Proposed Amended Rule 1168 – Adhesive and Sealant Applications

Working Group Meeting #2

April 12, 2022, 10:00 AM (PST)

Join zoom meeting:
https://scaqmd.zoom.us/j/98766362611
Meeting ID: 987 6636 2611

Agenda

- Background
- Progress since Working Group Meeting #1
- Rule Development Process
- Technology Assessment
- Exempt Solvents
- Next Steps
- Staff Contact Information

Progress Since Working Group Meeting #1

Progress of Rule Development

Summary of working group meeting #1 (02/11/2022)

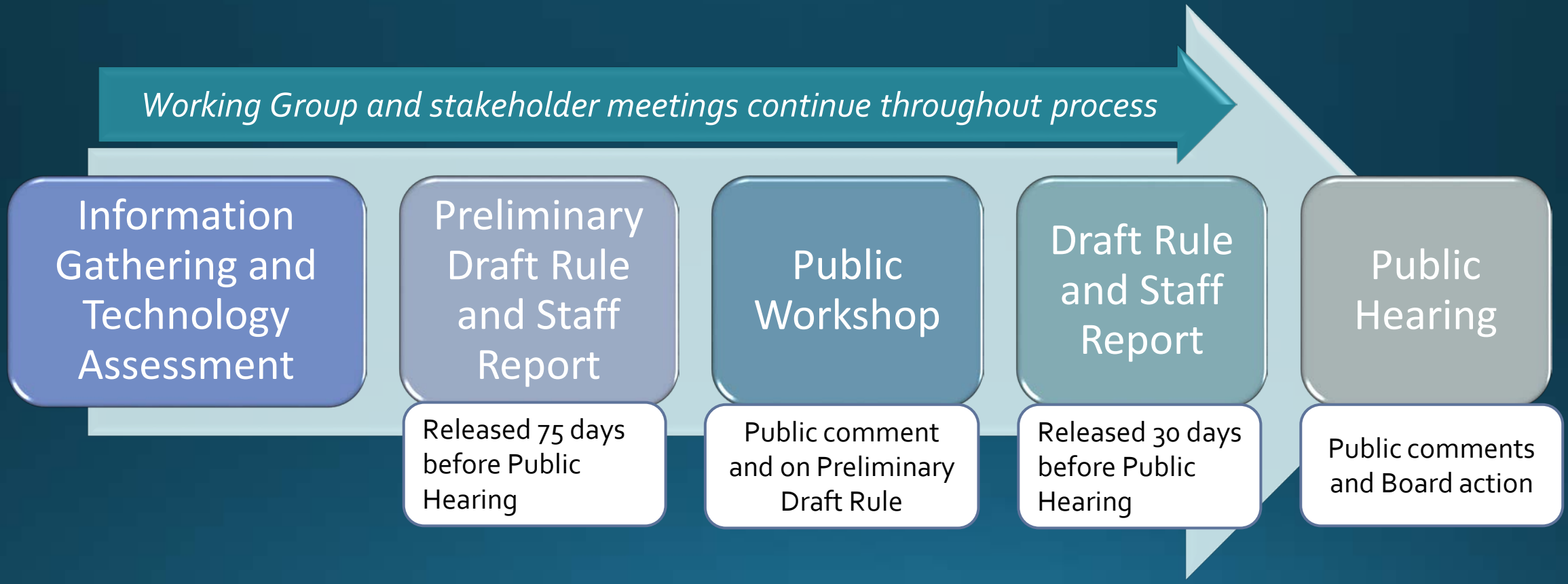
- Provided a background on Rule 1168 – Adhesive and Sealant Applications
- Preliminary technology assessment based on 2017 and 2018 Quantity and Emission Reports (QER) for 10 categories of adhesives and sealants
- Concluded a rule amendment is required to address implementation schedule for certain future effective limits

Since last working group meeting

- Staff continued meeting with stakeholders and trade groups
- Conducted a survey on exempt solvent usage

