Ambient Air Quality Services, Inc.

June 14, 2016

Via Overnight FedEx

Bev McKeone P. E.
NSR Program Manager
601 57th St. SE
Charleston, WV 25304

RE: Axiall Corporation
45CSR13 Minor Source Class I Administrative Update Application
Brine H_2S Removal System

Dear Ms. McKeone:

Enclosed are one hard copy and two electronic copies (on CD discs) of the 45CSR13 Minor Source Class I Administrative Update Application for a new Brine H2S Removal System at the Axiall Corporation Natrium Plant in New Martinsville, WV.

Axiall currently is permitted to operate a gas separator and flare on the raw brine (sodium chloride solution) tank to flash the dissolved hydrogen sulfide (H2S) from the raw brine and then convert the H2S to sulfur dioxide in a flare. The emission unit information for the gas separator and flare are shown below:

Emission Unit ID	Emission Point ID	Emission Unit Description	Control Device	Emission Limit
SP007	E417	Gas Separator	FL003 Flare	11.65 lbs. SO2/hour

The Axiall Natrium Plant is proposing to install a new process to remove the dissolved hydrogen sulfide gas from its raw brine stream and absorb these hydrogen sulfide vapors in caustic to produce a sodium hydrosulfide solution to be beneficially used in the plant. The project would require installation of two packed columns; one to air strip the hydrogen sulfide from the brine solution (stripper) and the other to absorb the hydrogen sulfide from the vapor stream (scrubber). The new dual packed column scrubber would replace the gas separator and flare.

The new dual packed column scrubber replacing the gas separator and flare (FL003) would:

- Increase the removal of hydrogen sulfide from the brine
- Produce a material valuable to the plant (sodium hydrosulfide)
- Eliminate approximately 51 tons/year of SO2 emissions from the Natrium Plant (11.65 lbs/hr for 8,760 hr/yr)
- Not emit any regulated air pollutants

Please review the application and contact either Mr. Tom Horan, Axial Corporation at (304) 455-2200 x3310 or Louis Militana, Ambient Air Quality Services, Inc. (484) 224-6218 x101 with any questions.

Payment of the application fee will be made by Mr. Louis Militana of Ambient Air Quality Services, Inc. via credit card by calling (484) 224-06218 x101.

Very truly yours,
AAQS Inc.

Louis Militana
Partner/Principal Consultant

Cc: Tom Horan/Axiall
Roni Willams/Axiall

45CSR13 Minor Source Class I Administrative Update Application
Brine H_2S Removal System

Axiall Corporation
Natrium Plant
P.O. Box 191, New Martinsville, WV 26155

Prepared for Axiall Corporation

Prepared by

Ambient Air Quality Services, Inc.
107 Hidden Fox Drive
Lincoln University, PA 19352

JUNE 2016

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1. INTRODUCTION

1.1 PROJECT OVERVIEW

Axiall Corporation operates a chemical plant in New Martinsville, WV for the production of Chlorine, HCl, Cal-Hypo and Caustic. The plant is known as the Natrium plant and holds a Title V Operating Permit (Permit No. R30-05100002-2013) which was issued by West Virginia Department of Environmental Protection (WVDEP), Division of Air Quality on April 23, 2013. Axiall utilizes raw brine (sodium chloride solution) obtained from solution mining rock salt at the Natrium facility.

Axiall currently operates a gas separator and flare on the raw brine (sodium chloride solution) tank to flash the dissolved hydrogen sulfide (H_2S) from the raw brine and then convert the H_2S to sulfur dioxide in a flare.

Axiall is planning to replace the gas separator and flare with a new brine H_2S removal system which will consist of two stages to remove H_2S from the raw brine and convert it to sodium hydrosulfide. In the first stage a packed column is used to strip the H_2S from the raw brine and in the second stage a dual packed column scrubber system is used to convert the H_2S to sodium hydrosulfide. The dual packed column scrubber system would increase the removal efficiency of H_2S from the raw brine and eliminate the production of sulfur dioxide (SO_2) from the flare, thus eliminating an air pollutant emission source from the plant. The H_2S vapors would be absorbed in caustic to produce a sodium hydrosulfide solution to be beneficially used in the plant.

1.2 APPLICATION SUMMARY

The installation of the dual packed column scrubber on the raw brine tank will reduce emissions of a regulated pollutant (SO_2) and is considered a 45CSR13 Minor Source Class I Administrative Update since it satisfies the following requirement of 45CSR13 4.2.a.8

Change in a permit condition as necessary to allow changes in operating parameters, emission points, control equipment or any other aspect of a source which results in a ***decrease in the emission of any existing regulated air pollutant.***

1.3 CONTENT OF APPLICATION

This Minor Source Class I Administrative Update Application is organized in a report format and is comprised of the following sections and appendices:

Section 2 – Project Description - describes the design and proposed operation of the brine H_2S removal system

Section 3 – Emissions Inventory - presents a summary of the estimated maximum potential emission rates for all regulated pollutants from the brine H_2S removal system and the reduction in the SO_2 emission due to the removal of the gas separator and flare system.

Section 4 – Regulatory Review - provides an assessment of all state and federal applicable requirements; including, but not limited to, applicability of federal and state New Source Review (NSR) permitting requirements

2. PROJECT DESCRIPTION

The Axiall Natrium Plant is proposing to install a new process to remove the dissolved hydrogen sulfide gas from its raw brine stream and absorb these hydrogen sulfide vapors in caustic to produce a sodium hydrosulfide solution to be used in the plant. The project would require installation of two packed columns; one to air strip the hydrogen sulfide from the brine solution (stripper) and the other to absorb the hydrogen sulfide from the vapor stream (scrubber).

2.1 CURRENT BRINE H2S REMOVAL SYSTEM

Raw brine (sodium chloride solution) is currently produced from several underground wells at the Natrium Plant. This brine has a known dissolved hydrogen sulfide content which varies depending on the well currently in operation and can be in the range of 100-200 ppm. The hydrogen sulfide gas contained in the brine is currently flashed in a gas separator (Emission Unit SP007, Gas Separator) and the raw brine continues to storage or for direct feed to the process. Combustion of the hydrogen sulfide produces SO_2 at the flare (Flare FL003), which is vented to atmosphere. The gas separator flare is currently permitted to emit no more than 11.65 lb/hr of SO_2 to the atmosphere. Table 2-1 summarizes the emission unit, point, description, capacity, pollution control device and SO_2 emission limit for the current and future emission sources of the Natrium Plant's Brine Department in the Title V Permit.

Depending on the well in operation and the brine flow rate, the amount of sulfur dioxide produced can come close to meeting the permit threshold, requiring operational adjustments and negatively affecting brine supply reliability to the plant. Therefore, Axiall is proposing to install a dual packed column scrubber to replace the gas separator flare (FL003) which would:

- Increase the removal of hydrogen sulfide from the brine
- Produce a material valuable to the plant (sodium hydrosulfide)
- Eliminate approximately 51 tons/year of SO_2 emissions from the Natrium Plant (11.65 lbs/hr for 8,760 hr/yr)

Table 2-1
Current and Future Brine Department Emissions Sources

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed/ Modified	Design Capacity	Control	SO_2 Emission Limit	Notes
Current Brine Department Emissions Sources							
SP007	E417	Gas Separator	1989	0.045 tph	FL003 Flare	11.65 lbs/hr	
V273	E418	Zero Discharge Collection Tank	1992	0.022 tph	FL002 Flare	4.5 lbs/hr or 766 lbs/yr	
Future Brine Department Emissions Sources							
~~SP007~~	~~E417~~	~~Gas Separator~~	~~1989~~	~~0.045 tph~~	~~FL003 Flare~~	~~11.65 lbs/hr~~	Removed once new brine H_2S removal system becomes fully commissioned.
V273	E418	Zero Discharge Collection Tank	1992	0.022 tph	FL002 Flare	4.5 lbs/hr or 766 lbs/yr	Zero Discharge Collection Tank Flare (FL002) will remain in place and only be used during depressurizing of the raw brine wells

2.2 PROPOSED BRINE H2S REMOVAL SYSTEM

The brine H_2S removal system is a two stage system to remove H_2S from the raw brine and convert it to sodium hydrosulfide. In the first stage, a packed column is used to air strip the H_2S from the raw brine and in the second stage the H_2S is converted to sodium hydrosulfide. Each of these stages is described in the following sections and a process flow diagram of the H_2S brine removal system is presented in Figure 2-1.

The current Gas Separator Flare (FL003) will be demolished after the new brine H_2S removal system is fully commissioned and proven operational (expected to be April/ May 2017) and the Zero Discharge Collection Tank Flare (FL002) will remain in place and only be used during depressurizing of the raw brine wells.

