

State/Industry Ambient Monitoring Network

Air Quality Report

4<sup>th</sup> Quarter 2009

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SECTION ONE

DISCUSSION OF  
MONITORING RESULTS

### Sulfur Dioxide (SO<sub>2</sub>)

There were no exceedances of either the state or the federal standards during the quarter. The Department was notified prior to the repairs of the pre-heater at the Hess plant. The highest 1-hour concentration was 111 ppb at Hess Tioga #3; the highest 3-hour concentration was 62 ppb at Hess — Tioga #3; and, the highest 24-hour concentration was 28 ppb at Hess — Tioga #3. The highest arithmetic mean was 3.0 ppb at Hess — Tioga #3. All sites achieved at least an 80% data recovery for the period operated.

### Sulfur Dioxide (SO<sub>2</sub>) 5-Minute Average

The highest 5-minute concentration was 225 ppb at Hess — Tioga #3. All sites achieved at least an 80% data recovery for the period operated.

### Trace Level Sulfur Dioxide (SO<sub>2</sub>)

There were no exceedances of either the state or the federal standards during the quarter. The highest 1-hour concentration was 57.1 ppb at Lostwood NWR; the highest 3-hour concentration was 46.0 ppb at Lostwood NWR; and, the highest 24-hour concentration was 15.0 ppb at Lostwood NWR. The highest arithmetic mean was 1.7 ppb at Lostwood NWR. All sites with the exception of Lostwood NWR achieved at least an 80% data recovery for the period operated. Lostwood NWR failed to achieve 80% data recovery due to machine malfunction, caused by a lighting strike.

### Trace Level Sulfur Dioxide (SO<sub>2</sub>) 5-Minute Average

The highest 5-minute concentration was 144.0 ppb at Lostwood NWR. All sites with the exception of Lostwood NWR achieved at least an 80% data recovery for the period operated. Lostwood NWR failed to achieve 80% data recovery due to machine malfunction, caused by a lighting strike.

### Ozone (O<sub>3</sub>)

There was no exceedance of the ozone standard during the quarter. The highest observed 1-hour concentration was 76 ppb at Bismarck Residential. The highest 4<sup>th</sup> highest 8-hour concentration was 59 ppb at Lostwood NWR. All sites achieved at least an 80% data recovery for the period operated.

### Nitrogen Dioxide (NO<sub>2</sub>)

The highest observed 1-hour concentration was 59 ppb at Beulah-North. The highest arithmetic mean concentration was 5.9 ppb at Bismarck Residential. All sites achieved at least an 80% data recovery for the period operated.

### Carbon Monoxide (CO)

The highest observed 1-hour concentration was 1186 ppb at Fargo NW. The highest 8-hour concentration was 700 ppb at Fargo NW. The site achieved at least an 80% data recovery for the period operated.

### Ammonia (NH<sub>3</sub>)

The highest 1-hour concentration was 145.0 ppb at Beulah – North. The site except Lostwood achieved an 80% data recovery for the period. Lostwood failed to achieve 80% data recovery due to machine malfunction.

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

### Inhalable Continuous PM<sub>2.5</sub> Particulates

The highest 24-hour concentration was 18.9  $\mu\text{g}/\text{m}^3$  at Hannover. The highest arithmetic mean concentration was 6.6  $\mu\text{g}/\text{m}^3$  at Hannover. All sites achieved at least an 80% data recovery for the period operated.

The analyzer used to collect PM<sub>2.5</sub> at the Bismarck Residential site is designated as a FEM (Federal Equivalent Method). The analyzer used to collect the PM<sub>2.5</sub> at the remaining 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<sub>2.5</sub> concentrations.

### Inhalable PM<sub>2.5</sub> Particulates

There was no exceedance of the 24-hour standard during the quarter. The highest 24-hour average concentration was 35.9  $\mu\text{g}/\text{m}^3$  at Fargo NW. The highest weighted mean was 7.63  $\mu\text{g}/\text{m}^3$  at Fargo NW. All sites achieved at least an 80% data recovery for the period.

### Inhalable Continuous PM<sub>10</sub> Particulates

There was no exceedance of the 24-hour standard during the quarter. The highest 24-hour concentration was 54.0  $\mu\text{g}/\text{m}^3$  at Dunn Center. The highest arithmetic mean was 12.4  $\mu\text{g}/\text{m}^3$  at Bismarck Residential. 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	NUM OBS	1 - HOUR		M A X I M A		24 - HOUR		ARITH MEAN	1HR #>273	24HR #>99
			1ST	2ND	1ST	2ND	1ST	2ND			
Bear Paw - MGP #3	2009	8648	51	45	33	16	6	5	1.2		
Bear Paw - MGP #5	2009	8636	14	10	7	6	3	2	1.1		
Beulah - North	2009	8689	41	38	31	20	7	6	1.6		
Bismarck Residential	2009	8626	50	32	27	25	10	8	2.0		
DGC #12	2009	8713	52	45	25	22	5	5	1.5		
DGC #14	2009	8716	34	31	20	18	6	5	1.4		
DGC #16	2009	8647	58	34	26	21	10	5	1.5		
DGC #17	2009	8721	31	30	19	18	6	5	1.4		
Hannover	2009	8692	59	47	30	29	10	8	1.7		
Hess - Tioga #1	2009	8622	44	39	34	19	6	6	1.3		
Hess - Tioga #3	2009	8611	111	87	62	51	28	26	3.0		
TRNP - SU	2009	8508	18	17	16	15	7	6	1.2		