Rule Development Process

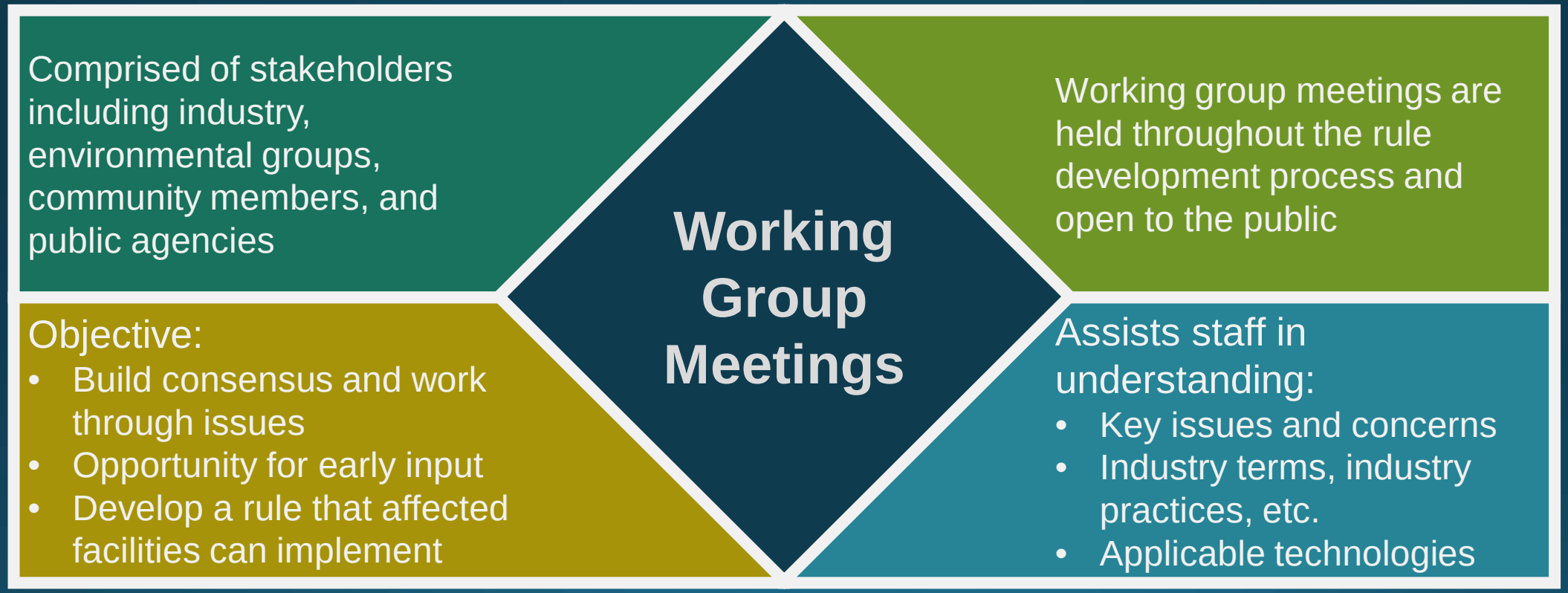
Rule Development Process



Information Gathering and Technology Assessment For PAR 1168

- Staff uses data from various sources to perform technology assessment

PAR 1168 Working Group Meetings



Stakeholders Input

- Stakeholders can provide input during working group meetings and rulemaking process
- Early input is strongly encouraged to help develop proposed rule amendments and to address issues
- Working Group Meetings, Individual Meetings, and Site Visits allow stakeholders to dialogue directly with staff and discuss individual issues

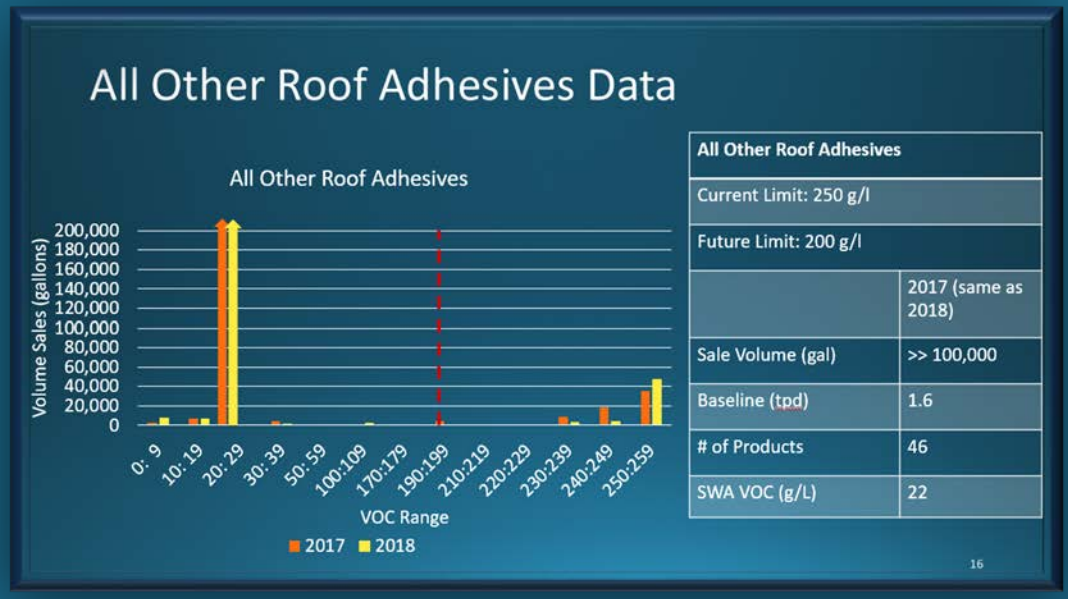
Technology Assessment

Technology Assessment

Roofing Adhesive and Sealants

Background on Roofing Adhesive and Sealants

- Technical assessment will evaluate if further sub-categorization of the Roofing Adhesives and Sealants category is needed
- Staff's preliminary assessment was to break-up the "All Other Roof Adhesives" category into further subcategories
  - Address the large volume of low-VOC products
- Staff found two types of low-VOC products in this category



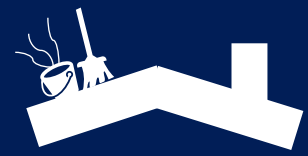
All Other Roof Adhesives	
Current Limit: 250 g/l	
Future Limit: 200 g/l	
	2017 (same as 2018)
Sale Volume (gal)	>> 100,000
Baseline (tpd)	1.6
# of Products	46
SWA VOC (g/L)	22