2.2.1 Brine H_2S Removal Stripper

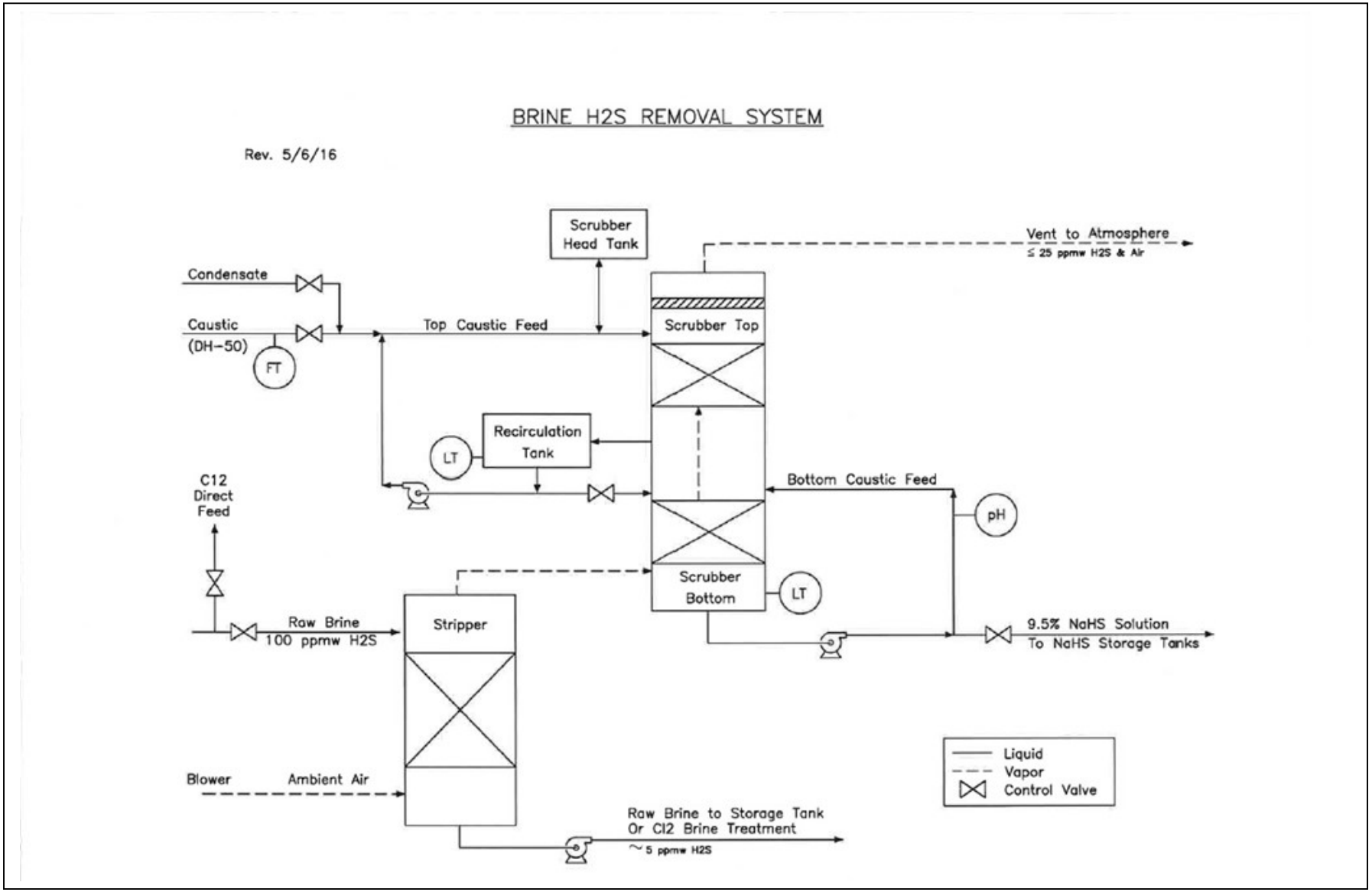
In the new process, a maximum of 1,600 gpm of raw brine would be directed to a packed column (stripper) where atmospheric air will be used to strip the hydrogen sulfide from the brine stream to the vapor stream. The brine out of this stripper would then be pumped either to storage or directly to the downstream process.

2.2.2 Brine H_2S Removal Scrubber

The vapor stream out of the top of the stripper, consisting mainly of air and hydrogen sulfide, would then be directed to a two-staged, packed absorber (scrubber). In the scrubber, a circulating solution of sodium hydroxide absorbs and reacts with hydrogen sulfide to produce sodium hydrosulfide solution, which is sent to one of the existing sodium hydrosulfide storage tanks.

The absorbent feed to the scrubber will be a variable flow of sodium hydroxide solution, based on the removal of H_2S and corresponding production of sodium hydrosulfide. This diluted sodium hydroxide is fed to the top stage of the scrubber, which acts as a polishing section for absorbing hydrogen sulfide in the vapor stream from bottom stage. Liquid out of the top stage of the scrubber is sent to a recirculation pump, which recirculates most of the solution back to the top of the section, with a side stream being sent to the bottom stage of the scrubber. The vapor stream out of this top stage is vented to atmosphere and contains no more than 0.31 lb/hr hydrogen sulfide, per Aspen simulation modeling.

Figure 2-1
Process Flow Diagram
Brine H_2S Scrubber System



In the bottom scrubber stage, most of the hydrogen sulfide from the vapor stream out of the stripper is absorbed and reacted to produce sodium hydrosulfide, and the vapor out of this stage is sent to the top stage. Liquid out of the bottom stage is sent to another recirculation pump, which recirculates most of the solution back to the bottom stage, while pumping a side stream to one of several existing sodium hydrosulfide storage tanks.

The pH of the liquid out of the bottom stage of the scrubber is measured and controlled at a minimum pH of 11 by manipulating the flow rate of diluted caustic to the top stage of the scrubber. Control of pH of this stream ensures that sufficient sodium hydroxide is being added to the column to react with varying levels of hydrogen sulfide stripped from the raw brine, therefore limiting the amount of hydrogen sulfide vented to atmosphere from the scrubber at the top of the stack to a maximum of 0.31 lb/hr (25 ppmw).

In the event that this system would be bypassed and raw brine production would still be required, the raw brine would bypass the scrubber system and be routed directly to the brine treatment process. Caustic streams (in the forms of sodium hydroxide and sodium carbonate solutions) are continuously mixed with this raw brine stream before entering the brine tanks. The caustic flows are adjusted to control the mixed brine stream to excess caustic. In the scrubber bypass scenario, dissolved hydrogen sulfide would react with the alkalinity and dissociate to sodium sulfide due to the excess caustic. In response to an increased hydrogen sulfide load, plant operators would increase caustic flow to maintain an excess. Flows of ash liquor (sodium carbonate) and cell liquor (sodium hydroxide) are continuously monitored and recorded in the plant's process control system. Operators normally perform analyses on the mixed brine stream to verify excess caustic is being maintained, and make adjustments to the cell liquor feed rates as necessary to maintain this excess.

3. EMISSION INVENTORY

Currently, emissions of SO_2 to the atmosphere from the Flare (FL002) on Zero Discharge Collection Tank (emission unit E418) shall not exceed 4.5 lbs/hr or 766 lbs/yr and emissions of SO_2 from the Flare (FL003) on the Gas Separator (emission unit E417) shall not exceed 11.65 lbs/hour averaged over a three hour period. All of the SO_2 emissions from the Gas Separator Flare (FL003) would be eliminated with the installation and operation of the new raw brine H_2S removal system. The SO_2 emission from the Zero Discharge Collection Tank Flare (FL002) will remain but only during depressurizing the brine wells.

The new scrubber system has the potential to emit, in a worst case scenario, 0.31 lb/hr, 2716 lb/yr or 1.36 tons/yr of H_2S and no SO_2 emission since there is neither combustion nor oxidation of the H_2S in the raw brine removal system.

4. REGULATORY REVIEW

This section describes the applicable State of West Virginia and Federal requirements for the brine H_2S removal system.

4.1 FEDERAL APPLICABLE REQUIREMENTS

None, there are no known federal requirements applicable to the new brine H_2S removal system. Hydrogen sulfide, which is the only pollutant emitted to the atmosphere is neither a criteria pollutant nor a hazardous air pollutant (HAP) and does not have either a West Virginia or federal ambient air quality standard.

4.2 STATE APPLICABLE REQUIREMENTS

The following State of West Virginia air quality regulations currently applicable to either the Discharge Collection Tank or Gas Separator Flares (FL002 and FL003) were evaluated to determine if they were applicable to the new raw brine H_2S removal system.

4.2.1 Particulate Matter

Emission of Visible Particulate Matter –No person shall cause, suffer, allow or permit emission of smoke into the atmosphere from any incinerator which is twenty (20%) percent opacity or greater. (Emission Units: FL003 – Flare on Gas Separator (SP007) and FL002 – Flare on Zero Discharge Collection Tank (V273)) [45CSR§6-4.3.]

This regulation would apply to the Discharge Collection Tank Flare (FL002) since that flare will remain in existence and only be used during depressurizing of the raw brine wells. This regulation does not apply to the new brine H_2S removal system since the system does not contain either an incinerator or any combustion device.

4.2.2 Visible Emissions

Emission of Visible Particulate Matter not apply to smoke which is less than forty (40%) percent opacity, for a period or periods aggregating no more than eight (8) minutes per start-up. (Emission Units: FL003 – Flare on Gas Separator (SP007) and FL002 – Flare on Zero Discharge Collection Tank (V273)) [45CSR§6-4.4.]

This regulation would apply to the Discharge Collection Tank Flare (FL002) since that flare will remain in existence and only be used during depressurizing of the raw brine wells. This regulation does not apply to the new brine H_2S removal system since the system does not contain either an incinerator or any combustion device.

4.2.3 Stack Height

All exhaust gases from Process #017, Raw Brine Flare (FL003) on process vent E417, shall be exhausted from a stack having a height of forty (40) meters above grade. Any modifications to the stacks in existence on the date of entry (July 29, 2003) of Consent Order CO-SIP-C-2003-27 or replacement of those stacks shall comply with the provisions of 45CSR20 "Good Engineering Practice as Applicable to Stack Heights." [CO-SIP-C-2003-27, IV.4.]

This regulation does not apply to the new brine H_2S removal system since Process #017, Raw Brine Flare (FL003) on process vent E417 is being removed with the installation of the new brine H_2S removal system.

