

State/Industry Ambient Monitoring Network

Air Quality Report

3rd Quarter 2009

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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 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 26 ppb at Hess — Tioga #3. The highest arithmetic mean was 2.9 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 198 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 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 1.8 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 (SO₂) 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 (O₃)

There was no exceedance of the ozone standard during the quarter. The highest observed 1-hour concentration was 67 ppb at Dunn Center and Hannover. The highest 4th highest 8-hour concentration was 59 ppb at Lostwood NWR. 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 observed 1-hour concentration was 59 ppb at Beulah-North. The highest arithmetic mean concentration was 5.5 ppb at Bismarck Residential. All sites except DGC #17 achieved at least an 80% data recovery for the period operated. DGC #17 failed to achieve 80% data recovery due to machine malfunction.

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 (NH₃)

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_{2.5} Particulates

The highest 24-hour concentration was 18.9 $\mu\text{g}/\text{m}^3$ at Hannover. The highest arithmetic mean concentration was 7.0 $\mu\text{g}/\text{m}^3$ at Hannover. All sites achieved at least an 80% data recovery for the period operated.

The analyzer used to collect PM_{2.5} at the Bismarck Residential site is designated as a FEM (Federal Equivalent Method). The analyzer used to collect the PM_{2.5} 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_{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 35.9 $\mu\text{g}/\text{m}^3$ at Fargo NW. The highest weighted mean was 7.73 $\mu\text{g}/\text{m}^3$ 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 highest 24-hour concentration was 54.0 $\mu\text{g}/\text{m}^3$ at Dunn Center. The highest arithmetic mean was 11.4 $\mu\text{g}/\text{m}^3$ 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 1ST	— HOUR 2ND	M A X 3 1ST	— HOUR 2ND	M A 24 1ST	— HOUR 2ND	ARITH MEAN	1HR #>273	24HR #>99
Bear Paw - MGP #3	2009	6462	51	45	33	16	6	5	1.2		
Bear Paw - MGP #5	2009	6446	14	8	5	5	2	2	1.1		
Beulah - North	2009	6502	41	38	31	20	7	5	1.7		
Bismarck Residential	2009	6431	32	29	25	22	10	8	1.9		
DGC #12	2009	6518	52	45	25	22	5	5	1.6		
DGC #14	2009	6518	34	28	20	18	6	4	1.5		
DGC #16	2009	6521	58	34	26	21	10	5	1.5		
DGC #17	2009	6524	31	30	19	18	6	5	1.5		
Hannover	2009	6498	59	47	30	29	10	8	1.7		
Hess - Tioga #1	2009	6450	44	39	34	17	6	6	1.3		
Hess - Tioga #3	2009	6435	111	87	62	51	26	26	2.9		
TRNP - SU (Painted Canyon)	2009	6313	18	17	16	13	7	4	1.3		

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 26 ppb at Hess - Tioga #3
 The highest arithmetic mean is 2.9 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	6462	122	105	81	
Bear Paw - MGP #5	2009	6446	43	20	16	
Beulah - North	2009	6502	73	66	51	
Bismarck Residential	2009	6433	57	45	43	
Hannover	2009	6445	128	97	92	
Hess - Tioga #1	2009	6450	111	101	93	
Hess - Tioga #3	2009	6435	198	195	187	
TRNP - SU (Painted Canyon)	2009	6313	24	21	18	

The maximum 5-minute concentration is 198 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		24 - HOUR		ARITH MEAN	1HR #>273	24HR #>99
			1ST	2ND	1ST	2ND	1ST	2ND			
Dunn Center	2009	6142	20.1	17.4	13.0	12.0	6.0	5.0	0.5		
Fargo NW	2009	6323	8.5	8.0	7.0	4.0	3.0	3.0	0.3		
Lostwood NWR	2009	4287	57.1	55.6	46.0	29.0	15.0	11.0	1.8		
TRNP - NU	2009	5946	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 1.8 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			M A X I M A	# HOURS >600
			1ST	2ND	3RD		
Dunn Center	2009	6053	25.6	22.5	20.5		
Fargo NW	2009	6333	14.6	12.6	11.8		
Lostwood NWR	2009	4287	144.0	118.0	113.0		
TRNP - NU	2009	5826	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	4262	63	61	60	58	56	55		
Bismarck Residential	2009	4287	61	61	58	54	54	54		
Dunn Center	2009	3996	67	61	57	55	55	54		
Fargo NW	2009	6440	64	63	60	60	58	57		
Hannover	2009	6488	67	65	62	59	57	57		
Lostwood NWR	2009	5947	66	63	60	60	59	59		
TRNP - NU	2009	6449	62	60	58	56	56	56		
TRNP - SU	2009	4320	66	63	61	58	56	56		

