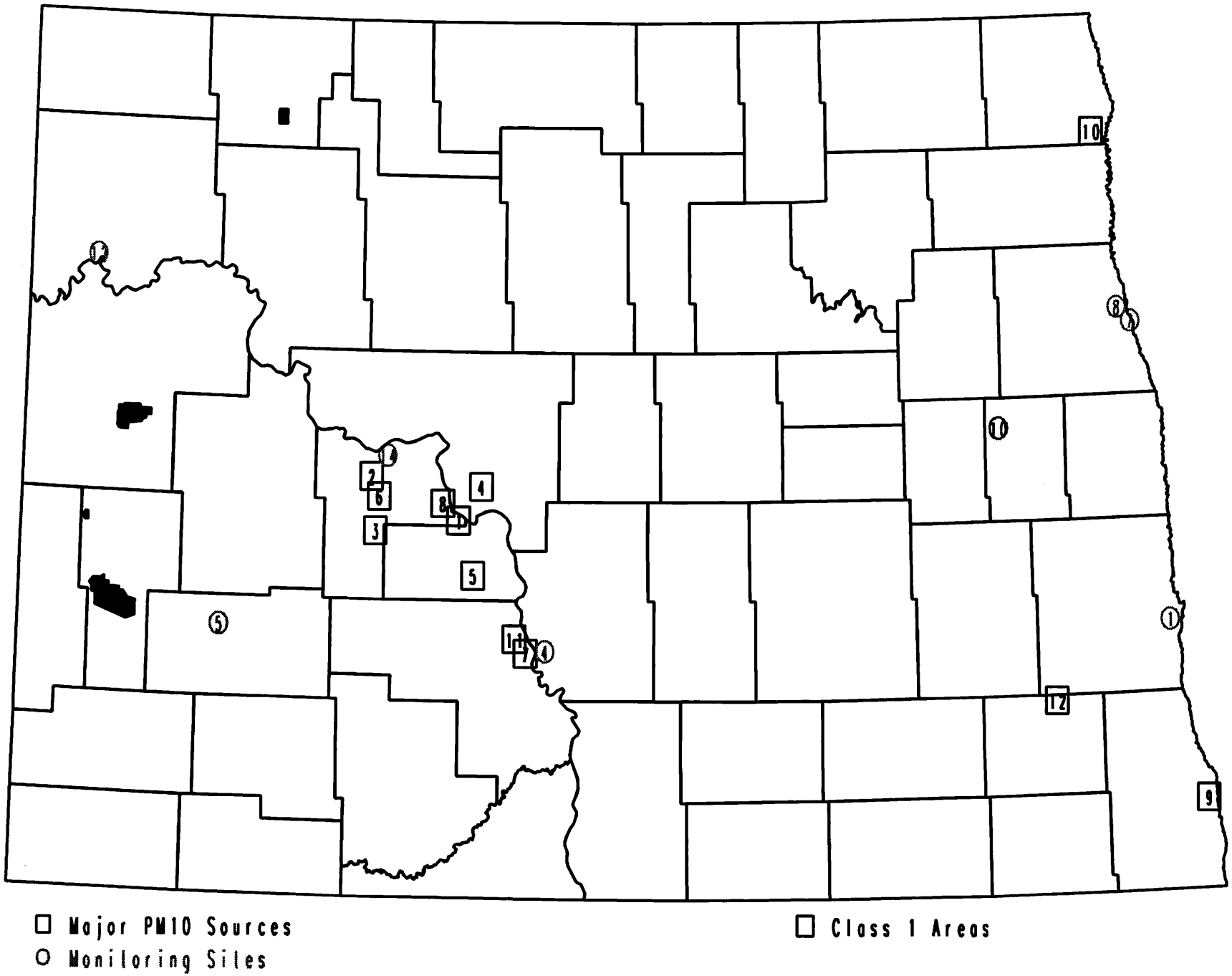

Figure 5 Major PM Sources

TABLE 9

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable Particulates ($\mu g/m^3$)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAX 1ST MM/DD	MAX 2ND MM/DD	MAX 3RD MM/DD	ARITH MEAN	#>150	AM>50	% >MDV
BISMARCK	1994	JAN-DEC	61	3.3	48.5 08/24	39.5 03/21	38.7 12/10	17.6			98.3
COTEAU #5	1994	JAN-DEC	59	4.1	36.0 08/24	35.5 12/10	28.0 05/26	12.5			100.0
COTEAU #6	1994	JAN-DEC	56	0.4	41.9 08/24	41.7 12/10	23.5 05/14	11.6			92.8
COTEAU #7	1994	JAN-DEC	59	1.1	66.8 08/24	40.2 12/10	30.6 11/10	14.1			96.6
COTEAU #8	1994	JAN-DEC	59	2.8	44.5 12/10	39.8 05/14	33.8 08/24	12.8			94.9
DICKINSON RES	1994	JAN-DEC	58	0.2	37.9 08/24	26.2 09/29	24.1 08/06	10.7			86.2
FARGO	1994	JAN-DEC	61	2.0	43.6 08/24	39.3 08/18	38.8 05/20	17.6			96.7
GRAND FORKS	1994	JAN-DEC	61	3.9	39.3 09/29	36.2 08/06	34.0 05/08	16.4			98.3
GRAND FORKS UND - SPM	1994	JAN-MAY	40 ***	5.9	71.2 05/11	56.3 05/08	53.6 04/23	20.4			100.0
SHARON	1994	JUL-DEC	30 ***	0.2	33.1 08/06	32.8 08/24	29.9 09/29	13.2			80.0
WILLISTON	1994	JAN-DEC	56	3.7	66.6 08/24	58.6 01/14	47.0 08/19	14.8			96.4

* THE AIR QUALITY STANDARDS ARE: 1) 50 $\mu g/m^3$ EXPECTED ANNUAL ARITHMETIC MEAN.
2) MAXIMUM OF 150 $\mu g/m^3$ AVERAGED OVER A 24-HOUR PERIOD WITH NO MORE THAN ONE EXPECTED EXCEEDANCE PER YEAR.

*** LESS THAN 80% OF THE POSSIBLE SAMPLES (DATA) WERE COLLECTED

A rural background site in Sharon, in the east central part of the State, began operation on July 1. This location was selected because it is centrally located between Fargo, Devils Lake, Grand Forks, and Jamestown and is designed to collect background data. These data will be used for input to dispersion models in evaluating permits to construct in the eastern part of the State.

