

State/Industry Ambient Monitoring Network

Air Quality Report

4th Quarter 2010

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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 highest Three year 1-hour 99th percentile concentration was 64 at Hess – Tioga #3. The highest 1–hour concentration was 165 ppb at DGC #12; the highest 3–hour concentration was 96 ppb at Hess – Tioga #3; and, the highest 24–hour concentration was 48.8 ppb at Hess – Tioga #3. The highest arithmetic mean was 2.74 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 highest 5–minute concentration was 823 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 highest Three year 1-hour 99th percentile concentration was 46 at Lostwood NWR. The highest 1–hour concentration was 84.7 ppb at Lostwood NWR; the highest 3–hour concentration was 45.4 ppb at Lostwood NWR; and, the highest 24–hour concentration was 19.8 ppb at Lostwood NWR. The highest arithmetic mean was 1.25 ppb at Lostwood NWR. All sites with the exception of Dunn Center achieved at least an 80% data recovery for the period operated. Dunn Center failed to achieve 80% data recovery due to machine malfunction, caused by a lighting strike.

Trace Level Sulfur Dioxide (SO₂) 5–Minute Average

The highest 5–minute concentration was 121.6 ppb at Lostwood NWR. All sites with the exception of Dunn Center achieved at least an 80% data recovery for the period operated. Dunn Center failed to achieve 80% data recovery due to machine malfunction, caused by a lighting strike.

Ozone (O₃)

There was no exceedance of the ozone standard during the quarter. The highest observed 1-hour concentration was 74 ppb at Hannover and Lostwood NWR. The highest 4th highest 8-hour concentration was 63 ppb at Fargo NW and Lostwood NWR. The highest Three year average 4th highest 8-hour concentration was 60 ppb at Lostwood NWR and TRNP – NU. All sites except Dunn Center achieved at least an 80% data recovery for the period operated. Dunn Center failed to achieve 80% due to machine malfunction.

Nitrogen Dioxide (NO₂)

The highest Three year average of the annual 98th percentile 1-hour concentrations was 42 at Fargo NW. The highest observed 1-hour concentration was 58 ppb at Fargo NW. The highest arithmetic mean concentration was 5.44 ppb at Bismarck Residential. All sites with the exception of Dunn Center achieved at least an 80% data recovery for the period operated. Dunn Center failed to achieve 80% data recovery due to machine malfunction.

Carbon Monoxide (CO)

The highest observed 1-hour concentration was 1534 ppb at Fargo NW. The highest 8-hour concentration was 600 ppb at Fargo NW. The site achieved at least an 80% data recovery for the period operated.

Ammonia (NH₃)

The highest 1-hour concentration was 204.0 ppb at Beulah – North. All sites 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_{2.5} Particulates

The highest 24-hour concentration was 27.3 $\mu\text{g}/\text{m}^3$ at TRNP - NU. The highest arithmetic mean concentration was 6.83 $\mu\text{g}/\text{m}^3$ at Hannover. All sites with the exception of Dunn Center achieved at least an 80% data recovery for the period operated. Dunn Center failed to achieve 80% data recovery due to machine malfunction.

The analyzer used to collect the PM_{2.5} at these sites were required by EPA, but never given the reference or equivalent designation. Therefore, the data can only be used as an indicator of PM_{2.5} concentrations.

Inhalable PM_{2.5} Particulates

There was no exceedance of the 24-hour standard during the quarter. The highest 24-hour average concentration was 32.6 $\mu\text{g}/\text{m}^3$ at Fargo NW. The highest Three year average 24-hour concentration was 23.0 $\mu\text{g}/\text{m}^3$ at Fargo NW. The highest weighted mean was 9.89 $\mu\text{g}/\text{m}^3$ at Fargo NW. The highest three year average annual weighted mean concentration was 8.6 $\mu\text{g}/\text{m}^3$ at TRNP - NU. All sites achieved at least an 80% data recovery for the period operated. Although the data collected for the period met the 80% data recovery requirements for the time period operated. The summary averages for calculation of the three year averages was incomplete for the following sites, Beulah - North, Fargo NW, Lostwood NWR, and TRNP - NU.

Inhalable Continuous PM₁₀ Particulates

There was no exceedance of the 24-hour standard during the quarter. The highest 24-hour concentration was 104.0 $\mu\text{g}/\text{m}^3$ at Fargo NW. The highest arithmetic mean was 13.9 $\mu\text{g}/\text{m}^3$ at Bismarck Residential. All sites with the exception of Dunn Center achieved an 80% data recovery for the period. Dunn Center failed to achieve 80% data recovery due to machine malfunction.