4.2.4 Opacity Monitoring

For the purpose of determining compliance with the opacity limits set fort for flares FL003 and FL002, the permittee shall conduct opacity monitoring and recordkeeping for all emission points and equipment in service that are subject to the opacity limit under 45CSR6.

This regulation would apply to the Discharge Collection Tank Flare (FL002) since that flare will remain in existence and only be used during depressurizing of the raw brine wells. This regulation does not apply to the new brine H_2S removal system since the system does not contain either an incinerator or any combustion device.

4.2.5 Testing

Tests to determine the concentration of H_2S in the gas streams to the flare (FL002) on process vent E418 and the flow rate of those streams shall be conducted at least once per year with the concentration of H_2S reported in units of grains per hundred standard cubic feet of gas. These tests shall be conducted for the following conditions: backwash only, depressurization only, and the combination of backwash and depressurization. A copy of the report for the tests shall be submitted to the Director of Air Quality within thirty (30) days of the end of each calendar year. [45CSR13, R13-1527, B.]

This regulation would only apply when Gas Collection Tank Flare (FL002) is used during depressurizing of the raw brine wells. This regulation does not apply to the new brine H_2S removal system since the system does not contain either an incinerator or any combustion device.

4.2.6 Recordkeeping

The permittee shall maintain records of all monitoring data required by this permit, documenting the date and time of each visible emissions check, the emission point or equipment identification number, the name or means of identification of the responsible observer, the results of the check, and if necessary, all corrective actions taken. Should a visible emissions observation be required to be performed per the requirements specified in 40 C.F.R. 60 Appendix A, Method 9, then data records of each observation shall be maintained per the requirements of that

method. For an emission unit out of service during the normal monthly evaluation, the record of observation may note "out of service" (OOS) or equivalent. These records shall be maintained on site for a period of five years in accordance with 3.4.2. and shall be made available to the Director or his authorized representative upon request. [45CSR§30-5.1.c]

This regulation would only apply when Gas Collection Tank Flare (FL002) is used during depressurizing of the raw brine wells. This regulation does not apply to the new brine H_2S removal system since the system does not contain either an incinerator or any combustion device.

4.2.7 Reporting

After completing the annual tests to determine the concentration of H_2S in the gas streams to the flare (FL002) on process vent E418, the Company shall calculate SO_2 emissions assuming 100% conversion of H_2S to SO_2 in the flare. The SO_2 yearly emissions (lb/yr) shall be calculated for each of the operating scenarios: backwash only, depressurization only, and the combination of backwash and depressurization. In addition, the maximum highest SO_2 hourly emission rate (lb/hr) shall be reported. This data shall be included in the test report, which is submitted to the Director of Air Quality within thirty (30) days of the end of each calendar year. [45CSR§30-5.1.c.]

This regulation would only apply when Gas Collection Tank Flare (FL002) is used during depressurizing of the raw brine wells. This regulation does not apply to the new brine H_2S removal system since the system does not contain either an incinerator or any combustion device.

APPENDIX A
WVDEP NSR/TITLE V PERMIT REVISION APPLICATION FORM

WEST VIRGINIA DEPARTMENT OF
ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

601 57th Street, SE
Charleston, WV 25304
(304) 926-0475
www.dep.wv.gov/daq

APPLICATION FOR NSR PERMIT AND TITLE V PERMIT REVISION (OPTIONAL)

PLEASE CHECK ALL THAT APPLY TO **NSR (45CSR13)** (IF KNOWN):

☒ **CONSTRUCTION** ☐ **MODIFICATION** ☐ **RELOCATION**
☒ **CLASS I ADMINISTRATIVE UPDATE** ☐ **TEMPORARY**
☐ **CLASS II ADMINISTRATIVE UPDATE** ☐ **AFTER-THE-FACT**

PLEASE CHECK TYPE OF **45CSR30 (TITLE V)** REVISION (IF ANY):

☐ **ADMINISTRATIVE AMENDMENT** ☐ **MINOR MODIFICATION**
☐ **SIGNIFICANT MODIFICATION**

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS **ATTACHMENT S** TO THIS APPLICATION

FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

1. Name of applicant *(as registered with the WV Secretary of State's Office):*
Axiall Corporation

2. Federal Employer ID No. ***(FEIN):***
25-0730780

3. Name of facility *(if different from above):*
Natrium Plant

4. The applicant is the:
☒ **OWNER** ☐ **OPERATOR** ☐ **BOTH**

5A. Applicant's mailing address:
Axiall Corporation
P.O. 191, New Martinsville, WV 26155

5B. Facility's present physical address:
15696 Energy Road
Proctor, WV 26055

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☒ **YES** ☐ **NO**
- If **YES,** provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**
- If **NO,** provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

7. If applicant is a subsidiary corporation, please provide the name of parent corporation:

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site?* ☒ **YES** ☐ **NO**
- If **YES,** please explain: Applicant currently owns the Natrium Plant site
- If **NO,** you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be **constructed, modified, relocated, administratively updated** or **temporarily permitted** (e.g., coal preparation plant, primary crusher, etc.): Chemicals and Allied Products Plant

10. North American Industry Classification System **(NAICS)** code for the facility:
325180

11A. DAQ Plant ID No. (for existing facilities only):
051-00002

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):

Permit Number	Date of Issuance
R13-1664	12/20/1993
R13-1527	12/15/1992
R13-1637A	11/17/2004
R13-2046F	3/12/2013
R13-2886	10/28/2011
R14-027B	4/23/2008
R30-05100002-2013	5/7/2013

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits,** please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B**.

From the intersection of State Routes 2 and 7 proceed north approximately 10 miles.

12.B. New site address (if applicable):	12C. Nearest city or town:	12D. County:
	New Martinsville	Marshall
12.E. UTM Northing (KM): 4,399.60	12F. UTM Easting (KM): 512.70	12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:

Axiall is planning to replace the gas separator (Emission Unit SP007, Gas Separator) and raw brine flare (FL003) with a new brine H_2S removal system which will consist of two stages to remove H_2S from the raw brine and convert it to sodium hydrosulfide. In the first stage a packed column is used to strip the H_2S from the raw brine and in the second stage a dual packed column scrubber system is used to convert the H_2S to sodium hydrosulfide. The dual packed column scrubber system would increase the removal efficiency of H_2S from the raw brine and eliminate the production of sulfur dioxide (SO_2) from the flare, thus eliminating an air pollutant emission source from the plant. The H_2S vapors would be absorbed in caustic to produce a sodium hydrosulfide solution to be beneficially used in the plant.

Also, see the project description in Section 2.0 of the 45CSR13 Minor Source Class I Administrative Update Application Document for further details and description of the planned changes.

14A. Provide the date of anticipated installation or change: 09/15/2016 – If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: / /	14B. Date of anticipated Start-Up if a permit is granted: 12/30/2016

14C. Provide a **Schedule** of the planned **Installation** of/**Change** to and **Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved).

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:

Hours Per Day 24 Days Per Week 7 Weeks Per Year 52

16. Is demolition or physical renovation at an existing facility involved? ☒ **YES** ☐ **NO**

Removal of existing gas separator flare (FL003) once the new scrubber is operational.

17. **Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

The facility will not become subject to 112(R) due to the propose changes.

18. **Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process *(if known)*. A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance *(if known)*. Provide this information as **Attachment D.**

None, H_2S is the only pollutant that will be emitted to the atmosphere from the H_2S scrubber. Since H_2S is not a regulated pollutant there are no Federal or State air pollution regulations that are applicable to the scrubber.

Also, see the regulatory review discussion in Section 4.0 of the 45CSR13 Minor Source Class I Administrative Update Application Document for further details and description of the applicable regulations.

Section II. Additional attachments and supporting documents.

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

A credit card will be used to pay for the 45CSR13 Minor Source General Permit (Class I) Application fee.

20. Include a **Table of Contents** as the first page of your application package.

A Table of Content is in the 45CSR13 Minor Source General Permit (Class I) Application Document.

21. Provide a **Plot Plan,** e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to ***Plot Plan Guidance***) .

– Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

A plot plan is provided in Attachment E of this application

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F.**

See Figure 2-1 of the 45CSR13 Minor Source General Permit (Class I) Application Document and Attachment F of this application for the Process Flow Diagram for the new Brine H_2S Removal System.

23. Provide a **Process Description** as **Attachment G.**

– Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

See Section 2 of the 45CSR13 Minor Source General Permit (Class I) Application Document and Attachment G of this application for the Process Description.

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H.**

– For chemical processes, provide a MSDS for each compound emitted to the air.

A MSDS for H_2S which is the only compound emitted to the air from the H_2S scrubber is contained in Attachment H.

25. Fill out the **Emission Units Table** and provide it as **Attachment I.**

See Attachment I of this Application Document for the Emission Units Table for the new Brine H_2S Removal System.

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J.**

See Attachment J of this Application for the Emission Point Data Summary (Tables 1 and 2) for the new Brine H_2S Removal System.

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K.**

Not applicable, there will be no fugitive emission associated with the new Brine H_2S Removal System

28. Check all applicable **Emissions Unit Data Sheets** listed below:

☐ Bulk Liquid Transfer Operations	☐ Haul Road Emissions	☐ Quarry
☒ Chemical Processes	☐ Hot Mix Asphalt Plant	☐ Solid Materials Sizing, Handling and Storage Facilities
☐ Concrete Batch Plant	☐ Incinerator	☐ Storage Tanks
☐ Grey Iron and Steel Foundry	☐ Indirect Heat Exchanger	
☐ General Emission Unit, specify		

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L.**

See Attachment L of this Application for the Emission Units Data Sheet for the new Brine H_2S Removal System.