Slide from Working Group Meeting #1

Roofing Industry feedback

- Staff met with roofing representatives of asphalt and non-asphaltic adhesives and sealants
  - Asphaltic roofing adhesives can be very low-VOC but some are still formulated with solvents
  - Non-asphaltic adhesives representatives mainly concerned with meeting future limits because of the potential loss of pCBtF

Asphalt Roofing Industry Feedback



- Stakeholders expressed concerns on staff's preliminary proposal to create an "asphalt-based roofing adhesive" category with a VOC limit less than 30 g/L

VOC Levels > 200 g/L

"Cold adhesives" or "mastics" cannot meet the 30 g/L VOC limit

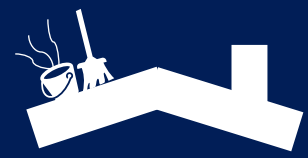
They consist of a mixture of asphalt, solvents, fibers, clay and/or calcium carbonate fillers

Other type is 100% asphalt adhesives that contain no added solvent can meet 30 g/L VOC limit

- Used to manufacture two-ply roofing shingles and for built up roofing applications (hot mop)

VOC Levels < 30 g/L

Preliminary Recommendation on Asphalt Adhesive Categorization



- Staff found two low-VOC products in this category:

Two ply laminate sheet/shingles

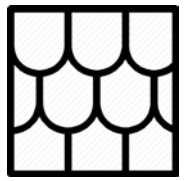
- Laminate shingles are also known as “laminated architectural” or just “architectural” shingles

Built-up Roofing Asphalt (BURA)

- ARMA defines a built-up roofing system as a roof where multiple layers of asphalt is alternated with ply sheets (felts) applied over the roof deck (vapor retarder)
- In the United States, BURA should meet the current version of ASTM D312
- ASTM D312 defines four types of roofing BURA (Types I, II, III, and IV)
- Used in low slope applications

Preliminary Definitions

- Preliminary definitions for the low-VOC asphalt adhesives



TWO PLY LAMINATE SHEET/SHINGLE ADHESIVE means an asphalt-based adhesive used to adhere laminate sheets or shingles when manufacturing two-ply laminate sheets or shingles

BUILT-UP ROOFING ASPHALT ADHESIVE means a solid asphalt adhesive that must be heated in order to be applied

Consider establishing the VOC limit at 30 g/L

Note: Rule 1168 will retain the “Other Asphalt Adhesives” categories for the higher-VOC products

Roofing Industry Feedback
Non-Asphalt Adhesives and Sealants

Feedback on the use of para-Chlorobenzotrifluoride (pCBtF)

- Stakeholders indicated there are a considerable number of non-asphalt roofing products that are formulated with pCBtF to meet VOC limits
- Manufacturers were hesitant to reformulate to meet the 2023 VOC limits due to uncertainty regarding the exempt status of pCBtF
- Requested South Coast AQMD consider a limited exemption for outdoor applications where exposures is lower

Staff Response

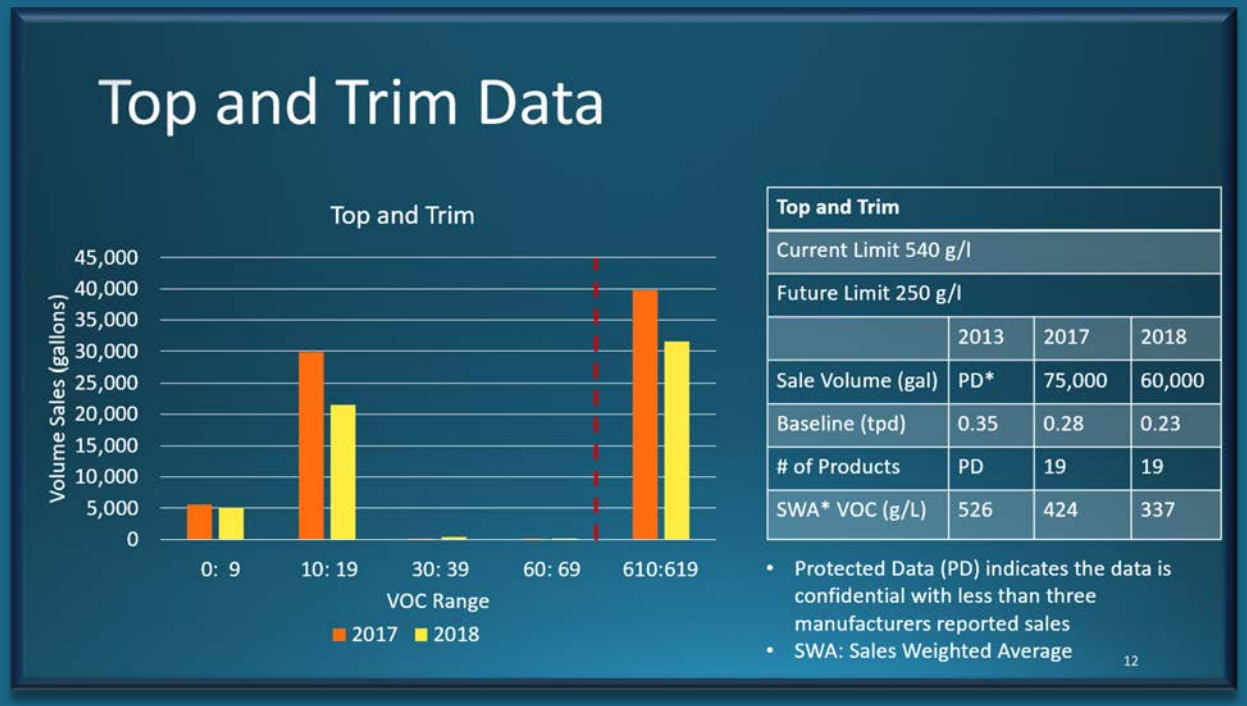
- Staff understands the time and expense that reformulations entails
- Staff has been directed by the Governing Board to remove the VOC exempt status of pCBtF
- Staff will discuss the potential exposure from roofing applications later in this presentation

