

MARAMA

Mid-Atlantic Regional Air
Management Association, Inc.

FUMIGATION WORKGROUP FINDINGS

August 22, 2018

Presented by:
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MARAMA

Timeline

March: Pull together Fumigation Workgroup

April: Organize State practices in spreadsheet

May-June: Discussions on State permitting, modeling and control technology

Coordination for States

July-Aug: Develop White Paper to summarize current status



Fumigant Pollutants

	Methyl Bromide	Sulfuryl Fluoride	Phosphine
Classification	VOC, HAP	MD TAP	HAP
US Registration	1961 (used in 1920's)	1959	1999 (but around since the 1780's)
Characteristics	Colorless, Odorless	Colorless, Odorless	Colorless, Garlic/Fish Odor
Impact on Environment	Ozone Depleting Substance (ODS)	Could contribute to Climate Change	unknown
Banned	January 1, 2005	Proposed in 2014, but never happened.	No

Summary of Agency Fumigation Info

State	Fumigation Regulation	Threshold	Boundary / Buffer	Screening Process?	Permit	Fumigant Pollutant	Product(s)
DE	None; Title V	VOC major >25 ton/yr. HAP > 10 ton/yr.	No Minimum, but known source is located ~ 1 mi from residences	AERMOD / limited onsite monitoring	None yet. Complete construction application rec'd 2017		
MD	AQ permit required for > 1 tpy or VOC, HAP or MD TAP	Prohibits VOC > 20 lbs/day unless controlled 85% Must install T-BACT and meet TAP ambient impact requirements	Concentration of the pollutant at the Property Line and beyond must be less than any applicable threshold and risk based screening levels established for each TAP		SO ₂ F ₂ for vehicles exported to Au & NZ Existing, non-permitted MBr source for logs exported to China at the Port of Baltimore has shut down due to inability to comply with VOC/TAP requirements	SF	Vehicles
NJ	None, NJAC 7:27-8.2 (catch all to get fumigators in) plan to develop rules	>50 lb/hr Based on processing rate of materials used	Case by Case basis determination	Level 1 Health Risk Screening Worksheet, then Level 2 Refined Modeling	Twenty five (25) Pending Permit applications	MBr, SF	Lumber, Cocoa Beans, Fruits, Logs, licorice roots
NC	None specific; Synthetic Minor and Title V	SM less than or = 10 tpy Title V > 10 tpy	None. There are currently no setback limitations in the existing permits.	None. Modeling has been conducted using AERMOD for a proposed TV facility.	Synthetic Minor Permits: Five TV Permits: zero (one application in house)	MBr (HAP); Phosphine HAP and TAP; Sulfuryl Fluoride (not HAP or TAP)	Exports: hardwood Oak and S. Yellow Pine Imports: Fruits and Vegetables
PA	PA Code Chapter 128	1.370 lb/hr	200 feet		Macaroni Co. permit	MBr	pasta
PA – PHL	None, AMR VI for ambient MBr	Limits < MBr 2.7 tpy (1.254 lb/hr); Phos 0.0462 lb/hr and 0.0609 tpy		Working on Risk Analysis Policy; Modeling for larger projects.		MBr	
VA	Yes, since 2011 Statute Code of VA: 10.1-1308.01	HAP major (10 tpy); exempt if not HAP major	300 feet buffer or monitor @ property line		4 Syn minor permits issued (logs)	MBr, Phos	logs
WV	None; General Permitting for MBr	HAPs > 2 lb/hr or 5 tpy; max potential					

What should be included in a fumigation permit?

- Facility Name / Location
- Object / Product being fumigated (including size and quantity)
- Type of fumigant (MBr, Phos, SF)
- Method of application (including containment system)
- Fumigation (application) Rate and Quantity
- Frequency and duration of fumigations (Hour/Day/Yr)
- Volume to be fumigated
- Duration of aeration
- Emissions (lb/hr & tpy)
- Control devices, if applicable
- Discharge parameters (i.e., stack ht., flowrate, exit velocity)
- Risk assessment
- Monitoring requirement
- Signage requirements before/during/after fumigation event.
- Recordkeeping after the event - report fumigation activity and actual quantity of fumigant used, along with actual duration of aeration and any controls that may have been used.