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

☐ Absorption Systems	☐ Baghouse	☐ Flare
☐ Adsorption Systems	☐ Condenser	☐ Mechanical Collector
☐ Afterburner	☐ Electrostatic Precipitator	☒ Wet Collecting System
☐ Other Collectors, specify		

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M.**

See Attachment M of this Application for the Air Pollution Control Device Sheet for the new Brine H_2S Removal System.

30. Provide all **Supporting Emissions Calculations** as **Attachment N,** or attach the calculations directly to the forms listed in Items 28 through 31.

The installation of the new Brine H_2S Removal System will result in the elimination of the gas separator flare including: emission unit SP007, emission point E417, and air pollution control device (Flare FL003) and the associated 11.65 lbs/hr (51 tons/year) of sulfur dioxide emissions. The new H_2S scrubber will emit a maximum of 0.31 lb/hr (1.36 tons/yr) of H_2S to the atmosphere.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O.**

➢ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

Since H_2S has no emission standard or ambient air quality standard it is suggested that monitoring of the pH stream in the scrubber be performed. The pH of the liquid out of the bottom stage of the scrubber will be measured and controlled at a minimum pH of 11 by manipulating the flow rate of diluted caustic to the top stage of the scrubber. This will ensures that sufficient sodium hydroxide is being added to the scrubber column to react with varying levels of hydrogen sulfide stripped from the raw brine.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and ***Example Legal Advertisement*** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

The proof of Public Notice will be submitted as soon as it available.

33. **Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

☐ **YES** ☒ **NO**

➢ If **YES,** identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's ***"Precautionary Notice – Claims of Confidentiality"*** guidance found in the ***General Instructions*** as **Attachment Q.**

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

☐ Authority of Corporation or Other Business Entity ☐ Authority of Partnership

☐ Authority of Governmental Agency ☐ Authority of Limited Partnership

Submit completed and signed **Authority Form** as **Attachment R.**

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

Certification of Truth, Accuracy, and Completeness

I, the undersigned ☒ **Responsible Official** / ☐ **Authorized Representative,** hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE _____ *(Please use blue ink)* DATE: 6/13/16 *(Please use blue ink)*

35B. Printed name of signee: Jerry Mullens		35C. Title: Works Manager
35D. E-mail: jerry.mullens@axiall.com	36E. Phone: (304) 455-2200 x3221	36F. FAX: (304) 455-6927
36A. Printed name of contact person (if different from above): Tom Horan		36B. Title: Environmental Manager
36C. E-mail: tom.horan@axiall.com	36D. Phone: (304) 455-2200 x3310	36E. FAX: (304) 455-2422

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

- ☒ Attachment A: Business Certificate
- ☐ Attachment B: Map(s)
- ☐ Attachment C: Installation and Start Up Schedule
- ☒ Attachment D: Regulatory Discussion
- ☒ Attachment E: Plot Plan
- ☒ Attachment F: Detailed Process Flow Diagram(s)
- ☒ Attachment G: Process Description
- ☒ Attachment H: Material Safety Data Sheets (MSDS)
- ☒ Attachment I: Emission Units Table
- ☒ Attachment J: Emission Points Data Summary Sheet
- ☐ Attachment K: Fugitive Emissions Data Summary Sheet
- ☒ Attachment L: Emissions Unit Data Sheet(s)
- ☒ Attachment M: Air Pollution Control Device Sheet(s)
- ☒ Attachment N: Supporting Emissions Calculations
- ☒ Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans
- ☒ Attachment P: Public Notice
- ☐ Attachment Q: Business Confidential Claims
- ☐ Attachment R: Authority Forms
- ☐ Attachment S: Title V Permit Revision Information
- ☒ Application Fee

Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.

FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:

- ☐ *Forward 1 copy of the application to the Title V Permitting Group and:*
- ☐ *For Title V Administrative Amendments:*
  - ☐ *NSR permit writer should notify Title V permit writer of draft permit,*
- ☐ *For Title V Minor Modifications:*
  - ☐ *Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,*
  - ☐ *NSR permit writer should notify Title V permit writer of draft permit.*
- ☐ *For Title V Significant Modifications processed in parallel with NSR Permit revision:*
  - ☐ *NSR permit writer should notify a Title V permit writer of draft permit,*
  - ☐ *Public notice should reference both 45CSR13 and Title V permits,*
  - ☐ *EPA has 45 day review period of a draft permit.*

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

ATTACHMENT A
BUSINESS CERTIFICATE

ATTACHMENT A

WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
EAGLE NATRIUM LLC
STATE ROUTE 2
NEW MARTINSVILLE, WV 26155-0000

BUSINESS REGISTRATION ACCOUNT NUMBER: **2276-8329**

This certificate is issued on: 03/1/2013

This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with Chapter 11, Article 12, of the West Virginia Code

The person or organization identified on this certificate is registered to conduct business in the State of West Virginia at the location above.

This certificate is not transferrable and must be displayed at the location for which issued

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them. CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

atl.006 v.4
L18/7588864

ATTACHMENT B
MAP

B1. Map is not needed since this is a modification to an existing facility.

ATTACHMENT C
INSTALLATION AND START UP SCHEDULE

C1. The construction of the H_2S Scrubber is planned to begin on or about 09/15/2016 with start up on or about 12/30/2016.

ATTACHMENT D
REGULATORY DISCUSSION

D1. See Section 4 of the 45CSR13 Minor Source Class I Administrative Update Application for a discussion of the applicable regulations to the brine H_2S removal system.

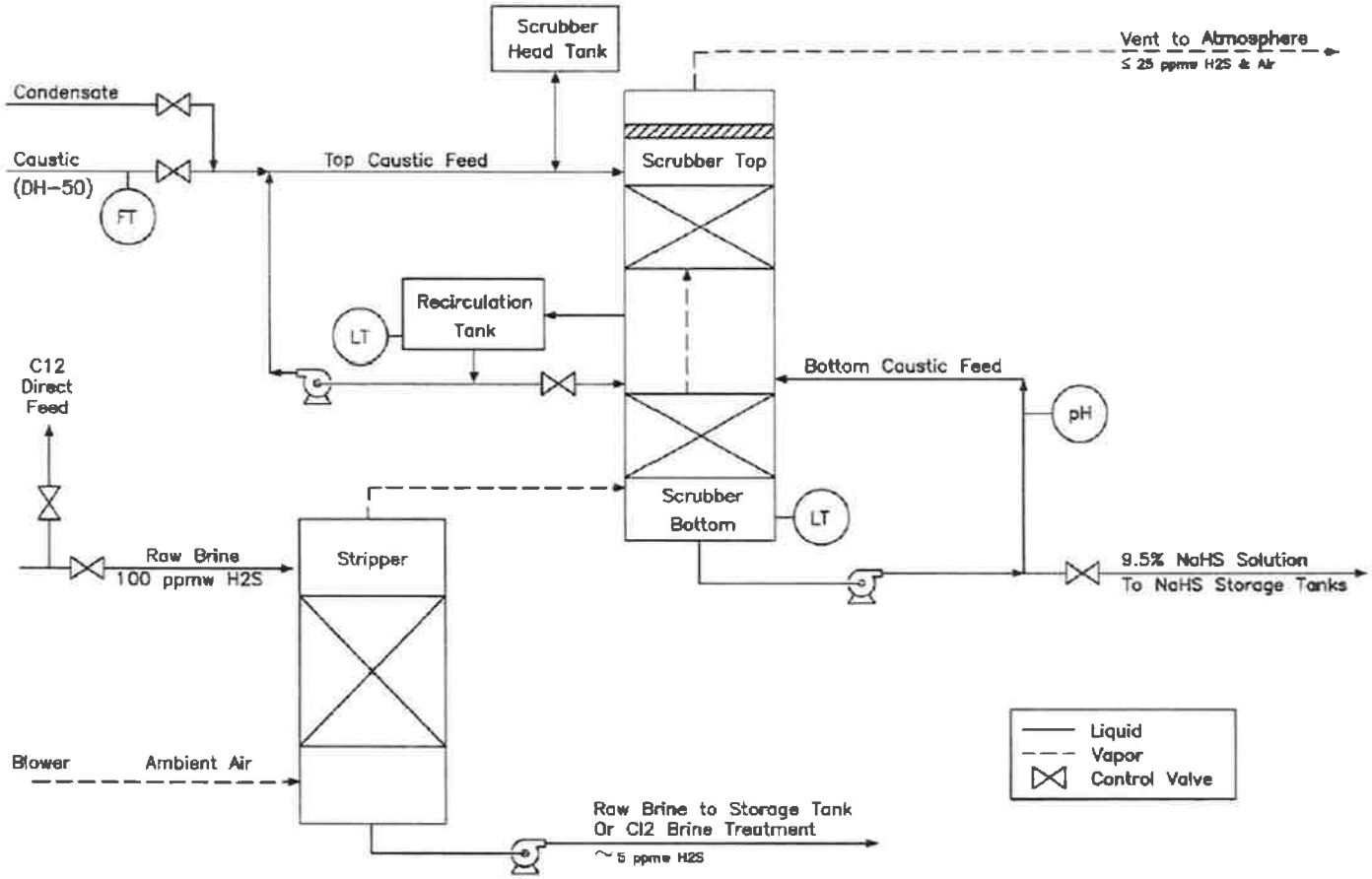
ATTACHMENT E
PLOT PLAN


STACK
Axiall Corporation
© 2016 Google

ATTACHMENT F
PROCESS FLOW DIAGRAM

BRINE H2S REMOVAL SYSTEM

Rev. 5/6/16



ATTACHMENT G
PROCESS DESCRIPTION

G1. Process Description

Axiall is planning to replace the gas separator (Emission Unit SP007, Gas Separator) and raw brine flare (FL003) with a new brine H2S removal system which will consist of two stages to remove H2S from the raw brine and convert it to sodium hydrosulfide. In the first stage a packed column is used to strip the H2S from the raw brine and in the second stage a dual packed column scrubber system is used to convert the H2S to sodium hydrosulfide. The dual packed column scrubber system would increase the removal efficiency of H2S from the raw brine and eliminate the production of sulfur dioxide (SO2) from the flare, thus eliminating an air pollutant emission source from the plant. The H2S vapors would be absorbed in caustic to produce a sodium hydrosulfide solution to be beneficially used in the plant.