The PM_{10} samplers at Fargo will be moved from the roof of the City Hall, which does not meet population exposure siting criteria, to a new site in or near a residential area on the northwest side of town. Since this site is on the edge of town, we will be able to separate the data into two categories: from a rural influence and from an urban influence. By separating the data into these two categories we should be able to identify the relative amounts of pollution added by the urban activities in Fargo-Moorhead area.

The samplers in Bismarck, Grand Forks and Williston do not meet the siting criteria for population exposure and are scheduled to be moved as soon as new sites can be found and weather permits. Sites in the northwest edge of the cities are the primary locations for 3 reasons: 1) locations near the center of the cities cannot meet the siting criteria for height, setback from roadways, and/or obstructions; 2) locations in residential areas would be unacceptable for security, noise, and/or obstructions; and 3) locations in or near industrial areas would produce elevated concentrations from the activity in the immediate vicinity but may not be representative of the actual concentrations in the residential areas.

Two PM monitoring methods are anticipated to be added to the existing PM_{10} network. Continuous PM_{10} analyzers are under consideration for up to four locations in decreasing order of priority: Fargo, Sharon, Hannover, and Beulah. A Graseby Andersen Model 231-F $PM_{2.5}$ impactor will be added to the Bismarck site after the sampler is moved to new location.

2.5 Carbon Monoxide

Many large urban areas in the United States have problems attaining the AAQS for carbon monoxide (CO). The primary source of CO in these urban areas is automobiles. North Dakota does not have sufficient population with the corresponding traffic congestion and geographical/meteorological conditions to create significant CO emission problems. However, there are several stationary sources in the State that emit more than 100 TPY of CO.

