



September 16, 2015

Mr. Carl Daly (8P-AR)  
Director, Air Programs  
U.S. EPA, Region 8  
1595 Wynkoop Street  
Denver, CO 80202-1129

Re: SO<sub>2</sub> Designation Recommendations

Dear Mr. Daly:

On March 2, 2015, the U.S. District Court for the Northern District of California entered a Consent Decree between the EPA, Sierra Club and Natural Resources Defense Council that requires the EPA to complete designations for the 2010 1-hour SO<sub>2</sub> NAAQS. This is to be accomplished in three rounds with the first round completed by July 2, 2016. EPA has established a deadline of September 18, 2015 by which states may submit updated recommendations and supporting information for this first round of designations. Attached to this letter is a letter from Governor Dalrymple with North Dakota's updated designation recommendations. In addition, attached are dispersion modeling analyses for the Coyote Station, Leland Olds Station/Coal Creek Station (combined analysis) and Tioga Gas Plant as well as other supporting information for those recommendations.

In a conversation with EPA Region 8, EPA agreed to allow the Department further time to review the modeling analyses and provide any supplemental findings following that review. The Department will supply EPA any supplemental information based on our review of those analyses by December 1, 2015.

If you or your staff has any questions regarding this submittal, please contact Tom Bachman of my staff at (701) 328-5188.

Sincerely,

Terry L. O'Clair, P.E.  
Director  
Division of Air Quality

TLO/TB:saj  
Enc:



State of  
**North Dakota**  
*Office of the Governor*

Jack Dalrymple  
*Governor*

September 16, 2015

Ms. Gina McCarthy  
c/o Mr. Shaun McGrath  
U.S. EPA, Region 8  
1595 Wynkoop Street  
Denver, CO 80202-1129

Re: Updated Sulfur Dioxide Designations Recommendation

Dear Administrator McCarthy:

On June 22, 2010, the United States Environmental Protection Agency (EPA) published its Final Rule regarding the Primary National Ambient Air Quality Standards (NAAQS) for sulfur dioxide (SO<sub>2</sub>). See 75 F.R. 35520. On May 25, 2011, the State of North Dakota submitted its recommendation (with supporting data) that the entire state be designated as attainment for the new one-hour SO<sub>2</sub> NAAQS. This recommendation was based on the results of monitoring data from an extensive monitoring network located across the state.

On March 2, 2015, the U.S. District Court for the Northern District of California entered a Consent Decree that requires EPA to make further designations for the one-hour SO<sub>2</sub> NAAQS. No later than July 2, 2016, the EPA must designate two groups of areas: 1) areas that have newly monitored violations of the new one-hour NAAQS; and 2) areas that contain any stationary source that emitted more than 16,000 tons of SO<sub>2</sub> in 2012 or emitted more than 2,600 tons of SO<sub>2</sub> and had an annual average emission rate of at least 0.45 lb/10<sup>6</sup> BTU of SO<sub>2</sub> in 2012. The State of North Dakota has four plants that fit into the 2016 groups specified in the Consent Decree. These include the Lelands Olds Station, the Coal Creek Station, the Coyote Station and the Tioga Gas Plant.

Based on the data collected by the Department of Health and information provided by the owners of the above listed facilities, it is recommended that the area around the Leland Olds Station, the Coal Creek Station and the Coyote Station be designated "attainment" for the 2010 one-hour SO<sub>2</sub> NAAQS (see attachments).

The Tioga Gas Plant has recently undergone an expansion to enable the facility to process sweet gas and reduce flaring incidents. Because of the characteristics of the gas processed, the plant experienced periodic upsets and malfunctions. These upsets resulted in elevated concentrations of sulfur dioxide. An enforcement action was taken and several

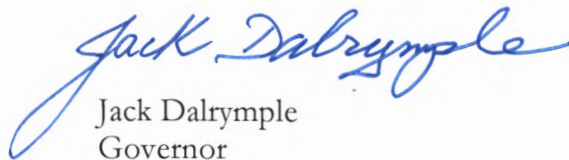
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operational changes have been implemented at the plant. The Department of Health believes the issues that resulted in elevated concentrations in the immediate area of the plant have been rectified. Although the latest ambient data indicate the plant is complying with the NAAQS, it is recommended the immediate area around the Tioga Gas Plant be designated as “unclassifiable” while the Department of Health continues to gather additional data to demonstrate the plant is in compliance. In early 2018, after more data has been collected, a recommendation for reclassification will be submitted based on the monitoring data from 2015-2017 and other available information. Attached to this letter are ambient monitoring data and other supporting information for this recommendation.

