

State/Industry Network

Air Quality Report

4th Quarter 1997

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SECTION ONE

DISCUSSION OF
MONITORING RESULTS

Sulfur Dioxide (SO₂)

There were no exceedances of either the State or Federal standards during the quarter. The maximum 1-hour concentration was 192 ppb on November 2 at Amerada Hess - Tioga #3; the maximum 3-hour concentration was 141 ppb on November 2 at Mandan Refinery - SPM; and, the maximum 24-hour concentration was 60 ppb on November 2 at Mandan refinery - SPM. All sites achieved at least an 80% data recovery for the period operated except Bear Paw-MGP #3.

Bear Paw -MGP #3 failed to achieve 80% data recovery due to poor quality assurance checks and equipment problems..

Sulfur dioxide monitoring at Whiskey Joe - SPM was terminated effective October 1, 1997.

Sulfur Dioxide (SO₂) 5-Minute Average

The maximum 5-minute concentration was 348 ppb on November 13 at Mandan Refinery - SPM.

Hydrogen Sulfide (H₂S)

There were twelve exceedances of the H₂S standards during the quarter at Whiskey Joe - SPM. The maximum 1-hour concentration was 355 ppb on November 9 at Whiskey Joe - SPM; the maximum 24-hour concentration was 56 ppb on October 19 at Whiskey Joe - SPM; the maximum 3-month concentration was 15 ppb in November at Whiskey Joe - SPM. All sites except Bear Paw -MGP #4 achieved at least an 80% data recovery for the period operated.

Bear Paw -MGP #4 failed to meet the 80% data recovery due to poor quality assurance checks.

The twelve 1-hour exceedances at Whiskey Joe - SPM were caused by the Federal 1-7 well owned by Slawson Exploration, Inc., southeast of the monitoring site. After working with Slawson Exploration, Inc., since January 16, 1997, on December 3, 1997, the department determined the terms of the consent agreement were satisfied and terminated monitoring.

Ozone (O₃)

There was no exceedance of the ozone standard during the quarter. The maximum observed 1-hour concentration was 51 ppb on October 2 at Hannover. The maximum 8-hour concentration was 50 ppb at Hannover on October 2. All sites achieved at least an 80% data recovery for the period operated.

The TRNP - NU analyzers were shut down for the winter effective September 30. The Beulah analyzer was restarted effective January 1 to provide data for epidemiological studies.

Nitrogen Dioxide (NO₂)

The maximum 1-hour concentration observed was 207 ppb on November 29 at DGC #17. All sites achieved at least an 80% data recovery for the period operated except Fargo Residential.

Fargo Residential failed to achieve 80% data recovery due to equipment failure.

Inhalable PM_{2.5} Particulates

The maximum 24-hour average concentration was 20.3 µg/m³ on November 18 at Beulah. Both sites achieved at least an 80% data recovery for the period operated.

Inhalable PM₁₀ Particulates

There was no exceedance of the 24-hour standard during the quarter. The maximum 24-hour average concentration was 47.6 µg/m³ on October 1 at Sharon. All sites achieved at least an 80% data recovery for the period operated except Dickinson Residential.

Dickinson Residential failed to achieve 80%. The sampler was removed while the roof was resurfaced.

Inhalable PM_{2.5} Sulfates (SO₄)

The purpose for sulfate analysis is to aid the Department in assessing the impact of SO₂ emissions on inhalable particulate concentrations and visibility. The maximum 24-hour PM_{2.5} sulfate concentration was 7.5 µg/m³ on November 18 at Bismarck Residential.

Inhalable PM₁₀ Sulfates

The purpose for sulfate analysis is to aid the Department in assessing the impact of SO₂ emissions on inhalable particulate concentrations and visibility. The maximum 24-hour PM₁₀ sulfate concentration was 7.8 µg/m³ on November 18 at Bismarck Residential. All sites achieved at least an 80% data recovery for the period operated except Dickinson Residential.

Dickinson Residential failed to achieve 80%. The sampler was removed while the roof was resurfaced.

