

Saskatchewan-North Dakota Trans-Boundary Ambient Monitoring Network

Air Quality Report

4<sup>th</sup> Quarter 2004

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February 2005



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## Introduction

The Saskatchewan (SK) - North Dakota (ND) Trans-Boundary Ambient Monitoring Network is a cooperative effort among Environment Canada (EC), US Environmental Protection Agency (EPA), Saskatchewan Environment (SE), North Dakota Department of Health (NDDH), and SaskPower. The working participants are SaskPower (Boundary Dam Power Station) and NDDH (Division of Air Quality). After the initial data sharing details are worked out, data collected by SaskPower at the Boundary Dam Power Station (BDPS) and Estevan site continuous data will be included in this quarterly report.

Section One provides a description of the data collected, by pollutant, and a brief summary of data and any significant action(s) that may affect the data. Section Two presents the data in summary tables comparing the data to the applicable Saskatchewan, North Dakota and US ambient air quality standards. Section Three lists any exceedance of the North Dakota ambient air quality standards first by site and date, then by date and site.



SECTION ONE

DISCUSSION OF  
MONITORING RESULTS

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

There were no exceedances of either the Saskatchewan, ND state, or US federal standards during the quarter. The maximum 1-hour concentration was 83 ppb on November 30 at Short Creek, ND; the maximum 3-hour concentration was 40 ppb on December 7 at Short Creek, ND; and, the maximum 24-hour concentration was 10 ppb on December 15 at Short Creek, ND. An 80% data recovery was achieved for the period operated.

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

The maximum 5-minute concentration was 165 ppb on November 1 at Short Creek, ND.

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

The maximum 1-hour concentration observed was 24 ppb on December 7 at Short Creek, ND. An 80% data recovery was not achieved for the period operated.

Short Creek, ND did not achieve 80% data recovery due to an analyzer malfunction.

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

The maximum 1-hour concentration was 19.3 µg/m<sup>3</sup> on October 11 at Short Creek, ND; the maximum 24-hour concentration was 10.6 µg/m<sup>3</sup> on December 8 at Short Creek, ND. An 80% data recovery was achieved for the period operated.

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

The maximum 24-hour average concentration was 17.4 µg/m<sup>3</sup> on December 29 at both Estevan and Rafferty Dam, SK. An 80% data recovery was achieved at all sites the period operated except for Short Creek, ND.

Short Creek, ND failed to achieve 80% data recovery due to several problems with the sampler.

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

There was no exceedance of the 24-hour Saskatchewan or ND state standards during the quarter. The maximum 24-hour average concentration was 56.0 µg/m<sup>3</sup> on October 6 at Short Creek, ND. An 80% data recovery was achieved for the period operated.



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<br>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  |            |           |           |        |
| Short Creek, ND | 2004 | OCT-DEC         | 2195    | 83<br>11/30:12 | 67<br>12/07:01 | 40<br>12/07:02          | 30<br>11/30:14 | 10<br>12/15 | 9<br>12/16 | 2.2        |           |           | 22.6   |

The maximum 1-hour concentration is 83 ppb at Short Creek, ND on 11/30:12  
The maximum 3-hour concentration is 40 ppb at Short Creek, ND on 12/07:02  
the maximum 24-hour concentration is 10 ppb at Short Creek, ND on 12/15

\* The air quality standards are:

Sask. Provincial Standards -

- 1) 0.17 ppm maximum 1-hour average concentration.
- 2) 0.06 ppm maximum 24-hour average concentration.
- 3) 0.01 ppm annual arithmetic mean.

ND 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.

US 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 | NUM 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 |              |        |
| Short Creek, ND | 2004 | OCT-DEC         | 2195    | 165<br>11/01:12             | 163<br>12/16:13   | 152<br>11/30:12   | 0            | 32.9   |

The maximum 5-minute concentration is 165 ppb at Short Creek, ND on 11/01:12

\* No Standard is currently in effect:

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<br>1 - HOUR |                | ARITH MEAN | % >MDV |
|-----------------|------|-----------------|-------------|-------------------------|----------------|------------|--------|
|                 |      |                 |             | 1ST MM/DD:HH            | 2ND MM/DD:HH   |            |        |
| Short Creek, ND | 2004 | OCT-DEC         | 1685<br>*** | 24<br>12/07:01          | 17<br>11/30:12 | 2.3        | 90.5   |

The maximum 1-hour concentration is 24 ppb at Short Creek, ND on 12/07:01

\* The air quality standards are:

Sask. Provincial Standards are:

- 1) 0.2 ppm maximum 1-hour average concentration.
- 2) 0.05 ppm maximum annual arithmetic mean concentration.

ND STATE - 53 ppb maximum annual arithmetic mean.