2.5.1 Sources

The major stationary CO sources (>100 TPY) are listed in Table 10 along with their emissions as calculated from the most recent emissions inventories reported to the department as of April 17. Figure 6 show the approximate locations of these facilities (the numbers correspond to the respective positions in the site and source tables). Most of these sources are the same sources that are the major emitters of SO_2 and NO_x, but the corresponding levels of CO from these sources are considerably lower.

2.5.2 Monitoring Network

A CO monitor was located in Fargo in the West Acres Mall parking lot near the busiest traffic intersection in the State and was operated only during first quarter. The monitoring results are shown in Table 11. The observed concentrations are well below the standards. The CO monitor would not seem to be well placed with respect to the major sources; However, these sources are relatively small, and monitoring has concentrated on mobile sources in a population center.

The Fargo - SPM site at West Acres Shopping Mall was removed May 17 at the request of the mall owners. The site would have had to be removed by fall in preparation for the road construction planned in the vicinity of the site.

TABLE 10

Major CO Sources
(> 100 TPY)

1994

#	Name of Company	Type of Source	Location	County	CO Emissions Ton/Year
1	Dakota Gasification Co.	Synthetic Fuel Gen. Plant	Beulah	Mercer	1984
2	Montana Dakota Utilities (Heskett Plant)	Steam Electric Gen. Plant	Mandan	Morton	1075
3	Minnkota Power Coop.	Steam Electric Gen. Facility	Center	Oliver	1053
4	Basin Electric Power Coop. (Leland Olds)	Steam Electric Gen. Plant	Stanton	Mercer	761
5	Basin Electric Power Cooperative (AVS)	Steam Electric Gen. Facility	Beulah	Mercer	648
6	Montana Dakota Utilities (Coyote Station)	Steam Electric Gen. Plant	Beulah	Mercer	525
7	CPA/UPA (Coal Creek)	Steam Electric Gen. Facility	Underwood	Mc Lean	362
8	Amerada Hess	Natural Gas Processing	Tioga	Williams	335
9	American Crystal Sugar Co.	Sugar Beet Processing Plant	Drayton	Pembina	332
10	American Crystal Sugar Co.	Sugar Beet Processing Plant	Hillsboro	Pembina	329

#	Name of Company	Type of Source	Location	County	CO Emissions Ton/Year
11	MINN-DAK Farmers Cooperative	Sugar Beet Processing Plant	Wahpeton	Richland	247
12	Northern Sun	Oil Seed Processing	Enderlin	Ransom	151
13	Interenergy Sheffield	Natural Gas Processing Plant	Lignite	Burke	145
14	United Power Association	Steam Electric Gen. Facility	Stanton	Mercer	140
15	Amoco Oil Co.	Oil refinery	Mandan	Morton	139
16	True Oil - Red Wing	Compressor Station	---	McKenzie	137
17	Koch Hydrocarbon - Tree Top	Compressor Station	---	Billings	129
18	UND	Steam Heat	Grand Forks	Grand Forks	127
19	Amerada Hess - Hawkeye Station	Compressor station	---	McKenzie	124
20	Western Gas Resources - Temple Gas Plant	Natural Gas Processing Plant	McGregor	Williams	107