PM_{2.5} Sulfate /PM_{2.5} Analysis

The PM_{2.5} sulfate/PM_{2.5} total mass tables present statistics for PM_{2.5} sulfate and PM_{2.5} total mass when both concentrations are greater than the respective minimum detectable concentration: 0.5 µg/m³ for PM_{2.5} sulfate analysis; 4 µg/m³ for PM_{2.5} total mass. Statistics for the ratio are produced by evaluating the ratio of the PM_{2.5} sulfate concentration to the PM_{2.5} total mass concentration for each data pair. In the individual summaries, one-half of the minimum detectable concentration is substituted for those concentrations less than the minimum detectable value. However, when the PM_{2.5} total mass concentration is less than 4 µg/m³, the PM_{2.5} sulfate concentration can be higher than the PM_{2.5} total mass concentration. This is because of the variability in the sulfate analysis procedure at low concentrations. Therefore, when calculating the ratio of PM_{2.5} sulfate concentration to PM_{2.5} total mass concentration, only data pairs where both the PM_{2.5} sulfate and PM_{2.5} total mass concentrations are greater than the minimum detectable concentrations are used. When the ratio is multiplied by 100, it becomes the percentage of total mass which is sulfate. The maximum PM_{2.5} Sulfate/PM_{2.5} total mass ratio was 0.656 (65.6%) at Beulah on December 6. The maximum average ratio was 0.324 (32.4%) at Beulah.

PM₁₀ Sulfate/PM₁₀ Analysis

The PM₁₀ sulfate/PM₁₀ total mass tables present statistics for PM₁₀ sulfate and PM₁₀ total mass when both concentrations are greater than the respective minimum detectable concentration: 0.5 µg/m³ for PM₁₀ sulfate analysis; 4 µg/m³ for PM₁₀ total mass. Statistics for the ratio are produced by evaluating the ratio of the PM₁₀ sulfate concentration to the PM₁₀ total mass concentration for each data pair. In the individual summaries, one-half of the minimum detectable concentration is substituted for those concentrations less than the minimum detectable value. However, when the PM₁₀ total mass concentration is less than 4 µg/m³, the PM₁₀ sulfate concentration can be higher than the PM₁₀ total mass concentration. This is because of the variability in the sulfate analysis procedure at low concentrations. Therefore, when calculating the ratio of PM₁₀ sulfate concentration to PM₁₀ total mass concentration, only data pairs where both the PM₁₀ sulfate and PM₁₀ total mass concentrations are greater than the minimum detectable concentrations are used. When the ratio is multiplied by 100, it becomes the percentage of total mass which is sulfate. The maximum PM₁₀ Sulfate/PM₁₀ total mass ratio was 0.810 (81.0%) at Beulah on December 6. The maximum average ratio was 0.257 (25.7%) at Beulah.

SECTION TWO

AMBIENT AIR QUALITY DATA

SUMMARIES

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

POLLUTANT : Sulfur Dioxide (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1 - HOUR		M A X I M A		24 - HOUR		ARITH MEAN	1HR #>273	24HR #>99	% >MDV
				1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD	2ND MM/DD				
AMERADA HESS - TIOGA #1	1997	OCT-DEC	2206	26 12/20/04	26 12/20/05	23 12/20/05	17 12/20/08	8 12/20	3 10/02	1.4			8.0
AMERADA HESS - TIOGA #3	1997	OCT-DEC	2208	192 11/02/15	70 11/02/14	94 11/02/17	45 10/18/17	20 10/08	20 11/02	3.1			19.2
BEAR PAW - MGP #3	1997	OCT-DEC	1384 ***	19 11/04/09	9 12/09/22	7 11/04/11	5 12/30/05	2 10/19	2 12/30	1.2			5.8
BEULAH	1997	OCT-DEC	2203	48 11/19/12	43 11/19/11	31 11/19/14	19 11/19/11	8 11/19	5 10/10	1.8			26.3
DGC #12	1997	OCT-DEC	2203	35 11/18/10	30 11/25/17	23 10/06/17	22 12/06/11	6 10/12	6 12/19	2.9			73.6
DGC #14	1997	OCT-DEC	2081	144 11/16/13	63 10/22/11	75 11/16/14	40 11/18/14	13 11/16	8 11/18	2.7			62.0
DGC #16	1997	OCT-DEC	2206	47 11/30/10	33 10/02/09	22 10/21/11	22 11/30/11	9 10/02	9 10/10	3.0			68.5
DGC #17	1997	OCT-DEC	2197	38 10/07/01	34 10/07/02	32 10/07/02	20 11/21/08	9 10/07	8 12/08	4.0			85.9
DUNN CENTER	1997	OCT-DEC	2200	13 10/10/15	11 11/15/00	7 11/15/02	6 10/10/17	3 11/20	2 12/10	1.2			11.9
FARGO RESIDENTIAL	1997	OCT-DEC	2198	26 11/19/09	23 11/19/04	19 11/19/11	17 11/19/05	11 11/19	7 11/12	1.6			18.1
HANNOVER	1997	OCT-DEC	2197	73 10/06/08	55 11/10/11	28 10/06/08	23 11/18/11	9 10/06	9 12/06	1.9			24.4
LITTLE KNIFE #5	1997	OCT-DEC	2201	61 10/10/10	40 10/09/12	31 10/10/11	21 10/09/14	5 10/10	4 10/09	1.3			13.7
MANDAN REFINERY - SPM	1997	OCT-DEC	2206	159 12/27/20	156 12/24/21	141 11/02/05	123 12/27/23	60 11/02	50 11/01	9.6			37.5
SHARON	1997	OCT-DEC	2207	7 11/16/15	6 11/16/00	6 11/16/02	5 11/16/17	4 11/16	2 12/31	1.2			10.4