The Department of Health has not fully reviewed the modeling data that is submitted with this recommendation. However, as agreed in a telephone conversation with staff at EPA Region 8, the data will be reviewed by the Department of Health and any supplemental information submitted by December 1, 2015.

If you have any questions, please contact the Division of Air Quality at the Department of Health at (701)328-5188.

Sincerely,



Jack Dalrymple  
Governor

C: Terry Dwelle, State Health Officer  
Dave Glatt, Environmental Health Section Chief  
Terry O’Clair, Division of Air Quality Director

Enc.

37:68:56

## **Tioga Gas Plant**

The Tioga Gas Plant was constructed in 1954 in Williams County North Dakota near the town of Tioga to process gas generated by the first oil wells drilled in North Dakota. The plant, which has had many owners, is currently owned and operated by Hess Corp (Hess Tioga Gas Plant, LLC). The plant was originally designed to process 100 - 120 million standard cubic feet per day (MMSCF) of sour gas (3.5 - 4% H<sub>2</sub>S). In 1967, a 105 long ton per day (LTD) sulfur recovery unit (SRU) was added to the plant which was replaced in 1991 with a 220 LTD SRU. Since 1987, the Department has required Hess to operate two ambient air quality monitoring sites near the plant. One site is approximately 0.75 miles northeast of the plant and the other is approximately 0.5 miles southeast of the plant. The data from these sites has not been certified by either the Department or Hess as being accurate. In addition, the quality assurance procedures did not strictly adhere to 40 CFR 58 requirements.

In 2008, development of the Bakken shale formation accelerated, primarily for oil. However, there is a significant amount of gas produced with the oil from the Bakken. This gas is primarily sweet gas (< 0.0004% H<sub>2</sub>S). The Tioga Gas Plant began processing the Bakken gas which helped reduce flaring in the field and offset the decline in gas production from older non-Bakken wells with sour gas. Because the Tioga plant was designed to handle sour gas, the plant experience numerous operational problems as it switched over from sour gas processing to a sour/sweet mix including the Bakken gas. Starting in 2012, these operational problems lead to plant upsets where Hess had to “learn” how to operate the plant with the sour/sweet gas mix. These upset resulted in equipment malfunctions, periodic flaring and reduced gas production. During several of the upsets, elevated levels of SO<sub>2</sub> above of the 1-hour SO<sub>2</sub> design value were recorded at the southeast monitor (no elevated levels have been monitored at the site northeast of the plant). Initially, Hess believed that the problems would be readily solved; however, due the characteristics of the Bakken gas, consistent operations with the sweet/sour gas mixture proved to be more difficult than expected.

On February 13, 2013 the Department issued Hess a Notice of Violation for these elevated SO<sub>2</sub> levels. In December of 2013, a Consent Agreement was signed by the Department and Hess (attached). This Consent Agreement required Hess to complete facility upgrades to improve the SRU operations and, most importantly, other upgrades that improved the reliability of the plant to minimize upsets that were occurring too frequently. Since these upgrades were installed and fine tuned in July 2014, plant operations have stabilized and become consistent. Only one hour of monitored SO<sub>2</sub> concentrations has exceeded the 75 ppb design value in last year (see attached data). This occurred on February 25, 2015 and was attributed to an abnormal startup of the plant. As shown on the attached graph, the SO<sub>2</sub> emissions from the plant have been decreasing since 2005.

Attached is a dispersion modeling analysis prepared for Hess by Bison Engineering that uses current emissions rates (starting with September 2014) and three years of meteorological data. The results indicate the plant will comply with the NAAQS (maximum design concentration of 50 ppb or 131  $\mu\text{g}/\text{m}^3$ ). Although the Department has not reviewed the modeling in depth, it will do so and provide any updates or additional information by December 1, 2015.

The Department believes the incidences of elevated  $\text{SO}_2$  concentrations at the plant have been resolved. Both the frequency and duration of plant upsets have been substantially reduced. Normal operations of the plant over many years have shown compliance with the ambient standards and actual emissions are decreasing. Because of the high 99<sup>th</sup> percentile values of the daily maximum 1-hour concentration in 2013 and 2014 ( 264 ppb and 180 ppb respectively) and the averaging of three years of monitoring data for determining compliance with the one-hour  $\text{SO}_2$  NAAQS, the 2015 and 2016 design values will likely be elevated. The Department proposes that the area be classified as “unclassifiable” until monitoring data are available for 2017. At that time, the Department will propose a reclassification (attainment or non-attainment) based on the design value for that year and other pertinent information.