Also, see the project description in Section 2.0 of the 45CSR13 Minor Source Class I Administrative Update Application Document for further details and description of the planned changes.

ATTACHMENT H
MSDS FOR H_2S

SECTION: 1. Product and company identification

1.1. Product identifier

Product form	:	Substance
Name	:	Hydrogen Sulfide
CAS No	:	7783-06-4
Formula	:	H2S
Other means of identification	:	Sulfuretted hydrogen, sulfur hydride, hydrosulfuric acid, hepatic gas, stink damp

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	:	Industrial use. Use as directed.

1.3. Details of the supplier of the safety data sheet

Praxair, Inc.
39 Old Ridgebury Road
Danbury, CT 06810-5113 - USA
T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146
www.praxair.com

1.4. Emergency telephone number

Emergency number	:	Onsite Emergency: 1-800-645-4633 CHEMTREC, 24hr/day 7days/week — Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887 (collect calls accepted, Contract 17729)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Flam. Gas 1	H220
Liquefied gas	H280
Acute Tox. 2 (Inhalation:gas)	H330
STOT SE 3	H335
Aquatic Acute 1	H400

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS02 GHS04 GHS06 GHS07 GHS09

Signal word (GHS-US) : DANGER

Hazard statements (GHS-US) :
H220 - EXTREMELY FLAMMABLE GAS
H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
H330 - FATAL IF INHALED
H335 - MAY CAUSE RESPIRATORY IRRITATION
H400 - VERY TOXIC TO AQUATIC LIFE
CGA-HG04 - MAY FORM EXPLOSIVE MIXTURES WITH AIR
CGA-HG11 - SYMPTOMS MAY BE DELAYED
CGA-HG16 - EXTENDED EXPOSURE TO GAS REDUCES THE ABILITY TO SMELL SULFIDES.

Precautionary statements (GHS-US) :
P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from Heat, Open flames, Sparks, Hot surfaces. - No smoking
P260 - Do not breathe gas
P271+P403 - Use and store only outdoors or in a well-ventilated place.
P273 - Avoid release to the environment.

P280+P284 - Wear protective gloves, protective clothing, eye protection, respiratory protection, and/or face protection.
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381 - Eliminate all ignition sources if safe to do so
P405 - Store locked up
P501 - Dispose of contents/container in accordance with container supplier/owner instructions
CGA-PG05 - Use a back flow preventive device in the piping.
CGA-PG20+CGA-PG10 - Use only with equipment of compatible materials of construction and rated for cylinder pressure.
CGA-PG12 - Do not open valve until connected to equipment prepared for use.
CGA-PG18 - When returning cylinder, install leak tight valve outlet cap or plug.
CGA-PG06 - Close valve after each use and when empty.
CGA-PG29 - Do not depend on odor to detect the presence of gas.
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F).

2.3. Other hazards

Other hazards not contributing to the classification : Contact with liquid may cause cold burns/frostbite.

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substance

Name	Product identifier	%
Hydrogen Sulfide (Main constituent)	(CAS No) 7783-06-4	100

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Immediately remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

First-aid measures after skin contact : For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

No additional information available

4.3. Indication of any immediate medical attention and special treatment needed

Obtain medical assistance. Treat with corticosteroid spray as soon as possible after inhalation.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Carbon dioxide, Dry chemical, Water spray or fog. Use extinguishing media appropriate for surrounding fire.

5.2. Special hazards arisin g from the substance or mixture

Fire hazard : EXTREMELY FLAMMABLE GAS. If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.

Explosion hazard : EXTREMELY FLAMMABLE GAS. Forms explosive mixtures with air and oxidizing agents.

Reactivity : No reactivity hazard other than the effects described in sub-sections below.

5.3. Advice for firefighters

Firefighting instructions : **DANGER! Toxic, flammable liquid and gas under pressure**

Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

Other information : Containers are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : **DANGER! Toxic, flammable liquid and gas under pressure** . Forms explosive mixtures with air and oxidizing agents. Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if safe to do so. Reduce vapors with fog or fine water spray, taking care not to spread liquid with water. Shut off flow if safe to do so. Ventilate area or move container to a well-ventilated area. Flammable vapors may spread from leak and could explode if reignited by sparks or flames. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an appropriate device.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Try to stop release. Reduce vapor with fog or fine water spray. Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Leak-check system with soapy water; never use a flame.

All piped systems and associated equipment must be grounded.

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment.

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store only where temperature will not exceed 125°F (52°C). Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g., NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16.

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Hydrogen Sulfide (7783-06-4)		
ACGIH	ACGIH TLV-TWA (ppm)	1 ppm
ACGIH	ACGIH TLV-STEL (ppm)	5 ppm
USA OSHA	OSHA PEL (Ceiling) (ppm)	20 ppm

8.2. Exposure controls

Appropriate engineering controls : Use corrosion-resistant equipment. Use an explosion-proof local exhaust system. Local exhaust and general ventilation must be adequate to meet exposure standards. MECHANICAL (GENERAL): Inadequate - Use only in a closed system. Use explosion proof equipment and lighting.

Eye protection : Wear safety glasses when handling cylinders; vapor-proof goggles and a face shield during cylinder changeout or whenever contact with product is possible. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Skin and body protection	: Wear metatarsal shoes and work gloves for cylinder handling, and protective clothing where needed. Wear appropriate chemical gloves (e.g. neoprene, nitrile, etc.) during cylinder changeout or wherever contact with product is possible. Select per OSHA 29 CFR 1910.132, 1910.136, and 1910.138.
Respiratory protection	: When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure (e.g., an organic vapor cartridge). For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).
Thermal hazard protection	: Wear cold insulating gloves when transfilling or breaking transfer connections. Standard EN 511 - Cold insulating gloves. None necessary.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Colorless gas. Colorless liquid at low temperature or under high pressure.
Molecular mass	: 34 g/mol
Color	: Colorless.
Odor	: Odor can persist. Poor warning properties at low concentrations. Rotten eggs.
Odor threshold	: Odor threshold is subjective and inadequate to warn for overexposure.
pH	: Not applicable.
Relative evaporation rate (butyl acetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable.
Melting point	: -86 °C
Freezing point	: No data available
Boiling point	: -60.3 °C
Flash point	: Not applicable.
Critical temperature	: 100.4 °C
Auto-ignition temperature	: 260 °C
Decomposition temperature	: No data available
Flammability (solid, gas)	: 4.3 - 46 vol %
Vapor pressure	: 1880 kPa
Critical pressure	: 8940 kPa
Relative vapor density at 20 °C	: No data available
Relative density	: No data available
Relative gas density	: 1.2
Solubility	: Water: 3980 mg/l
Log Pow	: Not applicable.
Log Kow	: Not applicable.
Viscosity, kinematic	: Not applicable.
Viscosity, dynamic	: Not applicable.
Explosive properties	: Not applicable.
Oxidizing properties	: None.
Explosion limits	: No data available

9.2. Other information

Gas group	: Liquefied gas
Additional information	: Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May react violently with oxidants. Can form explosive mixture with air.

10.4. Conditions to avoid

Avoid moisture in installation systems. Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

10.5. Incompatible materials

Ammonia. Bases. Bromine pentafluoride. Chlorine trifluoride. chromium trioxide . Copper. Fluorine. Lead. Lead oxide. (and heat). (powdered). Mercury. Nitric acid. Nitrogen trifluoride. nitrogen sulfide. Organic compounds. Oxidizing agents. Oxygen difluoride. Rubber. Sodium. (and moisture). Water.

10.6. Hazardous decomposition products

Thermal decomposition may produce : Sulfur. Hydrogen.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Inhalation:gas: FATAL IF INHALED.

Hydrogen Sulfide (\f)7783-06-4	
LC50 inhalation rat (mg/l)	0.99 mg/l (Exposure time: 1 h)
LC50 inhalation rat (ppm)	356 ppm/4h
ATE US (gases)	356.000 ppmV/4h
ATE US (vapors)	0.990 mg/l/4h
ATE US (dust, mist)	0.990 mg/l/4h

Skin corrosion/irritation : Not classified

pH: Not applicable.

Serious eye damage/irritation : Not classified

pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : MAY CAUSE RESPIRATORY IRRITATION.

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : VERY TOXIC TO AQUATIC LIFE.

Hydrogen Sulfide (7783-06-4)	
LC50 fish 1	0.0448 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [flow-through])
LC50 fish 2	0.016 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])

12.2. Persistence and degradability

Hydrogen Sulfide (7783-06-4)	
Persistence and degradability	Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Hydrogen Sulfide (7783-06-4)	
BCF fish 1	(no bioaccumulation expected)
Log Pow	Not applicable.
Log Kow	Not applicable.
Bioaccumulative potential	No data available.

12.4. Mobility in soil

Hydrogen Sulfide (7783-06-4)	
Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Other adverse effects : May cause pH changes in aqueous ecological systems.

Effect on ozone layer : None.