Technology Assessment

Top and Trim

Top and Trim Background

- During the first WGM, staff's Initial assessment was that 250 g/L limit is feasible because:
  - Higher VOC products were successfully phased out in 2019
  - Sales of low-VOC products increased



Slide from Working Group Meeting #1

Top and Trim Industry feedback

- Staff met with Top and Trim industry stakeholders
  - February 18, 2022 – Adhesive Solutions
  - March 23, 2022 – DAP

Removing the 55-gallon facility exemption successfully eliminated the use of high-VOC products (>600 g/L products)

Reformulating to the current 540 g/L was successful

- Supply chain issues and price spikes have creating challenges

Reformulating to 250 g/L has not yet been successful

- Products do not perform to the necessary standards
- Adhesive works well with flat areas, challenging with contoured areas (e.g., seats)
- Manufacturers still see a potential to reformulate to 250 g/L but need more time
  - Requested a delay of between 3 to 5 years

Top and Trim Considerations

- Staff has been working with industry for 15 years to achieve lower emissions for Top and Trip adhesives

Since 2007

- Rule 1168 required a future effective VOC limit of 250 g/L
- Technical challenges prevented reformulations

2007 - 2019

- The 55 gallon/year exemption allowed very high VOC top and trim products to be sold (>600 g/L)

After 2019

- Products complying with the 540 g/L VOC have been commercialized, resulting in VOC emission reductions

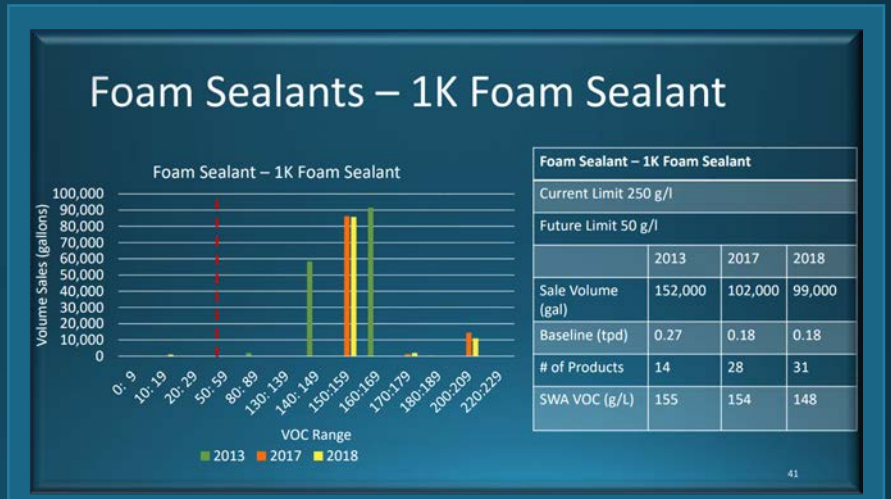
- Based on stakeholder feedback, staff considering retaining the 250 g/L limit with a delayed effective date

