Rapid City Area Air Monitoring Report  
June 13, 2022  
SD Department of Agriculture and Natural Resources

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Introduction

The focus of this report is on particulate matter 10 microns in diameter or less (PM-10) and particulate matter 2.5 microns in diameter or less (PM-2.5) pollution levels collected by the South Dakota Department of Agriculture and Natural Resources (DANR) in the Rapid City area. The data in this report is draft and subject to change.

Current levels of air pollutants in Rapid City can be viewed by going to the DANR Air Quality Real Time Data webpage:

https://danr.sd.gov/Environment/AirQuality/AirMonitoring/RealTimeData.aspx

From this location you can view the hourly concentration data from a majority of DANR’s monitoring sites in the state. Two of these sites are located in the Rapid City area: Credit Union and Black Hawk.

High Wind Dust Alerts

A high wind dust alert is issued by the National Weather Service during the following three meteorological conditions established in the Natural Events Action Plan for Rapid City: 1) Five consecutive days of 0.02 inches or less of precipitation each day, excluding dry snow; 2) forecasted peak wind gusts greater than 40 miles per hour; and 3) forecasted average hourly wind speed greater than 20 miles per hour.

Nine high wind dust alerts have been issued by the National Weather Service so far in 2022. Table 1 provides the 24-hour PM-10 concentration from the Credit Union site compared to the Black Hawk site for the alert days in 2022.

Table 1. Credit Union and Black Hawk PM10 Comparison During High Wind Dust Alerts

<table>
<thead>
<tr>
<th>No.</th>
<th>Date</th>
<th>Credit Union PM-10 (ug/m³)</th>
<th>Black Hawk PM-10 (ug/m³)</th>
<th>Wind Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-14-2022</td>
<td>185.8</td>
<td>15.8</td>
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</tr>
<tr>
<td>2</td>
<td>1-18-2022</td>
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<td>2.7</td>
<td>NW</td>
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<td>3</td>
<td>1-21-2022</td>
<td>43.1</td>
<td>2.1</td>
<td>NW</td>
</tr>
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<td>4</td>
<td>2-08-2022</td>
<td>87.9</td>
<td>16.8</td>
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</tbody>
</table>
### Air Monitoring Report for PM-10 and PM-2.5

**PM-10**

Figure 1 shows the 24-hour average sample concentrations for PM-10 at the Credit Union site for January through May 2022. The federal 24-hour National Ambient Air Quality Standard for PM-10 is 150 micrograms per cubic meter and is represented as the bold red line.

The highest 24-hour PM-10 concentration so far in 2022 was recorded on January 14, 2022 with a level of 185.8 micrograms per cubic meter. This day exceeded the PM-10 24-hour standard. Winds were generally out of the northwest with winds of 64 miles per hour in Rapid City.

On February 21, 2022, the PM-10 24-hour standard at the Credit Union site was exceeded with a 24-hour average of 182.54 micrograms per cubic meter. The hourly wind speed average on February 21, 2022, was 22.3 miles per hour. Gusts over 40 miles per hour were also recorded.

On March 5, 2022, sustained winds of 20-30mph with gusts of 30-40mph over a 10-hour period occurred in Rapid City, South Dakota, with a direct air quality impact to the population west of town. Wind gusts above 40 miles per hour were recorded at the Rapid City Airport. The 24-hour PM$_{10}$ average reached 218.1 µg/m$^3$ which is an exceedance under the PM$_{10}$ NAAQS.

So far this year, there have been three PM-10 exceedances at the Credit Union site in 2022.

### Table: PM-10 Concentrations

<table>
<thead>
<tr>
<th>No.</th>
<th>Date</th>
<th>Credit Union PM-10 (µg/m$^3$)</th>
<th>Black Hawk PM-10 (µg/m$^3$)</th>
<th>Wind Direction</th>
</tr>
</thead>
<tbody>
<tr>
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<td>NNW</td>
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<td>9</td>
<td>4-17-2022</td>
<td>82.9</td>
<td>10.0</td>
<td>NNW</td>
</tr>
</tbody>
</table>

*Note: “µg/m$^3$” means micrograms per cubic meter.*

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*PM-2.5* results not included in this report.
Figure 1. January-May 2022 24-Hour PM-10 Concentrations at Credit Union Site

Figure 2 shows the ten highest 24-hour average concentration days for 2022. PM-10 concentrations at the Credit Union Site are shown in green and are compared to the corresponding Black Hawk Site concentrations in purple for those days.

DANR uses this comparison along with the wind direction to help determine what may be contributing to PM-10 concentrations at each site. For example, DANR can estimate how well fugitive dust emissions from the quarry area are controlled when the wind direction is out of the north (N) to north-northwest (NNW) or south (S) to south-southeast (SSE).

Figure 2. 10 Highest 24-Hr. PM-10 Concentrations for 2022: Credit Union vs Black Hawk
**PM-2.5**

Figure 3 provides a graph of the 24-hour PM-2.5 concentrations at the Credit Union Site for January through May 2021. The 24-hour PM-2.5 concentrations are represented in light blue while the bold red line represents the 24-hour PM-2.5 federal National Ambient Air Quality Standard of 35 micrograms per cubic meter.

**Figure 3. January-May 2022 24-Hour PM-2.5 Concentrations at Credit Union Site**

Figure 4 shows the ten highest 24-hour PM-2.5 concentrations for 2022. The highest 24-hour PM-2.5 concentration was recorded on March 6, 2022, with a level of 12.5 micrograms per cubic meter. This day did not occur during a high wind dust alert event and did not exceed the PM-2.5 24-hour standard of 35 micrograms per cubic meter.
Figure 4. 10 Highest 24-Hour PM-2.5 Sample Concentrations for January through May 2022

EPA and State Activities

- DANR continues to review the Natural Events Action Plan for the Rapid City area to determine if any changes are necessary. DANR will provide an overview of the findings and possible changes to the plan to the Rapid City Area Air Quality Board, local industry, and the public before any changes are finalized.