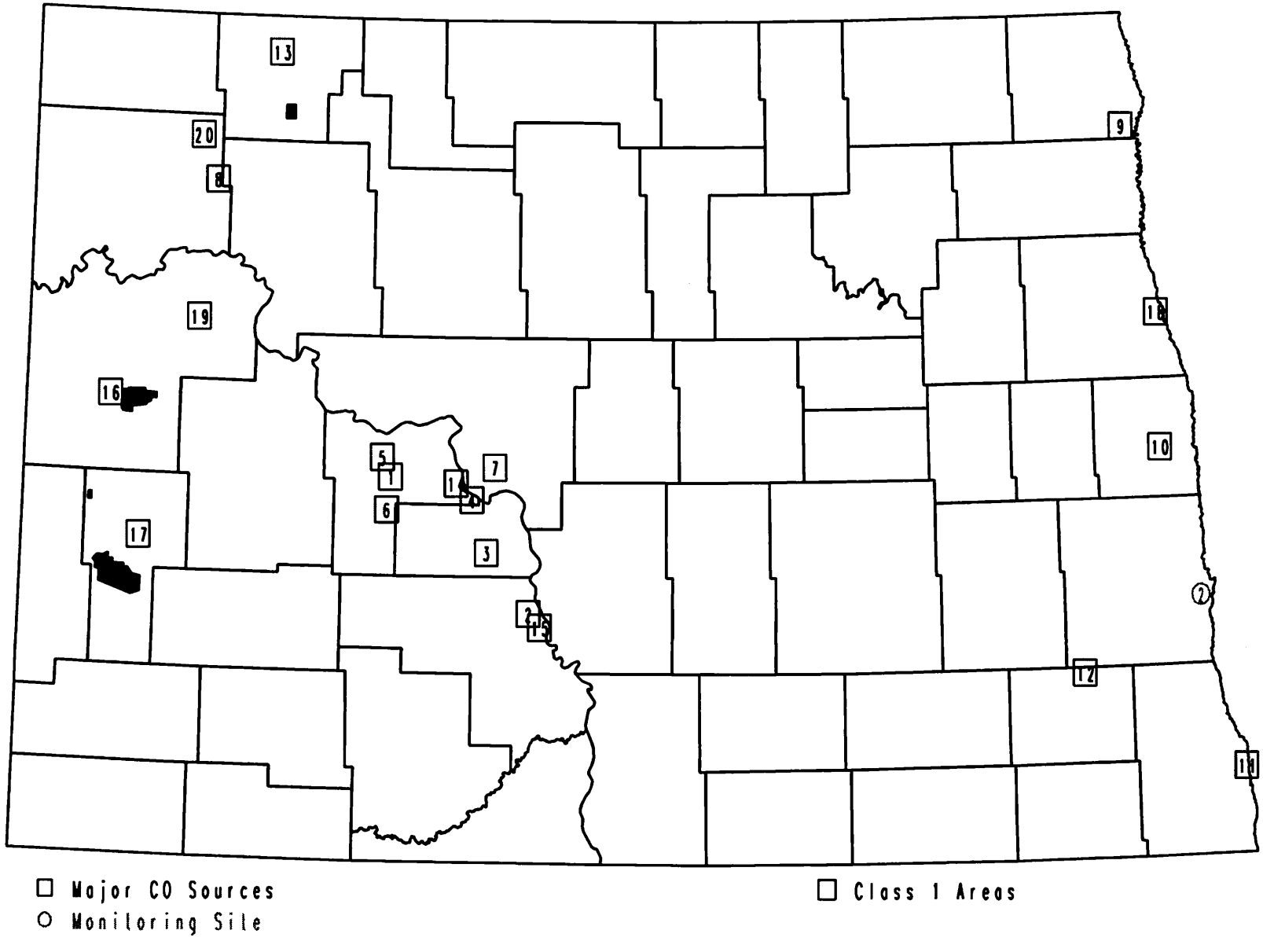

Figure 6 Major CO Sources

TABLE 11

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Carbon Monoxide (PPM)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAX 1-HOUR 1ST MM/DD/HH	MAX 1-HOUR 2ND MM/DD/HH	MAX 8-HOUR 1ST MM/DD/HH	MAX 8-HOUR 2ND MM/DD/HH	1HR #>35	8HR #>9	% >MDV
FARGO - SPM	1994	JAN-MAR	2095	0.0	7.2 01/21/22	6.4 01/21/21	4.7 01/22/00	1.9 01/22/01			52.1

* THE AIR QUALITY STANDARDS ARE: 1) THE MAXIMUM ALLOWABLE 1-HOUR CONCENTRATION IS 35 ppm (40 mg/m^3).
2) THE MAXIMUM ALLOWABLE 8-HOUR CONCENTRATION IS 9 ppm (10 mg/m^3).

