

State/Industry Ambient Monitoring Network

Air Quality Report

4th Quarter 2007

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SECTION ONE

DISCUSSION OF
MONITORING RESULTS

Sulfur Dioxide (SO₂)

There were no exceedances of either the state or the federal standards during the quarter. The maximum 1-hour concentration was 151 ppb at Hess - Tioga #3; the maximum 3-hour concentration was 89 ppb at Hess - Tioga #3; and, the maximum 24-hour concentration was 24 ppb at Hess - Tioga #3. The highest arithmetic mean was 2.6 ppb at Hess - Tioga #3. All sites achieved at least an 80% data recovery for the period operated.

Sulfur Dioxide (SO₂) 5-Minute Average

The maximum 5-minute concentration was 1017 ppb at Hess - Tioga #3. All sites achieved at least an 80% data recovery for the period operated.

Trace Level Sulfur Dioxide (SO₂)

There were no exceedances of either the state or the federal standards during the quarter. The maximum 1-hour concentration was 32.4 ppb at Lostwood NWR; the maximum 3-hour concentration was 23.6 ppb at Lostwood NWR; and, the maximum 24-hour concentration was 8.0 ppb at Lostwood NWR. The highest arithmetic mean was 1.2 ppb at Lostwood NWR. All sites achieved at least an 80% data recovery for the period operated.

Trace Level Sulfur Dioxide (SO₂) 5-Minute Average

The maximum 5-minute concentration was 46.0 ppb at Lostwood NWR. All sites achieved at least an 80% data recovery for the period operated.

Ozone (O₃)

There was no exceedance of the ozone standard during the quarter. The highest observed 1-hour concentration was 59 ppb at TRNP - NU. The highest 4th highest 8-hour concentration was 40 ppb at Dunn Center and TRNP-SU. All sites achieved at least an 80% data recovery for the period operated.

Nitrogen Dioxide (NO₂)

The highest observed 1-hour concentration was 40 ppb at Fargo NW. The maximum arithmetic mean concentration was 8.1 ppb at Bismarck Residential. All sites achieved at least an 80% data recovery for the period operated.

Ammonia (NH₃)

The highest 1-hour concentration was 98.0 ppb at Beulah – North. The site achieved an 80% data recovery for the period.

The data is used as part of the ambient data input used by the newer dispersion models.

Inhalable Continuous PM_{fine} Particulates

The highest 24-hour concentration was 13.6 µg/m³ at Fargo NW. The highest arithmetic mean concentration was 5.8 µg/m³ at Hannover. All sites achieved at least an 80% data recovery for the period operated.

The analyzer used to collect the PM_{fine} was required by EPA, but never given the reference or equivalent designation. Therefore, the data can be used only as an indicator of PM_{fine} concentrations.

Inhalable PM_{fine} Particulates

There was no exceedance of the 24-hour standard during the quarter. The highest 24-hour average concentration was 14.8 $\mu\text{g}/\text{m}^3$ at Fargo NW. The highest arithmetic mean was 7.4 $\mu\text{g}/\text{m}^3$ at Fargo NW. All sites achieved at least an 80% data recovery for the period.

Inhalable Continuous PM₁₀ Particulates

There was no exceedance of the 24-hour standard during the quarter. The maximum 24-hour concentration was 76.5 $\mu\text{g}/\text{m}^3$ at Lostwood NWR. The highest arithmetic mean was 13.7 $\mu\text{g}/\text{m}^3$ at Fargo NW and Dunn Center. All sites achieved an 80% data recovery for the period.

