STATEMENT OF BASIS

For the issuance of Air Permit # 0762-AOP-R34 AFIN: 14-00028

1. PERMITTING AUTHORITY:

Division of Environmental Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118-5317

2. APPLICANT:

Albemarle Corporation - South Plant
Highway 79, Approximately 6 Miles South of Magnolia
Magnolia, Arkansas 71753

3. PERMIT WRITER:

Alexander Sudibjo

4. NAICS DESCRIPTION AND CODE:

NAICS Description: Other Basic Inorganic Chemical Manufacturing
NAICS Code: 325180

5. ALL SUBMITTALS:

The following is a list of ALL permit applications included in this permit revision.

Date of Application	Type of Application (New, Renewal, Modification, Deminimis/Minor Mod, or Administrative Amendment)	Short Description of Any Changes That Would Be Considered New or Modified Emissions
4/16/2024	Minor Modification	New truck unloading station

6. REVIEWER'S NOTES:

With this minor modification, the facility is installing a new truck unloading station at the pilot plant (SN-AL-05). This will not increase the throughput rate or production rate of the pilot plant. The facility's permitted annual emissions are increasing by 0.1 tpy VOC.

7. COMPLIANCE STATUS:

As of April 16, 2024, there are no compliance issues with the facility. ECHO (https://echo.epa.gov/detailed-facility-report?fid=110000743508) shows no air violations identified as of October 3, 2023.

8. PSD/GHG APPLICABILITY:

a) Did the facility undergo PSD review in this permit (i.e., BACT, Modeling, etc.)? N
If yes, were GHG emission increases significant?

b) Is the facility categorized as a major source for PSD? Y
- *Single pollutant ≥ 100 tpy and on the list of 28 or single pollutant ≥ 250 tpy and not on list*

If yes for 8(b), explain why this permit modification is not PSD. The emission increases are below the PSD significant emission rates.

9. SOURCE AND POLLUTANT SPECIFIC REGULATORY APPLICABILITY:

Source	Pollutant	Regulation (NSPS, NESHAP or PSD)
Facility	PM_{10}, SO_2, VOC, CO, NO_X	PSD
Facility	VOC	40 CFR Part 82 – Standards for the Protection of Stratospheric Ozone
Facility	PM/PM_{10}	40 CFR Part 61, Subpart M – National Emission Standard for Asbestos
AB-15	VOC/HAP	40 CFR Part 63, Subpart A – National Emission Standards for Hazardous Air Pollutants for Source Categories, General Provisions
AB-15 TB-11 TB-25 TB-29 TB-30 WW-01	VOC/HAP	40 CFR Part 63, Subpart F – National Emission Standards for Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry 40 CFR Part 63, Subpart G – National Emission Standards for Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater 40 CFR Part 63, Subpart H – National Emission Standards

Source	Pollutant	Regulation (NSPS, NESHAP or PSD)
		for Organic Hazardous Air Pollutants for Equipment Leaks
NC-23 Process MeBr Scenario	Ozone Depleting Substances	40 CFR Part 82, Part A – Protection of Stratospheric Ozone, Production and Consumption Controls
NC-23 Process MeBr Scenario	Ozone Depleting Substances	40 CFR Part 82, Subpart E – Protection of Stratospheric Ozone, The Labeling of Products Using Ozone-Depleting Substances
NC-17 CMPU	VOC/HAP	40 CFR Part 63, Subpart A – National Emission Standards for Hazardous Air Pollutants for Source Categories, General Provisions
NC-17 CMPU	VOC/HAP	40 CFR Part 63, Subpart F – National Emission Standards for Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry
NC-17 CMPU	VOC/HAP	40 CFR Part 63, Subpart G – National Emission Standards for Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater
NC-17 CMPU	VOC/HAP	40 CFR Part 63, Subpart H – National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks
21-01 21-02	VOC/HAP	40 CFR Part 61, Subpart A – National Emission Standards for Organic Hazardous Air Pollutants, General Provisions
21-01 21-02	VOC/HAP	40 CFR Part 61, Subpart J – National Emission Standards

Source	Pollutant	Regulation (NSPS, NESHAP or PSD)
		for Equipment Leaks (Fugitive Emission Sources) of Benzene
21-01 21-02	VOC/HAP	40 CFR Part 61, Subpart V – National Emission Standards for Equipment Leaks (Fugitive Emission Sources)
21-01 21-02	VOC/HAP	40 CFR Part 61, Subpart Y – National Emission Standards for Benzene Emissions from Benzene Storage Vessels
21-01 21-02	VOC/HAP	40 CFR Part 61, Subpart FF – National Emission Standards for Benzene Waste Operations
MS-05	VOC/HAP	40 CFR Part 63, Subpart JJ – National Emission Standards for Wood Furniture Manufacturing Operations
Facility	Ozone Depleting Substances	40 CFR Part 82, Subpart E – Protection of Stratospheric Ozone, The Labeling of Products Using Ozone-Depleting Substances
MCPU's: DMTDA NC-12 NC-15 NC-17 NC-21 NC-23	VOC/HAP	40 CFR Part 63, Subpart FFFF – National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing and Miscellaneous Coating Manufacturing
CCF All Ethylene Glycol Storage	VOC/HAP	40 CFR Part 63, Subpart EEEE – National Emission Standards for Hazardous Air Pollutants: Organic Liquids Distribution (Non-Gasoline)
Facility/Engines	VOC, CO, NO_X, HAPs	40 CFR Part 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

Source	Pollutant	Regulation (NSPS, NESHAP or PSD)
		40 CFR Part 60, Subpart JJJJ – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. 40 CFR Part 63, Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines
Facility/Boilers and Process Heaters	HAPS, CO, Filterable PM	40 CFR Part 63, Subpart DDDDD - National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters
BH-03 and BH-04	PM and SO_2	40 CFR Part 60, Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

10. UNCONSTRUCTED SOURCES:

Unconstructed Source	Permit Approval Date	Extension Requested Date	Extension Approval Date	If Greater than 18 Months without Approval, List Reason for Continued Inclusion in Permit
AL-01, AL-02, AL-03, AL-04	10/19/23	N/A	N/A	N/A
AL-05	Issuance of #0762-AOP-R34	N/A	N/A	N/A

11. PERMIT SHIELD – TITLE V PERMITS ONLY:

Did the facility request a permit shield in this application? N
(Note - permit shields are not allowed to be added, but existing ones can remain, for minor modification applications or any Rule 18 requirement.)

If yes, are applicable requirements included and specifically identified in the permit?

If not, explain why.

For any requested inapplicable regulation in the permit shield, explain the reason why it is not applicable in the table below.

Source	Inapplicable Regulation	Reason
N/A		

12. COMPLIANCE ASSURANCE MONITORING (CAM) – TITLE V PERMITS ONLY:

List sources potentially subject to CAM because they use a control device to achieve compliance and have pre-control emissions of at least 100 percent of the major source level. List the pollutant of concern and a brief summary of the CAM plan (temperature monitoring, CEMs, opacity monitoring, etc.) and frequency requirements of § 64.

Source	Pollutant Controlled	Cite Exemption or CAM Plan Monitoring and Frequency
N/A		

13. EMISSION CHANGES AND FEE CALCULATION:

See emission change and fee calculation spreadsheet in Appendix A.

14. AMBIENT AIR EVALUATIONS:

The following are results for ambient air evaluations or modeling.

a) NAAQS

A NAAQS evaluation is not required under the Arkansas State Implementation Plan, National Ambient Air Quality Standards, Infrastructure SIPs and NAAQS SIP per Ark. Code Ann. § 8-4-318, dated March 2017 and the DEQ Air Permit Screening Modeling Instructions.

b) Non-Criteria Pollutants:

The non-criteria pollutants listed below were evaluated. Based on Division of Environmental Quality procedures for review of non-criteria pollutants, emissions of all other non-criteria pollutants are below thresholds of concern.

1st Tier Screening (PAER)

Estimated hourly emissions from the following sources were compared to the Presumptively Acceptable Emission Rate (PAER) for each compound. The Division of Environmental Quality has deemed the PAER to be the product, in lb/hr, of 0.11 and the

Threshold Limit Value (mg/m^3), as listed by the American Conference of Governmental Industrial Hygienists (ACGIH).

Pollutant	TLV (mg/m^3)	PAER (lb/hr) = 0.11 × TLV	Proposed lb/hr	Pass?
Acrolein	0.23	0.0253	0.01004	Y
Arsenic	0.01	0.0011	0.000361	Y
Benzene	1.597	0.176	7.90	N
Beryllium	0.00005	5.5E-06	2.17E-05	N
Bromine (Br_2)[1]	0.65	0.0718	12.32	N
Cadmium	0.01	0.0011	0.00199	N
Chlorine	0.29	0.0159	1.13	N
Chromium	0.5	0.055	0.00253	Y
Cobalt	0.02	0.0022	0.000155	Y
Formaldehyde	1.5	0.165	0.1444	Y
Hydrazine	0.013	0.00143	0.0962	N
Hydrogen Chloride	2.98	0.3278	4.28	N
Lead	0.05	0.0055	2.35E-05	Y
Manganese	0.02	0.0022	0.000691	Y
Mercury	0.025	0.00275	0.000474	Y
Methanol	262.085	28.83	61.945	N
POM	0.2	0.022	0.000159	Y
Selenium	0.2	0.022	4.33E-05	Y
Ammonia	17.413	1.915	11.54	N
Methyl Bromide	3.883	0.427	2.17	N
H_2S	1.39	0.1529	259.72	N
Phthalic Anhydride	0.002	0.00022	3.93	N
Sulfuric Acid	0.2	0.022	0.07	N
Ethylene	0.3	0.033	8.04E-05	Y

Pollutant	TLV (mg/m^3)	PAER (lb/hr) = 0.11 × TLV	Proposed lb/hr	Pass?
Dibromide				

*Includes Bromine from Br_2+HBr.

2nd Tier Screening (PAIL)

AERMOD air dispersion modeling was performed on the estimated hourly emissions from the following sources, in order to predict ambient concentrations beyond the property boundary. The Presumptively Acceptable Impact Level (PAIL) for each compound has been deemed by the Department to be one one-hundredth of the Threshold Limit Value as listed by the ACGIH.

