

STATEMENT OF BASIS

for the issuance of Draft Air Permit # 882-AR-3

1. PERMITTING AUTHORITY:

Arkansas Department of Environmental Quality
8001 National Drive
Post Office Box 8913
Little Rock, Arkansas 72219-8913

2. APPLICANT:

Albemarle Corporation - Magnolia West Plant
1550 Highway 371 West
Magnolia, Arkansas 71754

3. PERMIT WRITER:

Lyndon Poole

4. PROCESS DESCRIPTION AND SIC CODE:

SIC Description: Chemical Manufacturing Plant
SIC Code: 2819, 2869

5. SUBMITTALS: 04/20/99 08/11/99 10/08/99

6. REVIEWER'S NOTES: This permitting action consolidates three modifications:

- 1) A de minimis change (submitted 04/20/99, approved April 23, 1999) authorizing the facility to continue the use of 1,4-dioxane (DEDO) as an alternative reaction solvent in place of isobutanol (IBA) in the Hexabromocyclododecane (HBCD) production facility. This de minimis change also authorized the removal of the permit limit for bromine at SN-HB-08 (a previous permit condition allowed the limit removal if bromine tested below 0.01 lb/hr at this source).
- 2) A proposal submitted 08/11/99 which requested an air permit with coverage under Regulation 19. The previous air permit had been issued under Regulation 18. This permitting action includes applicable requirements from both Arkansas Regulations.
- 3) A de minimis change (submitted 10/08/00, conditionally approved 11/02/00) authorizing the facility to:

- a) Convert the solvent usage in the HBCD process from isobutanol (IBA) to 1,4-dioxane (DEDO).
- b) Remove the carbon beds as a secondary control device on the HBCD process (SN-HB-08).
- c) Replace existing recovered water tank (SN-HB-12) with a new tank.
- d) Remove SN-BP-01, SN-GT-04, and SN-HB-13 from service.
- e) Remove SN-HB-01 as an emission source (emissions will be routed to the HBCD scrubber, SN-HB-08).
- f) Redesignate SN-GT-01, GT-02, SG-05, HB-07, HB-12, HB-14, and HB-15, as well as a new NH₃ and HCl tote be listed as insignificant sources.
- g) Implement an alternative scenario for the flare (SN-SR-01), to account for emergency events.
- h) Add permitted emissions for brine holding tank BD-03.
- i) Implement the following miscellaneous changes approved for Air Permit 882-AR-2:
 - 1) Removal of existing Specific Condition 1 (the General Conditions of the new permit template will address this concern).
 - 2) Change of reporting period end date to May 1, in existing Specific Conditions 11 and 12 (this change was already made in the administrative amendment of 3/16/99).
 - 3) Removal of the phrase "Within 180 days of the issuance of this permit", in any condition where it refers to the commencement of stack testing already begun as per Air Permit 882-AR-2 (the ongoing annual testing requirements will remain).
 - 4) Removal of existing Specific Condition 15. This one-time test has been performed with passing results. The bromine limit removal was approved during the previous de minimis review.
 - 5) Removal of existing Specific Condition 15. This condition lists requirements for the carbon adsorber unit, whose retirement has been approved with this action.
 - 6) Removal of the previous de minimis requirement which limited DEDO application to the times IBA was not in use at SN-HB-08. This de minimis action allows DEDO to be used in place of IBA on a permanent on-going basis.

- 7) Modification of the previous de minimis requirement regarding scrubber liquid temperature at SN-HB-08. The value will be changed from 15 deg C to 10 deg C.
- 8) Modification of the previous de minimis requirement regarding scrubber liquid concentration at SN-HB-08. The maximum allowable DEDO weight percent will be changed from 13 to 6%.
- 9) Removal of the previous de minimis requirement which mandated carbon adsorption control in conjunction with DEDO use. This de minimis action allows removal of the carbon unit.
- 10) Addition of a new specific condition that would provide a daily calculation mechanism to show compliance with short-term DEDO emission limits at SN-HB-08.