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

POLLUTANT : SULFUR DIOXIDE (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1 - HOUR		3 - HOUR		24 - HOUR		ARITH MEAN	1HR #>273	24HR #>99	% >MDV
				1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD	2ND MM/DD				
TRNP - NU	1997	OCT-DEC	2206	9 10/29/03	9 12/06/11	7 10/29/05	6 11/04/20	3 11/18	3 11/20	1.2			12.4
WHITE SHIELD	1997	OCT-DEC	2158	44 11/23/18	33 10/21/10	22 11/30/14	20 11/23/20	6 11/23	6 11/30	1.5			12.1

The maximum 1-hour concentration is 192 ppb at AMERADA HESS - TIOGA #3 on 11/02/15
 The maximum 3-hour concentration is 141 ppb at MANDAN REFINERY - SPM on 11/02/05
 The maximum 24-hour concentration is 60 ppb at MANDAN REFINERY - SPM on 11/02

* The air quality standards are:

STATE Standards -

- 1) 273 ppb maximum 1-hour average concentration.
- 2) 99 ppb maximum 24-hour average concentration.
- 3) 23 ppb maximum annual arithmetic mean concentration.

FEDERAL Standards -

- 1) 500 ppb maximum 3-hour concentration not to be exceeded more than once per year.
- 2) 140 ppb maximum 24-hour concentration not to be exceeded more than once per year.
- 3) 30 ppb annual arithmetic mean.

*** Less than 80% of the possible samples (data) were collected.

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

POLLUTANT : Sulfur Dioxide 5-Minute Averages (ppb)

LOCATION	YEAR	PERIOD	OBS	5 - M I N U T E			M A X I M A			# HOURS >600	% >MDV
				1ST DATE MM/DD/HH	2ND DATE MM/DD/HH	3RD DATE MM/DD/HH	1ST DATE MM/DD/HH	2ND DATE MM/DD/HH	3RD DATE MM/DD/HH		
BEULAH	1997	OCT-DEC	2203	99	11/19/11	74	11/18/09	67	11/19/12	0	39.4
DUNN CENTER	1997	OCT-DEC	1857	13	11/15/00	11	11/21/10	10	11/15/01	0	24.2
FARGO RESIDENTIAL	1997	OCT-DEC	2202	26	11/19/09	23	11/19/04	23	11/19/13	0	17.5
HANNOVER	1997	OCT-DEC	2197	119	10/06/08	96	11/10/11	80	12/ 6/14	0	34.2
MANDAN REFINERY - SPM	1997	OCT-DEC	2206	348	11/13/00	343	11/13/01	260	10/19/08	0	48.0
SHARON	1997	OCT-DEC	2207	7	11/16/15	6	11/16/00	6	11/16/02	0	10.4
TRNP - NU	1997	OCT-DEC	2206	15	10/29/03	15	12/06/11	13	10/07/11	0	18.4

The maximum 5-minute concentration is 348 ppb at MANDAN REFINERY - SPM on 11/13/00

* No standard is currently in effect.