Pollutant	PAIL ($\mu g/m^3$) = 1/100 of Threshold Limit Value	Modeled Concentration ($\mu g/m^3$)	Pass?
Benzene	15.97	20.47[1]	N*
Beryllium	0.0005	1.0E-05[1]	Y
Bromine (Br_2)	6.5	37.0541[1]	N**
Cadmium	0.1	0.00076[1]	Y
Chlorine	2.9	2.194	Y
Hydrazine	0.13	0.12711[1]	Y
Hydrogen Chloride	29.8	12.614[1]	Y
Methanol	2,620	663.74[1]	Y
Ammonia	174.13	28.85[1]	Y
Phthalic Anhydride	0.02	5.52[2]	N***
Sulfuric Acid	2.0	1.687[1]	Y

[1]24-hr, H1H value, 2016 Shreveport Met Data.
[2]24-hr, H2H value, 2012-2016 Shreveport Met Data. SN-16-31 variable emissions over 4-hrs.
*The resulting ambient concentrations of benzene that are above the PAIL limit all occur along Albemarle's fence line. The impacted area is an industrial area where there is no risk for significant human exposure. The emissions of benzene are not expected to cause a significant impact.
**See Bromine Analysis section.
***See Phthalic Anhydride Analysis section.

Bromine Analysis

3rd Tier Screening (AEGL-1 and AEGL-2)

A Tier III screening level human health risk assessment was performed to demonstrate that permitted bromine emissions do not result in unacceptable impacts to human health. For this analysis, modeled impacts are compared to the Level1 and Level 2 Acute Exposure Guideline Levels (AEGL-1 and AEGL-2) as an alternative to PAIL screening levels.

AEGL-1 is the airborne concentration of a substance below which it is not expected that the general population, including susceptible individuals, would experience notable discomfort, irritation, or certain asymptomatic, nonsensory effects.

AEGL-2 is the airborne concentration of a substance below which it is not expected that the general population, including susceptible individuals, would experience irreversible or other serious, long lasting adverse health effects or an impaired ability to escape. Ambient air concentrations of bromine used to assess risk were predicted using air dispersion modeling. The latest version of the AERMOD modeling system (Aermod_19191) was used to estimate maximum ground-level concentrations of bromine for 1-hour, 4-hour, and 8-hour averaging periods. Meteorological data for 2012 through 2016 measured at the Shreveport, LA was used in the model. To determine both the 10-minute and 30-minute average concentration, the equation below was used:

$$Cp = Cm\ (t_m/t_p)^{0.2}$$ where,

Cp = 10-minute or 30-minute average concentration as appropriate
Cm = 1-hour average concentration
t_m = 60 minutes
t_p = 10 minutes or 30 minutes as appropriate

The highest predicted acute concentrations occur very near the facility property line. The table below compares the predicted concentrations with the AEGL-1 and AEGL-2 thresholds.

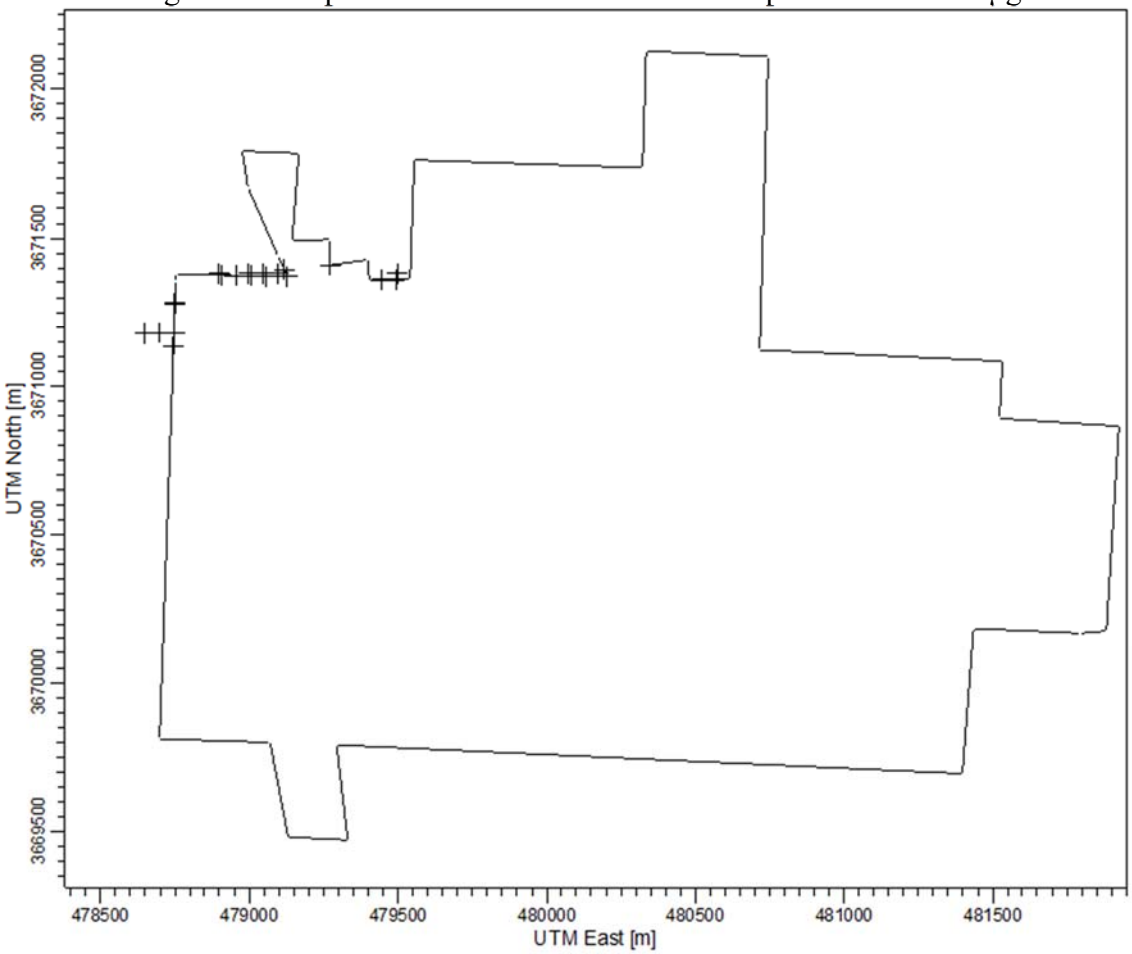
Averaging Period	Highest Modeled Impact ($\mu g/m^3$)*	AEGL-1 Value ($\mu g/m^3$)	Percent of AEGL-1	AEGL-2 Value ($\mu g/m^3$)	Percent of AEGL-2
10-minute	318.8	220	144.91%	3600	8.85%
30-minute	255.9	220	116.32%	2200	11.63%
1-hour	222.8	220	101.27%	1600	13.92%
4-hour	187.6	220	85.27%	850	22.07%
8-hour	120.2	220	54.64%	620	19.39%

* Modeled impact includes the new pilot plant added in permit #0762-AOP-R33.

Predicted concentrations at (and beyond) the facility property line are well below AEGL-2 thresholds for all averaging periods. The areas with predicted 10-minute impacts above

the AEGL-1 threshold (Figure 1) are along, or very near, the Albemarle property line. The area surrounding Albemarle's property is densely forested, rural, and uninhabited. Model results at all potentially occupied public "receptors" are less than AEGL-1. Given that the predicted concentrations above the AEGL-1 10-minute threshold are limited to only the rural, unoccupied area immediately adjacent to Albemarle's property line, it is unlikely that the public would be present in that area. A condition of pollution is not expected from short-term exposure to bromine emissions.

Figure 1. Receptors with Predicted 10-minute Impacts Above 220 µg/m^3



Phthalic Anhydride Analysis

In 2017, the ACGIH published a revised TLV for Phthalic Anhydride (PA): 0.002 mg/m^3 (IFV) and 0.005 mg/m^3 (ST). Where "IFV" is inhalable fraction and vapor, and "ST" is short term exposure limit. The IFV end-note is used when a material exerts sufficient vapor pressure such that it may be present in both particle and vapor phases, with each contributing a significant portion of the dose at the TLV – TWA concentration.

The revised TLV is significantly lower than the previously published TLV of 6 mg/m^3.

The lower TLV consequently results in a lower PAIL value of 0.02 ug/m^3 compared to the previous PAIL value 60 ug/m^3. This change has negative implications when modeling; unchanged sources that previously passed the PAIL screening, no longer pass.

The two sources contributing to PA emissions are SN-16-01 and SN-16-31. SN-16-01 consists of SO_3 railcar venting, an SO_3 storage tank, two Oleum storage tanks, and two PA/Oleum Mix Tanks, all of which are controlled by a packed scrubber. SN-16-31 is a storage tank loading operation where molten PA, offloaded from tankers/railcars, is loaded into to molten PA storage tank in batches. SN-16-01 and SN-16-31 contribute a maximum of 0.029 lb PA/hr and 3.83 lb PA/day respectively.

As noted by the ACGIH, PA emissions can be present in multiple phases. Without sophisticated monitoring or testing it is difficult to determine what portion of PA emitted will be the inhalable fraction and what will be vapor.

In August 2020, The EPA published a "Final Scope of the Risk Evaluation for Phtahlic Anhydride (1,3-Isobenzofurandione)", where the EPA describes how they plan to evaluate PA in the industry and the environment. Some key areas of the risk evaluation are: Environmental fate and transport, releases to the environment, environmental exposures, conceptual models for industrial and commercial activities and uses, data from risk assessments by other environmental agencies, occupational exposures, and general population/human health.

Environmental Fate and Transport:
EPA plans to use the environmental fate characteristics described in the table below to support the development of the risk evaluation for phthalic anhydride and its subsequent transformation into 1,2-benzenedicarboxylic acid.