As a result of comments submitted on the draft permit, the following conditions were added to the final permit:

- | | |
|-------|---|
| SC 24 | Establishes a weekly observation system for visible emissions. |
| SC 25 | Provides relief from record keeping/monitoring requirements when a source is out of operation. |
| SC 26 | Outlines procedure for new/modified source's operating terms prior to issuance of future modified permits. |
| SC 27 | Provides relief from stack testing if a source has not operated at least 25% of the 12-month period prior to the scheduled test. |
| SC 28 | Restates the Department policy regarding throughput during stack testing. |
| SC 29 | Allows the facility to substitute recent stack test data for an initial test required by this permit, if the surrogate testing event occurs within 6 months prior to permit issuance. |

- 7) **COMPLIANCE STATUS:** The following summarizes the current compliance status of the facility including active/pending enforcement actions and recent compliance activities and issues:

No compliance/enforcement issues outstanding at this time.

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8) APPLICABLE REGULATIONS:

A. Applicability

Did the facility undergo PSD review in this permit (i.e., BACT, Modeling, et cetera) (Y/N) N

Has this facility undergone PSD review in the past (Y/N) N Permit # _____

Is this facility categorized as a major source for PSD? (Y/N) N

\$ 100 tpy and on the list of 28 (100 tpy)? (Y/N) N/A

\$ 250 tpy all other (Y/N) N/A

This facility is not subject to PSD, NSPS, or NESHAP regulations.

9) EMISSION CHANGES:

The following table summarizes plantwide emission changes associated with this permitting action.

Plantwide Permitted Emissions (ton/yr)			
Pollutant	Air Permit 882-AR-2	Air Permit 882-AR-3	Change
PM/PM ₁₀	30.3	30.3	0
SO ₂	97.8	97.8	0
VOC	66.4	37.4	-29
CO	80.8	98.5	17.7
NO _x	98.5	98.5	0
H ₂ S	7.6	7.60	0
Br ₂	14.9	10.80	-4.1
HBr	0.5	0.70	0.20
NH ₃	4.7	4.90	0.20
Cl ₂ (HAP)	3.7	3.90	0.20
HCl (HAP)	0.4	0.40	0

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Plantwide Permitted Emissions (ton/yr)			
Pollutant	Air Permit 882-AR-2	Air Permit 882-AR-3	Change
Ethylene Dichloride (HAP)	0.9	0.90	0
Ethylene Dibromide (HAP)	0.2	0.20	0
Dibromochloropropane (HAP)	0.1	0.01	-0.09
Ethylene Glycol (HAP)	2.7	2.80	0.10
1,4 Dioxane (HAP)	0.0	8.20	8.20

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10) MODELING:

A. Criteria Pollutants

Examination of the source type, location, plot plan, land use, emission parameters, and other available information indicate that modeling is not warranted at this time.

B. Non-Criteria Pollutants

1st Tier Screening (PAER)

Estimated hourly emissions from the following sources were compared to the Presumptively Acceptable Emission Rate (PAER) for each compound. The PAER was deemed by the Department 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?
H ₂ S	13.94	1.5334	1.97	No.
Br ₂	0.66	0.0726	2.60	No.
HBr	9.93	1.0923	0.17	Yes.
NH ₃	17.42	1.9162	1.20	Yes.
Cl ₂ (HAP)	1.45	0.1595	0.91	No.
HCl (HAP)	7.46	0.8206	0.10	Yes.
Ethylene Dichloride (HAP)	40.48	4.4528	0.20	Yes.
Ethylene Dibromide (HAP)	153.7	16.907	0.10	Yes.
Dibromochloropropane (HAP)	0.01*	0.0011	0.01	No.
Ethylene Glycol (HAP)	100	11	0.64	Yes.
1,4 Dioxane (HAP)	73.20	8.06	1.88	Yes.