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 1ST	M - A X HOUR 2ND	I	M 3 - A HOUR 2ND	24 - HOUR 1ST	2 2ND	ARITH MEAN	1HR #>273	24HR #>99	% >MDV
Bear Paw - MGP #3	2007	OCT-DEC	2186	8	8		8	4	2	2	1.1		4.3
Bear Paw - MGP #5	2007	OCT-DEC	2188	9	9		8	6	3	2	1.2		7.8
Beulah - North	2007	OCT-DEC	2189	35	33		23	21	8	5	1.5		14.3
Bismarck Residential	2007	OCT-DEC	2185	34	31		22	21	8	8	2.2		27.9
DGC #12	2007	OCT-DEC	2175	26	26		20	18	5	5	1.5		14.5
DGC #14	2007	OCT-DEC	2195	62	32		21	18	5	4	1.5		10.9
DGC #16	2007	OCT-DEC	2195	34	28		17	14	5	3	1.3		8.8
DGC #17	2007	OCT-DEC	2199	44	28		19	16	6	4	1.3		7.7
Hannover	2007	OCT-DEC	2192	31	20		20	11	6	3	1.4		13.8
Hess - Tioga #1	2007	OCT-DEC	2164	24	21		12	9	4	3	1.2		6.2
Hess - Tioga #3	2007	OCT-DEC	2167	151	109		89	35	24	14	2.6		18.8
TRNP - SU	2007	OCT-DEC	2194	9	8		6	5	2	2	1.0		2.0

The highest 1-hour concentration is 151 ppb at Hess - Tioga #3
 The highest 3-hour concentration is 89 ppb at Hess - Tioga #3
 The highest 24-hour concentration is 24 ppb at Hess - Tioga #3
 The highest arithmetic mean is 2.6 ppb at Hess - Tioga #3

* 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.

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

POLLUTANT : **Sulfur Dioxide 5-Minute Averages** (ppb)

LOCATION	YEAR	SAMPLING PERIOD	5 - M I N U T E			M A X I M A		# HOURS >600	% >MDV
			NUM OBS	1ST	2ND	3RD			
Bear Paw - MGP #3	2007	OCT-DEC	2186	15	12	9	0	10.1	
Bear Paw - MGP #5	2007	OCT-DEC	2188	35	21	14	0	19.0	
Beulah - North	2007	OCT-DEC	2189	59	48	46	0	27.6	
Bismarck Residential	2007	OCT-DEC	2185	56	51	49	0	44.0	
Hannover	2007	OCT-DEC	2192	49	44	44	0	23.6	
Hess - Tioga #1	2007	OCT-DEC	2164	62	57	57	0	10.4	
Hess - Tioga #3	2007	OCT-DEC	2167	1017	289	81	1	34.0	
TRNP - SU	2007	OCT-DEC	2194	14	11	11	0	3.7	

The maximum 5-minute concentration is 1017 ppb at Hess - Tioga #3

* No Standard is currently in effect:

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

POLLUTANT : **Trace Level Sulfur Dioxide** (ppb)

LOCATION	YEAR	SAMPLING PERIOD	OBS	1 - HOUR		M A X I M A		24 - HOUR		ARITH MEAN	1HR #>273	24HR #>99	% >MDV
				1ST	2ND	1ST	2ND	1ST	2ND				
Dunn Center	2007	OCT-DEC	2190	23.4	20.6	18.1	3.2	3.3	1.2	0.4			59.3
Fargo NW	2007	OCT-DEC	2180	4.5	3.0	2.5	2.0	0.7	0.7	0.2			53.1
Lostwood NWR	2007	OCT-DEC	2197	32.4	29.1	23.6	17.1	8.0	6.4	1.2			76.8
TRNP - NU	2007	OCT-DEC	2198	13.4	11.8	10.2	6.5	2.3	1.7	0.4			63.7

The highest 1-hour concentration is 32.4 ppb at Lostwood NWR
 The highest 3-hour concentration is 23.6 ppb at Lostwood NWR
 The highest 24-hour concentration is 8.0 ppb at Lostwood NWR
 The highest arithmetic mean is 1.2 ppb at Lostwood NWR

* 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.