NJ Risk Screening Worksheet

NJDEP DIVISION OF AIR QUALITY RISK SCREENING WORKSHEET															
For Long-Term Carcinogenic and Noncarcinogenic Effects and Short-Term Effects															
October 2017															
For source operations emitting air toxics. One worksheet should be completed for each emission point, which should include all air toxics above reporting threshold or for which there is a federally enforceable limit included in an approved permit. Based on the assumptions made when generating the model, the following sources may not use this worksheet: (1) Sources without stacks, such as certain dry cleaners, degreasers, storage tanks, and gasoline stations, (2) sources with stacks with a horizontal or downward discharge direction, or (3) sources with stack heights less than 10 feet. See Technical Manual 1003 Guidance on Preparing a Risk Assessment for Air Contaminant Emissions for a complete list of assumptions. For information on how to evaluate risk from other kinds of sources, contact Air Quality Evaluation at 609-292-6722.															
To see a listing of air toxics by CAS number, click on the "CAS Index" tab at the bottom of this worksheet page.															
This is a protected file. Changes are allowed only to certain cells (those in yellow). It is also a "read only" file. To save the data you input, select "File" on the menu above, then "Save as" in your own files, under the name of your choice. Input data only to yellow fields. Incremental cancer risk (IR) and hazard quotient (HQ) will calculate automatically when you type in the stack parameters (stack height and distance to property line) and an emission rate.															
For references for toxicity data (URFs and RfCs), see the lists at www.nj.gov/dep/aqpp/risk.html .															
Date															
Facility ID No.															
Activity ID No.															
Facility name	EXAMPLE!														
Facility location															
File name (.xls)															
Emission Unit/Batch Process ID No.		Stack height ¹	10.0 ft												
Emission Point ID No.		Distance to property line	20 ft												
Equipment ID No.(s)		Annual air impact value, C'	162.77 (ug/m ³)/(ton/yr)												
Operating Scenario(s)		24-hour air impact value, C' ₂₄	4469.5 (ug/m ³)/(lb/hr)												
KEY:	Long-Term Effects							Short-Term Effects							
	Q = Annual emission rate (in tons per year) C = C' × Q = Annual average ambient air concentration URF = Unit risk factor (for carcinogenic risk) IR = C × URF = Incremental risk (for carcinogen) RfC = Reference concentration (for noncarcinogenic effects) HQ = C/RfC = Hazard quotient (for noncarcinogenic risk) Rslt = The result of comparing the IR or HQ to the negligible threshold (FER if > threshold, Negl. if <= threshold) FER = Further Evaluation Required (See Notes for thresholds) Negl. = Negligible (See Notes for thresholds)							Q_h = Hourly emission rate (in pounds per hour) C₂₄ = C' × Q _h = Short-term average ambient air concentration RfC₂₄ = Short-term reference concentration (for noncarcinogenic effects) HQ₂₄ = C ₂₄ /RfC ₂₄ = Hazard quotient for short-term noncarcinogenic effects Rslt = The result of comparing the HQ ₂₄ to the negligible threshold (FER if > threshold, Negl. if <= threshold) FER = Further Evaluation Required (See Notes for thresholds) Negl. = Negligible (See Notes for thresholds)							
¹ When evaluating risk for diesel engines, use the equivalent stack height consistent with the memo dated June 10, 2009. Click here to view the "Stack Height Equivalents for Use in First Level Screening Analyses for Diesel Engines" memo.															
EXAMPLE!															
			LONG-TERM EFFECTS					SHORT-TERM EFFECTS							
H A P	CAS No.	Air Toxic	Q (ton/yr)	C (ug/m ³)	URF [(ug/m ³) ⁻¹]	IR	Rslt	RfC (ug/m ³)	HQ	Rslt	Q _h (lb/yr)	C ₂₄ (ug/m ³)	RfC ₂₄ (ug/m ³)	HQ ₂₄	Rslt
1	*	75070 Acetaldehyde			2.2E-06			9						470	
2	*	60355 Acetamide			2.0E-05										
3	*	67641 Acetone						31000						62000	
4	*	75865 Acetone cyanohydrin						2							
.....															
150	*	Lead			1.2E-05									0.1	
151	*	108316 Maleic anhydride						0.7							
152	*	Manganese						0.05						0.17	
153	*	Mercury (elemental)						0.3							
154	*	7439976 Mercury (inorganic)						0.03						0.6	
155	*	126987 Methacrylonitrile						0.7							
156	*	67561 Methanol						4000						28000	
157	*	74839 Methyl bromide	1.0E+00	1.6E+02				5	3.3E+01	FER	3.0E+00	33521.3	3900	8.6E+00	FER
158	*	74873 Methyl chloride			1.8E-06			90							
159	*	71556 Methyl chloroform						1000						9000	
160	*	78933 Methyl ethyl ketone						5000						13000	
161	*	108101 Methyl isobutyl ketone												3000	
162	*	624839 Methyl isocyanate						1							

Fumigation Control Technology & Alternative Fumigants

- Nordiko (Australia)
- Value Recovery (New Jersey)
- Linde Group (Germany)
- Spectros Instruments (Boston)
 - Mebrom Gas Destruction Technology (Australia)
- Others?

Potential Solutions to Consider

CONSISTENCY

- Regulations / Policies to be consistent between states (State & Federal Rulemaking)
- Good Fumigation Practices: Use least toxic fumigant, for a short time period and long aeration time.
- Agencies should take a proactive approach when issuing air permits by providing Stakeholder Outreach events

Potential Solutions to Consider

EPA / FEDERAL AGENCY INVOLVEMENT

- 112 (c) MACT source category for fumigation
- Alternative fumigants usage:
 - e.g., go to USDA to get approval for ethyl formate – approved in other countries, but not in US

Potential Solutions to Consider

TECHNICAL APPROACH

- Control Technologies & Industry Cooperation
- Dispersion modeling, Risk Mitigation, Raise Stacks, ...
- Monitoring Data
- Testing procedures
- Review of any verification / testing of permitted sources

Next Steps / Recommendations

- ✓ Letter from MARAMA to EPA on MACT Fumigation Category
- ✓ Ongoing quarterly engagement via MARAMA fumigation workgroup to:
 - ✓ Develop consistency among the agencies, including components within the permit.
 - ✓ Continue research of fumigation practices / controls

A big thank you to the Fumigation Workgroup!!



Questions?



Thank you.