Regulatory Impact Analysis for SO_2 Rule Revision

Rule Citation Number	15A NCAC 02D .0516
Rule Topic:	SO_2 Rule Revision
DEQ Division:	Division of Air Quality
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Impact Summary:	State government: Yes Local government: No Substantial impact: No Private Sector: Yes
Authority:	G.S. 143-215.3(a)(1); 143-215.107(a)(5)
Necessity:	To amend the rule to prohibit the use of excess supplemental fuel to achieve compliance with the SO_2 limit.

I. Executive Summary

The purpose of this document is to provide an analysis detailing the impacts associated with the proposed amendment to 15A NCAC 02D .0516, *Sulfur Dioxide Emissions from Combustion Sources*. This amendment is in response to a declaratory ruling by the Environmental Management Commission (EMC) on November 18, 2021. In that ruling, the EMC concluded that the plain language of the Rule does not prohibit the use of supplemental fuels to increase the heating value of flared waste gas to achieve compliance with the sulfur dioxide (SO_2) standard in the rule.

II. Background

The Clean Air Act required the EPA to set national ambient air quality standards (NAAQS) for sulfur dioxide and five other pollutants considered harmful to public health and the environment. North Carolina adopted these ambient standards on February 1, 1976, in 15A NCAC 02D .0400, *Ambient Air Quality Standards*. In addition, the State adopted on this date emission control standards for these pollutants, including an SO_2 emission standard in 15A NCAC 02D .0516. The original SO_2 emission standard required new sources constructed after July 1, 1971, to limit SO_2 emissions to less than or equal to 1.6 pounds per million British thermal units (lb/MMBtu), and existing sources to limit SO_2 emissions to less than or equal to 2.3 lb/MMBtu. On April 1, 1977, the Rule was amended to the current standard of 2.3 lb/MMBtu for both new and existing sources. This standard was determined to be adequate to attain and maintain the Federal ambient air quality standards. Since then, the Rule has been amended six times to add or remove rule references or to provide clarity to the rule language and readopted once.

On November 18, 2021, a request for a declaratory ruling pursuant to NCGS § 150B-4 came before the EMC. The petition sought a ruling as to the interpretation of 15A NCAC 02D .0516 as it relates to the use of supplemental fuel. The petitioner argued that the Rule on its face does not prohibit the use of supplemental fuels, including natural gas to meet the 2.3 lb/MMBtu limit. The North Carolina Division of Air Quality (DAQ) asserted that authorization can be obtained "to combust supplemental fuels, including natural gas, to enhance combustion (or "oxidation") as needed for proper operation of its flare. What the petitioner may not do, however, is burn additional natural gas for no legitimate business or pollution control purpose but solely to appear in compliance with 02D .0516." The Commission concluded that the plain language of the Rule does not prohibit the use of supplemental fuels, including natural gas purchased from a utility, to increase the heating value of flared waste biogas to enhance oxidation and to endeavor compliance with 2D .0516.

III. Reason for Rule Change

The revisions proposed in this rulemaking are primarily to provide clarity and consistency with the DAQ's position that the use of supplemental fuel beyond what is needed for proper operation of the control device is not a means for compliance with 15A NCAC 02D .0516.

IV. Proposed Rule

The DAQ is proposing amendment to the following rule:

15A NCAC 02D .0516, Sulfur Dioxide Emissions from Combustion Sources, is proposed for amendment to clarify the use of supplemental fuel beyond what is needed for proper operation of the control device is prohibited.

V. Estimating the Fiscal Impacts

The sections below provide a summary of the costs associated with complying with the revised language in the rule.

<u>Private Sector</u>

Emissions of SO_2 are generated as a result of combusting a fuel or waste that contains sulfur. Sources complying with the SO_2 standard in 15A NCAC 02D .0516 may need to use sulfur or hydrogen sulfide removal technologies to reduce the amount of sulfur that is being combusted. These sources may also use scrubbers to remove SO_2 from the combustion exhaust gas if the combustion emission rate exceeds the

2.3 lb/MMBtu standard. Emissions of SO_2 may also result as a byproduct from a combustion control device used for controlling volatile organic compounds (VOC) or hazardous air pollutants emissions (HAP).