The highest 1-hour concentration is 111 ppb at Hess - Tioga #3  
 The highest 3-hour concentration is 62 ppb at Hess - Tioga #3  
 The highest 24-hour concentration is 28 ppb at Hess - Tioga #3  
 The highest arithmetic mean is 3.0 ppb at Hess - Tioga #3

\* The air quality standards are:

STATE Standards -

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

FEDERAL Standards -

- 1) 500 ppb highest 3-hour concentration not to be exceeded more than once per year.
- 2) 140 ppb highest 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	NUM OBS	5 - M I N U T E M A X I M A			# HOURS >600
			1ST	2ND	3RD	
Bear Paw - MGP #3	2009	8648	122	105	81	
Bear Paw - MGP #5	2009	8636	68	43	31	
Beulah - North	2009	8689	73	66	51	
Bismarck Residential	2009	8628	82	64	62	
Hannover	2009	8639	128	97	92	
Hess - Tioga #1	2009	8622	111	101	93	
Hess - Tioga #3	2009	8611	225	198	195	
TRNP - SU	2009	8508	24	24	21	

The maximum 5-minute concentration is 225 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 A X I M A 3 - HOUR		24 - HOUR		ARITH MEAN	1HR #>273	24HR #>99
			1ST	2ND	1ST	2ND	1ST	2ND			
Dunn Center	2009	8327	20.1	17.4	13.0	12.0	6.0	5.0	0.5		
Fargo NW	2009	8505	8.5	8.0	7.0	4.0	3.0	3.0	0.3		
Lostwood NWR	2009	6478	57.1	56.9	46.0	34.0	15.0	13.0	1.7		
TRNP - NU	2009	8142	20.3	11.6	10.0	8.0	4.0	4.0	0.6		

The highest 1-hour concentration is 57.1 ppb at Lostwood NWR  
 The highest 3-hour concentration is 46.0 ppb at Lostwood NWR  
 The highest 24-hour concentration is 15.0 ppb at Lostwood NWR  
 The highest arithmetic mean is 1.7 ppb at Lostwood NWR

\* The air quality standards are:

STATE Standards -

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

FEDERAL Standards -

- 1) 500 ppb highest 3-hour concentration not to be exceeded more than once per year.
- 2) 140 ppb highest 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	NUM OBS	5 - M I N U T E			# HOURS >600
			1ST	2ND	3RD	
Dunn Center	2009	8240	25.6	22.5	20.5	
Fargo NW	2009	8515	14.6	12.6	11.8	
Lostwood NWR	2009	6479	144.0	118.0	113.0	
TRNP - NU	2009	8022	29.0	17.0	15.2	

The maximum 5-minute concentration is 144 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	NUM OBS	1 - 1ST	M HOUR 2ND	A X 1ST	I M 2ND	A 8 - 3RD	HOUR 4TH	1HR #>120	8HR #>75
Beulah North	2009	8615	66	63	60	58	56	55		
Bismarck Residential	2009	8624	76	61	58	57	54	54		
Dunn Center	2009	8378	67	61	57	55	55	54		
Fargo NW	2009	8600	64	63	60	60	58	57		
Hannover	2009	8641	67	65	62	59	57	57		
Lostwood NWR	2009	8123	66	63	60	60	59	59		
TRNP - NU	2009	8620	62	60	58	56	56	56		
TRNP - SU	2009	8657	68	66	61	58	56	56		

The highest 1-hour concentration is 76 ppb at Bismarck Residential  
The 4th highest 8-hour concentration is 59 ppb at Lostwood NWR

\* The air quality standards for ozone are:  
STATE - 120 ppb highest 1-hour not to be exceeded more than once per year.

FEDERAL Standards -

- 1) 120 ppb highest 1-hour concentration with no more than one expected exceedance per year.
- 2) Fourth highest daily highest 8-hour averages for a 3-year period not to exceed 75 ppb.

