

## STATEMENT OF BASIS

For the issuance of Draft Air Permit # 0860-AR-9 AFIN: 18-00081

1. PERMITTING AUTHORITY:

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

2. APPLICANT:

BASF Corporation  
 100 Bridgeport Road  
 West Memphis, Arkansas 72301

3. PERMIT WRITER:

Bart Patton

4. NAICS DESCRIPTION AND CODE:

NAICS Description: All Other Basic Organic Chemical Manufacturing  
 NAICS Code: 325199

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, De minimis/Minor Mod, or Administrative Amendment)	Short Description of Any Changes That Would Be Considered New or Modified Emissions
11/1/2018	De Minimis	Increase production at SN-P2-4; Increase throughput at SN-P2-6; Increase equipment leaks at SN-FS-2
6/6/2019	Modification	Add SN-MI-6; Add items to the I.A. List
2/20/2020	Modification	Remove SN-P1-1, 3, 4, and 8; Remove SN-P1-9 and reassign reactor R-107 to SN-P1-7; Remove SN-P2-2; Increase throughput at SN-P2-4 and 6; Remove sources SN-P3-4, 10, 11, and 12; Remove fuels other than nat gas for SN-P3-6 and SN-P4-5; Remove SN-P4-6 and 8; Reassign FS-1 to individual sources; Increase hours of operation for SN-MI-1 through 5

6. REVIEWER'S NOTES:

BASF Corporation, located at 100 Bridgeport Road in West Memphis, Arkansas, owns and operates a facility which manufactures chemicals, primarily intermediate synthetic organic chemicals used in water treatment applications.

This permit modification makes the following changes:

P1 Building:

- Remove TAAC Process (SN-P1-1) and its associated equipment, Reactor 104
- Remove Poly Epamine Process and its associated equipment, Reactor 106 (SN-P1-3) and Reactor 114 (SN-P1-4)
- Remove Tank Farm 200 (SN-P1-8)
- Remove Crude mDMDAC Process and its associated source SN-P1-9 (Reactor 107 as used in this process; Reactor 107 continues to be used in other processes)

P2 Building:

- Remove Storage Vessel 102 (SN-P2-2)
- Increase throughput at Urethane Product Group I (SN-P2-4 ) and Tank Farm #100 (SN-P2-6)

P3 Building:

- Remove Reactors, Tanks, P3 Wash System, and Methanol Recovery (SN-P3-1)
- Remove Tank Farm 600 (SN-P3-2)
- Remove Tank Farm 400 (SN-P3-3)
- Remove Boiler #1 (SN-P3-4)
- Remove provisions for fuels other than natural gas for Boiler #3 (SN-P3-6)
- Remove Wash Tanks (SN-P3-10)
- Remove Methanol Recovery Process (SN-P3-11)
- Remove Tank Farm 700 (SN-P3-12)

P4 Building:

- Remove provisions for fuels other than natural gas for Boiler #4 (SN-P4-5)
- Remove 25,000-gallon Diesel Fuel Tanks (SN-P4-6 and SN-P4-8)

Fugitive Sources:

- Move emissions from loading, unloading, and drumming from Loading/Unloading/Drumming (SN-FS-1) to their respective processes and sources
- Correct the fugitive component counts from recent modifications (SN-FS-2)

Miscellaneous Sources:

- Increase maximum annual hours of operation for engines MI-1 through MI-5 from 100 (MI-2 through 5) or 200 hours (MI-1 only) to 500 hours each, and recalculate emissions using the latest AP-42 factors
- Add Emergency Electrical Generator (SN-MI-6) to permit, installed 1999

Other:

- Incorporate provisions of the Non-Criteria Pollutant Control Strategy (NCPCS) for Total HAPs
- Replace VOC and HAP recordkeeping with hourly limits (for engines) or maximum emission calculations
- Add waste toluene and waste acetates shipping to the Insignificant Activities List

Annual emissions increases are as follows (in tpy): MDI, 0.01; TDI, 0.01; Total HAP, 11.18.