The highest 1-hour concentration is 67 ppb at Dunn Center and Hannover
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	6484	59	51	2.9
Bismarck Residential	2009	6467	47	45	5.5
DGC #12	2009	6491	36	27	2.7
DGC #17	2009	5029	41	39	2.1
Dunn Center	2009	6143	12	12	1.6
Fargo NW	2009	6418	57	54	4.8
Hannover	2009	6479	53	50	2.0
Lostwood NWR	2009	6133	29	26	1.7
TRNP - NU	2009	6410	13	8	0.9

The highest 1-hour concentration is 59 ppb at Beulah North
The highest Arithmetic Mean concentration is 5.5 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	1 1ST	M A X 1 - HOUR 2ND	I M A 8 - HOUR 2ND	1HR #>35000	8HR #>9000
Fargo NW	2009	6344	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 - HOUR 3RD	M A 4TH
Beulah - North	2009	6421	145.0	134.0	132.0	68.0
Lostwood NWR	2009	3779	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_{2.5} Particulates (µg/m³)

LOCATION	YEAR	NUM OBS	1 1ST	M - HOUR 2ND	A X 1ST	I M 2ND	M A 24 3RD	A - HOUR 4TH	MEAN	24HR #>35 AM>15
Beulah - North	2009	6496	35.1	32.7	15.0	14.8	12.9	12.8	3.8	
Dunn Center	2009	6131	38.9	33.2	15.0	14.3	14.0	13.4	3.8	
Fargo NW	2009	6453	49.7	47.8	14.7	14.6	14.5	13.9	4.5	
Hannover	2009	6418	81.3	43.5	18.9	18.2	15.9	14.2	7.0	
Lostwood NWR	2009	6130	48.4	40.8	18.1	18.1	17.1	15.7	4.2	
TRNP - NU	2009	6386	32.0	30.0	14.9	11.3	10.6	9.6	3.3	
TRNP - SU (Painted Canyon)	2009	6357	47.0	43.5	16.3	15.5	14.5	12.8	6.2	

The highest 24-hour concentration is 18.9 µg/m³ at Hannover
The highest Annual Mean concentration is 7.0 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.

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

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

LOCATION	YEAR	OBS	MIN	M A X I M A			98th %	WTD MEAN	#>35	AM>15
				1ST	2ND	3RD				
Beulah - North	2009	45		14.8	13.5	12.0	14.8	6.56		
Bismarck Residential	2009	89		17.8	15.7	15.1	15.7	6.68		
Bismarck Residential (BAMM)	2009	6981		27.9	26.5	23.6	18.4	5.92		
Fargo NW	2009	79		35.9	19.9	19.7	19.9	7.73		
TRNP - SU (Painted Canyon)	2009	46		13.8	9.4	8.7	13.8	4.43		

The highest 24-hour concentration is 35.9 µg/m³ at Fargo NW
The highest Annual Weighted Mean concentration is 7.73 µg/m³ 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/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 Continuous PM₁₀ Particulates (µg/m³)

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	7223	135	92	34.0	32.0	31.0	31.0	10.2		
Bismarck Residential	2009	7181	137	124	43.0	37.0	34.0	32.0	11.4		
Dunn Center	2009	6786	248	232	54.0	52.0	35.0	33.0	10.2		
Fargo NW	2009	7227	92	90	26.0	25.0	24.0	22.0	8.6		
Lostwood NWR	2009	6876	72	67	31.0	27.0	27.0	26.0	7.9		
TRNP - NU	2009	7030	264	226	44.0	40.0	35.0	33.0	8.4		

The highest 24-hour concentration is 54.0 µg/m³ at Dunn Center
The highest Annual Mean concentration is 11.4 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 (µg/m³)

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 (µg/m³)

The * Identifies the Exceedances