One facility in North Carolina, Optima TH, LLC, receives biogas produced by Smithfield Meats' wastewater treatment plant, which includes existing anaerobic digesters and associated biogas collection system. The facility processes the biogas, removes the impurities, and separates and sells methane as a renewable natural gas to Duke Energy by transporting it via the Piedmont Natural Gas Company's pipeline. The impurities or tail gas from the separation process is combusted in a flare. The tail gas is primarily composed of carbon dioxide, but also includes hydrogen sulfide. Hydrogen sulfide is generated from the wastewater treatment plant and is a flammable, colorless gas that smells like rotten eggs. This chemical is regulated by the State as a chronic (e.g., 24-hour averaging time) toxic air pollutant pursuant to 15A NCAC 02D .1104 with an acceptable ambient level of 0.12 milligrams per cubic meter (mg/m^3).

Based on the permit review for the facility, an estimated 325 standard cubic feet per minute (scfm) of waste gas is treated by the flare. The review for the permit application estimated that the corresponding emission rate would be 2.2 lb/MMBtu. Because the estimated emission rate was close to the emission standard of 2.3 lb/MMBtu, the DAQ requested monitoring of the SO_2 emissions from the flare to assure compliance. In reports submitted to the DAQ, the SO_2 was found to have exceeded the 2.3 lb/MMBtu emission standard in 15A NCAC 02D .0516. Rather than adding a control device to remove the sulfur from the tail gas, the facility added excess natural gas to the tail gas prior to the flare to increase the heat input of the tail gas beyond what was need for combustion in the flare. While this approach allows the facility to meet the 2.3 lb/MMBtu standard, it also unnecessarily increases emissions of carbon dioxide, nitrogen oxides, and other pollutants from the flare due to the combustion of excess natural gas. This approach is also a deviation from the DAQ's position that the use of supplemental fuel beyond what is needed for proper operation of the control device is not a means for compliance with 15A NCAC 02D .0516.

The facility uses a non-assisted flare which needs a gas with a heating value of at least 200 British thermal units per standard cubic feet (Btu/scf) to support 98 percent destruction of the waste gas. The tail gas from the separation process was estimated to have a heating value of 204 Btu/scf, however some supplemental natural gas is needed to ensure there is enough heat content in the tail gas for combustion in the flare. This approach results in the exceedance of the 2.3 lb/MMBtu standard, therefore, to address this issue, other approaches were evaluated.

A study was done on hydrogen sulfide scrubbing systems for anaerobic digesters[1]. In this study they evaluated two hydrogen sulfide scrubbing systems: biological desulfurization, which uses bacteria to oxidize hydrogen sulfide to elemental sulfur and sulfides; and an iron sponge which iron oxides to capture sulfur as iron sulfide. Another study[2] looked at other methods including in-situ hydrogen sulfide

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[1] Evaluation of Hydrogen Sulfide Scrubbing Systems for Anaerobic Digestors on Two Dairy Farms, Abhinav Choudhury et al, MDPI, December 4, 2019. Energies | Free Full-Text | Evaluation of Hydrogen Sulfide Scrubbing Systems for Anaerobic Digesters on Two U.S. Dairy Farms (mdpi.com)

[2] Hydrogen Sulfide Removal from Biogas, Cornell University, Dairy Environmental Systems Program, September 2016. Part-1-H2S-Available-technologies.pdf (sare.org)

precipitation in which iron salts are added to the digester to react with hydrogen sulfide to form iron sulfide; and hydrogen sulfide adsorption which uses chemical reagents to adsorb the hydrogen sulfide. In addition, several companies offer adsorbent treatment options for removing hydrogen sulfide from biogas. The studies noted that the biological desulfurization unit costs ranged from $185,000 to $342,000 depending on the type of media used in the process, whereas the iron sponge technology unit cost less than $1,000. For the purpose of this analysis, the iron sponge adsorption method was selected to estimate the cost for removing hydrogen sulfide from biogas. This option was selected because it is the most likely option when considering efficacy and cost and has been demonstrated to be effective at removing sulfur from biogas at a similar facility in North Carolina, Align RNG.