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

POLLUTANT : Hydrogen Sulfide (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1 - HOUR		24 - HOUR		3 - MONTH		ARITH MEAN	1HR #>200	24HR #>100	% >MDV
				1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD	2ND MM/DD	1ST MM	2ND MM				
AMERADA HESS - TIOGA #2	1997	OCT-DEC	2208	57 11/23/04	40 11/07/01	7 10/21	7 11/27	2 10	2 12	1.6			12.5
BEAR PAW - MGP #4	1997	OCT-DEC	1547 ***	89 10/15/12	37 10/06/09	6 10/12	6 10/15	4 10	4 11	1.9			21.8
LITTLE KNIFE #5	1997	OCT-DEC	2203	67 11/24/09	49 11/10/16	8 12/14	8 12/31	3 11	3 12	3.1			53.2
TRNP - NU	1997	OCT-DEC	2204	11 10/02/01	9 10/01/23	2 10/02	2 12/21	3 10	3 11	1.1			4.3
WHISKEY JOE - SPM	1997	OCT-NOV	1462	355 11/09/18	342 10/15/02	56 10/19	54 10/17	15 11	12 10	12.9	12		46.5

The maximum 1-hour concentration is 355 ppb at WHISKEY JOE - SPM on 11/09/18
the maximum 24-hour concentration is 56 ppb at WHISKEY JOE - SPM on 10/19
The maximum 3-month concentration is 15 ppb at WHISKEY JOE - SPM on 11

* The State air quality standards are:

- 1) 10 ppm maximum instantaneous (ceiling) concentration not to be exceeded.
- 2) 200 ppb maximum 1-hour average concentration not to be exceeded more than once per month.
- 3) 100 ppb maximum 24-hour average concentration not to be exceeded more than once per year.
- 4) 20 ppb maximum arithmetic mean concentration averaged over three consecutive months.

*** Less than 80% of the possible samples (data) were collected.

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

POLLUTANT : Ozone (PPB)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	M A X I M A		8 - HOUR		1HR #>120	8HR #>80	
				1ST 1 - HOUR	2ND 2 - HOUR	1ST 1 - HOUR	2ND 2 - HOUR			
				MM/DD/HH	MM/DD/HH	MM/DD/HH	MM/DD/HH			
FARGO RESIDENTIAL	1997	OCT-DEC	2204	46 10/02/23	45 10/03/00	44 10/02/22	42 10/03/05	38 10/03/04	38 10/03/03	
HANNOVER	1997	OCT-DEC	2207	51 10/02/15	50 10/02/12	50 10/02/14	50 10/02/17	41 10/02/18	41 10/02/16	
SHARON	1997	OCT-DEC	2207	47 10/01/15	46 10/02/15	45 10/01/14	41 10/02/17	36 10/02/18	36 10/02/16	

The maximum 1-hour concentration is 51 ppb at HANNOVER on 10/02/15
The maximum 8-hour concentration is 50 ppb at HANNOVER on 10/02/17

* The air quality standards for ozone are:

STATE - 120 ppb maximum 1-hour concentration not to be exceeded more than once per year.
FEDERAL Standards -

- 1) 120 ppb maximum 1-hour concentration with no more than one expected exceedance per year.
- 2) Fourth highest daily maximum 8-hour average for a 3-year period not to exceed 80 ppb.

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

POLLUTANT : Nitrogen Dioxide (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	M A X I M A 1 - HOUR		ARITH MEAN	% >MDV
				1ST MM/DD/HH	2ND MM/DD/HH		
BEULAH	1997	OCT-DEC	2208	35 10/17/17	29 10/02/18	4.2	77.1
DGC #12	1997	OCT-DEC	2177	45 10/13/18	43 10/17/20	4.9	97.7
DGC #17	1997	OCT-DEC	1943	207 11/29/13	54 10/29/19	3.1	80.5
FARGO RESIDENTIAL	1997	OCT-DEC	872 ***	38 12/03/08	37 12/03/09	7.9	84.9
HANNOVER	1997	OCT-DEC	2205	25 12/06/14	20 12/06/15	2.1	47.1
SHARON	1997	OCT-DEC	2207	9 10/23/15	9 11/16/20	1.5	26.1

The maximum 1-hour concentration is 207 ppb at DGC #17 on 11/29/13

* The air quality standards are:
STATE - 53 ppb maximum annual arithmetic mean.
FEDERAL - 53 ppb annual arithmetic mean.