Technology Assessment

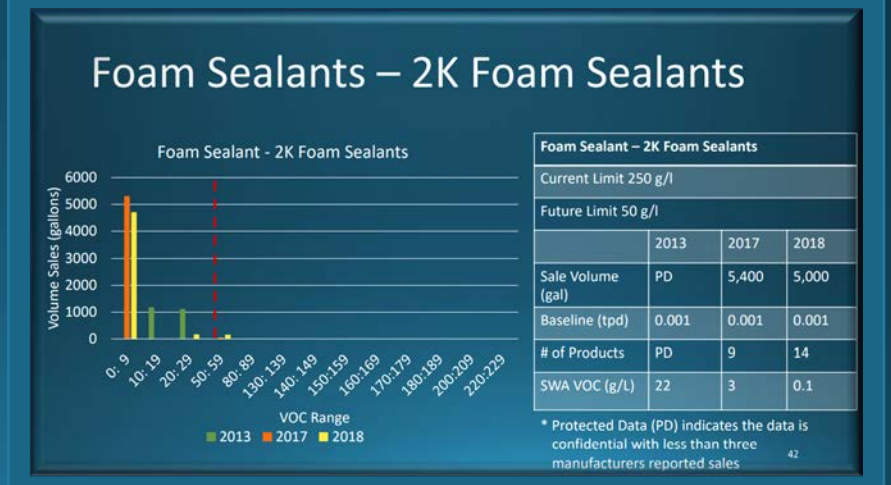
Foam Sealants

Foam Sealant Background

- Stakeholders requested further subcategorization of the foam sealant category
- Staff evaluated one and two component foam sealants in the QER data
  - Most two component sealants are formulated below 50 g/L
  - One component foam sealants exceed 50 g/L
- Staff intends to:
  - Create foam sealant subcategories and establish appropriate VOC limits
  - Allow time for manufacturers to reformulate and to meet proposed VOC limit
  - Work with CARB and EPA on metric used to regulate foam products (g/L or weight percent)



Foam Sealant – 1K Foam Sealant			
Current Limit 250 g/l			
Future Limit 50 g/l			
	2013	2017	2018
Sale Volume (gal)	152,000	102,000	99,000
Baseline (tpd)	0.27	0.18	0.18
# of Products	14	28	31
SWA VOC (g/L)	155	154	148



Foam Sealant – 2K Foam Sealants			
Current Limit 250 g/l			
Future Limit 50 g/l			
	2013	2017	2018
Sale Volume (gal)	PD	5,400	5,000
Baseline (tpd)	0.001	0.001	0.001
# of Products	PD	9	14
SWA VOC (g/L)	22	3	0.1

Slides from Working Group Meeting #1

Potential Foam Product Subcategorizations

- Staff is considering several options for subcategories and seeking further feedback
  - Should the sealants be separated based on one or two component or high and low pressure?
  - Should Rule 1168 include categories for foam adhesives?
  - Should there be a separate category for handheld products?
- Stakeholders recommended staff consider using the EPA definitions

EPA Categorization on Spray Foam

Two-Component High Pressure

- Pressurized 800–1600 psi
- Sold in 2-part pressurized containers
- Sprayed in the field for air sealing of buildings and in roofing applications
- Applied in situ using high-pressure pumps to propel the components
- May use liquid blowing agents without additional propellant

Two-Component Low Pressure

- Pressurized less than 250 psi
- Sold in 2-part pressurized containers
- Sprayed in the field to air sealing of buildings
- Typically applied in situ relying upon a gaseous foam blowing agent that also serves as a propellant
- Pumps typically are not needed

One Component Foam (OCF)

- Packaged in aerosol cans
- Applied in situ using a gaseous foam blowing agent that is also the propellant for the aerosol formulation

Technology Assessment

Plastic Welding Cement

Feedback From Plastic Welding Cement Manufacturers

- Some manufacturers have reformulated most of their products to meet January 1, 2023 future effective VOC limit
- Some manufacturers stated they need more time to reformulate and test products
- Consensus that there are technical challenges and high cost associated with reformulating solvent cement for CPVC used in “life saving systems”
- Staff is continuing discussions with manufacturers and will perform shelf surveys to assess the availability of compliant products

CPVC Subcategorization

- Staff is considering creating a subcategory for “CPVC Welding Cement for Life Saving Systems”

Initial Suggested Definition	
CPVC WELDING CEMENT FOR LIFE SAVING SYSTEM means Plastic Welding Cement with an increased resistance to high temperatures which is used for Life Saving Systems, including standalone and multipurpose fire sprinkler systems.	
Potential VOC limits: Maintain the 490 g/L limit Staff will evaluate the potential foregone emissions	Rule 1168 may require specific labeling requirements to distinguish these products from the lower-VOC CPVC cements

Exempt Solvents

t-BAc and pCBtF

Background on tBAc and pCBtF

1994

- U.S. EPA exempted para-Chlorobenzotrifluoride (pCBtF)

2014

- South Coast AQMD added pCBtF as an exempt VOC compound in Rule 102

2016

- Rule 1113 amendment included a resolution that directed staff to review the exemption for t-Butyl Acetate (t-BAc) due to renewed toxicity concerns

2017

- OEHHA finalized their t-BAc assessment, concluding it had a higher cancer potency than previously estimated

2018

- Staff presented preliminary t-BAc assessment and summary on pCBtF to Stationary Source Committee which directed staff to:
  - Remove existing t-BAc exemption in Rules 1113 and 1151 when rules are amended
  - Request OEHHA review the potential toxicity of pCBtF and remove the exemption, as resources allow, if pCBtF is deemed a potential carcinogen