The permit review of current operations estimated the hydrogen sulfide-controlled emissions to be 9.96 pounds per day after the flare. Assuming the flare has a 98 percent control efficiency, the uncontrolled hydrogen sulfide emissions would be 498 pounds per day (lb/day). Assuming that all the hydrogen sulfide that is combusted in the flare converts to SO_2, the SO_2 emission rate from the flare is 918.7 lb/day or 38.3 pounds per hour (lb/hr). The heat input to the flare from the permit review was estimated to be 17.73 million British thermal units per hour (MMBtu/hr), thus the calculated SO_2 emissions from the flare would be 2.2 lb/MMBtu.

Any increase in the sulfur content of the tail gas results in the SO_2 emission rate exceeding the 2.3 lb/MMBtu emission limit in 15A NCAC 02D .0516. To address this issue, different hydrogen sulfide reductions were calculated using an iron sponge. The iron sponge vessel was estimated to cost $896 dollars using capital cost information from the evaluation study[3] ($525), 30 percent installation cost from the EPA Control Cost Manual, and escalating to January 2022 dollars using the Chemical Engineering Control Cost Manual.

The cost of the ferric oxide (Fe_2O_3) media to capture the hydrogen sulfide was calculated using cost information from the Cornell study[4]. They estimated a cost of $12 per bushel for the Fe_2O_3 media, 15 pounds of Fe_2O_3 per bushel, and the ratio of one pound of Fe_2O_3 reacting with 0.56 pounds of hydrogen sulfide. This data, along with the Chemical Engineering Plant Cost Index was used to calculate the annual cost of reducing hydrogen sulfide in the tail gas. In addition, labor costs for operation and maintenance were included. The labor hours were assumed to be 4 hours per day for operation and maintenance of the iron sponge at a rate of $31.53 per hour[5]. The Fe_2O_3 media can be regenerated through aeration and used again in the adsorption process. A summary of different reduction percentages is provided in Table 1.

[3] See Footnote 1.
[4] See Footnote 2.
[5] May 2021 State Occupational Employment and Wage Estimates, North Carolina, U.S. Bureau of Labor Statistics. https://www.bls.gov/oes/current/oes_nc.htm

Table 1. Summary of Iron Sponge Control Costs and SO_2 Emission Rate

Hydrogen Sulfide Reduction Percent	Daily Cost of Fe_2O_3 Media ($/day)	Total Annual Control Cost ($/yr)	SO_2 Emission Rate from Flare (lb/MMBtu)	Additional SO_2 Reduction (Ton/yr)
5%	$50	$64,282	2.1	5.1
10%	$100	$82,530	2.0	13.7
25%	$250	$137,273	1.7	39.3
50%	$500	$228,519	1.1	82.1

As stated previously in this analysis, increases in sulfur content in the tail gas has created exceedances of the 2.3 lb/MMBtu emission limit from the flare. Reducing the sulfur content in the tail will eliminate this issue. Currently the facility is designed to emit 2.2 lb/MMBtu from the flare, but that does not provide any margin of compliance if there are fluctuations in the sulfur content of the tail gas. By removing some of the sulfur in the tail gas prior to being combusted in the flare, the facility can have assurance that their operations will meet the 2.3 lb/MMBtu emissions limit. As shown in Table 1, even reductions of sulfur of 10 percent can provide a better margin of compliance and can provide assurance that the facility is meeting the SO_2 emission limit. For the purposes of this analysis, it will be assumed that the facility will select the least expensive option of 5 percent reduction of hydrogen sulfide at an initial cost of $65,178 and an ongoing annual cost of $64,282.