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	NUM OBS	1 - 1ST HOUR	2ND HOUR	M 99 TH 1HR	A %	X I 3 - 1ST HOUR	M 2ND HOUR	A	24 - 1ST HOUR	2ND HOUR	ARITH MEAN	3yr Avg	1HR #>273	24HR #>99
Bear Paw - MGP #3	2010	8655	30	28	21		19.6	13.0		4.6	3.5	1.12	15		
Bear Paw - MGP #5	2010	8664	30	17	15		20.0	10.0		4.5	3.0	1.15	13		
Beulah - North	2010	8663	164	56	52		86.0	33.6		15.1	11.2	1.86	36		
Bismarck Residential	2010	8575	64	52	41		38.6	36.6		11.0	9.3	1.82	35		
DGC #12	2010	8710	165	76	46		83.0	36.6		15.0	14.3	1.78	38		
DGC #14	2010	8686	99	70	54		48.3	46.0		14.8	9.1	1.71	36		
DGC #16	2010	8704	143	47	44		82.0	32.0		11.4	10.4	1.69	32		
DGC #17	2010	8712	117	59	37		69.6	29.0		14.3	10.3	1.61	32		
Hannover	2010	8647	122	62	59		65.3	36.6		10.8	10.4	1.98	52		
Hess - Tioga #1	2010	8400	30	29	27		14.0	13.6		7.8	5.2	1.29	33		
Hess - Tioga #3	2010	8591	151	129	77		96.0	78.3		48.8	25.9	2.74	64		
TRNP - SU (Painted Canyon)	2010	8424	15	10	6		10.0	7.6		3.2	1.5	1.03	7		

The highest 1-hour concentration is 165 ppb at DGC #12
 The highest Three year 1-hour 99th percentile concentration is 64 ppb at Hess - Tioga #3
 The highest 3-hour maximum concentration is 96 ppb at Hess - Tioga #3
 The highest 24-hour concentration is 48.8 ppb at Hess - Tioga #3
 The highest arithmetic mean is 2.74 ppb at Hess - Tioga #3

* The air quality standards are:

STATE Standards -

- 1) 75 ppb Three year average of the annual 99th percentile (4th highest) of the daily maximum 1-hour average concentration in a year.
- 2) 500 ppb highest 3-hour average concentration not to be exceeded more than once per year.

FEDERAL Standards -

- 1) 75 ppb Three year average of the annual 99th percentile (4th highest) of the daily maximum 1-hour average concentration in a year.
- 2) 500 ppb highest 3-hour average concentration not to be exceeded more than once per year.
- 3) 140 ppb highest 24-hour concentration not to be exceeded more than once per year.
- 4) 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	NUM OBS	5 - M I N U T E M A X I M A			# HOURS >600
			1ST	2ND	3RD	
Bear Paw - MGP #3	2010	8655	163	93	78	
Bear Paw - MGP #5	2010	8664	137	35	34	
Beulah - North	2010	8663	202	162	142	
Bismarck Residential	2010	8573	108	78	62	
DGC #12	2010	6561	151	122	114	
DGC #14	2010	6539	148	138	117	
DGC #16	2010	6567	99	92	89	
DGC #17	2010	6567	281	104	88	
Hannover	2010	8647	181	137	131	
Hess - Tioga #1	2010	8259	103	84	75	
Hess - Tioga #3	2010	8591	823	371	308	
TRNP - SU (Painted Canyon)	2010	8424	19	17	12	

The maximum 5-minute concentration is 823 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	NUM OBS	1 - HOUR		M 99 TH	A %	X 3	I -	M HOUR	A	24	- HOUR	ARITH	3yr	1HR	24HR
			1ST	2ND	1HR	1ST	2ND	1ST	2ND	1ST	2ND	MEAN	Avg	#>273	#>99	
Dunn Center	2010	2691 ***	25.8	19.0	19.0		16.3		13.3		3.7	3.2	0.71	15		
Fargo NW	2010	8597	7.8	6.5	6.1		5.6		4.6		2.5	2.5	0.32	6		
Lostwood NWR	2010	8648	84.7	84.0	45.2		45.4		40.5		19.8	15.9	1.25	46		
TRNP - NU	2010	8695	22.6	13.5	11.2		10.4		9.4		4.1	3.2	.55	11		

The highest 1-hour concentration is 84.7 ppb at Lostwood NWR
 The highest Three year 1-hour 99th percentile concentration is 46 ppb at Lostwood NWR
 The highest 3-hour maximum concentration is 45.4 at Lostwood NWR
 The highest 24-hour concentration is 19.8 ppb at Lostwood NWR
 The highest arithmetic mean is 1.25 ppb at Lostwood NWR

* The air quality standards are:

STATE Standards -

- 1) 75 ppb Three year average of the annual 99th percentile (4th highest) of the daily maximum 1-hr average concentration in a year.
- 2) 500 ppb highest 3-hour average concentration not to be exceeded more than once per year.