## **Leland Olds Station Coal Creek Station Combined Analysis**

The Leland Olds Station is a lignite/subbituminous coal-fired steam electric generating plant located in southeast Mercer County approximately four miles southeast of Stanton, North Dakota. The plant consists of two units with a nameplate capacity of 222 MWe and 447 MWe. Sulfur dioxide emissions are controlled by two new wet scrubbers. The Unit 2 scrubber was placed into service in October 2012 and the Unit 1 scrubber in June 2013. The plant has a BART SO<sub>2</sub> limit of 0.15 lb/10<sup>6</sup> Btu (effectively 393 lb/hr and 770 lb/hr for Units 1 and 2 respectively) or 95% reduction which was effective in the Leland Olds Title V Permit to Operate on January 1, 2014. The units vent emissions through separate flues in a common stack that is 600 feet high. The plant is operated by Basin Electric Power Coop.

The Coal Creek Station is a lignite-fired steam electric generating plant located approximately six miles southwest of Underwood, ND in McLean County. The plant consists of two units each with nameplate rating of 605 MWe. Sulfur dioxide emissions are controlled by a wet scrubber on each unit. Each unit vents through a separate stack that is approximately 683 feet high. The plant is operated by Great River Energy.

Attached is dispersion modeling analysis report prepared for Basin Electric and Great River Energy by AECOM Environmental. The analysis was conducted using the AERMOD modeling system, version 15181. Emissions data for the Leland Olds Station used the BART allowable emission rate for the 2012-2014 period. 2012–2014 SO<sub>2</sub> CEM data was used for the Coal Creek Station. The report includes the results from two separate dispersion modeling analyses. The first analysis utilized the EPA regulatory default options. The results indicate a maximum predicted design concentration of 163.8 µg/m<sup>3</sup>. The second analysis utilized the AERMET ADJ\_U\* and the AERMOD LOWWIND3 options. The results of that analysis indicate a maximum design concentration of 117.2 µg/m<sup>3</sup>. The Department has not reviewed the analyses. The Department will review the analyses and submit any additional or updated information by December 1, 2015.

Based on the results of the attached dispersion modeling analyses, it recommended that the area around the Leland Olds Station and Coal Creek Station be designated “attainment”.

## Coyote Station

The Coyote Station is a lignite-fired steam electric generating unit located approximately 3 miles southwest of the City of Beulah in Mercer County. The plant consists of a single unit and has a nameplate rating 450 MWe. Sulfur dioxide emissions are controlled by a spray dryer/baghouse system and emissions vent from a stack that is 498 feet tall. The plant is operated by Otter Tail Power Co.

Attached is dispersion modeling analysis report prepared for Otter Tail by AECOM Environment. The analysis was conducted using the AERMOD modeling system, version 15181, and continuous emissions monitor data for 2012-2014. The report includes results for two different methods of conducting the analysis. The first method uses the EPA regulatory defaults for all options. The results of this analysis predict a maximum design concentration of 115.9  $\mu\text{g}/\text{m}^3$ . The second analysis utilized the AERMET ADJ\_U\* and the AERMOD LOWWIND3 options. The results of the second analysis are similar to the results of the regulatory default analysis with a design concentration of 106.1  $\mu\text{g}/\text{m}^3$ . Because of the short time available to make an updated classification recommendation, the Department has not reviewed the analyses. The Department will review the analyses and submit any additional or updated information by December 1, 2015.

There are five sulfur dioxide ambient air quality monitoring sites located within approximately 20 kilometers of the Coyote Station. The attached monitoring results from these sites for 2012-2014 indicate design values for 1-hour  $\text{SO}_2$  concentrations well below the NAAQS. The maximum design value of any of these monitors is 47 ppb or 63% of the NAAQS in 2012. However, data for 2013 and 2014 show declining concentrations with a maximum design value in 2014 of 34 ppb or 45% of the NAAQS.

Based on the results of Otter Tail's dispersion modeling analyses for the Coyote Station and the nearby ambient monitoring data, it is recommended that the area around the station be designated "attainment" for the 1-hour  $\text{SO}_2$  NAAQS.