2.6 Lead

Through prior sampling efforts, the Department has determined that the State has low lead concentrations (38.6% of the standard) and no significant lead sources. This determination, coupled with the Federal requirement for a NAMS network only in urbanized areas with populations greater than 500,000, resulted in terminating the lead monitoring program effective December 31, 1983. Along with the low monitored concentrations, lead has been completely removed from gasoline since lead monitoring began in 1979.

2.7 Hydrogen Sulfide

Although no Federal Ambient Air Quality Standards exist for hydrogen sulfide (H_2S), the State of North Dakota has developed H_2S standards.

2.7.1 Sources

H_2S emissions of concern stems almost totally from the oil and gas operations in the western part of the State; principally from the green outlined area on Figure 2. Flares and treater stacks associated with oil/gas wells, oil storage tanks, compressor stations, pipeline risers, and natural gas processing plants are all potential sources of H_2S emissions.

2.7.2 Monitoring Network

Currently only one State-operated site, TRNP-NU, is monitoring for H_2S emissions. There are five industry-operated H_2S monitoring sites. The latest H_2S data summary is shown in Table 12.

TABLE 12

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Hydrogen Sulfide (PPB)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MAXIMA 1 - HOUR 1ST MM/DD/HH	1 - HOUR 2ND MM/DD/HH	24 - HOUR 1ST MM/DD	24 - HOUR 2ND MM/DD	3 - MONTH 1ST MM	3 - MONTH 2ND MM	ARITH MEAN	1HR #>200	24HR #>100	% MDV
AMERADA HESS - TIOGA #2	1994	JAN-DEC	8206	168 04/12/20	145 04/12/19	26 04/10	24 04/12	3 04	3 06	2.0			25.3
DGC #13	1994	JAN-DEC	8654	87 11/01/08	85 10/14/19	17 10/14	9 10/15	3 01	3 11	2.2			44.2
HUNT #5	1994	JAN-DEC	7836	284 05/04/18	260 09/09/07	33 12/19	30 09/09	6 11	6 12	4.6	5		52.2
KOCH - MGP #1	1994	JAN-MAY	3076 ***	20 02/26/03	15 01/26/21	6 02/26	3 02/21	1 01	1 05	1.2			9.2
KOCH - MGP #4	1994	MAY-DEC	4556 ***	39 09/10/22	25 09/16/21	6 09/10	4 05/28	2 07	2 09	1.5			18.4
TRNP - NU	1994	JAN-DEC	7375	29 02/09/05	22 07/24/06	6 02/09	5 02/26	1 04	1 12	1.1			4.3

* THE AIR QUALITY STANDARDS ARE: 1) THE MAXIMUM INSTANTANEOUS (CEILING) CONCENTRATION IS 10 ppm (14 mg/m3).
2) THE MAXIMUM 1-HOUR CONCENTRATION IS 200 ppb (280 µg/m3) NOT TO BE EXCEEDED MORE THAN ONCE PER MONTH.
3) THE MAXIMUM 24-HOUR CONCENTRATION IS 100 ppb (140 µg/m3) NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR.
4) THE MAXIMUM 3-MONTH CONCENTRATION IS 20 ppb (28 µg/m3) AVERAGED OVER 3 CONSECUTIVE MONTHS.

*** LESS THAN 80% OF THE POSSIBLE SAMPLES (DATA) WERE COLLECTED

After the National Park Service raised questions about possible SO_2 PSD increments exceedances in the T. R. Roosevelt National Park - South Unit and the problems the Department has had getting some of the oil well operators to tie tank batteries to flares and vapor recovery units, it was decided to install an H_2S analyzer along with an SO_2 somewhere along the northern border of the park. After reviewing all well locations and meteorological data, a site was selected in the Whiskey Joe oil field on the northeast side of the park. The site will be established as soon as the U. S. Forest Service completes a botanical survey and power is available.

There were five exceedances, with one violation, of the 1-hour H_2S standard (200 ppb). The four of the five exceedances at Hunt #5 were due to equipment malfunctions. The fifth exceedance was due to exceeding the salt water disposal well's flow capacity. No action was taken on the violation because it was due to an equipment failure that was repaired as soon as it was discovered.