Annual emissions decreases are as follows (in tpy): PM/PM<sub>10</sub>, -0.3; SO<sub>2</sub>, -6.5; VOC, -56.5; CO, -7.0; NO<sub>x</sub>, -16.1; Acetone, -1.90; Allyl Chloride, -0.87; Epichlorohydrin, -0.36; Methanol, -6.87; Methyl Methacrylate, -3.22; MIBK, -0.08; Toluene, -3.07.

7. COMPLIANCE STATUS:

The following summarizes the current compliance of the facility including active/pending enforcement actions and recent compliance activities and issues.

The facility was inspected on April 2, 2019, and found not to be in compliance with its permit, because of process changes that affected the FS Fugitive Emissions bubble, and because of an unpermitted engine, SN-MI-6. These issues were addressed in an enforcement letter dated August 9, 2019, and are being addressed in this permit modification.

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? N/A

b) Is the facility categorized as a major source for PSD? N

- *Single pollutant ≥ 100 tpy and on the list of 28 or single pollutant ≥ 250 tpy and not on list*

9. SOURCE AND POLLUTANT SPECIFIC REGULATORY APPLICABILITY:

Source	Pollutant	Regulation (NSPS, NESHAP or PSD)
SN-P3-6	SO <sub>2</sub>	NSPS Subpart Dc
SN-P4-5	SO <sub>2</sub>	NSPS Subpart Dc
SN-P4-1	VOC	NSPS Subpart NNN
SN-P4-1	VOC	NSPS Subpart RRR
SN-P4-2*	VOC	NSPS Subpart Kb
SN-MI-5	NO <sub>x</sub>	NSPS IIII
SN-P3-7, SN-P3-16, SN-MI-1 through 6	HAPs	NESHAP ZZZZ
SN-P3-8	HAPs	NESHAP CCCCCC

\*The source numbers represent tank farms. For specific tank numbers affected by Kb, see the table below.

Tanks				
Source	Tank #	Location	Capacity	Contents
P4-2	T-303	P4	32,120	Byproduct MeOH
	T-304	P4	32,120	Byproduct MeOH

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
None				

11. PERMIT SHIELD – TITLE V PERMITS ONLY:

This section is not applicable for this minor source permit.

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.

1<sup>st</sup> 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 ( $\text{mg}/\text{m}^3$ ), as listed by the American Conference of Governmental Industrial Hygienists (ACGIH).

Pollutant	TLV ( $\text{mg}/\text{m}^3$ )	PAER (lb/hr) = $0.11 \times \text{TLV}$	Proposed lb/hr	Pass?
MDI	0.0512	5.63E-3	4.74E-7	Y
TDI	0.007125	7.84E-4	2.09E-4	Y

Toluene has a TLV greater than  $1 \text{ mg}/\text{m}^3$ , and the facility does not emit more than 10 tpy.

Source	Toluene tpy
P1-7	2.07
P2-4	4.94
P2-6	0.24
FS-2	0.90
FS-3	0.31
Total from Combustion	<0.01
IA A-13	0.10
Total	8.57

c) No other modeling was required.