US 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 Continuous PM<sub>2.5</sub> (µg/m<sup>3</sup>)

| LOCATION        | YEAR | SAMPLING PERIOD | NUM OBS | M A X I M A<br>1 - HOUR |                  |               |              | 24 - HOUR    |              | MEAN | 1HR #>150 | 24HR #>65 |
|-----------------|------|-----------------|---------|-------------------------|------------------|---------------|--------------|--------------|--------------|------|-----------|-----------|
|                 |      |                 |         | 1ST MM/DD:HH            | 2ND MM/DD:HH     | 1ST MM/DD     | 2ND MM/DD    | 3RD MM/DD    | 4TH MM/DD    |      |           |           |
| Short Creek, ND | 2004 | OCT-DEC         | 2196    | 19.3<br>10/11:18        | 19.1<br>12/08:07 | 10.6<br>12/08 | 7.0<br>10/27 | 6.2<br>11/09 | 5.9<br>10/07 | 2.6  |           |           |

The maximum 1-hour concentration is 19.3 µg/m<sup>3</sup> at Short Creek, ND on 10/11:18  
The highest 24-hour concentration is 10.6 µg/m<sup>3</sup> at Short Creek, ND on 12/08

\* The ambient air quality standards are:

US FEDERAL Standards -

- 1) 24-hour: 3-year average of 98th percentiles not to exceed 65 µg/m<sup>3</sup>.
- 2) Annual: 3-year average not to exceed 15 µg/m<sup>3</sup>.

Canadian-Wide Standard -

- 24-hour: 3-year average of 98th percentiles not to exceed 30 µg/m<sup>3</sup>.

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

POLLUTANT : Inhalable FRM PM<sub>2.5</sub> Particulates (µg/m<sup>3</sup>)

| LOCATION        | YEAR | SAMPLING PERIOD | NUM OBS   | MIN | M A X I M A   |               |               | ARITH MEAN | #>150 | AM>50 | % >MDV |
|-----------------|------|-----------------|-----------|-----|---------------|---------------|---------------|------------|-------|-------|--------|
|                 |      |                 |           |     | 1ST MM/DD     | 2ND MM/DD     | 3RD MM/DD     |            |       |       |        |
| Estevan, SK     | 2004 | OCT-DEC         | 15        | 2.7 | 17.4<br>12/29 | 11.1<br>10/06 | 10.3<br>12/05 | 7.7        |       |       | 100.0  |
| Lignite, ND     | 2004 | OCT-DEC         | 15        | 1.7 | 9.0<br>10/30  | 8.5<br>12/29  | 8.1<br>10/24  | 4.6        |       |       | 93.3   |
| Raferty Dam, SK | 2004 | OCT-DEC         | 14        | 2.5 | 17.4<br>12/29 | 9.3<br>10/30  | 7.4<br>10/06  | 5.9        |       |       | 100.0  |
| Short Creek, ND | 2004 | OCT-DEC         | 11<br>*** | 1.8 | 12.7<br>12/29 | 10.4<br>10/30 | 8.7<br>10/24  | 6.1        |       |       | 90.9   |

The maximum 24-hour concentration is 17.4 µg/m<sup>3</sup> at Estevan and Rafferty Dam, SK on 12/29

\* The ambient air quality standards are:

US FEDERAL Standards -

- 1) 24-hour: 3-year average of 98th percentiles not to exceed 65 µg/m<sup>3</sup>.
- 2) Annual: 3-year average not to exceed 15 µg/m<sup>3</sup>.

Canadian-Wide Standard -

24-hour: 3-year average of 98th percentiles not to exceed 30 µg/m<sup>3</sup>.

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

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

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

| LOCATION        | YEAR | SAMPLING PERIOD | NUM OBS | 1 - HOUR          |                   | M A X I M A   |               | 24 - HOUR     |               |  |  | MEAN | #>150 | AM>50 |
|-----------------|------|-----------------|---------|-------------------|-------------------|---------------|---------------|---------------|---------------|--|--|------|-------|-------|
|                 |      |                 |         | 1ST MM/DD:HH      | 2ND MM/DD:HH      | 1ST MM/DD     | 2ND MM/DD     | 3RD MM/DD     | 4TH MM/DD     |  |  |      |       |       |
| Short Creek, ND | 2004 | OCT-DEC         | 1980    | 261.0<br>10/06:17 | 159.0<br>10/06:16 | 56.0<br>10/06 | 36.5<br>10/07 | 30.2<br>10/09 | 25.5<br>12/05 |  |  | 13.0 |       |       |

The maximum 24-hour concentration is 56.0 µg/m<sup>3</sup> at Short Creek, ND on 10/06

\* The STATE and FEDERAL air quality standards are:

- 1) 150 µg/m<sup>3</sup> maximum averaged over a 24-hour period with no more than one expected exceedance per year.
- 2) 50 µg/m<sup>3</sup> 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<sub>2.5</sub> and PM<sub>10</sub> (µg/m<sup>3</sup>)

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<sub>2.5</sub> and PM<sub>10</sub> (µg/m<sup>3</sup>)

The \* Identifies the Exceedances

NONE