*** Less than 80% of the possible samples (data) were collected.

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

POLLUTANT : Inhalable PM_{2.5} Particulates (µg/m³)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	M A X I M A 24 - HOUR			ARITH MEAN	#> 50	AM>20	% >MDV
					1ST MM/DD	2ND MM/DD	3RD MM/DD				
BEULAH	1997	OCT-DEC	16	3.8	20.3 11/18	13.6 10/01	10.1 10/25	7.5			87.5
BISMARCK RESIDENTIAL	1997	OCT-DEC	15	6.1	19.0 11/18	12.9 11/24	12.4 10/07	9.0			100.0

The maximum 24-hour concentration is 20.3 µg/m³ at BEULAH on 11/18

FEDERAL Standards -
1) 24-hour: 3-year average of 98th percentiles not to exceed 65 µg/m³.
2) Annual: 3-year average not to exceed 15 µg/m³.

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

POLLUTANT : Inhalable PM₁₀ Particulates (µg/m³)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	M A X I M A 24 - HOUR			ARITH MEAN	#>150	AM>50	% >MDV
					1ST MM/DD	2ND MM/DD	3RD MM/DD				
BEULAH	1997	OCT-DEC	16	5.2	31.8 10/01	22.3 10/07	21.2 11/18	11.1			100.0
BISMARCK RESIDENTIAL	1997	OCT-DEC	15	6.5	25.7 11/18	23.5 10/07	14.2 12/18	11.4			100.0
DICKINSON RESIDENTIAL	1997	OCT-DEC	7 ***	3.2	23.3 10/01	18.5 10/07	17.8 10/19	12.3			85.7
DRAGSWOLF	1997	OCT-DEC	16	1.0	17.0 10/07	15.0 11/18	13.0 10/01	7.8			93.7
FARGO RESIDENTIAL	1997	OCT-DEC	14	0.7	43.9 10/01	29.8 10/07	23.0 12/24	13.5			92.8
GRAND FORKS - NORTH	1997	OCT-DEC	12	6.9	44.6 10/13	36.7 11/06	31.3 10/31	19.1			100.0
SHARON	1997	OCT-DEC	16	1.2	47.6 10/01	27.3 10/07	12.6 12/24	11.1			81.2
WHITE SHIELD	1997	OCT-DEC	16	2.0	16.0 10/07	13.0 10/01	13.0 11/18	7.9			93.7
WILLISTON RESIDENTIAL	1997	OCT-DEC	15	2.2	31.9 10/01	25.4 11/18	19.9 10/07	11.1			93.3

The maximum 24-hour concentration is 47.6 µg/m³ at SHARON on 10/01

* The STATE and FEDERAL air quality standards are:

- 1) 150 µg/m³ maximum averaged over a 24-hour period with no more than one expected exceedance per year.
- 2) 50 µg/m³ expected annual arithmetic mean.

*** Less than 80% of the possible samples (data) were collected.

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

POLLUTANT : Inhalable PM_{2.5} Sulfates (µg/m³)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	M A X I M A 24 - HOUR			ARITH MEAN	#>15.	AM>5.	% >MDV
					1ST MM/DD	2ND MM/DD	3RD MM/DD				
BEULAH	1997	OCT-DEC	16	0.8	6.6 11/18	4.4 10/25	4.2 12/06	2.4			100.0
BISMARCK RESIDENTIAL	1997	OCT-DEC	15	1.2	7.5 11/18	4.3 12/06	2.7 11/24	2.3			100.0

The maximum 24-hour concentration is 7.5 µg/m³ at BISMARCK RESIDENTIAL on 11/18

* No standard is currently in effect.