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)
P1-5	EPA Tanks IV software	T-500 Tank Farm vessels contain water-based, low vapor pressure materials. Small VOC losses expected.	-	-	23.57 lb VOC/yr. Loss is assumed to be steady-state, so 8760 hr/yr.
P1-7 R-107	Facility data	Reactor can be used for one of two processes (DSX Epi Intermediates or DSX Epi) at a given time. Worst case per-batch losses of 32.7 lb VOC, 32.0 lb toluene, 0.7 lb epichlorohydrin, 0.01 Butyl Carbitol (glycol ether)	Scrubber	90%	129 batches/yr; hourly emissions averaged over the process time.
P2-4 R-108	Ideal Gas Law, Dalton's Law.	Reactor can be used for one of two processes (Rheovis urethanes I and II) at a given time. Worst case, lb/hr, tpy: VOC: 1.28, 5.59 (Rheovis type I) Toluene: 1.128, 4.939 tpy (type I) Glycol Ether: 0.00102, 0.00449 (type II)	-	-	Each hourly limit is for worst-case pollutant and process, but reactor can only be used for one process at a time; hourly emissions are averaged over the batch process time
P2-5 R-109	Ideal Gas Law, Dalton's Law.	Reactor can be used for one of two Versamid processes at a given time. Worst case, lb/hr, tpy: VOC: 0.48, 2.09 (Versamid type II) MDI: 4.74E-7, 2.08E-6 (type II)	-	-	

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)
P2-6	EPA Tanks IV software.	1,333.03 lb/yr VOC 468.53 lb/yr Toluene 0.13 lb/yr Glycol Ether	-	-	-
P3-6	EPA AP-42, Small boilers NG fired AP-42, 1.4-1 through 1.4-3	<u>Lb/MMscf</u> PM/PM <sub>10</sub> 7.6 SO <sub>2</sub> 0.6 VOC 5.5 CO 84 NO <sub>x</sub> 100  <u>Lb/MMBtu</u> Total HAP 1.88	-	-	29.4 MMBTU/hr 8,760 hr/yr 1000 Btu/scf
P3-7 P3-16	EPA AP-42, Diesel-fired RICE AP-42, 3.3-1 through 3.3-3	<u>Lb/hp-hr</u> PM/PM <sub>10</sub> 0.0022 SO <sub>2</sub> 0.00205 VOC 0.00247 CO 0.00668 NO <sub>x</sub> 0.031  <u>Lb/MMBtu</u> Total HAP 0.00413	-	-	368 hp 500 hr/yr 2544 Btu/hp-hr @ 36.3% efficiency = 2.57904 MMbtu/hr
P3-8	EPA Tanks IV software.	394 lb/yr VOC/HAP	-	-	Gasoline tank.



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)																
P4-1	Facility data (scrubber column samples) from a sister plant in England.	Inlet and outlet lb/hr values for each component given for each component. 0.42 lb/hr VOC 0.22 lb/hr MEOH	Caustic and Acid Scrubbers and Carbon Beds	97% and 99%																	
P4-2	EPA Tanks IV software.	2398 lb/yr VOC, no HAP	-	-	-																
P4-3	EPA AP-42, 5.2, Equation 1	$\text{Equation L} = 12.46 * (\text{SPM}/t) * (1 - \text{eff})$ <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">pollutant</td> <td style="text-align: right;">lb/yr</td> </tr> <tr> <td>MAC</td> <td style="text-align: right;">166</td> </tr> <tr> <td>DME</td> <td style="text-align: right;">8</td> </tr> <tr> <td>TiPT</td> <td style="text-align: right;">216</td> </tr> <tr> <td>IPA</td> <td style="text-align: right;">67</td> </tr> <tr> <td>FA-1</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Methanol (HAP)</td> <td style="text-align: right;">50</td> </tr> <tr> <td colspan="2" style="text-align: right;"><b>509 lb/yr VOC [0.26 tpy]</b></td> </tr> </table>	pollutant	lb/yr	MAC	166	DME	8	TiPT	216	IPA	67	FA-1	2	Methanol (HAP)	50	<b>509 lb/yr VOC [0.26 tpy]</b>		Vapor recovery	98%	Hourly emissions assumed highest VOC/HAP loading conducted in one hour period. Saturation factor S = 1.45.
pollutant	lb/yr																				
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DME	8																				
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FA-1	2																				
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<b>509 lb/yr VOC [0.26 tpy]</b>																					
P4-4 FS-2	EPA Guidance Document	SOCMI Fugitive Factors SOCMI Fugitive Factors for less than 10,000 ppm (non-leaker factor) EPA-453/R-95-017	-	-																	