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

POLLUTANT : Nitrogen Dioxide (ppb)

LOCATION	YEAR	NUM OBS	M A X 1 - 1ST	I M A 2ND	ARITH MEAN
Beulah - North	2009	8622	59	51	2.8
Bismarck Residential	2009	8486	47	45	5.9
DGC #12	2009	8675	36	28	2.7
DGC #17	2009	7224	41	39	2.0
Dunn Center	2009	8329	14	12	1.5
Fargo NW	2009	8590	57	54	5.0
Hannover	2009	8663	53	50	2.0
Lostwood NWR	2009	7965	29	27	1.7
TRNP - NU	2009	8293	15	13	1.0

The highest 1-hour concentration is 59 ppb at Beulah North  
The highest Arithmetic Mean concentration is 5.9 ppb at Bismarck Residential

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

FEDERAL - 53 ppb annual arithmetic mean.

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

POLLUTANT : CARBON MONOXIDE (PPB)

LOCATION	YEAR	NUM OBS	M A X 1 - 1ST	I M A 2ND	1HR #>35000	8HR #>9000
Fargo NW	2009	8525	1186.0	1003.0	700.0	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 - 3RD	X I 3RD	M A 4TH
Beulah - North	2009	8583	145.0	134.0	132.0	68.0	
Lostwood NWR	2009	4882	16.0	11.0	10.0	9.0	

The highest 1-hour concentrations is 145.0 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<sub>2.5</sub> Particulates (µg/m<sup>3</sup>)

LOCATION	YEAR	NUM OBS	1 1ST	M - 2ND	A HOUR 1ST	X I 2ND	M A 24 3RD	A HOUR 4TH	MEAN	24HR #>35 AM>15
Beulah - North	2009	8635	40.7	35.6	15.0	14.8	12.9	12.8	3.4	
Dunn Center	2009	8298	38.9	33.2	15.0	14.3	14.0	13.4	3.4	
Fargo NW	2009	8642	68.9	67.2	14.7	14.6	14.5	13.9	4.2	
Hannover	2009	8565	81.3	71.7	18.9	18.2	15.9	14.2	6.6	
Lostwood NWR	2009	8315	94.4	48.4	18.1	18.1	17.1	15.7	3.8	
TRNP - NU	2009	8576	32.0	30.0	14.9	11.3	10.6	9.6	3.0	
TRNP - SU (Painted Canyon)	2009	8546	47.0	43.5	16.3	15.5	14.5	12.8	5.8	

The highest 24-hour concentration is 18.9 µg/m<sup>3</sup> at Hannover  
The highest Annual Mean concentration is 6.6 µg/m<sup>3</sup> 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<sub>2.5</sub> standards. This data can only be used as an indicator of the actual PM<sub>2.5</sub> 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<sub>2.5</sub> Particulates (µg/m<sup>3</sup>)

LOCATION	YEAR	OBS	MIN	M A X I M A			98th %	WTD MEAN	#>35	AM>15
				1ST	2ND	3RD				
Beulah - North	2009	60		14.8	13.5	12.0	13.5	5.47		
Bismarck Residential	2009	119		17.8	15.7	15.1	15.1	6.39		
Bismarck Residential (BAMM)	2009	8415		27.8	26.4	23.5	16.7	6.35		
Fargo NW	2009	110		35.9	35.5	19.9	19.9	7.63		
TRNP - SU (Painted Canyon)	2009	61		13.8	9.9	9.4	9.9	4.12		

The highest 24-hour concentration is 35.9 µg/m<sup>3</sup> at Fargo NW  
The highest Annual Weighted Mean concentration is 7.63 µg/m<sup>3</sup> at Fargo NW

\* The ambient air quality standards are:  
FEDERAL Standards -

- 1) 24-hour: 3-year average of 98th percentiles not to exceed 35 µg/m<sup>3</sup>.
- 2) Annual: 3-year average not to exceed 15 µg/m<sup>3</sup>.

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

POLLUTANT : Inhalable Continuous PM<sub>10</sub> Particulates (µg/m<sup>3</sup>)

LOCATION	YEAR	NUM OBS	1 - HOUR		M A X I M A		24 - HOUR		MEAN	24HR #>150	AM>50
			1ST	2ND	1ST	2ND	3RD	4TH			
Beulah - North	2009	8628	137	135	34.0	32.0	31.0	31.0	11.0		
Bismarck Residential	2009	8585	137	124	43.0	37.0	34.0	32.0	12.4		
Dunn Center	2009	8139	248	234	54.0	52.0	37.0	35.0	11.3		
Fargo NW	2009	8679	92	90	26.0	25.0	24.0	22.0	9.0		
Lostwood NWR	2009	8322	72	67	31.0	27.0	27.0	26.0	8.5		
TRNP - NU	2009	8447	264	254	44.0	40.0	35.0	33.0	9.2		

The highest 24-hour concentration is 54.0 µg/m<sup>3</sup> at Dunn Center  
The highest Annual Mean concentration is 12.4 µg/m<sup>3</sup> at Bismarck Residential

FEDERAL air quality standards are:

150 µg/m<sup>3</sup> 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<sub>2.5</sub> and PM<sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )

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<sub>2.5</sub> and PM<sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )

The \* Identifies the Exceedances