Table 1. Environmental Fate Characteristics of Phthalic Anhydride and 1,2-Benzenedicarboxylic Acid

Property or Endpoint	Value[a]	Reference
Direct Photodegradation	Phthalic anhydride absorbs at wavelengths >290 nm, and therefore, may be susceptible to direct photolysis by sunlight	NLM (2015)
Indirect Photodegradation	$t_{1/2}$ = 54.6 days from OH rate constant 1.96×10^{-13} cm^3/molecules-second (12-hour day; 1.5×10^6 ·OH/cm^3)	U.S. EPA (2012b)
Hydrolysis	$t_{1/2}$ = 24.8 minutes based on first-order hydrolysis of 4.29×10^{-4}/second at 25.1 ºC; $t_{1/2}$ = 70 seconds measured at pH 0–6 and 25 ºC in buffered solutions; $t_{1/2}$ = 2.4 seconds measured at pH 8.9	NLM (2015)

Property or Endpoint	Value[a]	Reference
Biodegradation (Aerobic)[b]	85.2%/14 days with 30 mg/L sludge based on BOD; 90.5%/30 days in predominantly domestic sewage (OECD 301D); 99%/14 days (OECD 301E)	SYKE (2018)
Biodegradation (Aerobic)[b]	85.2%/14 days in activated sludge (method comparable to OECD TG 301C)	OECD (2005) citing MITI Japan (1992)
Biodegradation (Aerobic)[b]	33% TOC removal, 88% COD removal after 24 hours in aerobic activated sludge	OECD (2005) citing Matsui et al. (1975); Matsui et al. (1988)
Wastewater Treatment[b]	94% total removal (93% by biodegradation, 0.34% by sludge, 0% by volatilization to air; estimated)[c]	U.S. EPA (2012b)
Bioconcentration Factor[b]	4,053 in Oedogonium (alga); did not concentrate in water flea or snail; bioconcentration in fish may not be an important process due to rapid hydrolysis in water	NLM (2015)
Bioconcentration Factor[b]	3.2–3.4	OECD (2005) citing Bayer Industry (2004b) and Bayer Industry (2004a)
Bioaccumulation Factor[b]	4.9[c]	U.S. EPA (2012b)
Soil Organic Carbon:Water Partition Coefficient (Log KOC)[b]	0.3–1.5 (KOC = 2–31 in various soils)	OECD (2005)

[a]Measured unless otherwise noted
[b] Due to the rapid rate of hydrolysis, these data likely pertain to the hydrolysis byproduct, 1,2-benzenedicarboxyllic acid.
[c] EPI Suite™ physical property inputs: Log Kow = 1.60, BP = 295.00 °C, MP = 130.80 deg C, VP = 0.000517 mm Hg, WS = 6200 mg/L, BioP = 4, BioA = 1 and BioS = 1 SMILES O=C(OC(=O)c1cccc2)c12
Note: ·OH = hydroxyl radical; HPLC = high performance liquid chromatography; BOD = biological oxygen demand; OECD = Organisation for Economic Co-operation and Development; MITI = Ministry of International Trade and Industry, Japan; TOC = total organic carbon; COD = chemical oxygen demand

Releases to the Environment:

Phthalic anhydride is highly reactive and only exists under artificial conditions devoid of moisture and rapidly hydrolyzes to 1,2-benzenedicarboxylic acid (Phthalic Acid), when allowed contact with water or moisture present in the air. This immediate hydrolysis product, 1,2-benzenedicarboxylic, is expected to be the product found in the environment

and the proximal toxicant in contact with living organisms. EPA plans to consider the Toxics Release Inventory (TRI) program when evaluating exposure.

Environmental Exposures:
The manufacturing, processing, distribution, use and disposal of phthalic anhydride can result in releases of phthalic anhydride and its immediate hydrolysis product, 1,2-benzenedicarboxylic acid, to the environment and exposure to aquatic and terrestrial receptors. EPA plans to review reasonably available information on environmental exposure in biota to inform development of the environmental exposure assessment for 1,2-benzenedicarboxylic acid and phthalic anhydride, recognizing that phthalic anhydride **is not expected to be found in the environment**. EPA plans to review reasonably available environmental monitoring data found in the literature for phthalic anhydride and 1,2-benzenedicarboxylic acid.

Conceptual Model for Industrial and Commercial Activities and Uses:
EPA plans to evaluate activities resulting in exposures associated with distribution in commerce (e.g., loading, unloading) throughout the various lifecycle stages and conditions of use (e.g., manufacturing, processing, industrial use, commercial use, and disposal) rather than a single distribution scenario.

Review reasonably available chemical-specific release data, including measured or estimated release data (e.g., data from risk assessments by other environmental agencies):
EPA plans to match identified data to applicable conditions of use and identify data gaps where no data are found for particular conditions of use. EPA plans to attempt to address data gaps by considering potential surrogate chemicals that have similar uses and physical properties.

Additionally, for conditions of use where no measured data on releases are reasonably available, EPA may use a variety of methods including release estimation approaches and assumptions in the Chemical Screening Tool for Exposures and Environmental Releases (ChemSTEER).

Occupational Exposures:
EPA plans to evaluate worker activities where there is a potential for exposure under the various conditions of use (e.g., manufacturing, processing, industrial/commercial uses, and disposal). In addition, EPA plans to evaluate exposure to occupational non-users (ONUs), i.e., workers who do not directly handle the chemical but perform work in an area where the chemical is present. EPA also plans to consider the effect(s) that engineering controls (EC) and/or personal protective equipment (PPE) have on occupational exposure levels as part of the risk evaluation.

Phthalic anhydride has an Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL). The PEL is 2 ppm or 12 mg/m3 over an 8-hour workday, time weighted average (TWA). National Institute for Occupational Safety and Health (NIOSH) has set the Recommended Exposure Limit (REL) at 1 ppm (6 mg/m3)

TWA and the Immediately Dangerous to Life or Health Concentration (IDLH) at 60 mg/m3. The American Conference of Governmental Industrial Hygienists (ACGIH) set the threshold limit value (TLV) at 0.002 mg/m3 TWA, with a Short-Term Exposure Limit (STEL) of 0.005 mg/m3.

General Population:

EPA plans to analyze general population exposures as follows:

1. Refine and finalize exposure scenarios for the general population by considering sources conditions of use, exposure pathways and routes.
2. For exposure pathways where empirical data is not reasonably available, review existing exposure models that may be applicable in estimating exposure levels.
3. Review reasonably available exposure modeled estimates. For example, existing models developed for a previous phthalic anhydride and/or 1,2-benzenedicarboxylic acid chemical assessment may be applicable to EPA's assessment. In addition, another chemical's assessment may also be applicable if model parameter data are reasonably available.
4. Review reasonably available information on releases to determine how modeled estimates of concentrations near industrial point sources compare with reasonably available monitoring data.
5. Review reasonably available information about population- or subpopulation-specific exposure factors and activity patterns to determine if PESS need to be further defined (e.g., early life and/or puberty as a potential critical window of exposure).
6. Evaluate the weight of the scientific evidence of general population exposure estimates based on different approaches.

Human Health:

EPA plans to analyze human health hazards as follows:

1. Review reasonably available human health hazard data, including data from alternative test methods (e.g., computational toxicology and bioinformatics; high-throughput screening methods; data on categories and read-across; in vitro studies; systems biology).
2. Review reasonably available human health hazard data, including data from alternative test methods (e.g., computational toxicology and bioinformatics; high-throughput screening methods; data on categories and read-across; in vitro studies; systems biology).
3. Conduct hazard identification (the qualitative process of identifying non-cancer and cancer endpoints) and dose-response assessment (the quantitative relationship between hazard and exposure) for identified human health hazard endpoints.
4. Derive points of departure (PODs) where appropriate; conduct benchmark dose modeling depending on the reasonably available data. Adjust the PODs as appropriate to conform (e.g., adjust for duration of exposure) to the specific exposure scenarios evaluated.
5. Evaluate the weight of the scientific evidence of human health hazard data.

6. Consider the route(s) of exposure (e.g., oral, inhalation, dermal), reasonably available route-to-route extrapolation approaches; biomonitoring data; and approaches to correlate internal and external exposures to integrate exposure and hazard assessment.
7. Conduct a human health risk estimation and characterization of phthalic anhydride and 1,2-benzenedicarboxylic acid.

Since no PA emissions have changed with this permit revision (0762-AOP-R34) and EPA is in the process of further evaluating the environmental effects/reactions of PA, PA emissions will be evaluated against the previously published TLV of 6 mg/m^3 which equates to a PAIL value of 60 ug/m^3.

Pollutant	PAIL (µg/m^3) = 1/100 of Threshold Limit Value	Modeled Concentration (µg/m^3)	Pass?
Phthalic Anhydride	60.00	5.52	Y

Louisiana has established its own "Toxic Air Pollutant Ambient Air Standards" for PA, among other pollutants. For PA, the 8-Hour average ambient standard is 145 µg/m^3. This standard is based on one forty-second of the selected occupational exposure level, or other data determined to be superior by the administrative authority. For completeness, the 8-hr modeled concentration, for SN-16-01 and 31, was compared against the Louisiana 8-hr, 145 µg/m^3 standard.

Pollutant	Toxic Air Pollutant Ambient Air Standards (µg/m^3) (8-hr Avg.)	8-hr Modeled Concentration (µg/m^3)	Pass?
Phthalic Anhydride	145	17.13	Y

Based on the information provided in the Phthalic Anhydride Analysis section, a condition of pollution is not expected from exposure to Phthalic Anhydride emissions.

c) H_2S Modeling:

A.C.A. §8-3-103 requires hydrogen sulfide emissions to meet specific ambient standards. Many sources are exempt from this regulation, refer to the Arkansas Code for details.

Is the facility exempt from the H_2S Standards N
If exempt, explain:_____

Pollutant	Threshold value	Modeled Concentration (ppb)	Pass?
H_2S	20 parts per million	211.16	Y

Pollutant	Threshold value	Modeled Concentration (ppb)	Pass?
	(5-minute average*)		
	80 parts per billion (8-hour average) residential area	56.21	Y
	100 parts per billion (8-hour average) nonresidential area	52.61	Y

*To determine the 5-minute average use the following equation

$Cp = Cm\ (t_m/t_p)^{0.2}$ where

Cp = 5-minute average concentration
Cm = 1-hour average concentration
t_m = 60 minutes
t_p = 5 minutes

15. CALCULATIONS:

SN	Emission Factor Source (AP-42, Testing, etc.)	Emission Factor and units (lbs/ton, lbs/hr, etc.)	Control Equipment Type (if any)	Control Equipment Efficiency	Comments (Emission factor controlled/uncontrolled, etc.)
BR-01	Testing	1.5 lb/hr VOC 0.26 lb/hr BR_2 0.06 lb/hr Cl_2	Scrubber		99% Control for Bromine and Chlorine
BR-04	Testing	3.81 lb/hr VOC 0.14 lb/hr BR_2 0.03 lb/hr Cl_2	Scrubber		99% Control for Bromine and Chlorine
BR-08A/B	TANKS	1.1 lb/hr VOC 0.24 lb/hr HCl 1.10 lb/hr Benzene	N/A	N/A	
BR-09	Mass Balance	0.02 lb/hr HBr 0.02 lb/hr Br_2	Scrubber		99% Control for Br_2 and HBr
BR-12	Testing	0.10 lb/hr Cl_2 0.30 lb/hr Br_2	Scrubber	99.9%	
BR-14	SOCMI	0.50 lb/hr VOC 0.04 lb/hr Cl_2 1.39 lb/hr Br_2+HBr			
BR-15	Testing	1.63 lb/hr Halogens			
SL-01	AP-42 1.4-1 and 2	Flare Pilot lb/mmscf PM_{10}: 11.18			Primary Scenario, 200 scfh natural gas