In addition to the control device costs, the facility would also be required to do a Title V significant modification at a cost of $7,210. Note that the Title V significant modification fee is based on the current year cost. This fee will be adjusted for inflation for calendar year 2023 as specified in 15A NCAC 02Q .0204, but that adjustment is not known as this time.

Adding an iron sponge control system to the tail gas system prior to being sent to the flare would also reduce the amount of natural gas that is currently being used to increase the heating value of the waste gas for compliance with the 2.3 lb/MMBtu standard. The permit review data estimated the natural gas to the flare to be 0.65 scfm to ensure 98 percent combustion in the flare, and the corresponding SO_2 emission rate to be 2.2 lb/MMBtu. The actual natural gas usage that was reported to the DAQ ranged from a maximum of 3.61 scfm to a minimum of 0.31 scfm with an average of 2.94 scfm. At the average natural gas flow rate, this is roughly 4.5 times higher than the permitted rate or an average of 2.29 scfm excess natural gas that is burned in the flare. This calculates to an annual excess natural gas usage of 1,134,374 standard cubic feet or 1,180 million British thermal units beyond what is needed for combustion in the flare if an iron sponge control system was installed.

Emissions from the burning of this excess natural gas was estimated using the EPA AP-42: Compilation of Air Emissions Factors[6]. The emission factors for Industrial Flares (Chapter 13.5) and Natural Gas Combustion (Chapter 1.4) were used to estimate that annual emission from burning excess natural gas in the flare. A summary of the emissions is provided in Table 2.

Table 2. Emissions from Burning Excess Natural Gas to Achieve 2.1 lb/MMBtu SO_2 Emission Level

Pollutant	Annual Emission Rate (Tons/yr)	AP-42 Emission Factor Source
CO	0.18	Industrial Flares
NOx	0.040	Industrial Flares
VOC	0.39	Industrial Flares
CO_2	68	Natural Gas Combustion
PM	0.0043	Natural Gas Combustion

As shown in Table 2, emissions of criteria pollutants can be avoided by not allowing the use of excess natural gas beyond what is needed for proper operation of the combustion control device.

State Government Impacts

The DAQ anticipates minimal impact on state government as a result of this proposed rule. The proposed rule will not have any impact on any of the facilities except for the one discussed in the previous section. This facility will require a permit modification to include the control device that the facility selects. This is estimated to take 8 hours for a Permit Engineer to write and 4 hours for a Permit Supervisor to review at a cost of $1,360. A summary of the hours and costs are provided in Table 3.

Table 3. State Government Costs

State Government Costs	Permit Review Hours	Total Compensation ($/hr)*	Total DAQ Cost
Engineer II	16	47	$752
Supervisor	8	76	$608
Total	24	---	$1,360

* To estimate total compensation, the contributing reference rate from the career banding rates for 2018-2019 were used to calculate the annual salary for an Engineer II (16104 Engineer - $63,414) and Supervisor (16106 Engineering Manager - $101,747). See Career-Banding-Rates-2018-19.pdf (nc.gov). Total Compensation is estimated from https://oshr.nc.gov/state-employee-resources/classification-compensation/total-compensation-calculator assuming 10 years of service for the Engineer and 20 years of service for the Supervisor. An estimated 2080 works hours per years was used to calculate the hourly rate.

[6] EPA, AP-42: Compilation of Air Emission Factors. https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors

The DAQ will also receive a benefit of $7,210 as a result of the Title V Permit Fee modification that will occur as a result of installing the iron sponge control technology at the facility. This Title V fee is used to fund the Title V program at the DAQ and includes the expenses for writing and approving the Title V permit for the facility, inspections of the facility, preparation of reports to the EPA, and review of documents associated with compliance of the facility.

Local Community Costs

It is expected that there will be no costs to the local community as the result of the proposed rule.