*No TLV-TWA established for dibromochloropropane. OSHA occupational exposure limit = 1 part per billion = 0.001 part per million = 0.01 mg/m^3 . This is a surrogate screening value. $1/100 = 0.10 \text{ ug}/\text{m}^3$.

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2nd Tier Screening (PAIL)

ISCST3 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 was deemed by the Department to be one one-hundredth of the Threshold Limit Value, as listed by the ACGIH.

Pollutant	(PAIL, $\mu\text{g}/\text{m}^3$) = 1/100 of Threshold Limit Value	Modeled Concentration ($\mu\text{g}/\text{m}^3$)	Pass?
H ₂ S	139.4	50.29	Yes.
Br ₂	6.6	6.30	Yes.
Cl ₂ (HAP)	14.5	2.21	Yes.
Dibromochloropropane (HAP)	0.10	0.06	Yes.

11) 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)
GS-01	Tanks 4.0	-	None	-	No emission limit changes requested.
BR-01	Aspen modeling.	-	Scrubber	98%	No emission limit changes requested.
BR-03	Aspen modeling.	-	Scrubber	98%	No emission limit changes requested.
SR-01	AP-42 (flare)	See AP-42 Table 13.5-1.	None	-	No emission limit changes requested.
SG-01	AP-42 (boiler)	See AP-42 Table 1.4-1 and 1.4-2.	None	-	CO emission limits increased, due to updates in AP-42 factors.

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)
SG-03	AP-42 (boiler)	See AP-42 Table 1.4-1 and 1.4-2.	None	-	CO emission limits increased, due to updates in AP-42 factors.
GT-03	On-site stack test history.	-	Carbon canister.	Not quantified.	DBCP emission limits being lowered to comply with dispersion modeling PAIL. Stack test history indicates new limit of 0.01 lb/hr is appropriate (and conservative).
BD-03	Facility estimate, based upon process analysis.	-	None	-	Facility requests that the "Trace" bromine limit be changed to 0.1 lb/hr and 0.1 ton/yr, as a conservative estimate for bromine, ammonia, VOC, and hydrogen sulfide.
HB-02	Ideal gas calculation.	-	None.	-	No emission limit changes requested
HB-06	Maximum loading.	0.06 gr/ft ³	Baghouse	98%	No emission limit changes requested
HB-08	Aspen modeling.	-	Scrubber	Not quantified.	1,4 Dioxane (DEDO) newly introduced contaminant.
HB-09	Maximum loading.	0.02 gr/ft ³	Baghouse	90%	No emission limit changes requested
PT-01	EPA "Protocol for Equipment Leak Emission Estimates".	-	-	-	Some minor changes requested for fugitive limits.

12. TESTING REQUIREMENTS:

This permit requires stack testing of the following sources.

SN(s)	Pollutant	Test Method	Test Interval	Justification For Test Requirement
Amine Unit	H ₂ S, calculated to SO ₂ .	11	Annual	To confirm amine unit efficiency and resulting emissions at process flare and at NaHS loading stations.
SG-01 SG-02	NO _x CO	7E 10	Annual	Permit limit (bubble) @ 98.5 ton/yr.
GT-03	EDB EDC DBCP	18	Every 5 years.	Toxicity of HAPs involved. Confirmation of dispersion modeling for DBCP.
HB-08	1,4 dioxane	18	Every 5 years.	Toxicity of HAP involved. Confirmation of dispersion modeling. Also a newly introduced contaminant.

13. MONITORING OR CEMS

The following are parameters that must be monitored with CEMs or other monitoring equipment (temperature, pressure differential, etc), frequency of recording and whether records are needed to be included in any annual, semiannual or other reports.

SN	Parameter or Pollutant to be Monitored	Method of Monitoring (CEM, Pressure Gauge, etc)	Frequency*	Report (Y/N)**
SG-01	Fuel inlet flow.	Flow meter.	Continuous.	Yes-SO ₂ , CO and NO _x .
SG-03	Fuel inlet flow.	Flow meter.	Continuous.	Yes-SO ₂ , CO and NO _x .
SR-01	Fuel inlet flow.	Flow meter.	Continuous.	Yes-SO ₂ , CO and NO _x .