SN	Emission Factor Source (AP-42, Testing, etc.)	Emission Factor and units (lbs/ton, lbs/hr, etc.)	Control Equipment Type (if any)	Control Equipment Efficiency	Comments (Emission factor controlled/uncontrolled, etc.)
		NO_x: 94 CO: 40 VOC: 11 SO_2: 0.6			
SL-01	Mass Balance	3.7 lb/hr PM/PM_{10} 31.4 lb/hr NO_x 13.4 lb/hr CO 3.7 lb/hr VOC 12,066 lb/hr SO_2			Alternate Scenario #1, emergency flaring of Brinefield gas. Sulfur plant feed gas 139,127 scfh + sweet gas 195,284 scfh = 334,411 scfh flared
SL-01	Mass Balance	2.2 lb/hr PM/PM_{10} 18.4 lb/hr NO_x 7.8 lb/hr CO 2.2 lb/hr VOC 5.6 lb/hr SO_2			Alternate Scenario #2, emergency flaring of sweet gas. 195,284 scfh sweet gas flared
SL-02	Mass Balance	0.12 lb/hr VOC			
SR-01	AP-42 1.4-1 and 2 Mass Balance	<u>lb/mmscf</u> PM_{10}: 11.18 NO_x: 94 CO: 40 VOC: 11 SO_2: 727 lb/hr			Primary Operating Scenario
SR-01	Mass Balance	242.6 lb/hr SO_2 257.4 lb/hr H_2S			Alternate Operating Scenario: Tail Gas Pilot Flame Deviation (<1200 ºF)
SR-02	SOCMI	0.7 lb/hr VOC 0.15 lb/hr SO_2 0.38 lb/hr Methanol 0.30 lb/hr H_2S			
SR-03	Mass Balance	0.42 lb/hr SO_2 0.22 lb/hr H_2S			8,760 hr/yr
CB-01	Mass Balance	0.1 lb/hr PM_{10}	Baghouse	99%	
CB-04	Mass Balance	26.00 lb/hr VOC			1,000,000 gal/yr
CB-16	Mass Balance	0.27 lb/hr VOC	Scrubber		
CB-17	SOCMI	1.16 lb/hr VOC 0.0038 lb/hr Hydrazine 0.37 Br2+HBr 0.88 lb/hr Methanol			
CB-18	Mass Balance	0.1 lb/hr PM_{10} 0.06 lb/hr HAP			Baghouse, control is included in emission rate

SN	Emission Factor Source (AP-42, Testing, etc.)	Emission Factor and units (lbs/ton, lbs/hr, etc.)	Control Equipment Type (if any)	Control Equipment Efficiency	Comments (Emission factor controlled/uncontrolled, etc.)
CB-21	Mass Balance	9.35E-05 lb/hr HAP			
CB-22a	Mass Balance	1.02E-04 lb/hr HAP			
CB-22b	Mass Balance	1.02E-04 lb/hr HAP			
CB-23	Mass Balance	5.0 lb/hr VOC 1.97E-03 lb/hr HAP			
CB-23	Mass Balance	5.9 lb MeOH/Batch			Alternate scenario limited to 185 batches/yr
DE-01	Mass Balance	0.5 lb/hr VOC			ADMA Brine Storage Tank (Additional ADMA Storage Scenario)
AD-01	TANKS	0.16 lb/hr VOC			
AD-02	TANKS	0.16 lb/hr VOC			
AD-03	TANKS	0.26 lb/hr VOC			
AD-05	VOC TANKS HCl Mass Balance	0.30 lb/hr VOC 0.10 lb/hr HCl			
AD-07	TANKS	0.05 lb/hr VOC			
AD-08	TANKS	0.05 lb/hr VOC			
AD-09	TANKS	0.05 lb/hr VOC			
AD-10	TANKS	0.26 lb/hr VOC			
AD-11	TANKS	0.26 lb/hr VOC			
AD-12	TANKS	0.26 lb/hr VOC			
AD-13	TANKS	0.26 lb/hr VOC			
AD-14	TANKS	0.26 lb/hr VOC			
AD-15	TANKS	0.26 lb/hr VOC			
AD-16	AP-42 Sec. 1.4	See Tables 1.4-1 and 1.4-2	None	None	3.55 MMBtu/hr
AD-17	TANKS	0.26 lb/hr VOC			
AD-18	TANKS	0.26 lb/hr VOC			
AD-20	TANKS	0.16 lb/hr VOC			
AD-21	TANKS	3.45 lb/hr VOC			
AD-23	TANKS	0.03 lb/hr VOC			
AD-24	TANKS	0.26 lb/hr VOC			
AD-25	TANKS	0.26 lb/hr VOC			
AD-26	AP-42	See Section 14.1			2.77 MMscf/hr nat gas
AD-27	TANKS	0.26 lb/hr VOC			
AD-28	TANKS	0.08 lb/hr VOC			
AD-29	TANKS	0.08 lb/hr VOC			
AD-32	AP-42 Section 1.4	0.04 lb/hr PM_{10} 0.01 lb/hr SO_2			4.62 MMBtu/hr

SN	Emission Factor Source (AP-42, Testing, etc.)	Emission Factor and units (lbs/ton, lbs/hr, etc.)	Control Equipment Type (if any)	Control Equipment Efficiency	Comments (Emission factor controlled/uncontrolled, etc.)
		0.03 lb/hr VOC 0.38 lb/hr CO 0.45 lb/hr NO_X			
AD-35	Facility Knowledge Testing Computer Simulation	0.22 lb/hr PM_{10} 0.15 lb/hr SO_2 1.22 lb/hr VOC 0.06 lb/hr CO 0.70 lb/hr NO_X			2.5 MMbtu/hr
AD-36	SOCMI	4.48 lb/hr VOC 1.41 lb/hr HBr 0.29 lb/hr Br_2 0.04 lb/hr Ethylene Glycol < 0.001 lb/hr Hydrazine			
AD-37	TANKS	0.05 lb/hr VOC			
AD-39	Mass Balance	0.08 lb/hr VOC			ADMA Additional Storage Alternate Operating Scenario Loadout Emissions
AD-40	Mass Balance	0.26 lb/hr VOC			
AD-41	Mass Balance	0.6 lb/hr VOC			
AB-15	Testing	1.20 lb/hr VOC			
AB-16	SOCMI	7.19 lb/hr VOC 0.11 lb/hr HCl 0.02 lb/hr HBr 0.29 lb/hr MeCl			
AB-18	EPA Water9	1.44 lb/hr VOC 0.34 lb/hr MeCl			
DB-01	Mass Balance	0.44 lb/hr Halogens 0.10 lb/hr HCl	Scrubber		Includes assumed scrubber efficiency of 99.9% Can also treat HCl emissions from DB-07
DB-02	TANKS	0.10 lb/hr VOC			
DB-07	Mass Balance	0.10 lb/hr VOC 5.10 lb/hr HCl			
DB-16	SOCMI	1.44 lb/hr VOC 1.39 lb/hr HBr 1.07 lb/hr Br_2			
DB-17	Mass Balance	0.10 lb/hr Halogens			Includes assumed scrubber efficiency of 99.8%
DB-19	Mass Balance	1.00 lb/hr Br_2 +HBr 0.972 lb/hr PM/PM_{10}	Scrubber		85% Control for PM/PM_{10} and 40% control for Br_2+HBr

SN	Emission Factor Source (AP-42, Testing, etc.)	Emission Factor and units (lbs/ton, lbs/hr, etc.)	Control Equipment Type (if any)	Control Equipment Efficiency	Comments (Emission factor controlled/uncontrolled, etc.)
DB-20	Mass Balance	0.9 lb/hr VOC			
TB-01	TANKS	0.26 lb/hr VOC			
TB-05	Mass Balance	0.45 lb/hr PM_{10}	K-tron Filter	99.9%	
TB-08 (NC-22)	Mass Balance	0.30 lb/hr PM_{10}	Baghouse	95%	
TB-11	Mass Balance	0.1 lb/hr VOC			ADMA Brine Storage Tank (Additional ADMA Storage Scenario)
TB-14 (Stabrom)	Mass Balance	0.30 lb/hr Halogens			
TB-14 (NC-22)	Mass Balance	0.10 lb/hr Halogens			
TB-29 (Stabrom)	SOCMI	0.30 lb/hr Halogens			
TB-29 (NC-22)	SOCMI	1.45 lb/hr VOC 0.36 lb/hr HBr 0.22 lb/hr Br_2 0.06 lb/hr HCl 0.10 MeCl			
TB-41 (NC-22)	Mass Balance	18.40 lb/hr VOC 0.2 lb/he MeCl 0.05 lb/hr HBr 0.01 lb/hr HCl 0.01 lb/hr Br_2	Carbon Beds/ Scrubber	50%/99%	No carbon bed control eff. Applied for Br_2.
TB-42 (NC-22 C)	TANKS	0.03 lb/hr VOC (as Bromochloromethane) 0.18 lb/hr HBr 0.01 lb/hr HCl 0.01 lb/hr Br_2			
TB-43 (NC-22)	Mass Balance	0.63 lb/hr VOC			
TB-44 (NC-22)	Mass Balance	0.2 lb/hr PM/PM_{10}	Baghouse	99.93%	
TB-45 (NC-22)	TANKS	1.174E-04 lb/hr Hydrazine			