Effect on the global warming : No known effects from this product.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional legislation (waste) : U.S. - RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261. U.S. - RCRA (Resource Conservation & Recovery Act) - U Series Wastes - Acutely Toxic Wastes & Other Hazardous Characteristics.

Waste disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1053 Hydrogen sulfide, 2.3

UN-No.(DOT) : UN1053

Proper Shipping Name (DOT) : Hydrogen sulfide

Department of Transportation (DOT) Hazard Classes : 2.3 - Class 2.3 - Poisonous gas 49 CFR 173.115

Hazard labels (DOT) : 2.3 - Poison gas
2.1 - Flammable gas

DOT Special Provisions (49 CFR 172.102) : 2 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone B (see 173.116(a) or 173.133(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.
B9 - Bottom outlets are not authorized.
B14 - Each bulk packaging, except a tank car or a multi-unit-tank car tank, must be insulated with an insulating material so that the overall thermal conductance at 15.5 C (60 F) is no more than 1.5333 kilojoules per hour per square meter per degree Celsius (0.075 Btu per hour per square foot per degree Fahrenheit) temperature differential. Insulating materials must not promote corrosion to steel when wet.
N89 - When steel UN pressure receptacles are used, only those bearing the "H" mark are authorized.

Additional information

Emergency Response Guide (ERG) Number : 117

Other information : No supplementary information available.

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

Transport by sea

UN-No. (IMDG) : 1053

Proper Shipping Name (IMDG) : HYDROGEN SULPHIDE

Class (IMDG) : 2 - Gases

MFAG-No : 117

Air transport

UN-No.(IATA) : 1053

Proper Shipping Name (IATA) : Hydrogen sulphide

Class (IATA) : 2

Civil Aeronautics Law : Gases under pressure/Gases toxic under pressure

SECTION 15: Regulatory information

15.1. US Federal regulations

Hydrogen Sulfide (7783-06-4)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on the United States SARA Section 302 Listed on United States SARA Section 313	
SARA Section 302 Threshold Planning Quantity (TPQ)	500
SARA Section 311/312 Hazard Classes	Sudden release of pressure hazard Immediate (acute) health hazard Fire hazard Delayed (chronic) health hazard
SARA Section 313 - Emission Reporting	1.0 %

15.2. International regulations

CANADA

Hydrogen Sulfide (7783-06-4)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

Hydrogen Sulfide (7783-06-4)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

15.2.2. National regulations

Hydrogen Sulfide (7783-06-4)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) Listed on the Canadian IDL (Ingredient Disclosure List)

15.3. US State regulations

Hydrogen Sulfide(7783-06-4)	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Revision date : 3/20/2015 12:00:00 AM

Other information : When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product.

Praxair asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair SDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current SDSs for these products, contact your Praxair sales representative, local distributor, or supplier, or download from www.praxair.com. If you have questions regarding Praxair SDSs, would like the document number and date of the latest SDS, or would like the names of the Praxair suppliers in your area, phone or write the Praxair Call Center (Phone: 1-800-PRAXAIR/1-800-772-9247; Address: Praxair Call Center, Praxair, Inc., P.O. Box 44, Tonawanda, NY 14151-0044).

PRAXAIR and the Flowing Airstream design are trademarks or registered trademarks of Praxair Technology, Inc. in the United States and/or other countries.

NFPA health hazard : 4 - Very short exposure could cause death or serious residual injury even though prompt medical attention was given.

NFPA fire hazard : 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.

HMIS III Rating

Health	: 2 Moderate Hazard - Temporary or minor injury may occur
Flammability	: 4 Severe Hazard
Physical	: 2 Moderate Hazard

SDS US (GHS HazCom 2012) - Praxair

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

ATTACHMENT I
EMISSION UNIT TABLE

Attachment I

Emission Units Table

(includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
E427	SP017	Two-staged, packed absorber	09/15/2016	2650 gallons	New 12/30/2016	SCRB003

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

ATTACHMENT J
EMISSION POINTS DATA SUMMARY

EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] (ppmv or mg/m^4)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
SP017	Upward	E427	Scrubber	SCRB003	Wet Scrubber	NA	NA	None, only H_2S	0.31	1.36	0.31	1.36	Vapor	E Aspen Model	25 ppmw

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

[1] Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

[2] Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).

[3] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. **DO NOT LIST** H_2, H_2O, N_2, O_2, and Noble Gases.

[4] Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[5] Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[6] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

[7] Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m^3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO_2, use units of ppmv (See 45CSR10).

EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data								
Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°F)	Volumetric Flow [1] (acfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
SP007	1.03	94	3,632	73	648	89	512.70	4,399.60

ATTACHMENT K
FUGITIVE EMISSIONS DATA SUMMARY SHEET

K1. There are no fugitive emissions associated with the brine H_2S scrubber.

ATTACHMENT L
EMISSIONS UNIT DATA SHEET

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): E417

1. Name or type and model of proposed affected source: Augusta Two-staged, packed absorber
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of proposed process material(s) charged per hour: 3,400 acfm vapor stream of air and hydrogen sulfide
4. Name(s) and maximum amount of proposed material(s) produced per hour: Not applicable.
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants: A solution of sodium hydroxide absorbs and reacts with hydrogen sulfide in the vapor stream to produce sodium hydrosulfide solution

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

(1) Combustion Data (if applicable):

- Type and amount in appropriate units of fuel(s) to be burned:

Not applicable

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

Not applicable

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	24	Days/Week	7	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ °F and psia

a.	NO_X	lb/hr	grains/ACF
b.	SO_2	lb/hr	grains/ACF
c.	CO	lb/hr	grains/ACF
d.	PM_{10}	lb/hr	grains/ACF
e.	Hydrocarbons	lb/hr	grains/ACF
f.	VOCs	lb/hr	grains/ACF
g.	Pb	lb/hr	grains/ACF
h.	Specify other(s)		
		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
The pH of the liquid out of the bottom stage of the scrubber will be measured and controlled at a minimum pH of 11 by manipulating the flow rate of diluted caustic to the top stage of the scrubber. This will ensures that sufficient sodium hydroxide is being added to the scrubber column to react with varying levels of hydrogen sulfide stripped from the raw brine to ensure the H_2S emissions do not exceed 0.31 lb/hr.	Records of the flow of sodium hydroxide will be continuously monitored and recorded in the Foxboro DCS.
REPORTING None	TESTING None

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

ATTACHMENT M
AIR POLLUTION CONTROL DEVICE SHEET

Attachment M
Air Pollution Control Device Sheet
(WET COLLECTING SYSTEM-SCRUBBER)

Control Device ID No. (must match Emission Units Table): SCRB003

Also, see the project description in Section 2.0 of the 45CSR13 Minor Source Class I Administrative Update Application Document for further details and description of the air pollution control device and the design drawings for scrubber which is attached.

Equipment Information

1. Manufacturer: Augusta Model No.	2. Method: Packed Bed, Spray Tower, Mechanical, Other, specify; Venturi, Cyclone, Orifice
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. Provide a scale diagram of the scrubber showing internal construction. Please include packing type and size, spray configurations, baffle plates, and mist eliminators. Packing type: Raschig 2" Tri-Pack packing – polypropylene. See attached scrubber drawing.	
5. What type of liquid entrainment eliminators or system will be used? Submit a schematic diagram showing thickness, mesh, and material of construction.	
6. Describe the scrubber's construction material: See attached scrubber drawing.	
7. What will be the power requirements of the collector? Fan HP	Inlet scrubbing liquid pump: HP
8. What type of fan(s) will be used? Type of fan blade: Number of blades: Diameter of blade: in. Also supply a fan curve for each fan to be used.	
9. Estimated gas pressure drop at maximum flow rate: inches H_2O	

Scrubbing Liquor Characteristics

10. Scrubbing Liquor

Composition	Weight %
1 Max. 11 wt% sodium hydroxide	11% (max)
2	
3	
4	

11. Scrubbing liquor losses (evaporation, etc.): gal/1000 ACF gas

12. Liquor pressure to scrubber: PSIA

13. Pressure drop through scrubber: in. H_2O

14. Source of liquor (explain):
One of the plant's products is a low-salt, 50 wt% sodium hydroxide solution.

15. Liquor flow rates to scrubber:
Flow varied to maintain a minimum pH of 11

16. Describe system to be used to supply liquor to collector:
See the project description in Section 2.0 of the 45CSR13 Minor Source Class I Administrative Update Application Document for further details and description of the air pollution control device

17. Give the expected solids content of the liquor:

18. If the liquor is to be recirculated, describe any treatment performed:
Liquid out of the top stage of the scrubber is sent to a recirculation pump, which recirculates most of the solution back to the top of the section, with a side stream being sent to the bottom stage of the scrubber.

19. Data for Venturi Scrubber:

Throat Dimensions:
(Specify Units)

Throat Velocity: ft/sec

20. Data for Packed Towers:

Type of Packing:

Superficial Gas Velocity through Bed:

21. Gas flow into the collector:

ACF @ °F and PSIA

22. Gas stream temperature:

Inlet: 91 °F

Outlet: 91 °F

23. Gas flow rate:

Design Maximum: ACFM

Average Expected: ACFM

24. Particulate Grain Loading in grains/scf:

Inlet:

Outlet:

25. Emission rate of each pollutant (specify) into and out of collector:

Pollutant	IN	OUT	Guaranteed Minimum Collection Efficiency
lb/hr	grains/acf	lb/hr	grains/acf
A H_2S		0.31	
B			
C			
D			
E			

26. Type of pollutant(s) controlled: SO_x Odor

Particulate (type): Other: H_2S

27. By what method were the uncontrolled emissions calculated? Material Balance Stack Test

Pilot Test Other: Aspen Modeling Calculations

28. Dimensions of stack:	Height	89	ft.	Diameter	1.03 ft

29. Supply an equilibrium curve and/or solubility data (at various temperatures) for the proposed system.

30. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 100 percent of design rating of collector.