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

POLLUTANT : **Trace Level Sulfur Dioxide 5-Minute Averages** (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	5 - MINUTE MAXIMA			DATE >600	# HOURS >MDV	%
				1ST	2ND	3RD			
Dunn Center	2007	OCT-DEC	2190	40.8	32.4	26.6	0	81.9	
Fargo NW	2007	OCT-DEC	2182	17.7	16.8	7.4	0	74.7	
Lostwood NWR	2007	OCT-DEC	2197	46.0	44.7	39.3	0	83.3	
TRNP - NU	2007	OCT-DEC	2198	17.1	16.6	15.1	0	85.6	

The maximum 5-minute concentration is 46.0 ppb at Lostwood NWR

* No Standard is currently in effect:

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		4TH	1HR #>120	8HR #>80
				1ST	2ND	1ST	2ND	3RD	4TH			
Beulah - North	2007	OCT-DEC	1858	46	46	43	42	39	39			
Bismarck Residential	2007	OCT-DEC	2191	44	43	41	36	36	36			
Dunn Center	2007	OCT-DEC	2193	50	45	43	40	40	40			
Fargo NW	2007	OCT-DEC	2178	47	44	39	34	34	33			
Hannover	2007	OCT-DEC	2194	46	45	43	42	40	39			
Lostwood NWR	2007	OCT-DEC	2197	50	44	45	39	39	39			
TRNP - NU	2007	OCT-DEC	2198	59	51	46	43	40	39			
TRNP - SU	2007	OCT-DEC	2032	52	46	49	44	42	40			

The highest 1-hour concentration is 59 ppb at TRNP - NU
The 4th highest 8-hour concentration is 40 ppb at Dunn Center and TRNP-SU

* The air quality standards for ozone are:
STATE - 120 ppb 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 averages 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 A M A		ARITH MEAN	% >MDV
				1 - HOUR 1ST	2ND		
Beulah - North	2007	OCT-DEC	2186	26	25	2.6	88.0
Bismarck Residential	2007	OCT-DEC	2155	39	37	8.1	99.8
DGC #12	2007	OCT-DEC	1933	25	24	3.1	99.6
DGC #17	2007	OCT-DEC	2188	21	20	1.9	88.3
Dunn Center	2007	OCT-DEC	1943	17	16	1.6	80.2
Fargo NW	2007	OCT-DEC	2172	40	40	6.9	96.4
Hannover	2007	OCT-DEC	2185	30	19	1.9	81.3
Lostwood NWR	2007	OCT-DEC	1811	16	14	1.6	75.9
TRNP - NU	2007	OCT-DEC	2192	9	9	0.9	36.3

The highest 1-hour concentration is 39 ppb at Bismarck Residential
The maximum Arithmetic Mean concentration is 8.1 ppb at Bismarck Residential

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

FEDERAL - 53 ppb annual arithmetic mean.

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

POLLUTANT : Ammonia (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	M A X I M A					
				1ST	2ND	3RD	4TH	5TH	6TH
Beulah - North	2007	OCT-DEC	2164	98.0	95.4	79.3	68.6	63.0	62.1

* No Standard is currently in effect:

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

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

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	M A X I M A						24 - HOUR	ARITH MEAN	24HR #>35	AM>15
				1ST	2ND	1ST	2ND	3RD	4TH				
Beulah - North	2007	OCT-DEC	2187	59.2	23.5	8.8	7.9	6.3	6.1	2.6			
Bismarck Residential	2007	OCT-DEC	2188	42.5	29.6	9.6	7.8	7.5	7.1	3.4			
Dunn Center	2007	OCT-DEC	2181	47.5	43.1	10.1	8.7	7.4	6.2	2.9			
Fargo NW	2007	OCT-DEC	2182	28.2	27.4	13.6	10.9	10.0	9.7	4.3			
Hannover	2007	OCT-DEC	2187	40.2	38.8	11.7	10.0	9.8	9.7	5.8			
Lostwood NWR	2007	OCT-DEC	2193	40.0	27.3	9.3	5.8	5.4	5.1	2.6			
TRNP - NU	2007	OCT-DEC	2191	42.2	36.7	13.4	6.5	6.5	5.7	2.3			
TRNP - SU	2007	OCT-DEC	2185	30.3	24.9	12.9	10.1	9.9	9.0	5.2			

The highest 24-hour concentration is 13.6 µg/m³ at Fargo NW on 10/30
The highest Annual Mean concentration is 5.8 µg/m³ at Hannover

* The EPA-required analyzer used to collect this data is not a reference or equivalent method, this data cannot be compared to the PM_{fine} standards. This data can only be used as an indicator of the actual PM_{fine} ambient concentrations. If this data were to indicate there may be an exceedance of the ambient standards, then the department could be required to install a designated reference or equivalent sampler.