SN	Emission Factor Source (AP-42, Testing, etc.)	Emission Factor and units (lbs/ton, lbs/hr, etc.)	Control Equipment Type (if any)	Control Equipment Efficiency	Comments (Emission factor controlled/uncontrolled, etc.)
TB-47	Mass Balance	50.5 lb/hr VOC 0.70 lb/hr $MeCl_2$	Carbon Adsorption		96% Control for VOC
TB-48	Mass Balance	0.20 lb/hr PM/PM_{10}	Fabric Filter	99.9%	
TB-49	Mass Balance	0.30 lb/hr PM/PM_{10}			
15-02	Mass Balance	0.20 lb/hr Halogens	Scrubber	99.99%	
15-12	Facility Knowledge AP-42 Section 1.4 Testing	0.101 lb/hr Br_2+HBr/batches per day 80 lb CO/MMscf 100 lb NO_x/MMscf 0.6 lb SO_2/MMscf 3.1 lb/hr PM/PM_{10} 2.17 lb VOC/hr	Scrubber	90%	Includes assumed Venturi Scrubber efficiency of 85% for PM/PM_{10}. Scrubber efficiency of 90% for Br_2+HBr
15-13	Mass Balance	0.79 lb/hr VOC			
15-14A 15-14B 15-21	AP-42 Section 1.4	<u>lb/MMscf</u> PM_{10}: 7.6 SO_2: 0.6 VOC: 5.5 CO: 84 NO_X: 100			2.15 MMBtu/hr, each
15-15	SOCMI	0.98 lb/hr VOC 0.02 lb/hr HCl 0.18 lb/hr HBr 1.13 lb/hr Br_2			
15-16	Mass Balance	1.20 lb/hr VOC	Scrubber	85%	
15-17	Mass Balance	0.69 lb/hr VOC			
15-18	Mass Balance	1.10 lb/hr VOC			
15-20	Mass Balance	6.90 lb/hr VOC			
16-01	Mass Balance	0.50 lb/hr SO_2 0.10 lb/hr PM_{10}	Scrubber	99%	
16-02	Mass Balance Testing	0.40 lb/hr SO_2 0.10 lb/hr VOC 0.1 lb/hr Br_2	Scrubber		Includes assumed Venturi Scrubber efficiency of 99%
16-05	Mass Balance	0.10 lb/hr VOC	Scrubber		Includes assumed Venturi Scrubber efficiency of 99%
16-06	Mass Balance	0.10 lb/hr VOC 0.40 lb/hr PM/PM_{10}	Scrubber/ Baghouse (Teflon	99.8%/ 99%	

SN	Emission Factor Source (AP-42, Testing, etc.)	Emission Factor and units (lbs/ton, lbs/hr, etc.)	Control Equipment Type (if any)	Control Equipment Efficiency	Comments (Emission factor controlled/uncontrolled, etc.)
			coated filter bags)		
16-07	Testing	0.30 lb/hr PM_{10}	Baghouse		Baghouse control is included in emission rate
16-08	Testing	0.30 lb/hr PM_{10}	Baghouse		Baghouse control is included in emission rate
16-10	Testing	0.50 lb/hr PM_{10} 0.066lb/hr SO_2	Baghouse		Baghouse control is included in emission rate
16-12	Testing	0.10 lb/hr PM_{10}	Baghouse		Baghouse control is included in emission rate
16-13	Mass Balance	0.10 lb/hr SO_2	Scrubber		Scrubber control is included in emission rate
16-14	Mass Balance	0.10 lb/hr VOC	Carbon Drum		ER based on max venting during filling
16-15	Mass Balance	0.01 lb/hr VOC	Carbon Drum		ER based on max venting during filling
16-16	Mass Balance	0.10 lb/hr SO_2			
16-17	Mass Balance	0.02 lb/hr VOC (as ethylene glycol)			Max flow 200 gpm
16-18	AP-42 Section 1.4	7.6 lb/MMscf PM_{10} 0.60 lb/MMscf SO_2 100 lb/MMscf NO_X 84 lb/MMscf CO 8 lb/MMscf VOC	Thermal Oxidizer	95%	VOC control only
16-19	Testing (PM_{10}) Mass Balance (SO2)	0.30 lb/hr PM_{10} 0.10 lb/hr SO_2	Baghouse		Baghouse control is included in emission rate
16-20	AP-42 Section 1.4	7.6 lb/MMscf PM_{10} 0.60 lb/MMscf SO_2 100 lb/MMscf NO_X 84 lb/MMscf CO 5.5 lb/MMscf VOC			4.4 MMBtu/hr
16-21	Testing (PM10) Mass Balance (VOC)	0.20 lb/hr PM_{10} 0.40 lb/hr VOC	Baghouse		Baghouse control is included in emission rate

SN	Emission Factor Source (AP-42, Testing, etc.)	Emission Factor and units (lbs/ton, lbs/hr, etc.)	Control Equipment Type (if any)	Control Equipment Efficiency	Comments (Emission factor controlled/uncontrolled, etc.)
16-22	Mass Balance	0.01 lb/hr PM_{10} 0.01 lb/hr VOC	Filter/ Carbon Drum	95%	
16-23	SOCMI	6.34 lb/hr VOC 0.89 lb/hr SO_2 0.05 H_2SO_4 0.62 lb/hr Br_2 0.09 lb/hr Ethylene Glycol 0.68 lb/hr Xylene			
16-28	Mass Balance	0.10 lb/hr SO_2			
16-30	AP-42 Sec. 1.4	7.6 lb/MMscf PM_{10} 0.60 lb/MMscf SO_2 100 lb/MMscf NO_X 84 lb/MMscf CO 5.5 lb/MMscf VOC			1.2 MMBtu/hr 8,760 hr/yr
16-31	Mass Balance	3.83 lb/hr VOC (as Phthalic Anhydride)			
BH-01 BH-02	Testing (SO_2, VOC, NO_X, CO) AP-42 (PM_{10})	2.59 lb/hr PM_{10} 5.60 lb/hr SO_2 1.87 lb/hr VOC 13.60 lb/hr CO 47.60 lb/hr NO_X			Emission rates are for each boiler except SO_2. The emission rate for SO_2 is bubbled all sources.
BH-03 BH-04	AP-42, Testing, Vendor Data	lb/MMscf PM/PM10: 7.6 VOC: 5.5 CO/NO_x: 37 Lead: 5.0E-04 SO_2: 5.6 lb/hr			
21-01	AP-42 Sec. 1.4 Mass Balance	7.6 lb/MMscf PM_{10} 0.60 lb/MMscf SO_2 100 lb/MMscf NO_X 1.8 lb/hr VOC 5.0 lb/hr CO	VGO	98%	Emissions are calculated every six months. Control efficiency only applied to VOC's.
21-02	SOCMI	4.78 lb/hr VOC			

SN	Emission Factor Source (AP-42, Testing, etc.)	Emission Factor and units (lbs/ton, lbs/hr, etc.)	Control Equipment Type (if any)	Control Equipment Efficiency	Comments (Emission factor controlled/uncontrolled, etc.)
		0.34 lb/hr Methanol 0.19 lb/hr HCl 1.37 lb/hr Benzene			
21-03	Mass Balance	0.01 lb/hr VOC/Benzene			Emissions are calculated annually.
21-04	Testing	2.16 lb/hr VOC/Benzene 0.77 lb/hr HCl			
21-05	AP-42 Section 1.4	lb/MMscf PM_{10}: 7.6 SO_2: 0.6 VOC: 5.5 CO: 84 NO_X: 100			13.5 MMBtu/hr
23-01	SOCMI	*NC-23 Scenario* 1.12 lb/hr VOC *MeBr Scenario* 2.33 lb/hr VOC 0.97 lb/hr MeOH 0.97 lb/hr MeBr			
23-02	Mass Balance	0.10 lb/hr PM_{10}	Baghouse		Baghouse control is included in emission rate
23-03	*NC-23 Scenario* Testing *MeBr Scenario* Mass Balance	*NC-23 Scenario* 0.35 lb/hr VOC *MeBr Scenario* 27.37 lb/hr VOC 27.37 lb/hr MeOH	Scrubber		
23-04	Mass Balance	0.44 lb/hr VOC			
23-05	*NC-23 Scenario* Testing *MeBr Scenario* Mass Balance	*NC-23 Scenario* 2.90 lb/hr VOC *MeBr Scenario* 1.60 lb/hr VOC 0.40 lb/hr MeOH 0.90 lb/hr MeBr			
23-06 23-07 23-08	Mass Balance (PM_{10}) Testing (VOC/HBr)	0.60 lb/hr PM 0.30 lb/hr PM_{10} 3.80 lb/hr VOC 0.23 lb/hr HBr	Baghouse		Baghouse control is included in emission rate
23-09	Mass Balance	0.10 lb/hr PM_{10}	Baghouse		Baghouse control is included in emission rate

SN	Emission Factor Source (AP-42, Testing, etc.)	Emission Factor and units (lbs/ton, lbs/hr, etc.)	Control Equipment Type (if any)	Control Equipment Efficiency	Comments (Emission factor controlled/uncontrolled, etc.)
23-10	Mass Balance	0.10 lb/hr PM_{10}	Baghouse		Baghouse control is included in emission rate
23-11A 23-11B	Mass Balance	0.10 lb/hr PM_{10}	Baghouse		Baghouse control is included in emission rate
23-12A 23-12B	Mass Balance	0.10 lb/hr PM_{10}	Baghouse		Baghouse control is included in emission rate
23-13	Mass Balance	0.10 lb/hr PM_{10}	Baghouse		Baghouse control is included in emission rate
23-16	Mass Balance	0.10 lb/hr MeOH 0.01 lb/hr H_2SO_4			
23-17	Mass Balance	0.01 lb/hr Ethylene Glycol			
23-18	Mass Balance	0.01 lb/hr Ethylene Glycol			
TB-30	Mass Balance	0.01 lb/hr H_2SO_4			
BT-01	Mass Balance	0.01 lb/hr VOC 0.14 lb/hr H_2S			
BT-11	Mass Balance	0.01 lb/hr VOC 0.01 lb/hr H_2S 0.20 lb/hr NH_3 0.03 lb/hr Halogens			
BT-13	Mass Balance	0.01 lb/hr VOC 0.01 lb/hr H_2S 0.02 lb/hr NH_3 0.01 lb/hr Halogens			
BT-12, BT-23, BT-24, BT-25, BT-26, BT-27, BT-28	Mass Balance	0.01 lb/hr VOC 0.01 lb/hr NH_3 0.01 lb/hr Halogens			Emission rates for each source.
BT-16	Mass Balance	30.00 lb/hr VOC 0.01 lb/hr H_2S			
BT-17	TANKS	16.40 lb/hr VOC 0.01 lb/hr H_2S			
BT-21	Mass Balance and Testing	2.7 lb/hr PM_{10} 1.56 lb/hr VOC			PM/PM_{10} SF of 2.1 all other pollutants SF of 1.4
BT-22	Engineering Estimate	0.02 lb/hr VOC			2x tail brine tank emissions
DM-01	TANKS	0.025 lb/hr VOC			