**Ambient Monitoring Data**  
**1-Hr. SO<sub>2</sub>**  
**Vicinity of Coyote Station**

YEAR	<u>Beulah</u>		<u>DGC 12</u>		<u>DGC 14</u>		<u>DGC 16</u>		<u>DGC 17</u>	
	Annual 99 <sup>th</sup> pctl. (ppb)	3-yr. Avg. 99 <sup>th</sup> pctl. (ppb)	Annual 99 <sup>th</sup> pctl. (ppb)	3-yr. Avg. 99 <sup>th</sup> pctl. (ppb)	Annual 99 <sup>th</sup> pctl. (ppb)	3-yr. Avg. 99 <sup>th</sup> pctl. (ppb)	Annual 99 <sup>th</sup> pctl. (ppb)	3-yr. Avg. 99 <sup>th</sup> pctl. (ppb)	Annual 99 <sup>th</sup> pctl. (ppb)	3-yr. Avg. 99 <sup>th</sup> pctl. (ppb)
2006	26		28		26		39		36	
2007	40		37		36		30		38	
2008	31	32	29	31	26	29	29	33	43	39
2009	26	32	38	35	27	30	23	27	28	36
2010	52	36	46	38	54	36	44	32	37	36
2011	23	34	31	38	32	38	38	35	31	32
2012	28	34	37	38	27	38	58	47	41	36
2013	18	23	17	28	22	27	22	39	19	30
2014	23	23	33	29	26	25	21	34	19	26



## Monitor Values Report

**Geographic Area:** Mercer County, ND

**Pollutant:** SO2

**Year:** 2014

**Exceptional Events:** Included (if any)

Obs 1hr	First Max 1hr	Second Max 1hr	99th Percentile	Obs 24hr	First Max 24hr	Second Max 24hr	Days >STD	Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8632	47	39	23	362	6	4	0	1.07	None	1	380570004	6024 Highway 200	Not in a City	Mercer	ND	08
8609	58	43	33	360	7	5	0	1.15	None	1	380570102	Dgc #12	Not in a city	Mercer	ND	08
8700	46	30	26	365	7	6	0	0.94	None	1	380570118	Dgc #14	Not in a city	Mercer	ND	08
8700	39	25	21	365	5	5	0	1.11	None	1	380570123	Dgc #16	Not in a city	Mercer	ND	08
8702	36	33	19	365	4	4	0	0.87	None	1	380570124	Dgc #17	Not in a city	Mercer	ND	08

For detailed information about this report, including column descriptions, at [http://www.epa.gov/airquality/airdata/ad\\_about\\_reports.html#mon](http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon)

Air quality reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. [http://www.epa.gov/airquality/airdata/ad\\_contacts.html](http://www.epa.gov/airquality/airdata/ad_contacts.html)

Users are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>

Generated: September 2, 2015

## Monitor Values Report

**Geographic Area:** Mercer County, ND

**Pollutant:** SO2

**Year:** 2013

**Exceptional Events:** Included (if any)

Obs 1hr	First Max 1hr	Second Max 1hr	99th Percentile	Obs 24hr	First Max 24hr	Second Max 24hr	Days >STD	Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8664	29	26	18	365	3	3	0	0.56	None	1	380570004	6024 Highway 200	Not in a City	Mercer	ND	08
8702	21	19	17	365	4	4	0	0.83	None	1	380570102	Dgc #12	Not in a city	Mercer	ND	08
8675	26	23	22	362	5	4	0	0.83	None	1	380570118	Dgc #14	Not in a city	Mercer	ND	08
8647	33	32	22	362	11	7	0	0.79	None	1	380570123	Dgc #16	Not in a city	Mercer	ND	08
6483	28	22	19	271	4	3	0	0.42	None	1	380570124	Dgc #17	Not in a city	Mercer	ND	08

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Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>

Generated: September 2, 2015

## Monitor Values Report

**Geographic Area:** Mercer County, ND

**Pollutant:** SO2

**Year:** 2012

**Exceptional Events:** Included (if any)

Obs. 1hr	First Max 1hr	Second Max 1hr	99th Percentile	Obs. 24hr	First Max 24hr	Second Max 24hr	Days >STD	Annual Mean	Exc. Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8279	62	35	28	347	7	5	0	1	None	1	380570004	6024 Highway 200	Not in a City	Mercer	ND	08
8690	43	42	37	363	9	7	0	0.92	None	1	380570102	Dgc #12	Not in a city	Mercer	ND	08
8729	39	35	27	366	10	6	0	0.67	None	1	380570118	Dgc #14	Not in a city	Mercer	ND	08
8737	72	67	58	366	10	9	0	1.27	None	1	380570123	Dgc #16	Not in a city	Mercer	ND	08
8710	72	61	41	364	19	11	0	1.24	None	1	380570124	Dgc #17	Not in a city	Mercer	ND	08

Detailed information about this report, including column descriptions, at [http://www.epa.gov/airquality/airdata/ad\\_about\\_reports.html#mon](http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon)

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Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>

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