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

POLLUTANT : Inhalable PM₁₀ Sulfates (µg/m³)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	M A X I M A 24 - HOUR			ARITH MEAN	#>15.	AM>5.	% >MDV
					1ST MM/DD	2ND MM/DD	3RD MM/DD				
BEULAH	1997	OCT-DEC	16	0.6	7.2 11/18	4.7 12/06	4.4 10/25	2.4			100.0
BISMARCK RESIDENTIAL	1997	OCT-DEC	15	0.6	7.8 11/18	4.9 12/06	2.8 11/24	2.2			100.0
DICKINSON RESIDENTIAL	1997	OCT-DEC	7 ***	0.4	2.2 11/06	1.7 10/25	1.6 10/07	1.3			85.7
FARGO RESIDENTIAL	1997	OCT-DEC	14	0.5	3.8 11/24	3.3 11/18	3.1 10/07	2.0			100.0
GRAND FORKS - NORTH	1997	OCT-DEC	12	0.6	3.6 12/18	2.7 10/13	2.7 10/25	1.8			100.0
SHARON	1997	OCT-DEC	16	0.6	3.3 11/18	3.2 11/24	2.7 11/30	1.8			100.0
WILLISTON RESIDENTIAL	1997	OCT-DEC	15	0.8	6.2 11/18	3.0 11/08	2.4 10/25	1.7			100.0

The maximum 24-hour concentration is 7.8 µg/m³ at BISMARCK RESIDENTIAL on 11/18

* No standard is currently in effect.

*** Less than 80% of the possible samples (data) were collected.

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

POLLUTANT : PM_{2.5} Sulfate/PM_{2.5} Total Mass Ratio (Percentage)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	M A X I M A			ARITH MEAN
					1ST MM/DD	2ND MM/DD	3RD MM/DD	
BEULAH	1997	OCT-DEC	14	15	65.6 12/06	53.1 11/30	43.6 10/25	32.4
BISMARCK RESIDENTIAL	1997	OCT-DEC	15	12	57.3 12/06	39.5 11/18	29.3 10/25	25.6

The maximum 24-hour ratio is 65.6 percent at BEULAH on 12/06

* No standard is currently in effect.

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

POLLUTANT : PM₁₀ Sulfate/PM₁₀ Total Mass Ratio (Percentage)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	M A X I M A			ARITH MEAN
					1ST MM/DD	2ND MM/DD	3RD MM/DD	
BEULAH	1997	OCT-DEC	16	6.2	81.0 12/06	36.5 11/24	34.3 12/18	25.7
BISMARCK RESIDENTIAL	1997	OCT-DEC	15	7.2	59.8 12/06	30.4 11/18	26.5 10/25	19.2
DICKINSON RESIDENTIAL	1997	OCT-NOV	6 ***	5.6	24.7 11/06	20.2 10/25	11.4 10/13	12.8
FARGO RESIDENTIAL	1997	OCT-DEC	13	2.5	57.1 12/06	30.3 11/30	27.3 11/18	19.8
GRAND FORKS - NORTH	1997	OCT-DEC	12	2.5	52.2 12/18	30.3 10/25	24.1 11/18	14.8
SHARON	1997	OCT-DEC	13	2.9	46.6 11/30	30.2 10/25	28.2 12/30	21.6
WILLISTON RESIDENTIAL	1997	OCT-DEC	14	4.7	46.2 11/08	32.0 10/25	24.4 11/18	17.3

The maximum 24-hour ratio is 81.0 percent at BEULAH on 12/06

* No standard is currently in effect.

*** Less than 80% of the possible samples (data) were collected.

SECTION THREE

EXCEEDANCE LISTINGS

By Site Date Hour

All Units Are in Parts Per Billion Except Wind Direction (Degrees),
Wind Speed (MPH), CO (PPM), and PM_{2.5} and PM₁₀ (μg/m³)

The * Identifies the Exceedances

----- SITE=WHISKEY JOE - SPM -----

DATE	HOUR	1-HOUR SO2	3-HOUR SO2 BLOCK	24-HOUR SO2 BLOCK	5-MIN SO2 MAX	H2S	24-HOUR H2S BLOCK	NO2	O3	WS	WD	PM10	PM25
October 3, 1997	2100					212*				3.6	181		
October 5, 1997	1900					222*				2	177		
October 15, 1997	200					342*				2.8	168		
October 15, 1997	400					234*				2.3	184		
October 17, 1997	1900					241*				2.5	152		
October 17, 1997	2000					250*				2	156		
October 19, 1997	200					292*				1.7	177		
October 19, 1997	400					209*				2.5	190		
October 27, 1997	2000					224*				1.9	178		
October 27, 1997	2300					274*		32		1.9	229		
November 4, 1997	2300					283*		35		2.1	122		
November 9, 1997	1800					355*				1.9	186		