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

POLLUTANT : **Inhalable PM_{fine} Particulates** ($\mu\text{g}/\text{m}^3$)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	M A X I M A			ARITH MEAN	#> 35	AM>15	% >MDV
					24 - HOUR 1ST	2ND	3RD				
Beulah - North	2007	OCT-DEC	15	2.8	10.6	8.1	7.3	6.0			100.0
Bismarck Residential	2007	OCT-DEC	30	1.8	13.2	13.0	11.7	6.3			96.7
Fargo NW	2007	OCT-DEC	25	1.0	14.8	14.0	11.3	7.4			96.0
TRNP - SU	2007	OCT-DEC	14	1.8	6.0	5.5	3.8	3.1			85.7

The highest 24-hour concentration is 14.8 $\mu\text{g}/\text{m}^3$ at Fargo NW
The highest Annual Mean concentration is 7.4 $\mu\text{g}/\text{m}^3$ at Fargo NW and Dunn Center

* The ambient air quality standards are:
FEDERAL Standards -

- 1) 24-hour: 3-year average of 98th percentiles not to exceed 35 $\mu\text{g}/\text{m}^3$.
- 2) Annual: 3-year average not to exceed 15 $\mu\text{g}/\text{m}^3$.

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

POLLUTANT : Inhalable Continuous PM₁₀ Particulates (µg/m³)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1 - HOUR		M A X I M A 24 - HOUR		3RD	4TH	MEAN	ARITH #>150	24HR AM>50
				1ST	2ND	1ST	2ND					
Beulah - North	2007	OCT-DEC	2190	164.0	108.0	33.2	30.9	26.8	21.6	11.0		
Bismarck Residential	2007	OCT-DEC	2188	305.0	119.0	41.8	24.7	22.8	21.0	12.0		
Dunn Center	2007	OCT-DEC	2184	246.0	158.0	37.9	35.5	30.3	28.9	13.7		
Fargo NW	2007	OCT-DEC	2184	158.0	138.0	51.7	41.2	36.1	34.0	13.7		
Lostwood NWR	2007	OCT-DEC	2193	332.0	206.0	76.5	17.0	16.7	14.7	8.7		
TRNP - NU	2007	OCT-DEC	2193	161.0	130.0	47.5	26.4	18.3	14.5	9.2		

The highest 24-hour concentration is 76.5 µg/m³ at Lostwood NWR
The highest Annual Mean concentration is 13.7 µg/m³ at Fargo NW

* 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.

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_{fine} and PM₁₀ (µg/m³)

The * Identifies the Exceedances

NONE

By Date Hour Site

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

The * Identifies the Exceedances

NONE

SECTION FOUR

DATA RECOVERY SUMMARIES/DATA VOID PERIODS

Abbreviations Used in the Data Summaries

Parm = parameter

Poss = possible number of values

Val = actual number of values

Recvry = percent data recovery = $\frac{VAL}{POSS} * 100\%$

L_MDV = number of values less than the minimum detectable value

PL_MDV = percentage of values less than the minimum detectable value = $\frac{L_MDV}{Val} * 100\%$

G_MDV = number of values greater than the minimum detectable value

PG_MDV = percentage of values greater than the minimum detectable value = $\frac{G_MDV}{Val} * 100\%$

Mean = arithmetic mean of the values greater than the minimum detectable value

- Voids -

MALF = machine malfunction

COLL = collection error

BIRD = bird damage to filter

LAB = lab error

AUDT = audit

VTOTAL = total data voids

QA_CHK = zero/span/precision

PREC = precision

POWR = power failure

CALB = calibration

VIO = number of values exceeding the standard

P_VOID = percent data void = $\frac{VTOTAL}{POSS} * 100\%$