FEDERAL Standards -

- 1) 75 ppb Three year average of the annual 99th percentile (4th highest) of the daily maximum 1-hour average concentration in a year.
- 2) 500 ppb highest 3-hour average concentration not to be exceeded more than once per year.
- 3) 140 ppb highest 24-hour concentration not to be exceeded more than once per year.
- 4) 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 : **Trace Level Sulfur Dioxide 5-Minute Averages** (ppb)

LOCATION	YEAR	NUM OBS	5 - M I N U T E M A X I M A			# HOURS >600
			1ST	2ND	3RD	
Dunn Center	2010	2691 ***	30.7	28.5	25.3	
Fargo NW	2010	8600	12.5	9.5	9.4	
Lostwood NWR	2010	8648	121.6	113.9	108.8	
TRNP - NU	2010	8694	34.3	18.6	17.6	

The maximum 5-minute concentration is 121.6 ppb at Lostwood NWR

* 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 : Ozone (ppb)

LOCATION	YEAR	VAL DAYS	1 - 1ST	M HOUR 2ND	A X 1ST	I M 2ND	A 8 - 3RD	HOUR 4TH	3yr Avg	1HR #>120	8HR #>75
Beulah North	2010	153	71	68	66	64	62	61	59		
Bismarck Residential	2010	153	67	66	64	63	62	61	57		
Dunn Center	2010	16 ***	68	64	66	62	59	58	57		
Fargo NW	2010	140	72	71	67	66	64	63	58		
Hannover	2009	152	74	68	68	67	65	61	59		
Lostwood NWR	2010	150	74	71	67	65	64	63	60		
TRNP - NU	2010	152	73	67	70	66	65	62	60		
TRNP - SU (Painted Canyon)	2010	150	69	65	67	62	61	61	59		

The highest 1-hour concentration is 74 ppb at Hannover and Lostwood NWR
The Three year average 4th highest 8-hour concentration is 60 ppb at Lostwood NWR and TRNP - NU

* The air quality standards for ozone are:

STATE - 75ppb Three year average of the annual 4th highest daily maximum 8-hour concentrations.

FEDERAL Standards - 75 ppb Three year average of the annual 4th highest daily maximum 8-hour concentrations.

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

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

POLLUTANT : Nitrogen Dioxide (ppb)

LOCATION	YEAR	NUM OBS	M 1ST	A - X 1ST	I - HOUR 2ND	M 2ND	A	98TH PCTL	ARITH MEAN	3yr Avg
Beulah - North	2010	8401		48		41		26	2.75	24
Bismarck Residential	2010	8476		55		43		38	5.71	38
DGC #12	2010	8691		46		37		26	2.93	23
DGC #17	2010	8338		30		28		23	2.33	22
Dunn Center	2010	2641 ***		24		13		13	1.44	13
Fargo NW	2010	8559		58		50		44	5.44	42
Hannover	2010	8629		35		25		19	2.20	21
Lostwood NWR	2010	8525		29		25		21	1.86	17
TRNP - NU	2010	8230		12		10		10	1.15	8

The highest 1-hour concentration is 58 ppb at Fargo NW
The highest Three year average of the annual 98th percentile is 42 ppb at Fargo NW
The highest Arithmetic Mean concentration is 5.44 ppb at Fargo NW

* The air quality standards are:

STATE Standards -

- 1) 100 ppb Three year average of the annual 98th percentile (8th highest) of the daily maximum 1-hour average concentration in a year.
- 2) 53 ppb annual arithmetic mean.

FEDERAL Standards -

- 1) 100 ppb Three year average of the annual 98th percentile (8th Highest) of the daily maximum 1-hour average concentration in a year.
- 2) 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 : CARBON MONOXIDE (PPB)

LOCATION	YEAR	NUM OBS	M 1ST	A - X 2ND	I - HOUR 2ND	M 1ST	A - 8 HOUR 2ND	1HR #>35000	8HR #>9000
Fargo NW	2010	8599	1534.0	944.0		600.0	500.0		

* The STATE and FEDERAL air quality standards are:

- 1) The highest allowable 1-hour concentration is 35000 ppb not to be exceeded more than once per year.
- 2) The highest allowable 8-hour concentration is 9000 ppb not to be exceeded more than once per year.