Particulate Distribution

31. Complete the table:	**Particle Size Distribution at Inlet to Collector**	**Fraction Efficiency of Collector**
Particulate Size Range (microns)	**Weight % for Size Range**	**Weight % for Size Range**
0 – 2		
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

32. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

33. Describe the collection material disposal system:

34. Have you included ***Wet Collecting (Scrubber) Control Device*** in the Emissions Points Data Summary Sheet? Yes

35. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**

Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING:

The pH of the liquid out of the bottom stage of the scrubber will be measured and controlled at a minimum pH of 11 by manipulating the flow rate of diluted caustic to the top stage of the scrubber. This will ensures that sufficient sodium hydroxide is being added to the scrubber column to react with varying levels of hydrogen sulfide stripped from the raw brine to ensure the H_2S emissions do not exceed 0.31 lb/hr.

RECORDKEEPING:

Records of the flow of sodium hydroxide will be continuously monitored and recorded in the Foxboro DCS.

REPORTING:

None

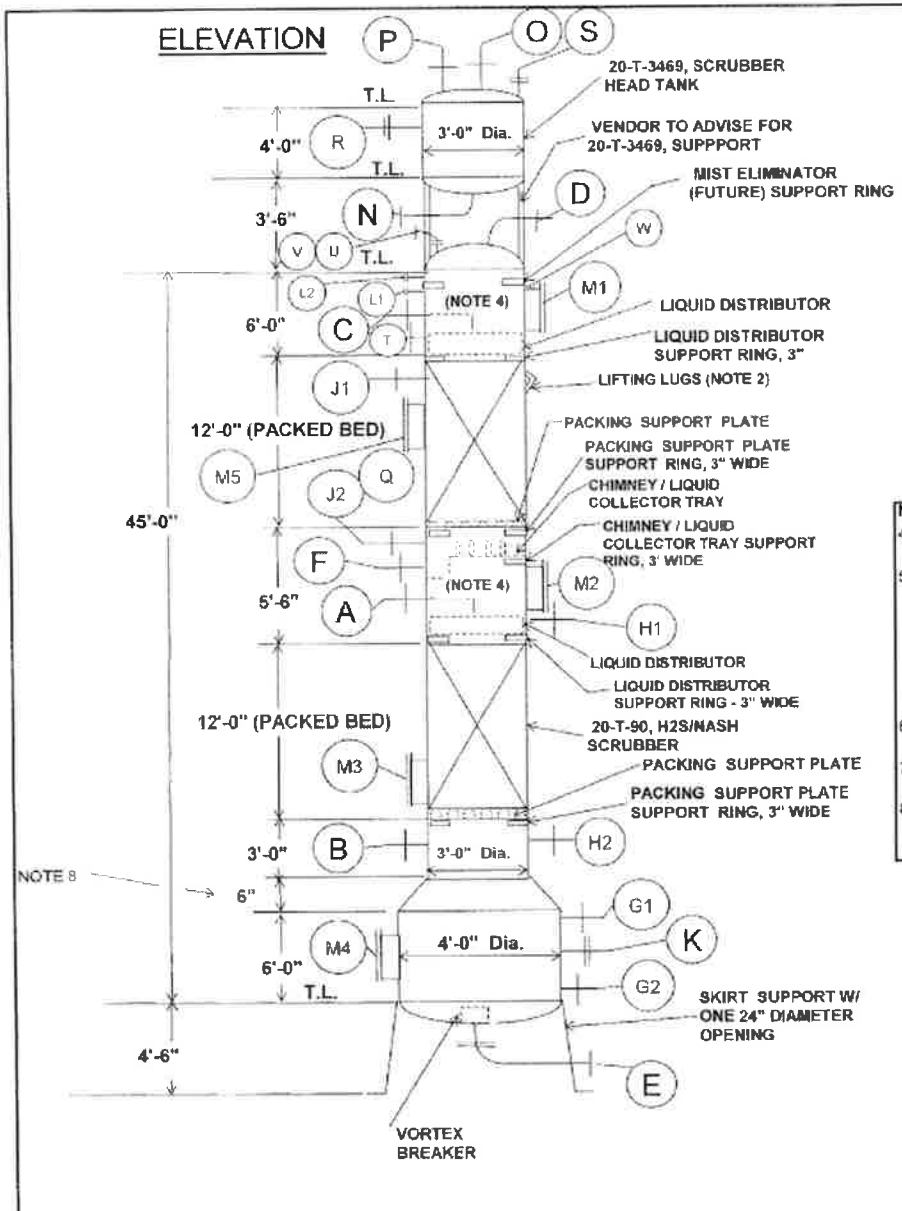
TESTING:

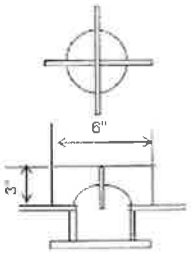
None

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

36. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.

37. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
38. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.





VORTEX BREAKER DETAIL

Notes Cont'd.

4. 3" liquid feed pipe w/break flange and LR 90 deg. elbow.
5. Temperature 60 - 145 F
   - Liquid: normal conditions: 6 wt. % NaOH 7 wt. % NaHS aqueous solution, pH = 11.9 - 13.3
   - Liquid: cleaning conditions: 36 wt. % HCl solution
   - Vapor: Air with 1.2 wt. % H2S
6. Quote standard thickness, over specified if not able to provide specified.
7. Outdoors installation, apply local wind, snow & earthquake loading.
8. Adjust dimension for the most economical length.

TAG NO.	20-T-90, 20-T-3469	NO. REQ'D	ONE
SPECIFICATIONS	Axiall D4-2000 & ASME		
CONSTRUCTION	RPT-1	CODE STAMP	NOT REQ'D

	VESSEL	JACKET	UNITS
DESIGN PRESSURE	Note 1		PSIG.
DESIGN TEMPERATURE	160/ -20		deg. F
OPERATING PRESSURE	0.1 TOP		PSIG.
OPERATING TEMPERATURE	91		deg. F
MATERIAL	FRP See Note 5		
THICKNESS	By Fabricator		IN.
CORROSION ALLOWANCE	0.03		IN.
CAPACITY			GAL

SPECIFIC GRAVITY 1.23 Max.
BOLT DESCRIPTION: Xylan coated stainless steel: studs A-193-B8, nuts A-194-8
GASKET DESCRIPTION: GYLON 3510
EMPTY WEIGHT by vendor LBS. | FULL WEIGHT by vendor LBS.
PAINTING C.S. surfaces to be prime coated.
INSULATION SUPPORTS | INSULATION THK. 1-1/2" Note 6
FIREPROOFING RETARDANT REQ'D
EXTERIOR UV PROTECTION
LADDER & PLATFORM: NONE
SUPPORT DESCRIPTION: SKIRT FOR 20-T-90, VENDOR TO ADVISE FOR 20-T-3469
HEAD TYPE: ASME F&D
INTERNAL DESCRIPTION - LIQUID FEED PIPES, VORTEX BREAKER, AND SUPPORT RINGS SUPPLIED BY VENDOR. PACKING SUPPORT PLATES, LIQUID DISTRIBUTORS, AND CHIMNEY/COLLECTOR TRAY SUPPLIED BY OTHERS.
SEE NOTE 3 FOR INTERNAL COMPONENT WEIGHTS.
NOTES & REF. DWGS.
1. Design pressure: 20-T-90: +14 psig. @ Top + Liquid Full Condition & -0.5 psig.
20-T-3469: +14 psig. @ Top + Liquid Full Condition & -0.5 psig.
2. Lifting lugs location and number by vendor.
3. Packed bed operating wt = 1500 lbs. each (est). Liquid distrib. operating wt = 800 lbs. each (est).
Chimney / collector tray operating wt = 700 lbs. (est)

NOZZLE SCHEDULE

MK	NO.	SIZE	RATING	TYPE	DESCRIPTION
A	1	2"	150 LB	FF	20-T-90, 1st stage liquid inlet
B	1	12"	150 LB	FF	20-T-90, 1st stage vapor inlet
C	1	2"	150 LB	FF	20-T-90, 2nd stage liquid inlet
D	1	12"	150 LB	FF	20-T-90, 2nd stage vapor outlet
E	1	3"	150 LB	FF	20-T-90, 1st stage liquid outlet
F	1	3"	150 LB	FF	20-T-90, 2nd stage liquid outlet
G	2	3"	150 LB	FF	20-T-90, Level transmitter
H	2	3"	150 LB	FF	20-T-90 1st stage diff. pressure transmitter
J	2	3"	150 LB	FF	20-T-90, 2nd stage, diff. pressure transmitter
K	1	2"	150 LB	FF	20-T-90, spare with blind, bolts, gasket
L	2	3"	150 LB	FF	20-T-90, mist eliminator diff. pressure transmitter
M	5	24"	150 LB	FF	20-T-90, Manway with blind & davit, bolts, gasket
N	1	2"	150 LB	FF	20-T-3469, liquid inlet/outlet
O	1	2"	150 LB	FF	20-T-3469, level transmitter
P	1	3"	150 LB	FF	20-T-3469, vent / overflow
Q	1	1-1/2"	150 LB	FF	20-T-90, liquid draw vent
R	1	8"	150 LB	FF	20-T-3469, handhole w/blind, bolts, gasket
S	1	2"	150 LB	FF	20-T-3469, spare with blind, bolts, gasket
T	1	3"	150 LB	FF	20-T-90, vent / overflow from 20-T-3469
U	1	12"	150 LB	FF	20-T-90, demister installation / inspection
V	1	3"	150 LB	FF	20-T-90, chemical cleaning
W	1	3"	150 LB	FF	20-T-90, spare with blind, bolts, gasket