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)
P4-5	EPA AP-42, Small boilers NG fired AP-42, 1.4-1 through 1.4-3	<u>Lb/MMscf</u> PM/PM <sub>10</sub> 7.6 SO <sub>2</sub> 0.6 VOC 5.5 CO 84 NO <sub>x</sub> 100  <u>Lb/MMBtu</u> Total HAP 1.88	-	-	33.5 MMBTU/hr 8,760 hr/yr 1000 Btu/scf
FS-3	WATER9 Modeling	From the Output: 0.00928 g/s VOC 0.000514 g/s methanol 1.20E-38 g/s sulfuric acid 0.00876 g/s toluene	-	-	Total VOC 0.1 lb/hr, 0.4 ton/yr. Total toluene 0.07 lb/hr, 0.31 tpy.

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)
MI-1 MI-2 MI-3 MI-4 MI-5 MI-6	EPA AP-42, Table 3.3-1 and 3.3-3, Diesel Fuel	Diesel (#2 fuel oil) emission factors. PM/PM <sub>10</sub> , 0.0022 lb/hp-hr SO <sub>2</sub> , 0.00205 lb/hp-hr VOC, 0.0025 lb/hp-hr CO, 0.00668 lb/hp-hr NO <sub>x</sub> , 0.031 lb/hp-hr Total HAP, 0.00413 lb/MMBtu	-	-	500 hr/yr per engine. (hp rating / 36.3% eff) x 2544 Btu/hp-hr x 1 MMBtu / 10 <sup>6</sup> Btu = MMBtu/hr  MI-1: 170 hp MI-2: 2,935 hp MI-3: 270 hp MI-4: 685 hp, 511 kW MI-5: 108 hp, 80 kW MI-6: 48 hp

16. TESTING REQUIREMENTS:

The permit requires testing of the following sources.

SN	Pollutants	Test Method	Test Interval	Justification
None				

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)**
SN-P4-1	Scrubbing Fluid Flow Caustic/Acid Concentrations	Flow Meter pH Meter	3 hrs-flow 7 days-caustic and acid	No

\* Indicate frequency of recording required for the parameter (Continuously, hourly, daily, etc.)

\*\* Indicates whether the parameter needs to be included in reports.

Note 1: The 3-hour caustic and acid sampling was adjusted to once every 7 operating days for the P-4-I scrubbers, due to the supplementary monitoring data submitted May 11, 2000.

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)
SN-P3-7 SN-P3-16 SN-MI-1 through SN-MI-6	Operating Hours, Emergency or Non-Emergency	500 hr/yr each engine	Per event	No
SN-P3-8	Gasoline Throughput under NESHAP CCCCC	10,000 gallons/month (SC #73 and 74)	Monthly	No
SN-P4-1	Scrubbing Fluid Flow Caustic/Acid Concentrations	40 gpm at each column 3% caustic and 3% acid	Flow-3 hr Concentration- 7 days	No

SN	Recorded Item	Limit (as established in permit)	Frequency	Report (Y/N)
SN-P4-4	Number of valves, pumps, relief valves, flanges, and compressors at the P4 unit, to calculate SN-P4-4 emissions	Emission limits in SC#1 and #2	Annually	No
FS-2	Number of valves, pumps, relief valves, flanges, and compressors at buildings P1, P2, and P3, to calculate FS-2 emissions	Emission limits in SC#1 and #2	Annually	No

## 19. OPACITY:

SN	Opacity %	Justification (NSPS limit, Dept. Guidance, etc)	Compliance Mechanism (daily observation, weekly, control equipment operation, etc)
SN-P3-6	5%	§18.501	Inspector's Observation
SN-P3-7 SN-P3-16	20%	§19.503	Inspector's Observation
SN-P4-5	5%	§18.501	Inspector's Observation
SN-MI-1 through SN-MI-6	20%	§19.503	Inspector's Observation