SN	Emission Factor Source (AP-42, Testing, etc.)	Emission Factor and units (lbs/ton, lbs/hr, etc.)	Control Equipment Type (if any)	Control Equipment Efficiency	Comments (Emission factor controlled/uncontrolled, etc.)
DM-02	AP-42 Section 1.4 Testing Mass Balance	0.50 lb/hr PM/PM_{10} 6.00 lb/hr SO_2 0.10 lb/hr VOC 0.10 lb/hr CO 0.31 lb/hr NO_X			1.12 MMBtu/hr SO_2 Determined by mass balance. PM_{10} EF is from stack testing. NOx from mass balance.
DM-03 DM-06	TANKS	0.81 lb/hr H_2O_2			Emission rates for each source.
DM-07	SOCMI	4.10 lb/hr VOC 0.08 Ethylene Glycol 0.10 lb/hr H_2O_2			
MS-01	Water9	6.00 lb/hr VOC			Calculate emission rate once every six months
MS-02	Mass Balance	0.10 lb/hr VOC			Calculate emission rate once every six months
MS-03	Test Sample Data	0.1 lb/hr VOC			
MS-05	Mass Balance	0.67 lb/hr VOC			
MS-06	Mass Balance	0.50 lb/hr SO2 7.00 lb/hr VOC			
MS-07	TANKS	47.70 lb/hr VOC			
MS-08 -01 -02 -03 -04 -05 -06 -08	AP-42	See AP-42 Sections 3.2 3.3			Emission rates are based on worst case fuel combustion. VOC emission rate includes an estimate for non-combustion emissions (evaporation, crankcase, and refueling losses).
MS-08-07	AP-42 and NSPS IIII	g/hp-hr NO_x: 3 CO: 2.6 VOC: 3 PM: 0.15 lb/hp-hr SO_2:2.05E-03			
MS-08-09	AP-42 and NSPS IIII	g/hp-hr NO_x: 3.5 CO: 3.7 PM: 0.3 lb/hp-hr SO_2:2.05E-03 VOC:2.2E-03			
MS-12	SOCMI	14.14 lb/hr Refrigerant			Combined all Non-VOC/Non-HAP

SN	Emission Factor Source (AP-42, Testing, etc.)	Emission Factor and units (lbs/ton, lbs/hr, etc.)	Control Equipment Type (if any)	Control Equipment Efficiency	Comments (Emission factor controlled/uncontrolled, etc.)
					Refrigerant emissions for the entire facility
MS-13	AP-42 13.2.6-1	PM: 0.027 lb/lb PM_{10}: 0.013 lb/lb	N/A	N/A	Abrasive usage 2,000 lb/hr 312,000 lb/yr
24-01	Mass Balance	48.5 lb/hr VOC 0.10 lb/hr HBr 0.10 lb/hr Acetone 0.10 lb/hr HCl 0.1 lb/hr 1,2-Epoxybutane			Primary Operating VOC emissions from the reactor before flaring are 48.5 lb/hr
24-01	Mass Balance	48.5 lb/hr VOC 0.10 lb/hr HBr 0.10 lb/hr Acetone 0.10 lb/hr HCl 0.1 lb/hr			VOC missions are not sent to a flare but emitted directly to the atmosphere HBr and HCl are scrubbed out by the wash column.
24-02	SOCMI	1.2 lb/hr VOC 0.1 lb/hr HBr 0.1 lb/hr Acetone 0.1 lb/hr HCl 0.1 lb/hr 1,2-Epoxybutane 0.2 lb/hr Ethylene Glycol			
33-01	Mass Balance ChemCAD Manufacturer HCl Stack Test	1.90 PM_{10} lb/hr 0.10lb/hr SO_2 5.15 lb/hr VOC 1.68 lb/hr CO 8.71 lb/hr NO_X 1.60 lb/hr H_2S 1.00 lb/hr Br_2 0.10 lb/hr HBr 0.20 lb/hr HCl 1.04 lb/hr Benzene 0.01 lb/hr Bromoform 1.28 lb/hr Xylene 0.01 lb/hr Phenol 1.29 lb/hr Toluene		99.9% VOC	Emission factors are based on maximum feed rate 1,380 lb/hr brominated VOC compounds
33-02	SOCMI	5.15E-05 lb/hr Benzene 9.14E-03 lb/hr Bromoform 4.08E-05 lb/hr Hexane			

SN	Emission Factor Source (AP-42, Testing, etc.)	Emission Factor and units (lbs/ton, lbs/hr, etc.)	Control Equipment Type (if any)	Control Equipment Efficiency	Comments (Emission factor controlled/uncontrolled, etc.)
		1.29E-05 lb/hr Isooctane 2.75E-04 lb/hr Phenol 1.01E-04 lb/hr Toluene 4.59E-04 lb/hr Xylene			
33-03	Mass Balance	0.10 lb/hr PM_{10}	Fabric Filter	99.93%	<3 micron
33-04	Mass Balance	1.17E-04 lb/hr N_2H_4			
AL-01 AL-02 AL-03 AL-04 AL-05	Confidential Information	Confidential Information	Carbon Beds	90-95%	Throughput 87.6 tpy 20 tph
			Caustic Scrubber	98%	
			Water Trap	50%	

16. TESTING REQUIREMENTS:

The permit requires testing of the following sources.

SN(s)	Pollutant	Test Method	Test Interval	Justification For Test Requirement
BR-01 BR-04	VOC	18/25A	5 year	Compliance Verification
BR-01 BR-04 BR-12	Br_2 Cl_2	26A	5 year	Compliance Verification
SR-01	SO_2	6C	5 year	Compliance Verification
CB-16	Br_2	26A	5 year	Compliance Verification
CB-16 (Alternate)	VOC	18 or 25A	Every 365 days operation	Compliance Verification
AD-05	VOC HBr	18 or 25A 26A	5 year	Compliance Verification
AD-35	PM_{10} SO_2 VOC CO NO_X	5 6C 18/25A 10B 7E	2 years	Compliance Verification
AD-35	Br_2	26A	5 year	Compliance Verification
DB-01	Br_2	26A	5 year	Compliance Verification
DB-19	Br_2	26A	5 year	Compliance Verification

SN(s)	Pollutant	Test Method	Test Interval	Justification For Test Requirement
TB-14 (Stabrom)	Br_2 BrCl Cl_2	26A 26A 26A	5 year	Compliance Verification
15-12	VOC	18 or 25A	5 year	Compliance Verification
15-12	PM_{10}	5	5 year	Compliance Verification
15-12	Br_2	26A	5 year	Compliance Verification
15-16	PM_{10}	5	5 year	Compliance Verification
16-02	Br_2	26A	5 year	Compliance Verification
BH-01 BH-02	SO_2 VOC CO NO_X	6C 18/25A 10 7E	5 year	Compliance Verification
21-04	VOC	Approved Method	5 year after initial compliance	Compliance Verification
23-03	VOC	18	5 year	Compliance Verification
23-05	VOC	18	5 year	Compliance Verification
23-06 23-07 23-08	VOC	18	5 year, one silo, must be in receiving mode	Compliance Verification
23-06 23-07 23-08	HBr	26A	5 year, one silo, must be in receiving mode	Compliance Verification
DM-02	PM_{10} VOC CO NO_X	5 18 10 7E	5 year	Compliance Verification
DM-02	SO_2	6C	2 year	Compliance Verification
33-01	VOC HCl	25A 26A	Every Calendar Year	Compliance Verification
33-01	Br_2	26A	5 Year	Compliance Verification

17. MONITORING OR CEMS:

The permittee must monitor the following parameters with CEMS or other monitoring equipment (temperature, pressure differential, etc.)

SN	Parameter or Pollutant to be Monitored	Method of Monitoring (CEM, Pressure Gauge, etc)	Frequency	Report (Y/N)
BR-01 BR-04	Flow Rate	Flow Rate Monitor Alarm	Continuously	Y
SR-01	Temperature	Thermocouple	Continuously	N

SN	Parameter or Pollutant to be Monitored	Method of Monitoring (CEM, Pressure Gauge, etc)	Frequency	Report (Y/N)
AD-05	Scrubber Media Flow Rate	Flow Rate Monitor	Continuously	N
AD-35	Temperature	Thermocouple	Continuously	N
23-05	Liquid to Gas Mass Flow Rate	Flow Rate Monitor	Continuously	N
23-05	Stripper Temperature	Thermocouple	Continuously	N
TB-25 (NC-24)	Coolant Temperature	Thermocouple	Continuously (Compliance is demonstrated using daily averages)	N
15-02	Br_2	CEM	Continuously	N
15-12	Br_2	CEM	Continuously	N
16-01	Scrubber Media Flow Rate	Flow Rate Monitor	Every 3 hours	N
16-01	Scrubber Media pH	pH Monitor	Every 3 hours	N
16-02	Scrubber Media Flow Rate	Flow Rate Monitor	Every 3 hours	N
16-02	Scrubber Media pH	pH Monitor	Every 3 hours	N
16-05	Scrubber Media Flow Rate	Flow Rate Monitor	Every 3 hours	N
16-05	Scrubber Media pH	pH Monitor	Every 3 hours	N
16-06	Scrubber Media Flow Rate	Flow Rate Monitor	Every 3 hours	N
16-06	Scrubber Media pH	pH Monitor	Every 3 hours	N
16-13	Scrubber Media Flow Rate	Flow Rate Monitor	Every 3 hours	N
BH-01 BH-02 BH-03 BH-04	H_2S Concentration / Gas Flow Rate	H_2S Concentration Monitor / Flow Rate Monitor	Continuously for concentration Once every six hours for flow rate	N
21-01	Process Gas Flow Rate into Oxidizer	Flow Rate Monitor	Continuously	N
21-01	Combustion Zone Temperature	Thermocouple	Continuously	N
23-03	Scrubber media Flow Rate	Flow Rate Monitor Alarm	Continuously	N
23-05	Scrubber media Flow Rate	Flow Rate Monitor Alarm	Continuously	N
DM-02	Combustion Zone Temperature	Thermocouple	Continuously	N
24-01	Water Flow Rate	Flow Rate Monitor	Continuously	N

SN	Parameter or Pollutant to be Monitored	Method of Monitoring (CEM, Pressure Gauge, etc)	Frequency	Report (Y/N)
	Chilled Water Temperature	Thermocouple		
33-01	Combustion Zone Temperature	Thermocouple	Continuously	N
	Scrubber Media Flow Rate	Flow Rate Meter	Continuously	N
	Evaporative Cooling Water Flow Rate	Flow Rate Meter	Continuously	N
	Solids Concentration in Evaporative Cooling Water	Sampling	Weekly	N
	Brue Feed Tank Feed Rate	Flow Meter	Continuously	Y
AL-02	Scrubber Solution Flow Rate	Flow Rate Monitor Alarm	Continuously	N

18. RECORDKEEPING REQUIREMENTS:

The following are items (such as throughput, fuel usage, VOC content, etc.) that must be tracked and recorded.