CLIENT / PROJECT Axiall / Brine H2S Removal Project			CHEMSTRESS CONSULTANT COMPANY	PREPARED BY TDS DATE 2/22/11	TAG NO. 20-T-90, 20-T-3469
PROJ. NO. 7368	REV. B	DATE 4/4/16	39 S. Main Street AKRON, OHIO	CHECKED BY DATE	TITLE: H2S REMOVAL SCRUBBER, SCRUBBER HEAD TANK

SHEET 1 OF 1

ATTACHMENT N
SUPPORTING EMISSIONS CALCULATIONS

4/15/2016		Stripper Brine Feed	Stripper Air Feed	Stripper Air Outlet	Stripper Brine Outlet	Scruber Vent	Bottom Scrubber Liquid Outlet	NaHS Scrubber Recycle	DH-50	Condensate	Top Scrubber Liquid Feed	NaHS Product	Top Scrubber Liquid Outlet	Top Scrubber Recirc	Diluted Caustic	Bottom Scrubber Recirc	Top Scrubber Vapor Feed	Bottom Scrubber Vapor Feed	Rock Box Vent
		101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
Vapor Fraction		0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1
Temperature	F	90	90	90.0458	89.62907	94.20618	91.14187	91.14171	90	90	94.59134	91.14171	93.42142	94.59134	112.5358	94.59134	91.53691	90.04297	90
Pressure	PSIG	25	3	0	0	0	0	0	25.00405	25.00405	0	0	0	0	25.00405	0	0	0	0.00405122
Mass Density	LB/CUFT	73.96133	0.0863374	0.0707896	73.96754	0.0698824	60.52451	60.52449	95.08722	62.1245	69.70281	60.52449	69.71808	69.70281	69.4288	69.70281	0.0702981	0.0708585	0.0719299
Volume Flow_GAL/MIN	GAL/MIN	1600.29	16419.47	20678.1	1599.53	22291	55.94	52	0.56	2.96	57	3.94	51.95	55.33	3.38	3.33	22121.57	22032.45	1353.97
Volume Flow_CUFT/MIN	CUFT/MIN	213.93	2194.96	2764.26	213.83	2979.87	7.48	6.96	0.07	0.4	6.95	0.53	6.94	7.4	0.45	0.45	2957.22	2945.31	181
Mass Flow	LB/HR	949341	11370.41	11740.86	948971	12494.44	27156.26	25243.76	410	1475	29071.88	1902.501	29060.73	30935.73	1885	1863.85	12473.24	12522.01	781.1587
Component Mass Flow																			
H2O	LB/HR	711851	0	280.1005	711570	389.2956	23524.19	21867.48	205	1475	25868.84	1656.71	25847.26	27527.33	1680	1658.497	365.7472	288.4919	8.391461
NACL	LB/HR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NAOH	LB/HR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N2S	LB/HR	93.95411	0	96.45081	0.2715983	0.0302184	0.000398843	0.000367008	0	0	2.92E-07	2.78E-05	3.07E-07	3.11E-07	0	1.87E-08	2.323174	126.3859	31.93506
NAHS	LB/HR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NA2S	LB/HR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H3O+	LB/HR	0.013613	0	0	4.15E-05	0	8.84E-11	8.22E-11	1.19E-17	3.66E-06	1.26E-11	6.23E-12	1.20E-11	1.34E-11	1.62E-12	8.09E-13	0	0	0
NA+	LB/HR	93354.04	0	0	93354.04	0	1672.913	1555.097	117.8283	0	1837.909	117.8163	1837.906	1955.734	117.8283	117.8312	0	0	0
HCL	LB/HR	3.40E-15	0	5.48E-09	1.03E-17	1.61E-31	5.26E-29	7.48E-35	0	0	0.00E+00	5.67E-36	5.81E-29	0.00E+00	0	0.00E+00	7.89E-11	5.48E-09	0
HS-	LB/HR	48.58664	0	0	45.87988	0	1515.532	1408.804	0	0	13.32396	106.7329	14.32135	14.17818	0	0.8547228	0	0	0
CL-	LB/HR	143968	0	0	143968	0	7.45E-08	6.99E-08	0	0	0.00E+00	5.25E-09	8.33E-11	0.00E+00	0	0.00E+00	0	0	0
OH-	LB/HR	4.34E-05	0	0	0.0140392	0	392.8933	183.9587	87.17173	3.28E-06	1330.842	13.93696	1329.067	1416.165	87.17173	85.32267	0	0	0
S--	LB/HR	8.94E-07	0	0	0.000272165	0	245.966	228.1798	0	0	20.77314	17.28676	21.96614	22.10496	0	1.331809	0	0	0
N2	LB/HR	0	8982.627	8978.585	4.042473	9546.853	0.1726142	0.1604577	0	0	0.1309763	0.0121564	0.1393734	0.1393734	0	0.00839712	9546.861	9546.865	568.2798
O2	LB/HR	0	2387.787	2385.715	2.072117	2558.261	0.0890194	0.0827502	0	0	0.0673387	0.00626927	0.0716559	0.0716559	0	0.00431721	2558.265	2558.267	172.5524
NHS	LB/HR	0.00443985	0	0.0040731	1.357364	0.0038147	0.00366856	0.0034102	0	0	0.00154398	0.000258361	0.00164297	0.00164297	0	9.90E-05	0.0039136	0.00407311	0
NH4+	LB/HR	26.4741	0	0	25.03683	0	2.03E-06	1.89E-06	0	0	2.32E-07	1.49E-07	2.47E-07	2.47E-07	0	1.49E-08	0	0	0
pH		6.217834			8.734299		12.99705	12.98711	17.43288	6.884396	13.90309	12.99711	13.92775	13.90309	13.61574	13.90309			

NaCl	LB/HR	237333.99	0.00	0.00	237333.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NaOH	LB/HR	0.00	0.00	0.00	0.03	0.00	465.36	432.59	204.99	0.00	3129.55	32.77	3125.38	3330.19	204.99	200.64	0.00	0.00	0.00
NaHS	LB/HR	82.33	0.00	0.00	77.78	0.00	2568.12	2388.19	0.00	0.00	22.59	180.93	24.28	24.03	0.00	1.45	0.00	0.00	0.00
Na2S	LB/HR	0.00	0.00	0.00	0.00	0.00	597.40	555.32	0.00	0.00	90.56	42.07	53.46	53.80	0.00	3.24	0.00	0.00	0.00
ppm Total Sulfide	LB/HR	150			48.63	2.42						64846.86					186.25	10252.82	

Average Molecular Weight		19.927	28.76584	28.39721	19.92683	28.23537	18.4133	18.4133	18.95518	18.01528	18.12092	18.4133	18.12177	18.12092	18.11495	18.12092	28.26832	28.42674	28.84504
Viscosity - mixture	CP		0.0185929	0.0184398		0.0185047											0.0184636	0.0184373	0.0183958
Viscosity - mixture	CP	1.067093			1.091118		0.7705604	0.7706495	18.45332	0.6774903	0.9349718	0.7706495	0.9449084	0.9349718	0.8301136	0.9349718			
Surface tension - mixture	LBF/FT	0.0054881			0.0054903		0.00503592	0.00503601	0.0071512	0.00488469	0.00504035	0.00503601	0.00504017	0.00504035	0.004979	0.00504035			

ATTACHMENT O
MONITORING/RECORDKEEPING/REPORTING/TESTING PLANS

O1. MONITORING/RECORDKEEPING/REPORTING/TESTING PLANS

O1.1 Monitoring

The pH of the liquid out of the bottom stage of the scrubber will be measured and controlled at a minimum pH of 11 by manipulating the flow rate of diluted caustic to the top stage of the scrubber. This will ensures that sufficient sodium hydroxide is being added to the scrubber column to react with varying levels of hydrogen sulfide stripped from the raw brine to ensure the H2S emissions do not exceed 0.31 lb/hr.

O1.2 Recordkeeping

Records of the flow of sodium hydroxide will be continuously monitored and recorded in the Foxboro DCS.

O1.2 Reporting

None

O1.3 Testing

None

ATTACHMENT P
PUBLIC NOTICE

P1. Public Notice

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Axiall Corporation has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a General Permit (Class I) Permit, for a Wet Scrubber located on 15696 Energy Road, Proctor, WV 26055 near New Martinsville in Wetzel County, West Virginia. The latitude and longitude coordinates are: 39° 44' 46.35" North and 80° 51' 6.35" W.

The applicant estimates a decrease in potential to discharge the following Regulated Air Pollutants will be: 51 tons/year of sulfur dioxide.

Startup of operation is planned to begin on or about the 30th day of December, 2016. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours. Dated this the 13th day of June, 2016.

By: Axiall Corporation
Jerry Mullens
Plant Manager
P.O. 191
New Martinsville, WV 26155

ATTACHMENT Q
BUSINESS CONFIDENTIAL

Q1. Business Confidential Claims

None of the information in this application is considered business confidential

ATTACHMENT R
AUTHORITY OF CORPORATION

R1. Authority Of Corporation is not needed, see Business Certificate in Appendix

ATTACHMENT S
TITLE V PERMIT REVISION INFORMATION

S1. TITLE V PERMIT REVISION INFORMATION

The Title V permit revision information will be submitted once the 45CSR13 Permit is issued.