## 20. DELETED CONDITIONS:

Former SC	Justification for removal
6, 7	SN-P1-1 removed
8	SN-P1-9 removed
9-12	VOC and HAP recordkeeping replaced with maximum emission (8,760 hr/yr) calculations
13	SN-P3-1 removed
15-17	Methanol, Isopropanol, and No. 2 Fuel Oil removed for SN-P3-6
19-20	VOC and HAP recordkeeping replaced with hourly limits (for engines) or maximum emission (8,760 hr/yr) calculations
23-25	Methanol, Isopropanol, and No. 2 Fuel Oil removed for SN-P4-5
32, 33	SN-FS-1 removed
36	Hourly usage limit for SN-MI-1 changed to match SN-MI-2 through 6
41-43	VOC and HAP recordkeeping replaced with hourly limits (for engines) or maximum emission (8,760 hr/yr) calculations

## 21. GROUP A INSIGNIFICANT ACTIVITIES:

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

Source Name	Group A Category	Emissions (tpy)							
		PM/ PM <sub>10</sub>	SO <sub>2</sub>	VOC	CO	NO <sub>x</sub>	HAPs		Other
							Single	Total	
Centrifuges C3 & C4 in the P1 mDADMAC Process	A-13			No volatiles					
Final Product Drumming and Shipping	A-13			1.2			0.8	0.8	
Heated Raw Material Tanks (V-1212, V-1213)	A-13			Negl.					
Mercaptan Addition for T-125	A-13			Negl.					
P2 Acetate Boilout (propyl acetate)	A-13			0.02					0.01
P2 Acetone Boilout	A-13			N/A					
P2 Waste Acetate Loadout	A-13			0.02					
P2 Waste Toluene Loadout	A-13			0.11			0.10	0.10	
P3 Acetone Boilouts (acetone only, no VOC)	A-13			N/A					
R-105 Use as a blend tank for DSX Epi Process	A-13			No volatiles					
T-400 Tank Farm Methanol Cleanout	A-13			0.01			0.01	0.01	
T-600 Tank Farm Methanol Cleanout	A-13			0.01			0.01	0.01	
T902 Poly Epiamine Dilution	A-13			No volatiles					
Wastewater Sludge Dewatering	A-13			Negl.					
A-13 Total				1.37			0.92	0.92	0.01

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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 #
0860-AR-8





## APPENDIX A – EMISSION CHANGES AND FEE CALCULATION

## Fee Calculation for Minor Source

Revised 03-11-16

Facility Name: BASF Corporation

Permit Number: 0860-AR-9

AFIN: 18-00081

			Old Permit	New Permit
\$/ton factor	23.93	Permit Predominant Air Contaminant	83.3	59.4
Minimum Fee \$	400	Net Predominant Air Contaminant Increase	-23.9	
Minimum Initial Fee \$	500			
Check if Administrative Amendment <input type="checkbox"/>		Permit Fee \$	400	
		Annual Chargeable Emissions (tpy)	59.4	

Pollutant (tpy)	Old Permit	New Permit	Change
PM	4.3	4	-0.3
PM <sub>10</sub>	4.3	4	-0.3
PM <sub>2.5</sub>	0	0	0
SO <sub>2</sub>	18.6	12.1	-6.5
VOC	83.3	26.8	-56.5
CO	37.7	30.7	-7
NO <sub>x</sub>	75.5	59.4	-16.1
Acetone	1.9	0	-1.9
Allyl Chloride	0.87	0	-0.87
Epichlorohydrin	0.36	0	-0.36
Methanol	6.87	0	-6.87
Methyl Methacrylate	3.22	0	-3.22
MIBK	0.08	0	-0.08
Toluene	3.07	0	-3.07
MDI	0	0.01	0.01
TDI	0	0.01	0.01
Total HAP	0	11.18	11.18