3.0 SUMMARY AND CONCLUSIONS

The North Dakota Ambient Air Quality Monitoring Network is designed to monitor those air pollutants which demonstrate the greatest potential for deteriorating the air quality of North Dakota. Due to a greater number of pollution producing sources in the western part of the State (primarily associated with the energy producing industries) the greatest percentage of the network is located in the western part of the State.

3.1 Sulfur Dioxide (SO_2)

None of the State or Federal SO_2 standards were exceeded at any of the monitoring sites. The maximum concentrations and the maximum concentrations expressed as a percentage of the applicable standards are as follows: 1-hour - 477 ppb (174.7%); 3-hour - 184 ppb (36.8%); 24-hour - 43 ppb (43.4%); and, annual (partial year) - 1.3 ppb (5.6%) annual (full year) - 4.0 ppb (17.4%).

3.2 Nitrogen Dioxide (NO_2)

None of the State or Federal NO_2 standards were exceeded at any of the monitoring sites. The maximum concentrations and the maximum concentrations expressed as a percentage of the applicable standards are as follows: 1-hour - 103 ppb (N/A); annual (partial year) - 1.4 ppb (2.8%); annual (full year) - 4.9 ppb (9.8%). The State 1-hour NO_2 standard was repealed effective December 1, 1994.

3.3 Ozone (O_3)

Neither the State nor Federal standard was exceeded during the year. The maximum concentration and the maximum concentration expressed as a percentage of the applicable standard is 79 ppb (65.8%).

3.4 Inhalable Particulates (PM_{10})

Neither State nor Federal standards were exceeded during the year. The maximum concentrations and the maximum concentrations expressed as a percentage of the applicable standards are as follows: 24-hour - 71.2 $\mu g/m^3$ (47.5%); annual(partial year) - 19.1 $\mu g/m^3$ (38.2%); annual (full year) - 17.6 $\mu g/m^3$ (35.2%).

3.5 Carbon Monoxide (CO)

Neither State nor Federal standards were exceeded during the year. The maximum concentrations and the maximum concentrations expressed as a percentage of the applicable standards are as follows: 1-hour - 9.3 ppb (26.6%); 8-hour - 3.2 ppm (35.6%).

3.6 Hydrogen Sulfide (H_2S)

There were five exceedances of the State 1-hour standard: one resulted in a violation. The maximum 1-hour average was 410 ppb at the Hunt #5 Site. Neither the 24-hour nor the 3-month State standards were exceeded during the year. The maximum concentrations and the maximum concentrations expressed as a percentage of the applicable standards are as follows: 1-hour - 410 ppb (205%); 24-hour - 33 ppb (33%); 3-month - 6 ppb (30%).

Table 13 summarizes the evaluations for each of the sites in the State network.

TABLE 13
Monitoring Site Evaluation

Site	Parameter*	Meets Needs	Modification Needed	New Site Needed	Parameter Not Needed	Date Deleted
Beulah Residential	SO_2	X				
	NO_2	X				
	O_3	X				
	MET	X				
Bismarck Commercial	PM_{10}					
Dickinson Residential	PM_{10}	X		X		
Dunn Center Rural	SO_2	X				
	MET	X				
Fargo Commercial	PM_{10}			X		
(SPM)	CO				X	05/16
	MET				X	05/16
	O_3				X	05/16
Fargo Residential	SO_2			X		
	NO_2			X		
	O_3			X		
	MET			X		
Sharon	SO_2	X				
	NO_2	X				
	O_3	X				
	MET	X				
	PM_{10}	X				
Grand Forks Commercial	PM_{10}			X		
Hannover Rural	SO_2	X				
	NO_2	X				
	O_3	X				
	MET	X				
Portable Unit (SPM)	SO_2			X		
(Minnkota Power Plant)	MET			X		
University of North Dakota (SPM)	PM_{10}				X	05/14
TRNP-NU	SO_2	X				
	O_3	X				
	H_2S	X				
	MET	X				
TRNP-SU	SO_2			X		
(Whiskey Joe)	H_2S					
	MET					
Williston Commercial	PM_{10}			X		

* MET refers to meteorology and indicates wind speed and wind direction data are available from those sites.