2020

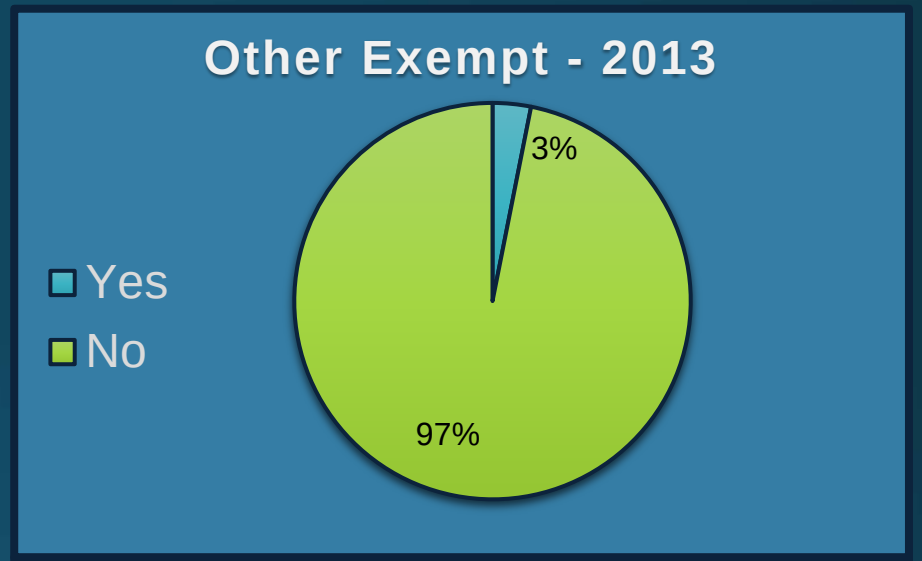
- pCBtF Hot Spots cancer inhalation unit risk factor document was adopted by OEHHA which indicated pCBtF is a potential carcinogen

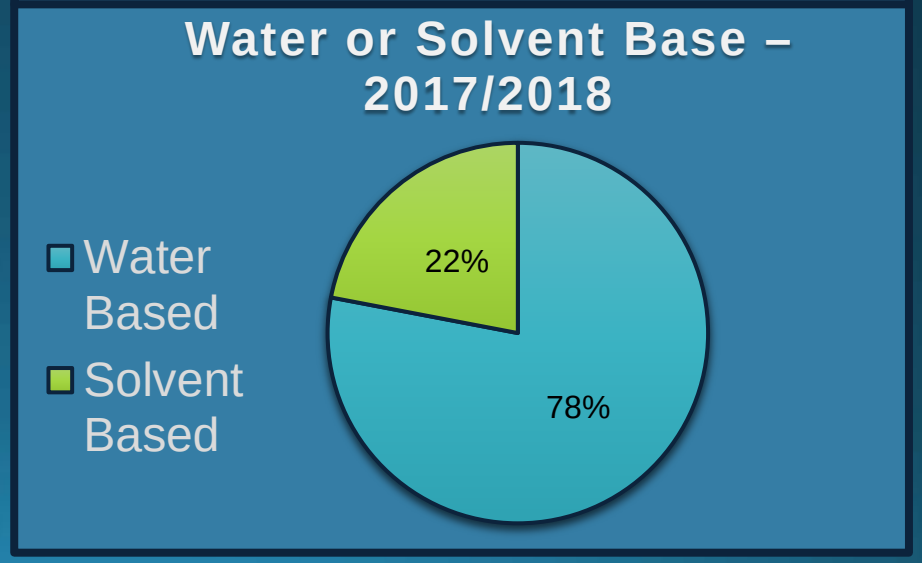
Exempt Solvents

Use of t-BAc and pCBtF based on Survey Results

pCBtF and t-BAc Usage

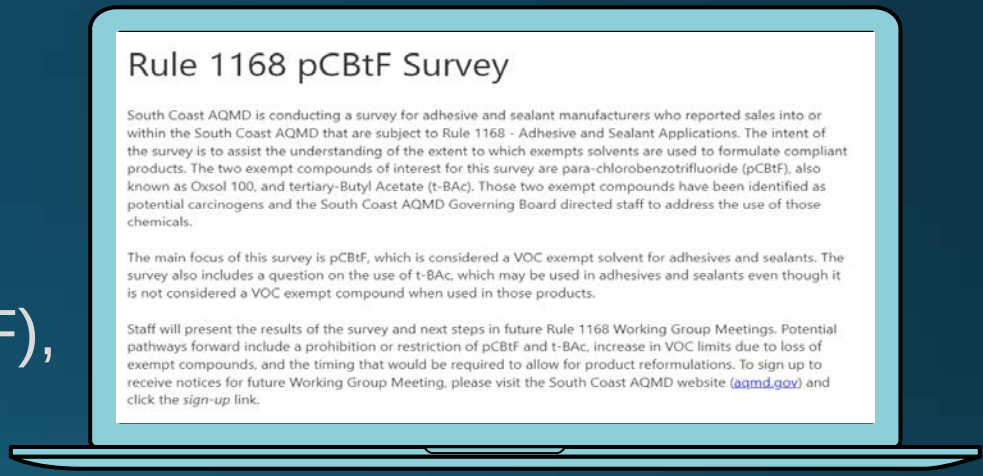
- During the 2013 survey, staff asked if the product is classified as “other exempt,” which would include pCBtF
  - Only 3% of the reported products were other exempt
- In 2017-2018 survey, 78% of the products reported were waterborne and 22% were solvent based
  - pCBtF and t-BAc are not compatible with waterborne systems
- Preliminary data suggests pCBtF and t-BAc are not used to a great extend in adhesives and sealants