SN	Parameter or Pollutant to be Monitored	Method of Monitoring (CEM, Pressure Gauge, etc)	Frequency*	Report (Y/N)**
HB-08	Scrubber recirculating flow rate, scrubber liquid temperature, scrubber liquid concentration.	Flow monitor, temperature gauge, lab analysis.	Twice per day for flow and temperature. Once per day for DEDO concentration.	No.

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

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

14. RECORD KEEPING REQUIREMENTS

The following are items (such as throughput, fuel usage, VOC content of coating, etc) that must be tracked and recorded, frequency of recording and whether records are needed to be included in any annual, semiannual or other reports.

SN	Recorded Item	Limit (as established in permit)	Frequency*	Report (Y/N)**
SR-01 SG-01 SG-03	Purchased gas H ₂ S concentration.	Maximum 6.5 ppm (vol) H ₂ S	As purchased.	No.
SR-01	H ₂ S concentration of sweetened gas and resulting SO ₂ emissions.	22.1 lb/hr SO ₂ emissions.	Once per day.	Yes.
SR-01 SG-01 SG-03	SO ₂ emissions.	0.1 lb/hr SO ₂ , each boiler. 22.1 lb/hr SO ₂ from flare. 3-source bubble: 97.8 ton/yr.	Once per month.	Yes.
SR-01 SG-01 SG-03	NO _x emissions. CO emissions.	See permit for lb/hr limits. 3-source bubble: 98.5 ton/yr, for both NO _x and CO.	Once per month.	Yes.

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SN	Recorded Item	Limit (as established in permit)	Frequency*	Report (Y/N)**
HB-08	Scrubber recirculating flow rate, scrubber liquid temperature, scrubber liquid concentration.	Flow = 9000 lb/hr (min). T = 10 degrees Centigrade (max). Concentration = 6% DEDO (max).	Twice per day for flow and temperature. Once per day for DEDO concentration.	No.
HB-08	Average lb/hr DEDO (1,4 dioxane) emissions.	1.60 lb/hr	Once per day.	No.

* Indicates frequency of recording required for the item (Continuously, hourly, daily, etc.).

** Indicates whether the item needs to be included in reports.

15. OPACITY

SN	Opacity %	Justification (NSPS limit, Dept. Guidance, etc)	Compliance Mechanism (daily observation, weekly, control equipment operation, etc)
BR-01	5%	Department guidance.	Weekly observations.
BR-03	5%	Department guidance.	Weekly observation.
SR-01	20%	Department guidance.	Weekly observation.
SG-01	5%	Department guidance.	Weekly observations.
SG-03	5%	Department guidance.	Weekly observations.
GT-03	10%	Department guidance.	Weekly observations.
BD-03	10%	Department guidance.	Weekly observations.
HB-06	10%	Department guidance.	Weekly observations.
HB-09	10%	Department guidance.	Weekly observations.

16. DELETED CONDITIONS:

The following Specific Conditions were included in the previous permit, but deleted for the current permitting action.

Former SC	Justification for removal
1	Covered in General Condition 17.
15	Bromine limit removed due to stack testing and the allowance stated in this previous condition. New 1,4 dioxane testing replaces VOC test requirement.
17	Carbon adsorbers at HB-08 allowed by new permit to be removed.
18	Deadline for flow meter instrumentation installation has passed. New Specific Condition 21 covers calibration and maintenance requirements for these devices.

17. VOIDED, SUPERSEDED OR SUBSUMED PERMITS

List all active permits for this facility which are voided/superseded/subsumed by issuance of this permit.

Permit #
882-AR-2

18. CONCURRENCE BY:

The following supervisor concurs with the permitting decision:

Thomas Rheaume, P.E.