VI. Public Health and Environmental Impact

The State adopted the SO_2 emission standard in 15A NCAC 02D .0516 to support the State in being in attainment with the NAAQS for SO_2. Emissions of SO_2 affects both human health and the environment. Short-term exposures to SO_2 can harm the human respiratory system and make breathing difficult. People with asthma, particularly children, are sensitive to these effects of SO_2. Emissions of SO_2 also lead to the formation of other sulfur oxides, which can react with other compounds in the atmosphere to form small particles. These particles contribute to particulate matter pollution. Small particles may penetrate deeply into the lungs and in sufficient quantity can contribute to health problems. At high concentrations, sulfur oxides can harm trees and plants by damaging foliage and decreasing growth and can contribute to acid rain which can harm sensitive ecosystems.

The primary public health benefit for this proposed Rule is generated from lower air pollutant emissions associated with maintaining attainment of the NAAQS for SO_2 and lower natural gas combustion. These emissions are is difficult to quantify precisely without conducting extensive modeling for the facility. However, there are other resources that look at the public health benefits from reducing precursor pollutants associated with PM2.5, such as SO_2. One approach for determining health benefits is to use the EPA's CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)[7]. This tool helps state and local governments explore how changes in air pollution emissions may affect human health at the county, state, regional, or national levels, and estimate the economic value of the health benefits associated with those changes. As noted by EPA, COBRA is a screening tool for comparing the relative impacts of emission reduction measures but should not be used to estimate the absolute impacts of specific control measures. Though simplified, the COBRA model provides useful approximations of the direction and magnitude of health effects from emission reductions.

Using the COBRA program, the estimated emission reductions were added to the input portion of the program. The emission reductions included 5.13 tons/yr of SO_2 from using the iron sponge, as well as the emission reductions of 0.0043 tons/yr (rounded to 0.01 tons/yr) for PM2.5, 0.04 tons/yr of nitrogen oxides (NOx), and 0.39 tons/yr of volatile organic compounds (VOC) from the reduction of natural gas used in the flare. The Other Industrial Processes category was used as the baseline for changes in emissions from Bladen County, where the facility is located.

[7] U.S. Environmental Protection Agency, CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA), https://www.epa.gov/cobra.

Air quality can impact health endpoints in multiple locations as air pollutants can travel great distances. While emissions cross county and state lines, the scope of this analysis is limited to North Carolina. The estimated range of health benefit results in 2021 dollars for North Carolina is $55,600 to $125,300 per year using a 3 percent discount rate and $49,600 to $111,700 per year using a 7 percent discount rate. These values were escalated from 2017 to 2021 dollars using implicit price deflators values for gross domestic product[8]. A table of the health benefits and the changes to various health outcomes is provided in Table 4.

Table 4. Summary of EPA's CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool for Proposed Rule in North Carolina

Annual Health Benefit	Change in Incidence		3% discount rate Monetary Value		7% discount rate Monetary Value	
	Low	High	Low	High	Low	High
Mortality	0.005	0.010	$49,694	$112,569	$44,262	$100,263
Nonfatal Heart Attacks	0.000	0.004	$72	$672	$68	$629
Infant Mortality	0.000	0.000	$362	$362	$362	$362
Hospital Admits, All Respiratory	0.001	0.001	$37	$37	$37	$37
Hospital Admits, Cardiovascular (except heart attacks)	0.001	0.001	$55	$55	$55	$55
Acute Bronchitis	0.005	0.005	$3	$3	$3	$3
Upper Respiratory Symptoms	0.099	0.099	$4	$4	$4	$4
Lower Respiratory Symptoms	0.070	0.070	$2	$2	$2	$2
Emergency Room Visits, Asthma	0.002	0.002	$1	$1	$1	$1
Asthma Exacerbation	0.104	0.104	$8	$8	$8	$8
Minor Restricted Activity Days	2.890	2.890	$253	$253	$253	$253
Work Loss Days	0.488	0.488	$98	$98	$98	$98
Total Health Benefits (2017$)			$50,590	$114,064	$45,153	$101,716
Total Health Benefits (2021$)*			**$55,578**	**$125,310**	**$49,605**	**$111,744**

* Values adjusted using the US Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts, Table 1.1.9 Implicit Price Deflators for Gross Domestic Product

The estimated COBRA health benefit results are based on SO_2, PM2.5, NOx, and VOC reductions that occur in North Carolina where the emission reductions are taking place. This program provides potential order-of-magnitude estimates associated with use of the iron sponge to control SO_2 emissions at the facility. Because of this, this program introduces errors in modeled PM 2.5 contributions from SO_2 emissions due to the very small change in emissions relative to the national/regional model. Without true modeling of the emission reductions from the facility, the COBRA values should be considered approximations of the health benefits from the proposed Rule.