SN	Recorded Item	Limit (as established in permit)	Frequency	Report (Y/N)
BR-01 BR-04	Brine Solution Flow Rate	Established according to most recent satisfactory test	Per Alarm Incident	Y
BR-12	Pump Discharge Valve Position and Run Light	Established according to most recent satisfactory test	3 hours	Y
BR-12	Caustic Concentration of Scrubber Media	Strength of caustic solution as established according to most recent satisfactory test	Each RailCar/Truck Unloading	Y
SR-01	Incinerator Temperature	1200 °F or above	Continuous	N
CB-04	Methanol Throughput	10^6 gallon per consecutive 12 months	Monthly	Y
CB-16	Batch Production (Alternate Scenario)	185 batches per consecutive 12 months	Monthly	Y
CB-18	Raw Material Baghouse Products	Identity of each compound, TLV, amount of each compound	Per Batch	N
AD-05	Scrubber Media Flow Rate	Established according to most recent satisfactory test	4 hour	N

SN	Recorded Item	Limit (as established in permit)	Frequency	Report (Y/N)
AD-05	Caustic Concentration of Scrubber Media	Strength of caustic solution and change out as established according to most recent satisfactory test	12 hour	N
AD-21	Period of Storage of C8 Olefin	Not to exceed 4380 hours per consecutive 12 months	Monthly	N
AD-35	Incinerator Temperature	1500 °F or above	Continuous	N
AD-39	Duration of each Alternate Scenario Event and Vapor Pressure	2.9 tpy VOC as calculated from mass balance and records	Per Event	N
AB-15	Carbon Bed Regeneration/Carbon Replacement	Regenerate every 12 hours Replace Every 10,220 hours of operation	N/A	N
DB-01	Caustic Concentration of Scrubber Media	Must measure greater than 5%	12 hour	N
		Replace caustic when concentration falls below 5%	As Needed	N
	Scrubber Media Pumps	Visual Inspections	Once Per Day	N
DB-07	Dried Tanks of Diphenyl Oxide	150 tanks per year	Monthly	N
23-05	Liquid to Gas Mass Flow Rate Ratio	L/G ≥ 5.7	Continuous	N
23-05	Stripper Temperature	170 ºF or above	Continuous	Y
TB-25 (NC-24)	Glycol Coolant Temperature	Maximum Daily Ave 40 °F	Daily	N
TB-47 (NC-22)	Tons of off-spec product processed	660 tons/12 month	Monthly	Y
15-18 15-20	DPE Production By-Product Generation	140,000 lbs/week By-Product Throughput	Weekly	N
16-01	Scrubber Media Flow Rate	6 gpm	3 hours	N
16-01	Scrubber Media pH	Established according to most recent satisfactory test	3 hours	N
16-02	Scrubber Media Flow Rate	60 gpm	3 hours	N
16-02	Scrubber Media pH	Established according to most recent satisfactory test	3 hours	N
16-05	Scrubber Media Flow Rate	4 gpm	3 hours	N
16-05	Scrubber Media pH	Established according to most recent satisfactory test	3 hours	N
16-06	Scrubber Media Flow Rate	6 gpm	3 hours	N

SN	Recorded Item	Limit (as established in permit)	Frequency	Report (Y/N)
16-06	Scrubber Media pH	Established according to most recent satisfactory test	3 hours	N
16-13	Scrubber Media Flow Rate	4 gpm	3 hours	N
16-14	Carbon Canister Replacement	Once every year	Annually	N
16-15	Carbon Canister Replacement	Once every year	Annually	N
16-22	Carbon Canister Replacement	Once every year	Annually	N
16-24	Hours of Operation	1,752 hours per year	Per Event	N
16-24	Scrubber Media Flow Rate	6 gpm	3 hours	N
16-31	Phthalic Anhydride Throughput	18.25 MM lb per consecutive 12 months	Monthly	Y
BH-01 BH-02 BH-03 BH-04	H_2S Concentration in fuel	Established according to most recent satisfactory test for SO_2 at BH-01 and BH-02.	6 hours	N
BH-01 BH-02 BH-03 BH-04	Fuel Flow Rate	Established according to most recent satisfactory test at BH-01 and BH-02.	6 hours	N
BH-03 BH-04 21-05	Fuel Combusted	N/A	Daily	N
BH-03 BH-04	Temporary Status of Boiler	See Specific Condition #170c.	As Necessary to verify boiler is temporary	N
21-01	Combustion Zone Temperature	1400 ºF Min.	Continuous	N
NC-22 Unit	Number of Batches Produced	3,137 batches per consecutive 12 months	Monthly	Y
23-03	Scrubber Media Flow Rate	Minimum flow rate set point established according to most recent satisfactory test.	Per Alarm Incident	N
23-04	By-Product Drum Turnovers	96 turnovers per day	Daily	N
23-05	Scrubber Media Flow Rate	Minimum flow rate set point established according to most recent satisfactory test.	Per Alarm Incident	N
23-14	Cleaning Cycles	If less than 75 cycles per year then monthly recordkeeping of number of cycles.	Monthly	Y
		If more than 75 cycles per year then compliance demonstrated through emission calculations.	Monthly	

SN	Recorded Item	Limit (as established in permit)	Frequency	Report (Y/N)
NC-23 CMPU	Primary Reactor Throughput for ABRM1	1.725 Million Pounds of ABRM1 per year	Monthly	Y
DM-02	Combustion Zone Temperature	1200 °F or above	24 hours	N
MS-02	Amount of Solids Transferred to Landfill (MS-06)	Based on Semi-Annual Emission Calculations	Monthly	N
MS-03	Amount of Water Recovered	82.0 million gallons per year (total)	Monthly	N
MS-05	Coating and Adhesives Usage	100 gallons per year	Monthly	N
MS-06	All Matter Disposed	24 million pounds per consecutive 12 months	Monthly	N
MS-07	Gasoline Throughput	200,000 gallons per consecutive 12 months	Monthly	N
MS-08 -01 -02 -03 -04 -05 -06 -07 -08 -09	Hours of Operation Reason of Operation (*i.e.* testing, readiness checks, emergency, *etc.*)	Non-Emergency: 100 hr per calendar year per engine Emergency: No Limit	Monthly	Y
MS-13	Abrasive Throughput	312,000 lbs per rolling 12 months	Monthly	Y
24-01	Water Flow Rate	Minimum Daily Ave. 1,700 lb/hr	Daily	N
	Chilled Water Temperature	Maximum Daily Ave. 60 ºF		
24-01	Duration of each event while operating in alternate Scenario	0.60 tpy VOC calculated based on mass balance and recordkeeping		
NC-24 Unit	Gallons of Product	2,800,000 gallons per year	Monthly	Y
	1,2-Epoxybutane Usage	50,000 gallons per year		
	Venting to SN-AD-26	24-hours per consecutive 12 months. If venting exceeds 24 hours calculate emissions for each event.		
33-01	Feed Tank Feed Rate to Thermal Oxidizer	1,380 lb/hr	Monthly	Y
	Thermal Oxidizer Temperature	Minimum 1,750 °F	Continuously	Y
	Scrubber Media (Brine) Flow Rate	350 gpm	Continuously	N

SN	Recorded Item	Limit (as established in permit)	Frequency	Report (Y/N)
	Evaporative Cooling Water Flow Rate	20 gpm	Continuously	N
	Evaporative Cooling Water Solids (including TDS)	183 mg/l	Weekly	N
Pilot Plant	Flame Retardant Product Throughput	175,200 pounds of flame retardant product	Monthly	N
AL-02	Scrubber Solution Flow Rate Incidents And Corrective Action	if flow rate falls below 4.5 gpm	Continuously	N

19. OPACITY:

SN	Opacity %	Justification (NSPS limit, Dept. Guidance, etc)	Compliance Mechanism (daily observation, weekly, control equipment operation, etc)
BR-01	5	Department Guidance	Inspector's Observation
BR-04	5	Department Guidance	Inspector's Observation
BR-09	5	Department Guidance	Inspector's Observation
BR-12	5	Department Guidance	Inspector's Observation
SL-01	5	Department Guidance	Inspector's Observation
SR-01	5	Department Guidance	Inspector's Observation
CB-01	5	Department Guidance	Inspector's Observation
CB-16	5	Department Guidance	Inspector's Observation
CB-18	5	Department Guidance	Inspector's Observation
AD-05	5	Department Guidance	Inspector's Observation
AD-16	5	Department Guidance	Inspector's Observation
AD-26	5	Department Guidance	Inspector's Observation
AD-32	5	Department Guidance	Inspector's Observation
AD-35	5	Department Guidance	Inspector's Observation
DB-01	5	Department Guidance	Inspector's Observation
DB-17	5	Department Guidance	Inspector's Observation
DB-19	5	Department Guidance	Inspector's Observation
TB-05	5	Department Guidance	Inspector's Observation
TB-08	5	Department Guidance	Inspector's Observation
TB-14	5	Department Guidance	Inspector's Observation
TB-44	5	Department Guidance	Inspector's Observation
TB-48	5	Department Guidance	Inspector's Observation
15-02	5	Department Guidance	Inspector's Observation
15-12	5	Department Guidance	Inspector's Observation
15-14A	5	Department Guidance	Inspector's Observation

SN	Opacity %	Justification (NSPS limit, Dept. Guidance, etc)	Compliance Mechanism (daily observation, weekly, control equipment operation, etc)
15-14B	5	Department Guidance	Inspector's Observation
15-16	5	Department Guidance	Inspector's Observation
15-21	5	Department Guidance	Inspector's Observation
16-01	5	Department Guidance	Inspector's Observation
16-02	5	Department Guidance	Inspector's Observation
16-06	5	Department Guidance	Inspector's Observation
16-07	5	Department Guidance	Inspector's Observation
16-08	5	Department Guidance	Inspector's Observation
16-10	5	Department Guidance	Inspector's Observation
16-12	5	Department Guidance	Inspector's Observation
16-18	5	Department Guidance	Inspector's Observation
16-19	5	Department Guidance	Inspector's Observation
16-20	5	Department Guidance	Inspector's Observation
16-21	5	Department Guidance	Inspector's Observation
16-22	5	Department Guidance	Inspector's Observation
16-29	5	Department Guidance	Inspector's Observation
16-30	5	Department Guidance	Inspector's Observation
BH-01	5	Department Guidance	Inspector's Observation
BH-02	5	Department Guidance	Inspector's Observation
BH-03	5	Department Guidance	Inspector's Observation
BH-04	5	Department Guidance	Inspector's Observation
21-01	5	Department Guidance	Inspector's Observation
21-05	5	Department Guidance	Inspector's Observation
23-02	5	Department Guidance	Inspector's Observation
23-06	5	Department Guidance	Inspector's Observation
23-11A	5	Department Guidance	Inspector's Observation
23-11B	5	Department Guidance	Inspector's Observation
23-12A	5	Department Guidance	Inspector's Observation
23-12B	5	Department Guidance	Inspector's Observation
23-13	5	Department Guidance	Inspector's Observation
BT-11	5	Department Guidance	Inspector's Observation
BT-12	5	Department Guidance	Inspector's Observation
BT-13	5	Department Guidance	Inspector's Observation
BT-21	5	Department Guidance	Inspector's Observation
DM-02	5	Department Guidance	Inspector's Observation
MS-08-X	20/5	§19.503 and Part 52, Subpart E	Inspector's Observation
MS-13	20%	Rule 19.503	Monthly Observation
33-01	5	Department Guidance	Inspector's Observation
33-03	5	Department Guidance	Inspector's Observation

20. DELETED CONDITIONS:

Former SC	Justification for removal
N/A	

21. GROUP A INSIGNIFICANT ACTIVITIES:

The following is a list of Insignificant Activities including revisions by this permit.