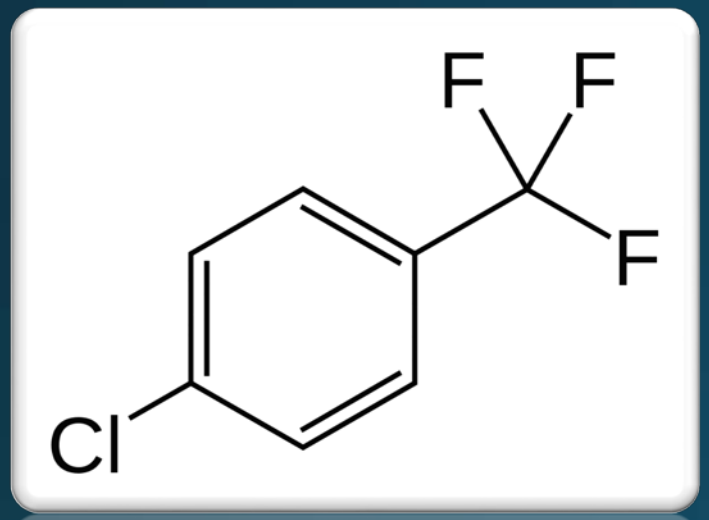


pCBtF Survey

- Staff conducted a survey in February 2022 for adhesive and sealant manufacturers who reported sales into or within the South Coast AQMD
- The intent of the survey was to assist the understanding of the extent to which exempts solvents are used to formulate compliant products
  - The two exempt compounds of interest for this survey were para-chlorobenzotrifluoride (pCBtF), also known as Oxsol 100, and tertiary-Butyl Acetate (t-BAc)
- The focus of this survey was pCBtF, which is considered a VOC exempt solvent for adhesives and sealants



Survey Overview

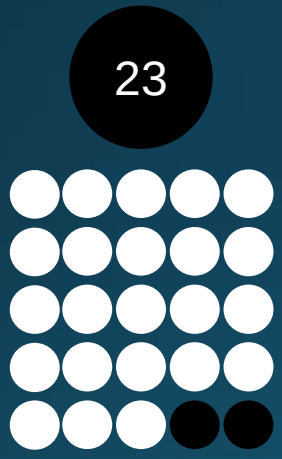


pCBtF

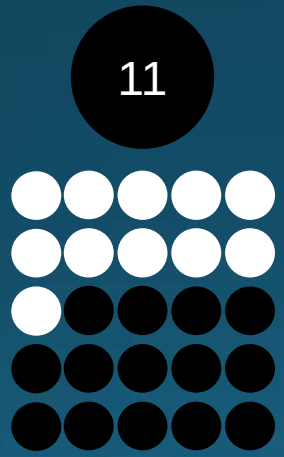
Question	Requested Information
1.	Company name, contact person, and an email address
2.	Do you sell adhesives or sealants into or within the South Coast AQMD?
3.	Do any of the adhesives or sealants sold into or within the South Coast AQMD contain para-chlorobenzotrifluoride (pCBtF), also know as Oxsol 100?
4.	Information regarding general adhesives or sealants categories include pCBtF
5.	Describing the product if the category is any other adhesive or sealant in above question, or if the product category was not listed in the survey
6.	The approximate weight percent of pCBtF in formulations
7.	Alternative products that do not contain pCBtF that could replace the pCBtF adhesives or sealants
8.	If the alternate products comply with the Rule 1168 VOC limits
9.	Do any of the adhesives or sealants sold into or within the South Coast AQMD contain tertiary-Butyl Acetate (tBAc)?

Survey Preliminary Results

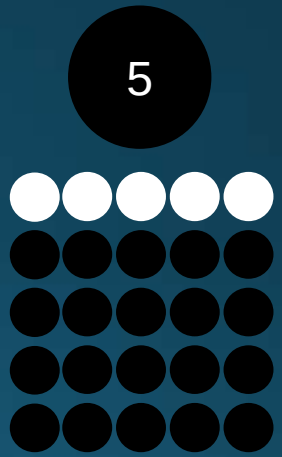
- 25 manufacturer responded to the survey
- Most reported pCBtF range for these categories was between 4% to 25%
  - Staff will follow up with all 11 manufacturers for more detailed information
  - Five manufacturer reported they have alternatives for pCBtF
- Categories using pCBtF: Architectural Adhesive and Sealants, Roofing Adhesive and Sealants, Adhesive and Sealant Primers, Any Other Adhesive, Any Other Sealant, Flooring Adhesive



Survey Question 2
Do you sell adhesive or Sealants into or within the South Coast AQMD?



Survey Question 3
Do any of the adhesive or Sealants sold into or within the South Coast AQMD contain pCBtF which is also known as Oxsol 100?



Survey Question 9
Do any of the adhesive or Sealants sold into or within the South Coast AQMD contain t-BAc?