[8] U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts, Table 1.1.9 Implicit Price Deflators for Gross Domestic Product. https://apps.bea.gov/iTable/iTable.cfm?reqid=19&step=3&isuri=1&1921=survey&1903=11#reqid=19&step=3&isuri=1&1921=survey&1903=11

In addition to the health benefits from SO2 and other PM2.5 precursor emission reductions, the proposed rule is expected to reduce carbon dioxide emissions by 68 tons per year. The avoided economic and public health damages from these emissions reductions are unquantified. Currently, the EPA's interim estimates of the cost per ton of carbon is set at $51 per ton in 2020 dollars at a 3% discount rate.[9] An interagency working group is developing updated estimates based on the latest empirical data and modeling. Litigation of the interim estimates is ongoing.[10]

VII. Cost and Benefit Analysis

The DAQ developed a cost and benefit analysis of the proposed amendment to 15A NCAC 02D .0516. The analysis is based on the compliance scenario that is most likely to be pursued by the affected facilities. This analysis uses the cost impacts developed in the previous sections for the private sector and state government and is provided in Table 5.

The fiscal analysis was performed over a 2-year period because all of state government costs occur in the first year and costs to the private sector are expected to remain constant after the second year of the fiscal analysis. These Year 2 costs will continue for the lifetime of the facility. The starting year for the costs is 2023 which would be the year that the proposed Rule would become effective.

Table 5. Total Impact Summary of Revisions to 15A NCAC 02D .0516

Cost/Benefits (2021 dollars)	***Initial Impacts Year 2023***	***Annual Impacts 2024+***
Private Sector Costs		
Iron Sponge Vessel	($896)	---
Cost of Media and Labor	($64,282)	($64,282)
Title V Significant Modification	($7,210)	---
Total Private Sector Costs	($72,388)	($64,282)
Private Sector Benefits		
Excess Natural Gas Savings	$6,239	$6,239
State Government Costs		
Permit Modification Review	($1,360)	---
State Government Benefits		
Title V Significant Permit Fee Benefit	$7,210	---
Net Impacts Before Health Benefits		
Private Sector/State Government (Costs-Benefits)	($60,299)	($58,043)
Net impacts in 2021 dollars @7% discount rate	**($52,667)**	**($47,380)**
Estimated Public Benefits (2021 dollars @ 7% discount rate)		
COBRA Estimate of Health Benefits for PM Precursors	**$49,600-$111,700**	**$49,600-$111,700**
Avoided damages from reduced CO2 emissions	Unquantified	Unquantified

[9] Ranging from $14 per ton at a 5% discount rate to $76 at a 2.5% discount rate.
Technical Support Document: Social Cost of Carbon, Methane, (whitehouse.gov)
[10] https://www.epa.gov/environmental-economics/scghg-tsd-peer-review

The DAQ then calculated the total financial impact for each year by adding the costs and subtracting savings or benefits. Over the first year, excluding health benefits, the proposed rule would cost the private sector and state government approximately $72,388, however there would a benefit of $12,089 for the private sector and state government. This provides a net impact of $52,667 in the first year in 2021 dollars. The costs for Year 2024 and subsequent years thereafter would be $64,282 with an associated annual benefit of $6,239. The health benefits of the proposed rule were estimated to be $49,600 to $111,700 per year in 2021 dollars at a 7% discount rate for North Carolina using the COBRA program. The avoided damages from reduced carbon dioxide emissions of 68 tons per year are unquantified.