By Date Hour Site

All Units Are in Parts Per Billion Except Wind Direction (Degrees),
Wind Speed (MPH), CO (PPM), and PM_{2.5} and PM₁₀ (μg/m³)

The * Identifies the Exceedances

----- DATE=October 3, 1997 -----													
SITE	HOUR	1-HOUR SO2	3-HOUR SO2 BLOCK	24-HOUR SO2 BLOCK	5-MIN SO2 MAX	H2S	24-HOUR H2S BLOCK	NO2	O3	WS	WD	PM10	PM25
WHISKEY JOE - SPM	2100					212*				3.6	181		
----- DATE=October 5, 1997 -----													
SITE	HOUR	1-HOUR SO2	3-HOUR SO2 BLOCK	24-HOUR SO2 BLOCK	5-MIN SO2 MAX	H2S	24-HOUR H2S BLOCK	NO2	O3	WS	WD	PM10	PM25
WHISKEY JOE - SPM	1900					222*				2	177		
----- DATE=October 15, 1997 -----													
SITE	HOUR	1-HOUR SO2	3-HOUR SO2 BLOCK	24-HOUR SO2 BLOCK	5-MIN SO2 MAX	H2S	24-HOUR H2S BLOCK	NO2	O3	WS	WD	PM10	PM25
WHISKEY JOE - SPM	200					342*				2.8	168		
WHISKEY JOE - SPM	400					234*				2.3	184		
----- DATE=October 17, 1997 -----													
SITE	HOUR	1-HOUR SO2	3-HOUR SO2 BLOCK	24-HOUR SO2 BLOCK	5-MIN SO2 MAX	H2S	24-HOUR H2S BLOCK	NO2	O3	WS	WD	PM10	PM25
WHISKEY JOE - SPM	1900					241*				2.5	152		
WHISKEY JOE - SPM	2000					250*				2	156		
----- DATE=October 19, 1997 -----													
SITE	HOUR	1-HOUR SO2	3-HOUR SO2 BLOCK	24-HOUR SO2 BLOCK	5-MIN SO2 MAX	H2S	24-HOUR H2S BLOCK	NO2	O3	WS	WD	PM10	PM25
WHISKEY JOE - SPM	200					292*				1.7	177		
----- DATE=October 19, 1997 -----													

(continued)

SITE	HOUR	1-HOUR SO2	3-HOUR SO2 BLOCK	24-HOUR SO2 BLOCK	5-MIN SO2 MAX	H2S	24-HOUR H2S BLOCK	NO2	O3	WS	WD	PM10	PM25
WHISKEY JOE - SPM	400					209*				2.5	190		

----- DATE=October 27, 1997 -----

SITE	HOUR	1-HOUR SO2	3-HOUR SO2 BLOCK	24-HOUR SO2 BLOCK	5-MIN SO2 MAX	H2S	24-HOUR H2S BLOCK	NO2	O3	WS	WD	PM10	PM25
WHISKEY JOE - SPM	2000					224*				1.9	178		
WHISKEY JOE - SPM	2300					274*	32			1.9	229		

----- DATE=November 4, 1997 -----

SITE	HOUR	1-HOUR SO2	3-HOUR SO2 BLOCK	24-HOUR SO2 BLOCK	5-MIN SO2 MAX	H2S	24-HOUR H2S BLOCK	NO2	O3	WS	WD	PM10	PM25
WHISKEY JOE - SPM	2300					283*	35			2.1	122		

----- DATE=November 9, 1997 -----

SITE	HOUR	1-HOUR SO2	3-HOUR SO2 BLOCK	24-HOUR SO2 BLOCK	5-MIN SO2 MAX	H2S	24-HOUR H2S BLOCK	NO2	O3	WS	WD	PM10	PM25
WHISKEY JOE - SPM	1800					355*				1.9	186		