Preliminary Conclusions

Preliminary Conclusion on pCBtF

- Staff will assess specific categories the manufacturers reported using pCBtF
  - Reach out to manufacturers for additional details
  - Determine the market share of products using pCBtF
- Staff will evaluate next steps

Exempt Solvents

t-BAc and pCBtF in Roofing Applications

Risk Assessment for the use of pCBtF in Roofing Products

- Roofing manufacturers indicated they rely on pCBtF to meet Rule 1168 VOC limits
- Requested staff consider allowing the continued use for pCBtF for roofing applications
  - Roofing applications occur outside reducing potential exposure
- Staff will rely on previous t-BAc assessments to evaluate risks:

2017 t-BAc White Paper

- Focused on existing limited exemption for automotive and industrial maintenance coatings

Risk assessment of potential t-BAc use in roofing adhesives

- Stakeholders request an exemption for t-BAc during 2017 amendment
- Staff evaluated the potential risk associated with t-BAc usage

Assessment of the Risk of t-BAc in Industrial Maintenance and Automotive Coatings

- Due to toxicity concerns, staff reviewed the limited VOC exemption for t-BAc when used in certain automotive coatings and industrial maintenance (IM) coatings in 2017 t-BAc white paper

	Automotive Coatings	IM Coatings
Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$	$6.7 * 10^{-3}$	$6.7 * 10^{-3}$
Risk Factor (in one million)	17(1)	3.8(1)
Acute Hazard Index (HI) (non-cancer)	$5.11 * 10^{-3}$	0.4
(1) HI less than 1 shows no risk; as HI becomes higher than 1 the risk increases		

Finding summarized in draft White Paper (link here)

- Staff presented the results to the Stationary Source Committee
  - Recommended removing VOC exemption for tBAc and requesting OEHHA assess the potential toxicity of pCBtF

Assessment of Acute Offsite Risk for the use of t-BAc in Roofing Applications

- During the 2017 rule amendment, staff assessed the health risks associated with potential t-BAc usage in roofing products using the following assumptions:

Offsite receptors only exposed to acute effects; adhesives are not continually applied to the same roof, so chronic exposure not evaluated

Concentrations estimated by air dispersion modeling

Usage estimated at 500 gal/day for 10,000 ft^2 area elevated at 35 feet

Receptor located at a 25-meter distance

	Toxic Air Contaminant	Acute Hazard Index
Baseline	0.5% Ethylbenzene,10% Toluene and Hexane, 5% Methyl Ethyl Ketone (MEK)	0.9
Future	50% t-BAc	17

Based on the assessment staff decided not to exempt t-BAc in Rule 1168

OEHHA t-BAc and pCBtF risk factors

- California Office of Environmental Health Hazard Assessment (OEHHA) implements Proposition 65 and compiles the list of substances that cause cancer or reproductive harm
  - OEHHA also provides risk assessments reports
  - 2015 and 2018 t-BAc and 2020 pCBtF reports includes Inhalation Slope Factor (ISF) which is the same factor as previous Cancer Potency Factor (CPF)

Report	ISF (CPF) $(mg/kg\text{-}day)^{-1}$
Draft OEHAA t-BAc (2015)	$6.7 * 10^{-3}$
Final OEHAA t-BAc (2018)	$5.0 * 10^{-3}$
Final OEHAA pCBtF (2020)	$3.0 * 10^{-2}$

Consideration for pCBtF in roofing

RCMA asked staff to consider limited exemption for roofing adhesives

t-BAc toxicity was assessed for a roofing project and Acute HI was calculated to be 17

Rule 1401 – New Source Review of Toxic Air Contaminants limits Acute HI of new projects to less than 1

Cancer Potency Factor for pCBtF is considerably higher than for t-BAc

Staff concludes a limited VOC exemption for roofing should not be allowed

Exempt Solvents

Opteon 1100

Background on Opteon 1100

2017

- Chemours reached out the South Coast AQMD regarding a possible VOC exemption for Opteon 1100 (HFO-1336mzz-Z, CAS number 692–49–9)
- South Coast AQMD does not exempt a compound unless it is exempted by the U.S. EPA

2019

- U.S. EPA revised the regulatory definition of VOC to exempt Opteon 1100 due to negligible contribution to the formation of tropospheric ozone
- Opteon 1100 is listed as an acceptable substitute by the U.S. EPA under the Significant New Alternatives Policy (SNAP) program for:
  - Foam Blowing Agents, Refrigeration and Air Conditioning, Cleaning Solvents, and Aerosol Solvent

2020

- South Coast AQMD reviewed available toxicology data for Opteon 1100 and did not find anything of concern

Preliminary Assessment on Opteon 1100

- Opteon 1100 could be used as a foam blowing agent for foam products to meet the future effective VOC limits
- Staff would have to evaluate the technical feasibility and cost-effectiveness

- Due to toxicity concerns of existing exempt compounds, staff prefers limited case-by-case exemptions
- Rule 1168 could include a limited exemption for foam sealants and foam insulation

- South Coast AQMD has a history of exempting HFOs as replacements for compounds with higher global warming potential
- Similar approach could be considered for HFOs that could replace compounds with higher photochemical reactivity

Next Steps

Continue Individual Meetings with Manufacturers

Seeking feedback on progress towards meetings future effective VOC limits

Continue to Review Existing Products in the Market

Evaluate availability of future compliant products

Continue Rule Amendment

Report on initial findings and continue discussions

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