VIII. Rule Alternatives

The DAQ is required to analyze alternative approaches under the proposed rulemaking if a substantial economic impact to the government and/or private sector entities is expected to result from the rulemaking. Substantial economic impact is defined in North Carolina's Administrative Procedures Act in NC General Statute 150B-21.4, Fiscal and Regulatory Impact Analysis on Rules as an aggregate financial impact on all persons affected of at least one million dollars in a 12-month period. Because the amendment to 15A NCAC 02D .0516 does not have a substantial economic impact, no rule alternatives were explored.

IX. Conclusion

The amendment to 15A NCAC 02D .0516 is intended to clarify the DAQ's position that the use of supplemental fuel beyond what is needed for proper operation of the control device is not a means for compliance with the 2.3 lb/MMBtu SO_2 emission standard. As noted in this analysis, this proposed amendment is only expected to affect one facility in North Carolina that is adding excess natural gas to their waste gas stream to meet the SO_2 emission standard in their flare. This analysis provides a control technology cost estimate that is currently being used by a similar biogas production facility in North Carolina.

The cost for operating an iron sponge sulfur adsorption unit that removes 5 percent of the sulfur from the waste gas stream was estimated to be $72,388 for the first year and $64,282 annually thereafter. This level of control should provide a compliance margin that addresses fluctuations in the sulfur content in the waste gas stream and will allow the facility to meet the 2.3 lb/MMBtu SO_2 standard from the flare. The facility will see an annual savings of $6,239 in natural gas usage as a result of using the iron sponge control technology. The facility will also have a cost of $7,210 for a Title V permit modification fee to add this technology to their permit.

The DAQ will spend approximately $1,360 in staff time the first year to complete a permit modification. The DAQ will also receive a payment of $7,210 that will be used to fund the Division's Title V program.

The public will see a health benefit ranging from $49,600 to $111,700 per year at a 7 percent discount rate. These benefits include the reductions in hospitalizations and the avoidance of premature deaths from PM2.5 exposure. The avoided damages from reduced carbon dioxide emissions of 68 tons per year are unquantified.

The DAQ expects the proposed rule change will ensure that North Carolina will continue to maintain compliance with the NAAQS for SO_2 for which it is in statewide compliance.

Attachment 1

Proposed Revisions to 15A NCAC 02D .0516

15A NCAC 02D .0516 is proposed for amendment as follows:

15A NCAC 02D .0516 SULFUR DIOXIDE EMISSIONS FROM COMBUSTION SOURCES

(a) ~~Emission~~ Emissions of sulfur dioxide from any source of ~~combustion~~ combustion, including air pollution control devices, discharged from any vent, stack, ~~or chimney~~ chimney, or flare shall not exceed 2.3 pounds of sulfur dioxide per million ~~BTU~~ Btu input.

(b) When determining compliance with this standard:

(1) ~~Sulfur~~the sulfur dioxide formed by the combustion of sulfur in fuels, wastes, ores, and other substances shall be ~~included when determining compliance with this standard.~~ included;

(2) ~~Sulfur~~the sulfur dioxide formed or reduced as a result of treating flue gases with sulfur trioxide or other materials shall also be accounted ~~for when determining compliance with this standard.~~ for in the determination of emissions; and

(3) the determination of Btu input shall not include any fraction of heat input associated with the combustion of fuels whose purpose is to increase heat input beyond what is needed for normal or permitted operation and solely in order to demonstrate compliance with this standard.

~~(b)~~(c) The standard set forth in Paragraph (a) of this Rule shall not apply to sulfur dioxide emission sources already subject to an emission standard for sulfur dioxide in 15A NCAC 02D .0524, .0527, .1110, .1111, .1206, or .1210.

History Note: *Authority G.S. 143-215.3(a)(1); 143-215.107(a)(5);*
Eff. February 1, 1976;
Amended Eff. July 1, 2007; April 1, 2003; July 1, 1996; February 1, 1995; October 1, 1989; January 1, 1985; April 1, 1977;
Readopted Eff. November 1, ~~2020.~~2020;
Amended Eff.