INSIGNIFICANT ACTIVITIES				
SN	Description	Category	Pollutant	ton/yr
BR-05	Recovered Groundwater Storage Tank, T-3045	A13	VOC Bromoform Ethylene Dibromide Ethylene Dichloride Toluene Br_2	1.453 <0.01 <0.01 <0.01 <0.01 <0.01
BR-16	C-12 Olefin Storage (up to 10,000 gal total capacity)	A3	VOC	0.07
SL-03	Sulfinol Storage Sump (S-1901)	A3	Sulfolane DIPA	<0.01 <0.01
SL-04	MDEA Storage Tank (T-5001)	A3	MDEA	<0.01
CB-10	Wash Water Tank	A13	VOC HCl HBr Acetone	0.01 0.01 0.01 0.01
CB-20	Formic Acid Storage Bins	A13	Formic Acid	<0.01
DE-05	Pressure Vessel	A13	No Emissions	N/A
DB-03	DB-03 H_2SO_4 Tank	A3	HAP	0.044
DB-23	DPE Heavies	A3	VOC	0.4
AD-38	Alcohol Addition System	A13	VOC	0.022
AB-17	T-703 Ethylene Glycol Storage Tank	A3	VOC Ethylene Glycol	0.002 0.002
TB-13	Refrigerant Storage Tank	A13	VOC Ethylene Glycol	<0.01 <0.01
TB-26	Sulfuric Acid Storage Tank Alternate Use: Ethylene Glycol Storage	A3	VOC H_2SO_4 Ethylene Glycol	<0.001 <0.001 <0.001
TB-27	Refrigerant Storage Tank	A3	VOC	<0.001
TB-36	Water Scrubber Tank	A3	VOC	<0.001
TB-40	Raw Material Weigh Vessel	A13	PM/PM_{10}	0.44
TB-43	During NC-22 Scenario B	A13	VOC	0.10
TB-50	Heating System Expansion Tank	A13	VOC	<0.01
--	Hot Water Tank, T-602	A13	VOC	0.00
16-09	EBTBP Ambient Dust Collector SF9398	A13	PM/PM_{10}	0.05

INSIGNIFICANT ACTIVITIES				
SN	Description	Category	Pollutant	ton/yr
--	Ethylene Glycol Tanks, T-93952, T-9393, T-9351, T-9359, T-9392	A3	Ethylene Glycol	0.005
--	Hot Oil Expansion Tank / Heat Transfer fluid Tank, T-9354	A2	VOC	0.003
--	Hot Oil Surge Tank, D-3490	A13	VOC	0.007
BT-02	Purchased Brine Surge Tank, T-3017	A13	VOC H_2S	0.05 0.05
BT-03	Brine/Oil Separator OS-3002	A13	VOC H_2S	0.05 0.09
BT-04	Feed Brine Pump Suction Header Vent	A13	VOC H_2S	0.05 0.05
BT-05	Overflow Line Vent	A13	VOC H_2S	0.05 0.05
BT-06	Overflow Line Vent	A13	VOC H_2S	0.05 0.05
BT-07	Feed Brine Pump Suction Header Vent	A13	VOC H_2S	0.05 0.05
BT-08	Brine/Oil Separator Outlet Line Vent	A13	VOC H_2S	0.05 0.05
BT-09	Overflow Line Vent	A13	VOC H_2S	0.05 0.05
BT-10	Brine/Oil Separator Outlet Line Vent (OS-3002)	A13	VOC H_2S	0.05 0.05
BT-14	Vacuum Pump Vent	A13	H_2S	0.001
BT-15	Overflow Line Vent	A13	VOC H_2S	0.05 0.05
BT-18	Brine Underflow Line Vent	A13	VOC H_2S	0.05 0.05
BT-19	Brine Underflow Line Vent	A13	VOC H_2S	0.05 0.05
BT-20	Brine Underflow Line Vent	A13	VOC H_2S	0.05 0.05
BT-30	Brine Management Line Vent	A13	VOC Chlorine Ammonia	0.05 Trace 0.05
DM-04	Catalyst Loading	A13	PM/PM_{10}	0.01
DM-05	Stabilizer Hopper	A13	PM/PM_{10}	0.01
--	Solid Waste Vault No. 2	A13	PM/PM_{10} VOC	0.05 0.05
--	Outfall 002 Bioreactor	A13	Chlorine	0.01
--	PSV-1 Sumps	A13	VOC Bromoform	0.01 0.001
MS-09	Diesel fuel Storage Tanks (up to 10,000 gallons total capacity)	A3	VOC	0.12
MS-10	Gasoline Storage Tanks (up to 2,000 gallons total capacity)	A13	VOC HAPs	1.27 0.07

INSIGNIFICANT ACTIVITIES				
SN	Description	Category	Pollutant	ton/yr
MS-11	Cooling Towers (Maintenance/Support Facilities)	A13	PM/PM_{10} Chlorine	3.30 Trace
--	Drinking Water Treatment and Distribution	A13	Chlorine	0.01
--	Quality Control Laboratory	A5	VOC HAPs	2.39 0.71
--	200 gallon Hot Oil Tank (CP-6000-68)	A3	VOC	0.007
--	pH Adjustment Bag Dumping	A13	PM/PM_{10}	0.009
16-32	H_2SO_4 Tank	A3	HAPs	0.001
--	T-9358 H_2SO_4 Tank	A3	HAPs	0.001
21-05	D3680 Hot Oil Drain	A13	VOC	<0.001
--	Hydrocyclone Tank (T-6630)	A13	VOC HAPs	0.12 0.07
	Hydrocyclone Tank (T-6631)	A13	VOC HAPs	0.12 0.07
--	Central Vacuum	A13	PM	0.32
--	Painting activities not related to the plant's primary business	B14	-	N/A
--	Welding activities not related to the plant's primary business	B14	-	N/A
Totals for Category A2			VOC	0.003
Totals for Category A3			VOC Sulfolane MDEA Total HAP	0.60 0.01 0.01 0.049
Totals for Category A13			VOC PM PM_{10} H_2S HBr Formic Acid Any Single HAP Total HAP	3.767 4.189 4.189 0.691 <0.10 0.01 0.055 0.321

22. VOIDED, SUPERSEDED, OR SUBSUMED PERMITS:

The following is a list of all active permits voided/superseded/subsumed by the issuance of this permit.

Permit #
0762-AOP-R33

APPENDIX A – EMISSION CHANGES AND FEE CALCULATION

Fee Calculation for Major Source

Revised 03-11-16

Facility Name: Albemarle Corporation - South Plant
Permit Number: 0762-AOP-R34
AFIN: 14-00028

$/ton factor	28.14	Annual Chargeable Emissions (tpy)	4579.981
Permit Type	Minor Mod	Permit Fee $	500

Minor Modification Fee $	500
Minimum Modification Fee $	1000
Renewal with Minor Modification $	500
Check if Facility Holds an Active Minor Source or Minor Source General Permit	☐
If Hold Active Permit, Amt of Last Annual Air Permit Invoice $	0
Total Permit Fee Chargeable Emissions (tpy)	0.1
Initial Title V Permit Fee Chargeable Emissions (tpy)	

HAPs not included in VOC or PM: *Chlorine, Hydrazine, HCl, HF, Methyl Chloroform, Methylene Chloride, Phosphine, Tetrachloroethylene, Titanium Tetrachloride*

Air Contaminants: *All air contaminants are chargeable unless they are included in other totals (e.g., H2SO4 in condensible PM, H2S in TRS, etc.)*

Pollutant (tpy)	Check if Chargeable Emission	Old Permit	New Permit	Change in Emissions	Permit Fee Chargeable Emissions	Annual Chargeable Emissions
PM		116	116	0	0	116
PM_{10}		102.6	102.6	0		
$PM_{2.5}$		0	0	0		
SO_2		3293.1	3293.1	0	0	3293.1
VOC		499	499.1	0.1	0.1	499.1
CO		188.6	188.6	0		
NO_X		500	500	0	0	500
Total HAP	☐	108.96	108.96	0		

Pollutant (tpy)	Check if Chargeable Emission	Old Permit	New Permit	Change in Emissions	Permit Fee Chargeable Emissions	Annual Chargeable Emissions
Benzene	☐	18.42	18.42	0		
Br2+Cl2	☐	0.1	0.1	0		
Cl2	☑	3.64	3.64	0	0	3.64
Cl2 or Halogens	☐	0.62	0.62	0		
HCl	☑	9.48	9.48	0	0	9.48
Hydrazine	☑	0.451	0.451	0	0	0.451
Methanol	☐	21.24	21.24	0		
Methyl Bromide	☐	9.54	9.54	0		
Methylene Chloride	☑	5.83	5.83	0	0	5.83
Acetone	☑	0.4	0.4	0	0	0.4
Ammonia	☑	47.23	47.23	0	0	47.23
Br2	☑	28.95	28.95	0	0	28.95
Br2+HBr	☑	20.48	20.48	0	0	20.48
BrCl	☑	0.88	0.88	0	0	0.88
H2O2	☑	7.54	7.54	0	0	7.54
H2S	☑	13.27	13.27	0	0	13.27
H2SO4	☑	0.32	0.32	0	0	0.32
HBr	☑	23.69	23.69	0	0	23.69
Refrigerant	☐	9.62	9.62	0	0	9.62
	☐	0	0	0		
	☐	0	0	0		
	☐	0	0	0		
	☐	0	0	0		
	☐	0	0	0		
	☐	0	0	0		
	☐	0	0	0		
	☐	0	0	0		
	☐	0	0	0		
	☐	0	0	0		