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

POLLUTANT : Ammonia (ppb)

LOCATION	YEAR	NUM OBS	1ST	M 1 - 2ND	A - HOUR 3RD	M A 4TH
Beulah - North	2010	8587	204.0	117.0	85.0	83.0
Lostwood NWR	2010	8143	53.0	49.0	40.0	37.0

The highest 1-hour concentrations is 204.0 at Beulah - North

* No Standard is currently in effect:

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

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

LOCATION	YEAR	NUM OBS	1 - 1ST	M A - HOUR 2ND	X I - 1ST	M A 2ND	24 - HOUR 3RD	4TH	MEAN	24HR #>35 AM>15
Beulah - North	2010	8534	156.0	98.0	23.6	20.7	19.0	16.6	5.72	
Dunn Center	2010	2674 ***	32.3	30.1	13.0	12.8	12.2	9.8	3.87	
Hannover	2010	7312	46.3	45.1	17.7	16.7	15.5	15.3	6.83	
Lostwood NWR	2010	7946 ***	45.0	42.6	24.0	20.7	18.3	16.0	5.79	
TRNP - NU	2010	8291	57.8	42.9	27.3	21.0	18.6	17.0	5.46	
TRNP - SU (Painted Canyon)	2010	8128	31.3	27.7	15.2	14.6	14.5	14.5	6.24	

The highest 24-hour concentration is 27.3 µg/m³ at TRNP - NU
The highest Annual Mean concentration is 6.83 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_{2.5} standards. This data can only be used as an indicator of the actual PM_{2.5} 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.

*** 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** ($\mu\text{g}/\text{m}^3$)

LOCATION	YEAR	OBS MIN	M A X I M A			24-HR 98th%	24-HR 3yr Avg	WTD MEAN	Annual 3yr Avg	#>35	AM>15
			1ST	2ND	3RD						
Beulah - North	2010	60	15.0	14.9	14.3	14.9	(NA)	6.35	(NA)		
Beulah - North (BAMM)	2010	3782 ***	23.6	20.7	19.0	16.6	14.0	7.93	6.3		
Bismarck Residential	2010	61	23.6	19.0	17.8	17.8	(NA)	7.65	(NA)		
Bismarck Residential (BAMM)	2010	8467	30.0	25.9	25.5	19.0	17.0	7.84	7.1		
Fargo NW	2010	120	28.0	26.7	25.5	26.7	(NA)	8.46	(NA)		
Fargo NW (BAMM)	2010	5963 ***	32.6	29.1	26.5	23.6	23.0	9.89	8.5		
Lostwood NWR (BAMM)	2010	3828 ***	24.0	20.7	18.3	16.0	16.0	8.04	8.0		
TRNP - NU (BAMM)	2010	3440 ***	27.3	21.0	18.6	18.6	19.0	8.59	8.6		
TRNP - SU (Painted Canyon)	2010	58	12.7	12.1	9.9	12.1	11.0	4.70	4.5		

The highest 24-hour concentration is 32.6 $\mu\text{g}/\text{m}^3$ at Fargo NW
 The highest Three year average 24-hour concentration is 23.0 $\mu\text{g}/\text{m}^3$ at Fargo NW
 The highest Annual Weighted Mean concentration is 9.89 $\mu\text{g}/\text{m}^3$ at Fargo NW
 The highest Three year average Annual weighted Mean concentration is 8.6 $\mu\text{g}/\text{m}^3$ at TRNP - NU

* 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 $\mu\text{g}/\text{m}^3$.

*** 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 Continuous PM₁₀ Particulates (µg/m³)

LOCATION	YEAR	NUM OBS	M A X I M A				24HR MEAN	#>150	AM>50
			1ST	2ND	3RD	4TH			
Beulah - North	2010	8389	49.0	43.0	40.0	34.0	11.5		
Bismarck Residential	2010	8463	54.0	44.0	44.0	42.0	13.9		
Dunn Center	2010	2321 ***	32.0	32.0	31.0	29.0	9.7		
Fargo NW	2010	8442	104.0	96.0	84.0	82.0	12.9		
Lostwood NWR	2010	8431	48.0	46.0	44.0	44.0	10.1		
TRNP - NU	2010	8679	31.0	29.0	29.0	27.0	8.6		

The highest 24-hour concentration is 104.0 µg/m³ at Fargo NW

The highest Annual Mean concentration is 13.9 µg/m³ at Bismarck Residential

FEDERAL air quality standards are:

150 µg/m³ highest averaged over a 24-hour period with no more than one expected exceedance per year.

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 ($\mu\text{g}/\text{m}^3$)

The * Identifies the Exceedances

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 ($\mu\text{g}/\text{m}^3$)

The * Identifies the Exceedances

